

Vegetation Classification of Alliances and Associations in Alameda and Contra Costa Counties, California



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Photos on Cover:

Top Left: Distant *Aesculus californica* Forest & Woodland Alliance at Lake Del Valle, Alameda County (photo by Mark Bibbo)

Top Right: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance at Sycamore Grove Park, Alameda County (photo by Rebecca Wynd)

Bottom Left: *Prunus ilicifolia* – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance at Point Molate, Contra Costa County (photo by Mark Bibbo)

Bottom Right: *Sesuvium verrucosum* Herbaceous Alliance at Brushy Peak Regional Preserve, Contra Costa County (photo by Erin McDermott)

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Abstract

This report includes approximately 120 alliances and 280 associations that occur in Alameda and Contra Costa Counties, California, comprising the most comprehensive local vegetation classification to date. The vegetation types were defined using a standardized classification approach consistent with the Survey of California Vegetation (SCV) and the United States National Vegetation Classification (USNVC) system. This floristic classification forms the basis for an integrated, two-county vegetation map supported through a collaboration by California State Coastal Conservancy (SCC), East Bay Regional Park District (EBRPD), and Tukman Geospatial LLC. Vegetation ecologists from the California Native Plant Society (CNPS) analyzed vegetation data from over 2,600 field surveys collected between 1992 and 2024. The data included over 500 new surveys collected in 2022 and 2023, and 100 additional grassland surveys in 2024, in association with this classification effort. Additional surveys were compiled for the analysis from previous sampling efforts in Alameda and Contra Costa Counties (560), and from adjacent counties within the same ecoregion subsections (1,460) to provide a broad, regional understanding. A total of 29 tree-overstory, 38 shrubland, and 56 herbaceous alliances are described, with 93 tree-overstory, 66 shrubland, and 124 herbaceous associations.

The report results include Alliance-level summary tables of the classification results from Alameda and Contra Costa counties, along with supporting data from surrounding counties for uncommon types. Appendices include a floristic field key of vegetation types, a table of vegetation types nested within the USNVC hierarchy, and descriptions of each vegetation alliance and association. The descriptions contain stand tables which summarize structural and plant species cover data for each type; stand tables serve as a reference for the expression of vegetation, as well as plant palettes for future restoration efforts in the region.

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Introduction

Ecological Setting

Alameda and Contra Costa counties generally occupy the East Bay region, which is to the east of San Francisco Bay and to the south of San Pablo Bay, Suisun Bay, and the San Joaquin River. The Alameda County shoreline stretches from the city of Albany across from the Golden Gate opening of San Francisco Bay down the full length of the bay about 60 km (37 miles). The Contra Costa County shoreline is primarily its northern boundary where it borders San Pablo Bay, through the Carquinez Strait, and into the Sacramento - San Joaquin River Delta, which also extends along the eastern boundary of the county.

Both counties include portions of 3 ecoregion sections: the Central California Coast, the Coast Ranges, and the Great Valley. The majority of Contra Costa County is within the Central California Coast section, and its largest subsection is the East Bay Hills – Mount Diablo subsection (see Figure 1), which stretches from the bayside alluvial plain up to the peak of Mount Diablo, over 1,100 m elevation (3,800 ft). The total land area for Contra Costa is about 185,000 hectares (450,000 acres). Alameda is slightly larger at about 190,000 hectares (470,000 acres). Alameda also has a large portion of its land area with the Central California Coast ecoregion section, but most of its area is within the Coast Ranges and its largest subsection is the Fremont – Livermore Hills and Valleys (Goudey and Smith 1997). The Diablo Range within Alameda County rises to the same elevation as Mt. Diablo.

Both counties contain large urban and agricultural areas, though the East Bay Regional Park District (EBRPD) manages 125,000 acres of parkland of which 88 km (55 miles) is shoreline (EBRPD 2024; <https://www.ebparks.org/about-us>), comprising greater than 10% of the land area of the two counties. Protected areas (GreenInfo Network 2020) make up approximately 280,000 acres or about 30% of the land area. The region has undergone extensive modification since the early 1800's, though native plant communities such as sycamore alluvial woodland, alkali meadows and wetlands, and vernal pools are still supported in the alluvial plains of the Alameda Creek watershed which stretches from Livermore, through Niles Canyon, to the SF Bay (Stanford et al. 2013). Over 4,000 acres of alkali soils are found in east Alameda County, which supports both grasslands and wetlands (ICF International 2010), including the Springtown Alkali Sink in the Livermore Valley (Coats et al. 1989). Alkali soils are high pH due to the presence of sodium carbonate or other salts. Sargent Cypress woodland is known from Cedar Mountain in east Alameda County (ICF International 2010). In northeastern Contra Costa County, there was an area of dense interior dune scrub of about 2,800 acres (Stanford et al. 2011) of which only remnants now exist. East Contra Costa County contains a

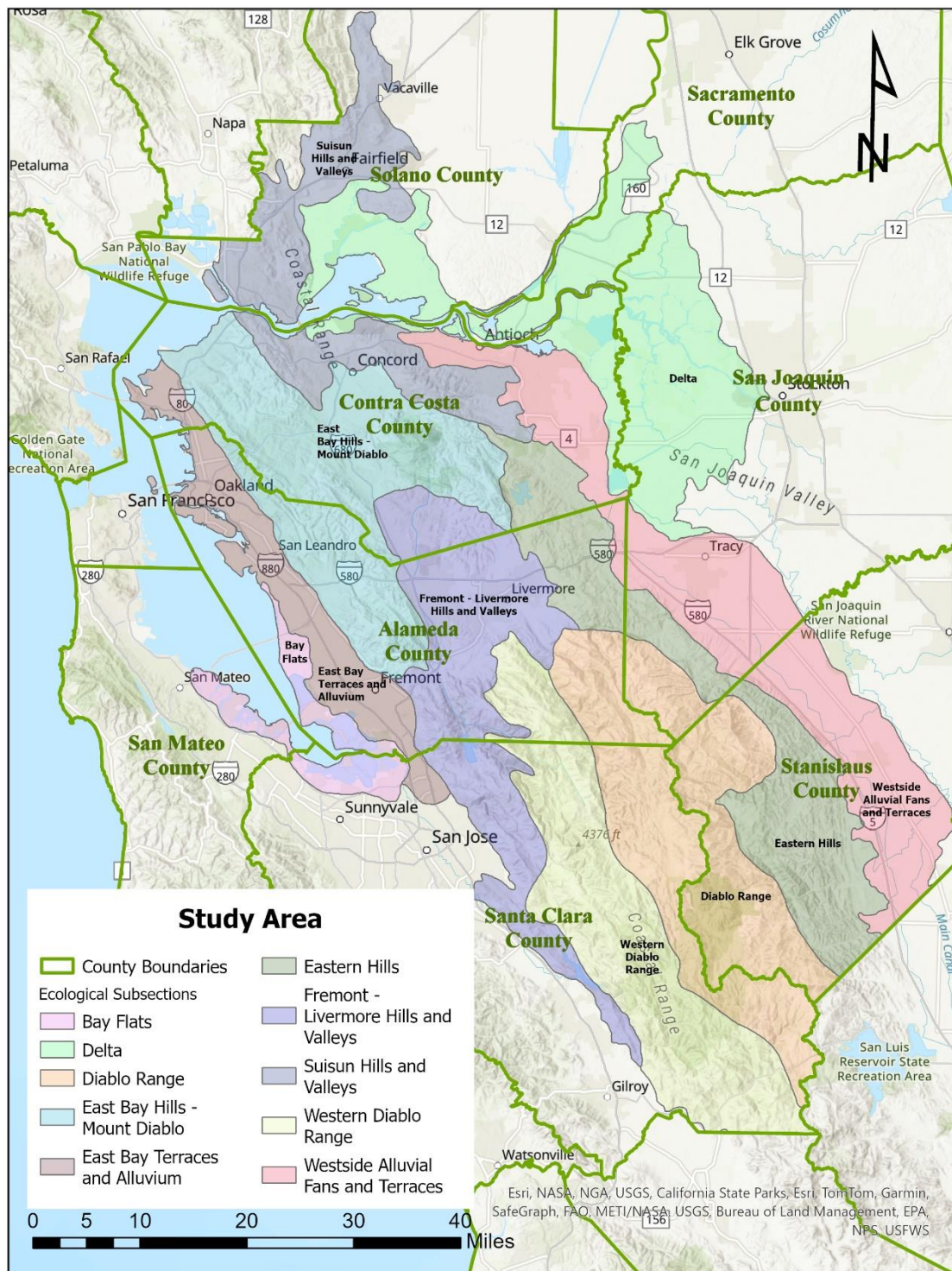


Figure 1. Ecological subsections as defined by USDA in Alameda, Contra Costa, and adjacent counties. These units divide the counties into regions and are noted as sample locations in the vegetation descriptions.

disproportionately high amount of the state's biodiversity, according to its Habitat Conservation Plan (Jones and Stokes 2006).

The typical Mediterranean climate of warm dry summers and cool rainy winters is moderated by the San Francisco Bay and fog reaching to the western slopes of Mount Diablo. Precipitation and temperatures vary from west to east across the two counties, with more moderate temperatures in the west, and reduced rainfall to the east. Vegetation along the western portion of the region includes Coast Redwood groves, oak and bay woodlands, willow and alder riparian stringers, maritime chaparral, coastal scrub, and tidal marshes. Further east the vegetation has increasing grasslands and mesic and xeric chaparral.

As with other areas of central California, this is a seismically active region, with faults including the Calaveras, Concord-Green Valley, Greenville, Hayward, and Mt. Diablo being part of the greater San Andreas Fault System. These faults, and the resulting mountains and valleys, are northwest trending. Serpentine soils occur in zones of faulting and mountain uplift. Serpentine soil has unique chemistry, which is low in calcium and nutrients (N, P, and K) and high in iron and magnesium, and limits plant growth (Alexander 2022). A number of endemic species have evolved to tolerate these soil conditions. Serpentine soils are more prevalent in Alameda than in Contra Costa County. A GIS layer that indicates the likelihood of serpentine environments, estimated over 10,000 acres in Alameda and about 2,400 acres in Contra Costa County (California Geological Survey, unpublished data).

Project & Classification Overview

In 2022, East Bay Regional Park District initiated the project, with funding from California Department of Forestry and Fire Protection (Calfire), the California State Coastal Conservancy (SCC), and California Department of Fish and Wildlife (CDFW) grants, to map the region's topography, physical and biotic features, and diverse plant communities. The foundation for the map is the standard vegetation classification approach, which is supported by the California Native Plant Society Vegetation Program (CNPS) and the CDFW Vegetation Classification and Mapping Program (VegCAMP). This report summarizes the methods and results of the classification effort completed by CNPS and vetted by VegCAMP ecologists, to describe the vegetation types found across Alameda and Contra Costa Counties.

CNPS uses an integrated set of steps for classification compliant with *A Manual of California Vegetation* (CNPS 2024) and the United States National Vegetation Classification System (FGDC 2008). The field key and descriptions of the vegetation for Alameda and Contra Costa Counties are included in the Appendices, as well as a table showing the hierarchical relationship of the full local classification to the United

States National Vegetation Classification (USNVC). The USNVC hierarchy is composed of eight levels, organized into three upper, three middle, and two lower levels as shown below in Table 1. The hierarchy has been updated recently (Keith et al. 2022a, 2022b, Faber-Langendoen and McIntyre 2024), and the new version is currently displayed on NatureServe Explorer (<https://explorer.natureserve.org/>).

Table 1. The levels of the USNVC hierarchy for natural vegetation.

Level	Example
<i>Upper</i>	
Level 1 – Biome	Temperate-Boreal Forest & Woodland
Level 2 – Subbiome	Cool Temperate Forest & Woodland
Level 3 – Formation	Oceanic Cool Temperate Rainforest
<i>Middle</i>	
Level 4 – Division	North American Pacific Coast Temperate Rainforest
Level 5 – Macrogroup	North Pacific Coastal Rainforest
Level 6 – Group	Californian Coastal Redwood Forest
<i>Lower</i>	
Level 7 – Alliance	<i>Sequoia sempervirens</i> Forest Alliance
Level 8 – Association	<i>Sequoia sempervirens</i> – <i>Notholithocarpus densiflorus</i> / <i>Vaccinium ovatum</i> Forest Association

The regional classification defines vegetation at the two finest levels, Alliance and Association. The Alliance is defined by plant species composition, habitat conditions, physiognomy, and diagnostic species; at least one of the diagnostic species is typically found in the uppermost or dominant stratum (Jennings et al. 2009). The Association is the most detailed classification level and reflects more specific characteristics of vegetation such as finer-level differences in species composition, topography, soils, substrate, climate, hydrology, and disturbance regime (FGDC 2008). Associations often recognize two or more diagnostic species found in different vegetation layers (Sawyer et al. 2009). Note that to comply with the USNVC, plant names used in alliances and associations use their standard of USDA NRCS (2024) accepted taxonomy, which is sometimes at odds with California’s current taxonomy (Jepson Flora Project 2024)

While this document represents the most comprehensive vegetation classification of Alameda and Contra Costa Counties to date, further refinement of types is expected with additional site-specific data collection and analyses from the Central California Coast and Coast Ranges ecoregion sections as well as future changes to vegetation

due to disturbance (e.g., fire, drought, and climate change), and natural successional shifts that occur across the landscape over time. Updates to the classification across the state will be documented in *A Manual of California Vegetation Online* (CNPS 2024).

Methods

Data Collection

CNPS and Tukman Geospatial LLC initially compiled available vegetation datasets from previous sampling, classification, and mapping efforts. CNPS, CDFW, and the mapping team drafted a preliminary list of classification and mapping units, and many agency partners assisted in refining this preliminary list. Then we identified specific vegetation types that needed further representation in classification surveys, and determined target sampling sizes, while project partners helped identify priority locations, and provided land access for sampling. The CNPS project manager (Mark Bibbo, formerly CNPS staff) additionally coordinated land access, expanding the sampling effort on public and private lands.

Beginning with a training in June 2022, field staff from CNPS, CDFW, EBRPD, Nomad Ecology, and Stillwater Sciences assembled to begin the sampling effort for vegetation across the region. CNPS vegetation staff met with the sampling team regularly to help coordinate the sampling effort. The field staff sampled opportunistically to capture a range of vegetation types across the study area.

Field staff used the CNPS-CDFW Combined Vegetation Rapid Assessment and Relevé protocol for sampling (see [CNPS Field Protocols & Guidelines](#) for copies of the field form and protocol) after training and calibration by CNPS and CDFW staff. Protocols comply with state and national standards as defined by the Survey of California Vegetation (SCV; VegCAMP 2022) and the US National Vegetation Classification (USNVC 2024) and are dependent on the recognition of a *stand* as the basic physical unit of vegetation in a landscape. A stand has both compositional and structural integrity. Compositional integrity is defined as similarity in species composition and relative cover; structural integrity refers to general regularity in the horizontal and vertical spacing of plant species as a result of topography, soils, geology, climate, slope, exposure, and site or disturbance history. A stand has no set size and may represent patterns as small as zones within a vernal pool, or quite expansive patches, such as a Douglas-fir forest occupying several hundred acres.

The survey data included the date of sampling, GPS location, environmental characteristics of the sampled stands, vegetation layer information, site history, and

the field-assessed vegetation type. Additionally, four digital photos were taken in the cardinal directions at the GPS point for each survey location, using digital cameras having a minimum of 8-megapixel resolution. Complete species lists were recorded for plot-based relevé surveys, while the most dominant and/or characteristic species were recorded for stand-based Rapid Assessment surveys (RA's). Percent cover estimates were recorded for all species listed in relevés and RA's. Data was collected digitally in the field for the most part, using a custom designed Survey123 form on GPS-enabled devices running ESRI's Field Maps application. Data were stored in ArcGIS Online, quality-controlled for accuracy, and later transferred to a geodatabase feature class and a standardized Microsoft Access database.

Analysis and Classification

Vegetation rapid assessment and relevé data from both the collection effort and legacy data were analyzed by CNPS in two batches. Due to the late season start for data collection in 2022, which occurred after spring's prime herbaceous phenology, woody vegetation types were analyzed first in the winter of 2022-2023. Collection of herbaceous surveys was prioritized in 2023, and these types were subsequently classified in the winter of 2023-2024.

Prior to analysis, scientific names of all taxa were first converted to a standard taxonomy, with alpha-numeric codes used by the PLANTS Database (USDA NRCS 2024). A prefix of "2" was applied to custom codes for taxa recognized by the Jepson eFlora (Jepson Flora Project 2024) or *A Manual of California Vegetation* (CNPS 2024), but not the PLANTS Database. General life forms, such as moss and lichen, also have codes beginning with the number 2 (e.g., 2MOSS). Abundance (cover) values for all taxa were converted to seven different classes using the following modified Braun-Blanquet (1932) cover categories: 1=<1%, 2=1–5%, 3=>5–15%, 4=>15–25%, 5=>25–50%, 6=>50–75%, 7=>75%. The data were then screened for outliers using the Sorensen (Bray-Curtis) Distance Measure, and taxa that occur in a small number of plots (i.e., less than 6 plots) were removed to generate additional plot-by-species matrices with lower coefficients of variation for species (typically <200%) and to minimize chaining.

CNPS analyzed the species cover data using PC-Ord and R software (McCune and Mefford 2006, R Core Team 2013). The cluster analysis used the Sørensen Distance Measure and Flexible Beta Linkage method at -0.25 (McCune and Grace 2002). Using this method of agglomerative clustering, surveys were grouped together based on similarities in species composition and abundance (McCune and Mefford 1997). In both classification efforts, CNPS conducted an initial cluster

analysis including all surveys in the available dataset. The initial cluster analysis was performed to partition the dataset into manageable subsets. Indicator species analysis (ISA) was used to select cluster group levels for classification analysis. ISA produced indicator values for each species across different cluster group levels (ranging from 2 to 50), testing for statistical significance using a quantitative/binary response with 4999 randomizations (Dufrêne and Legendre 1997). The cluster group levels that had relatively high numbers of significant indicators and relatively low overall mean p-values were chosen for the final evaluation of the community classification (McCune and Grace 2002).

The initial analysis consisted of the following steps:

1. Import a plot-by-species matrix into PC-Ord with percent cover values of plants converted into Braun-Blanquet cover classes
2. Run summary statistics on the complete dataset and remove taxa occurring in < 2, 3, etc. surveys. Determine the coefficient of variation (CV) and species and plot outliers for each output. Use an output with a CV less than 200%, if possible
3. Decide on an output from step 2 and remove plot and species outliers greater than 3 standard deviations from the mean, using Sorensen Distance Measure
4. Run cluster analysis on the chosen output to determine the arrangement of samples based on species abundance and presence
5. Run indicator species analysis (ISA) at each cluster group level, from 2 groups up to the maximum number possible (all groups must have at least 2 samples)
6. Use ISA results to settle on the best number of subsets to use in subsequent analyses.

Subsets were analyzed using a secondary PC-Ord cluster analysis. The classification process proceeded as follows:

1. Determine preliminary alliance and association names for each of the samples based on cluster or group membership, species constancy, abundance, and existing classification rules
2. Develop decision and membership rules for each association and alliance by summarizing species cover, species constancy, and diagnostic species for the type for the floristic field key and descriptions
3. Use the decision and membership rules to assign final alliance and association names to all samples included in the analysis and all outlier samples removed from the dataset.

A portion of the surveys within the dataset had already been classified. If almost all of the surveys in a subset were already classified, a secondary cluster analysis was not performed, and any remaining surveys were named by using the results of their initial cluster analysis.

During the classification process, samples were partitioned into groups based on cluster membership. Membership rules for assigning samples to Alliance and an Association (if possible) were defined primarily by species constancy and abundance; however, pre-existing classifications and floras were consulted to define analogous/similar types. Each sample was evaluated for consistency within a group, and samples that were misclassified in the cluster analysis were reclassified based on the membership rules. The resulting floristic classification is compliant with *A Manual of California Vegetation* (CNPS 2024) and the USNVC (FGDC 2008, USNVC 2024). The most specific vegetation type, the association, is defined by a group of samples that have similar dominant and/or characteristic species in the overstory as well as other important or indicator species, whereby these species are distinctive for a particular environmental setting. A set of similar associations is grouped hierarchically to the next higher level in the classification, the alliance. These are grouped sequentially into the group, macrogroup, division, and upwards through the formation, sub-class, and class levels.

Following the analysis of field data and development of the classification and field key, CNPS engaged peer reviewers including state ecologists at VegCAMP (including Rachelle Boul, Senior Environmental Scientist) and national ecologists at NatureServe. This process has involved two parallel efforts: 1) evaluate the existing alliance and association units to determine types for addition or revision in both the state and national classification systems, and 2) apply the upper levels of the recently revised USNVC hierarchy (see table 1) to ensure conformity in our state classification (per USNVC 2024). While working to apply the most current version of the 8-level USNVC hierarchy, we also are making recommendations on revisions and refinements for the upper levels of the hierarchy as well as the lower levels (Faber-Langendoen et al. 2018). This dynamic process is on-going since it includes various peer reviewers (such as western regional ecologists from the Washington Heritage Program), whereby updates and improvement still may occur in the future. In the meantime, the California state classification may have minor differences in the alliance and association names as compared to the USNVC (or in their concepts), and we are working towards aligning these state and national efforts.

Note that the 100 additional surveys collected in 2024 were not analyzed; instead, the samples were keyed to type and their data was used to augment the

descriptions. Upon conferring alliance and association units, CNPS has written detailed local vegetation descriptions for Alameda and Contra Costa Counties. CNPS office staff (namely, Kendra Sikes, Savannah Vu, and Julie Evens) wrote and edited the descriptions. The descriptions are divided into three sections based on general lifeform (dominance by trees, shrubs, and herbs); they are organized alphabetically by alliance within each section followed by their respective association descriptions. Alliance descriptions begin with a statewide and a local narrative, including vegetation lifeform summary information and membership rules. Next, a summary of the environmental setting is provided including elevation, aspect, slope, macro topography, ground surface cover, soil texture, geology and county distribution by ecological subsection (see subsection map, Figure 1). Cover of exotic species are noted as site impacts, along with a list of associations found in either county. Finally, classification comments are provided along with data references, global and state rarity ranks, and sample size. References for datasets in the descriptions may not be included in the Reference section of this report. All references are available for review using the bibliography available through *A Manual of California Vegetation Online* (CNPS 2024).

Each alliance and association description includes a stand table that summarizes species composition by type and lists constancy and cover estimate values (average, minimum and maximum) for all taxa occurring in at least 20% of stands. After classification, geographic locations of the surveys were analyzed to remove auto-correlated plots (either revisits to the same plot, or plots of the same association within 200 m of each other). In a pair of auto-correlated plots, a single survey was retained to include in the descriptions. For vegetation types with a low sample size from Alameda and Contra Costa Counties (<6), related surveys from surrounding counties are included in the data summaries. The definitions and conventions used to develop the descriptions and the field key are available as a comprehensive glossary in Appendix A.

Results

Data Compilation

A total of 319 surveys of vegetation were sampled from June to September 2022 through funding provided specifically for this classification effort, including 230 rapid assessment (RA), 21 relevé, and 68 reconnaissance surveys. In 2023, with the emphasis on herbaceous vegetation, an additional 213 surveys were collected, including 165 relevés, 45 RAs, and 3 reconnaissance. In 2024, 94 additional relevés were collected by Nomad Ecology and Benson Bio Consulting as reference sites for a finescale grassland mapping project (Nomad Ecology et al. 2024). Thus, a total of 626 surveys were conducted in 2022-2024 (project code ALCC, Figure 2).

Surveys from previous sampling and mapping efforts in the two-county region (560) and from shared ecoregion subsections within adjacent counties (1,466) were compiled to include in the classification analysis and provided a broader, regional understanding of vegetation types with overlapping floristic and ecological characteristics (orange points, Figure 2). The compiled data were collected between 1992 and 2022, with surveys from Sacramento, San Joaquin, San Mateo, Santa Clara, Solano and Stanislaus Counties.

Datasets compiled and classified for this project are listed in Table 2. CNPS reviewed the quality and accuracy of the data and archived it with newly collected data into a standardized Microsoft Access database. Data will be publicly available through CDFW's Biogeographic Information and Observation System (BIOS; <https://apps.wildlife.ca.gov/bios6/>) and other data-sharing platforms upon project completion.

Species names were entered in the survey database as they were recorded in the field, while the PLANTS Database (USDA NRCS 2024) was used to standardize the taxonomy for this classification effort. Taxa that could not be found in the PLANTS Database were assigned custom codes based on the Jepson eFlora (Jepson Flora Project 2024).

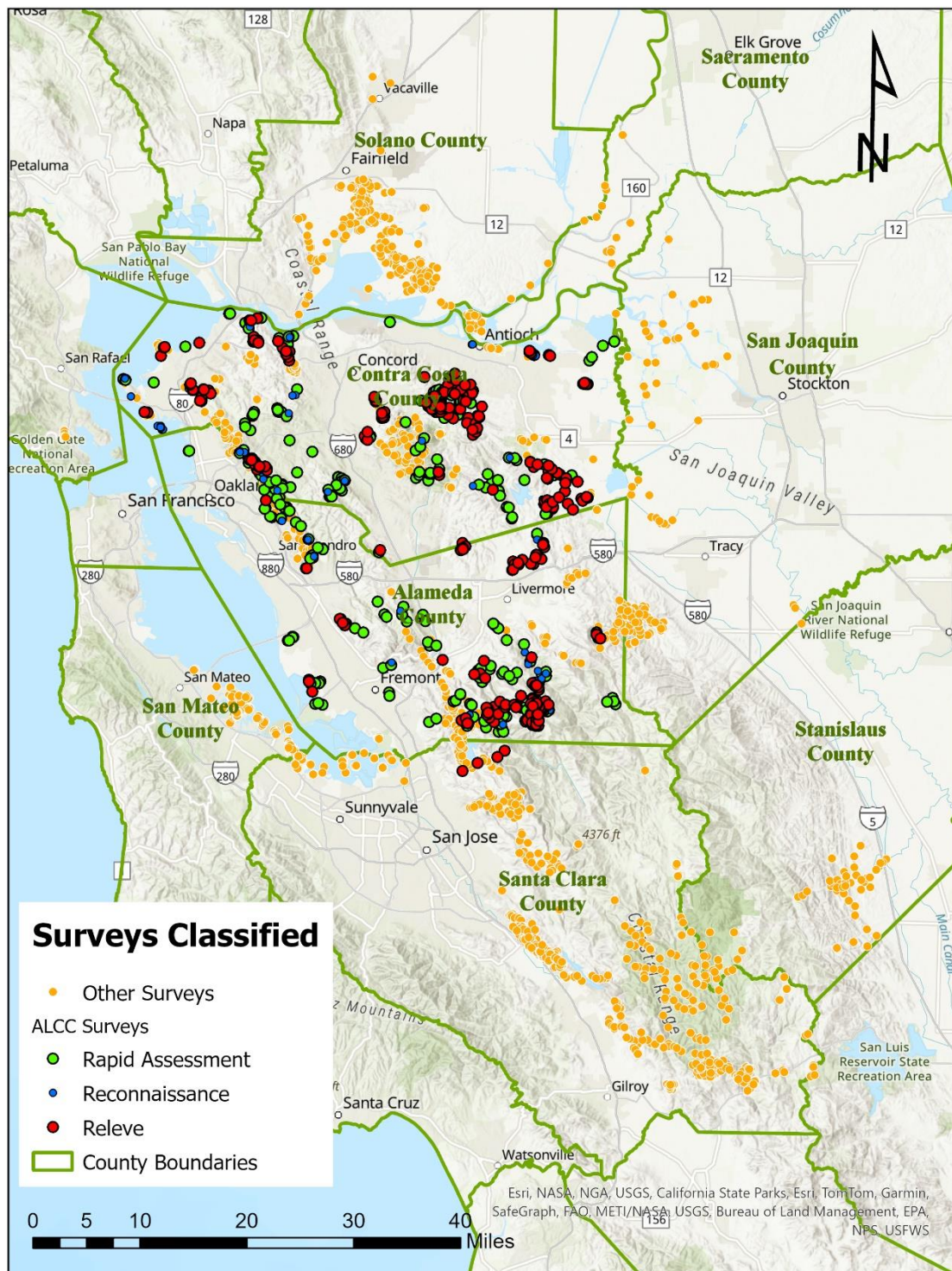


Figure 2. Locations of vegetation survey points in Alameda and Contra Costa Counties. Surveys collected for this effort from 2022-2024 (project code ALCC) are indicated by larger points. The smaller orange points show surveys compiled from other projects and included in the classification.

Table 2. Compilation of vegetation classification samples by focal area and entity within Alameda and Contra Costa Counties (ALA/CCA) versus adjacent counties (other). The first row displays the surveys collected specifically for this project (see Figure 2).

Focus/Location of sampling	Years	Entity	Type of survey	ALA/CCA	other
Alameda & Contra Costa Counties	2022-2024	CDFW, CNPS, EBRPD, Nomad Ecology	RA's, Relevés, Recons	622	4
Alameda Watershed	2011-2012	Nomad Ecology	RA's, Relevés	35	16
Canada de los Osos Ecological Reserve	2004-2005	CDFW	RA's	0	58
Coyote Ridge, Santa Clara Co.	2001-2003	CNPS chapter / state staff	Relevés	0	75
Coyote Ridge, Santa Clara Co.	2019	Santa Clara Valley Open Space Authority	Transects	0	42
Central Valley Riparian	2010	CDFW	RA's, Recons	11	1
Don Edwards National Wildlife Refuge	2018	USGS Western Ecological Research Center (K. Thorne)	Transects	0	208
East Bay Chapter, CNPS	2003-2018	CNPS chapter	RA's, Relevés	61	0
East Bay Regional Parks	2017-2019	Nomad Ecology	RA's	68	0
East Bay Regional Parks, Grasslands	2018-2022	Nomad Ecology & Benson Bioconsulting	RA's, Relevés	41	0
Grassland data	2008-2009	TNC and UCB Range Ecology Lab	Relevés	2	53
Grassland thesis data	1998	Cort Johnson	Transects	6	0
John Muir National Historic Site	2004	NPS	RA's	45	0
Lawrence Livermore National Labs	2020	Nomad Ecology	RA's	31	62

Focus/Location of sampling	Years	Entity	Type of survey	ALA/CCA	other
Maritime Chaparral	2008-2009	Mike Vasey & Brett Hall	Macro Plot, Relevés	6	6
Range Management	2017-2020	Point Blue	Transects	37	5
Santa Clara Co., Coyote Ridge	2001-2008	CNPS chapter / state staff	RA's, Relevés	0	121
Santa Clara, Post-fire Henry Coe SP	2021	UCSC / CNPS / SCMSN staff	RA's, Relevés	0	26
Santa Clara County	2021	UCSC / CNPS / SCMSN staff	RA's, Relevés, Recons	0	96
San Mateo County	2019	Golden Gate National Parks Conservancy	RA's, Relevés	0	12
State Parks Central Coast	2021	GIC	RA's, Relevés	77	53
Sacramento San Joaquin Delta	2005-2006	CDFW	RA's	9	94
Suisun Marsh	1999-2012	CDFW	Multivisit Relevés	0	386
Sunol Valley	2011	Nomad Ecology	Relevés	44	0
State Vehicle Recreation Area, Carnegie	2021-2022	State Parks	RA's, Recons	11	5
Sycamore Woodland	1992-1993	CDFW	Transects	11	8
Valley Water, Riparian	2020-2021	Santa Clara Valley Water District (Claire Mallen)	RA's	0	138
Vernal Pools	2002-2005	M. Barbour Research Team	Relevés	46	1
Wrubel Thesis Data	2008-2010	Eric Wrubel	RA's, Relevés	19	0
Total Surveys				1182	1470

Classification

The initial compilation of rapid assessment and relevé data, which prioritized woody vegetation, were analyzed by CNPS in 2022–2023. This dataset included 1,254 surveys, of which 301 were collected for the effort in 2022. Almost half of the surveys in this dataset had been previously classified by CNPS, primarily those from Santa Clara Co. (see Sikes et al. 2023). The initial cluster analysis resulted in 4 subgroups (riparian/wetland, coastal sage and mesic woodland, chaparral, and oak woodland), which each went through a secondary cluster analysis. A total of 25 secondary clusters were selected. While herbaceous surveys (n=186) were included in the cluster analyses, final classification of these was delayed until more data was available after the 2023 field season.

In 2023–2024, another classification analysis was performed. With the additional data, both collected and compiled, 2,546 surveys were included in the initial cluster analysis. Again, a four-group split was chosen for further analysis. One of the four subsets was almost entirely woody, so a secondary cluster analysis was not performed. Another group also had a large number of woody surveys that had already been classified, so these were removed from the subset. The remainder of the three groups (salt marsh, wet herbaceous, upland herbaceous), included 1,433 surveys, and each underwent a secondary cluster analysis. Of these, approximately half had been classified in an earlier effort. A total of 29 secondary clusters for community classification were selected using Cluster and Indicator Species Analyses. Both broad- and fine-scale cluster grouping variables were selected for each subset based on the presence of relatively high numbers of significant indicators and low average p-values.

After producing a draft classification, VegCAMP ecologists reviewed it and provided feedback for additional refinement. The resulting floristic vegetation classification includes approximately 115 alliances and 280 associations based on field data within Alameda and Contra Costa Counties: 24 tree-overstory, 36 shrubland, and 54 herbaceous/grassland alliances (Table 3); and 89 tree-overstory, 66 shrubland, and 121 herbaceous/grassland associations (Appendix B, Table 4). One alliance and approximately 50 associations are considered provisional due to low sample size or lack of samples in all the areas that the type would be expected. At least 10 additional alliances are known to occur in the region, without classification samples collected for them.

Of the alliances, 51 (or 44%) are currently considered sensitive plant communities (S1-S3), 44 are ranked as S4 or S5 (not sensitive), and 16 others are non-ranked. While most of the associations have not been formally ranked, over 167 (or 60%) of

the associations are estimated to be sensitive plant communities (S1-S3). Additionally, 16 alliances (and 24 associations) were not ranked because they are considered “Semi-Natural” or “Ruderal”, in which they are strongly dominated and characterized by non-native plants that are reproducing and maintaining occurrences in the wild.

The attributes of sampled vegetation, including species composition, structure, and cover, were used to develop a floristic field key (Appendix C) and local descriptions (Appendix D) for the vegetation types of Alameda and Contra Costa counties. There were some alliances mapped by the mapping team that had no classification data available from the area. We created descriptions for those based on reconnaissance data provided by the mapping team. The field key is organized by vegetation layer (e.g., tree-overstory, shrubland, herbaceous), USNVC hierarchical level (e.g., Group, Alliance, and Association), and environmental setting (e.g., riparian / wetland, upland). The field key provides users the ability to assess vegetation types while in the field and was field tested in collaboration with the mapping team during field reconnaissance trips and field sampling in Alameda and Contra Costa counties. Both the field key and descriptions contain membership rules for each alliance and association in the classification. While 2,546 surveys were included in the vegetation classification analysis, the descriptions (Appendix D) are limited to those located in Alameda and Contra Costa Counties (1,182 surveys), unless otherwise noted in the classification comments (when sample size was low). In addition, 204 surveys were excluded from the descriptions because they were within 200 m of a survey of the same association or were return visits to the same plot location (i.e., the same occurrence). Only 62 of the excluded surveys were in Alameda or Contra Costa counties.

Summary tables of classification include Table 5 (Appendix B), representing the classification list of alliances and associations in Alameda and Contra Costa counties nested within the USNVC hierarchy. The classification names for each field survey are included within a survey database. The survey data will be publicly available upon project completion through CDFW’s Biogeographic Information and Observation System (BIOS; <https://apps.wildlife.ca.gov/bios6/>).

Table 3. Alliance list with sample size for surveys classified in this effort (“All” column) and those collected in Alameda and Contra Costa (ALA/CCA) counties. The modifier column indicates whether the alliance is provisional (Provis) or semi-natural (Semi-Nat). An asterisk (*) denotes alliances that are likely present or known to be present but did not have classification surveys in either county.

Lifeform	Alliance Name	Modifier	All	ALA/CCA
Tree	<i>Acer macrophyllum</i> – <i>Alnus rubra</i>		17	11
	<i>Acer negundo</i> *		0	0
	<i>Aesculus californica</i>		30	21
	<i>Alnus rhombifolia</i>		31	14
	<i>Arbutus menziesii</i>		2	2
	<i>Eucalyptus</i> spp. – <i>Ailanthus altissima</i> – <i>Robinia pseudoacacia</i>	Semi-Nat	21	19
	<i>Fraxinus latifolia</i> *		0	0
	<i>Hesperocyparis (sargentii, macnabiana)</i> *		0	0
	<i>Hesperocyparis macrocarpa</i> – <i>Pinus radiata</i>	Semi-Nat	8	8
	<i>Juglans hindsii</i> and Hybrids		5	5
	<i>Juniperus californica</i>		5	4
	<i>Pinus attenuata</i>		4	4
	<i>Pinus coulteri</i>		5	5
	<i>Pinus ponderosa</i> *		2	0
	<i>Pinus sabiniana</i>		17	8
	<i>Platanus racemosa</i> – <i>Quercus agrifolia</i>		70	35
	<i>Populus fremontii</i> – <i>Fraxinus velutina</i> – <i>Salix gooddingii</i>		16	9
	<i>Populus trichocarpa</i> *		0	0
	<i>Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)</i>		14	8
	<i>Quercus agrifolia</i>		86	52
	<i>Quercus chrysolepis</i> (tree)		5	5
	<i>Quercus douglasii</i>		78	44
	<i>Quercus kelloggii</i>		21	10
	<i>Quercus lobata</i>		42	23
	<i>Quercus lobata</i> Riparian		21	7
	<i>Quercus wislizeni</i> – <i>Quercus parvula</i> (tree)		7	5
	<i>Salix gooddingii</i> – <i>Salix laevigata</i>		36	15
	<i>Salix lucida</i> ssp. <i>lasiandra</i> *		0	0

Lifeform	Alliance Name	Modifier	All	ALA/ CCA
Tree	<i>Schinus (molle, terebinthifolius) – Myoporum laetum*</i>	Semi-Nat	1	0
	<i>Sequoia sempervirens</i>		9	9
	<i>Umbellularia californica</i>		70	47
Shrub	<i>Acacia</i> spp. – <i>Grevillea</i> spp. – <i>Leptospermum laevigatum*</i>	Semi-Nat	0	0
	<i>Adenostoma fasciculatum</i>		44	22
	<i>Adenostoma fasciculatum – Salvia</i> spp.		7	6
	<i>Allenrolfea occidentalis</i>		8	8
	<i>Arctostaphylos (canescens, manzanita, stanfordiana)</i>		9	9
	<i>Arctostaphylos (crustacea, tomentosa)</i>		15	14
	<i>Arctostaphylos glandulosa*</i>		1	0
	<i>Arctostaphylos glauca</i>		26	4
	<i>Artemisia californica – (Salvia leucophylla)</i>		60	29
	<i>Atriplex lentiformis*</i>		5	0
	<i>Baccharis pilularis</i>		87	60
	<i>Baccharis salicifolia</i>		12	7
	<i>Ceanothus (oliganthus, leucodermis, tomentosus)</i>		2	1
	<i>Ceanothus cuneatus</i>		5	2
	<i>Cephalanthus occidentalis – Rosa californica</i>		14	2
	<i>Cercocarpus montanus</i>		4	2
	<i>Cornus sericea</i>		9	1
	<i>Corylus cornuta</i> var. <i>californica</i>		2	2
	<i>Cytisus scoparius – Genista monspessulana – Cotoneaster</i> spp.	Semi-Nat	2	2
	<i>Diplacus aurantiacus</i>		4	3
	<i>Ericameria linearifolia – Cleome isomeris</i>		7	4
	<i>Ericameria nauseosa</i>		2	2
	<i>Eriogonum fasciculatum</i>		4	3
	<i>Eriogonum wrightii – Eriogonum heermannii – Buddleja utahensis</i>		9	3
	<i>Frangula californica – Rhododendron occidentale – Salix breweri*</i>		6	0
	<i>Gaultheria shallon – Rubus (ursinus)</i>		7	6
	<i>Lotus scoparius – Lupinus albifrons – Eriodictyon</i> spp.		18	17

Lifeform	Alliance Name	Modifier	All	ALA/ CCA
Shrub	<i>Lupinus arboreus</i> *		0	0
	<i>Malacothamnus fasciculatus</i> – <i>Malacothamnus</i> spp.		5	3
	<i>Prunus ilicifolia</i> – <i>Heteromeles arbutifolia</i> – <i>Ceanothus spinosus</i>		22	6
	<i>Quercus berberidifolia</i>		3	2
	<i>Quercus durata</i>		16	1
	<i>Quercus wislizeni</i> – <i>Quercus chrysolepis</i> (shrub)		4	4
	<i>Rhus trilobata</i> – <i>Crataegus rivularis</i> – <i>Forestiera pubescens</i>		2	2
	<i>Ribes quercetorum</i> – <i>Rhus trilobata</i> – <i>Frangula californica</i>		13	11
	<i>Rubus armeniacus</i> – <i>Sesbania punicea</i> – <i>Ficus carica</i>	Semi-Nat	11	4
	<i>Salix exigua</i>		20	9
	<i>Salix lasiolepis</i>		26	17
	<i>Salvia mellifera</i> – (<i>Artemisia californica</i>)		16	8
	<i>Suaeda moquinii</i>		2	2
	<i>Toxicodendron diversilobum</i>		21	16
Herb	<i>Amsinckia (menziesii, tessellata)</i> – <i>Phacelia</i> spp.		11	5
	<i>Anemopsis californica</i> – <i>Helianthus nuttallii</i> – <i>Solidago spectabilis</i>		5	5
	<i>Arthrocnemum subterminale</i>		1	1
	<i>Atriplex prostrata</i> – <i>Cotula coronopifolia</i>	Semi-Nat	12	1
	<i>Avena</i> spp. – <i>Bromus</i> spp.	Semi-Nat	77	31
	<i>Azolla (filiculoides, microphylla)</i>		2	2
	<i>Bidens cernua</i> – <i>Euthamia occidentalis</i> – <i>Ludwigia palustris</i>		8	2
	<i>Bolboschoenus maritimus</i>		25	3
	<i>Brassica nigra</i> – <i>Centaurea (solstitialis, melitensis)</i>	Semi-Nat	12	5
	<i>Bromus carinatus</i> – <i>Elymus glaucus</i>		20	18
	<i>Bromus rubens</i> – <i>Schismus (arabicus, barbatus)</i> *	Semi-Nat	0	0
	<i>Carex barbarae</i>		4	3
	<i>Carex nudata</i> *		2	0
	<i>Carex obnupta</i> – <i>Oenanthе sarmentosa</i> – <i>Scirpus microcarpus</i> *		1	0
	<i>Centromadia (pungens)</i>		5	5

Lifeform	Alliance Name	Modifier	All	ALA/ CCA
Herb	<i>Ceratophyllum demersum</i> Aquatic*	Provis	2	0
	<i>Conium maculatum</i> – <i>Foeniculum vulgare</i>	Semi-Nat	4	1
	<i>Corethrogyne filaginifolia</i> – <i>Eriogonum</i> (<i>elongatum</i> , <i>nudum</i>)		45	39
	<i>Cortaderia</i> (<i>jubata</i> , <i>selloana</i>)	Semi-Nat	3	1
	<i>Cressa truxillensis</i> – <i>Distichlis spicata</i>		4	3
	<i>Cynodon dactylon</i> – <i>Crypsis</i> spp. – <i>Paspalum</i> spp.	Semi-Nat	4	1
	<i>Deschampsia cespitosa</i> – <i>Hordeum</i> <i>brachyantherum</i> – <i>Danthonia californica</i>		4	2
	<i>Distichlis spicata</i> – <i>Frankenia salina</i> Coastal		133	10
	<i>Distichlis spicata</i> – (<i>Juncus cooperi</i> – <i>Frankenia</i> <i>salina</i>) Interior		11	11
	<i>Eriophyllum staechadifolium</i> – <i>Erigeron glaucus</i> – <i>Eriogonum latifolium</i> *		0	0
	<i>Eryngium aristulatum</i>		2	2
	<i>Eschscholzia</i> (<i>californica</i>) – <i>Lupinus</i> (<i>nanus</i>)		44	38
	<i>Festuca idahoensis</i> – <i>Danthonia californica</i>		24	24
	<i>Heterotheca</i> (<i>oregona</i> , <i>sessiliflora</i>)*		2	0
	<i>Holocarpha</i> (<i>heermannii</i> , <i>virgata</i>)		22	17
	<i>Hydrilla verticillata</i> – <i>Myriophyllum spicatum</i> *	Semi-Nat	1	0
	<i>Juncus</i> (<i>effusus</i> , <i>patens</i>) – <i>Carex</i> (<i>pansa</i> , <i>praegracilis</i>)		29	10
	<i>Juncus arcticus</i> (<i>var. balticus</i> , <i>mexicanus</i>)		14	3
	<i>Lasthenia californica</i> – <i>Plantago erecta</i> – <i>Vulpia</i> <i>microstachys</i>		104	32
	<i>Lasthenia fremontii</i> – <i>Distichlis spicata</i>		30	29
	<i>Lasthenia fremontii</i> – <i>Downingia</i> (<i>bicornuta</i>)		3	3
	<i>Lasthenia glaberrima</i> – <i>Eleocharis</i> <i>macrostachya</i>		9	9
	<i>Layia fremontii</i> – <i>Achyrrachaena mollis</i>		2	2
	<i>Lepidium latifolium</i> – <i>Lactuca serriola</i>	Semi-Nat	4	1
	<i>Leymus cinereus</i> – <i>Leymus triticoides</i>		43	23
	<i>Lolium perenne</i>	Semi-Nat	49	21
	<i>Ludwigia</i> (<i>hexapetala</i> , <i>peploides</i>) – <i>Eichhornia</i> <i>crassipes</i>	Semi-Nat	1	1
	<i>Mesembryanthemum</i> spp. – <i>Carpobrotus</i> spp.	Semi-Nat	1	1
	<i>Mimulus guttatus</i> – <i>Cirsium</i> spp. – <i>Stachys</i> spp.*		15	0

Lifeform	Alliance Name	Modifier	All	ALA/ CCA
	<i>Monolopia (lanceolata) – Coreopsis (calliopsidea)</i>		3	3
	<i>Nassella spp. – Melica spp.</i>		154	78
	<i>Phalaris aquatica – Phalaris arundinacea</i>	Semi-Nat	15	2
	<i>Phragmites australis – Arundo donax</i>	Semi-Nat	13	2
	<i>Plagiobothrys nothofulvus</i>		9	6
	<i>Polygonum lapathifolium – Xanthium strumarium*</i>		19	0
	<i>Ruppia (cirrhosa, maritima)</i>		1	1
	<i>Salsola tragus – Isatis tinctoria – Bassia spp.*</i>	Semi-Nat	1	0
	<i>Sarcocornia pacifica (Salicornia depressa)</i>		248	17
	<i>Schoenoplectus (acutus, californicus)</i>		50	8
	<i>Schoenoplectus americanus</i>		27	2
	<i>Selaginella (bigelovii, wallacei)</i>		7	3
	<i>Sesuvium verrucosum</i>		13	1
	<i>Sparganium (angustifolium)</i>		1	1
	<i>Spartina foliosa</i>		41	2
	<i>Spergularia marina*</i>	Provis	1	0
	<i>Stuckenia (pectinata) – Potamogeton spp.</i>		8	2
	<i>Trifolium variegatum</i>		3	2
	<i>Typha (angustifolia, domingensis, latifolia)</i>		30	4
	<i>Zostera (marina, pacifica) Pacific Aquatic*</i>		0	0
Sparse	<i>Allium spp. – Streptanthus spp. – Hesperolinon spp. Serpentinite</i>		10	1
	<i>Dudleya cymosa – Dudleya lanceolata</i> / Lichen – Moss		2	2

Discussion

Though Alameda is slightly larger in area than Contra Costa, fewer surveys were available from Alameda (530 vs. 638 surveys). The number of alliances followed the same trend (84 vs. 96 alliances), perhaps in part due to the number of samples. About half of the alliances described have samples in one, but not both, of the two counties. Some of the alliances that were only sampled in one county may also occur in the other county, but are less common there or were not sampled due to the vagaries of land access, accessibility, and post-fire conditions in some areas. Other alliances are restricted to one of the counties because suitable habitats are only found there (e.g., remnant dunes in Contra Costa Co., some serpentine chaparral and grassland types in Alameda County).

Several tree alliances were only sampled in Contra Costa County (*Juniperus californica*, *Pinus attenuata*, *Pinus coulteri*, and *Quercus wislizeni* – *Quercus parvula*). All of these dominant species are found in both counties but have a greater presence in Contra Costa. *Juniperus californica* and *Pinus coulteri* occurrences are most prevalent on Mount Diablo in Contra Costa Co. (CalFlora 2024), whereas *Pinus attenuata* and *Quercus wislizeni* are more widely distributed in the northern half of the East Bay region, with few occurrences in Alameda Co. (CalFlora 2024). *Quercus kelloggii* Alliance was only recorded in Alameda Co. though the species is just as prevalent in Contra Costa Co. (CalFlora 2024).

Shrub alliance samples that were limited to Contra Costa include *Adenostoma fasciculatum* – *Salvia* spp. and *Arctostaphylos* (*canescens*, *manzanita*, *stanfordiana*). Co-dominant *Salvia mellifera* and chamise is more prevalent in the northern half of the East Bay. The manzanitas *Arctostaphylos auriculata* and *A. manzanita* ssp. *laevigata* are limited to the vicinity of Mount Diablo. Shrub alliances limited to Alameda Co. include *Ceanothus* (*oliganthus*, *leucodermis*, *tomentosus*) because there is no record of *Ceanothus leucodermis* in Contra Costa, though *C. oliganthus* occurs often in both counties (CalFlora 2024). *Ericameria nauseosa* and *Eriogonum wrightii* similarly are limited in range to the southern half of Alameda Co. (CalFlora 2024); thus, the *Ericameria nauseosa* and *Eriogonum wrightii* – *Eriogonum heermannii* – *Buddleja utahensis* Alliances are also limited to that region.

At the association-level, there was less overlap between the two counties. Less than a third of the associations were sampled in both counties. This meets expectations since associations are often of more limited range than alliances. Contra Costa had more associations sampled than Alameda (225 as compared to 195), perhaps due to the number of surveys available.

In this classification, we described 24 new associations. Of these, all but one (*Allenrolfea occidentalis* / (*Frankenia salina* – *Centromadia* spp.) Association) were designated as provisional due to low sample size or lack of representation over its expected range. Three of the new associations were types dominated by rare species, *Arctostaphylos auriculata*, *Blepharizonia (laxa, plumosa)*, and *Leptosiphon ambiguus*. New perennial forbland associations include *Chlorogalum pomeridianum* – (*Triteleia laxa* – *Perideridia kelloggii*), *Croton californicus* – *Distichlis spicata*, *Grindelia camporum* – Annual Grass – Forb, *Heterotheca sessiliflora* Upland, and *Urtica dioica*. There was a concentrated effort to document the diversity of grassland and forbland types (Nomad Ecology et al. 2024), and this classification better defines differences between perennial and annual herbaceous types (21 of the 24 new associations). In addition, 13 associations were revised, that is, their names were updated to better reflect their species composition or they were moved to a new alliance.

Changes at the alliance level in this classification were primarily expansions to include new associations. *Ambrosia psilostachya* had previously been its own provisional alliance but has been redefined as an association within the *Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Alliance. Similarly, *Quercus palmeri* Alliance had been the only placement for stands of *Q. palmeri*, though the alliance range was limited to southern California. Northern stands of the species, such as those found in Alameda and Contra Costa, have a greater affinity with other northern shrubby oaks, so this new association has been placed in the *Quercus wislizeni* – *Quercus chrysolepis* (shrub) Alliance. The *Nassella* spp. – *Melica* spp. Alliance has been expanded to include perennial grasslands dominated by *Poa secunda* in the Central Coast and Coast Ranges.

One new alliance was a reconfiguration of previously existing types, including broadening or narrowing of alliance concepts due to their similarity in ecological settings. A new *Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Alliance has been recognized which separates coastal influence salt-tolerant vegetation from interior, alkaline stands of similar composition (i.e., *Distichlis spicata* and related species), to more closely align with the separate ecological units in the USNVC hierarchy. This interior alliance also includes dominant plants that were previously included in separate alliances *Distichlis spicata*, *Frankenia salina*, and *Juncus cooperi*.

We have included here the most recent iteration of the USNVC hierarchy (D. Faber-Langendoen 2025, pers.comm.) which has made changes at every level, including separating wetland and riparian alliances from upland ones at the highest levels of

the hierarchy. Thus, the placement of some alliances, as well as their groups and macrogroups has changed. Some of the changes were based on feedback provided by CNPS and CDFW ecologists. A new group Californian Mediterranean Riparian Forest (G113) has been created. Some Macrogroup and Group names have been updated. See Table 5 in Appendix B for the placement of the alliances of this classification into the USNVC hierarchy.

The classification recognizes various 'semi-natural' or 'ruderal' types when invasive (non-native) weedy generalist plant species overwhelmingly dominate stands (e.g., >90% relative cover) and substantially replace the typical diagnostic native plants. Setting a high threshold minimizes the creation of new types until it is certain that a characteristic combination of species has been formed (Faber-Langendoen et al. 2018). The greatest number of surveys representing Semi-natural types are non-native grasslands including *Avena* spp. – *Bromus* spp. and *Lolium perenne* Alliances, among various other herbaceous alliances. One expanded ruderal woodland type is the *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Alliance which now includes provisional associations for *Olea europaea* and *Ulmus* spp. Classifying and mapping these ruderal types can be important to identify and evaluate restoration actions, particularly for ruderal types that negatively impact the local ecosystems – i.e., when the impacts of non-native plant dominance change the natural ecological processes and/or increase threats (e.g., non-native herbs disrupting active dune assemblages, invasive shrubs increasing fuel loads and wildfire threats).

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Appendix A

Glossary

The following terms with their respective definitions have been established in developing the vegetation classification, field keys, and descriptions.

- **Taxon** – Species names defined in the PLANTS Database (USDA NRCS 2024), except in two cases: when a more current name has been assigned in the Jepson eflora (Jepson Flora Project 2024), or for general vegetation terms such as moss and lichen.
- **Lifeform terms:**
 - **Tree** – Is a one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multiple-stemmed (ramifying) after fire or other disturbance, but size of mature plants is typically greater than 5 m and undisturbed individuals of these species are usually single stemmed.
 - **Regenerating tree** – seedlings and saplings defined as follows:
 - **Seedlings** – trees clearly of a young age that have less than 1” diameter at breast height (dbh) or have not reached breast height. Applies only to trees propagating from seed; resprouts are not recorded here even if they meet the size requirements.
 - **Saplings** – trees with 1” – 6” dbh and young in age, OR small trees that are less than 1” dbh, are clearly of appreciable age, and are kept short by repeated browsing, burning, or other disturbance. Includes trees that are re-sprouting from roots or stumps following fire, logging or other disturbance. These re-sprouts may exhibit a shrubby form, with multiple small trunks, but are species that are generally considered trees. If a majority of the trunks are greater than 6” dbh, then the re-sprouts would be recorded under the “Tree” stratum.
 - **Understory tree** – trees that grow beneath the main canopy of a forest/woodland.
 - **Shrub** – Is normally a multi-stemmed woody plant that generally has several erect, spreading, or prostrate stems and is usually between 0.2 meters and 5 meters tall, giving it a bushy appearance. Definitions are blurred at the low and the high ends of the height scales. At the tall end, shrubs may approach trees based on disturbance frequencies (e.g., old-growth re-sprouting species such as *Quercus wislizeni*, etc., may frequently attain “tree size”). At the low end, woody perennial herbs or sub-shrubs of various species are often difficult to categorize into a single life-form; usually sub-shrubs (per USDA-NRCS 2024) were categorized in the “shrub” category.
 - **Herb** – Is any vascular plant species that has no main woody stem-development, and includes grasses, forbs, and perennial species that die-back seasonally.

- **Cryptogam** – Is a nonvascular plant or plant-like organism without specialized water or fluid conducting vascular tissue (i.e., xylem and phloem). Includes mosses, lichens, liverworts, hornworts, and algae.
- **Cover** – The primary metric used to quantify the abundance of a particular species or a particular vegetation layer within a plot. It was measured by estimating the aerial extent of the living plants, or the “bird’s-eye view” looking from above, for each category. Various subcategories of cover for species and vegetation are defined as follows:
 - **Absolute cover** – Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pseudotsuga menziesii* covers between 5% and 10% of the stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100% because it is not a proportional number.
 - **Relative cover** – Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50% relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are proportional numbers and, if added, total 100% for each stand (sample).
 - **Dense/Continuous cover** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is greater than 66 percent absolute cover.
 - **Intermittent cover** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is 33-66 percent absolute cover.
 - **Open cover** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 33 percent absolute cover.
 - **Sparse cover** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the *average* cover value is <2% absolute cover (though the range in cover could be <1-9% cover).
 - **Emergent** – A plant (or vegetation layer) is considered emergent if it includes plants that rises above a predominant vegetation layer, but that are sparse in cover. It is considered as a member of the next tallest layer, but typically has an absolute cover < 10%.
- **Constancy, Cover-Abundance, and Related Terms** – Used in the key, descriptions and the vegetation constancy tables for the species summarized within all stands of the alliance or association (codes from tables in parentheses):
 - **Constancy (Con)** – Number of occurrences divided by the number of samples X 100%
 - **Diagnostic** – A species or group of species whose relative constancy or abundance differentiates one vegetation type from another; the term can include character, constant, differential, and indicator species (Jennings et al. 2006).
 - **Dominant (D)** – Must be in at least 75% of the samples, with at least 50% relative cover in all samples.

- **Co-dominant** (cD) – Must be in at least 75% of the samples, with at least 30% relative cover in all samples.
- **Characteristic** (Char) – Present in at least 75% of the samples for that vegetation type, with no restriction on cover.
- **Abundant** – Present in 50 to 75% of the samples, with at least 50% relative cover.
- **Usually/Often** (Often) – Present in 50 to 75% of the samples, with no restriction on cover.
- **Sometimes** – Present in 25 to 50% of the samples, with no restriction on cover.
- **Average** (Avg) and **Relative Cover** (RelCov) – Average cover for a taxon in a vegetation type is calculated as the sum of its 'absolute' cover values divided by the total sample size; relative cover is calculated as the comparative sum of cover values for one taxon compared to the sum of cover values of other taxa, in which proportional numbers are derived (see **Cover** section for more details).
- **Minimum** (Min) and **Maximum** (Max) – The minimum and maximum cover values that a taxon had from the surveys of a vegetation type. Values could be an absolute cover value (e.g., 1%) and/or a mid-point value of a cover class (e.g., 2.5% for a cover class of 1–5 %) depending on data available
- **Stand** – Is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:
 - It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.
 - It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species, but that has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep moister soil and the same species.
- **Vegetation:**
 - **Woodland and forest vegetation:** In the National Vegetation Classification, a woodland is defined as a tree-dominated stand of vegetation with between 25 and 60 percent cover of trees and a forest is defined as a tree-dominated stand of vegetation with 60 percent or greater cover of trees.
 - **Shrubland vegetation:** Shrubs (including dwarf-shrubs) are evenly distributed throughout the stand, providing a consistent (even if sparse) structural component, and one or both of the following criteria are met: (1) Shrubs influence the distribution or population dynamics of other plant species; (2) Shrubs play an important role in ecological processes within the stand.
 - **Herbaceous vegetation:** Herbs are evenly distributed throughout the stand, providing a consistent (even if sparse) structural component, and play an

important role in ecological processes within the stand, and the stand cannot be characterized as a tree or shrub stand.

- **Nonvascular vegetation:** Nonvascular organisms provide a consistent (even if sparse) structural component and play an important role in ecological processes within the stand.
- **Semi-natural/ruderal vegetation:** Stands characterized by naturalized non-native species. Examples include *Tamarix* spp., and *Brassica* spp. Note: the terminology for semi-natural versus ruderal plant communities is still under discussion with ESA Vegetation Panel and Hierarchy Review Working Group, and in the last 5 years the classification names have gone back and forth between these two terms.
- **US National Vegetation Classification (USNVC, or NVC) Hierarchy Levels:**
 - **Biome** – A vegetation classification unit of high rank (1st level) defined by one or a few common major ecological drivers that regulate major ecosystem functions and ecological processes (Keith et al. 2022b).
 - **Subbiome** – A vegetation classification unit of high rank (2nd level), the first subdivision of biome, defined by a combination of general dominant and diagnostic growth forms that reflect global mega- or macroclimatic factors driven primarily by latitude and continental position, or that reflect overriding substrate or aquatic conditions (FGDC 2008).
 - **Formation** – A vegetation classification unit of high rank (3rd level) defined by a combination of dominant and diagnostic growth forms that reflect global macroclimatic conditions as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions (FGDC 2008).
 - **Division** – A vegetation classification unit of intermediate rank (4th level) defined by a combination of dominant and diagnostic growth forms and a broad set of diagnostic plant species that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (FGDC 2008).
 - **Macrogroup** – A vegetation classification unit of intermediate rank (5th level) defined by a moderate set of diagnostic plant species and diagnostic growth forms that reflect biogeographic differences in composition and sub-continental to regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (FGDC 2008).
 - **Group** – A vegetation classification unit of intermediate rank (6th level) defined by combinations of relatively narrow sets of diagnostic plant species (including dominants and co-dominants), broadly similar composition, and diagnostic growth forms that reflect biogeographic differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (FGDC 2008).
 - **Alliance** – A classification unit of vegetation of low rank (7th level), containing one or more associations and defined by one or more diagnostic species, often of high cover, in the uppermost layer or the layer with the highest canopy cover. Alliances reflect physiognomy as well as regional to subregional climates, substrates, hydrology, and disturbance regimes (Jennings et al. 2006, FGDC 2008). The USNVC assigns Alliances a database code and scientific name.

- **Association** – A vegetation classification unit of low rank (8th level) defined by a diagnostic species, a characteristic range of species composition, physiognomy, and distinctive habitat conditions (Jennings et al. 2006). Associations reflect local topo-edaphic climates, substrates, hydrology, and disturbance regimes.
- **Other Classification Terms:**
 - **Provisional Type** – A vegetation type that is not yet formally described, but expected to be an addition to the existing list of USNVC types for a project area. The type may be represented by plot samples (e.g., <10 samples), while it may or may not be particularly common or because it is localized in extent; however, it could be documented in additional location(s) outside of the study area.
- **Conservation Rank** – The California Department of Fish and Wildlife’s Vegetation Classification and Mapping Program’s Survey of California Vegetation (SCV) uses the state Heritage Program methodology per NatureServe for natural community conservation ranks as defined below (and see <http://www.natureserve.org>). “G” indicates the alliance’s rarity and threat globally, and “S” indicates the alliance’s rarity and threat in California:
 - **G1 and S1** – Critically Imperiled—At very high risk of extinction due to extreme rarity. Often 5 or fewer viable occurrences and/or up to 518 hectares.
 - **G2 and S2** – Imperiled—At high risk of extinction due to very restricted range, very few occurrences, steep declines, or other factors. Often 6–20 viable occurrences, and/or 518–2,590 hectares
 - **G3 and S3** – Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors. Often 21–100 viable occurrences and/or 2,590–12,950 hectares.
 - **G4 and S4** – Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors. Often greater than 100 viable occurrences and/or more than 12,950 hectares.
 - **G5 and S5** – Secure—Common; widespread and abundant.
 - If a vegetation type (i.e., alliance or association) is marked with a G1 through a G3 code, it is rare and threatened throughout its range. A type marked with a G5 and an S1 through an S3 code is secure through its range outside the state but is rare and threatened in California. A G4/S4 type may or may not be endemic to the state and is secure statewide.
 - Semi-natural alliances and associations are not ranked.
- **Abbreviations and Other Characters:**
 - **Parentheses ()** – When parentheses are used around a species name within a vegetation type name, it indicates that the species is often present as an indicator of that association or alliance, but it does not meet a threshold of 75% or more constancy. The parentheses may be used around the full scientific name or only around the species epithet. An example is the *Pinus muricata* – (*Arbutus menziesii* – *Notholithocarpus densiflorus*) / *Vaccinium ovatum* Association. If parentheses are only around the species epithet, it means that the genus is consistently present but another species could also be present from that genus.

An example is the *Artemisia californica* / *Nassella (pulchra)* Association, where the genus may be represented by one or more species found within the parentheses.

- **NVC Alliance Code** – The assigned database code and scientific name for the Alliances in the USNVC.
- **Local Environmental Attributes** – Used in the alliance and association descriptions.
 - **Macrotopography** – broad topographic term to describe general position of a stand in the surrounding watershed (e.g., top, upper third, middle third, lower third, and/or bottom) followed by the number of surveys noted in parentheses within each position.
 - **% Surface cover:** The abiotic ground surface substrates of the plot/survey.
 - **Large rock** – percent cover of rocks on the ground with a diameter greater than 25 cm. Includes rocks that were recorded in the field as bedrock, boulder (>60 cm in diameter) and stone (>25 cm – 60 cm in diameter).
 - **Small rock** – percent cover of rocks on the ground with a diameter ranging from 2 mm to 25 cm. Includes rocks that were recorded in the field as gravel (2 mm – 7.5 cm in diameter) and cobble (>7.5 cm – 25 cm in diameter).
 - **Fines Cover** – percent (exposed) cover of fine sediment or soil particles with a diameter less than 2 mm; i.e., ground that is not covered by litter, small rock, or large rock.
 - **Litter Cover** – percent cover of litter, duff, and/or unattached wood on the ground.
- **Site Impacts** – Used in the alliance and association descriptions to depict the degree of non-native plant cover and most frequent or abundant non-native plant species. Categories for the average non-native plant cover relative to native cover include low ($\leq 20\%$ relative cover), moderate (20-50% relative cover), and high ($> 50\%$ relative cover).

Appendix B

Vegetation Classification Tables

Vegetation Classification for Alameda and Contra Costa Counties is organized within two tables, one including the Alliances and Associations, and the other with Alliances nested in the current USNVC hierarchy.

Table 4. Alliances and associations with surveys in Alameda (ALA) and Contra Costa (CCA) Counties, with number of surveys classified for that association including in the adjoining counties (in column “All”). Status column (Stat) includes the following abbreviations for association status: rev = revised definition, new = new type.

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Acer macrophyllum</i> – <i>Alnus rubra</i>	<i>Acer macrophyllum</i> / (<i>Rubus ursinus</i>)	2	2	6	
		<i>Umbellularia californica</i> – <i>Acer macrophyllum</i>	4	3	11	
	<i>Acer negundo</i>*	<i>Acer negundo</i> / (<i>Rubus ursinus</i>)*	0	0	0	
	<i>Aesculus californica</i>	<i>Aesculus californica</i>	1	4	9	
		<i>Aesculus californica</i> – <i>Umbellularia californica</i>	0	6	8	
		<i>Aesculus californica</i> / (<i>Fraxinus dipetala</i> – <i>Ptelea crenulata</i>)	0	5	5	new
		<i>Aesculus californica</i> / <i>Toxicodendron diversilobum</i> / Moss	0	3	6	
		<i>Aesculus californica</i> alliance	1	1	2	
	<i>Alnus rhombifolia</i>	<i>Alnus rhombifolia</i>	7	3	13	
		<i>Alnus rhombifolia</i> – <i>Platanus racemosa</i>	2	0	6	
		<i>Alnus rhombifolia</i> – <i>Umbellularia californica</i> – (<i>Quercus chrysolepis</i>)	0	1	3	
		<i>Alnus rhombifolia</i> / <i>Carex (nudata)</i>	1	0	3	
		<i>Alnus rhombifolia</i> / <i>Salix exigua</i> – (<i>Rosa californica</i>)*	0	0	6	
	<i>Arbutus menziesii</i>	<i>Arbutus menziesii</i> – (<i>Quercus agrifolia</i>)	0	1	1	
		<i>Arbutus menziesii</i> – <i>Umbellularia californica</i>	1	0	1	
	<i>Eucalyptus</i> spp. – <i>Ailanthus altissima</i> – <i>Robinia pseudoacacia</i>	<i>Acacia melanoxyton</i>	1	0	1	
		<i>Ailanthus altissima</i>	1	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Eucalyptus</i> spp. – <i>Ailanthus altissima</i> – <i>Robinia pseudoacacia</i>	<i>Eucalyptus (globulus, camaldulensis)</i>	2	10	14	
		<i>Olea europea</i>	2	2	4	new
		<i>Robinia pseudoacacia</i> *	0	0	0	
		<i>Ulmus</i> spp.	0	1	1	new
	<i>Fraxinus latifolia</i>*	<i>Fraxinus latifolia</i> alliance*	0	0	0	
	<i>Hesperocyparis macrocarpa</i> – <i>Pinus radiata</i>	<i>Hesperocyparis macrocarpa</i> Ruderal*	0	0	0	
		<i>Pinus radiata</i> plantations	2	6	8	
	<i>Hesperocyparis (sargentii, macrocarpa)</i>*	<i>Hesperocyparis (sargentii, macrocarpa)</i> alliance*	0	0	0	
	<i>Juglans hindsii</i> and Hybrids	<i>Juglans hindsii</i>	1	2	3	
		<i>Juglans hindsii</i> / <i>Sambucus nigra</i>	2	0	2	
	<i>Juniperus californica</i>	<i>Juniperus californica</i> – (<i>Cercocarpus montanus</i> – <i>Fraxinus dipetala</i>)	0	1	1	
		<i>Juniperus californica</i> / <i>Ericameria linearifolia</i> / annual – perennial herb	0	3	3	
		<i>Juniperus californica</i> / <i>Eriogonum fasciculatum</i> – <i>Artemisia californica</i> *	0	0	1	
	<i>Pinus attenuata</i>	<i>Pinus attenuata</i> / <i>Arctostaphylos (crustacea)</i>	0	1	1	
		<i>Pinus attenuata</i> / <i>Arctostaphylos (manzanita, canescens)</i>	0	2	2	
		<i>Pinus attenuata</i> alliance	0	1	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Pinus coulteri</i>	<i>Pinus coulteri</i> / <i>Arctostaphylos</i> (<i>auriculata</i> , <i>manzanita</i>)	0	4	4	new
		<i>Pinus coulteri</i> alliance	0	1	1	
	<i>Pinus ponderosa</i> *	<i>Pinus ponderosa</i> – (<i>Quercus agrifolia</i> – <i>Arbutus menziesii</i>)*	0	0	2	
	<i>Pinus sabiniana</i>	<i>Pinus sabiniana</i> / <i>Adenostoma fasciculatum</i>	0	1	1	
		<i>Pinus sabiniana</i> / <i>Artemisia californica</i> – <i>Ceanothus ferrisiae</i> – <i>Heteromeles arbutifolia</i> *	0	0	5	
		<i>Pinus sabiniana</i> / <i>Ceanothus cuneatus</i> – (<i>Rhamnus ilicifolia</i>)	0	2	2	
		<i>Pinus sabiniana</i> / herbaceous	2	2	7	
		<i>Pinus sabiniana</i> / <i>Quercus durata</i>	1	0	2	
	<i>Platanus racemosa</i> – <i>Quercus agrifolia</i>	<i>Platanus racemosa</i> – <i>Aesculus californica</i>	1	0	1	
		<i>Platanus racemosa</i> – <i>Quercus agrifolia</i>	2	0	7	
		<i>Platanus racemosa</i> – <i>Quercus lobata</i>	4	1	6	
		<i>Platanus racemosa</i> – <i>Salix laevigata</i> / <i>Salix lasiolepis</i> – <i>Baccharis salicifolia</i>	2	0	10	
		<i>Platanus racemosa</i> / annual grass	15	0	21	
		<i>Platanus racemosa</i> / <i>Baccharis salicifolia</i>	2	0	4	
		<i>Platanus racemosa</i> / <i>Toxicodendron diversilobum</i>	5	0	8	
		<i>Quercus agrifolia</i> / <i>Salix lasiolepis</i>	0	1	7	
		<i>Umbellularia californica</i> – <i>Platanus racemosa</i>	2	0	6	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Populus fremontii</i> – <i>Fraxinus velutina</i> – <i>Salix gooddingii</i>	<i>Populus fremontii</i>	0	1	1	
		<i>Populus fremontii</i> – <i>Fraxinus velutina</i> – <i>Salix gooddingii</i> alliance	0	3	3	
		<i>Populus fremontii</i> – <i>Salix gooddingii</i> *	0	0	3	
		<i>Populus fremontii</i> – <i>Salix laevigata</i> / <i>Salix lasiolepis</i> – <i>Baccharis salicifolia</i>	2	2	7	
		<i>Populus fremontii</i> / <i>Baccharis salicifolia</i>	1	0	2	
	<i>Populus trichocarpa</i> *	<i>Populus trichocarpa</i> alliance*	0	0	0	
	<i>Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)</i>	Mixed oak – <i>Aesculus californica</i> / grass	0	2	2	
		Mixed oak – <i>Quercus agrifolia</i> / <i>Toxicodendron diversilobum</i>	2	1	7	
		Mixed oak – <i>Quercus kelloggii</i> / grass	0	3	4	
		<i>Quercus douglasii</i> – <i>Quercus lobata</i> – <i>Quercus agrifolia</i> / <i>Toxicodendron diversilobum</i> *	0	0	1	
	<i>Quercus agrifolia</i>	<i>Quercus agrifolia</i>	0	1	2	
		<i>Quercus agrifolia</i> – <i>Aesculus californica</i>	2	2	6	
		<i>Quercus agrifolia</i> – <i>Arbutus menziesii</i> – <i>Umbellularia californica</i>	0	1	2	
		<i>Quercus agrifolia</i> – <i>Pinus coulteri</i>	1	1	2	
		<i>Quercus agrifolia</i> – <i>Quercus kelloggii</i>	0	2	4	
		<i>Quercus agrifolia</i> – <i>Umbellularia californica</i>	7	6	16	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Quercus agrifolia</i>	<i>Quercus agrifolia</i> – <i>Umbellularia californica</i> / <i>Heteromeles arbutifolia</i> – <i>Quercus berberidifolia</i>	2	0	11	
		<i>Quercus agrifolia</i> / <i>Adenostoma fasciculatum</i> – (<i>Salvia mellifera</i>)	1	1	2	
		<i>Quercus agrifolia</i> / <i>Arctostaphylos</i> (<i>crustacea</i>)	0	3	3	
		<i>Quercus agrifolia</i> / <i>Artemisia californica</i>	1	0	4	
		<i>Quercus agrifolia</i> / <i>Frangula californica</i> – <i>Heteromeles arbutifolia</i> *	0	0	1	
		<i>Quercus agrifolia</i> / grass	6	6	21	
		<i>Quercus agrifolia</i> / <i>Toxicodendron diversilobum</i>	4	5	12	
	<i>Quercus chrysolepis</i> (tree)	<i>Quercus chrysolepis</i>	1	1	2	
		<i>Quercus chrysolepis</i> – <i>Umbellularia californica</i>	1	2	3	
	<i>Quercus douglasii</i>	<i>Quercus douglasii</i> – <i>Aesculus californica</i> / grass	3	2	9	
		<i>Quercus douglasii</i> – <i>Juniperus californica</i> / <i>Ericameria linearifolia</i> *	0	0	2	
		<i>Quercus douglasii</i> – <i>Pinus sabiniana</i> / <i>Ceanothus cuneatus</i> – <i>Cercocarpus montanus</i> *	0	0	4	
		<i>Quercus douglasii</i> – <i>Pinus sabiniana</i> / grass*	0	0	6	
		<i>Quercus douglasii</i> – <i>Quercus agrifolia</i>	3	6	11	
		<i>Quercus douglasii</i> – <i>Quercus wislizeni</i>	0	2	2	
		<i>Quercus douglasii</i> – <i>Quercus wislizeni</i> – <i>Pinus sabiniana</i> *	0	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Quercus douglasii</i>	<i>Quercus douglasii</i> / <i>Arctostaphylos manzanita</i> / herbaceous	0	1	1	
		<i>Quercus douglasii</i> / <i>Ericameria linearifolia</i>	7	0	7	
		<i>Quercus douglasii</i> / Mixed herbaceous	8	12	35	
	<i>Quercus kelloggii</i>	<i>Quercus kelloggii</i> – <i>Arbutus menziesii</i> – <i>Quercus agrifolia</i>	2	0	2	
		<i>Quercus kelloggii</i> – <i>Pinus coulteri</i>	3	0	3	
		<i>Quercus kelloggii</i> – <i>Pinus ponderosa</i> *	0	0	4	
		<i>Quercus kelloggii</i> – <i>Quercus chrysolepis</i> *	0	0	2	
	<i>Quercus kelloggii</i>	<i>Quercus kelloggii</i> / grass – herb	4	0	8	
		<i>Quercus kelloggii</i> / <i>Toxicodendron diversilobum</i>	1	0	2	
	<i>Quercus lobata</i>	<i>Quercus lobata</i> – <i>Quercus agrifolia</i> / grass	5	4	14	
		<i>Quercus lobata</i> – <i>Quercus douglasii</i>	2	0	2	
		<i>Quercus lobata</i> / <i>Baccharis pilularis</i> – <i>Diplacus aurantiacus</i> *	0	0	7	
		<i>Quercus lobata</i> / grass	5	7	19	
	<i>Quercus lobata</i> Riparian	<i>Quercus lobata</i> – <i>Alnus rhombifolia</i> *	0	0	1	
		<i>Quercus lobata</i> – <i>Quercus agrifolia</i> / <i>Toxicodendron diversilobum</i> – (<i>Symphoricarpos</i> spp.)	2	1	8	
		<i>Quercus lobata</i> / herbaceous semi-riparian	2	0	2	
		<i>Quercus lobata</i> / <i>Rubus armeniacus</i> *	0	0	5	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Quercus lobata</i> Riparian	<i>Quercus lobata</i> / <i>Rubus ursinus</i> – <i>Rosa californica</i>	1	1	5	
	<i>Quercus wislizeni</i> – <i>Quercus parvula</i> (tree)	<i>Quercus wislizeni</i> – <i>Aesculus californica</i>	0	1	2	
		<i>Quercus wislizeni</i> – <i>Quercus parvula</i> (tree) alliance	0	0	1	
		<i>Quercus wislizeni</i> / <i>Eriodictyon californicum</i>	0	1	1	
		<i>Quercus wislizeni</i> / <i>Heteromeles arbutifolia</i>	0	2	2	
		<i>Quercus wislizeni</i> / <i>Toxicodendron diversilobum</i>	0	1	1	
	<i>Salix gooddingii</i> – <i>Salix laevigata</i>	<i>Salix gooddingii</i>	1	1	5	
		<i>Salix gooddingii</i> – <i>Quercus lobata</i> / wetland herb*	0	0	2	
		<i>Salix gooddingii</i> – <i>Salix laevigata</i> alliance	0	0	1	
		<i>Salix gooddingii</i> / <i>Baccharis salicifolia</i>	1	0	1	
		<i>Salix gooddingii</i> / <i>Rubus armeniacus</i>	0	1	2	
		<i>Salix laevigata</i>	4	1	9	
		<i>Salix laevigata</i> / (<i>Cornus sericea</i> – <i>Ribes</i> spp.) / <i>Scirpus microcarpus</i> – <i>Carex</i> spp.*	0	0	3	
		<i>Salix laevigata</i> / <i>Salix lasiolepis</i>	3	3	13	
	<i>Salix lucida</i> ssp. <i>lasiandra</i> *	<i>Salix lucida</i> ssp. <i>lasiandra</i> *	0	0	0	
	<i>Schinus (molle, terebinthifolius)</i> – <i>Myoporum laetum</i> *	<i>Schinus molle</i> *	0	0	1	
	<i>Sequoia sempervirens</i>	<i>Sequoia sempervirens</i>	1	1	2	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Forest & Woodland	<i>Sequoia sempervirens</i>	<i>Sequoia sempervirens</i> – <i>Umbellularia californica</i>	3	2	5	
		<i>Sequoia sempervirens</i> / <i>Polystichum munitum</i>	0	2	2	
	<i>Umbellularia californica</i>	<i>Umbellularia californica</i>	5	7	13	
		<i>Umbellularia californica</i> – <i>Quercus agrifolia</i> / <i>Toxicodendron diversilobum</i>	7	23	47	
		<i>Umbellularia californica</i> – <i>Quercus wislizeni</i> *	0	0	1	
		<i>Umbellularia californica</i> / <i>Toxicodendron diversilobum</i>	1	4	9	
Shrubland	<i>Acacia</i> spp. – <i>Grevillea</i> spp. – <i>Leptospermum laevigatum</i>	<i>Acacia</i> (<i>cyclops</i> , <i>dealbata</i>)*	0	0	0	
	<i>Adenostoma fasciculatum</i>	<i>Adenostoma fasciculatum</i>	5	9	20	
		<i>Adenostoma fasciculatum</i> – (<i>Ceanothus cuneatus</i>)	0	2	4	
		<i>Adenostoma fasciculatum</i> – (<i>Lotus scoparius</i> – <i>Eriodictyon</i> spp.)	0	1	13	
		<i>Adenostoma fasciculatum</i> – <i>Diplacus aurantiacus</i>	1	4	6	
		<i>Adenostoma fasciculatum</i> – <i>Heteromeles arbutifolia</i> / <i>Melica torreyana</i> *	0	0	1	
	<i>Adenostoma fasciculatum</i> – <i>Salvia</i> spp.	<i>Adenostoma fasciculatum</i> – <i>Salvia mellifera</i>	0	6	7	
	<i>Allenrolfea occidentalis</i>	<i>Allenrolfea occidentalis</i> / (<i>Frankenia salina</i> – <i>Centromadia</i> spp.)	3	3	6	new

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Shrubland	<i>Allenrolfea occidentalis</i>	<i>Allenrolfea occidentalis</i> / <i>Distichlis spicata</i>	0	2	2	
	<i>Arctostaphylos</i> (<i>canescens</i>, <i>manzanita</i>, <i>stanfordiana</i>)	<i>Arctostaphylos auriculata</i>	0	6	6	new
		<i>Arctostaphylos manzanita</i>	0	3	3	
	<i>Arctostaphylos</i> (<i>crustacea</i>, <i>tomentosa</i>)	<i>Arctostaphylos (andersonii, pallida)</i>	0	4	4	
		<i>Arctostaphylos crustacea</i>	1	7	9	
		<i>Arctostaphylos crustacea</i> – <i>Adenostoma fasciculatum</i> – <i>Ceanothus (cuneatus, papillosus)</i>	2	0	2	
	<i>Arctostaphylos glandulosa</i>	<i>Arctostaphylos glandulosa</i> – <i>Adenostoma fasciculatum</i> – <i>Quercus berberidifolia</i> *	0	0	1	
	<i>Arctostaphylos glauca</i>	<i>Arctostaphylos glauca</i>	2	1	7	
		<i>Arctostaphylos glauca</i> – <i>Adenostoma fasciculatum</i>	0	1	4	
	<i>Arctostaphylos glauca</i>	<i>Arctostaphylos glauca</i> – <i>Artemisia californica</i> – <i>Salvia mellifera</i> *	0	0	5	
		<i>Arctostaphylos glauca</i> / <i>Melica torreyana</i> *	0	0	10	
	<i>Artemisia californica</i> – (<i>Salvia leucophylla</i>)	<i>Artemisia californica</i>	6	9	28	
		<i>Artemisia californica</i> – (<i>Salvia leucophylla</i>) alliance	0	0	3	
		<i>Artemisia californica</i> – <i>Diplacus aurantiacus</i>	7	4	21	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
		<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i>	1	0	3	
		<i>Artemisia californica</i> / <i>Nassella (pulchra)</i>	2	0	5	
	<i>Atriplex lentiformis</i>*	<i>Atriplex lentiformis</i> *	0	0	5	
	<i>Baccharis pilularis</i>	<i>Baccharis pilularis</i>	6	4	13	
		<i>Baccharis pilularis</i> – (<i>Frangula californica</i>) – <i>Rubus</i> spp.	4	0	5	
		<i>Baccharis pilularis</i> – <i>Artemisia californica</i>	6	4	17	
		<i>Baccharis pilularis</i> – <i>Toxicodendron diversilobum</i>	14	6	27	
		<i>Baccharis pilularis</i> / (<i>Nassella pulchra</i> – <i>Elymus glaucus</i> – <i>Bromus carinatus</i>)	3	2	5	
		<i>Baccharis pilularis</i> / Annual Grass – Herb	1	5	13	
		<i>Baccharis pilularis</i> alliance	0	2	2	
		<i>Frangula californica</i> ssp. <i>californica</i> – <i>Baccharis pilularis</i> / <i>Scrophularia californica</i>	3	0	5	
	<i>Baccharis salicifolia</i>	<i>Baccharis salicifolia</i>	7	0	12	
	<i>Ceanothus (oliganthus, leucodermis, tomentosus)</i>	<i>Ceanothus leucodermis</i>	1	0	1	
		<i>Ceanothus oliganthus</i> *	0	0	1	
	<i>Ceanothus cuneatus</i>	<i>Ceanothus cuneatus</i> – <i>Adenostoma fasciculatum</i>	0	2	5	
	<i>Cephalanthus occidentalis</i> – <i>Rosa californica</i>	<i>Cephalanthus occidentalis</i> *	0	0	1	
		<i>Rosa californica</i>	1	1	7	
		<i>Rosa californica</i> – <i>Baccharis pilularis</i> *	0	0	6	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Shrubland	<i>Cercocarpus montanus</i>	<i>Cercocarpus montanus</i> – <i>Adenostoma fasciculatum</i> *	0	0	1	
		<i>Cercocarpus montanus</i> var. <i>glaber</i>	0	2	3	
	<i>Cornus sericea</i>	<i>Cornus sericea</i> – <i>Salix (lasiolepis, exigua)</i>	0	1	9	
	<i>Corylus cornuta</i> var. <i>californica</i>	<i>Corylus cornuta</i> / <i>Polystichum munitum</i>	2	0	2	
	<i>Cytisus scoparius</i> – <i>Genista monspessulana</i> – <i>Cotoneaster</i> spp.	<i>Genista monspessulana</i>	1	1	2	
	<i>Diplacus aurantiacus</i>	<i>Diplacus (aurantiacus, puniceus)</i>	1	2	4	
	<i>Ericameria linearifolia</i> – <i>Cleome isomeris</i>	<i>Ericameria linearifolia</i>	0	1	1	
		<i>Gutierrezia californica</i> / <i>Poa secunda</i>	2	1	6	
	<i>Ericameria nauseosa</i>	<i>Ericameria nauseosa</i>	2	0	2	
	<i>Eriogonum fasciculatum</i>	<i>Eriogonum fasciculatum</i> alliance	0	2	3	
		<i>Eriogonum fasciculatum</i> var. <i>foliolosum</i> – <i>Juniperus californica</i>	1	0	1	
	<i>Eriogonum wrightii</i> – <i>Eriogonum heermannii</i> – <i>Buddleja utahensis</i>	<i>Eriogonum wrightii</i> – <i>Eriogonum heermannii</i> – <i>Buddleja utahensis</i> alliance	0	0	1	
		<i>Eriogonum wrightii</i> – <i>Juniperus californica</i>	1	0	1	
		<i>Eriogonum wrightii</i> (ssp. <i>subscaposum</i> , ssp. <i>wrightii</i>)	2	0	7	
	<i>Frangula californica</i> – <i>Rhododendron occidentale</i> – <i>Salix breweri</i>*	<i>Frangula californica</i> ssp. <i>californica</i> *	0	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Shrubland	<i>Frangula californica</i> – <i>Rhododendron occidentale</i> – <i>Salix breweri</i>*	<i>Frangula californica</i> ssp. <i>tomentella</i> / <i>Cirsium fontinale</i> var. <i>campylon</i> – <i>Mimulus guttatus</i> *	0	0	5	
	<i>Gaultheria shallon</i> – <i>Rubus (ursinus)</i>	<i>Holodiscus discolor</i> – <i>Baccharis pilularis</i> – <i>Rubus ursinus</i>	1	2	3	
		<i>Rubus ursinus</i>	0	3	4	
	<i>Lotus scoparius</i> – <i>Lupinus albifrons</i> – <i>Eriodictyon</i> spp.	<i>Eriodictyon californicum</i> / herbaceous	0	1	2	
		<i>Lotus scoparius</i> – <i>Lupinus albifrons</i> – <i>Eriodictyon</i> spp. alliance	0	1	1	
		<i>Lupinus albifrons</i>	1	6	7	
		<i>Lupinus albifrons</i> – <i>Lotus scoparius</i> / (<i>Oenothera deltoidea</i> – <i>Croton californicus</i>)	0	8	8	new
	<i>Lupinus arboreus</i>*	<i>Lupinus arboreus</i> alliance*	0	0	0	
	<i>Malacothamnus fasciculatus</i> – <i>Malacothamnus</i> spp.	<i>Malacothamnus</i> (<i>aboriginum</i> , <i>fremontii</i> , <i>hallii</i>)	3	0	5	rev
	<i>Prunus ilicifolia</i> – <i>Heteromeles arbutifolia</i> – <i>Ceanothus spinosus</i>	<i>Ceanothus ferrisiae</i> – <i>Heteromeles arbutifolia</i> *	0	0	4	
		<i>Heteromeles arbutifolia</i>	0	5	5	
		<i>Heteromeles arbutifolia</i> Serpentine*	0	0	3	
		<i>Prunus ilicifolia</i> – <i>Rhamnus (crocea, ilicifolia)</i>	0	1	6	
		<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i> – <i>Fraxinus dipetala</i> *	0	0	2	
		<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i> – <i>Heteromeles arbutifolia</i> *	0	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Shrubland	<i>Prunus ilicifolia</i> – <i>Heteromeles arbutifolia</i> – <i>Ceanothus spinosus</i>	<i>Prunus ilicifolia</i> ssp. <i>Illicifolia</i> / <i>Sanicula crassicaulis</i> *	0	0	1	
	<i>Quercus berberidifolia</i>	<i>Quercus berberidifolia</i>	0	2	2	
		<i>Quercus berberidifolia</i> – <i>Arctostaphylos glauca</i> *	0	0	1	
	<i>Quercus durata</i>	<i>Quercus durata</i>	1	0	3	
		<i>Quercus durata</i> – <i>Arctostaphylos glauca</i> – <i>Artemisia californica</i> / Grass*	0	0	2	
		<i>Quercus durata</i> – <i>Arctostaphylos glauca</i> – <i>Garrya congdonii</i> / <i>Melica torreyana</i> *	0	0	6	
		<i>Quercus durata</i> – <i>Frangula californica</i> ssp. <i>tomentella</i> – <i>Arctostaphylos glauca</i> *	0	0	3	
		<i>Quercus durata</i> – <i>Heteromeles arbutifolia</i> – <i>Umbellularia californica</i> *	0	0	2	
	<i>Quercus wislizeni</i> – <i>Quercus chrysolepis</i> (shrub)	<i>Quercus palmeri</i>	2	1	3	new
		<i>Quercus wislizeni</i> – <i>Quercus berberidifolia</i>	1	0	1	
	<i>Rhus trilobata</i> – <i>Crataegus rivularis</i> – <i>Forestiera pubescens</i>	<i>Forestiera pubescens</i>	2	0	2	
	<i>Ribes quercetorum</i> – <i>Rhus trilobata</i> – <i>Frangula californica</i>	<i>Frangula californica</i> – (<i>Prunus emarginata</i> – <i>Ribes menziesii</i>)	5	0	5	new
		<i>Prunus emarginata</i> Foothills	2	1	3	new
		<i>Prunus virginiana</i> Foothills	1	1	3	rev
		<i>Ribes quercetorum</i> *	0	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Shrubland	<i>Ribes quercetorum</i> – <i>Rhus trilobata</i> – <i>Frangula californica</i>	<i>Ribes quercetorum</i> – <i>Rhus trilobata</i> – <i>Frangula californica</i> alliance	1	0	1	
	<i>Rubus armeniacus</i> – <i>Sesbania punicea</i> – <i>Ficus carica</i>	<i>Rubus armeniacus</i>	0	3	10	
		<i>Rubus armeniacus</i> – <i>Sesbania punicea</i> – <i>Ficus carica</i> alliance	0	1	1	
	<i>Salix exigua</i>	<i>Salix exigua</i>	6	1	10	
		<i>Salix exigua</i> – (<i>Salix lasiolepis</i>) – <i>Rubus armeniacus</i>	0	2	10	
	<i>Salix lasiolepis</i>	<i>Salix lasiolepis</i>	4	4	14	
		<i>Salix lasiolepis</i> – <i>Baccharis salicifolia</i>	1	0	1	
		<i>Salix lasiolepis</i> – <i>Rubus</i> spp.	2	6	10	
		<i>Salix lasiolepis</i> alliance	0	0	1	
	<i>Salvia mellifera</i> – (<i>Artemisia californica</i>)	<i>Salvia mellifera</i>	4	1	9	
		<i>Salvia mellifera</i> – <i>Artemisia californica</i>	2	1	7	
	<i>Suaeda moquinii</i>	<i>Suaeda moquinii</i>	0	1	1	
		<i>Suaeda moquinii</i> / <i>Lepidium dictyotum</i>	0	1	1	
	<i>Toxicodendron diversilobum</i>	<i>Toxicodendron diversilobum</i> – (<i>Baccharis pilularis</i>)	4	5	14	
		<i>Toxicodendron diversilobum</i> / herbaceous	2	3	5	
		<i>Toxicodendron diversilobum</i> alliance	0	2	2	
Herbaceous	<i>Amsinckia (menziesii, tessellata)</i> – <i>Phacelia</i> spp.	<i>Amsinckia (intermedia, menziesii)</i>	1	3	7	

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Herbaceous	<i>Amsinckia</i> (menziesii, tessellata) – <i>Phacelia</i> spp.	<i>Croton setigerus</i> – (<i>Trichostema lanceolatum</i>)	0	1	2	
		<i>Eriogonum</i> (angulosum, gracillimum) – <i>Amsinckia tessellata</i> *	0	0	2	
	<i>Anemopsis californica</i> – <i>Helianthus nuttallii</i> – <i>Solidago spectabilis</i>	<i>Anemopsis californica</i>	2	2	4	
		<i>Anemopsis californica</i> – <i>Juncus arcticus</i> var. <i>mexicanus</i>	0	1	1	
	<i>Arthrocnemum subterminale</i>	<i>Arthrocnemum subterminale</i> alliance	1	0	1	
	<i>Atriplex prostrata</i> – <i>Cotula coronopifolia</i>	<i>Atriplex prostrata</i> *	0	0	4	
		<i>Atriplex prostrata</i> – <i>Cotula coronopifolia</i> alliance	0	0	1	
		<i>Atriplex prostrata</i> / annual grasses*	0	0	3	
		<i>Cotula coronopifolia</i>	1	0	4	
	<i>Avena</i> spp. – <i>Bromus</i> spp.	<i>Avena barbata</i> – <i>Avena fatua</i>	1	2	17	
		<i>Avena barbata</i> – <i>Bromus hordeaceus</i>	3	0	4	
		<i>Avena</i> spp. – <i>Bromus</i> spp. alliance	7	3	19	
		<i>Brachypodium distachyon</i>	0	1	1	
		<i>Bromus diandrus</i>	3	1	6	
		<i>Bromus diandrus</i> – <i>Avena</i> spp.	0	1	3	
		<i>Bromus hordeaceus</i> – <i>Erodium botrys</i>	7	0	18	
		<i>Bromus hordeaceus</i> – <i>Hordeum</i> spp. – <i>Medicago polymorpha</i>	1	1	6	
		<i>Hypochaeris glabra</i> – <i>Vulpia bromoides</i> *	0	0	3	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Azolla (filiculoides, microphylla)</i>	<i>Azolla (filiculoides, microphylla)</i>	0	2	2	
	<i>Bidens cernua – Euthamia occidentalis – Ludwigia palustris</i>	<i>Ambrosia psilostachya*</i>	0	0	1	rev
		<i>Euthamia occidentalis</i>	0	1	3	
		<i>Grindelia camporum</i>	0	1	2	rev
		<i>Urtica dioica*</i>	0	0	2	new
	<i>Bolboschoenus maritimus</i>	<i>Bolboschoenus maritimus</i>	2	1	15	
		<i>Bolboschoenus maritimus – Sarcocornia pacifica*</i>	0	0	8	
		<i>Bolboschoenus maritimus</i> alliance	0	0	2	
	<i>Brassica nigra – Centaurea (solstitialis, melitensis)</i>	<i>Brassica nigra</i>	0	3	3	
		<i>Carduus pycnocephalus – Silybum marianum</i>	0	2	4	
		<i>Centaurea solstitialis*</i>	0	0	4	
		<i>Raphanus sativus*</i>	0	0	1	
	<i>Bromus carinatus – Elymus glaucus</i>	<i>Bromus carinatus</i>	5	6	12	
		<i>Elymus glaucus</i>	2	5	8	
	<i>Carex barbarae</i>	<i>Carex barbarae</i>	0	3	4	
	<i>Carex nudata*</i>	<i>Carex nudata*</i>	0	0	2	
	<i>Carex obnupta – Oenanthe sarmentosa – Scirpus microcarpus*</i>	<i>Oenanthe sarmentosa*</i>	0	0	1	
	<i>Centromadia (pungens)</i>	<i>Centromadia (pungens)</i> alliance	0	1	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	Centromadia (<i>pungens</i>)	<i>Centromadia pungens</i> – <i>Lepidium dictyotum</i>	3	1	4	
	Ceratophyllum demersum Aquatic*	<i>Ceratophyllum</i> <i>demersum</i> Western*	0	0	2	
	Conium maculatum – Foeniculum vulgare	<i>Conium maculatum</i>	1	0	1	
		<i>Dipsacus</i> (<i>fullonum</i> , <i>sativus</i>)*	0	0	1	
		<i>Foeniculum vulgare</i> *	0	0	2	
	Corethrogyne filaginifolia – Eriogonum (elongatum, nudum)	<i>Chlorogalum</i> <i>pomeridianum</i> – (<i>Triteleia laxa</i> – <i>Perideridia kelloggii</i>)	0	9	11	new
		<i>Corethrogyne</i> <i>filaginifolia</i> – <i>Eriogonum</i> (<i>elongatum, nudum</i>) alliance	0	3	3	
		<i>Eriogonum nudum</i>	3	3	7	
		<i>Grindelia camporum</i> – Annual Grass – Forb	2	8	10	new
		<i>Heterotheca sessiliflora</i> Upland	2	1	3	new
		<i>Viola pedunculata</i> – (<i>Eschscholzia californica</i> – <i>Nassella pulchra</i>)	7	1	11	
	Cortaderia (jubata, selloana)	<i>Cortaderia (jubata,</i> <i>selloana)</i>	1	0	3	
	Cressa truxillensis – Distichlis spicata	<i>Cressa truxillensis</i>	0	1	1	
		<i>Cressa truxillensis</i> – <i>Distichlis spicata</i>	0	1	2	
		<i>Cressa truxillensis</i> – <i>Distichlis</i> <i>spicata</i> alliance	0	1	1	
	Cynodon dactylon – Crypsis spp. – Paspalum spp.	<i>Cynodon dactylon</i> *	0	0	1	
		<i>Cynodon dactylon</i> – <i>Crypsis</i> spp. – <i>Paspalum</i> spp. alliance	0	1	3	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Deschampsia cespitosa</i> – <i>Hordeum brachyantherum</i> – <i>Danthonia californica</i>	<i>Deschampsia</i> (<i>cespitosa</i> , <i>holciformis</i>)	0	1	1	
		<i>Deschampsia cespitosa</i> – <i>Lilaeopsis masonii</i> *	0	0	2	
		<i>Hordeum brachyantherum</i> Lowland	0	1	1	
	<i>Distichlis spicata</i> – <i>Frankenia salina</i> Coastal	<i>Distichlis spicata</i> – (<i>Bromus diandrus</i> – <i>Avena</i> spp.)	0	2	10	rev
		<i>Distichlis spicata</i> – <i>Atriplex prostrata</i> *	0	0	9	
		<i>Distichlis spicata</i> – <i>Frankenia salina</i> – <i>Jaumea carnosa</i>	1	1	17	
		<i>Distichlis spicata</i> – <i>Frankenia salina</i> Coastal alliance	0	1	6	
		<i>Distichlis spicata</i> – <i>Juncus arcticus</i> var. <i>balticus</i> (<i>J. mexicanus</i>) Coastal*	0	0	3	rev
		<i>Distichlis spicata</i> – <i>Sarcocornia pacifica</i> *	0	0	16	
		<i>Distichlis spicata</i> Coastal	0	2	16	rev
		<i>Frankenia salina</i> – <i>Limonium californicum</i> – <i>Monanthochloe littoralis</i> – <i>Sarcocornia pacifica</i>	1	0	16	
		<i>Frankenia salina</i> Coastal*	0	0	14	
		<i>Grindelia stricta</i>	1	1	11	
		<i>Hordeum depressum</i> – Annual Herb*	0	0	8	new
		<i>Lepidium latifolium</i> – <i>Distichlis spicata</i> *	0	0	7	rev

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Distichlis spicata</i> – (<i>Juncus cooperi</i> – <i>Frankenia salina</i>) Interior	<i>Croton californicus</i> – <i>Distichlis spicata</i>	0	2	2	new
		<i>Distichlis spicata</i> Interior	4	4	8	
		<i>Frankenia salina</i> – <i>Distichlis spicata</i> Interior	1	0	1	rev
	<i>Eryngium aristulatum</i>	<i>Eryngium aristulatum</i> var. <i>aristulatum</i> – (<i>Lupinus bicolor</i>)	0	2	2	rev
	<i>Eriophyllum staechadifolium</i> – <i>Erigeron glaucus</i> – <i>Eriogonum latifolium</i> *	<i>Artemisia pycnocephala</i> *	0	0	0	
	<i>Eschscholzia (californica)</i> – <i>Lupinus (nanus)</i>	<i>Bromus hordeaceus</i> – <i>Lupinus nanus</i> – <i>Trifolium</i> spp.	1	1	3	
		<i>Eschscholzia (californica)</i> – <i>Lupinus (nanus)</i> alliance	1	0	1	
		<i>Eschscholzia californica</i>	5	7	12	
		<i>Lupinus (microcarpus, succulentus)</i>	3	12	16	
		<i>Lupinus bicolor</i>	2	4	6	
		<i>Lupinus formosus</i>	0	2	6	new
	<i>Festuca idahoensis</i> – <i>Danthonia californica</i>	<i>Danthonia californica</i> – <i>Nassella pulchra</i>	1	9	10	
		<i>Danthonia californica</i> Coastal	0	8	8	
		<i>Festuca idahoensis</i> – <i>Nassella pulchra</i>	2	2	4	
		<i>Perideridia kelloggii</i> – <i>Danthonia californica</i>	0	2	2	
	<i>Heterotheca (oregona, sessiliflora)</i> *	<i>Heterotheca oregona</i> *	0	0	2	

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Herbaceous	<i>Holocarpha</i> (<i>heermannii</i>, <i>virgata</i>)	<i>Blepharizonia</i> (<i>laxa</i> , <i>plumosa</i>)	0	3	3	new
		<i>Deinandra lobbii</i>	1	0	1	new
		<i>Holocarpha</i> (<i>heermannii</i> , <i>virgata</i>) alliance	0	2	2	
		<i>Holocarpha heermannii</i> *	0	0	1	
		<i>Holocarpha virgata</i>	8	3	15	
	<i>Hydrilla verticillata</i> – <i>Myriophyllum</i> <i>spicatum</i>*	<i>Myriophyllum</i> spp. – <i>Egeria densa</i> *	0	0	1	
	<i>Juncus</i> (<i>effusus</i>, <i>patens</i>) – <i>Carex</i> (<i>pansa</i>, <i>praegracilis</i>)	<i>Carex densa</i>	0	1	2	
		<i>Carex praegracilis</i> Lowland*	0	0	1	
		<i>Carex serratodens</i> *	0	0	4	
		<i>Carex tumulicola</i>	0	1	1	
		<i>Eleocharis</i> <i>macrostachya</i> Lowland*	0	0	8	
		<i>Juncus</i> (<i>effusus</i> , <i>patens</i>) – <i>Carex</i> (<i>pansa</i> , <i>praegracilis</i>) alliance	0	1	2	
		<i>Juncus bufonius</i>	0	1	2	new
		<i>Juncus effusus</i>	0	1	2	
		<i>Juncus patens</i> *	0	0	1	
		<i>Juncus phaeocephalus</i>	1	0	1	
		<i>Juncus xiphioides</i>	2	2	5	
	<i>Juncus arcticus</i> (var. <i>balticus</i>, <i>mexicanus</i>)	<i>Juncus arcticus</i> (var. <i>balticus</i> , <i>mexicanus</i>) alliance	0	0	1	
		<i>Juncus arcticus</i> var. <i>balticus</i> – (var. <i>mexicanus</i>)	1	2	7	
		<i>Juncus arcticus</i> var. <i>balticus</i> – <i>Conium</i> <i>maculatum</i> *	0	0	5	

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Herbaceous	<i>Juncus arcticus</i> (var. <i>balticus</i>, <i>mexicanus</i>)	<i>Juncus arcticus</i> var. <i>balticus</i> – <i>Lepidium latifolium</i> *	0	0	1	
	<i>Lasthenia californica</i> – <i>Plantago erecta</i> – <i>Vulpia microstachys</i>	<i>Hemizonia congesta</i> – <i>Lolium perenne</i>	1	4	14	
		<i>Hesperevax sparsiflora</i> – (<i>Microseris douglasii</i> – <i>Plagiobothrys</i> spp.)	0	6	6	new
		<i>Lasthenia</i> (<i>californica</i> , <i>gracilis</i>)	0	2	4	
		<i>Lasthenia californica</i> – <i>Plantago erecta</i> – <i>Hesperevax sparsiflora</i>	1	0	43	
		<i>Lasthenia californica</i> – <i>Plantago erecta</i> – <i>Vulpia microstachys</i> alliance	4	2	6	
		<i>Leptosiphon ambiguus</i>	3	0	3	new
		<i>Micropus californicus</i>	1	2	3	
		<i>Plantago erecta</i> – <i>Lolium perenne</i> lichen-rocky*	0	0	13	
		<i>Vulpia microstachys</i>	3	0	3	
		<i>Vulpia microstachys</i> – <i>Plantago erecta</i>	3	0	6	
		<i>Vulpia microstachys</i> – <i>Plantago erecta</i> – <i>Calycadenia</i> (<i>truncata</i> , <i>multiglandulosa</i>)*	0	0	3	
	<i>Lasthenia fremontii</i> – <i>Distichlis spicata</i>	<i>Downingia pulchella</i> – <i>Distichlis spicata</i>	8	0	8	
		<i>Frankenia salina</i> – <i>Psilocarphus brevissimus</i>	2	0	3	
		<i>Hordeum depressum</i> – <i>Spergularia</i> (<i>marina</i>)	0	6	6	rev
		<i>Lasthenia ferrisiae</i> – <i>Lasthenia conjugens</i>	9	0	9	

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Herbaceous	<i>Lasthenia fremontii</i> – <i>Distichlis spicata</i>	<i>Lasthenia fremontii</i> – <i>Distichlis spicata</i>	3	0	3	
		<i>Lasthenia fremontii</i> – <i>Distichlis spicata</i> alliance	1	0	1	
	<i>Lasthenia fremontii</i> – <i>Downingia (bicornuta)</i>	<i>Eryngium (vaseyi, castrense)</i>	1	0	1	
		<i>Plagiobothrys stipitatus</i> – <i>Psilocarphus brevissimus</i>	0	2	2	
	<i>Lasthenia glaberrima</i> – <i>Eleocharis macrostachya</i>	<i>Eleocharis macrostachya</i> – <i>Lasthenia glaberrima</i>	1	0	1	rev
		<i>Eleocharis macrostachya</i> Vernal Pool	6	0	6	rev
		<i>Lasthenia glaberrima</i> – <i>Pleuropogon californicus</i>	2	0	2	
	<i>Layia fremontii</i> – <i>Achyrrachaena mollis</i>	<i>Layia fremontii</i> – <i>Achyrrachaena mollis</i> alliance	0	2	2	
	<i>Lepidium latifolium</i> – <i>Lactuca serriola</i>	<i>Chenopodium album</i> – <i>Rumex</i> spp.	0	1	1	
		<i>Dittrichia graveolens</i> – <i>Pseudognaphalium luteoalbum</i> *	0	0	1	
		<i>Lepidium latifolium</i> – <i>Lactuca serriola</i> alliance	0	0	2	
	<i>Leymus cinereus</i> – <i>Leymus triticoides</i>	<i>Leymus triticoides</i>	3	11	27	
		<i>Leymus triticoides</i> – <i>Bromus</i> spp. – <i>Avena</i> spp.	2	5	14	
		<i>Leymus triticoides</i> – <i>Lolium perenne</i>	0	2	2	
	<i>Lolium perenne</i>	<i>Aegilops triuncialis</i> – <i>Hemizonia congesta</i> *	0	0	1	
		<i>Lolium perenne</i>	6	7	27	

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Herbaceous	<i>Lolium perenne</i>	<i>Lolium perenne</i> – <i>Bromus hordeaceus</i> *	0	0	3	
		<i>Lolium perenne</i> – <i>Hordeum marinum</i> – <i>Ranunculus californicus</i>	6	1	8	
		<i>Lolium perenne</i> – <i>Lepidium latifolium</i> *	0	0	2	
		<i>Lolium perenne</i> – <i>Lotus corniculatus</i> *	0	0	5	
		<i>Lolium perenne</i> alliance	0	1	3	
	<i>Ludwigia</i> (hexapetala, peploides) – <i>Eichhornia crassipes</i>	<i>Ludwigia</i> (hexapetala, peploides)	0	1	1	
	<i>Mesembryanthemum</i> spp. – <i>Carpobrotus</i> spp.	<i>Carpobrotus</i> (edulis)	0	1	1	
	<i>Mimulus guttatus</i> – <i>Cirsium</i> spp. – <i>Stachys</i> spp.*	<i>Cirsium fontinale</i> *	0	0	13	
		<i>Mimulus guttatus</i> *	0	0	2	
	<i>Monolopia</i> (lanceolata) – <i>Coreopsis</i> (calliopsidea)	<i>Monolopia major</i>	3	0	3	
	<i>Nassella</i> spp. – <i>Melica</i> spp.	<i>Elymus multisetus</i> – (<i>Eschscholzia californica</i> – <i>Plantago erecta</i>)	5	1	14	
		<i>Melica californica</i>	4	4	10	
		<i>Melica torreyana</i>	1	0	4	
		<i>Nassella cernua</i>	3	0	12	
		<i>Nassella lepida</i>	2	2	7	
		<i>Nassella pulchra</i>	3	9	14	
		<i>Nassella pulchra</i> – <i>Avena</i> spp. – <i>Bromus</i> spp.	5	10	23	
		<i>Nassella pulchra</i> – <i>Corethrogyne filaginifolia</i> *	0	0	1	

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Herbaceous	Nassella spp. – Melica spp.	<i>Nassella pulchra</i> – <i>Erodium</i> spp. – <i>Avena barbata</i>	1	0	1	
		<i>Nassella pulchra</i> – <i>Hemizonia congesta</i>	0	1	4	
		<i>Nassella pulchra</i> – <i>Lolium perenne</i> – (<i>Trifolium</i> spp.)	1	6	7	
		<i>Nassella pulchra</i> – <i>Lolium perenne</i> – <i>Plantago erecta</i> Serpentine	3	0	29	
		<i>Nassella pulchra</i> – <i>Melica californica</i> – annual grass	0	4	5	
		<i>Nassella</i> spp. – <i>Melica</i> spp. alliance	4	1	8	
		<i>Poa secunda</i> – (<i>Trifolium gracilentum</i> , <i>willdenovii</i>)	4	4	15	new
	<i>Phalaris aquatica</i> – <i>Phalaris arundinacea</i>	<i>Phalaris aquatica</i>	0	1	7	
		<i>Phalaris arundinacea</i>	1	0	1	
		<i>Thinopyrum</i> (<i>ponticum</i> , <i>intermedium</i>)*	0	0	7	
	<i>Phragmites australis</i> – <i>Arundo donax</i>	<i>Arundo donax</i> *	0	0	1	
		<i>Phragmites australis</i> Western Ruderal	0	2	12	
	<i>Plagiobothrys</i> <i>nothofulvus</i>	<i>Plagiobothrys</i> <i>nothofulvus</i> – <i>Castilleja</i> <i>exserta</i> – (<i>Lupinus</i> <i>nanus</i>)	1	2	4	
		<i>Plagiobothrys</i> <i>nothofulvus</i> – <i>Daucus</i> <i>pusillus</i> – <i>Trifolium</i> <i>microcephalum</i>	3	0	3	
		<i>Plagiobothrys</i> <i>nothofulvus</i> alliance	0	0	2	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Polygonum lapathifolium</i> – <i>Xanthium strumarium</i> *	<i>Polygonum (amphibium, lapathifolium)*</i>	0	0	5	
		<i>Polygonum lapathifolium</i> – <i>Xanthium strumarium</i> alliance*	0	0	7	
		<i>Xanthium strumarium</i> *	0	0	7	
	<i>Ruppia (cirrhosa, maritima)</i>	<i>Ruppia cirrhosa</i> – algae	0	1	1	
	<i>Salsola tragus</i> – <i>Isatis tinctoria</i> – <i>Bassia</i> spp.*	<i>Salsola</i> spp.*	0	0	1	
	<i>Sarcocornia pacifica</i> (<i>Salicornia depressa</i>)	<i>Sarcocornia pacifica</i> – <i>Atriplex prostrata</i> *	0	0	4	
		<i>Sarcocornia pacifica</i> – <i>Cotula coronopifolia</i>	4	0	7	
		<i>Sarcocornia pacifica</i> – <i>Frankenia salina</i> *	0	0	9	
		<i>Sarcocornia pacifica</i> – <i>Jaumea carnosa</i> – <i>Distichlis spicata</i>	1	1	64	
		<i>Sarcocornia pacifica</i> – <i>Lepidium latifolium</i> *	0	0	3	
		<i>Sarcocornia pacifica</i> – <i>Schoenoplectus americanus</i> *	0	0	8	
		<i>Sarcocornia pacifica</i> – <i>Sesuvium verrucosum</i> *	0	0	4	
		<i>Sarcocornia pacifica</i> (<i>Salicornia depressa</i>) alliance	2	1	8	
		<i>Sarcocornia pacifica</i> / (<i>Lolium perenne</i> – <i>Polypogon monspeliensis</i>)*	0	0	8	
		<i>Sarcocornia pacifica</i> Tidal	3	4	132	
		<i>Triglochin maritima</i>	1	0	1	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Schoenoplectus (acutus, californicus)</i>	<i>Schoenoplectus (acutus, californicus)</i> – <i>Typha (angustifolia, latifolia)</i> *	0	0	11	
		<i>Schoenoplectus (acutus, californicus)</i> – Wetland herbs	0	1	3	
		<i>Schoenoplectus acutus</i>	0	7	17	
		<i>Schoenoplectus acutus</i> – <i>Phragmites australis</i> *	0	0	3	
		<i>Schoenoplectus californicus</i> *	0	0	13	
		<i>Schoenoplectus californicus</i> – <i>Schoenoplectus acutus</i> *	0	0	3	
	<i>Schoenoplectus americanus</i>	<i>Schoenoplectus americanus</i>	1	0	22	
		<i>Schoenoplectus americanus</i> alliance	0	1	5	
	<i>Selaginella (bigelovii, wallacei)</i>	<i>Selaginella bigelovii</i> – (<i>Epilobium canum</i> – <i>Melica californica</i>)	3	0	7	new
	<i>Sesuvium verrucosum</i>	<i>Sesuvium verrucosum</i> *	0	0	9	
		<i>Sesuvium verrucosum</i> – <i>Distichlis spicata</i>	1	0	2	
		<i>Sesuvium verrucosum</i> – <i>Lolium perenne</i> *	0	0	1	
		<i>Sesuvium verrucosum</i> alliance	0	0	1	
	<i>Sparganium (angustifolium)</i>	<i>Sparganium eurycarpum</i>	1	0	1	
	<i>Spartina foliosa</i>	<i>Spartina foliosa</i>	1	1	8	
		<i>Spartina foliosa</i> – <i>Sarcocornia pacifica</i> *	0	0	33	
	<i>Spergularia marina</i>*	<i>Spergularia marina</i> alliance*	0	0	1	
	<i>Stuckenia (pectinata) – Potamogeton spp.</i>	<i>Potamogeton</i> spp.	1	0	2	
		<i>Stuckenia pectinata</i>	1	0	6	
	<i>Trifolium variegatum</i>	<i>Trifolium variegatum</i>	2	0	3	

Lifeform	Alliance	Association	ALA	CCA	All	Stat
Herbaceous	<i>Typha (angustifolia, domingensis, latifolia)</i>	<i>Typha (latifolia, angustifolia)</i>	3	1	29	
		<i>Typha domingensis</i> *	0	0	1	
	<i>Zostera (marina, pacifica)</i> Pacific Aquatic*	<i>Zostera (marina, pacifica)</i> Pacific Aquatic alliance*	0	0	0	
Sparsely Vegetated	<i>Allium</i> spp. – <i>Streptanthus</i> spp. – <i>Hesperolinon</i> spp. Serpentinite	<i>Allium falcifolium</i> – <i>Eriogonum luteolum</i> – <i>Streptanthus (batrachopus, morrisonii)</i> *	0	0	1	
		<i>Allium</i> spp. – <i>Streptanthus</i> spp. – <i>Hesperolinon</i> spp. Serpentinite alliance	0	1	1	
		<i>Streptanthus glandulosus</i> – <i>Dudleya abramsii</i> / Lichen – Moss*	0	0	8	
	<i>Dudleya cymosa</i> – <i>Dudleya lanceolata</i> / Lichen – Moss	<i>Dudleya cymosa</i> – <i>Dudleya lanceolata</i> / Lichen – Moss alliance	0	2	2	

Appendix C

Vegetation Field Key for Alameda and Contra Costa Counties

This field key is for the vegetation types, including alliances and associations, found in Alameda and Contra Costa Counties, based on the classification developed by analyzing vegetation field survey data collected for this and other relevant projects. The key is intended as a guide to field-based and image interpretation-based identification of vegetation. This key is not dichotomous; instead, it follows the hierarchy of the United States National Vegetation Classification (USNVC), in which we are updating the state classification of *A Manual of California Vegetation* (MCV; Sawyer et al. 2009) to conform to the revised USNVC (USNVC 2024). The USNVC hierarchy is promoted by the Federal Geographic Data Committee (FGDC), the Ecological Society of America's Vegetation Panel (FGDC 2008, Faber-Langendoen et al. 2012, 2014), and the California Department of Fish & Wildlife's Survey of California Vegetation (SCV). This key provides additions and revisions to both the USNVC and MCV, and future updates will be found online (USNVC 2024, CNPS 2024).

This key lists vegetation types starting with the current or recently updated version of the USNVC Macrogroup level and proceeding down to the Association level. The complete hierarchy for this classification is listed in Appendix B, Vegetation Classification for Alameda and Contra Costa Counties, California.

Due to a high diversity of the vegetation types in the counties, this key is complex. Follow the instructions in a section carefully and sequentially to arrive at the determined vegetation type. You will need to collect or refer to plant composition data that includes both species that are dominant and also those "indicator" or characteristic/diagnostic species, whose presence may cause a stand to key to a particular vegetation type. If it seems that a stand of vegetation could key to more than one type, review the descriptions (e.g., stand tables, environmental information) for each type to determine which one fits best. Note that this vegetation key may include types that are not accurately detectable in remotely-sensed imagery.

Terms, Concepts, and Symbols used throughout the Key

Stand: The basic physical unit of plant communities in a landscape. It has no set size. Some vegetation stands are very small, such as certain wetland types, and some may be several square kilometers in size, such as certain forest types. A stand is defined by two main unifying characteristics:

1. It has compositional integrity. Throughout the stand, the combination of species is similar. The stand is differentiated from adjacent stands by a discernible boundary that may be abrupt or occur indistinctly along an ecological gradient.
2. It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on

the upper part of the slopes but not the lower would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The compositional and structural features of a stand are often combined into a term called homogeneity. For an area to meet the definition of a stand, it must be homogeneous at the scale being considered.

United States National Vegetation Classification (USNVC): A central organizing framework for how all vegetation in the United States is inventoried and studied, from broad scale formations (biomes) to fine-scale plant communities. The purpose of the NVC is to produce uniform statistics about vegetation resources across the nation, based on vegetation data gathered at local, regional, or national levels. The latest classification standard was published by the FGDC (2008).

The hierarchy units in the USNVC from highest to lowest (i.e., broadest to finest) are:

1. Biome
2. Subbiome
3. Formation
4. Division
5. Macrogroup
6. Group
7. Alliance
8. Association

Alliance: Plant communities based on dominant/diagnostic species of the uppermost or dominant stratum. Accepted alliances are part of the USNVC hierarchy. For the Alameda and Contra Costa Counties vegetation mapping effort, map classes are typically at the alliance level of the USNVC hierarchy (though sometimes at the Group or Macrogroup levels).

Association: The most botanically detailed or finest-scale plant community designation based on dominant species and multiple co-dominant or sub-dominant indicator species from any stratum. Associations are also part of the USNVC hierarchy. The San Mateo Co. map classes are not typically defined to the association level, but they are noted in the key below the Alliance to represent the variation within each alliance that has been identified during the project.

Asterisks ()* – Those types not currently known for or sampled in the study area, but that have a high potential to occur, are sometimes included in the key with an * after the alliance or association name.

Botanical nomenclature: We use the PLANTS database (USDA NRCS 2024) as our standard for botanical names, including scientific names, so this information can be shared nationally with our USNVC partners. However, when a more current name has been assigned in *The Jepson Manual, second edition* (Jepson Flora Project 2024), we may substitute names by the TJM2 and a species code beginning with “2JM” is assigned. General vegetation types, such as moss and lichen, have database codes beginning with the number 2 (e.g., 2MOSS).

Plant community nomenclature: Taxa separated by "-" are typically within the same stratum; taxa separated by "/" are in different strata.

Cover: The primary metric used to quantify the importance/abundance of a particular species or a particular vegetation layer within a stand. Cover is measured by estimating the aerial extent of the living plants, or the bird's-eye view looking from above, for each category. Cover in this project uses the concept of "porosity" or foliar cover rather than "opacity" or crown cover. Thus, field crews are trained to estimate the amount of light versus shade produced by the canopy of a plant or a stratum by taking into account the amount of shade it casts excluding the openings it may have in the interstitial spaces (e.g., between leaves or branches). This is assumed to provide a more realistic estimate of the actual amount of shade cast by the individual or stratum which, in turn, relates to the actual amount of light available to individual species or strata beneath it. However, as a result, cover estimates can vary substantially between leaf-on versus leaf-off conditions. Stands dominated by deciduous species (e.g., *Aesculus californica*, *Toxicodendron diversilobum*) should be sampled during *leaf-on* since they will have substantially less cover when leaves are absent and may key to another type.

Absolute cover: The actual percentage of the surface area at a survey area covered by a species or physiognomic group (trees, shrubs, herbaceous), as in "tan oak covers 10% of the area being surveyed." Absolute cover of all species or physiognomic groups, when added together, may total greater than 100%, because this is not a proportional number and plants can overlap with each other. For example, a stand could have 25% tree cover in the upper layer, 40% shrub cover in the middle layer, and 50% herbaceous cover when surveyed on the ground. However, when aerial interpretation is being used, the maximum absolute value is 100%, since lower levels of vegetation cannot be seen through the overstory on aerial photographs.

Relative cover: The percentage of surface area at a survey area covered by one species relative to other species within the same physiognomic stratum (tree, shrub, herbaceous) or by one stratum relative to the total vegetation cover in an area (or polygon). Thus, 50% relative cover of *Quercus douglasii* in the tree layer means that *Q. douglasii* comprises half the cover of all tree species within a stand, while 50% relative shrub cover means that shrubs make up half the cover of all vegetation within a stand. Relative cover values are proportional numbers that, when added together, total 100% for each species within a stratum or each stratum within a stand of vegetation.

Dominance: Dominance refers to the preponderance of vegetation cover in a stand of uniform composition and site history. It may refer to cover of an individual species as in "dominated by tan oak," or it may refer to dominance by a physiognomic group, as in "dominated by shrubs." When we use the term in the key, a species is dominant if it is in relatively high cover in each stand (e.g. relative cover exceeds 50% of a layer's total cover). See "dominance by layer," below, for further explanation.

Strongly dominant: A species in the dominant lifeform stratum has 60% or greater relative cover.

Co-dominant: Co-dominance refers to two or more species in a stand with similar cover. Specifically, each species has between 30% and 60% relative cover. For example, in a coastal scrub stand with 5% *Baccharis pilularis*, 4% *Frangula*

californica, and 3% *Rubus ursinus* (total 12% shrub cover), technically only the *Baccharis* ($5/12 = 42\%$ relative cover) and the *Frangula* ($4/12 = 33\%$ relative cover) would be co-dominant because *Rubus* would only have 23% relative cover ($3/12 = 25\%$).

Sub-dominant: A species with less than 30% relative cover, usually greater than 15% relative cover.

Characteristic/Diagnostic species: Present in at least 80% of the stands of the type, with no restriction on cover. Relatively even spacing throughout the stand is important, particularly in vegetation with low total cover. Characteristic species that are evenly distributed can be better indicators than species with higher cover and patchy distribution.

Other terms for species, pertaining to presence or cover or a site characteristic:

Typically or *Usually*: trend in at least 80% of the stands

Often: trend in at least 50% of the stands

Sometimes: trend in 30% of the stands or less

Dominance by layer/stratum: Tree, shrub, and herbaceous layers are considered physiognomically distinct. Alliances are usually named by the dominant and/or characteristic species of the *tallest characteristic layer* (see tree-characterized, shrub-characterized, and herb-characterized vegetation definitions below). Average covers within the dominant layer reflect the "modal" concept of the health/age/environment of a particular vegetation type. For example, a higher average cover of woody plants within a stand not recently affected by disturbance reflects a mode of general availability of water, nutrition, and equitable climate, while lower average cover under similar conditions would reflect lower availability of these things.

Woody plant: A vascular plant species that has a noticeably woody stem (e.g., shrubs and trees). It does not include herbaceous species with woody underground portions such as tubers, roots, or rhizomes.

Tree: A one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multi-stemmed (due to fire or other disturbance) but the height of mature plants typically exceeds 5 meters. If less than 5 meters tall, undisturbed individuals of these species are usually single-stemmed. Certain species that sometimes resemble shrubs but may be trees in other areas (e.g., *Aesculus californica*) are, out of statewide tradition or by the USNVC, called trees. Species are "traditionally" placed in one life-form or another. We use the accepted lifeforms in the USNVC or the PLANTS Database (USDA NRCS 2024) to do this.

Tree-characterized vegetation: Trees are evenly distributed throughout the stand. In the Mediterranean climate of the North Coast, tree-dominated alliances typically have >10% absolute tree cover, providing a consistent structural component.

Forest: A forest is defined as a tree-dominated stand of vegetation with 60% or greater absolute cover of trees. Most forest alliances tend to have average cover of trees >60%, but individual stands under certain conditions may drop lower than 60%.

Woodland: A woodland is defined as a tree-dominated stand of vegetation with between 25% and 60% absolute cover of trees. Most woodland alliances tend to have

average cover of trees with 25-60%, but individual stands under certain conditions may drop higher or lower than this range.

Emergent: A plant or vegetation layer is considered emergent if it has low cover and rises above a layer with more cover in the stand. For example, *Pseudotsuga menziesii* trees may comprise an emergent tree layer of 2% cover over dense *Gaultheria shallon* and *Rubus parviflorus* in the shrub understory; the stand would be considered within the *Gaultheria shallon* – *Rubus (ursinus)* Shrubland Alliance because the total tree cover is <10% and the shrub cover is >10%. Medium to tall shrubs are not considered emergent over shorter shrubs, but short trees are considered emergent over tall shrubs.

Shrub: A multi-stemmed woody plant that is usually 0.2-5 meters tall. Definitions are blurred at the low and high ends of the height scales. At the tall end, shrubs may approach tree-size based on disturbance frequencies (e.g., old-growth re-sprouting chaparral species such as *Cercocarpus montanus*, *Prunus ilicifolia*, and so forth, may frequently attain "tree size", but are still typically multi-stemmed and are considered shrubs in this key). At the short end, woody perennial herbs or sub-shrubs of various species are often difficult to categorize into a consistent life-form (e.g., *Eriogonum latifolium*, *Lupinus chamissonis*); in such instances, we refer to the PLANTS Database or "pick a lane" based on best available definitions.

Sub-shrub: A multi-stemmed plant with noticeably woody stems less than 0.5 meter tall. May be easily confused with a perennial herb or small shrub. We lump them into the "shrub" category in stand tables and descriptions of vegetation types.

Shrub-characterized vegetation: Shrubs, including sub-shrubs, are evenly distributed throughout the stand, providing a consistent (even if sparse) structural component; the stand cannot be characterized as a tree stand; and one or both of the following criteria are met: 1) shrubs influence the distribution or population dynamics of other plant species; 2) shrubs play an important role in ecological processes within the stand. Shrub alliances typically have at least 10% absolute shrub cover.

Herbaceous plant: Any species of plant that has no main woody stem development; includes grasses, forbs, and perennial species that die back each year.

Herb-characterized vegetation: Herbs are evenly distributed throughout the stand, providing a consistent (even if sparse) structural component and playing an important role in ecological processes within the stand. The stand cannot be characterized as a tree or shrub stand.

Nonvascular vegetation: Nonvascular organisms characterize a stand, providing a consistent (even if sparse) structural component and playing an important role in ecological processes within the stand.

KEY TO NATURAL AND SEMI-NATURAL VEGETATION OF ALAMEDA AND CONTRA COSTA COUNTIES

Class A. Vegetation dominated, co-dominated, or characterized by an even distribution of overstory trees. The tree canopy is generally greater than 10%, but may occasionally be less than 10% over a denser understory of shrubs and/or herbs = **Tree-Overstory (Woodland & Forest) Vegetation (Page 6)**

Class B. Vegetation dominated, co-dominated, or characterized by woody shrubs in the canopy. Shrubs usually have at least 10% cover. Tree species, if present, generally total less than 10% absolute cover. Herbaceous species may have higher cover than shrubs = **Shrubland Vegetation (Page 25)**

Class C. Vegetation dominated, co-dominated, or characterized by non-woody, herbaceous species in the canopy, including grasses, graminoids, and broad-leaved herbaceous species. Shrubs, if present, usually comprise less than 10% of the vegetation cover. Trees, if present, generally comprise less than 10% cover. However, sometimes vegetation is sparse (<10%) or variable in herbaceous cover on rock outcrops, open sand, and other substrates, and will key here. = **Herbaceous & Sparse Vegetation (Page 43)**

Class A. Tree-Overstory (Woodland & Forest) Vegetation

Section I. Woodlands and forests dominated or characterized by needle or scale-leaved conifer trees. Includes *Hesperocyparis*, *Pinus*, *Pseudotsuga*, and *Sequoia*.

1. Temperate rainforest dominated or co-dominated by *Sequoia sempervirens*. Found either at the bottoms with cold air drainage or along ridgetops with fog influence in the Santa Cruz Mountains.

North Pacific Coastal Rainforest Macrogroup

Californian Coastal Redwood Forest Group

1a. *Sequoia sempervirens* dominates, co-dominates, or characterizes (rarely with as little as 5% cover) stands near streams on terraces, along all slopes and aspects, or on ridges. Associated trees include *Arbutus menziesii*, *Pseudotsuga menziesii*, *Quercus agrifolia*, and *Umbellularia californica*, which are typically sub-to co-dominant but may occasionally exceed *Sequoia* in cover. *Vaccinium ovatum*, *Polystichum munitum*, *Toxicodendron diversilobum*, *Woodwardia fimbriata*, and other shrubs and herbs may intermix in the understory.

Sequoia sempervirens Alliance

1a1. *Sequoia sempervirens* is strongly dominant in the stand without significant cover of other species in the overstory or understory.

Sequoia sempervirens Association

1a2. *Sequoia sempervirens* is strongly dominant in the overstory. *Oxalis oregana* is usually dominant in the understory, though may share cover with *Polystichum munitum*, usually in stream terraces and above riparian areas.

Sequoia sempervirens / *Oxalis oregana* Association*

1a3. *Sequoia sempervirens* is strongly dominant in the overstory. *Woodwardia fimbriata* is typically present in the understory, indicating riparian conditions.

Sequoia sempervirens / (*Pteridium aquilinum*) – *Woodwardia fimbriata* Riparian Association*

1a4. *Sequoia sempervirens* is dominant in the overstory. *Polystichum munitum* is typically co-dominant in the herbaceous layer.

Sequoia sempervirens / *Polystichum munitum* Association

1a5. *Sequoia sempervirens* with significant cover in the overstory and shares the tree layer with *Arbutus menziesii* which has higher cover than any other tree species besides redwood. *Vaccinium ovatum* is usually present in the shrub layer.

Sequoia sempervirens – *Arbutus menziesii* / *Vaccinium ovatum* Association*

1a6. *Sequoia sempervirens* with significant cover in the overstory and shares the tree layer with *Acer macrophyllum* and/or *Umbellularia californica*. In combination these three species make up > 60% of the canopy usually in bottomland and riparian stands.

Sequoia sempervirens – *Acer macrophyllum* – *Umbellularia californica* Association*

1a7. *Sequoia sempervirens* with significant cover in the overstory and shares the tree layer with *Umbellularia californica*, which is co-dominant to sub-dominant.

Sequoia sempervirens – *Umbellularia californica* Association

2. *Pinus ponderosa* dominates stands or co-dominates in combination with hardwoods in the tree overstory in cool-temperate coniferous forests and woodlands influenced by warm, relatively dry summers and cool rainy winters.

2a. *Pinus ponderosa* is dominant or co-dominant in the overstory, usually at greater than 15% absolute cover, with other trees such as *Arbutus menziesii*, *Quercus agrifolia*, and/or *Quercus chrysolepis*, along with an open to dense understory of shrubs.

Sierran-Californian Montane-Foothill Forest & Woodland Macrogroup

Californian Montane Conifer Forest & Woodland Group

Pinus ponderosa* Alliance

Pinus ponderosa – (*Quercus agrifolia* – *Arbutus menziesii*) Provisional Association*

3. Other closed-cone or xerophyllic conifers, including *Hesperocyparis* spp., *Juniperus californica*, *Pinus attenuata*, *Pinus coulteri*, *Pinus muricata*, *Pinus radiata*, or *Pinus sabiniana* is dominant or co-dominant in the overstory.

Californian Forest & Woodland Macrogroup

Californian Conifer Forest & Woodland Group

3a. *Hesperocyparis sargentii* dominates on slopes, ridges, or along stream benches and terraces of serpentine, volcanic, or other ultramafic substrates. *Adenostoma fasciculatum*, *Arctostaphylos* spp., *Ceanothus jepsonii*, and *Quercus*

durata are commonly found in stands. *Hesperocyparis sargentii* is known to occur in the project area but is inaccessible for sampling.

Hesperocyparis (sargentii, macnabiana) Alliance*

Hesperocyparis sargentii Association*

Hesperocyparis sargentii / *Quercus durata* (Mesic) Association*

3b. *Pinus attenuata* dominates or co-dominates with *Quercus chrysolepis* in the tree overstory; shrubs are typically present with an intermittent to dense cover of various shrubs such as *Arctostaphylos crustacea*, *A. manzanita*, and *Vaccinium ovatum* in the understory. Sites are usually nutrient-poor rocky slopes including shale, siltstone, and serpentine.

Pinus attenuata Alliance

3b1. *Pinus attenuata* dominates or co-dominates with *Quercus chrysolepis* in the overstory. *Arctostaphylos crustacea* co-dominates along with other shrubs in the understory.

Pinus attenuata / *Arctostaphylos (crustacea)* Association

3b2. *Pinus attenuata* dominates or co-dominates with *Quercus chrysolepis* or *Umbellularia californica* in the overstory. *Arctostaphylos canescens* and/or *A. manzanita* co-dominates along with other shrubs in the understory.

Pinus attenuata / *Arctostaphylos (manzanita, canescens)* Association

3c. *Pinus coulteri* dominates or co-dominates the tree overstory.

Pinus coulteri Alliance

3c1. *Pinus coulteri* dominates the overstory. *Arctostaphylos auriculata* and/or *A. manzanita* are present in the shrub layer.

Pinus coulteri / *Arctostaphylos (auriculata, manzanita)* Provisional Association

3c2. *Pinus coulteri* dominates the overstory and *Arctostaphylos glauca* dominates the shrub layer.

Pinus coulteri / *Arctostaphylos glauca* Association*

3d. *Pinus sabiniana* dominates the tree overstory; shrubs are typically present in the understory and may exceed pine in cover. Sites often transition to chaparral and often nutrient-poor serpentine or meta-sedimentary.

Pinus sabiniana Alliance

3d1. *Pinus sabiniana* dominates the overstory. *Adenostoma fasciculatum* co-dominates in the shrub layer.

Pinus sabiniana / *Adenostoma fasciculatum* Association

3d2. *Pinus sabiniana* dominates the overstory. *Quercus durata* is characteristically present and dominant or co-dominant with other shrubs including *Ceanothus jepsonii* and *Frangula californica* in the understory.

Pinus sabiniana / *Quercus durata* Association

3d3. *Pinus sabiniana* dominates the overstory. Various shrubs such as *Rhamnus ilicifolia* and *Ceanothus cuneatus* are present in an open to intermittent shrub layer.

Pinus sabiniana / *Ceanothus cuneatus* – (*Rhamnus ilicifolia*) Association

3d4. *Pinus sabiniana* dominates the overstory. Shrubs are sparse and herbs such as *Bromus* spp., *Vulpia* spp., *Calochortus albus*, and *Triteleia laxa* are present at variable cover in the understory.

Pinus sabiniana / herbaceous Association

3d5. Foothill pine occurs on non-serpentine substrates with California juniper and a well-developed herbaceous understory.

Pinus sabiniana – *Juniperus californica* / grass Association*

3e. *Juniperus californica* is dominant in stands, often with *Pinus sabiniana* or *Quercus douglasii* present at lower cover.

Great Basin-Intermountain Dry Shrubland & Grassland Macrogroup

Mojave Mid-Elevation Mixed Desert Scrub Group

***Juniperus californica* Alliance**

3e1. *Juniperus californica* is strongly dominant in the overstory. The understory is not shrubby.

Juniperus californica / annual herbaceous Association*

3e2. *Juniperus californica* is dominant in the overstory. *Ericameria linearifolia* is dominant in the shrub layer.

Juniperus californica / *Ericameria linearifolia* / annual – perennial herb Association

3e3. *Juniperus californica* is dominant in the overstory. *Eriogonum fasciculatum* and/or *Artemisia californica* is present in the shrub layer.

Juniperus californica / *Eriogonum fasciculatum* – *Artemisia californica* Association*

3e4. *Juniperus californica* is dominant in the overstory. *Cercocarpus montanus* and/or *Fraxinus dipetala* is present in the shrub layer.

Juniperus californica – (*Cercocarpus montanus* – *Fraxinus dipetala*) Association

3f. Stands dominated by planted or naturalized Mediterranean conifer species including *Hesperocyparis macrocarpa*, *Pinus pinea*, and/or *Pinus radiata*.

Californian Ruderal Forest Macrogroup

Californian Ruderal Forest Group

***Hesperocyparis macrocarpa* – *Pinus radiata* Semi-Natural Alliance**

3f1. *Pinus radiata* dominates the conifer canopy. Planted stands of *Pinus radiata* are found along roadsides or on slopes where they were introduced.

Pinus radiata plantations Semi-Natural Association

3f2. *Hesperocyparis macrocarpa* dominates the conifer canopy. Planted stands of *Hesperocyparis macrocarpa* are found along roadsides or on slopes where they were introduced.

Hesperocyparis macrocarpa Ruderal Semi-Natural Association*

Section II. Woodlands, forests, and riparian vegetation characterized and/or dominated mainly by native and non-native broad-leaved evergreen and deciduous trees. Includes species of *Aesculus*, *Acer*, *Alnus*, *Arbutus*, *Fraxinus*, *Juglans*, *Notholithocarpus*, *Populus*, *Quercus*, *Salix*, and *Umbellularia*.

4. Vegetation dominated, co-dominated, or characterized by one or more of the following broadleaf trees: *Arbutus menziesii*, *Chrysolepis chrysophylla*, or *Notholithocarpus densiflorus*.

4a. Broadleaf trees such as *Arbutus menziesii* or *Notholithocarpus densiflorus* dominate, co-dominate, or characterize moist, coastal, mixed evergreen forests and woodlands.

4a1. *Arbutus menziesii* is either dominant with sub-dominant *Quercus agrifolia* or is dominant to co-dominant with *Quercus kelloggii* and/or *Umbellularia californica*. *Pseudotsuga menziesii*, *Heteromeles arbutifolia*, and *Toxicodendron diversilobum* are often present. If *Arbutus* is sub- to co-dominant with *Quercus agrifolia*, *Q. chrysolepis*, or *Notholithocarpus densiflorus*, key to the one of these alliances instead of *A. menziesii*.

Southern Vancouverian Dry Foothill Forest & Woodland Macrogroup

Californian Moist Coastal Mixed Evergreen Forest Group

***Arbutus menziesii* Alliance**

4a1a. *Arbutus menziesii* dominates and *Quercus agrifolia* may be co-dominant in the overstory. *Toxicodendron diversilobum* is characteristically present in the shrub layer.

Arbutus menziesii – (*Quercus agrifolia*) Association

4a1b. *Arbutus menziesii* dominates or co-dominates and *Umbellularia californica* is less than 50% relative cover in the overstory.

Arbutus menziesii – *Umbellularia californica* Association

5. Vegetation dominated or co-dominated by the following broadleaf, primarily upland tree species: *Aesculus californica*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. douglasii*, *Q. kelloggii*, *Q. lobata*, *Q. parvula*, *Q. wislizeni*, and/or *Umbellularia californica*.

Californian Forest & Woodland Macrogroup

Californian Broadleaf Woodland & Savanna Group

5a. *Aesculus californica* dominates in open to moderately dense woodlands. If *Umbellularia californica* is present, it is sub-dominant. A variety of herbs may be found in the understory.

***Aesculus californica* Alliance**

5a1. *Aesculus californica* is strongly dominant in the overstory. The understory is usually grassy, with sparse shrub cover.

Aesculus californica Association

5a2. *Aesculus californica* is dominant and *Umbellularia californica* present and sub-dominant in the tree layer.

Aesculus californica – *Umbellularia californica* Association

5a3. *Aesculus californica* is dominant in the overstory. *Fraxinus dipetala* or *Ptelea crenulata* have significant cover in the shrub layer, and have higher cover than *Toxicodendron diversilobum*, if present.

Aesculus californica / (*Fraxinus dipetala* – *Ptelea crenulata*) Provisional Association

5a4. *Aesculus californica* is strongly dominant in the overstory. *Toxicodendron diversilobum* and other shrubs have significant cover in the understory. Moss is usually present in the understory.

Aesculus californica / *Toxicodendron diversilobum* / Moss Association

5b. *Umbellularia californica* is either dominant or co-dominant with *Quercus agrifolia* or *Quercus wislizenii* in open to dense woodlands. If *Quercus agrifolia* is co-dominant and the shrub layer is significant with toyon, scrub oak, or manzanita, key to the *Quercus agrifolia* Alliance. Found in a variety of upland settings, such as coastal bluffs, inland ridges, steep north-facing slopes, rocky outcrops and post-fire landscapes. If *U. californica* is found in a riparian setting, key to *Acer macrophyllum* – *Alnus rubra* Alliance. If *U. californica* is co-dominant with *Arbutus*, *Acer*, *Pinus sabiniana* on serpentine, *Quercus chrysolepis*, *Q. lobata*, *Q. kelloggii*, or *Sequoia*, key to one of these other hardwood or conifer alliances instead.

***Umbellularia californica* Alliance**

5b1. *Umbellularia californica* is strongly dominant in the overstory, with no other species co-dominant in the tree layer. The understory is not shrubby and lacks ferns.

Umbellularia californica Association

5b2. *Umbellularia californica* is dominant in the overstory. *Polystichum munitum* or other fern present at significant cover in the understory.

Umbellularia californica / *Polystichum munitum* Association*

5b3. *Umbellularia californica* is dominant in the overstory. *Toxicodendron* is characteristically present at variable cover and other shrubs may occur including *Heteromeles arbutifolia* or *Lonicera hispidula*.

Umbellularia californica / *Toxicodendron diversilobum* Association

5b4. *Umbellularia californica* is co-dominant and *Quercus wislizeni* is present at significant cover in the overstory or regenerating layer. *Pseudotsuga menziesii* may be present and low in cover.

Umbellularia californica – *Quercus wislizeni* Association*

5b5. *Umbellularia californica* is co-dominant and *Quercus agrifolia* is usually present at significant cover in the overstory. *Toxicodendron diversilobum* and other species form a shrub understory at variable cover.

Umbellularia californica – *Quercus agrifolia* / *Toxicodendron diversilobum* Association

5c. One or more species of *Quercus* listed above (step 5) dominates or co-dominates in the tree overstory.

5c1. Multiple *Quercus* tree species intermix (at least three species) and it is difficult to assign to an alliance defined by one oak species. Co-dominating oaks may include *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus kelloggii*, *Quercus lobata*, *Quercus parvula*, and/or *Q. wislizeni*. If one or two oak species dominate, read steps to key to individual oak alliances below.

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Alliance

5c1a. *Quercus kelloggii*, *Quercus douglasii* and/or other oaks share dominance in the overstory. Herbaceous cover is significant in the understory with shrubs typically low in cover.

Mixed oak – *Quercus kelloggii* / grass

5c1b. *Quercus agrifolia*, *Quercus kelloggii*, and *Quercus lobata* characteristically present with a combined dominance in the overstory; other hardwoods may also be present including *Quercus douglasii* and *Umbellularia californica*. *Toxicodendron diversilobum* is characteristically present with other shrubs in the understory.

Mixed oak – *Quercus agrifolia* / *Toxicodendron diversilobum*

5c1c. Three oak species, usually *Quercus douglasii*, *Quercus lobata*, and *Quercus agrifolia*, share nearly equal parts of the tree canopy. The sum of their covers is > 60% relative cover. *Toxicodendron diversilobum* is usually present in the shrub layer at variable cover, and herbs can be higher in cover in the understory.

Quercus douglasii – *Quercus lobata* – *Quercus agrifolia* / *Toxicodendron diversilobum* Association*

5c1d. *Quercus agrifolia*, *Quercus lobata*, *Quercus douglasii*, and/or *Quercus chrysolepis* share dominance and *Aesculus californica* is present at significant cover in the overstory. Herbaceous cover is significant in the understory.

Mixed oak – *Aesculus californica* / grass

5c2. *Quercus chrysolepis* is dominant or co-dominant with *Arbutus menziesii* or *Umbellularia californica* in the tree overstory. *Quercus wislizeni* is occasionally found as a sub-dominant tree.

***Quercus chrysolepis* (tree) Alliance**

5c2a. *Quercus chrysolepis* and *Umbellularia californica* are both present and co-dominate the overstory and regenerating layers.

Quercus chrysolepis – *Umbellularia californica* Association

5c2b. *Quercus chrysolepis* is dominant in the overstory. *Arctostaphylos crustacea* characteristically present in the understory.

Quercus chrysolepis / *Arctostaphylos crustacea* Association*

5c2c. *Quercus chrysolepsis* as a tree co-dominates with *Quercus wislizeni* or *Quercus parvula* var. *shrevei* present at significant cover in either tree or shrub form.

Quercus chrysolepis / *Quercus (wislizeni, parvula)* Association*

5c2d. *Quercus chrysolepsis* is strongly dominant in the overstory.

Quercus chrysolepis Association

5c3. *Quercus douglasii* dominates or co-dominates with *Aesculus californica*, *Pinus sabiniana*, *Quercus agrifolia*, or *Arbutus menziesii* in the tree overstory. The understory herbaceous layer is often moderately dense to dense, with a mixture of native and non-native forbs and grasses.

***Quercus douglasii* Alliance**

5c3a. *Quercus douglasii* dominates with *Aesculus* characteristically present in the overstory. Grasses such as *Avena*, *Lolium perenne*, and *Bromus* spp. dominate the understory.

Quercus douglasii – *Aesculus californica* / grass Association

5c3b. *Quercus douglasii* dominates with *Juniperus californica* sub-dominant in the overstory. *Ericameria linearifolia* is present along with other shrubs in the understory.

Quercus douglasii – *Juniperus californica* / *Ericameria linearifolia*
Association*

5c3c. *Quercus douglasii* dominant or co-dominant with *Pinus sabiniana* in the overstory. *Cercocarpus betuloides* and/or *Ceanothus cuneatus* are often present with other shrubs in the understory.

Quercus douglasii – *Pinus sabiniana* / *Ceanothus cuneatus* –
Cercocarpus montanus Association*

5c3d. *Quercus douglasii* dominates with *Pinus sabiniana* present to co-dominant in the overstory. Grasses and forbs are present with much higher cover than shrubs in the understory.

Quercus douglasii – *Pinus sabiniana* / grass Association*

5c3e. *Quercus douglasii* co-dominates with *Quercus agrifolia* present at significant cover in the overstory.

Quercus douglasii – *Quercus agrifolia* Association

5c3f. *Quercus douglasii* co-dominates with *Pinus sabiniana* and *Quercus wislizeni* in the overstory and/or understory.

Quercus douglasii – *Quercus wislizeni* – *Pinus sabiniana* Association*

5c3g. *Quercus douglasii* dominates with *Quercus wislizeni* sub-dominant in the overstory.

Quercus douglasii – *Quercus wislizeni* Association

5c3h. *Quercus douglasii* dominates in the overstory with *Arctostaphylos manzanita* co-dominates in the shrub layer.

Quercus douglasii / *Arctostaphylos manzanita* / herbaceous Association

5c3i. *Quercus douglasii* dominates the overstory. *Ericameria linearifolia* and/or *Artemisia californica* are present in the understory at variable cover.

Quercus douglasii / *Ericameria linearifolia* Association

5c3j. *Quercus douglasii* is strongly dominant in the overstory. The herbaceous layer is intermittent to continuous with a variety of grasses and other herbs.

Quercus douglasii / Mixed herbaceous Association

5c3k. *Quercus douglasii* is strongly dominant in the overstory. *Toxicodendron diversilobum* and various grasses or other herbs present in the understory at variable cover.

Quercus douglasii / *Toxicodendron diversilobum* / grass Association*

5c4. *Quercus kelloggii* or *Quercus × morehus* dominates or co-dominates with *Pinus ponderosa*, *Q. agrifolia*, *Q. chrysolepis*, and/or *Umbellularia californica* in the tree overstory. *Arbutus menziesii* is often present as a sub-dominant species. Stands are found inland, above maritime influence, often on northerly slopes.

***Quercus kelloggii* Alliance**

5c4a. *Quercus kelloggii* dominant or co-dominant with either *Arbutus menziesii*, *Quercus agrifolia*, or the two species in combination at significant cover in the tree layer.

Quercus kelloggii – *Arbutus menziesii* – *Quercus agrifolia* Association

5c4b. *Quercus kelloggii* is dominant with *Pinus coulteri* present at significant cover in the overstory.

Quercus kelloggii – *Pinus coulteri* Association

5c4c. Both *Quercus kelloggii* and *Pinus ponderosa* are present at significant cover in the overstory.

Quercus kelloggii – *Pinus ponderosa* Association*

5c4d. *Quercus kelloggii* is dominant or co-dominant with *Quercus chrysolepis* in the overstory.

Quercus kelloggii – *Quercus chrysolepis* Association*

5c4e. *Quercus kelloggii* is strongly dominant in the overstory. Herb layer is open to continuous with various grasses and herbs including *Elymus glaucus*, *Cynosurus echinatus*, and *Sanicula crassicaulis*.

Quercus kelloggii / grass – herb Association

5c4f. *Quercus kelloggii* is strongly dominant in the overstory. *Toxicodendron diversilobum* is usually dominant with other shrubs in the understory.

Quercus kelloggii / *Toxicodendron diversilobum* Association

5c5. *Quercus lobata* dominates or co-dominates with *Quercus agrifolia*, *Q. douglasii*, *Q. kelloggii*, and/or *Umbellularia californica* in the tree overstory in an

upland habitat. Stands are typically found on slopes with an open grassy understory and *Toxicodendron diversilobum* is a common understory shrub. If the habitat is riparian, go to **step 6**.

***Quercus lobata* Alliance**

5c5a. *Quercus lobata* co-dominates with *Quercus agrifolia* in the tree layer; these two oaks in combination are > 50% of the tree canopy. Herb layer is open to continuous, with grasses dominating, such as *Avena*, *Briza maxima*, *Bromus diandrus*, *Bromus hordeaceus*, and/or *Elymus glaucus*.

Quercus lobata – *Quercus agrifolia* / Grass Association

5c5b. *Quercus lobata* co-dominates with *Quercus douglasii* in the overstory. Understory is variable including herbs and grasses.

Quercus lobata – *Quercus douglasii* Association

5c5c. *Quercus lobata* is strongly dominant in the overstory. *Baccharis pilularis*, *Diplacus aurantiacus*, and *Toxicodendron diversilobum* present dominating in the understory.

Quercus lobata / *Baccharis pilularis* – *Diplacus aurantiacus* Provisional Association*

5c5d. *Quercus lobata* is strongly dominant in the overstory or co-dominant with trees other than *Quercus agrifolia*. The herbaceous layer is open to continuous, with grasses dominating, such as *Avena* or *Bromus diandrus*.

Quercus lobata / Grass Association

5c6. *Quercus agrifolia*, *Q. parvula*, *Q. wislizeni* or other *Quercus* spp. dominates and/or co-dominates as a shrub, co-occurring with *Umbellularia*, *Adenostoma*, and a variety of other shrubs that prefer more mesic, northerly exposures. *Quercus parvula* and *Q. wislizeni* are not always morphologically distinct.

***Quercus wislizeni* – *Quercus chrysolepis* (shrub) Alliance**

5c6a. *Quercus berberidifolia* is co-dominant with *Quercus chrysolepis* and/or *Quercus wislizeni* in the shrub layer.

Quercus wislizeni – *Quercus berberidifolia* Association

5c6b. Regenerating or shrubby *Quercus chrysolepis*, *Q. wislizeni*, *Q. parvula* and/or *Q. agrifolia* co-dominate in the shrub layer.

Quercus agrifolia – *Quercus chrysolepis* – *Quercus parvula* (shrub) Provisional Association*

5c6c. *Quercus palmeri* is strongly dominant in the shrub layer.

Quercus palmeri Provisional Association

5c7. The tree form of *Quercus parvula* and/or *Q. wislizeni* dominates or co-dominates in the tree canopy, often with *Arbutus menziesii*, *Pseudotsuga menziesii*, and/or *Umbellularia californica*. If the oaks have a shrubby habit or are regenerating and intermixing with a variety of other shrub species, key to the *Quercus wislizeni* – *Quercus chrysolepis* (shrub) Alliance above.

***Quercus wislizeni* – *Quercus parvula* (tree) Alliance**

5c7a. Either *Quercus wislizeni* or *Q. parvula* var. *shrevei* co-dominant with *Arbutus menziesii* characteristically present in the overstory. *Toxicodendron diversilobum* is usually present.

Quercus (parvula, wislizeni) – Arbutus menziesii / Toxicodendron diversilobum
Association*

5c7b. *Quercus parvula* var. *shrevei* dominates the overstory. Other trees, if present, are sub-dominant.

Quercus parvula var. *shrevei* Association*

5c7c. *Quercus wislizeni* or *Q. parvula* var. *shrevei* co-dominate with *Aesculus californica* in the overstory.

Quercus wislizeni – Aesculus californica Association

5c7d. *Quercus wislizeni* dominates the overstory. *Eriodictyon californicum* and other disturbance indicators are present in the shrub layer.

Quercus wislizeni / Eriodictyon californicum Association

5c7e. *Quercus wislizeni* dominates the overstory. *Heteromeles arbutifolia* is present with significant cover in the shrub layer.

Quercus wislizeni / Heteromeles arbutifolia Association

5c7f. *Quercus wislizeni* dominates the overstory. *Toxicodendron diversilobum* is present with significant cover in the shrub layer.

Quercus wislizeni / Toxicodendron diversilobum Association

5c8. *Quercus agrifolia* dominates or co-dominates with *Arbutus menziesii* in the canopy in an upland setting. If *Q. douglasii* (or hybrid *Q. ×eplingii*), *Q. lobata*, or *Q. wislizeni* is co-dominant to dominant, key to one of these other alliances instead of *Q. agrifolia*. If co-dominant with *Umbellularia californica*, key here if shrub understory is significant and includes toyon, scrub oak, or manzanita. The understory herbaceous layer often contains a mixture of native and non-native herbs and/or shrubs. If the habitat is riparian, go to **step 6**.

***Quercus agrifolia* Alliance**

5c8a. *Quercus agrifolia* is strongly dominant in the tree layer. The shrub layer is absent to sparse. Herbs may be present and variable in cover including *Pteridium aquilinum* and *Bromus* spp.

Quercus agrifolia Association

5c8b. *Quercus agrifolia* is dominant to co-dominant with *Aesculus californica* characteristically present to co-dominant in the tree layer. *Toxicodendron diversilobum* is typically present with variable cover in the shrub layer.

Quercus agrifolia – Aesculus californica Association

5c8c. *Quercus agrifolia* is dominant to co-dominant with *Quercus kelloggii* present with at least 5% absolute cover in the tree layer.

Quercus agrifolia – Quercus kelloggii Association

5c8d. *Quercus agrifolia* is co-dominant with *Pinus coulteri* alone or in combination with *Pinus sabiniana*.

Quercus agrifolia – *Pinus coulteri* Association

5c8e. *Quercus agrifolia* is dominant to co-dominant with both *Arbutus menziesii* and *Umbellularia californica* present and sub-dominant.

Quercus agrifolia – *Arbutus menziesii* – *Umbellularia californica* Association

5c8f. *Quercus agrifolia* is dominant with *Umbellularia californica* sub-dominant to co-dominant in the overstory. There may be shrubs in the understory which are generally deciduous and soft-leaved.

Quercus agrifolia – *Umbellularia californica* Association

5c8g. *Quercus agrifolia* is dominant with *Umbellularia californica* present at significant cover in the overstory and regenerating layer. Evergreen sclerophyll-leaved shrubs such as *Heteromeles arbutifolia*, *Quercus berberidifolia*, or *Frangula californica* are present in the understory.

Quercus agrifolia – *Umbellularia californica* / *Heteromeles arbutifolia* – *Quercus berberidifolia* Association

5c8h. *Quercus agrifolia* is strongly dominant in the overstory. *Adenostoma fasciculatum* co-dominates in the shrub layer.

Quercus agrifolia / *Adenostoma fasciculatum* – (*Salvia mellifera*) Association

5c8i. *Quercus agrifolia* is dominant in the overstory. *Arctostaphylos crustacea* or another coastal manzanita is present at significant cover.

Quercus agrifolia / *Arctostaphylos (crustacea)* Association

5c8j. *Quercus agrifolia* is dominant in the overstory. *Artemisia californica* and other shrubs significant (> 5% absolute cover) in the understory.

Quercus agrifolia / *Artemisia californica* Association

5c8k. *Quercus agrifolia* is strongly dominant in the overstory. *Frangula californica* and/or *Heteromeles arbutifolia* co-dominates in the shrub layer.

Quercus agrifolia / *Frangula californica* – *Heteromeles arbutifolia* Association*

5c8l. *Quercus agrifolia* is dominant in the overstory. Grasses such as *Avena*, *Briza maxima*, *Bromus* spp., and *Elymus glaucus* dominate the understory though various other herbs are often present.

Quercus agrifolia / grass Association

5c8m. *Quercus agrifolia* is dominant in the overstory. *Toxicodendron diversilobum* characteristically present though can occur with other shrubs such as *Corylus cornuta*, *Baccharis pilularis*, and *Lonicera hispidula* at variable cover.

Quercus agrifolia / *Toxicodendron diversilobum* Association

6. *Juglans hindsii*, *Platanus racemosa*, *Populus fremontii*, *Quercus agrifolia*, *Quercus lobata*, or *Salix laevigata* is dominant, co-dominant or characteristic in permanently moist or riparian settings, where sub-surface water is available all year. Nearby upland

vegetation is often dominated by broadleaf evergreen or deciduous trees, as opposed to conifers.

Western Arid Lowland Flooded Forest Macrogroup

Californian Mediterranean Riparian Forest Group

6a. *Salix laevigata* or *Salix gooddingii* dominates along streams, rivers, ditches, floodplains, and lake edges. If *Populus fremontii* is emergent with >5% absolute cover, key to the *Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Alliance. Associated trees and shrubs include *Alnus rhombifolia*, *Quercus agrifolia*, *Rubus*, *Salix*, and others.

***Salix gooddingii* – *Salix laevigata* Alliance**

6a1. *Salix gooddingii* is strongly dominant in the overstory.

Salix gooddingii Association

6a2. *Salix gooddingii* and *Quercus lobata* are present at significant cover in the overstory.

Salix gooddingii – *Quercus lobata* / wetland herb Association*

6a3. *Salix gooddingii* is strongly dominant in the overstory. *Baccharis salicifolia* dominates the shrub layer.

Salix gooddingii / *Baccharis salicifolia* Association

6a4. *Salix gooddingii* is dominant in the overstory. *Rubus armeniacus* is dominant in the shrub layer.

Salix gooddingii / *Rubus armeniacus* Association

6a5. *Salix laevigata* is strongly dominant in the overstory. Various shrubs may occur in the understory such as *Baccharis salicifolia*, *Rosa*, or *Rubus* spp.

Salix laevigata Association

6a6. *Salix laevigata* is strongly dominant in the overstory. *Cornus sericea*, *Ribes* spp., and/or *Rubus ursinus* are often present at significant cover along with other shrub species. *Scirpus microcarpus* and sedges are often present in the herbaceous layer.

Salix laevigata – (*Cornus sericea* – *Ribes* spp.) / *Scirpus microcarpus* – *Carex* spp. Provisional Association*

6a7. *Salix laevigata* is dominant in the overstory. *Salix lasiolepis* is characteristically present and >=1% to dominant in the shrub layer.

Salix laevigata / *Salix lasiolepis* Association

6b. *Juglans hindsii* or hybrids dominate in stands along riparian corridors, floodplains, and terraces. Other riparian species may be present, including *Acer*, *Fraxinus*, *Platanus*, *Rubus* and *Sambucus*. Understory is variable and often includes *Sambucus nigra* or *Rubus* spp.

***Juglans hindsii* and Hybrids Alliance**

6b1. *Juglans hindsii* or hybrids as the sole dominant or co-dominant with other riparian trees such as *Acer negundo* or *Salix laevigata*, along riparian corridors, floodplains, and stream banks. Shrubs such as *Rubus* spp. and *Vitis californica* may be present at variable cover.

Juglans hindsii Association

6b2. *Juglans hindsii* or hybrids are dominant along riparian corridors, floodplains, and terraces. Other riparian trees may be present. The shrub layer includes *Sambucus nigra* as a co-dominant.

Juglans hindsii / *Sambucus nigra* Provisional Association

6c. *Populus fremontii* dominates or co-dominates with *Acer negundo*, *Juglans*, and/or *Salix*, sometimes with *Populus* having as little as 5% absolute cover in riparian settings with a diverse mix of riparian species. If *Juglans hindsii* is co-dominant, but *Populus* has at least 20% relative cover in the tree layer, key to this alliance.

***Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Alliance**

6c1. *Populus fremontii* is strongly dominant in the overstory.

Populus fremontii Association

6c2. *Populus fremontii* and *Salix gooddingii* are co-dominant in the overstory.

Populus fremontii – *Salix gooddingii* Association*

6c3. *Populus fremontii* is dominant in the overstory or co-dominant with *Salix laevigata*. *Salix lasiolepis* and/or *Baccharis salicifolia* are present in the shrub layer with various other shrubs.

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia*
Association

6c4. *Populus fremontii* is strongly dominant in the overstory. *Baccharis salicifolia* is dominant in the shrub layer.

Populus fremontii / *Baccharis salicifolia* Association

6d. *Quercus agrifolia* dominates in a riparian setting, or *Platanus racemosa* is dominant, co-dominant, or characteristically present at >15% relative cover in the tree canopy of riparian habitats with *Acer macrophyllum*, *Acer negundo*, *Aesculus californica*, *Juglans hindsii*, *Quercus agrifolia*, *Quercus lobata*, *Salix laevigata*, or *Umbellularia californica*. If *Alnus rhombifolia* is co-dominant, key to *Alnus rhombifolia* Alliance. If *Populus fremontii* or *Populus trichocarpa* is present, key to the alliance of the species with the most cover.

***Platanus racemosa* – *Quercus agrifolia* Alliance**

6d1. *Platanus racemosa* is co-dominant with *Aesculus californica* in the overstory.

Platanus racemosa – *Aesculus californica* Association

6d2. Both *Platanus racemosa* and *Quercus agrifolia* are present and often co-dominate in the overstory, along with other trees including *Umbellularia*

californica and *Aesculus californica*. Shrubs are variable and can include *Symphoricarpos albus* and *Toxicodendron diversilobum*.

Platanus racemosa – *Quercus agrifolia* Association

6d3. *Platanus racemosa* is dominant to co-dominant with *Quercus lobata* in the overstory. Shrubs variable and can include *Sambucus nigra*, *Symphoricarpos albus*, and *Toxicodendron diversilobum*.

Platanus racemosa – *Quercus lobata* Association

6d4. *Platanus racemosa* is co-dominant with *Salix laevigata* or other *Salix* in the overstory. Shrubs are variable and can include *Salix lasiolepis*, *Baccharis salicifolia*, and *Rubus ursinus*.

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association

6d5. *Platanus racemosa* is strongly dominant in the overstory. Annual grasses and forbs, including non-native and native herbs, are present and variable in cover.

Platanus racemosa / annual grass Association

6d6. *Platanus racemosa* is dominant in the overstory. *Baccharis salicifolia* >/= 3% absolute cover in the understory along with various wetland herbs.

Platanus racemosa / *Baccharis salicifolia* Association

6d7. *Platanus racemosa* is dominant in the overstory. *Toxicodendron diversilobum* is characteristically present and variable in cover along other shrubs such as *Symphoricarpos albus* and with various wetland herbs in the understory.

Platanus racemosa / *Toxicodendron diversilobum* Association

6d8. *Quercus agrifolia* is dominant in a riparian setting, often with *Salix* spp. and *Toxicodendron diversilobum*.

Quercus agrifolia / *Salix lasiolepis* Association

6d9. *Umbellularia californica* is co-dominant in a riparian setting, often with other riparian trees including *Platanus racemosa*, *Acer macrophyllum*, and *Acer negundo*.

Umbellularia californica – *Platanus racemosa* Association

6e. *Quercus lobata* dominates or co-dominates with *Fraxinus latifolia*, *Quercus agrifolia*, *Quercus kelloggii*, *Salix lasiolepis*, and/or *Umbellularia californica* in the tree overstory. Stands are typically found along valley bottoms and lower slopes on seasonally saturated soils that may flood intermittently. Common understory shrubs include *Rosa californica*, *Rubus* spp., and *Toxicodendron diversilobum*.

***Quercus lobata* Riparian Alliance**

6e1. *Quercus lobata* is co-dominant with *Quercus agrifolia* in the overstory in riparian settings. *Toxicodendron diversilobum*, *Sambucus nigra*, *Symphoricarpos* spp. and other shrubs occur in the understory.

Quercus lobata – *Quercus agrifolia* / *Toxicodendron diversilobum* – (*Symphoricarpos* spp.) Association

6e2. *Quercus lobata* is dominant in the riparian overstory. *Rubus armeniacus* is dominant to co-dominant in the shrub layer.

Quercus lobata / *Rubus armeniacus* Association*

6e3. *Quercus lobata* is dominant in the overstory. *Rubus ursinus* and *Rosa californica* are often present with other shrubs in the understory.

Quercus lobata / *Rubus ursinus* – *Rosa californica* Association

6e4. *Quercus lobata* is dominant in the overstory. Various riparian and upland herbs occur in the understory, and shrubs such as *Rhus trilobata* sometimes occur.

Quercus lobata / herbaceous semi-riparian Association

6e5. *Quercus lobata* is co-dominant with *Alnus rhombifolia* in the overstory.

Quercus lobata – *Alnus rhombifolia* Association*

7. *Alnus rhombifolia*, *Alnus rubra*, *Acer macrophyllum*, *Acer negundo*, *Fraxinus latifolia*, *Populus trichocarpa*, and/or *Salix lucida* are dominant, co-dominant, or characteristic of broadleaf riparian tree vegetation. Stands are more likely to occur near cool temperate coniferous forests, unlike vegetation of the Western Interior Riparian Forest & Woodland Group described above. Found along riparian corridors, incised canyons, seeps, stream banks, mid-channel bars, floodplains, and terraces.

North Pacific Forested Wetland Macrogroup

North-Central Pacific Lowland Riparian Forest Group

7a. *Populus trichocarpa* dominates or co-dominates with *Alnus rubra* or *Salix* spp. in the tree overstory. Stands for this type will often have other riparian trees present. A variety of shrubs and herbs may be found in the understory, including *Cornus sericea*, *Rubus ursinus*, *Salix lasiolepis*, and *Stachys bullata*.

Populus trichocarpa* Alliance

7a1. *Populus trichocarpa* is co-dominant with *Salix laevigata* in the overstory. Shrubs are variable including *Rubus ursinus* and *Salix exigua* in the understory.

Populus trichocarpa – *Salix laevigata* Association*

7a2. *Populus trichocarpa* is dominant with other riparian trees such as *Acer negundo* sometimes co-dominant in the overstory. *Salix lasiolepis* > 30% relative cover with others including *Rubus ursinus* in the understory.

Populus trichocarpa / *Salix lasiolepis* Association*

7a3. *Populus trichocarpa* is dominant with other riparian trees sometimes co-dominant in the overstory. *Cornus sericea* is often dominant in the shrub layer.

Populus trichocarpa / *Cornus sericea* / *Carex obnupta* Association*

7b. *Alnus rhombifolia* dominates or co-dominates with *Acer macrophyllum*, *Platanus racemosa*, or *Umbellularia californica* in the tree overstory. *Umbellularia californica* may be higher in cover, though stands for this type will often have other

riparian trees along with *Alnus rhombifolia* to be classed here. If *Fraxinus latifolia* is co-dominant, key to the *Fraxinus latifolia* Alliance below. A variety of shrubs and herbs may be found in the understory, including *Rubus*, *Toxicodendron*, and numerous ferns. Careful identification of alder stands closer to the coast is necessary to differentiate from *A. rubra* stands.

***Alnus rhombifolia* Alliance**

7b1. *Alnus rhombifolia* is strongly dominant in the overstory. Understory is variable with *Rubus ursinus*, *Toxicodendron diversilobum*, and shrubby *Salix* spp. being the most common.

Alnus rhombifolia Association

7b2. *Alnus rhombifolia* is co-dominant with *Acer macrophyllum* present (with at least 5% absolute cover) to co-dominant in the overstory. Other trees may be present including *Umbellularia californica*. Understory is variable with *Rubus ursinus* and/or *Rubus armeniacus* the most common.

Alnus rhombifolia – *Acer macrophyllum* Association

7b3. *Alnus rhombifolia* is co-dominant with *Platanus racemosa* present (with at least 5% absolute cover) to co-dominant in the overstory. Understory is variable with *Rubus ursinus*, *Toxicodendron diversilobum*, and *Cornus sericea* being the most common.

Alnus rhombifolia – *Platanus racemosa* Association

7b4. *Alnus rhombifolia* is dominant to co-dominant with *Umbellularia californica* present (with at least 5% absolute cover) to co-dominant in the overstory. *Toxicodendron diversilobum* and/or *Rubus ursinus* are characteristically present in the shrub layer.

Alnus rhombifolia – *Umbellularia californica* – (*Quercus chrysolepis*) Association

7b5. *Alnus rhombifolia* is strongly dominant in the overstory. Shrubs such as *Rubus ursinus*, *Salix* spp., and *Toxicodendron diversilobum* are variable in cover. *Carex nudata* or other *Carex* sp. are present in the understory with variable cover.

Alnus rhombifolia / *Carex (nudata)* Association

7b6. *Alnus rhombifolia* is strongly dominant in the overstory. *Salix exigua* and/or *Rosa californica* are present in the shrub layer.

Alnus rhombifolia / *Salix exigua* – (*Rosa californica*) Association*

7c. *Acer macrophyllum* dominates or co-dominates with *Umbellularia californica* in riparian stands, OR *Umbellularia californica* is dominant in riparian stands with *Acer macrophyllum* or *Pseudotsuga menziesii* characteristically present. An understory of riparian shrubs such as *Rubus* spp. or *Rhododendron occidentale* are sometimes present.

***Acer macrophyllum* – *Alnus rubra* Alliance**

7c1. *Acer macrophyllum* is dominant in the overstory. *Rubus ursinus* is often present in the understory.

Acer macrophyllum / (*Rubus ursinus*) Association

7c2. *Umbellularia californica* is co-dominant and *Acer macrophyllum* characteristically present and usually at least 10% relative cover in riparian areas.

Umbellularia californica – *Acer macrophyllum* Association

7d. *Salix lucida* ssp. *lasiandra* (= *Salix lasiandra* var. *lasiandra*) dominates in the overstory, sometimes with higher or similar cover by shrubs in the understory, such as *Rubus* spp. and *Salix lasiolepis*. Sometimes *Alnus rubra* may be co-dominant with *S. lucida*, and adjacent stands may be dominated by *Alnus* spp., *Quercus agrifolia* or conifers.

Salix lucida* ssp. *lasiandra* Alliance

7d1. *Salix lucida* ssp. *lasiandra* dominates or co-dominates with *Alnus rubra* in the overstory.

Salix lucida ssp. *lasiandra* Association*

7e. *Fraxinus latifolia* dominates or co-dominates with *Acer negundo*, *Umbellularia californica*, or *Salix laevigata* in the tree overstory.

Fraxinus latifolia* Alliance

Fraxinus latifolia Association*

Fraxinus latifolia – *Salix laevigata* Association*

7f. *Acer negundo* dominates in the tree overstory with other riparian plants such as *Fraxinus*, *Populus*, *Rubus*, and *Salix*, or co-dominates with *Umbellularia californica*, often along major streams and rivers. Stands are considered rare in the state and may be small and monospecific.

Acer negundo* Alliance

Acer negundo / (*Rubus ursinus*) Association*

8. A non-native tree species dominates in planted or naturalized stands.

Californian Ruderal Forest Macrogroup and Group

8a. A tree species of *Eucalyptus*, *Acacia melanoxylon*, or *Ailanthus altissima* dominates in planted or naturalized stands. Often found in groves, windbreaks, uplands, and along stream courses. Stands were observed but rarely sampled. For tall shrubby species of *Acacia*, see **Section II, 7d.**

***Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Semi-Natural Alliance**

8a1. *Eucalyptus globulus* is strongly dominant in the overstory in an overstory strongly dominated by non-native trees. *Rubus ursinus* is often present in the shrub layer.

Eucalyptus (globulus, camaldulensis) Semi-Natural Association

8a2. *Acacia melanoxylon* is strongly dominant in the overstory.

Acacia melanoxylon Provisional Semi-Natural Association

8a3. *Olea europea* is strongly dominant in the overstory.

Olea europea Provisional Semi-Natural Association

8a4. *Ulmus* spp. is strongly dominant in the overstory.

Ulmus spp. Provisional Semi-Natural Association

8a5. *Ailanthus altissima* is strongly dominant in the overstory.

Ailanthus altissima Semi-Natural Association

8a6. *Robinia pseudoacacia* is strongly dominant in the overstory.

Robinia pseudoacacia Provisional Semi-Natural Association*

8b. *Myoporum laetum* or *Schinus molle* is strongly dominant in open to dense stands.

Schinus (molle, terebinthifolius) – Myoporum laetum* Semi-Natural Alliance

8b1. *Schinus molle* is dominant in the overstory.

Schinus molle Semi-Natural Association*

Class B. Shrubland Vegetation

Section I. Riparian or moist hillside settings with vegetation dominated or co-dominated by the following shrubs: *Baccharis salicifolia*, *Frangula californica* (including all subspecies), *Lonicera involucrata*, *Morella californica*, *Rhododendron occidentale*, *Rosa californica*, *Rubus armeniacus*, *R. spectabilis*, *Salix breweri*, *S. exigua*, *S. lasiolepis*, *S. melanopsis*, *S. sitchensis*, *Sambucus nigra*, and/or *Sambucus racemosa*. *Note: if *Rubus ursinus* or *Rubus parviflorus* dominates, key to the *Gaultheria shallon* – *Rubus (ursinus)* Alliance in Section II below (step 7b3).

1. Non-native shrub *Rubus armeniacus*, *Argyranthemum foeniculum*, *Rosa eglanteria*, or *Delairea odorata* is strongly dominant in riparian sites, mesic clearings, disturbed areas and stock ponds. Overall, non-native relative cover is > 75%.

Western Arid Ruderal Riparian Forest & Scrub Macrogroup

Western Arid Ruderal Lowland Riparian Forest & Scrub Group

***Rubus armeniacus* – *Sesbania punicea* – *Ficus carica* Semi-Natural Alliance**

1a. *Rubus armeniacus* is strongly dominant in the shrub layer. If emergent *Salix exigua* or *Salix lasiolepis* is greater than >15% relative cover, key to the *Salix exigua* alliance.

Rubus armeniacus Semi-Natural Association

1b. *Delairea odorata* is strongly dominant in the shrub layer, overtopping other shrubs. If emergent *Salix exigua* or *Salix lasiolepis* is greater than >15% relative cover, key to the *Salix exigua* alliance.

Delairea odorata Provisional Semi-Natural Association*

2. *Cornus sericea* or *Cornus glabrata* is dominant in the shrub layer or co-dominant with plants such as *Salix* spp. Emergent riparian trees and shrubs such as *Rubus ursinus*, *Salix* spp. and *Toxicodendron diversilobum* are often present.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Wet Shrubland Group

***Cornus sericea* Alliance**

2a. *Cornus sericea* is strongly dominant in the shrub layer, and *Salix lasiolepis* is often present along with other shrubs such as *Lonicera involucrata*, *Ribes divaricatum*, *Rubus ursinus*, and *Sambucus racemosa*, at variable cover.

Cornus sericea – *Salix (lasiolepis, exigua)* Association

3. *Frangula californica*, *Rhododendron occidentale*, or *Salix breweri* dominant, or co-dominant with *S. exigua*, *S. lasiolepis*, *S. melanopsis*, *Sambucus nigra*, *Baccharis pilularis* and/or *Rubus* spp.

3a. *Frangula californica* and/or *Salix breweri* dominate or co-dominate together with *Rubus*. Stands are found along springs, seeps, and ravines in wetland and riparian settings, often on sedimentary and serpentine substrates that retain water much of the year. If *Frangula californica* is dominant in upland settings along with

Baccharis pilularis or other coastal scrub plants, key to the *Baccharis* alliance. If *Frangula californica* is dominant in upland settings along with rocky foothill shrubs, key to the *Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Alliance.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Wet Shrubland Group

Frangula californica* – *Rhododendron occidentale* – *Salix breweri* Alliance

3a1. *Frangula californica* is co-dominant in the shrub layer.

Frangula californica ssp. *californica* Provisional Association*

3a2. *Frangula californica* is dominant in the shrub layer. *Cirsium fontinale* and/or *Mimulus guttatus* are present in the herbaceous layer.

Frangula californica ssp. *tomentella* / *Cirsium fontinale* var. *campylon* –
Mimulus guttatus Association*

3a3. *Salix breweri* is dominant in the shrub canopy.

Salix breweri Provisional Association*

3b. *Baccharis salicifolia*, *Rosa californica*, *Salix exigua*, or *S. lasiolepis* dominates or co-dominates along streams banks and benches, rivers, or close to springs.

Warm Desert Lowland Freshwater Marsh, Wet Meadow & Shrubland Macrogroup

Warm Desert Riparian Low Bosque & Shrubland Group

3b1. *Salix exigua* dominates, or is co-dominant with *Salix lasiolepis* or *Rubus armeniacus*, along rivers and streams or close to springs. If *Salix lasiolepis* is co-dominant with *Rubus armeniacus*, key here as well. They are often the first plants to colonize bars and cut banks, followed later by trees such as *Acer* and *Salix* spp.

***Salix exigua* Alliance**

3b1a. *Salix exigua* is dominant in the shrub layer.

Salix exigua Association

3b1b. *Salix exigua* and/or *Salix lasiolepis* are present at > 15% relative cover, while *Rubus armeniacus* co-dominates in the shrub layer.

Salix exigua – (*Salix lasiolepis*) – *Rubus armeniacus* Association

3b2. *Salix lasiolepis* dominates or co-dominates with *Rubus* spp. or *Baccharis pilularis* along stream banks and benches, slope seeps, and drainage stringers. If *Cornus sericea* is co-dominant, key to that alliance. If *Rubus armeniacus* has similar or greater cover than *Salix lasiolepis*, key to the *Salix exigua* Alliance above. Emergent riparian trees are often present, such as *Acer*, *Alnus*, *Fraxinus*, *Salix*, and others.

***Salix lasiolepis* Alliance**

3b2a. *Salix lasiolepis* is strongly dominant in the shrub layer.

Salix lasiolepis Association

3b2b. *Salix lasiolepis* is dominant and *Baccharis salicifolia* co-dominates in the shrub layer.

Salix lasiolepis – *Baccharis salicifolia* Association

3b2c. *Salix lasiolepis* is co-dominant in the tall shrub to low tree layer, and *Rubus ursinus*, *R. parviflorus*, *Baccharis pilularis*, *Toxicodendron diversilobum* and/or other shrubs are also present at variable cover in the shrub layer. Note that if *Salix lasiolepis* co-dominates with *Rubus armeniacus*, key to **3b1b.** instead.

Salix lasiolepis – *Rubus* spp. Association

3b3. *Baccharis salicifolia* dominates or co-dominates in the shrub canopy with *Artemisia californica*, *Baccharis pilularis*, *Rubus* spp., *Salix exigua*, *Salix lasiolepis*, and *Sambucus nigra*. Emergent trees may be present at low cover, including *Pinus sabiniana*, *Platanus racemosa*, *Populus fremontii*, *Quercus* spp. or *Salix* spp.

***Baccharis salicifolia* Alliance**

3b3a. *Baccharis salicifolia* is dominant in the shrub layer.

Baccharis salicifolia Association

3b4. *Cephalanthus occidentalis* and/or *Rosa californica* dominates or co-dominates in the shrub canopy with *Artemisia californica*, *Baccharis pilularis*, *Rubus armeniacus*, *Salix lasiolepis*, *Salvia mellifera*, *Sambucus nigra*, and *Symphoricarpos mollis*. Emergent trees may be present at low cover, including *Salix laevigata*.

***Cephalanthus occidentalis* – *Rosa californica* Alliance**

3b4a. *Rosa californica* is strongly dominant in the shrub layer.

Rosa californica Association

3b4b. *Rosa californica* is dominant to co-dominant with *Baccharis pilularis* sub-dominant to co-dominant in the shrub layer.

Rosa californica – *Baccharis pilularis* Association*

3b4c. *Cephalanthus occidentalis* is dominant or co-dominant in the shrub layer.

Cephalanthus occidentalis Association*

3c. *Forestiera pubescens* or *Sambucus nigra* dominates in the shrub overstory, often preferring stream terraces, bottomlands, and localized areas in uplands where there was past disturbance.

***Rhus trilobata* – *Crataegus rivularis* – *Forestiera pubescens* Alliance**

3c1. *Sambucus nigra* is dominant in the shrub layer in riparian sites. Note: Upland stands with *Sambucus nigra* dominant or co-dominant will key to the *Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Alliance.

Sambucus nigra Riparian Association*

3c2. *Forestiera pubescens* is dominant in the shrub layer.

Forestiera pubescens Provisional Association

Section II. Coastal scrub, dune/bluff, and disturbance-following vegetation dominated or co-dominated by drought-deciduous or seral (both deciduous and evergreen) shrubs. Includes *Artemisia californica*, *Baccharis pilularis*, *Ceanothus thyrsiflorus*, *Corylus cornuta*, *Ericameria ericoides*, *Ericameria nauseosa*, *Eriodictyon californicum*, *Eriogonum fasciculatum*, *Eriogonum wrightii*, *Frangula californica*, *Garrya elliptica*, *Gaultheria shallon*, *Holodiscus discolor*, *Keckiella corymbosa*, *Lupinus albifrons*, *Lupinus arboreus*, *Lupinus chamissonis*, *Prunus emarginata*, *Prunus virginiana*, *Ribes quercetorum*, *Rubus ursinus*, *Salvia mellifera*, and *Toxicodendron diversilobum*. Resprouting, deep-rooted, sclerophyllous shrubs may at times be characteristic, but not dominant.

4. *Eriogonum wrightii* is dominant in the shrub overstory.

Great Basin-Intermountain Dry Shrubland & Grassland Macrogroup

Mojave Mid-Elevation Mixed Desert Scrub Group

***Eriogonum wrightii* – *Eriogonum heermannii* – *Buddleja utahensis* Alliance**

4a. *Eriogonum wrightii* is strongly dominant in the shrub layer.

Eriogonum wrightii (ssp. *subscaposum*, ssp. *wrightii*) Association

4b. *Eriogonum wrightii* is dominant in the shrub layer with *Juniperus californica* an emergent tree at less than 10% absolute cover.

Eriogonum wrightii – *Juniperus californica* Association

5. *Ericameria nauseosa* is dominant in the shrub overstory.

Intermountain Semi-Desert Steppe & Shrubland Group

***Ericameria nauseosa* Alliance**

5a. *Ericameria nauseosa* is strongly dominant in the shrub layer.

Ericameria nauseosa Association

6. *Lupinus arboreus* is dominant, co-dominant, or characteristic (sometimes with as little as 5% cover) in the shrub overstory on coastal dunes, bluffs, or inland sandy and disturbed soils. A variety of herbs, including many of the following non-natives, may be present with high cover in the understory: *Bromus diandrus*, *Carduus*, *Holcus*, *Rumex acetosella*, and *Vulpia bromoides*.

Pacific Coastal Beach & Dune Macrogroup

Californian Coastal Beach, Dune & Sandy Bluff Group

6a. *Lupinus arboreus* dominates or co-dominates with *Baccharis pilularis* and/or *Rubus ursinus*, often with high cover of grasses including *Bromus diandrus*, *Holcus lanatus*, *Lolium perenne*, *Vulpia bromoides*, and other non-native herbaceous species.

Lupinus arboreus* Alliance

Lupinus arboreus Association*

Baccharis pilularis – *Lupinus arboreus* Association*

7. Shrublands dominated or co-dominated by native, coastal scrub and disturbance-following shrubs or by naturalized or planted species, including *Artemisia californica*, *Baccharis pilularis*, *Ceanothus thyrsiflorus*, *Cistus*, *Cytisus*, *Eriodictyon californicum*, *Eriogonum fasciculatum*, *Gaultheria shallon*, *Genista*, *Heterotheca sessiliflora*, *Lupinus albifrons*, *Rubus parviflorus*, *Rubus ursinus*, *Toxicodendron diversilobum*, and/or *Ulex europaeus*.

Californian Coastal Scrub Macrogroup

7a. *Diplacus aurantiacus*, *Eriodictyon californicum*, *Keckiella corymbosa*, *Lepechinia calycina*, *Lupinus albifrons*, *Malacothamnus* spp., or *Prunus emarginata* dominates in the overstory.

Californian Coastal-Foothill Seral Scrub Group

7a1. *Eriodictyon californicum*, *Lepechinia calycina*, *Lotus scoparius*, *Lupinus albifrons*, or *Pickeringia montana*, dominates or co-dominates with other seral scrub, often in stands that are open and/or display recent evidence of fire or other disturbance such as road cuts. Other coastal scrub may be present at lower cover, including *Artemisia californica*, *Baccharis pilularis*, and *Toxicodendron diversilobum*. The understory may be composed of mixed native and non-native herbs, which sometimes have higher cover than the overstory shrubs.

***Lotus scoparius* – *Lupinus albifrons* – *Eriodictyon* spp. Alliance**

7a1a. *Eriodictyon californicum* is dominant in the shrub layer, or co-dominant with *Diplacus aurantiacus* or *Pickeringia montana*. Herbs like *Avena*, *Bromus*, and *Pteridium aquilinum* are sometimes present.

Eriodictyon californicum / Herbaceous Association

7a1b. *Lotus scoparius* is dominant in the shrub layer.

Lotus scoparius Association*

7a1c. *Lupinus albifrons* is dominant in the shrub layer, or co-dominant with *Lotus scoparius*.

Lupinus albifrons Association

7a1d. *Lupinus albifrons*, *Lotus scoparius*, *Eriodictyon californicum*, or *Ericameria ericoides* are dominant in the shrub layer with other sandhill shrubs away from the immediate shoreline on sandy soils with recent disturbance typically with other diagnostic interior dune herbaceous plants.

Lupinus albifrons – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*)
Provisional Association

7a2. *Diplacus aurantiacus* strongly dominant, often on steep slopes and ridgetops. Other coastal scrub may be present at lower cover. If *D. aurantiacus* is co-dominant with *Adenostoma fasciculatum* or *Artemisia californica*, see those respective alliances.

***Diplacus aurantiacus* Alliance**

7a2a. *Diplacus aurantiacus* is dominant in the shrub layer, typically on moderate to abrupt slopes, often unstable, or recently burned, or a product of recent land or rock slides.

Diplacus (aurantiacus, puniceus) Association

7a3. A species of *Malacothamnus* is dominant in the shrub canopy with *Artemisia californica*, *Diplacus aurantiacus*, *Eriodictyon californicum*, *Heteromeles arbutifolia*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Quercus agrifolia*.

***Malacothamnus fasciculatus* – *Malacothamnus* spp. Alliance**
Malacothamnus (aboriginum, fremontii, hallii) Provisional Association

7a4. *Ericameria linearifolia* and/or *Gutierrezia californica* is dominant or co-dominant in the shrub canopy with *Eriogonum fasciculatum* or *Eriophyllum confertiflorum*. Only mapped where found in the field (including Cedar Mtn. and Mt. Diablo).

***Ericameria linearifolia* – *Cleome isomeris* Alliance**

7a4a. *Ericameria linearifolia* is strongly dominant in the shrub layer.

Ericameria linearifolia Association

7a4b. *Gutierrezia californica* dominates an open shrub canopy, and other shrubs may occur at low cover. The herb layer is usually well-developed, including natives such as *Poa secunda* and non-natives such as *Bromus* and *Erodium* species.

Gutierrezia californica / *Poa secunda* Association

7b. *Baccharis pilularis*, *Ceanothus incanus*, *C. thyrsiflorus*, *Corylus cornuta*, *Frangula californica*, *Garrya elliptica*, *Gaultheria shallon*, *Holodiscus discolor*, *Prunus emarginata*, *Prunus virginiana*, *Ribes quercetorum*, *Rubus parviflorus*, *Rubus ursinus*, and/or *Toxicodendron diversilobum* dominate or co-dominate as shrubs. Shrubs are typically evergreen or winter-deciduous, not sclerophyllous or drought-deciduous species. Found along cool, coastal strips or on sheltered inland draws and lower slopes, where species are tolerant of disturbance and trees tend to be excluded.

Californian North Coastal & Mesic Scrub Group

7b1. *Baccharis pilularis* dominates or co-dominates with *Frangula californica*, *Toxicodendron diversilobum*, or *Rubus* spp. in the shrub overstory. If *Corylus cornuta* is co-dominant, key to that alliance below. If stands have greater cover of *Ceanothus thyrsiflorus* or *Toxicodendron diversilobum* than *Baccharis pilularis*, key to those respective alliances. Stands that have greater cover of *Artemisia californica* usually key to that alliance. A variety of native and non-native forbs and grasses may intermix in the herbaceous layer, sometimes with higher cover than *Baccharis* – including *Avena*, *Bromus*, *Danthonia*, *Deschampsia*, *Elymus glaucus*, *Eriophyllum staechadifolium*, *Festuca*, *Hypochaeris*, *Nassella pulchra*, and others.

***Baccharis pilularis* Alliance**

7b1a. *Baccharis pilularis* is strongly dominant in the shrub layer.

Baccharis pilularis Association

7b1b. *Baccharis pilularis* is co-dominant with *Artemisia californica* at equal or lesser cover, intermixing along with *Toxicodendron diversilobum* and *Diplacus aurantiacus* in the shrub layer. Herbaceous layer is variable and can include *Pteridium aquilinum* and *Holcus lanatus*.

Baccharis pilularis – *Artemisia californica* Association

7b1c. *Baccharis pilularis* is co-dominant with various other shrubs intermixed including *Rubus ursinus*, *Rubus parviflorus*, and/or *Frangula californica* in the shrub layer.

Baccharis pilularis – (*Frangula californica*) – *Rubus* spp. Association

7b1d. *Baccharis pilularis* is co-dominant and *Toxicodendron diversilobum* is present at significant cover in the shrub layer.

Baccharis pilularis – *Toxicodendron diversilobum* Association

7b1e. *Baccharis pilularis* is dominant in the shrub layer. Various native, perennial grasses including *Nassella pulchra*, *Elymus glaucus*, and/or *Bromus carinatus* are present at significant cover.

Baccharis pilularis / (*Nassella pulchra* – *Elymus glaucus* – *Bromus carinatus*) Association

7b1f. *Baccharis pilularis* is dominant in the shrub layer. Annual, non-native herbs including *Avena*, *Bromus*, *Lolium*, *Carduus pycnocephalus*, and *Plantago lanceolata* dominate the herb layer at significant cover though native herbs such as *Achillea millefolium* and *Distichlis spicata* may also be present at low cover.

Baccharis pilularis / Annual Grass – Herb Association

7b1g. *Baccharis pilularis* is dominant in the shrub layer. *Danthonia californica* is present at significant cover in the herb layer.

Baccharis pilularis / *Danthonia californica* Association*

7b1h. *Baccharis pilularis* is dominant in the shrub layer. *Deschampsia cespitosa* is present at significant cover in the herb layer.

Baccharis pilularis / *Deschampsia cespitosa* Association*

7b2. *Frangula californica* dominates or co-dominates with *Baccharis pilularis*, *Diplacus aurantiacus*, *Morella californica*, *Salix lasiolepis*, and/or *Toxicodendron diversilobum* in the shrub overstory. Stands occur on slopes above salt marsh and in upland coastal bluff on mesic slopes, related to stands of *Baccharis pilularis*. (also see Class B. **3a** above, and **7c** below)

***Baccharis pilularis* Alliance**

7b2a. *Frangula californica* ssp. *californica* is co-dominant and *Baccharis pilularis* is characteristically present to co-dominant in the shrub layer. *Scrophularia californica* and *Pteridium aquilinum* are often present in the herb layer.

Frangula californica ssp. *californica* – *Baccharis pilularis* / *Scrophularia californica*
Association

7b3. *Gaultheria shallon*, *Holodiscus discolor*, *Rubus parviflorus*, and/or *Rubus ursinus* dominate or co-dominate with *Baccharis pilularis*, *Holcus lanatus*, or *Toxicodendron diversilobum* on hillslopes, rock outcrops, coastal bluffs, or flats.

***Gaultheria shallon* – *Rubus (ursinus)* Alliance**

7b3a. *Holodiscus discolor* is dominant while *Baccharis pilularis* and *Rubus ursinus* are often present in the shrub layer.

Holodiscus discolor – *Baccharis pilularis* – *Rubus ursinus* Association

7b3b. *Rubus ursinus* is dominant in the shrub layer.

Rubus ursinus Association

7b4. *Corylus cornuta* dominates or co-dominates with *Baccharis pilularis* and other shrubs as a medium-tall scrub on steep concave slopes with northern to eastern exposures surrounded by *Pseudotsuga menziesii*. Other shrubs may include *Baccharis pilularis*, *Frangula californica*, *Rubus ursinus*, *Vaccinium ovatum*, and *Toxicodendron diversilobum*.

***Corylus cornuta* var. *californica* Alliance**

Corylus cornuta / *Polystichum munitum* Association

7b5. *Toxicodendron diversilobum* dominates, sometimes intermixing with sub-dominant *Baccharis pilularis* and *Rubus* spp. If *B. pilularis* is present and greater than 50% relative cover, key to the *Baccharis pilularis* Alliance (step 7b1). For this project, stands were encountered close to the coast, although they are likely to occur inland as well.

***Toxicodendron diversilobum* Alliance**

7b5a. *Toxicodendron diversilobum* is dominant or higher in absolute cover than other shrubs, and *Baccharis pilularis* is often present at lower cover in the shrub layer.

Toxicodendron diversilobum – (*Baccharis pilularis*) Association

7b5b. *Toxicodendron diversilobum* is strongly dominant in the shrub layer. The herbaceous layer has significant cover.

Toxicodendron diversilobum / herbaceous Association

7b6. *Amelanchier utahensis*, *Frangula californica*, *Oemleria cerasiformis*, *Prunus emarginata*, *Prunus virginiana*, *Sambucus nigra*, *Ribes menziesii*, and/or *Ribes quercetorum* dominates, or co-dominate together in the shrub overstory, often on steep north-facing, mesic slopes or in post-fire settings along inland foothill, upland slopes.

***Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Alliance**

7b6a. *Frangula californica* is co-dominant with other mesic shrubs such as *Prunus emarginata* and *Ribes menziesii*.

Frangula californica - (*Prunus emarginata* – *Ribes menziesii*) Provisional
Association

7b6b. *Prunus virginiana* is dominant in the shrub layer.

Prunus virginiana Foothills Provisional Association

7b6c. *Prunus emarginata* is dominant or co-dominant with *Prunus virginiana* in the shrub layer.

Prunus emarginata Foothills Provisional Association

7b6d. *Ribes quercetorum* is dominant in the shrub layer.

Ribes quercetorum Association*

7c. *Artemisia californica*, *Eriogonum fasciculatum*, or *Salvia mellifera* dominates and may intermix with *Baccharis pilularis*, *Diplacus aurantiacus*, *Eriodictyon californicum*, and/or *Toxicodendron diversilobum*.

Central & Southern Californian Coastal Sage Scrub Group

7c1. *Artemisia californica* dominates and may intermix with *Baccharis pilularis*, *Diplacus aurantiacus*, and/or *Toxicodendron diversilobum*. If *Baccharis pilularis* is present, *Artemisia californica* is greater in cover for this alliance. If *Adenostoma fasciculatum* is present, it is not co-dominant. If the cover of *Eriophyllum staechadifolium* and the other nominate species in the *Eriophyllum staechadifolium* – *Erigeron glaucus* – *Eriogonum latifolium* Alliance is more than twice the cover of *Artemisia*, key to that alliance in the herbaceous part of the key. If *Eriodictyon californicum* or *Diplacus aurantiacus* is co-dominant, key here.

***Artemisia californica* – (*Salvia leucophylla*) Alliance**

7c1a. *Artemisia californica* is dominant in the shrub layer.

Artemisia californica Association

7c1b. *Artemisia californica* is co-dominant and *Diplacus aurantiacus* is present at significant cover in the shrub layer.

Artemisia californica – *Diplacus aurantiacus* Association

7c1c. *Artemisia californica* is co-dominant with *Eriogonum fasciculatum* in the shrub layer.

Artemisia californica – *Eriogonum fasciculatum* Association

7c1d. *Artemisia californica* is dominant in the shrub layer, and understory is usually >10% relative cover of *Nassella lepida* or *Nassella pulchra*. May be in serpentine conditions.

Artemisia californica / *Nassella (pulchra)* Association

7c2. *Salvia mellifera* dominates or co-dominates with *Artemisia californica*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, or *Lotus scoparius*. If *Adenostoma fasciculatum* is present, it is not co-dominant.

***Salvia mellifera* – (*Artemisia californica*) Alliance**

7c2a. *Salvia mellifera* is dominant in the shrub layer, other shrubs if present are lower in absolute cover.

Salvia mellifera Association

7c2b. *Salvia mellifera* is co-dominant with *Artemisia californica* in the shrub layer alone or with other shrubs such as *Toxicodendron diversilobum* and *Malacothamnus* spp.

Salvia mellifera – *Artemisia californica* Association

7c3. *Eriogonum fasciculatum* dominates or co-dominates with *Baccharis pilularis*, *Diplacus aurantiacus*, *Isocoma menziesii*, *Lotus scoparius*, *Malacothamnus fasciculatus*, or *Salvia mellifera*. Emergent trees may be present at low cover including *Juniperus californica*.

***Eriogonum fasciculatum* Alliance**

7c3a. *Eriogonum fasciculatum* dominates or co-dominates in the shrub layer with *Juniperus californica* an emergent tree at less than 10% absolute cover.

Eriogonum fasciculatum var. *foliolosum* – *Juniperus californica* Association

7d. *Albizia lophantha*, *Cistus* spp., *Cotoneaster* spp., *Cytisus scoparius*, *Echium candicans*, *Genista monspessulana*, *Grevillea* spp., *Helichrysum petiolare*, *Rosa rubiginosa*, *Ulex europaeus*, or other Mediterranean shrubs not native to California dominates in naturalized or planted stands. May be found invading disturbed areas, grasslands, or forest openings.

7d1. A non-native *Acacia*, *Albizia lophantha*, *Grevillea*, and/or *Leptospermum laevigatum* dominates or co-dominate together in the tall shrub or low tree canopy. If *Acacia melanoxylon* is dominant, key to the *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance.

Californian Ruderal Forest Macrogroup and Group

Acacia* spp. – *Grevillea* spp. – *Leptospermum laevigatum* Semi-Natural Alliance

7d2. *Myoporum laetum* or *Schinus molle* strongly dominant in open to dense stands.

Californian Ruderal Forest Macrogroup and Group

Schinus (molle, terebinthifolius)* – *Myoporum laetum* Semi-Natural Alliance

7d3. *Cistus* spp., *Cotoneaster* spp., *Cytisus scoparius*, *Genista monspessulana*, *Hypericum canariense*, *Ulex europaeus*, or other broom plants strongly dominate in the shrub overstory. Fire promotes broom invasions in woodland settings; however, broom or other non-native Mediterranean scrub may invade coastal grasslands without fire. Also, other non-natives such as *Echium candicans* may be dominant or co-dominant with other non-native shrubs and herbs and key here.

Western North American Ruderal Grassland & Shrubland Macrogroup

Sierran-North Pacific Ruderal Grassland & Shrubland Group

***Cytisus scoparius* – *Genista monspessulana* – *Cotoneaster* spp. Semi-Natural Alliance**

7d3a. *Cotoneaster lacteus* or *Cotoneaster pannosus* is strongly dominant in the shrub layer or characteristic with other non-native shrubs including *Rosa rubiginosa*.

Cotoneaster (lacteus, pannosus) Provisional Semi-Natural Association*

7d3b. *Cytisus scoparius* is strongly dominant in the shrub layer.

Cytisus scoparius Provisional Semi-Natural Association*

7d3c. *Genista monspessulana* is strongly dominant or co-dominant with other non-native shrubs such as *Cytisus scoparius* or *Spartium junceum* in the shrub layer.

Genista monspessulana Semi-Natural Association

7d3d. *Hypericum canariense* is strongly dominant in the shrub layer.

Hypericum canariense Provisional Semi-Natural Association*

7d3e. *Spartium junceum* is strongly dominant or co-dominant with other non-native shrubs in the shrub layer.

Spartium junceum Semi-Natural Association*

7d3f. *Ulex europaeus* is strongly dominant in the shrub layer.

Ulex europaeus Provisional Semi-Natural Association*

7d3g. *Echium candicans* or other non-native herbs dominate or co-dominate with *Cortaderia (jubata, selloana)* in the herbaceous layer.

Echium candicans Provisional Semi-Natural Association*

7d4. *Helichrysum petiolare*, *Maytenus boaria*, *Rosa rubiginosa*, *Pittosporum*, or other non-native shrubs dominant in open to dense stands, where they are often invading coastal grasslands.

Californian Annual & Perennial Grassland Macrogroup

Californian Ruderal Grassland, Meadow & Scrub Group (key to group level only)

Section III. Chaparral shrub vegetation dominated by evergreen sclerophyll-leaved species, including many that have developed growth strategies driven by a Mediterranean climate. Most of the core diagnostic species are endemic to California, including *Adenostoma*, *Arctostaphylos*, *Ceanothus cuneatus*, *C. leucodermis*, *C. oliganthus*, *Cercocarpus montanus*, *Chrysolepis chrysophylla*, *Quercus berberidifolia*, *Q. durata*, and shrubby *Q. parvula* var. *shrevei* or *Q. wislizeni*.

Californian Chaparral Macrogroup

8. *Arctostaphylos crustacea*, *Chrysolepis chrysophylla* var. *minor*, or *Vaccinium ovatum* dominates or co-dominates in maritime chaparral stands.

Californian Maritime Chaparral Group

8a. *Chrysolepis chrysophylla* var. *minor*, and/or *Vaccinium ovatum* dominates or co-dominates with *Adenostoma fasciculatum*, *Arctostaphylos crustacea*,

Ceanothus thyrsiflorus, or other shrubs. *Pinus attenuata* or *P. muricata* and *Pteridium aquilinum* are often present. Stands are often transitional between forest and chaparral.

Arctostaphylos (nummularia, sensitiva) – Chrysolepis chrysophylla Alliance*

8a1. *Chrysolepis chrysophylla* is dominant in the tree or shrub layer, or co-dominant with *Vaccinium ovatum* and other shrubs in the shrub layer.

*Chrysolepis chrysophylla / Vaccinium ovatum Association**

8b. *Arctostaphylos crustacea* or *Arctostaphylos pallida* dominates or co-dominates with *Adenostoma fasciculatum*, *Ceanothus cuneatus*, *C. papillosus*, *Frangula californica*, *Heteromeles arbutifolia*, *Quercus parvula*, or *Q. wislizeni* var. *frutescens*. Trees are often present but at low cover.

Arctostaphylos (crustacea, tomentosa) Alliance

8b1. *Arctostaphylos crustacea* is dominant in the shrub layer.

Arctostaphylos crustacea Association

8b2. *Arctostaphylos crustacea* and *Adenostoma fasciculatum* present at significant cover to dominant while *Ceanothus cuneatus* or another *Ceanothus* sp. is often present in the shrub layer.

Arctostaphylos crustacea – Adenostoma fasciculatum – Ceanothus (cuneatus, papillosus) Association

8b3. *Arctostaphylos pallida* is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos crustacea*, *Artemisia californica*, *Ceanothus cuneatus*, *Diplacus aurantiacus*, *Ericameria ericoides*, *Eriodictyon californicum*, *Eriophyllum confertiflorum*, *Frangula californica*, *Heteromeles arbutifolia*, *Lupinus albifrons*, and *Vaccinium ovatum*. Emergent trees may be present at low cover, including *Arbutus menziesii*, *Pinus attenuata*, *Pinus ponderosa*, *Pseudotsuga menziesii* or *Quercus agrifolia*.

Arctostaphylos (andersonii, pallida) Provisional Association

9. *Arctostaphylos glandulosa*, *Ceanothus papillosus*, *Cercocarpus montanus*, *Heteromeles arbutifolia*, *Prunus ilicifolia*, *Ptelea crenulata*, *Quercus berberidifolia*, *Quercus wislizeni*, and/or *Quercus durata* dominate or co-dominate with *Adenostoma fasciculatum*. Stands are mostly found inland from the coastal fog belt and are often composed of large shrubs occupying mesic sites such as north-facing slopes, concavities, and toeslopes with well-drained soils.

Californian Mesic & Pre-Montane Chaparral Group

9a. *Cercocarpus montanus* (= *C. betuloides*) dominates the stand, sometimes with *Adenostoma fasciculatum* or *Prunus ilicifolia* as co-dominants or sub-dominants. *Artemisia californica* and *Ribes californicum* are often present.

Cercocarpus montanus Alliance

9a1. *Cercocarpus montanus* var. *glaber* and *Adenostoma fasciculatum* combined are strongly dominant in the shrub layer and sometimes other shrubs co-occur including *Diplacus aurantiacus* and *Quercus berberidifolia*.

Cercocarpus montanus – *Adenostoma fasciculatum* Association*

9a2. *Cercocarpus montanus* is co-dominant with a variety of other shrubs including *Prunus ilicifolia*, *Heteromeles arbutifolia*, and *Artemisia californica*.

Cercocarpus montanus – *Prunus ilicifolia* Association*

9a3. *Cercocarpus montanus* is dominant in the shrub layer, though other shrubs may be present including *Toxicodendron diversilobum*.

Cercocarpus montanus var. *glaber* Association

9b. *Quercus berberidifolia* dominates or co-dominates with *Adenostoma fasciculatum*, *Ceanothus cuneatus*, and/or other chaparral shrubs.

***Quercus berberidifolia* Alliance**

9b1. *Quercus berberidifolia* is strongly dominant in the shrub layer.

Quercus berberidifolia Association

9b2. *Quercus berberidifolia* and *Adenostoma fasciculatum* are co-dominant in the shrub layer.

Quercus berberidifolia – *Adenostoma fasciculatum* Association*

9b3. *Quercus berberidifolia* is co-dominant and *Arctostaphylos glauca* is present in the shrub layer.

Quercus berberidifolia – *Arctostaphylos glauca* Association*

9b4. *Quercus berberidifolia* is co-dominant and *Ceanothus cuneatus* is sub-dominant in the shrub layer.

Quercus berberidifolia – *Ceanothus cuneatus* Association*

9c. *Heteromeles arbutifolia*, *Prunus ilicifolia*, and/or *Ptelea crenulata* dominate or co-dominate in the shrub layer with *Baccharis pilularis*, *Rhamnus crocea*, *R. ilicifolia*, and/or *Toxicodendron diversilobum*. *Sanicula crassicaulis* and other herbs such as *Clinopodium douglasii* may be present to abundant in the understory.

***Prunus ilicifolia* – *Heteromeles arbutifolia* – *Ceanothus spinosus* Alliance**

9c2. *Heteromeles arbutifolia* is dominant in the shrub layer.

Heteromeles arbutifolia Association

9c3. *Heteromeles arbutifolia* is co-dominant in the shrub layer of a serpentine stand.

Heteromeles arbutifolia Serpentine Association*

9c4. *Prunus ilicifolia* is dominant to co-dominant with *Fraxinus dipetala* is characteristically present in the shrub layer.

Prunus ilicifolia ssp. *ilicifolia* – *Fraxinus dipetala* Association*

9c5. *Prunus ilicifolia* and *Heteromeles arbutifolia* are present and together dominate, though other shrubs of mesic chaparral may also be present.

Prunus ilicifolia ssp. *ilicifolia* – *Heteromeles arbutifolia* Association*

9c6. *Prunus ilicifolia* and *Rhamnus* spp. are sub-dominant in the shrub layer.

Prunus ilicifolia – *Rhamnus (crocea, ilicifolia)* Provisional Association

9c7. *Prunus ilicifolia* is dominant with an herbaceous understory, *Sanicula crassicaulis* usually >5% absolute cover.

Prunus ilicifolia ssp. *Ilcifolia* / *Sanicula crassicaulis* Association*

9d. *Quercus durata* dominates or is characteristically present at significant cover with various shrubs including *Adenostoma fasciculatum*, *Arctostaphylos glauca*, *Frangula californica* ssp. *tomentella*, *Heteromeles arbutifolia* and/or shrubby *Umbellularia californica*. Soils are ultramafic soils (e.g., serpentine, gabbro). Herbaceous layer may be well-developed including *Chlorogalum* spp., *Festuca* spp., *Lolium perenne*, or *Melica torreyana*.

***Quercus durata* Alliance**

9d1. *Quercus durata* is strongly dominant in the shrub layer.

Quercus durata Association

9d2. Either *Quercus durata* or *Adenostoma fasciculatum* has the highest cover in the shrub layer, while the other species is next highest in cover, or at least half the cover of the most abundant species.

Quercus durata – *Adenostoma fasciculatum* Association*

9d3. *Quercus durata*, *Arctostaphylos glauca*, and *Artemisia californica* are co-dominant in the shrub layer.

Quercus durata – *Arctostaphylos glauca* – *Artemisia californica* / Grass Provisional Association*

9d4. *Quercus durata* is co-dominant, *Arctostaphylos glauca* and *Garrya congdonii* are characteristically present in the shrub layer.

Quercus durata – *Arctostaphylos glauca* – *Garrya congdonii* / *Melica torreyana* Provisional Association*

9d5. *Quercus durata* and *Frangula californica* are co-dominant, and *Arctostaphylos glauca* may be present in the shrub layer.

Quercus durata – *Frangula californica* ssp. *tomentella* – *Arctostaphylos glauca* Provisional Association*

9d6. *Quercus durata* is dominant, *Heteromeles arbutifolia*, and *Umbellularia californica* are characteristically present in the shrub layer.

Quercus durata – *Heteromeles arbutifolia* – *Umbellularia californica* Provisional Association*

9e. *Arctostaphylos glandulosa* or *A. ×campbelliae* dominates, co-dominates, or characterizes the stand, with *Adenostoma fasciculatum*, *Quercus berberidifolia*, and/or *Quercus wislizeni* on convexities, outcrops, ridges, or slopes. Sometimes *Q. wislizeni* may be a tree, though often it is shrubby in stands sampled. Soils may be derived from sandstone, shale, serpentine, or gabbro. Species commonly found as emergent trees or sub-dominant shrubs include *Arbutus menziesii*,

Arctostaphylos spp., *Diplacus aurantiacus*, and *Heteromeles arbutifolia*. *A. glandulosa* is found in the Diablo Range.

Arctostaphylos glandulosa* Alliance

9e1. *Arctostaphylos glandulosa* is dominant in the shrub layer; *Adenostoma fasciculatum*, if present, is low in cover. Found generally on igneous and sedimentary rock types.

Arctostaphylos glandulosa* Association

9e2. *Arctostaphylos glandulosa* or *A. ×campbelliae* is sub-dominant in the shrub layer with *Adenostoma fasciculatum* usually co-dominant along with *Quercus berberidifolia* intermixing.

Arctostaphylos glandulosa* – *Adenostoma fasciculatum* – *Quercus berberidifolia* Association

10. *Ceanothus leucodermis*, *C. oliganthus*, *Quercus wislizeni* var. *frutescens*, *Quercus palmeri*, and/or *Quercus parvula*, dominate or co-dominate in the shrub overstory. These shrublands are more frost tolerant and typically found at higher, cooler, or more mesic sites than the Californian Xeric Chaparral Group.

Californian Mesic & Pre-Montane Chaparral Group

10a. *Ceanothus leucodermis* dominates in shrublands that are often found in localized patches following fires.

***Ceanothus (oliganthus, leucodermis, tomentosus)* Alliance**
***Ceanothus leucodermis* Association**

10b. *Ceanothus oliganthus* dominates in shrublands that are often found in localized patches following fires. If *Quercus wislizeni* is co-dominant, key to the *Quercus wislizeni* – *Quercus chrysolepis* (shrub) Alliance directly below.

***Ceanothus (oliganthus, leucodermis, tomentosus)* Alliance**
Ceanothus oliganthus* Association

10c. *Quercus agrifolia*, *Q. palmeri*, *Q. parvula*, *Q. wislizeni* or other *Quercus* spp. dominate and/or co-dominate as shrubby regenerating trees or short trees, co-occurring with *Umbellularia*, *Adenostoma*, and a variety of other shrubs that prefer more mesic, northerly exposures. *Quercus parvula* and *Q. wislizeni* are not always morphologically distinct. When *Q. wislizeni* or *Q. parvula* dominates or co-dominates as an overstory tree, key to the *Quercus wislizeni* – *Quercus parvula* (tree) Alliance. *Umbellularia californica* is often emergent, while a variety of thick- and soft-leaved shrubs intermix as sub-dominants.

***Quercus wislizeni* – *Quercus chrysolepis* (shrub) Alliance**

10c1. *Quercus berberidifolia* is co-dominant with *Quercus chrysolepis* and/or *Quercus wislizeni* in the shrub layer.

***Quercus wislizeni* – *Quercus berberidifolia* Association**

10c2. Regenerating or shrubby *Quercus chrysolepis*, *Q. wislizeni*, *Q. parvula* and/or *Q. agrifolia* co-dominate in the shrub layer.

10c3. *Quercus palmeri* is strongly dominant in the shrub layer.

Quercus palmeri Provisional Association

11. Sclerophyll (i.e., thick-leaved) shrublands dominated by one or more of the following taxa: *Adenostoma fasciculatum*, *Arctostaphylos canescens*, *Arctostaphylos glauca*, or *Ceanothus cuneatus*. Most stands occur on well-drained soils along exposures that are in full sun much of the growing season, including upper slopes, spur ridges, and convexities.

Californian Xeric Chaparral Group

11a. *Arctostaphylos auriculata* and/or *A. manzanita* dominate or co-dominate, sometimes with co-dominant *Adenostoma fasciculatum*.

Arctostaphylos (canescens, manzanita, stanfordiana) Alliance

11a1. *Arctostaphylos auriculata* is co-dominant in the shrub layer.

Arctostaphylos auriculata Provisional Association

11a2. *Arctostaphylos manzanita* dominates the stand and *Adenostoma fasciculatum* and *Diplacus aurantiacus* are often present in the shrub layer.

Arctostaphylos manzanita Association

11b. *Arctostaphylos glauca* is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa*, *Artemisia californica*, *Ceanothus cuneatus*, *Cercocarpus montanus*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus durata*, *Quercus wislizeni*, *Rhamnus ilicifolia*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Quercus agrifolia* or *Quercus wislizeni* var. *wislizeni*. Found typically on volcanic, Franciscan, serpentine, and greenstone substrates.

Arctostaphylos glauca Alliance

11b1. *Arctostaphylos glauca* is strongly dominant in the shrub layer; *Adenostoma fasciculatum* if present is low in cover.

Arctostaphylos glauca Association

11b2. *Arctostaphylos glauca* is co-dominant with *Adenostoma fasciculatum* in the shrub layer, though other shrubs may intermix including *Diplacus aurantiacus* and *Salvia mellifera*.

Arctostaphylos glauca – *Adenostoma fasciculatum* Association

11b3. *Arctostaphylos glauca* is dominant with *Artemisia californica* and/or *Salvia mellifera* co-dominant to sub-dominant in the shrub layer, though other shrubs may intermix.

Arctostaphylos glauca – *Artemisia californica* – *Salvia mellifera* Association*

11b4. *Arctostaphylos glauca* is strongly dominant in the shrub layer; *Melica torreyana* and other herbs present at variable cover in a significant herbaceous layer that may be similar in cover to the shrub layer.

Arctostaphylos glauca / *Melica torreyana* Association*

11c. *Ceanothus cuneatus* dominates or co-dominates with *Adenostoma fasciculatum*, often on convexities with westerly exposures. A variety of shrubs may intermix, including *Arctostaphylos* spp., *Baccharis pilularis*, *Eriodictyon*, *Heteromeles*, *Quercus durata*, and others.

***Ceanothus cuneatus* Alliance**

11c1. *Ceanothus cuneatus* is strongly dominant in the shrub layer.

Ceanothus cuneatus Association*

11c2. *Ceanothus cuneatus* and *Adenostoma fasciculatum* are co-dominant in the shrub layer.

Ceanothus cuneatus – *Adenostoma fasciculatum* Association

11d. *Adenostoma fasciculatum* dominates the shrub layer. If chamise is co-dominant with *Salvia mellifera* or other sage scrub species, key to the *Adenostoma fasciculatum* – *Salvia* spp. Alliance below. If *A. fasciculatum* co-dominates with *Arctostaphylos* spp., *Ceanothus cuneatus*, *Cercocarpus montanus*, *Quercus berberidifolia*, or *Q. durata*, key to one of the latter alliances instead of *A. fasciculatum*.

***Adenostoma fasciculatum* Alliance**

11d1. *Adenostoma fasciculatum* is the sole dominant shrub. Other plants may intermix including *Diplacus* or *Toxicodendron diversilobum* at minimal cover (less than 10% relative cover).

Adenostoma fasciculatum Association

11d2. *Adenostoma fasciculatum* is dominant with *Ceanothus cuneatus* characteristically present to sub-dominant.

Adenostoma fasciculatum – (*Ceanothus cuneatus*) Association

11d3. *Adenostoma fasciculatum* is co-dominant in post-fire settings with a mix of scrub species such as *Eriodictyon californicum*, *Lotus scoparius*, *Lupinus albifrons*, *Malacothamnus* spp., and *Ceanothus cuneatus*.

Adenostoma fasciculatum – (*Lotus scoparius* – *Eriodictyon* spp.) Association

11d4. *Adenostoma fasciculatum* is dominant or co-dominant and *Diplacus aurantiacus* is typically present with significant cover while other coastal scrub species such as *Artemisia californica*, *Baccharis pilularis*, *Ceanothus* spp., *Diplacus aurantiacus*, *Eriophyllum confertiflorum*, *Lupinus albifrons* or *Toxicodendron diversilobum* may also be present.

Adenostoma fasciculatum – *Diplacus aurantiacus* Association

11d5. *Adenostoma fasciculatum* is dominant with *Heteromeles arbutifolia* characteristically present. *Melica torreyana* is characteristically present in the understory.

Adenostoma fasciculatum – *Heteromeles arbutifolia* / *Melica torreyana* Association*

11e. *Adenostoma fasciculatum* and sage scrub such as *Salvia mellifera*, *Artemisia californica*, and/or *Eriogonum fasciculatum* co-dominate.

***Adenostoma fasciculatum* – *Salvia* spp. Alliance**

11e1. *Adenostoma fasciculatum* and *Salvia mellifera* are both co-dominant, or chamise co-dominant with *Salvia mellifera* and other coastal scrub plants in the shrub layer.

Adenostoma fasciculatum – *Salvia mellifera* Association

Section VI. Scrub vegetation dominated by native alkaline or salt-tolerant shrubs such as *Atriplex lentiformis*, *Allenrolfea occidentalis*, and *Suaeda moquinii*.

12. *Allenrolfea occidentalis*, *Atriplex lentiformis*, and/or *Suaeda moquinii* dominate or co-dominate, on alkaline seasonally saturated soils.

North American Desert Alkali-Saline Marsh, Playa & Shrubland Macrogroup

Desert Alkaline-Saline Wet Scrub Group

12a. *Atriplex lentiformis* dominates, often with a high cover of herbaceous native and non-native herbs including *Bromus diandrus*, *Conium maculatum*, *Polypogon monspeliensis*, and *Frankenia salina*.

Atriplex lentiformis* Alliance

Atriplex lentiformis Association*

12b. *Allenrolfea occidentalis* dominates with > 2% absolute cover on seasonally saturated soils with *Distichlis spicata*, and other alkaline-tolerant herbs and shrubs such as *Frankenia salina* and *Suaeda moquinii* may be present.

***Allenrolfea occidentalis* Alliance**

12b1. *Allenrolfea occidentalis* is dominant in the shrub layer. *Distichlis spicata* is co-dominant in the herbaceous layer.

Allenrolfea occidentalis / *Distichlis spicata* Association

12b2. *Allenrolfea occidentalis* is dominant in the shrub layer. *Vulpia* spp., *Hordeum* spp., and native herbs are present in an herbaceous layer of significant cover.

Allenrolfea occidentalis / (*Frankenia salina* – *Centromadia* spp.) Association

12c. *Suaeda moquinii* (= *S. nigra*) dominates as a sub-shrub without significant *Allenrolfea occidentalis* cover, on seasonally wet soils, with alkaline-tolerant herbs.

***Suaeda moquinii* Alliance**

12c1. *Suaeda moquinii* is dominant in the shrub layer. *Lepidium dictyotum* is characteristically present in the herbaceous layer.

Suaeda moquinii / *Lepidium dictyotum* Association

12c2. *Suaeda moquinii* is dominant in the shrub layer. *Lepidium dictyotum* is absent from the herbaceous layer.

Suaeda moquinii Association

Class C. Herbaceous & Sparse Vegetation

Section I. Vegetation of: a) freshwater wetland or riparian settings with water or wet ground present temporarily, seasonally, or throughout the growing season, b) saline or alkaline lowlands where water accumulates in the winter, or c) tidal salt or brackish marshes with seasonal or ephemeral inundations. Includes herbaceous vegetation dominated, co-dominated, or characterized by: *Argentina* (= *Potentilla*), *Azolla*, *Bidens*, *Baccharis douglasii* (= *B. glutinosa*), *Bolboschoenus*, *Carex*, *Ceratophyllum*, *Distichlis*, *Eleocharis macrostachya*, *Grindelia stricta*, *Hydrocotyle*, *Juncus arcticus*, *J. effusus*, *J. lescurii*, *J. patens*, *Lasthenia glaberrima*, *Lemna*, *Lepidium latifolium*, *Leymus triticoides*, *Ludwigia*, *Mimulus guttatus*, *Nuphar*, *Oenanthe*, *Persicaria*, *Pleuropogon*, *Potamogeton*, *Ruppia*, *Sarcocornia* (= *Salicornia*), *Schoenoplectus*, *Scirpus*, *Sparganium*, *Spartina*, *Stuckenia*, *Typha*, and/or *Xanthium*.

1. Freshwater stands dominated by aquatic, floating or submerged plants, including *Azolla*, *Ceratophyllum*, *Hydrocotyle*, *Lemna*, *Ludwigia*, *Nuphar*, *Potamogeton*, *Sparganium*, and/or *Stuckenia*. Found along slow-moving streams, still ponds, lakes, or on ground surfaces after water levels have dropped.

1a. *Ludwigia hexapetala* or *L. peploides* dominates, creating mats in shallow water or over wet soil. Other aquatic plants such as *Azolla*, *Lemna*, *Myriophyllum aquaticum*, *Polygonum*, *Schoenoplectus acutus* and *Typha* may be present.

North American Temperate Ruderal Aquatic Vegetation Macrogroup

Western Temperate Ruderal Aquatic Vegetation Group

***Ludwigia* (*hexapetala*, *peploides*) – *Eichhornia crassipes* Semi-Natural Alliance**

Ludwigia (*hexapetala*, *peploides*) Semi-Natural Association

1b. *Egeria densa* or other non-native submersed aquatic plant is dominant or co-dominant in the aquatic herb layer with other aquatics.

North American Temperate Ruderal Aquatic Vegetation Macrogroup

Western Temperate Ruderal Aquatic Vegetation Group

Hydrilla verticillata* – *Myriophyllum spicatum* Semi-Natural Alliance

Myriophyllum spp. – *Egeria densa* Provisional Semi-Natural Association*

1c. *Ceratophyllum*, *Hydrocotyle*, *Nuphar*, *Potamogeton*, *Sparganium*, and/or *Stuckenia* dominates in water or on surfaces of streams, ponds, or lakes.

Western North American Temperate Freshwater Aquatic Vegetation Macrogroup

Western Temperate Freshwater Aquatic Vegetation Group

1c1. *Ceratophyllum demersum* dominates in aquatic settings. Algae and other plants may be present at low cover including *Potamogeton* spp.

Ceratophyllum demersum* Aquatic Provisional Alliance

Ceratophyllum demersum Western Provisional Association*

1c2. *Nuphar lutea* dominates on the water surface. Algae and a variety of hydrophytes may intermix, including *Alisma*, *Carex*, *Hippuris vulgaris*, *Lemna*, *Polygonum*, and *Oenanthe*.

Nuphar lutea* Freshwater Aquatic Provisional Alliance

Nuphar lutea ssp. *polysepala* Provisional Association*

1c3. *Hydrocotyle ranunculoides* dominant on the water surface of lagoons and freshwater lakes growing with *Lemna* spp. and *Scirpus microcarpus*.

Hydrocotyle (ranunculoides, umbellata) Alliance*

Hydrocotyle ranunculoides Association*

1c4. *Sparganium eurycarpum* is dominant in wetlands and slough channels with other aquatic plants including *Lemna*.

Sparganium (angustifolium) Alliance

Sparganium eurycarpum Provisional Association

1c5. *Potamogeton* and/or *Stuckenia* is dominant or co-dominant in freshwater at or near the surface with other aquatic species including algae and *Lemna* spp.

***Stuckenia (pectinata) – Potamogeton* spp. Alliance**

1c5a. One of several species of *Potamogeton* dominates the herbaceous layer with other species having less cover including *Ceratophyllum demersum*.

Potamogeton spp. Association

1c5b. *Stuckenia pectinata* dominates the herbaceous layer.

Stuckenia pectinata Association

1c6. *Azolla filiculoides* or *A. microphylla* dominates or characterizes stands on water or wet ground surfaces. If *Lemna* is co-dominant, key to this alliance.

Azolla (filiculoides, microphylla) Alliance

Azolla (filiculoides, microphylla) Association

2. Salt and brackish marshes and estuaries dominated or co-dominated by *Arthrocnemum subterminale*, *Atriplex prostrata*, *Bolboschoenus*, *Cotula coronopifolia*, *Distichlis*, *Lilaeopsis occidentalis*, *Ruppia*, *Sarcocornia* (= *Salicornia*), *Spartina*, *Spergularia marina*, and/or *Zostera*. *Argentina egedii* may also be dominant in high tidal salt marsh. May appear as sparsely vegetated mudflats at low tide or during restoration. Mudflats with trace amounts of cover by herbs are included here (see 2e2).

2a. *Bolboschoenus maritimus*, *Distichlis spicata*, *Frankenia salina*, *Grindelia stricta*, *Sarcocornia* (= *Salicornia*), *Spartina*, *Suaeda calceoliformis*, and/or *Triglochin* spp. dominant or co-dominant in tidal salt marshes to brackish marshes. *Argentina egedii* may also be dominant in high tidal salt marsh.

North American Pacific Coastal Salt Marsh Macrogroup

Temperate Pacific Salt Marsh Group

2a1. *Bolboschoenus maritimus* or *B. robustus* dominates or co-dominates with *Sarcocornia* (= *Salicornia*) *pacifica* and other native and non-native herbs such as *Atriplex prostrata* and *Sesuvium verrucosum*.

***Bolboschoenus maritimus* Alliance**

2a1a. *Bolboschoenus maritimus* dominates the herbaceous layer.

Bolboschoenus maritimus Association

2a1b. *Bolboschoenus maritimus* co-dominant in the herbaceous layer with *Sarcocornia pacifica* present and usually co-dominant.

Bolboschoenus maritimus – *Sarcocornia pacifica* Association*

2a2. *Argentina egedii* (= *Potentilla anserina* ssp. *pacifica*) dominates in high tidal salt marsh with *Distichlis spicata* and other salt-tolerant plants such as *Atriplex prostrata* or *Frankenia salina*.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**

Argentina egedii – *Distichlis spicata* Provisional Association*

2a3. *Distichlis spicata* or *Hordeum depressum* dominates in salty habitats along the coast and in high salt marsh settings, or co-dominates with *Frankenia salina* and/or *Jaumea carnosa*. Non-native grasses including *Avena* spp. and *Bromus hordeaceus* may have high cover and *Sarcocornia pacifica* may be present as a sub-dominant (if co-dominant key to *Sarcocornia* alliance below). If *Jaumea* is dominant, *Distichlis* must have more than twice the cover of *Sarcocornia* to key to this alliance. If *Distichlis spicata* dominates in alkali seeps or other salty habitats without direct marine influence, key to *Cressa truxillensis* – *Distichlis spicata* or *Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Alliance.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**

2a3a. *Distichlis spicata* dominates the herbaceous layer; *Sarcocornia pacifica* is sub-dominant.

Distichlis spicata – *Sarcocornia pacifica* Association*

2a3b. *Distichlis spicata* is strongly dominant in the herbaceous layer.

Distichlis spicata Coastal Association

2a3c. *Distichlis spicata* characteristically present in the herbaceous layer, occurring with, but at a higher cover than, *Sarcocornia pacifica*. *Frankenia salina*, *Glaux maritima*, *Jaumea carnosa*, and/or *Triglochin maritima* are present at significant cover. The sum of the three nominate species is greater than 50% relative cover in the herb layer.

Distichlis spicata – *Frankenia salina* – *Jaumea carnosa* Association

2a3d. *Distichlis spicata* co-dominates the herbaceous layer with *Juncus arcticus* var. *balticus* and/or *Juncus mexicanus*.

Distichlis spicata – *Juncus arcticus* var. *balticus* (*J. mexicanus*) Coastal Association*

2a3e. *Distichlis spicata* co-dominates or characterizes the herbaceous layer with non-native annual grasses.

Distichlis spicata – (*Bromus diandrus* – *Avena* spp.) Association

2a3f. *Lepidium latifolium* dominant to co-dominant while *Distichlis spicata* is co-dominant to sub-dominant in the herbaceous layer.

Lepidium latifolium – *Distichlis spicata* Association*

2a3g. *Distichlis spicata* co-dominates or characterizes the herbaceous layer with *Atriplex prostrata* co-dominant or at significant cover with other non-native forbs such as *Cotula coronopifolia*.

Distichlis spicata – *Atriplex prostrata* Association*

2a3h. Native annual grasses *Hordeum depressum* and/or *Vulpia microstachys* are the dominant native plant in a salt marsh habitat with other weedy annuals.

Hordeum depressum – Annual Herb Provisional Association*

2a4. *Frankenia salina* is strongly dominant or co-dominates with other plants in coastal and tidal marsh settings.

2a4i. *Frankenia salina* is co-dominant or sub-dominant, usually with the highest cover of any native species. While *Distichlis spicata* may be present, it is at much lower cover than *Frankenia*. *Limonium californicum* is absent.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**

Frankenia salina Coastal Association*

2a4ii. *Frankenia salina* is strongly dominant or co-dominates with *Grindelia stricta* in tidal marsh settings with other salt tolerant plants such as *Limonium californicum* and *L. ramosissimum*. *Sarcocornia pacifica* may be present as a sub-dominant.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**

Frankenia salina – *Limonium californicum* – *Monanthochloe littoralis* – *Sarcocornia pacifica* Association

2a5. *Limonium californicum* and *Frankenia salina* are present and in combination are greater than 30% relative cover of the stand. Grasses such as *Hordeum depressum* and *Bromus carinatus* may have higher cover in tidal marsh settings.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**

Frankenia salina – *Limonium californicum* – *Monanthochloe littoralis* – *Sarcocornia pacifica* Association

2a6. *Sarcocornia pacifica* or *Jaumea carnosa* dominates or co-dominates with *Atriplex prostrata*, *Cotula coronopifolia*, *Distichlis spicata*, *Frankenia salina*, *Lepidium latifolium* and/or *Triglochin maritima*. Stands found in coastal salt marshes, alkali flats, and wetland mudflats.

***Sarcocornia pacifica* (*Salicornia depressa*) Alliance**

2a6a. *Sarcocornia pacifica* co-dominates the herbaceous layer with *Atriplex prostrata* in combination with other non-native salt-tolerant herbs.

Sarcocornia pacifica – *Atriplex prostrata* Association*

2a6b. *Sarcocornia pacifica* co-dominates the herbaceous layer with *Cotula coronopifolia* in combination with other non-native salt-tolerant herbs.

Sarcocornia pacifica – *Cotula coronopifolia* Association

2a6c. *Sarcocornia pacifica* co-dominates the herbaceous layer with non-native grasses such as *Lolium perenne* and *Polypogon monspeliensis*.

Sarcocornia pacifica / (*Lolium perenne* – *Polypogon monspeliensis*) Association*

2a6d. *Lepidium latifolium* dominates while *Sarcocornia pacifica* is co-dominant to sub-dominant in the herbaceous layer.

Sarcocornia pacifica – *Lepidium latifolium* Association*

2a6e. *Sarcocornia pacifica* co-dominates the herbaceous layer with *Frankenia salina*.

Sarcocornia pacifica – *Frankenia salina* Association*

2a6f. *Jaumea carnosa* or *Sarcocornia pacifica* dominate or co-dominate the herbaceous layer. *Distichlis spicata* may be a co-dominant species at less than 60% relative cover in the herbaceous layer. If *Sarcocornia* is greater than 80% relative cover, *Jaumea* and *Distichlis* combined must be greater than 10% relative cover.

Sarcocornia pacifica – *Jaumea carnosa* – *Distichlis spicata* Association

2a6g. *Sarcocornia pacifica* dominates the herbaceous layer with *Schoenoplectus americanus* as a characteristic species.

Sarcocornia pacifica – *Schoenoplectus americanus* Provisional Association*

2a6h. *Sarcocornia pacifica* dominant to co-dominant with *Sesuvium verrucosum* in the herbaceous layer. *Sesuvium* sub-dominant to co-dominant.

Sarcocornia pacifica – *Sesuvium verrucosum* Association*

2a6i. *Sarcocornia pacifica* strongly dominant in the herbaceous layer. *Spartina foliosa* and other salt-tolerant species may be sub-dominant.

Sarcocornia pacifica Tidal Association

2a6j. *Triglochin maritima* and *Sarcocornia pacifica* co-dominate the herbaceous layer.

Triglochin maritima Provisional Association

2a7. *Spartina foliosa* dominates or co-dominates with *Grindelia stricta* or *Sarcocornia pacifica* on mudflats, banks, berms, and margins of bays and deltas.

***Spartina foliosa* Alliance**

2a7a. *Spartina foliosa* dominates the herbaceous layer; *Sarcocornia pacifica* may be sub-dominant.

Spartina foliosa Association

2a7b. *Spartina foliosa* is co-dominant with *Sarcocornia pacifica* or another native salt-tolerant species in the herbaceous layer, and *Sarcocornia* has significant cover.

Spartina foliosa – *Sarcocornia pacifica* Association*

2a8. *Grindelia stricta* or *Grindelia hirsutula* dominates or co-dominates with *Distichlis spicata*, *Sarcocornia pacifica*, or non-native herbs such as *Polypogon monspeliensis*, *Rumex crispus*, and *Bromus diandrus*. If *Spartina foliosa* co-

dominates, key to that alliance. Stands may be found on slightly elevated or drier ground adjacent to salt or alkaline marshes, tidal flats, levees, and road margins.

***Distichlis spicata* – *Frankenia salina* Coastal Alliance**
Grindelia stricta Association

2a9. *Arthrocnemum subterminale* dominates or co-dominates with other salt marsh plants.

***Arthrocnemum subterminale* Alliance**

2a10. *Spergularia marina* is dominant or co-dominant in the herbaceous layer with *Agrostis stolonifera*, *Alopecurus aequalis*, *Argentina egedi*, *Atriplex prostrata*, *Cotula coronopifolia*, *Eleocharis macrostachya*, *Polypogon monspeliensis*, and/or *Scirpus maritimus*.

Spergularia marina* Provisional Alliance

2b. Non-native species such as *Atriplex prostrata*, *Cotula coronopifolia*, *Crypsis* spp., *Cynodon dactylon*, *Echinochloa crus-galli*, *Lolium perenne*, *Polypogon monspeliensis*, and/or *Sonchus oleraceus* dominate in low-lying sloughs and other disturbed alkaline or saline wetlands.

Western North American Ruderal Marsh, Wet Meadow & Shrubland Macrogroup

Western Ruderal Marsh, Wet Meadow & Shrubland Group

2b1. *Atriplex prostrata* and/or *Cotula coronopifolia* dominates or co-dominates, with overall non-native herbs > 90% relative cover.

***Atriplex prostrata* – *Cotula coronopifolia* Semi-Natural Alliance**

2b1a. *Atriplex prostrata* strongly dominates the herbaceous layer.

Atriplex prostrata Semi-Natural Association*

2b1b. *Atriplex prostrata* is co-dominant with non-native annual grasses including *Bromus diandrus*, *Hordeum marinum*, *Lolium perenne*, and *Polypogon monspeliensis* in the herbaceous layer.

Atriplex prostrata / annual grasses Semi-Natural Association*

2b1c. *Cotula coronopifolia* strongly dominates the herbaceous layer and the sum of native species relative cover is less than 10%.

Cotula coronopifolia Semi-Natural Association

2b2. *Crypsis* spp., *Cynodon dactylon*, *Cyperus eragrostis*, *Echinochloa crus-galli*, *Mollugo verticillata*, *Panicum millaceum*, *Paspalum* spp., *Polypogon monspeliensis*, and/or other non-native plants > 90% relative cover individually or collectively in the herbaceous layer.

***Cynodon dactylon* – *Crypsis* spp. – *Paspalum* spp. Semi-Natural Alliance**

2b2a. *Cynodon dactylon* strongly dominates the herbaceous layer with other non-native grasses including *Bromus diandrus* and *Vulpia myuros*.

Cynodon dactylon Semi-Natural Association*

2b2b. *Crypsis schoenoides* or *C. vaginiflora* is dominant in low managed wetlands and alkaline marshes.

Crypsis (schoenoides, vaginiflora) Semi-Natural Association*

2c. *Ruppia* spp. dominant submersed in brackish to fresh water.

Western North American Freshwater Aquatic Vegetation Macrogroup

Western Temperate Freshwater Aquatic Vegetation Group

***Ruppia (cirrhosa, maritima)* Alliance**

2c1. *Ruppia cirrhosa* is characteristically present in the herb layer. Algae is present as a non-vascular plant.

Ruppia cirrhosa – algae Association

2d. *Zostera marina* and/or *Z. pacifica* dominate in tidal and aquatic marine settings.

Temperate Pacific Seagrass Intertidal Vegetation Macrogroup

Temperate Pacific Seagrass Bed Group

Zostera (marina, pacifica)* Pacific Aquatic Alliance

Zostera marina Association*

2e. Mudflats or dry pond bottoms (sometimes in sites undergoing restoration) with trace amounts of cover by herbs.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

Temperate Pacific Freshwater Mudflat Group

2e1. *Lilaeopsis occidentalis* dominates in coastal salt marsh settings.

Lilaeopsis occidentalis* Provisional Alliance

2e2. Mudflats or dry pond bottoms (sometimes in sites undergoing restoration) with trace amounts of cover by *Agrostis avenacea*, *Sarcocornia pacifica*, *Sesuvium*, and others. Cover by plants is sparse and/or uneven.

Mudflat/Dry Pond Bottom Mapping Unit

3. Freshwater or brackish stands dominated by *Argentina*, *Carex pansa*, *C. obnupta*, *C. praegracilis*, *Juncus effusus*, *J. lescurii*, *J. patens*, *Oenanthe*, *Schoenoplectus*, *Scirpus microcarpus*, and/or *Typha*, where water is present throughout all or most of the growing season. Soils have high organic content and may be poorly aerated.

3a. *Schoenoplectus* and/or *Typha* dominate in the herbaceous layer. Stands are found along streams, ditches, shores, bars, and channels of river mouth estuaries; around ponds and lakes; and in sloughs, swamps, and freshwater to brackish marshes.

Arid West Interior Freshwater Marsh Macrogroup

Arid West Interior Freshwater Marsh Group

3a1. *Schoenoplectus acutus* or *Schoenoplectus californicus* dominates or co-dominates with other herbs including *Typha* spp. Occurs in both freshwater and tidal marshes, along ponds and lagoons.

***Schoenoplectus (acutus, californicus)* Alliance**

3a1a. *Schoenoplectus acutus* dominates the herbaceous layer.

Schoenoplectus acutus Association

3a1b. *Schoenoplectus acutus* co-dominates with *Phragmites australis*.

Schoenoplectus acutus – *Phragmites australis* Association*

3a1c. *Schoenoplectus californicus* dominates the herbaceous layer.

Schoenoplectus californicus Association*

3a1d. *Schoenoplectus californicus* and *Schoenoplectus acutus* co-dominate the herbaceous layer.

Schoenoplectus californicus – *Schoenoplectus acutus* Association*

3a1e. *Schoenoplectus californicus* and/or *Schoenoplectus acutus* are co-dominant with other wetland herbs such as *Apocynum cannabinum*, *Persicaria lapathifolia*, or *Ludwigia* spp. at similar cover in the herbaceous layer.

Schoenoplectus (acutus, californicus) – Wetland herbs Provisional Association

3a1f. *Schoenoplectus californicus* and/or *Schoenoplectus acutus* are co-dominant with *Typha* spp. in the herbaceous layer.

Schoenoplectus (acutus, californicus) – *Typha (angustifolia, latifolia)* Association*

3a2. *Schoenoplectus americanus* or *Schoenoplectus pungens* dominates or co-dominates with other herbs. Occurs in fresh or brackish conditions.

***Schoenoplectus americanus* Alliance**

3a2a. *Schoenoplectus americanus* dominates or co-dominates with other herbs.

Schoenoplectus americanus Association

3a3. *Typha latifolia*, *T. angustifolia*, and/or *T. domingensis* dominate in semi-permanently flooded freshwater or brackish marshes. If *Schoenoplectus acutus* or *S. californicus* is co-dominant, key to the *Schoenoplectus* Alliance.

***Typha (angustifolia, domingensis, latifolia)* Alliance**

3a3a. *Typha angustifolia* and/or *Typha latifolia* co-dominates the herbaceous layer.

Typha (latifolia, angustifolia) Association

3a3b. *Typha domingensis* co-dominates the herbaceous layer.

Typha domingensis Association*

3a3c. A *Typha* spp. is co-dominant with *Schoenoplectus americanus* and other herbs.

Typha angustifolia – *Typha latifolia* – *Typha domingensis* / *Schoenoplectus americanus* Association*

3b. *Argentina egedii*, *Bolboschoenus maritimus*, *B. robustus*, *Carex nudata*, *C. obnupta*, *C. praegracilis*, *C. pansa*, *C. subbracteata*, *Eleocharis macrostachya*, *Juncus covillei*, *J. effusus*, *J. hesperius*, *J. lescurii*, *J. patens*, *J. occidentalis*, *J. phaeocephalus*, *J. xiphioides*, *Oenanthe*, and/or *Scirpus microcarpus* dominate or co-dominate in mesic or wetland settings. *Holcus*, *Hypochaeris*, *Leontodon*, *Rumex* and *Vulpia bromoides* may intermix with similar cover. Stands may be found along seasonally flooded brackish marshes, coastal sand dunes, swales and plains, shallowly inundated woods, meadows, roadside ditches, mudflats, coastal swamps, lakeshores, marshes, and riverbanks.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Freshwater Wet Meadow & Marsh Group

3b1. *Carex praegracilis*, *C. pansa*, *C. subbracteata*, or *C. tumulicola* dominates or co-dominates with *Holcus lanatus* or *Lolium perenne*. Stands of *C. praegracilis* are not restricted to the coast and may be found in interior moist meadows and hillside depressions.

Juncus (effusus, patens) – Carex (pansa, praegracilis) Alliance

3b1a. *Carex pansa* co-dominates in the herbaceous layer.

Carex pansa Provisional Association*

3b1b. *Carex praegracilis* co-dominates in the herbaceous layer.

Carex praegracilis Lowland Association*

3b1c. *Carex tumulicola* co-dominates in the herbaceous layer.

Carex tumulicola Provisional Association

3b2. *Carex obnupta*, *Oenanthe sarmentosa*, and/or *Scirpus microcarpus* dominates or co-dominates with other shrubs and herbs including *Argentina egedii*, *Baccharis pilularis*, *Juncus effusus*, *J. patens*, *Rubus ursinus*, and *Salix* spp. occur in a variety of freshwater and brackish settings. May grow adjacent to *Schoenoplectus californica* or *Typha* stands.

Carex obnupta – Oenanthe sarmentosa – Scirpus microcarpus Alliance

3b2a. *Carex obnupta* characterizes the herbaceous layer.

Carex obnupta Association*

3b2b. *Carex obnupta* and *Juncus patens* characterize the herbaceous layer.

Carex obnupta – Juncus patens Association*

3b2c. *Scirpus microcarpus* co-dominates the herbaceous layer.

Scirpus microcarpus Pacific Coast Association*

3b2d. *Oenanthe sarmentosa* dominates or co-dominates in the herbaceous layer.

Oenanthe sarmentosa Association*

3b3. *Juncus bufonius*, *J. effusus*, *J. patens*, *J. hesperius*, *J. occidentalis*, *J. phaeocephalus*, *J. subbracteata* and/or *J. xiphioides* dominate or co-dominate individually or in combination near the coast or farther inland. Co-dominant species may include *Carex densa*, *Holcus lanatus*, *Hypochaeris radicata*, and *Vulpia bromoides*.

Juncus (effusus, patens) – Carex (pansa, praegracilis) Alliance

3b3a. *Juncus effusus* or *Juncus hesperius* co-dominates the herbaceous layer.

Juncus effusus Association

3b3b. *Juncus patens* strongly dominates the herbaceous layer or co-dominates with other native graminoids.

Juncus patens Association*

3b3c. *Holcus lanatus*, in combination with other non-native graminoids, dominates the stand, native wetland plants including *Juncus patens* may co-dominate the herbaceous layer.

Juncus patens – Holcus lanatus Provisional Association*

3b3d. *Juncus occidentalis* dominates the herbaceous layer or co-dominates with *Juncus patens*.

Juncus patens – Juncus occidentalis Provisional Association*

3b3e. *Juncus phaeocephalus* co-dominates in the herbaceous layer.

Juncus phaeocephalus Association

3b3f. *Juncus xiphioides* co-dominates in the herbaceous layer.

Juncus xiphioides Provisional Association

3b3g. *Juncus bufonius* dominates the herbaceous layer along with a mix of non-native graminoids and native wetland plants.

Juncus bufonius Provisional Association

3b4. *Juncus lescurii* dominates or co-dominates with *Argentina egedii*, *Carex obnupta*, or *Distichlis spicata* in slightly brackish marshes or seeps near salt marshes.

Carex obnupta – Oenanthe sarmentosa – Scirpus microcarpus Alliance

Juncus lescurii Association*

3b5. *Argentina egedii* (= *A. anserina* or *Potentilla anserina* ssp. *pacifica*) dominates or co-dominates with *Calamagrostis nutkaensis*, *Carex obnupta*, *Holcus lanatus*, *Juncus* spp., *Leontodon saxatilis* (= *L. taraxacoides*), *Lotus corniculatus*, *Schoenoplectus californicus*, and *Trifolium wormskioldii* in brackish to freshwater marsh habitats. If *Distichlis spicata* is present in a high tidal salt marsh environment, key to the *Distichlis* alliance.

Carex obnupta – Oenanthe sarmentosa – Scirpus microcarpus Alliance

3b5a. *Argentina egedii* dominates the stand, and *Juncus lescurii* may be present in the herbaceous layer.

Argentina egedii – (*Juncus lescurii*) Association*

3b5b. *Carex obnupta* and *Argentina egedii* are co-dominant.

Carex obnupta – *Argentina egedii* Provisional Association*

3b6. *Oenanthe sarmentosa* dominates or co-dominates with *Argentina egedii*, or other herbs in freshwater to slightly brackish marshes.

***Carex obnupta* – *Oenanthe sarmentosa* – *Scirpus microcarpus* Alliance**

Oenanthe sarmentosa Association*

3b7. *Eleocharis macrostachya* dominates in the herbaceous layer along lakeshores, streambeds, swales, pastures, ditches, and ponds. *Juncus phaeocephalus* and *J. patens* may also be present. If vernal pool indicator species are present including *Lasthenia glaberrima* or *Pleuropogon californicus* at high cover, key to the *Lasthenia glaberrima* – *Eleocharis macrostachya* Alliance.

***Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Alliance**

Eleocharis macrostachya Lowland Association*

4. Wetland herbaceous vegetation dominated or characterized by *Alisma* spp., *Bidens frondosa*, *Baccharis douglasii* (= *B. glutinosa*), *Bolboschoenus glaucus*, *Carex barbarae*, *C. densa*, *C. nudata*, *C. serratodens*, *Cirsium fontinale*, *Euthamia occidentalis*, *Grindelia* spp., *Heterotheca oregona*, *Hoita orbicularis*, *Juncus arcticus*, *Lepidium latifolium*, *Leymus triticoides*, *Mimulus guttatus*, *Persicaria* (= *Polygonum*) *lapathifolia*, or *Xanthium strumarium*. Stands occupy settings where saturated soil or standing water throughout the growing season are key characteristics.

4a. Stands dominated or characterized by the species of *Carex*, *Juncus*, *Cirsium*, or *Mimulus* mentioned above.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Freshwater Wet Meadow & Marsh Group

4a1. *Carex barbarae* dominates in seasonally or intermittently saturated wetlands and slopes.

***Carex barbarae* Alliance**

Carex barbarae Association

4a2. *Carex nudata* dominates rocky streams and streambanks with other herbs that are lower in cover including *Artemisia douglasiana*, *Mimulus guttatus*, and *Equisetum* spp.

Carex nudata* Alliance

Carex nudata Association*

4a3. *Carex serratodens* dominates or co-dominates with *Agoseris heterophylla*, *Juncus arcticus*, *J. occidentalis*, *Leymus triticoides*, or *Mimulus guttatus*. Stands are often found in serpentine seeps and meadows.

***Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Alliance**

Carex serratodens Association*

4a4. *Carex densa* dominates individually or in combination near the coast or farther inland in wet meadows. Co-dominant species may include *Holcus lanatus*, *Mentha pulegium*, *Plantago lanceolatum*, and *Ranunculus californicus*.

Juncus (effusus, patens) – Carex (pansa, praegracilis) Alliance
Carex densa Provisional Association

4a5. *Carex amplifolia* dominates in wet areas with *C. gynodynema* and *Juncus* spp.

Juncus (effusus, patens) – Carex (pansa, praegracilis) Alliance
Carex amplifolia – Carex gynodynema Provisional Association*

4a6. *Mimulus guttatus* or another wetland *Erythranthe* (= *Mimulus*) species dominates or co-dominates in the herbaceous layer with *Juncus* spp. or non-native grasses such as *Lolium perenne* and *Polypogon monspeliensis*. Stands are found in moist or saturated settings along streams, ephemeral cascades, ditches, fens, seeps, and springs often with high cover of moss.

Mimulus guttatus – Cirsium spp. – Stachys spp. Alliance*
Mimulus guttatus Association*

4a7. *Cirsium fontinale* dominates or co-dominates with wetland herbs including *Carex*, *Hemizonia congesta* ssp. *luzulifolia*, *Lolium perenne*, and others. Stands are found in seeps, springs, and drainages. *C. fontinale* is an indicator of serpentine wetlands and while not sampled, stands may occur in the south-east corner of Alameda County.

Mimulus guttatus – Cirsium spp. – Stachys spp. Alliance*
Cirsium fontinale Association*

4a8. *Juncus arcticus* (var. *balticus* or var. *mexicanus*) dominates in freshwater, brackish, or alkaline settings or co-dominates with exotic forbs. *Argentina egedii*, *Carex* spp., *Mentha pulegium* and other hydrophytes may intermix as sub-dominants.

**Western North American Montane Marsh, Wet Meadow & Shrubland
Macrogroup**

Pacific-Rocky Mountain Montane Wet Meadow & Marsh Group

***Juncus arcticus* (var. *balticus*, *mexicanus*) Alliance**

4a8a. *Juncus arcticus* (var. *balticus* or *mexicanus*) dominates the herbaceous layer.

Juncus arcticus var. *balticus* – (var. *mexicanus*) Association

4a8b. *Juncus arcticus* (var. *balticus* or *mexicanus*) co-dominates with *Conium maculatum* in the herbaceous layer.

Juncus arcticus var. *balticus* – *Conium maculatum* Association*

4a8c. *Juncus arcticus* (var. *balticus* or *mexicanus*) co-dominates with *Lepidium latifolium* in the herbaceous layer.

Juncus arcticus var. *balticus* – *Lepidium latifolium* Association*

4b. Herbaceous stands dominated or co-dominated by alkaline-tolerant, wetland plants including *Anemopsis californica*, *Distichlis spicata*, *Frankenia salina*, *Leymus triticoides*, *Juncus* spp., and *Sesuvium verrucosum*.

North American Desert Alkali-Saline Marsh, Playa & Shrubland Macrogroup

Desert Alkaline-Saline Marsh & Playa Group

4b1. *Anemopsis californica* is co-dominant or dominant in meadows and seeps that often have a degree of alkalinity, and associated species may include *Juncus mexicanus*.

***Anemopsis californica* – *Helianthus nuttallii* – *Solidago spectabilis* Alliance**

4b1a. *Anemopsis californica* is dominant in the herbaceous layer.

Anemopsis californica Provisional Association

4b1b. *Anemopsis californica* co-dominates with *Juncus mexicanus*.

Anemopsis californica – *Juncus arcticus* var. *mexicanus* Association

4b2. *Distichlis spicata* is co-dominant or dominant in areas that have alkaline or saline soils, are wet for most of the year, and are away from the immediate coast. Associated species may include non-natives and natives such as *Bromus hordeaceus*, *Hordeum marinum*, *Vulpia bromoides*, *Juncus* spp., and *Frankenia salina*.

***Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Alliance**

4b2a. *Distichlis spicata* dominates the herbaceous layer.

Distichlis spicata Interior Association

4b2b. *Distichlis spicata* co-dominates the herbaceous layer with non-native annual grasses.

Distichlis spicata – (*Bromus hordeaceus* – *Hordeum marinum*) Association*

4b2c. *Distichlis spicata* is co-dominant with *Juncus arcticus* var. *balticus* in the herbaceous layer and other perennial species may be present including *Schoenoplectus americanus*, and *Typha* sp.

Distichlis spicata – *Juncus arcticus* var. *balticus* (*J. mexicanus*) Interior Association*

4b2d. *Croton californicus* is dominant to co-dominant and *Distichlis spicata* is characteristically present in the herbaceous layer in remnant sandy, moist dune patches.

Croton californicus – *Distichlis spicata* Provisional Association

4b3. *Frankenia salina* is co-dominant or dominant in areas that are alkaline wet, interior settings in alkali sinks and soils such as those occurring in the Springtown Alkali Sink in Livermore Valley.

***Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Alliance**

4b3a. *Frankenia salina* and *Distichlis spicata* are characteristically present though non-native herbs may be high in cover during some years.

Frankenia salina – *Distichlis spicata* Interior Association

4b4. Stands with *Leymus triticoides* or *Leymus x gouldii* dominant or co-dominant with *Avena*, *Bromus*, *Carduus pycnocephalus*, *Lolium perenne*, or other grasses or forbs. Stands are found on poorly drained floodplains, valley bottoms, and brackish marsh margins.

***Leymus cinereus* – *Leymus triticoides* Alliance**

4b4a. *Leymus triticoides* or *Leymus x gouldii* dominates the herbaceous layer.

Leymus triticoides Association

4b4b. *Leymus triticoides* or *Leymus x gouldii* is characteristic to co-dominant in the herb layer while other non-native annual grasses and forbs have greater cover including *Bromus diandrus*, *B. rubens*, *B. hordeaceus*, and *Avena* species.

Leymus triticoides – *Bromus* spp. – *Avena* spp. Association

4b4c. *Leymus triticoides* co-dominates the herbaceous layer with *Lolium perenne*, which typically has higher cover than *Leymus*.

Leymus triticoides – *Lolium perenne* Association

4b5. Stands dominated by *Sesuvium verrucosum* on saline or alkali flats.

***Sesuvium verrucosum* Alliance**

4b5a. *Sesuvium verrucosum* strongly dominates the herbaceous layer.

Sesuvium verrucosum Association*

4b5b. *Sesuvium verrucosum* dominates the herbaceous layer with sub-dominant *Distichlis spicata*.

Sesuvium verrucosum – *Distichlis spicata* Association

4b5c. *Sesuvium verrucosum* co-dominates the herbaceous layer with *Lolium perenne*.

Sesuvium verrucosum – *Lolium perenne* Association*

4c. Stands dominated or characterized by non-native, ruderal, or disturbance-adapted taxa: *Alisma* spp., *Bidens frondosa*, *Baccharis douglasii* (= *B. glutinosa*), *Cyperus erythrorhizos*, *Euthamia*, *Gnaphalium palustre*, *Hoita*, *Bolboschoenus glaucus*, *Lepidium*, *Persicaria*, *Rumex*, and/or *Xanthium*.

4c1. *Lepidium latifolium*, *Dittrichia graveolens*, *Lythrum hyssopifolia*, *Pseudognaphalium luteoalbum*, *Xanthium spinosum*, or similar non-native forb dominates in the herbaceous layer along intermittently and seasonally flooded freshwater and brackish marshes and riparian corridors. In alkaline or saline settings, *Distichlis spicata* is commonly present but overall native species have less than 10% relative cover when combined.

**Western North American Ruderal Marsh, Wet Meadow & Shrubland
Macrogroup**

Western Ruderal Marsh, Wet Meadow & Shrubland Group

***Lepidium latifolium* – *Lactuca serriola* Semi-Natural Alliance**

4c1a. Either *Dittrichia graveolens* or *Pseudognaphalium luteoalbum* is dominant in the herbaceous layer with other non-natives.

Dittrichia graveolens – *Pseudognaphalium luteoalbum* Provisional Semi-Natural Association*

4c1b. *Lepidium latifolium* is strongly dominant in the herbaceous layer, often occurring with *Bromus diandrus*, *Frankenia salina*, *Malvella leprosa*, and others.

Lepidium latifolium Semi-Natural Association*

4c1c. Either *Chenopodium album* or a non-native *Rumex* species is dominant in the herbaceous layer with other non-natives.

Chenopodium album – *Rumex* spp. Provisional Semi-Natural Association

4c2. *Persicaria* (= *Polygonum*) spp., *Alisma* spp., *Cyperus erythrorhizos*, *Gnaphalium palustre*, and/or *Xanthium strumarium* co-dominate or dominate in marshes and regularly disturbed vernal wet ponds, fields, and stream terraces.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

Temperate Pacific Freshwater Mudflat Group

Polygonum lapathifolium* – *Xanthium strumarium* Alliance

4c2a. *Alisma triviale* dominates the herbaceous layer.

Alisma (triviale) Provisional Association*

4c2b. Either *Cyperus erythrorhizos* or *Gnaphalium palustre* is dominant to co-dominant in the herb layer.

Cyperus erythrorhizos – *Gnaphalium palustre* Provisional Association*

4c2c. *Polygonum amphibium*, *P. lapathifolium*, or *P. punctatum* dominant to co-dominant in the herbaceous layer.

Polygonum (amphibium, lapathifolium) Association*

4c2d. *Xanthium strumarium* is dominant to co-dominant in the herb layer.

Xanthium strumarium Association*

4c3. *Ambrosia psilostachya*, *Baccharis glutinosa* (= *B. douglasii*), *Bidens* spp., *Euthamia occidentalis*, *Grindelia camporum*, *Helenium puberulum*, and/or *Urtica dioica* dominates or co-dominates in wetlands, riparian areas, and other mesic soils, with emergent shrubs such as *Baccharis* spp.

Temperate Pacific Freshwater Mudflat Group

***Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Provisional Alliance**

4c3a. *Baccharis glutinosa* (*B. douglasii*) dominates the herbaceous layer.

Baccharis douglasii Provisional Association*

4c3b. *Bidens frondosa* dominates the herbaceous layer.

Bidens frondosa Provisional Association*

4c3c. *Euthamia occidentalis* dominates the herb layer in wet meadow, floodplain and channel settings. *Typha* spp. may be present at lower cover.

Euthamia occidentalis Provisional Association

4c3d. *Ambrosia psilostachya* dominates the herbaceous layer of flat bottomlands with other native and non-native grasses including *Phragmites australis* and *Distichlis spicata*.

Ambrosia psilostachya Provisional Association*

4c3e. *Grindelia camporum* dominates the herbaceous layer with other species at low cover including *Distichlis spicata*, *Elymus triticoides*, and *Baccharis salicifolia*. Upland settings with *Grindelia camporum* key within the *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Alliance.

Grindelia camporum Association

4c3f. *Urtica dioica* dominates the herbaceous layer in channels and seeps with other species at variable cover including *Marrubium vulgare* and *Typha* spp.

Urtica dioica Provisional Association*

4c4. *Heterotheca oregona* dominates or co-dominates along gravel bars in floodplains, riparian terraces and stream banks.

Temperate Pacific Freshwater Mudflat Group

***Heterotheca (oregona, sessiliflora)* Alliance**

4c4a. *Heterotheca oregona* is dominant in the herbaceous layer.

Heterotheca oregona Association*

5. Herbaceous stands dominated or characterized by *Centromadia pungens*, *Cressa truxillensis*, *Distichlis spicata*, *Eleocharis macrostachya*, *E. acicularis*, *Eryngium aristulatum*, *Lasthenia conjugens*, *L. glaberrima*, *L. fremontii*, *Limnanthes douglasii*, *Navarretia leucocephala*, *Pleuropogon californicus* or *Trifolium variegatum*. In the *Manual of California Vegetation* (Sawyer et al. 2009), these stands are recognized in a macrogroup associated with vernal pools, even though they do not always occur in vernal pool settings. Future versions of the hierarchy will likely split vernal pool and non-vernal pool stands into different alliances, groups, and macrogroups based on ecological and environmental differences. Few true vernal pool types were surveyed in Alameda and Contra Costa Counties.

Western North American Vernal Pool Macrogroup

Californian Vernal Pool Group

5a. *Eryngium aristulatum* or *Hemizonia congesta* is co-dominant to characteristically present in the herbaceous layer on clay soils, often with other swale and vernal pool indicator species.

***Eryngium aristulatum* Alliance**

5a1. *Eryngium aristulatum*, *Hemizonia congesta* ssp. *luzulifolia*, *Hesperervax caulescens*, *Lolium perenne*, *Lupinus bicolor*, *Medicago polymorpha*, and/or *Trifolium willdenovii* are/is present and abundant in part or collectively.

Eryngium aristulatum var. *aristulatum* – (*Lupinus bicolor*) Association

5a2. *Hemizonia congesta* was characteristically present in the stand as a sub-dominant to co-dominant with other native and non-native herbs such as *Trifolium* spp., *Lolium perenne*, *Lupinus bicolor*, and various vernal pool species.

Hemizonia congesta Association*

5b. *Eleocharis macrostachya* or *E. palustris* is present and co-dominant in a vernal pool setting; OR *Pleuropogon californicus* and/or *Lasthenia glaberrima* are present, sometimes with high cover in the herbaceous layer along with *Limnanthus douglasii*, *Navarretia leucocephala*, *Eryngium aristulatum*, and/or *Isoetes howellii*. If no vernal pool indicators are present with *Eleocharis* spp. co-dominating, key to the *Juncus* (*effusus*, *patens*) – *Carex* (*pansa*, *praegracilis*) alliance. Stands typically occur in vernal pools or vernal influenced marshes.

***Lasthenia glaberrima* – *Eleocharis macrostachya* Alliance**

5b1. *Eleocharis macrostachya* and *Lasthenia glaberrima* are characteristically present in the herbaceous layer.

Eleocharis macrostachya – *Lasthenia glaberrima* Association

5b2. *Eleocharis macrostachya* is dominant to co-dominant with a mix of native and non-native wetland herbs in a vernal pool setting.

Eleocharis macrostachya Vernal Pool Association

5b3. *Lasthenia glaberrima* is co-dominant and *Pleuropogon californicus* is characteristically present in the herbaceous layer.

Lasthenia glaberrima – *Pleuropogon californicus* Association

5d. *Trifolium variegatum* dominates, co-dominates, or is characteristically present in the herbaceous layer with a variety of other native and non-native herbs such as *Deschampsia danthonioides*, *Hordeum marinum*, *Lythrum hyssopifolium*, *Plagiobothrys* spp., and others. Stands occur in vernal wet, shallow swales.

***Trifolium variegatum* Alliance**

Trifolium variegatum Association

5e. *Centromadia pungens* is characteristically present, dominant and/or co-dominant with *Deschampsia danthonioides* or other herbs in alkaline vernal wet areas.

***Centromadia (pungens)* Alliance**

5e1. *Centromadia pungens* is characteristically present and *Lepidium dictyotum* is sometimes present in the herb layer.

Centromadia pungens – *Lepidium dictyotum* Association

5f. *Achyrrachaena mollis*, *Lasthenia californica*, or *Lasthenia gracilis* is an indicator (may be dominant to sub-dominant), forming early spring displays along edges of

vernal pools and in vernal moist flats and swales along with native and non-native herbs including *Microseris douglasii*.

***Layia fremontii* – *Achyrachaena mollis* Alliance**

5g. Halophytes such as *Cressa truxillensis*, *Distichlis spicata*, and *Malvella leprosa* characterize the herbaceous layer away from the immediate coast with a variety of other native and non-native herbs such as *Hordeum marinum* and *Frankenia salina*. Stands occur in alkaline vernal wet pools/playa areas.

***Cressa truxillensis* – *Distichlis spicata* Alliance**

5g1. *Cressa truxillensis* is characteristically present in the herb layer often growing with *Frankenia salina* and *Malvella leprosa*.

Cressa truxillensis Provisional Association

5g2. Both *Cressa truxillensis* and *Distichlis spicata* combined dominate or co-dominate in the herb layer.

Cressa truxillensis – *Distichlis spicata* Provisional Association

5h. Halophytes, such as *Distichlis spicata*, *Frankenia salina*, *Hordeum depressum*, and *Myosurus minimus*, present along with other diagnostic species, such as *Downingia pulchella*, *Eryngium aristulatum*, *Lasthenia conjugens*, *Lasthenia fremontii*, and *Psilocarphus brevissimus*, found in saline or alkaline vernal pools that have a salt crust or salty soil.

***Lasthenia fremontii* – *Distichlis spicata* Alliance**

5h1. *Hordeum depressum* is characteristically present in the herbaceous layer in moist alkaline grassland. Other species present may include *Distichlis spicata*, *Cressa truxillensis*, *Frankenia salina*, *Hordeum marinum*, *Lolium perenne*, and *Spergularia marina*.

Hordeum depressum – *Spergularia (marina)* Association

5h2. *Downingia pulchella* is usually dominant in the herb layer, *Eryngium aristulatum* is characteristic, and *Distichlis spicata* is often present.

Downingia pulchella – *Distichlis spicata* Association

5h3. *Frankenia salina* is characteristically present in the herb layer of a vernal pool and *Psilocarphus brevissimus* is often present at high cover.

Frankenia salina – *Psilocarphus brevissimus* Provisional Association

5h4. *Lasthenia conjugens* is dominant in the herb layer.

Lasthenia ferrisiae – *Lasthenia conjugens* Association

5h5. *Lasthenia fremontii* is co-dominant in the herb layer and *Distichlis spicata* or *Frankenia salina* is present.

Lasthenia fremontii – *Distichlis spicata* Provisional Association

5i. *Eryngium castrense* and/or *Plagiobothrys stipitatus* var. *micranthus* present and abundant with a mix of native and non-native herbs in the herbaceous layer in vernal pools or seasonal wetlands.

***Lasthenia fremontii* – *Downingia (bicornuta)* Alliance**

5i1. *Eryngium castrense* is dominant or co-dominant with *Plagiobothrys stipitatus* in the herb layer.

Eryngium (vaseyi, castrense) Association

5i2. *Plagiobothrys stipitatus* is co-dominant in the herbaceous layer.

Plagiobothrys stipitatus – *Psilocarphus brevissimus* Provisional Association

Section II. Vegetation dominated or characterized by herbaceous species that occupy dry, seasonally moist, and usually well-drained sites that range from interior dry ridges and cliffs to ocean bluffs, dunes, and terraces with cooling summer fog and salty breezes. Stands are not wet or inundated as in Section I above. This group includes native and non-native annual and perennial grasslands, seral herbaceous stands, dry cliff and canyon vegetation, and coastal dune/ bluff vegetation. Dominant, co-dominant, and characteristic taxa include: *Abronia*, *Agrostis gigantea*, *A. stolonifera*, *Allium falcifolium*, *Ambrosia*, *Ammophila*, *Anthoxanthum*, *Avena*, *Brachypodium*, *Brassica*, *Briza*, *Bromus*, *Calamagrostis*, *Carpobrotus*, *Centaurea*, *Cynosurus*, *Danthonia*, *Deschampsia*, *Dudleya*, *Elymus elymoides*, *E. glaucus*, *E. multisetus*, *E. luteolum*, *E. nudum*, *Erodium*, *Eryngium armatum*, *Eschscholzia*, *Festuca arundinacea*, *F. californica*, *F. idahoensis*, *Hesperolinon*, *Heterotheca*, *Holcus*, *Hordeum*, *Lasthenia californica*, *Leymus mollis*, *Lolium*, *Melica*, *Mesembryanthemum*, *Nassella*, *Phalaris*, *Plagiobothrys nothofulvus*, *Plantago erecta*, *Pteridium*, *Raphanus*, *Sedum*, and/or *Vulpia*.

6. *Allium falcifolium*, *Dudleya* spp., *E. luteolum*, *E. nudum*, *Polypodium californicum*, *Sedum spathulifolium*, *Selaginella bigelovii*, *Streptanthus glandulosus*, and/or moss and lichen characterize or dominate stands on exposed rock.

Western North American Cliff, Scree & Rock Macrogroup

Californian Cliff, Scree & Rock Group

6a. Sparsely vegetated herbaceous stands (generally less than 10% absolute cover though may be higher in cover depending on rainfall) characterized by *Allium falcifolium*, *Claytonia exigua*, *Dudleya* spp., *Eriogonum luteolum*, *E. nudum*, *Hesperolinon* spp., *Plantago erecta*, and/or other native herbs growing on serpentine barrens with exposed gravel and bedrock.

***Allium* spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentinite Alliance**

6a1. *Allium falcifolium* is sometimes present, *Eriogonum luteolum* and *Streptanthus* spp. are characteristically present in the herbaceous layer.

Allium falcifolium – *Eriogonum luteolum* – *Streptanthus (batrachopus, morrisonii)*
Provisional Association*

6a2. *Streptanthus glandulosus* and/or *Dudleya abramsii* are characteristically present in the herb layer. Lichen often has high cover and moss is sometimes present.

Streptanthus glandulosus – *Dudleya abramsii* / Lichen – Moss Association*

6b. *Sedum spathulifolium* and/or *Polypodium* spp. dominate or co-dominate in small stands on steep north-facing rock outcrops and vertical cliff faces. Moss and lichen species often have high cover.

Sedum spathulifolium* Provisional Alliance

Sedum spathulifolium – *Polypodium californicum* / Lichen – Moss Provisional Association*

6c. The native *Dudleya cymosa* or other *Dudleya* spp. is characteristic, dominant, or co-dominant with herbs such as *Eriogonum* spp., *Epilobium canum*, and others at sparse cover. Lichen is characteristic and often dominant in the stand, with *Dudleya* sometimes lacking. Often on rocky coastal bluffs, cliffs, headlands, and bedrock outcrops.

***Dudleya cymosa* – *Dudleya lanceolata* / Lichen – Moss Alliance**

Dudleya farinosa / Lichen – Moss Provisional Association*

6d. *Selaginella bigelovii* dominates or characterizes small stands on rock outcrops, cliff faces, or skeletal soils over gently to steeply sloping, impervious substrates. Moss and lichen species often intermix. Emergent shrubs may be present.

Selaginella (bigelovii, wallacei) Alliance

6d1. *Selaginella bigelovii* dominates the herbaceous layer, and *Epilobium canum* and *Melica californica* are often present.

Selaginella bigelovii – (*Epilobium canum* – *Melica californica*) Provisional Association

7. Perennial grasses and/or forbs such as *Elymus elymoides*, *E. multisetus*, *Melica* spp., and/or *Nassella* spp., *Poa secunda*, *Achillea millefolium*, *Corethrogyne filaginifolia*, *Eriogonum nudum*, *Heterotheca sessiliflora*, or *Viola pedunculata* dominate or co-dominate with other herbs including non-natives in which the perennial herb cover is usually at least 10% relative cover, sometimes with high cover of non-native annuals. Habitats include sites with recent or seasonal disturbance and intact sites. If *Heterotheca sessiliflora* characterizes the stand with mesic herbs such as *Danthonia californica* (which can be at trace cover) and/or non-natives such as *Aira caryophyllea*, *Briza maxima*, and *Vulpia bromoides*, **see step 10b.**

Californian Annual & Perennial Grassland Macrogroup

Californian Perennial Grassland Group

7a. *Corethrogyne filaginifolia*, *Eriogonum nudum*, *Eriophyllum confertiflorum*, *Grindelia camporum*, *Heterotheca sessiliflora*, *Viola pedunculata*, *Achillea millefolium*, or other perennial forb(s) characterize the sub-shrub / herb layer in uplands often on shallow soils, stands are often co-dominated by native and non-native grasses and annual forbs and typically have grazing or other disturbance history. If perennial grasses are present, they are typically < 10% relative cover. If *Corethrogyne filaginifolia* is co-dominant with *Stipa pulchra*, key to the *Nassella* spp. – *Melica* spp. Alliance.

Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum) Alliance

7a1. *Eriogonum nudum* is co-dominant with non-native grasses and other herbs such as *Nassella pulchra* and *Eschscholzia californica*.

Eriogonum nudum Association

7a2. *Viola pedunculata* is characteristically present at significant cover with other perennial forbs such as *Achillea millefolium* and *Sidalcea malviflora*. *Nassella pulchra* and/or *Corethrogyne filaginifolia* are often present in the herbaceous layer.

Viola pedunculata – (*Eschscholzia californica* – *Nassella pulchra*) Provisional Association

7a3. *Chlorogalum pomeridianum* is characteristically present along with other geophytes such as *Triteleia laxa* or *Perideridia kelloggii*, which are often the highest cover species in the stand.

Chlorogalum pomeridianum – (*Triteleia laxa* – *Perideridia kelloggii*) Provisional Association

7a4. *Grindelia camporum* is characteristically present in an upland environment with non-native grasses and other herbs; if dominant in a wetland and floodplain settings, key to the *Grindelia camporum* Association in the *Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Alliance.

Grindelia camporum – Annual Grass – Forb Provisional Association

7a5. *Corethrogyne filaginifolia* is co-dominant with non-native grasses and other herbs such as *Eriogonum* spp. and *Eschscholzia californica*.

Corethrogyne filaginifolia Association*

7a6. *Heterotheca sessiliflora* is co-dominant to sub-dominant in the herbaceous layer in an upland environment.

Heterotheca sessiliflora Upland Provisional Association

7b. *Elymus elymoides*, *E. multisetus*, *Melica* spp., *Nassella* spp. and/or *Poa secunda*, all native perennial grasses, are dominant or characteristic in stands, sometimes with equal or greater cover of non-native herbs. Surveys dominated by *Wyethia angustifolia* key to this alliance.

Californian Perennial Grassland Group

***Nassella* spp. – *Melica* spp. Alliance**

7b1. *Elymus elymoides* or *E. multisetus* dominates, co-dominates, or characterizes stands often on serpentine soils and southerly exposures. Stands of *Elymus multisetus* with *Eschscholzia californica* and/or *Plantago erecta* were encountered most often in the sites visited for this project; *Dichelostemma capitatum*, *Eriogonum nudum*, *Lotus humistratus*, and *Minuartia douglasii* were also commonly present.

***Nassella* spp. – *Melica* spp. Alliance**

Elymus multisetus – (*Eschscholzia californica* – *Plantago erecta*) Association

7b2. *Melica californica*, *M. torreyana*, and/or *Nassella* spp. are dominant, co-dominant or characteristic in stands. *Avena*, *Bromus*, *Hemizonia congesta*, *Lolium perenne*, *Plantago erecta* *P. lanceolata*. and/or *Trifolium* spp. intermix as

dominant, co-dominant or characteristic taxa in associations of this alliance. If *Danthonia californica* or *Festuca idahoensis* is co-dominant or characteristic with *Nassella pulchra*, then key to the *Festuca idahoensis* – *Danthonia* alliance. If *Elymus (triticoideus, x gouldii)* is co-dominant, key here.

***Nassella* spp. – *Melica* spp. Alliance**

7b2a. *Melica californica* is present at significant cover in the herb layer, usually > 10% relative cover of the herb layer. If *Nassella pulchra* is present, its cover is much less than *Melica*.

Melica californica Association

7b2b. *Nassella pulchra* and *Melica californica* have similar cover in a stand with annual grasses and native forbs.

Nassella pulchra – *Melica californica* – annual grass Association

7b2c. *Melica torreyana* is characteristically present in the herb layer.

Melica torreyana Association

7b2d. *Nassella cernua* is characteristically present in the herb layer.

Nassella cernua Association

7b2e. *Nassella lepida* is characteristically present in the herb layer.

Nassella lepida Association

7b2f. *Nassella pulchra* is dominant to co-dominant in the herb layer.

Nassella pulchra Association

7b2g. Both *Nassella pulchra* and *Corethrogyne filaginifolia* are characteristically present in the herb layer.

Nassella pulchra – *Corethrogyne filaginifolia* Association*

7b2h. *Nassella pulchra* is characteristically present in the herbaceous layer, *Lolium* may have greater cover. *Hemizonia congesta* is present.

Nassella pulchra – *Hemizonia congesta* Association

7b2i. *Nassella pulchra* and *Lolium perenne* are characteristically present on serpentine soils. *Plantago erecta* is usually present in the herb layer.

Nassella pulchra – *Lolium perenne* – *Plantago erecta* Serpentine Association

7b2j. *Nassella pulchra* is characteristically present with co-dominant *Lolium perenne*. *Trifolium* spp. may be present at low cover.

Nassella pulchra – *Lolium perenne* – (*Trifolium* spp.) Association

7b2k. *Nassella pulchra* is characteristically present with non-native annual grasses. *Avena* together with non-native *Bromus* spp. have more cover than *Nassella*.

Nassella pulchra – *Avena* spp. – *Bromus* spp. Association

7b2l. *Nassella pulchra* is characteristically present with *Erodium* spp. dominant or co-dominant with *Avena barbata*.

Nassella pulchra – *Erodium* spp. – *Avena barbata* Association

7b3. *Poa secunda* is dominant or co-dominant in the herbaceous layer with *Avena* spp., *Bromus hordeaceus*, *B. madritensis*, *Dodecatheon* (=Primula) *hendersonii*, *Erodium cicutarium*, *Lupinus bicolor*, *Ranunculus* spp., *Trifolium* spp., or *Vulpia* spp.

***Nassella* spp. – *Melica* spp. Alliance**

7b3a. *Poa secunda* is co-dominant or characteristically present and native *Trifolium* spp. are often present in the herb layer along with other native forbs in clay soils.

Poa secunda – (*Trifolium gracilentum*, *willdenovii*) Provisional Association

8. Native and non-native annual forb/grass vegetation growing within the California Mediterranean climate where perennial herbs are <10% relative cover in the stands. Stands are generally found in relatively drier sites than those in the Vancouverian Macrogroups which are more common near the coast (**see step 10**). Includes vegetation characterized by, but not limited to *Amsinckia*, *Avena*, *Brassica*, *Bromus*, *Centaurea*, *Cynosurus*, *Eschscholzia*, *Lasthenia californica*, *Lolium*, *Lupinus*, *Monolopia*, *Plagiobothrys nothofulvus*, *Plantago erecta*, and *Vulpia microstachys*.

Californian Annual & Perennial Grassland Macrogroup

8a. Herbaceous vegetation dominated, co-dominated or characterized by native annual forbs and grasses such as *Amsinckia*, *Deinandra*, *Eschscholzia*, *Holocarpha*, *Lasthenia californica*, *Lupinus*, *Plagiobothrys*, *Plantago erecta*, and *Vulpia microstachys*. Commonly occurring taxa include *Avena*, *Bromus*, *Cryptantha*, *Geranium*, *Dichelostemma*, *Lolium*, and *Vulpia*. Stands are found on upland slopes, flats, and ridges. Native annual herbs are ≥ to 10% relative cover, and non-natives are often high in absolute cover.

Californian Annual Grassland & Forb Meadow Group

8a2. *Eschscholzia californica*, *Lupinus bicolor*, and/or other *Lupinus* species seasonally dominant to sub-dominant with a variety of native and non-native forbs and grasses, sometimes on thin soils with buried rocks.

***Eschscholzia (californica)* – *Lupinus (nanus)* Alliance**

8a2a. Native *Trifolium* sp. and/or *Lupinus nanus* characteristically present and intermixed with non-native annual grasses, which usually have higher cover.

Bromus hordeaceus – *Lupinus nanus* – *Trifolium* spp. Association

8a2b. *Eschscholzia californica* is seasonally dominant to characteristic, occurring on rocky outcrops and upland slopes that are usually south-facing.

Eschscholzia californica Association

8a2c. *Lupinus bicolor* is seasonally dominant to characteristic, occurring on upland slopes and grazed flats.

Lupinus bicolor Association

8a2d. *Lupinus formosus* is co-dominant to characteristically present with other native and non-native forbs and grasses, occurring often on ridgetops.

Lupinus formosus Provisional Association

8a2e. *Lupinus microcarpus* and/or *Lupinus succulentus* is characteristically present with typically with non-native forbs and grasses, which often have higher cover, occurring in grazed areas, roadsides, and steep slopes that have erosion.

Lupinus (microcarpus, succulentus) Provisional Association

8a3. *Castilleja exserta* and/or *Plagiobothrys nothofulvus* dominates or characterizes the stand with variable cover and may be sub-dominant to dominant with *Bromus* spp., *Castilleja* spp., *Erodium* spp., and *Trifolium* spp., intermixing with a variety of native and non-native forbs and grasses.

***Plagiobothrys nothofulvus* Alliance**

8a3a. *Plagiobothrys nothofulvus* and *Trifolium microcephalum* are characteristically present with *Bromus hordeaceus*, *Erodium botrys*, and other non-natives. Native species *Amsinckia menziesii*, *Castilleja attenuata*, and *Daucus pusillus* are often present with a variety of other forbs and grasses.

Plagiobothrys nothofulvus – *Daucus pusillus* – *Trifolium microcephalum* Association

8a3ba. *Plagiobothrys nothofulvus* and/or *Castilleja exserta* are characteristic with other species including non-native *Erodium cicutarium*, *Bromus rubens* and/or other nonnatives. Native species such as *Crassula connata*, *Lotus wrangelianus*, and *Lupinus nanus* are often present with a variety of other forbs and grasses.

Plagiobothrys nothofulvus – *Castilleja exserta* – (*Lupinus nanus*) Provisional Association

8a4. *Lasthenia californica*, *L. gracilis*, *Calycadenia* spp., *Hemizonia congesta*, *Hesperevax sparsiflora*, *Leptosiphon ambiguus*, *Leptosiphon bicolor*, *Lomatium*, *Lotus humistratus*, *Micropus californicus*, *Plantago erecta*, and/or *Vulpia microstachys* dominate individually or in combination as characteristic plants in the herbaceous layer. *Lasthenia*, *Plantago erecta*, and/or *Vulpia microstachys* are often present, sometimes with sparse cover.

***Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Alliance**

8a4a. *Hemizonia congesta* is characteristically present and *Lolium perenne* is often present at high cover in the herb layer.

Hemizonia congesta – *Lolium perenne* Association

8a4b. *Lasthenia californica* or *L. gracilis* is dominant or co-dominant with other herbs

Lasthenia (californica, gracilis) Association

8a4c. *Plantago erecta* often dominant, with *Lasthenia californica* present, *Hesperevax sparsiflora* may be trace or absent.

Lasthenia californica – *Plantago erecta* – *Hesperevax sparsiflora* Association

8a4d. *Hesperervax sparsiflora* is characteristically present to co-dominant with other native forbs such as *Microseris douglasii* and *Plagiobothrys* spp. Total cover is usually low on clay lenses or toe slopes.

Hesperervax sparsiflora – (*Microseris douglasii* – *Plagiobothrys* spp.) Provisional Association

8a4e. *Lotus humistratus* is present at significant cover and *Plantago erecta* and *Lomatium* spp. are often present in the herb layer.

Lotus humistratus – *Plantago erecta* – *Lomatium* spp. Provisional Association*

8a4e. *Micropus californicus* is dominant in the herbaceous layer with a rich diversity of native geophytes including *Dipterostemon capitatus* and other herbaceous species.

Micropus californicus Provisional Association

8a4f. *Leptosiphon ambiguus* is dominant or co-dominant with other herbs including *Gilia tricolor*, *Bromus* spp., *Erodium cicutarium*, *Lasthenia californica*, *Trifolium* spp., and other herbs, typically on ultramafic (including serpentine) hills and slopes.

Leptosiphon ambiguus Provisional Association

8a4g. *Lolium perenne* usually dominant but not at high cover. *Plantago erecta* present to co-dominant and other serpentine indicators usually present.

Plantago erecta – *Lolium perenne* lichen-rocky Association*

8a4h. *Festuca (Vulpia) microstachys* and *Plantago erecta* or *P. ovata* co-dominate in the herbaceous layer with a diverse mix of native and non-native herbs.

Vulpia microstachys – *Plantago erecta* Association

8a4i. *Vulpia microstachys* and/or *Plantago erecta* are typically present on ultramafic (including gabbro and serpentine) or volcanic substrates, with other native species such as *Calycadenia truncata*, *Calycadenia multiglandulosa* (or *C. oppositifolia*), *Castilleja lacera*, *Castilleja tenuis*, *Hemizonia congesta*, *Hesperolinon californicum*, *Lessingia micradenia*, *Microseris douglasii*, and *Trifolium willdenovii*. *Vulpia microstachys* and *Calycadenia multiglandulosa* are often present and *Plantago erecta* is present at significant cover in the herb layer.

Vulpia microstachys – *Plantago erecta* – *Calycadenia (truncata, multiglandulosa)* Association*

8a4j. *Festuca (Vulpia) microstachys* is the dominant native species in the herbaceous layer with a mix of native and non-native herbs. *Plantago erecta* is absent.

Vulpia microstachys Association

8a5. *Amsinckia* spp., *Phacelia* spp., *Croton setigerus*, an annual *Eriogonum* spp., and/or *Trichostema lanceolatum* is dominant or seasonally characteristic in herbaceous stands with a variety of native and non-native forbs and grasses. Soils

are often well-drained and loamy and may have high levels of bioturbation, grazing (either past/current), and/or other disturbances.

Amsinckia (menziesii, tessellata) – Phacelia spp. Alliance

8a5a. *Amsinckia intermedia* is sub-dominant to dominant with a variety of other native and non-native herbs including *Avena* sp., *Bromus* sp. and *Hordeum murinum*.

Amsinckia (intermedia, menziesii) Association

8a5b. An annual *Eriogonum* species such as *Eriogonum angulosum* is dominant or co-dominant with a variety of other native and non-native species including *Acmispon wrangelianus* and/or *Amsinckia tessellata*.

*Eriogonum (angulosum, gracillimum) – Amsinckia tessellata Provisional Association**

8a5c. *Croton setigerus* and/or *Trichostema lanceolatum* is characteristically present (>10% relative cover).

Croton setigerus – (Trichostema lanceolatum) Provisional Association

8a6. *Holocarpha heermannii*, *Holocarpha virgata*, *Holocarpha obconica*, or other *Holocarpha* spp., *Deinandra lobbiai*, *Blepharizonia laxa*, and/or *Blepharizonia plumosa* characteristically present to co-dominant in the herbaceous layer; native herbs typically > 10% relative cover.

Holocarpha (heermannii, virgata) Alliance

8a6a. *Holocarpha virgata* is characteristically present to co-dominant with a variety of other native and non-native herbs including *Bromus hordeaceus*.

Holocarpha virgata Association

8a6b. *Holocarpha heermannii* is characteristically present with a variety of other native and non-native herbs including *Erodium botrys*.

*Holocarpha heermannii Association**

8a6c. The rare tarweed *Blepharizonia plumosa* or the more common *Blepharizonia laxa* is characteristically present to co-dominant with a variety of other native and non-native herbs including *Lolium perenne*.

Blepharizonia (laxa, plumosa) Provisional Association

8a6d. The tarweed *Deinandra lobbiai* is dominant to co-dominant with a variety of other native and non-native herbs including *Bromus hordeaceus*.

Deinandra lobbiai Provisional Association

8a7. A species of *Monolopia* seasonally dominant to co-dominant in the herbaceous layer.

Monolopia (lanceolata) – Coreopsis (calliopsidea) Alliance

8a7a. *Monolopia major* is present with a variety of other native and non-native herbs including *Avena* spp., *Bromus* spp. and/or *Chlorogalum pomeridianum*.

8b. Herbaceous vegetation strongly dominated (typically >90% relative cover) by non-native grasses and forbs such as *Aegilops*, *Avena*, *Brachypodium*, *Brassica*, *Briza*, *Bromus*, *Carduus pycnocephalus*, *Centaurea*, *Cynosurus*, *Danthonia pilosa* (*Rytidosperma penicillatum*), *Elymus caput-medusae*, *Erodium*, *Lolium*, *Nassella manicata*, *Pennisetum*, and *Raphanus*. Native herbaceous species have insignificant cover in these stands, especially during the active growing season. Stands are found in foothills, rangelands, fallow fields, woodland openings, riparian areas, and disturbed settings.

Californian Ruderal Grassland, Meadow & Scrub Group

8b1. *Avena*, *Brachypodium*, *Briza*, *Bromus*, *Erodium*, *Hypochaeris*, *Medicago* spp., and/or *Vulpia bromoides* dominate individually or in combination, with overall non-native herbs > 90% relative cover. If *Elymus caput-medusae* is co-dominant with *Avena* and/or *Bromus* spp., those stands can also key here. If *Lolium perenne* is co-dominant, key to that alliance.

***Avena* spp. – *Bromus* spp. Semi-Natural Alliance**

8b1a. *Avena barbata* and/or *A. fatua* is dominant with other non-native grasses and forbs such as *Erodium cicutarium* and *Hordeum murinum*. If *Bromus hordeaceus* is present, it comprises < 30% relative cover of the herb layer.

Avena barbata – *Avena fatua* Semi-Natural Association

8b1b. *Avena barbata* and *Bromus hordeaceus* are the two taxa with the highest cover in a non-native grassland stand. Combined, the two species dominate the herbaceous layer.

Avena barbata – *Bromus hordeaceus* Semi-Natural Association

8b1c. *Brachypodium distachyon* dominates or co-dominates with other annual non-natives in the herb layer.

Brachypodium distachyon Semi-Natural Association

8b1d. *Briza maxima* dominates the herb layer.

Briza maxima Provisional Semi-Natural Association*

8b1e. *Bromus diandrus* dominates the herb layer with other non-native species such as *Bromus hordeaceus*. If *Avena* spp. are present, they are not co-dominant.

Bromus diandrus Semi-Natural Association

8b1f. *Bromus diandrus* and *Avena* spp. co-dominate the herb layer with other non-native species.

Bromus diandrus – *Avena* spp. Semi-Natural Association

8b1g. Either *Bromus hordeaceus* or *Erodium botrys* have the highest cover in a stand of non-native grassland, and combined are > 30% relative cover of the herb layer.

Bromus hordeaceus – *Erodium botrys* Semi-Natural Association

8b1h. At least two of the three nominate species, *Bromus hordeaceus*, *Hordeum murinum*, or *Medicago polymorpha* are present in the herb layer. One of the three, or a non-native *Trifolium* sp. has the highest cover in the stand.

Bromus hordeaceus – *Hordeum* spp. – *Medicago polymorpha* Semi-Natural Association

8b1i. Either *Hypochaeris glabra*, *H. radicata*, or *Vulpia bromoides* have the highest cover in a stand of non-native grassland, and combined are > 30% relative cover in the herb layer.

Hypochaeris glabra – *Vulpia bromoides* Semi-Natural Association*

8b2. *Brassica nigra*, *Raphanus* spp., *Carduus pycnocephalus*, *Carthamus lanatus*, *Centaurea solstitialis*, *Pichris echioides*, *Silybum marianum*, or another non-native forb dominates in the herbaceous layer, often in old or active agriculture lands. Overall non-native herbs >90% relative cover.

***Brassica nigra* – *Centaurea (solstitialis, melitensis)* Semi-Natural Alliance**

8b2a. *Brassica nigra* dominates the stand or is characteristically present with other non-native plants including *Avena* and *Bromus* spp.

Brassica nigra Semi-Natural Association

8b2b. *Carduus pycnocephala* and/or *Silybum marianum* typically dominate or are characteristically present with other non-natives in the herb layer, and native cover is low.

Carduus pycnocephalus – *Silybum marianum* Provisional Semi-Natural Association

8b2c. *Centaurea solstitialis* dominates the stand or is characteristically present with other non-natives in the herb layer, including *Bromus hordeaceus*, *B. diandrus*, *Lotus corniculatus*, *Rumex crispus*, and *Trifolium hirtum*. Stands often have little to no native cover.

Centaurea solstitialis Semi-Natural Association*

8b2d. *Raphanus sativus* and/or *R. raphanistrum* dominate the herb layer.

Raphanus sativus Semi-Natural Association*

8b3. *Cynosurus echinatus* dominates or co-dominates with other non-natives in the herbaceous layer. *Anagallis*, *Avena*, *Lolium*, *Plantago lanceolata*, *Rumex*, and *Vulpia bromoides* are often present.

Cynosurus echinatus* – *Arrhenatherum elatius* Semi-Natural Alliance

Cynosurus echinatus – (*Danthonia pilosa* – *Nassella manicata*) Provisional Semi-Natural Association*

8b4. *Lolium perenne* or *Lotus corniculatus* dominates or co-dominates with *Avena* spp., *Bromus* spp., *Hordeum marinum*, *H. murinum*, *Medicago*, *Trifolium subterraneum*, *Elymus caput-medusae*, and other non-natives in the herbaceous layer. Native species are typically less than 10% relative cover. These invaded stands are often found on moist or poorly drained sites, on or off serpentine.

***Lolium perenne* Semi-Natural Alliance**

8b4a. *Lolium perenne* is dominant in the herbaceous layer and non-native plants are strongly dominant overall and may include *Avena* spp., *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum marinum*, and *Hordeum murinum*, while native plants such as *Ranunculus californicus* may be trace in cover.

Lolium perenne Semi-Natural Association

8b4b. *Lolium perenne* co-dominates the stand with *Bromus hordeaceus* present at equal or higher cover.

Lolium perenne – *Bromus hordeaceus* Semi-Natural Association*

8b4c. *Lolium perenne* and *Hordeum marinum* are co-dominant, and *Ranunculus californicus* may be present at low cover in the herb layer.

Lolium perenne – *Hordeum marinum* – *Ranunculus californicus* Semi-Natural Association

8b4d. *Lolium perenne* is dominant to co-dominant and *Lepidium latifolium* is co-dominant to characteristically present in the herb layer.

Lolium perenne – *Lepidium latifolium* Semi-Natural Association*

8b4e. *Lotus corniculatus* is dominant to co-dominant in the herb layer and *Lolium perenne* is usually present.

Lolium perenne – *Lotus corniculatus* Semi-Natural Association*

8b5. *Aegilops triuncialis* dominates or co-dominates with *Avena barbata*, *Bromus hordeaceus*, *Lolium perenne*, and other non-natives in herbaceous stands. Often found on dry grasslands with serpentinite parent material.

***Lolium perenne* Semi-Natural Alliance**

Aegilops triuncialis – *Hemizonia congesta* Provisional Semi-Natural Association*

8b6. *Bromus rubens*, *B. madritensis*, *Schismus arabicus*, *S. barbatus* and/or *Erodium cicutarium* strongly dominant in stands, and native plants, if present, are less than 10% relative cover combined.

Bromus rubens* – *Schismus (arabicus, barbatus)* Semi-Natural Alliance

8b6a. *Bromus madritensis*, *B. rubens* and/or *Erodium cicutarium* dominate the herbaceous layer with other non-native grasses and forbs including *Hordeum murinum*.

Bromus (madritensis, rubens) – *Erodium cicutarium* Semi-Natural Association*

8b6b. *Schismus arabicus* and/or *S. barbatus* dominate the herbaceous layer with other non-native grasses including *Hordeum murinum* and *Bromus rubens*.

Schismus (arabicus, barbatus) Provisional Semi-Natural Association*

9. Vegetation not as above and strongly dominated by non-native annual herbaceous species of *Salsola* or *Sisymbrium irio*. Native plants, if present, are low in cover. Often in heavily disturbed or developed areas, including past agricultural and livestock areas.

Western North American Cool Semi-Desert Ruderal Scrub & Grassland Macrogroup*

Great Basin-Intermountain Ruderal Dry Shrubland & Grassland Group*

Salsola tragus* – *Isatis tinctoria* – *Bassia* spp. Semi-Natural Alliance

Salsola spp. Semi-Natural Association*

10. Herbaceous vegetation dominated, co-dominated, or characterized by native or non-native perennial grasses. Stands are generally found in moister settings than those in the Californian Annual & Perennial Grassland Macrogroup (**see step 8**) and are often coastal. The grasses included are: *Agrostis gigantea*, *A. stolonifera*, *Anthoxanthum*, *Calamagrostis nutkaensis*, *Cortaderia*, *Danthonia californica*, *Deschampsia cespitosa*, *Elymus elymoides*, *E. multisetus*, *Festuca arundinacea*, *F. idahoensis*, *Holcus*, *Hordeum brachyantherum* and/or *Phalaris aquatica*. Note: stands dominated by *Lolium perenne* key out in step 8 above.

10a. *Agrostis*, *Anthoxanthum*, *Cortaderia* spp., *Festuca arundinacea*, *Holcus*, and/or *Phalaris* are dominant, co-dominant, or characteristic in herbaceous stands.

10a1. Non-native, mesic to wet, disturbed pasturelands dominated or co-dominated by the following perennial grasses: *Agrostis gigantea*, *A. stolonifera*, *Arundo donax*, *Festuca arundinacea*, *Phalaris*, and/or *Phragmites australis*. If native species are present and co-dominant, key to an alliance dominated or characterized by natives. Found in wet settings, including brackish marshes, meadows, stream terraces, wet pastures, agricultural wetlands, or tidal zones.

Western North American Ruderal Marsh, Wet Meadow & Shrubland Macrogroup

Western Ruderal Marsh, Wet Meadow & Shrubland Group

10a1a. *Agrostis gigantea*, *A. stolonifera*, and/or *Festuca arundinacea* dominate or co-dominate in the herbaceous layer. The stands encountered for this project were dominated by *F. arundinacea*, though stands dominated by *Agrostis* may be present in Alameda and Contra Costa Counties.

Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Semi-Natural Alliance

Festuca arundinacea Provisional Semi-Natural Association*

10a1b. *Phalaris aquatica*, *Phalaris arundinacea*, or *Thinopyrum* spp. (= *Elymus hispidus*) is co-dominant in naturalized or planted stands. Other non-native herbs, such as *Avena barbata* and *Hypochaeris glabra* may be present.

***Phalaris aquatica* – *Phalaris arundinacea* Semi-Natural Alliance**

10a1b1. *Phalaris aquatica* co-dominates the herbaceous layer.

Phalaris aquatica Semi-Natural Association

10a1b2. *Phalaris arundinacea* co-dominates the herbaceous layer.

Phalaris arundinacea Provisional Semi-Natural Association

10a1b3. *Thinopyrum* spp. (= *Elymus hispidus*) dominates the herbaceous layer.

Thinopyrum (*ponticum*, *intermedium*) Provisional Semi-Natural Association*

10a1c. *Arundo donax* or *Phragmites australis* is dominant in the herbaceous layer.

***Phragmites australis* – *Arundo donax* Semi-Natural Alliance**

10a1c1. *Arundo donax* is dominant with other wetland species.

Arundo donax Semi-Natural Association*

10a1c2. *Phragmites australis* is dominant with other wetland species.

Phragmites australis Western Ruderal Semi-Natural Association

10a2. Non-native, slightly mesic, disturbed herblands dominated or co-dominated by the following perennial grasses: *Anthoxanthum*, *Cortaderia*, and/or *Holcus*, and/or the following forbs: *Ageratina adenophora*, *Conium maculatum*, *Dipsacus fullonum*, *Dipsacus sativus*, or *Foeniculum vulgare*. If native species are present and co-dominant, key to an alliance dominated or characterized by natives. Found in meadows, moist pastures, agricultural areas, coastal terraces, or coastal bluffs.

Western North American Ruderal Grassland & Shrubland Macrogroup

Sierran-North Pacific Ruderal Grassland & Shrubland Group

10a2a. *Holcus lanatus* and/or *Anthoxanthum odoratum* dominate individually or in combination. Other co-dominants may include *Briza maxima*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, and *Vulpia bromoides*.

Holcus lanatus* – *Anthoxanthum odoratum* Semi-Natural Alliance

10a2a1. *Holcus lanatus* dominates the herbaceous layer.

Holcus lanatus Semi-Natural Association*

10a2a2. *Holcus lanatus* co-dominates and *Anthoxanthum odoratum* is often present in the herbaceous layer.

Holcus lanatus – *Anthoxanthum odoratum* Semi-Natural Association*

10a2b. *Conium maculatum*, *Dipsacus fullonum*, *D. sativus*, *Foeniculum vulgare*, or *Ageratina adenophora* dominates herbaceous stands, though various other taxa are likely present.

***Conium maculatum* – *Foeniculum vulgare* Semi-Natural Alliance**

10a2b1. *Conium maculatum* dominates with other non-native forbs and grasses in the herb layer.

Conium maculatum Semi-Natural Association

10a2b2. *Foeniculum vulgare* dominates the herbaceous layer.

Foeniculum vulgare Semi-Natural Association*

10a2b3. *Dipsacus* (*fullonum*, *sativus*) dominates the herbaceous layer in wet areas.

Dipsacus (*fullonum*, *sativus*) Provisional Semi-Natural Association*

10a2c. *Cortaderia jubata* or *Cortaderia selloana* dominates in naturalized stands, sometimes in dense clumps; or other non-native herbs co-dominant with *Cortaderia jubata*. Overall non-native herbs are > 90% relative cover.

***Cortaderia* (*jubata*, *selloana*) Semi-Natural Alliance**

10a2c1. *Cortaderia (jubata, selloana)* strongly dominates the herb layer with other non-native species including *Phragmites australis*.

Cortaderia (jubata, selloana) Provisional Semi-Natural Association

10b. Native, mesic to moist, primarily coastal grasslands dominated, co-dominated, or characterized by *Bromus carinatus*, *Calamagrostis nutkaensis*, *Deschampsia cespitosa*, *Danthonia californica*, *Elymus glaucus*, *Eryngium armatum*, *Festuca californica*, *F. idahoensis*, *Heterotheca sessiliflora*, *Hordeum brachyantherum*, and/or *Pteridium aquilinum*. Other species such as *Baccharis pilularis*, *Briza maxima*, *Holcus lanatus*, *Nassella pulchra*, and/or *Vulpia bromoides* commonly intermix in stands. Found in a variety of settings, including dunes, bluffs, meadows, valley bottoms, alluvial slopes, terraces, meadows, and seasonally flooded areas with moderate salinity.

10b1. *Deschampsia cespitosa*, *Danthonia californica*, *Iris douglasiana*, and/or *Eryngium armatum* dominate or co-dominate individually or in combination (if *Holcus lanatus* has the highest cover, but these three species have at least 10% combined cover, key to *Deschampsia*). Settings range from seasonally wet bay edges to inland plains.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Freshwater Wet Meadow & Marsh Group

***Deschampsia cespitosa* – *Hordeum brachyantherum* – *Danthonia californica* Alliance**

10b1a. *Deschampsia cespitosa* is characteristically present to dominant in the herbaceous layer.

Deschampsia (cespitosa, holciformis) Association

10b1b. *Deschampsia cespitosa* and *Danthonia californica* are characteristically present in the herb layer.

Deschampsia cespitosa – *Danthonia californica* Association*

10b1c. *Deschampsia cespitosa* and *Eryngium armatum* are present at significant covers in the herb layer.

Deschampsia cespitosa – *Eryngium armatum* Association*

10b1d. *Deschampsia cespitosa* and *Iris douglasiana* are present at significant covers in the herb layer.

Deschampsia cespitosa – *Iris douglasiana* Association*

10b1e. *Deschampsia cespitosa* and *Lilaeopsis masonii* are co-dominant in the herbaceous layer along wet banks, other herbs may occur including *Schoenoplectus acutus* and *Hydrocotyle verticillata*.

Deschampsia cespitosa – *Lilaeopsis masonii* Provisional Association*

10b2. *Hordeum brachyantherum* dominates or co-dominates with *Distichlis spicata*, *Hordeum marinum*, *Lolium perenne* and/or *Rumex crispus* in moist meadows, along stream terraces, and near seeps and springs.

North Pacific Lowland Marsh, Wet Meadow & Shrubland Macrogroup

North Pacific Freshwater Wet Meadow & Marsh Group

Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica* Alliance

Hordeum brachyantherum Lowland Association

10b3. *Festuca idahoensis*, *F. californica*, *F. rubra* and/or *Danthonia californica* dominate or characterize stands. *Nassella pulchra* may be co-dominant. *Bromus carinatus*, *Elymus glaucus*, *Plantago erecta*, and a variety of native and non-native forbs and grasses may intermix as sub-dominants. *Festuca*, *Danthonia* or *Perideridia kelloggii* and other native species share at least 10% relative cover in the herb layer, with other non-native grasses and forbs sometimes having higher cover (e.g., *Briza maxima*, *Cynosurus echinatus*, *Hypochaeris radicata*, *Plantago lanceolata*, and *Vulpia bromoides*). Occasionally, the larger *Festuca californica* may replace *F. idahoensis* in somewhat shadier or less exposed sites, or occasionally *Heterotheca sessiliflora* may be dominant and/or co-dominant with other forbs and grasses including mesic herbs such as *Danthonia californica* (which can be at trace cover) and/or non-natives such as *Aira caryophyllea*, *Briza maxima*, and *Vulpia bromoides*.

Sierran-North Pacific Lowland Grassland & Shrubland Macrogroup

Sierran-North Pacific Bald, Bluff & Prairie Group

Festuca idahoensis – *Danthonia californica* Alliance

10b3a. *Danthonia californica* and *Nassella pulchra* are both characteristically present in the herb layer.

Danthonia californica – *Nassella pulchra* Association

10b3b. *Perideridia kelloggii* is characteristically present and *Danthonia californica* is often present in the herb layer.

Perideridia kelloggii – *Danthonia californica* Provisional Association

10b3c. *Danthonia californica* is co-dominant to characteristically present in the herb layer.

Danthonia californica Coastal Association

10b3d. *Festuca californica* is characteristically present in the herb layer.

Festuca californica Association*

10b3e. Both *Festuca idahoensis* and *Nassella pulchra* are present at significant cover in the herb layer.

Festuca idahoensis – *Nassella pulchra* Provisional Association

10b3f. *Festuca idahoensis* is characteristically present and *Danthonia californica* and *Koeleria macrantha* are often present in the herb layer.

Festuca idahoensis – (*Danthonia californica* – *Koeleria macrantha*) Association

10b3g. *Festuca idahoensis* dominates the herbaceous layer on ultramafic substrate.

Festuca idahoensis Ultramafic Provisional Association*

10b3h. *Festuca rubra* dominates the herbaceous layer.

Festuca rubra Association*

10b3i. *Heterotheca sessiliflora* dominates or co-dominates with other forbs and grasses including mesic herbs such as *Danthonia californica* (which can be at trace cover) and/or non-natives such as *Aira caryophyllea*, *Briza maxima*, and *Vulpia bromoides*.

Heterotheca sessiliflora – *Danthonia californica* Provisional Association*

10b4. *Bromus carinatus*, *Elymus glaucus* and/or *Pteridium aquilinum* dominate or co-dominate on steep north facing slopes. *Achillea millefolium*, *Bromus hordeaceus*, *Geranium dissectum* and *Lolium perenne* are often present.

***Bromus carinatus* – *Elymus glaucus* Alliance**

10b4a. *Bromus carinatus* is characteristically present and may be co-dominant in the herb layer, along with other herbs such as *Achillea millefolium* or *Elymus glaucus* at lower cover.

Bromus carinatus Association

10b4b. *Elymus glaucus* is characteristically present and often co-dominates the herb layer with other grasses and forbs.

Elymus glaucus Association

10b5c. *Pteridium aquilinum* co-dominant to characteristically present, grasses such as *Avena*, *Bromus*, *Briza maxima*, and *Vulpia bromoides* are often present in the herb layer.

Pteridium aquilinum – Grass Association*

11. Coastal dune, bluff, meadow, cliffs, rock outcrops, and other vegetation dominated by herbaceous species such as *Abronia*, *Ambrosia*, *Ammophila*, *Armeria maritima*, *Artemisia pycnocephala*, *Carpobrotus*, *Dudleya*, *Erigeron glaucus*, *Eriogonum latifolium*, *Eriophyllum staechadifolium*, *Fragaria chiloensis*, *Leymus mollis*, and *Mesembryanthemum*.

11a. Native species, including *Abronia latifolia*, *Ambrosia chamissonis*, *Artemisia pycnocephala*, *Leymus mollis*, *Lathyrus littoralis*, and/or other herbs, are characteristic to dominant on dunes or coastal bluffs. Plants are adapted to salt spray, wind and shifting sands and are thus capable of colonizing relatively unstable and sterile substrates.

Pacific Coastal Beach & Dune Macrogroup

11a1. *Abronia latifolia*, *Abronia umbellata*, *Ambrosia chamissonis*, *Calystegia soldanella*, and/or *Lathyrus littoralis* are characteristically present to dominant, sometimes with *Armeria maritima*, *Camissonia cheiranthifolia*, *Cardionema ramosissimum*, *Poa douglasii*, or *Polygonum paronychia* occurring as associated species. Non-native species such as *Cakile maritima*, *Carpobrotus* spp., and *Ammophila arenaria* may also be present.

Californian Coastal Beach, Dune & Sandy Bluff Group

Abronia latifolia* – *Ambrosia chamissonis* Alliance

11a1a. *Ambrosia chamissonis* is characteristically present and typically has the highest cover of any species, though *Cakile maritima*, *Calystegia soldanella*, or *Abronia latifolia* sometimes have greater cover.

Ambrosia chamissonis Association*

11a1b. *Ambrosia chamissonis* and *Abronia umbellata* are characteristically present in the herbaceous layer.

Ambrosia chamissonis – *Abronia umbellata* Association*

11a1c. One or more of the three nominate species dominates the herbaceous layer. *Ambrosia chamissonis* may be present, but is not characterizing the stand.

Abronia latifolia – *Calystegia soldanella* – *Lathyrus littoralis* Association*

11a2. *Armeria maritima*, *Artemisia pycnocephala*, *Erigeron glaucus*, *Eriophyllum staechadifolium*, *Eriogonum latifolium*, and/or *Fragaria chiloensis* dominate or characterize stabilized dunes, sea bluffs and exposed coastal terraces. Shrubs such as *Baccharis pilularis*, *Lupinus arboreus*, *L. versicolor*, and *Rubus ursinus* may be present at low cover. Other native forbs and grasses may be present including *Achillea millefolium*, *Angelica hendersonii*, *Bromus carinatus*, *Daucus pusillus* and/or *Dudleya* spp.

Californian Coastal Beach, Dune & Sandy Bluff Group

***Eriophyllum staechadifolium* – *Erigeron glaucus* – *Eriogonum latifolium* Alliance**

11a2a. *Armeria maritima* and/or *Plantago maritima* co-dominate the herbaceous layer in an open stand.

Armeria maritima – *Plantago (maritima)* Provisional Association*

11a2b. *Artemisia pycnocephala* is characteristically present in the herb layer.

Artemisia pycnocephala Association*

11a2c. *Eriophyllum staechadifolium* is often present and *Eriogonum latifolium* is sometimes present in the herb layer.

Eriophyllum staechadifolium – *Eriogonum latifolium* Association*

11b. Non-natives, including *Ammophila*, *Cakile*, *Carpobrotus*, and/or *Mesembryanthemum* strongly dominate at >80% relative cover on dunes, bluffs, or disturbed lands. Emergent shrubs such as *Baccharis pilularis* or *Lupinus arboreus* may be present.

North Pacific Coastal Ruderal Grassland & Shrubland Macrogroup

North Pacific Maritime Coastal Ruderal Dune & Bluff Group

11b1. *Carpobrotus* and/or *Mesembryanthemum* dominate on bluffs, dunes, or disturbed lands, often forming impenetrable mats that prevent natives from establishing.

Mesembryanthemum spp. – *Carpobrotus* spp. Semi-Natural Alliance

Carpobrotus (edulis) Semi-Natural Association

11b2. *Cakile edentula* and/or *C. maritima* are strongly dominant along active beaches at the debris line, and overall non-native cover > 90% relative cover.

Cakile (edentula, maritima)* Provisional Semi-Natural Alliance
Cakile (edentula, maritima) Provisional Semi-Natural Association*

Appendix D

Vegetation Descriptions

See separate electronic file for the local Alliance and Association descriptions for Alameda and Contra Costa Counties.

Vegetation Classification of Alliances and Associations in Alameda and Contra Costa Counties, California

Appendix D

Vegetation Descriptions

By

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A Report to:

East Bay Regional Parks District

2025

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TREE-OVERSTORY VEGETATION

***Acer macrophyllum* – *Alnus rubra* Forest & Woodland Alliance**



Common Name: Bigleaf maple – red alder forest and woodland

NVC Alliance Code: A4428. *Populus balsamifera* ssp. *trichocarpa* - *Alnus rubra* - *Fraxinus latifolia* Riparian Forest Alliance

Statewide Description

Acer macrophyllum and/or *Alnus rubra* is dominant or co-dominant in the tree canopy with *Abies concolor*, *Abies grandis*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Cornus nuttallii*, *Picea sitchensis*, *Populus trichocarpa*, *Pseudotsuga menziesii*, *Quercus* spp., *Salix* spp., *Sequoia sempervirens*, *Taxus brevifolia*, *Tsuga heterophylla*, and *Umbellularia californica*.

This alliance occurs in habitats with different moisture regimes from moist stream terraces to dry talus, but it attains its best development on deep alluvial soils. Stands typically include a well-developed shrub understory of species such as *Rubus spectabilis*, *R. ursinus*, and *Sambucus racemosa* (Cheng 2004, Keeler-Wolf et al. 2003a, Evens and Kentner 2006). Stands of *Alnus rubra* were much more restricted in the past, occurring chiefly along streams or natural landslides; today seedlings and

Acer macrophyllum – *Alnus rubra* Forest & Woodland Alliance

stands easily establish in upland areas that have been recently logged (Sawyer 2006). The best developed stands are scattered along alluvial river terraces, in adjacent side drainages, and at springs along slopes. *Acer macrophyllum* is extremely flood tolerant; it is the only hardwood encountered commonly in low elevation in Pacific Northwest coniferous forests in both steep upland slopes and riparian habitats. At the southern portion of its range, in southern and central California, it is usually riparian (Minore and Zasada 1990, Uchytel 1989a).

We are including two different environmental settings in this alliance at this time. Stands surrounded by coastal forests in northwestern or central California contain a scattering of tall conifers, such as *Picea sitchensis*, *Pseudotsuga menziesii*, or *Sequoia sempervirens* (Sawyer 2006). Stands in the mountains, which are scattered, may contain *Pseudotsuga menziesii* as a co-dominant. Other California authors (Chambers 2003, Fites 1993, Jimerson et al. 1996) have placed their mixed associations in the *Pseudotsuga menziesii* or other conifer alliances; however, we place them in the *Acer macrophyllum* – *Alnus rubra* alliance, because this riparian species is a primary indicator and co-dominant in these associations. Stands on talus and other upland settings are the third environmental setting. We have combined two previously separate alliances, the *Acer macrophyllum* and *Alnus rubra* alliances as recognized in the 2009 book, *A Manual of California Vegetation, second edition*.

Local Vegetation Description

The Bigleaf maple – red alder forest and woodland Alliance forms an open to continuous tree canopy with an open to intermittent shrub understory. The dominant trees are *Acer macrophyllum* and *Umbellularia californica*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Rubus ursinus*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Dryopteris arguta*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	40.1	15 – 70	23.8	10 – 100
Regenerating or Shrubby Tree	4.0	0 – 10	5.5	2 – 10
Shrub	19.8	5 – 62	1.1	0 – 2
Herb	7.6	0 – 21	0.3	0 – 1

Local Membership Rule

Acer macrophyllum > 50% relative cover in the tree canopy or > 30% relative cover with *Umbellularia californica*; or *U. californica* > 50% relative cover with *Acer macrophyllum* or *Pseudotsuga menziesii* characteristically present in riparian settings.

Local Environmental Description

Elevation: Mean 294 m, Range 97 – 421 m

Aspect: NE (3), NW (2), SW (2), Variable (2), SE (1)

Acer macrophyllum – *Alnus rubra* Forest & Woodland Alliance

Slope: Mean 20 degrees, Range 3 – 45 degrees

Macro Topography: Bottom (5), Lower 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 8.6%, Range 0 – 23%

Small Rock: Mean 11.0%, Range 0 – 34%

Fines Cover: Mean 32.8%, Range 1 – 90%

Litter Cover: Mean 44.8%, Range 0 – 92%

Soil Texture (field assessed): Coarse, loamy sand (1), Medium loam (1), Medium sand (1), Medium silt (1), Medium silt loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Coarse sand (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Sedimentary (3), Franciscan melange (1), Mixed alluvium (1), Sandstone and other sedimentary (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (4), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This alliance has low non-native plant cover (average 6.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Genista monspessulana*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Acer macrophyllum / (*Rubus ursinus*)

Umbellularia californica – *Acer macrophyllum*

Classification Comments

This alliance has been redefined from previously separate *Acer macrophyllum* and *Alnus rubra* Alliances. The USNVC now accepts a broader merging of alliances including this alliance along with lower elevation stands of other riparian trees such as *Fraxinus latifolia*, in the *Populus trichocarpa* – (*Alnus rubra*) – *Fraxinus latifolia* Alliance.

References: AECOM 2013, Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Stumpf et al. 2017

Global Rarity Rank: GNR

State Rarity Rank: SNR

Surveys Used for Description

Total: N=10; Alameda County (n=6): ALCC160, ALCC203, ALCC241, ALCC248, ALCC510, SUNOL012

Contra Costa County (n=4): ALCC025, EBAY0034, SPCCA-018, SPCCB-083

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Acer macrophyllum</i>	100	19.3	1.0	48.0	Y		Y	Y
T	<i>Umbellularia californica</i>	100	12.4	0.2	27.0	Y		Y	Y
T	<i>Quercus agrifolia</i>	70	5.4	1.0	17.0				Y
T	<i>Quercus lobata</i>	30	3.0	5.0	20.0				
T	<i>Platanus racemosa</i>	30	1.3	2.0	7.0				
T	<i>Aesculus californica</i>	30	0.9	0.2	7.0				
R	<i>Umbellularia californica</i> *	60	3.4	3.0	8.0				Y
R	<i>Acer macrophyllum</i>*	30	0.3	0.2	2.0				
R	<i>Quercus agrifolia</i> *	30	0.2	0.2	1.2				
R	<i>Platanus racemosa</i> *	20	0.0	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	90	6.3	2.0	18.0	Y		Y	Y
S	<i>Rubus ursinus</i>	80	4.8	0.2	29.0	Y			Y
S	<i>Symphoricarpos albus</i>	40	1.4	0.2	10.0				
S	<i>Holodiscus discolor</i>	30	3.6	0.2	35.0				
S	<i>Rhamnus ilicifolia</i>	20	0.1	0.2	1.0				
S	<i>Genista monspessulana</i>	20	0.0	0.2	0.2				
S	<i>Sambucus nigra</i>	20	0.0	0.1	0.2				
S	<i>Artemisia californica</i>	20	0.0	0.1	0.2				
H	<i>Bromus diandrus</i>	60	1.0	0.2	4.0				Y
H	<i>Carduus pycnocephalus</i>	60	0.5	0.2	2.0				Y
H	<i>Dryopteris arguta</i>	50	0.4	0.1	2.0				Y
H	<i>Torilis arvensis</i>	50	0.4	0.2	1.0				Y
H	<i>Artemisia douglasiana</i>	40	0.6	0.2	5.0				
H	<i>Conium maculatum</i>	30	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	20	0.5	0.2	5.0				
H	<i>Polystichum munitum</i>	20	0.2	0.2	2.0				
H	<i>Adiantum jordanii</i>	20	0.1	0.2	1.0				
H	<i>Pellaea andromedifolia</i>	20	0.1	0.2	1.0				
H	<i>Juncus patens</i>	20	0.1	0.2	1.0				
H	<i>Mimulus guttatus</i>	20	0.0	0.2	0.2				
H	<i>Scrophularia californica</i>	20	0.0	0.2	0.2				
H	<i>Pentagramma triangularis</i>	20	0.0	0.1	0.2				
NV	Moss	60	2.4	1.0	10.0				Y

Acer macrophyllum – *Alnus rubra* Forest & Woodland Alliance

***Acer macrophyllum* / (*Rubus ursinus*) Association**

Common Name: Bigleaf Maple / (California blackberry) Woodland

Alliance: *Acer macrophyllum* – *Alnus rubra* Forest & Woodland Alliance

Local Vegetation Description

The Bigleaf Maple / (California blackberry) Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. The dominant tree is *Acer macrophyllum*, and *Umbellularia californica* and *Quercus agrifolia* are characteristic or often present. Commonly associated shrubs include *Rubus ursinus*, *Toxicodendron diversilobum*, and *Holodiscus discolor*, and commonly associated herbs include *Dryopteris arguta*, *Torilis arvensis*, *Adiantum jordanii*, *Artemisia douglasiana*, *Bromus diandrus*, and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	40.8	10 – 63	14.3	2 – 35
Regenerating or Shrubby Tree	2.2	0 – 7	3.5	2 – 5
Shrub	29.5	9 – 62	1.2	0 – 2
Herb	15.5	7 – 24	0.4	0 – 1

Local Environmental Description

Elevation: Mean 363 m, Range 253 – 465 m

Aspect: NE (2), NW (2), Variable (1)

Slope: Mean 21 degrees, Range 5 – 38 degrees

Macro Topography: Lower 1/3 of slope (2), Channel Bed, High-flow bank/slope (1), Middle 1/3 of slope (1), Toe of Streambank, Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 4.2%, Range 0 – 10%

Small Rock: Mean 5.6%, Range 0 – 15%

Fines Cover: Mean 27.1%, Range 4 – 90%

Litter Cover: Mean 45.7%, Range 7 – 92%

Soil Texture (field assessed): Loam (2), Medium loam (1), Medium silt loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Sedimentary (2), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 12.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Genista monspessulana*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2021, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC203, ALCC241

Contra Costa County (n=2): ALCC025, SPCCA-018

Santa Clara Co. (n=2): VAWA059, VAWA086

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Acer macrophyllum</i>	100	28.9	10.0	48.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	5.7	0.2	12.0	Y			Y
T	<i>Quercus agrifolia</i>	50	1.7	1.0	5.0				Y
R	<i>Umbellularia californica</i> *	33	1.7	4.0	6.0				
S	<i>Toxicodendron diversilobum</i>	100	6.0	2.0	15.0	Y		Y	Y
S	<i>Rubus ursinus</i>	67	7.7	3.0	29.0				Y
S	<i>Holodiscus discolor</i>	50	7.6	0.5	35.0				Y
S	<i>Symphoricarpos albus</i>	33	0.7	1.0	3.0				
S	<i>Genista monspessulana</i>	33	0.1	0.2	0.2				
H	<i>Dryopteris arguta</i>	83	3.8	0.1	20.0	Y			Y
H	<i>Torilis arvensis</i>	83	0.6	0.2	1.0	Y			Y
H	<i>Bromus diandrus</i>	67	1.7	1.0	4.0				Y
H	<i>Carduus pycnocephalus</i>	67	0.7	0.2	2.0				Y
H	<i>Artemisia douglasiana</i>	50	1.4	0.2	5.0				Y
H	<i>Adiantum jordanii</i>	50	0.8	0.5	3.0				Y
H	<i>Cynosurus echinatus</i>	33	1.3	3.0	5.0				
H	<i>Elymus glaucus</i>	33	0.3	0.5	1.0				

Acer macrophyllum / (*Rubus ursinus*) Association
Acer macrophyllum – *Alnus rubra* Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sanicula</i> sp.	33	0.1	0.2	0.5				
H	<i>Pentagramma triangularis</i>	33	0.1	0.1	0.5				
NV	Moss	33	1.2	1.0	6.0				

***Umbellularia californica* – *Acer macrophyllum* Association**

Common Name: California Bay – Bigleaf Maple Woodland

Alliance: *Acer macrophyllum* – *Alnus rubra* Forest & Woodland Alliance

Local Vegetation Description

The California Bay – Bigleaf Maple Association forms an open to continuous tree canopy with an open shrub understory. The dominant tree is *Umbellularia californica*, and *Acer macrophyllum*, *Platanus racemosa*, and *Quercus agrifolia* are characteristic or often present. Regenerating or shrubby trees that are often present include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, *Rubus ursinus*, and *Symphoricarpos albus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	38.2	15 – 70	27.9	10 – 100
Regenerating or Shrubby Tree	4.6	0 – 10	6.2	2 – 10
Shrub	10.2	5 – 22	1.3	0.5 – 2
Herb	4.4	0 – 17	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 262 m, Range 97 – 411 m

Aspect: SW (2), NE (1), NW (1), SE (1), Variable (1)

Slope: Mean 20 degrees, Range 3 – 45 degrees

Macro Topography: Bottom (5), Bottom to Lower 1/3 of slope (1)

Large Rock: Mean 12.6%, Range 0 – 23%

Small Rock: Mean 15.2%, Range 0 – 34%

Fines Cover: Mean 32.6%, Range 1 – 65%

Litter Cover: Mean 36.5%, Range 0 – 53%

Soil Texture (field assessed): Coarse sand (1), Coarse, loamy sand (1), Medium sand (1), Medium silt (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Franciscan melange (1), Mixed alluvium (1), Sedimentary (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has very low non-native plant cover (average 0.6%) relative to native

cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus* and *Carduus pycnocephalus*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Stumpf et al. 2017

Global Rarity Rank: G3 **State Rarity Rank:** S3? **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=4): ALCC160, ALCC248, ALCC510, SUNOL012

Contra Costa County (n=2): EBAY0034, SPCCB-083

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	17.2	10.0	27.0	Y		Y	Y
T	<i>Acer macrophyllum</i>	100	11.2	1.0	25.0	Y			Y
T	<i>Quercus agrifolia</i>	67	7.3	4.0	17.0				Y
T	<i>Platanus racemosa</i>	50	2.2	2.0	7.0				Y
T	<i>Quercus lobata</i>	33	4.2	5.0	20.0				
T	<i>Aesculus californica</i>	33	0.4	0.2	2.0				
R	<i>Umbellularia californica</i> *	67	4.0	3.0	8.0				Y
R	<i>Quercus agrifolia</i> *	33	0.2	0.2	1.2				
R	<i>Acer macrophyllum</i> *	33	0.2	0.2	1.0				
R	<i>Platanus racemosa</i> *	33	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	83	5.5	2.0	18.0	Y		Y	Y
S	<i>Rubus ursinus</i>	83	0.9	0.2	2.0	Y			Y
S	<i>Symphoricarpos albus</i>	50	2.2	0.2	10.0				Y
S	<i>Holodiscus discolor</i>	33	0.2	0.2	1.0				
S	<i>Rhamnus ilicifolia</i>	33	0.2	0.2	1.0				
H	<i>Dryopteris arguta</i>	33	0.3	1.0	1.0				
H	<i>Juncus patens</i>	33	0.2	0.2	1.0				
H	<i>Carduus pycnocephalus</i>	33	0.1	0.2	0.2				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Mimulus guttatus</i>	33	0.1	0.2	0.2				
NV	Moss	67	2.8	1.0	10.0				Y

Umbellularia californica – *Acer macrophyllum* Association
Acer macrophyllum – *Alnus rubra* Forest & Woodland Alliance

***Acer negundo* Forest & Woodland Alliance**



Common Name: Box-elder forest and woodland

NVC Alliance Code: A4154. *Acer negundo* - *Alnus incana* ssp. *tenuifolia* - *Cornus sericea* Riparian Woodland Alliance

Statewide Description

Acer negundo is dominant or co-dominant in the tree canopy with *Alnus rhombifolia*, *Fraxinus latifolia*, *Juglans hindsii*, *Juglans hindsii* × *regia*, *Platanus racemosa*, *Populus fremontii*, *Populus trichocarpa*, *Quercus lobata*, *Salix gooddingii*, and *Salix* spp.

In California, this alliance is mainly limited to riparian zones of major streams and rivers that are regularly flooded. Individual trees often occur as an understory component in stands of *Populus fremontii*, *Quercus lobata*, and *Salix laevigata* – *Salix gooddingii* Alliances. *Acer negundo* stands may result from removal of the overstory trees in stands of those alliances. The *Acer negundo* Alliance is rare in the state, where small stands form and sometimes are monospecific.

Local Vegetation Description

The Box-elder forest and woodland Alliance forms an open to continuous tree canopy with a sparse to continuous shrub understory. The dominant tree is *Acer negundo*, and

Platanus racemosa, *Populus fremontii*, *Quercus agrifolia*, *Quercus lobata*, and *Salix lucida* ssp. *lasiandra* may be present. Commonly associated shrubs include *Salix lasiolepis*.

Local Membership Rule

Acer negundo > 50% relative cover in the tree canopy, with other riparian plants.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Contra Costa County Subsections: Fremont - Livermore Hills and Valleys (2)

Associations in Alameda & Contra Costa Counties

Acer negundo / (*Rubus ursinus*)*

Classification Comments

No survey data was available in the region, but 5 field observations were recorded.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S3

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Acer negundo* / (*Rubus ursinus*) Association**

Common Name: Box-elder / (California blackberry) Woodland

Alliance: *Acer negundo* Forest & Woodland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Aesculus californica* Forest & Woodland Alliance**



Common Name: California buckeye groves

NVC Alliance Code: A4125. *Aesculus californica* Woodland Alliance

Statewide Description

Aesculus californica is dominant or co-dominant in the tree canopy with *Fraxinus dipetala*, *Heteromeles arbutifolia*, *Pinus sabiniana*, *Prunus ilicifolia*, *Quercus wislizeni*, and *Umbellularia californica*.

Stands tend to be small and often occur in relatively mesic concavities inland or on steep lower to mid slopes in coastal areas. They intermix with stands of many chaparral and woodland alliances at low elevations.

Local Vegetation Description

The California buckeye groves Alliance forms an open to continuous canopy with a sparse to intermittent shrub understory. The dominant tree is *Aesculus californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus*, *Bromus diandrus*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	35.2	10 – 60	8.4	2 – 35
Regenerating or Shrubby Tree	2.0	0 – 23	3.0	0 – 10
Shrub	7.8	0 – 50	1.8	0.5 – 5
Herb	34.0	0 – 80	0.5	0 – 2

Local Membership Rule

Aesculus californica > 50% relative cover in the tree canopy, if *Umbellularia californica* is present it is < 30% relative cover.

Local Environmental Description

Elevation: Mean 253 m, Range 44 – 592 m

Aspect: NE (13), NW (3), SE (2), Flat (1), SW (1), Variable (1)

Slope: Mean 20 degrees, Range 2 – 35 degrees

Macro Topography: Lower 1/3 of slope (5), Bottom (3), Middle 1/3 of slope (3), Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 4.9%, Range 0 – 40%

Small Rock: Mean 4.4%, Range 0 – 35%

Fines Cover: Mean 30.8%, Range 2 – 82%

Litter Cover: Mean 43.9%, Range 5 – 91%

Soil Texture (field assessed): Loam (3), Medium silt loam (3), Moderately fine clay loam (3), Coarse, loamy sand (2), Moderately fine silty clay loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (6), Franciscan melange (4), Sandstone (2), Sandstone and other sedimentary (2), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1)

Alameda County Subsections: Diablo Range (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (8), Suisun Hills and Valleys (8), Eastern Hills (3)

Site Impacts

This alliance has moderate non-native plant cover (average 36.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Lolium perenne*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Aesculus californica

Aesculus californica – *Umbellularia californica*

Aesculus californica / (*Fraxinus dipetala* – *Ptelea crenulata*)

Aesculus californica / *Toxicodendron diversilobum* / Moss

Aesculus californica alliance

Classification Comments

The *Aesculus californica* / (*Fraxinus dipetala* – *Ptelea crenulata*) Association is newly described below.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens et al. 2004, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, VegCAMP 2015a

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=21; Alameda County (n=2): ALCCREC216, LLNL089

Contra Costa County (n=19): ALCC054, ALCC059, ALCC117, ALCC215, ALCC219, ALCC222, ALCCREC002, ALCCREC107, ALCCREC205, ALCCREC207, EBAY0011, EBAY0018, EBAY0027, JOMU004, JOMU019, JOMU020, JOMU032, SPCCA-038, SPCCB-024

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	28.4	10.0	60.0	Y	Y		Y
T	<i>Umbellularia californica</i>	33	2.6	2.0	23.0				
T	<i>Quercus agrifolia</i>	29	1.6	2.0	10.0				
T	<i>Quercus douglasii</i>	24	1.7	1.0	15.0				
R	<i>Aesculus californica</i>*	29	1.6	0.2	23.0				
S	<i>Toxicodendron diversilobum</i>	67	1.4	0.2	7.0				Y
S	<i>Heteromeles arbutifolia</i>	24	0.9	1.0	12.0				
S	<i>Sambucus nigra</i>	24	0.2	0.2	2.0				
H	<i>Carduus pycnocephalus</i>	76	2.7	0.2	20.0	Y			Y
H	<i>Bromus diandrus</i>	57	5.5	0.2	32.0				Y
H	<i>Lolium perenne</i>	52	4.7	1.0	50.0				Y
H	<i>Avena barbata</i>	43	6.0	0.2	65.0				
H	<i>Torilis arvensis</i>	43	0.4	0.2	2.0				
H	<i>Avena fatua</i>	24	8.5	0.2	75.0				
H	<i>Cynosurus echinatus</i>	24	0.9	0.2	10.0				
H	<i>Sanicula crassicaulis</i>	24	0.2	0.2	2.0				
NV	Moss	43	2.8	0.1	27.0				

***Aesculus californica* Association**

Common Name: California Buckeye Woodland

Alliance: *Aesculus californica* Forest & Woodland Alliance

Local Vegetation Description

The California Buckeye Association forms an open to intermittent tree canopy with a sparse shrub understory. The dominant tree is *Aesculus californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus*, *Bromus diandrus*, *Lolium perenne*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 2	12.5	10 – 15
Hardwood	23.0	10 – 50	6.5	2 – 10
Regenerating or Shrubby Tree	0.3	0 – 2	2.0	0 – 5
Shrub	0.4	0 – 1	1.8	0.5 – 5
Herb	29.7	3 – 72	0.4	0 – 1

Local Environmental Description

Elevation: Mean 387 m, Range 173 – 705 m

Aspect: NE (6), NW (2), SE (1)

Slope: Mean 15 degrees, Range 6 – 23 degrees

Macro Topography: Upper 1/3 of slope (4), Lower 1/3 of slope (2), Bottom (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 2.0%, Range 0 – 11%

Fines Cover: Mean 44.6%, Range 2 – 93%

Litter Cover: Mean 50.4%, Range 5 – 91%

Soil Texture (field assessed): Moderately fine clay loam (3), Coarse, loamy sand (1), Medium loam (1), Medium silt loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Franciscan melange (2), Sandstone, shale, and gravel deposits (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Eastern Hills (1)

Other Subsections: Fremont - Livermore Hills and Valleys (3), Western Diablo Range (1)

Site Impacts

This association has moderate non-native plant cover (average 46.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Hordeum murinum*, *Lolium perenne*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2007, Reyes et al. 2020a, Sikes et al. 2023, VegCAMP 2015a

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=9; Alameda County (n=1): LLNL089

Contra Costa County (n=4): ALCC054, ALCCREC205, SPCCA-038, SPCCB-024

Santa Clara Co. (n=4): AW035, AW036, SCLAV004, SPCCA-153

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	23.1	10.0	50.0	Y	Y		Y
T	<i>Quercus douglasii</i>	22	0.8	0.2	7.0				
T	<i>Quercus lobata</i>	22	0.2	0.2	2.0				
R	<i>Aesculus californica</i>*	22	0.2	0.2	2.0				
R	<i>Umbellularia californica</i> *	22	0.0	0.1	0.2				
S	<i>Toxicodendron diversilobum</i>	56	0.2	0.2	1.0				Y
H	<i>Carduus pycnocephalus</i>	78	1.1	0.2	5.0	Y			Y
H	<i>Lolium perenne</i>	67	6.1	1.0	25.0				Y
H	<i>Bromus diandrus</i>	56	4.0	0.2	22.0				Y
H	<i>Torilis arvensis</i>	56	0.4	0.2	1.0				Y
H	<i>Avena barbata</i>	44	10.5	0.2	65.0				
H	<i>Elymus glaucus</i>	44	0.6	0.2	4.0				
H	<i>Cynosurus echinatus</i>	33	1.2	0.2	10.0				
H	<i>Avena fatua</i>	33	0.2	0.2	1.0				
H	<i>Madia gracilis</i>	22	0.4	0.2	3.0				
H	<i>Bromus rubens</i>	22	0.3	1.0	2.0				
H	<i>Bromus madritensis</i>	22	0.2	1.0	1.0				
H	<i>Bromus hordeaceus</i>	22	0.1	0.2	1.0				
H	<i>Triteleia laxa</i>	22	0.0	0.2	0.2				
H	<i>Lathyrus vestitus</i>	22	0.0	0.2	0.2				
H	<i>Hordeum murinum</i>	22	0.0	0.2	0.2				
H	<i>Claytonia perfoliata</i>	22	0.0	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	22	0.0	0.2	0.2				
H	<i>Achillea millefolium</i>	22	0.0	0.1	0.2				
NV	Moss	33	0.1	0.2	0.2				

***Aesculus californica* – *Umbellularia californica* Association**

Common Name: California Buckeye – California Bay Woodland

Alliance: *Aesculus californica* Forest & Woodland Alliance

Local Vegetation Description

The California Buckeye – California Bay Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Aesculus californica*, *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum* and *Baccharis pilularis*, and commonly associated herbs include *Carduus pycnocephalus*, *Lolium perenne*, *Claytonia perfoliata*, *Sanicula crassicaulis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	42.3	17 – 60	11.7	5 – 35
Regenerating or Shrubby Tree	0.9	0 – 5	3.3	0 – 10
Shrub	3.4	0 – 11	1.6	0.5 – 5
Herb	50.5	3 – 80	0.6	0 – 2

Local Environmental Description

Elevation: Mean 132 m, Range 44 – 185 m

Aspect: NE (3), NW (1), SW (1), Variable (1)

Slope: Mean 24 degrees, Range 21 – 28 degrees

Macro Topography: Lower 1/3 of slope (3), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 50.0%, Range 15 – 82%

Litter Cover: Mean 22.0%, Range 5 – 60%

Soil Texture (field assessed): Loam (2), Medium silt loam (2), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan mélange (3), Sedimentary (2), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (2)

Site Impacts

This association has moderate non-native plant cover (average 37.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Lolium perenne*, *Stellaria media*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=6): ALCCREC002, EBAY0011, EBAY0018, EBAY0027, JOMU019, JOMU020

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	32.5	15.0	60.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	8.7	2.0	23.0	Y			Y
T	<i>Quercus lobata</i>	33	2.0	0.2	12.0				
S	<i>Toxicodendron diversilobum</i>	83	2.2	0.2	7.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	50	0.5	0.2	2.0				Y
H	<i>Lolium perenne</i>	83	12.2	1.0	50.0	Y			Y
H	<i>Carduus pycnocephalus</i>	83	1.4	0.2	5.0	Y			Y
H	<i>Claytonia perfoliata</i>	50	4.7	0.2	25.0				Y
H	<i>Sanicula crassicaulis</i>	50	0.7	0.2	2.0				Y
H	<i>Torilis arvensis</i>	50	0.5	0.2	2.0				Y
H	<i>Avena fatua</i>	33	22.5	60.0	75.0				
H	<i>Trifolium</i> sp.	33	2.0	5.0	7.0				
H	<i>Cynosurus echinatus</i>	33	2.0	2.0	10.0				
H	<i>Stellaria media</i>	33	0.8	2.0	3.0				
H	<i>Vicia</i> sp.	33	0.8	2.0	3.0				
H	<i>Scrophularia californica</i>	33	0.5	0.2	3.0				
H	<i>Centaurea solstitialis</i>	33	0.5	0.2	3.0				
H	<i>Ranunculus californicus</i>	33	0.5	1.0	2.0				
H	<i>Bromus diandrus</i>	33	0.5	1.0	2.0				
H	<i>Perideridia kelloggii</i>	33	0.4	0.2	2.0				
H	<i>Dryopteris arguta</i>	33	0.2	0.2	1.0				
H	<i>Medicago polymorpha</i>	33	0.2	0.2	1.0				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
NV	Moss	50	5.0	0.2	15.0				Y

***Aesculus californica* / (*Fraxinus dipetala* – *Ptelea crenulata*) Provisional Association**

Common Name: California Buckeye / (Two Petaled Ash – Hoptree) Woodland

Alliance: *Aesculus californica* Forest & Woodland Alliance

Local Vegetation Description

The California Buckeye / (Two Petaled Ash – Hoptree) Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. The dominant tree is *Aesculus californica*, and *Quercus agrifolia* is characteristic or often present. Commonly associated shrubs include *Ptelea crenulata*, *Sambucus nigra*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, and *Avena barbata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.4	22 – 45	8.5	5 – 15
Regenerating or Shrubby Tree	6.4	0 – 23	3.5	2 – 5
Shrub	24.0	12 – 50	1.6	0.5 – 5
Herb	32.6	5 – 60	0.7	0 – 1

Local Environmental Description

Elevation: Mean 204 m, Range 122 – 269 m

Aspect: NE (3), Flat (1), NW (1)

Slope: Mean 26 degrees, Range 3 – 35 degrees

Macro Topography: Bottom (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 6.5%, Range 0 – 13%

Small Rock: Mean 4.0%, Range 3 – 5%

Fines Cover: Mean 9.8%, Range 2 – 15%

Litter Cover: Mean 52.7%, Range 10 – 78%

Soil Texture (field assessed): Loam (1), Medium silt loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone (2), Sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (3), Eastern Hills (2)

Site Impacts

This association has moderate non-native plant cover (average 35.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Lolium perenne*.

Aesculus californica / (*Fraxinus dipetala* – *Ptelea crenulata*) Provisional Association
Aesculus californica Forest & Woodland Alliance

Classification Comments

This association is newly described here. It remains provisional until additional samples are available.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=5): ALCC215, ALCC219, ALCCREC207, JOMU004, JOMU032

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	31.8	15.0	42.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	60	3.0	2.0	10.0				Y
R	<i>Aesculus californica</i> *	40	6.2	8.0	23.0				
S	<i>Ptelea crenulata</i>	60	11.4	7.0	30.0				Y
S	<i>Toxicodendron diversilobum</i>	60	1.4	2.0	3.0				Y
S	<i>Sambucus nigra</i>	60	0.5	0.2	2.0				Y
S	<i>Fraxinus dipetala</i>	40	1.6	1.0	7.0				
S	<i>Heteromeles arbutifolia</i>	40	0.8	2.0	2.0				
H	<i>Bromus diandrus</i>	80	13.0	5.0	32.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	80	6.0	2.0	20.0	Y			Y
H	<i>Avena barbata</i>	60	4.2	2.0	12.0				Y
H	<i>Avena fatua</i>	40	8.8	4.0	40.0				
H	<i>Bromus hordeaceus</i>	40	2.4	2.0	10.0				
H	<i>Lolium perenne</i>	40	1.2	1.0	5.0				
H	<i>Melica torreyana</i>	40	1.0	0.2	5.0				
H	<i>Pentagramma triangularis</i>	40	0.8	0.2	4.0				
H	<i>Wyethia helenioides</i>	40	0.1	0.2	0.2				

Aesculus californica / (*Fraxinus dipetala* – *Ptelea crenulata*) Provisional Association
Aesculus californica Forest & Woodland Alliance

***Aesculus californica* / *Toxicodendron diversilobum* / Moss Association**

Common Name: California Buckeye / Poison Oak / Moss Woodland

Alliance: *Aesculus californica* Forest & Woodland Alliance

Local Vegetation Description

The California Buckeye / Poison Oak / Moss Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Aesculus californica*, and *Quercus agrifolia* and *Quercus douglasii* are characteristic or often present. Regenerating or shrubby trees that are often present include *Aesculus californica* and *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Heteromeles arbutifolia*, and commonly associated herbs include *Carduus pycnocephalus*, *Adiantum jordanii*, *Avena barbata*, *Bromus diandrus*, and *Bromus rubens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	27.0	14 – 38	6.7	2 – 10
Regenerating or Shrubby Tree	0.7	0 – 2	2.1	0.5 – 5
Shrub	8.2	1 – 15	2.1	0.5 – 5
Herb	10.0	0 – 23	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 307 m, Range 204 – 382 m

Aspect: NE (4), NW (1), SW (1)

Slope: Mean 12 degrees, Range 2 – 24 degrees

Macro Topography: Middle 1/3 of slope (3), Bottom (2), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 10.5%, Range 0 – 40%

Small Rock: Mean 13.2%, Range 3 – 35%

Fines Cover: Mean 49.0%, Range 10 – 80%

Litter Cover: Mean 26.2%, Range 10 – 53%

Soil Texture (field assessed): Moderately coarse, sandy loam (2), Coarse, loamy sand (1), Fine clay (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), Sandstone and other sedimentary (1), Serpentine (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (3)

Other Subsections: Fremont - Livermore Hills and Valleys (2), Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 18.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Polypogon monspeliensis*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens et al. 2004, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=3): ALCC059, ALCC117, ALCC222

Santa Clara Co. (n=3): SCLAR027, SCRUZ927, SPCCA-156

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	21.5	10.0	35.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	83	5.8	2.0	15.0	Y			Y
T	<i>Quercus douglasii</i>	50	1.2	1.0	5.0				Y
R	<i>Aesculus californica</i>*	67	0.6	0.2	2.1				Y
R	<i>Quercus agrifolia</i> *	67	0.1	0.1	0.2				Y
S	<i>Toxicodendron diversilobum</i>	100	4.7	1.0	10.0	Y	Y		Y
S	<i>Heteromeles arbutifolia</i>	67	2.9	0.2	12.0				Y
S	<i>Baccharis pilularis</i>	33	1.0	1.0	5.0				
S	<i>Diplacus aurantiacus</i>	33	0.3	1.0	1.0				
S	<i>Sambucus nigra</i>	33	0.2	0.2	1.0				
S	<i>Symphoricarpos mollis</i>	33	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	83	2.2	1.0	5.0	Y			Y
H	<i>Bromus diandrus</i>	50	3.0	0.2	12.0				Y
H	<i>Avena barbata</i>	50	2.0	0.2	10.0				Y
H	<i>Bromus rubens</i>	50	0.9	0.1	3.0				Y
H	<i>Adiantum jordanii</i>	50	0.2	0.1	1.0				Y
H	<i>Torilis arvensis</i>	33	0.3	1.0	1.0				
H	<i>Sanicula crassicaulis</i>	33	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	33	0.1	0.1	0.2				
NV	Moss	50	4.6	0.1	27.0				Y

***Alnus rhombifolia* Forest & Woodland Alliance**



Common Name: White alder groves

NVC Alliance Code: A3777. *Alnus rhombifolia* Riparian Forest Alliance

Statewide Description

Alnus rhombifolia is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Chamaecyparis lawsoniana*, *Fraxinus latifolia*, *Notholithocarpus densiflorus*, *Platanus racemosa*, *Populus fremontii*, *Populus trichocarpa*, *Pseudotsuga menziesii*, *Quercus lobata*, *Salix* spp. and *Umbellularia californica*.

Alnus rhombifolia stands primarily occur in inland foothills and lower montane zones, usually as narrow strips along perennial stream courses throughout cismontane California. *Alnus rhombifolia* is well adapted to many flood regimes. Stands exist usually on seasonally flooded stream banks and channel bars just at or below the bank full level, but they occur sometimes in intermittently flooded floodplains and rarely in permanently saturated seeps. Flooding typically comes from winter floods and spring runoff.

Local Vegetation Description

The White alder groves Alliance forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Alnus rhombifolia*, and *Alnus rhombifolia* and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	No data	No data
Hardwood	46.1	15 – 70	13.8	5 – 20
Regenerating or Shrubby Tree	0.6	0 – 3	3.1	0 – 10
Shrub	6.5	0 – 51	1.0	0 – 5
Herb	8.2	0 – 70	0.5	0 – 2

Local Membership Rule

Alnus rhombifolia > 50% relative cover in the tree canopy, or > 30% relative cover with *Acer macrophyllum*, *Platanus racemosa* or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 218 m, Range 109 – 467 m

Aspect: Flat (7), NE (2), NW (2), SE (1), SW (1)

Slope: Mean 2 degrees, Range 0 – 8 degrees

Macro Topography: Bottom (10), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 5.8%, Range 0 – 16%

Small Rock: Mean 36.3%, Range 3 – 93%

Fines Cover: Mean 19.3%, Range 2 – 50%

Litter Cover: Mean 23.6%, Range 0 – 88%

Soil Texture (field assessed): Coarse sand (4), Medium to very fine, sandy loam (3), Coarse, loamy sand (2), Medium silt (1), Medium to very fine, loamy sand (1), Sand (1)

Geology (field or map data): Gravelly alluvium (4), Mixed alluvium (3), Conglomerate (1), Franciscan melange (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (7), East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This alliance has low non-native plant cover (average 8.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Cynosurus echinatus*, *Rubus armeniacus*, *Torilis arvensis*, and *Trifolium dubium*.

Associations in Alameda & Contra Costa Counties

Alnus rhombifolia

Alnus rhombifolia – *Platanus racemosa*

Alnus rhombifolia – *Umbellularia californica* – (*Quercus chrysolepis*)

Alnus rhombifolia / *Carex (nudata)*

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2005, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003b, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, Lee 2004, NPS-SEKI 2009, Potter 2005, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=13; Alameda County (n=9): ALCC206, ALCC253, SUNOL025, SUNOL026, SUNOL031, SUNOL032, SUNOL035, SUNOL038, SUNOL043

Contra Costa County (n=4): ALCCREC003, EBRTA206, SPCCA-014, SPCCB-026

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Alnus rhombifolia</i>	100	42.7	18.0	70.0	Y	Y		Y
T	<i>Umbellularia californica</i>	62	2.9	0.2	25.0				Y
T	<i>Platanus racemosa</i>	46	1.6	0.2	13.0				
T	<i>Salix laevigata</i>	31	2.4	1.0	25.0				
T	<i>Quercus agrifolia</i>	23	0.2	0.1	2.0				
R	<i>Umbellularia californica</i> *	38	0.1	0.2	1.0				
S	<i>Toxicodendron diversilobum</i>	54	0.5	0.2	3.0				Y
S	<i>Rubus ursinus</i>	38	3.4	0.2	32.0				
S	<i>Rubus armeniacus</i>	23	1.2	2.0	10.0				
S	<i>Salix lasiolepis</i>	23	0.3	0.2	4.0				
S	<i>Artemisia californica</i>	23	0.0	0.2	0.2				
S	<i>Baccharis pilularis</i>	23	0.0	0.2	0.2				
S	<i>Brickellia californica</i>	23	0.0	0.2	0.2				
H	<i>Cynosurus echinatus</i>	38	0.2	0.2	2.0				
H	<i>Elymus glaucus</i>	38	0.1	0.2	1.0				
H	<i>Artemisia douglasiana</i>	31	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	23	0.0	0.2	0.2				
H	<i>Torilis arvensis</i>	23	0.0	0.2	0.2				
H	<i>Trifolium dubium</i>	23	0.0	0.2	0.2				

***Alnus rhombifolia* Association**

Common Name: White Alder Woodland

Alliance: *Alnus rhombifolia* Forest & Woodland Alliance

Local Vegetation Description

The White Alder Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Alnus rhombifolia*, and *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Rubus ursinus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	50.3	28 – 70	15.0	5 – 20
Regenerating or Shrubby Tree	0.8	0 – 3	3.4	0 – 10
Shrub	8.2	0 – 51	0.8	0 – 5
Herb	9.3	0 – 70	0.5	0 – 2

Local Environmental Description

Elevation: Mean 197 m, Range 109 – 320 m

Aspect: Flat (4), NE (2), NW (2), SW (1)

Slope: Mean 2 degrees, Range 0 – 8 degrees

Macro Topography: Bottom (8)

Large Rock: Mean 4.5%, Range 0 – 16%

Small Rock: Mean 43.3%, Range 3 – 93%

Fines Cover: Mean 15.8%, Range 2 – 30%

Litter Cover: Mean 26.4%, Range 1 – 88%

Soil Texture (field assessed): Coarse sand (2), Coarse, loamy sand (2), Medium to very fine, sandy loam (2), Medium silt (1), Sand (1)

Geology (field or map data): Mixed alluvium (3), Gravelly alluvium (2), Conglomerate (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4), East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Site Impacts

This association has low non-native plant cover (average 10.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Bromus diandrus, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Prunus cerasifera*, *Rubus armeniacus*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Keeler-Wolf et al. 2003b, Klein and Evens 2005, Klein et al. 2015, Lee 2004, Potter 2005, Reyes et al. 2022, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=9; Alameda County (n=6): ALCC206, ALCC253, SUNOL025, SUNOL026, SUNOL031, SUNOL043

Contra Costa County (n=3): ALCCREC003, EBRTA206, SPCCB-026

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Alnus rhombifolia</i>	100	46.8	25.0	60.0	Y	Y		Y
T	<i>Umbellularia californica</i>	67	3.5	0.2	25.0				Y
T	<i>Salix laevigata</i>	33	3.1	1.0	25.0				
T	<i>Prunus cerasifera</i>	22	1.0	0.2	9.0				
T	<i>Platanus racemosa</i>	22	0.1	0.2	1.0				
R	<i>Umbellularia californica</i> *	44	0.2	0.2	1.0				
S	<i>Rubus ursinus</i>	56	4.9	0.2	32.0				Y
S	<i>Toxicodendron diversilobum</i>	44	0.1	0.2	0.2				
S	<i>Rubus armeniacus</i>	33	1.8	2.0	10.0				
S	<i>Salix lasiolepis</i>	33	0.5	0.2	4.0				
S	<i>Physocarpus capitatus</i>	22	0.1	0.2	1.0				
S	<i>Baccharis pilularis</i>	22	0.0	0.2	0.2				
H	<i>Elymus glaucus</i>	33	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	33	0.1	0.2	0.2				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	22	0.1	0.2	1.0				
H	<i>Equisetum arvense</i>	22	0.1	0.2	1.0				
H	<i>Stachys pycnantha</i>	22	0.0	0.2	0.2				
H	<i>Dryopteris arguta</i>	22	0.0	0.2	0.2				
H	<i>Hoita macrostachya</i>	22	0.0	0.2	0.2				
H	<i>Perideridia californica</i>	22	0.0	0.2	0.2				

***Alnus rhombifolia* – *Platanus racemosa* Association**

Common Name: White Alder – California Sycamore Woodland

Alliance: *Alnus rhombifolia* Forest & Woodland Alliance

Local Vegetation Description

The White Alder – California Sycamore Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Alnus rhombifolia*, and *Platanus racemosa* is characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, *Artemisia californica*, and *Rubus ursinus*, and commonly associated herbs include *Polypogon monspeliensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	34.3	15 – 63	10.8	5 – 20
Regenerating or Shrubby Tree	0.2	0 – 1	1.5	1 – 2
Shrub	8.1	0 – 20	0.9	0 – 2
Herb	18.8	3 – 66	0.4	0 – 1

Local Environmental Description

Elevation: Mean 208 m, Range 152 – 247 m

Aspect: Flat (2), N (1), NE (1), NW (1)

Slope: Mean 4 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (1), Channel Bed, Toe of Streambank (1), Floodplain (1), Lower 1/3 of slope (1), Toe of Streambank (1), Toe of Streambank, Lower 1/3 of slope (1)

Large Rock: Mean 11.0%, Range 3 – 35%

Small Rock: Mean 20.3%, Range 5 – 50%

Fines Cover: Mean 8.2%, Range 0 – 22%

Litter Cover: Mean 40.5%, Range 10 – 68%

Soil Texture (field assessed): Medium silt (3), Coarse sand (1), Loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Franciscan melange (1), Gravelly alluvium (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (2), Western Diablo Range (2)

Site Impacts

This association has low non-native plant cover (average 2.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cynosurus echinatus*, *Polypogon monspeliensis*, and *Trifolium dubium*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2012, Evens and San 2005, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Klein et al. 2007, NPS-SEKI 2009, Potter 2005, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): SUNOL035, SUNOL038

Contra Costa County (n=0):

Santa Clara Co. (n=4): VAWA211, VAWA213, VAWA337, VAWA348

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Alnus rhombifolia</i>	100	20.6	10.0	37.5	Y	Y		Y
T	<i>Platanus racemosa</i>	100	9.3	3.0	13.0	Y			Y
T	<i>Quercus agrifolia</i>	33	1.8	1.0	10.0				
T	<i>Umbellularia californica</i>	33	1.8	1.0	10.0				
T	<i>Salix laevigata</i>	33	1.0	3.0	3.0				
S	<i>Toxicodendron diversilobum</i>	83	5.5	0.2	20.0	Y		Y	Y
S	<i>Rubus ursinus</i>	67	2.3	0.5	10.0				Y
S	<i>Artemisia californica</i>	50	0.2	0.2	0.5				Y
S	<i>Brickellia californica</i>	33	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	50	0.3	0.5	0.5				Y
H	<i>Carex</i> sp.	33	1.8	0.5	10.0				
H	<i>Hoita macrostachya</i>	33	1.8	0.5	10.0				
H	<i>Equisetum telmateia</i>	33	0.6	0.5	3.0				
H	<i>Cynosurus echinatus</i>	33	0.4	0.2	2.0				
H	<i>Helenium puberulum</i>	33	0.2	0.5	0.5				
H	<i>Juncus patens</i>	33	0.2	0.5	0.5				

***Alnus rhombifolia* – *Umbellularia californica* – (*Quercus chrysolepis*) Association**

Common Name: White Alder – California Bay – (Canyon Live Oak) Woodland

Alliance: *Alnus rhombifolia* Forest & Woodland Alliance

Local Vegetation Description

The White Alder – California Bay – (Canyon Live Oak) Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Alnus rhombifolia*, and *Platanus racemosa* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Umbellularia californica*. Commonly associated shrubs include *Rubus ursinus*, *Toxicodendron diversilobum*, and *Lonicera hispidula*, and commonly associated herbs include *Galium aparine*, *Artemisia douglasiana*, *Elymus glaucus*, *Osmorhiza berteroi*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	25.2	10 – 38	19.2	10 – 35
Regenerating or Shrubby Tree	3.4	0 – 10	no data	no data
Shrub	9.3	3 – 20	1.3	0.5 – 2
Herb	10.7	8 – 15	0.6	0 – 1

Local Environmental Description

Elevation: Mean 312 m, Range 195 – 467 m

Aspect: NW (2), SE (1)

Slope: Mean 7 degrees, Range 3 – 15 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Toe of Streambank (1), Toe of Streambank, High-flow bank/slope (1)

Large Rock: Mean 14.5%, Range 8 – 25%

Small Rock: Mean 8.7%, Range 2 – 15%

Fines Cover: Mean 19.0%, Range 2 – 50%

Litter Cover: Mean 52.0%, Range 25 – 81%

Soil Texture (field assessed): Loam (2), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 6.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus sterilis*, *Geranium dissectum*, *Melissa officinalis*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf and Evens 2006, Klein et al. 2007, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; **Alameda County (n=0):**

Contra Costa County (n=1): SPCCA-014

Santa Clara Co. (n=2): VAWA338, VAWA401

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Alnus rhombifolia</i>	100	21.8	10.0	37.5	Y	Y		Y
T	<i>Umbellularia californica</i>	67	5.3	6.0	10.0				Y
T	<i>Platanus racemosa</i>	67	2.0	3.0	3.0				Y
T	<i>Acer macrophyllum</i>	33	0.3	1.0	1.0				
T	<i>Quercus agrifolia</i>	33	0.0	0.1	0.1				
R	<i>Umbellularia californica*</i>	67	3.4	0.2	10.0				Y
R	<i>Quercus wislizeni</i>	33	0.1	0.4	0.4				
R	<i>Platanus racemose*</i>	33	0.1	0.2	0.2				
S	<i>Rubus ursinus</i>	67	4.3	3.0	10.0				Y
S	<i>Toxicodendron diversilobum</i>	67	2.0	3.0	3.0				Y
S	<i>Lonicera hispidula</i>	67	0.3	0.5	0.5				Y
S	<i>Frangula californica</i>	33	1.0	3.0	3.0				
S	<i>Sambucus nigra</i>	33	0.2	0.5	0.5				
H	<i>Galium aparine</i>	100	2.3	1.0	3.0	Y			Y
H	<i>Elymus glaucus</i>	67	0.5	0.5	1.0				Y
H	<i>Osmorhiza berteroi</i>	67	0.3	0.5	0.5				Y
H	<i>Torilis arvensis</i>	67	0.3	0.5	0.5				Y

Alnus rhombifolia – *Umbellularia californica* – (*Quercus chrysolepis*) Association
Alnus rhombifolia Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Artemisia douglasiana</i>	67	0.2	0.2	0.5				Y
H	<i>Equisetum telmateia</i>	33	1.0	3.0	3.0				
H	<i>Geranium dissectum</i>	33	1.0	3.0	3.0				
H	<i>Melica imperfecta</i>	33	1.0	3.0	3.0				
H	<i>Hoita macrostachya</i>	33	1.0	3.0	3.0				
H	<i>Melissa officinalis</i>	33	1.0	3.0	3.0				
H	<i>Lathyrus vestitus</i>	33	0.3	1.0	1.0				
H	<i>Bromus carinatus</i>	33	0.2	0.5	0.5				
H	<i>Carex</i> sp.	33	0.2	0.5	0.5				
H	<i>Helenium puberulum</i>	33	0.2	0.5	0.5				
H	<i>Juncus patens</i>	33	0.2	0.5	0.5				
H	<i>Urtica dioica</i>	33	0.2	0.5	0.5				
H	<i>Cyperus eragrostis</i>	33	0.2	0.5	0.5				
H	<i>Bromus diandrus</i>	33	0.1	0.2	0.2				
H	<i>Stachys rigida</i>	33	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				
H	<i>Osmorhiza brachypoda</i>	33	0.1	0.2	0.2				
H	<i>Juncus xiphioides</i>	33	0.1	0.2	0.2				
H	<i>Juncus arcticus</i>	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Bromus sterilis</i>	33	0.1	0.2	0.2				
H	<i>Sanicula</i> sp.	33	0.1	0.2	0.2				
H	<i>Mimulus guttatus</i>	33	0.0	0.1	0.1				
NV	Moss	33	0.3	1.0	1.0				

***Alnus rhombifolia* / *Carex (nudata)* Association**

Common Name: White Alder / Torrent Sedge Woodland

Alliance: *Alnus rhombifolia* Forest & Woodland Alliance

Local Vegetation Description

The White Alder / Torrent Sedge Association forms an intermittent to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Alnus rhombifolia*, and *Platanus racemosa*, *Quercus agrifolia*, and *Salix laevigata* are characteristic or often present. Commonly associated shrubs include *Rubus ursinus*, *Baccharis pilularis*, *Heteromeles arbutifolia*, *Lonicera hispidula*, *Symphoricarpos albus*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Carex nudata*, *Achillea millefolium*, *Artemisia douglasiana*, *Asclepias fascicularis*, *Carex tumulicola*, *Drymocallis glandulosa*, *Elymus glaucus*, *Juncus arcticus*, *Juncus xiphioides*, *Lomatium californicum*, *Melica imperfecta*, and *Stachys pycnantha*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	66.3	63 – 70	10.0	5 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	31.3	0 – 63	0.8	0.5 – 1
Herb	11.3	2 – 21	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 187 m, Range 127 – 247 m

Aspect: Flat (1)

Slope: Mean 7 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (1), In-channel Bar, High-flow bank/slope (1)

Large Rock: Mean 12.0%, Range 9 – 15%

Small Rock: Mean 15.5%, Range 1 – 30%

Fines Cover: Mean 12.5%, Range 5 – 20%

Litter Cover: Mean 9.1%, Range 0 – 18%

Soil Texture (field assessed): Coarse sand (1), Medium silt (1)

Geology (field or map data): Gravelly alluvium (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded in the two samples.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2007, Klein et al. 2015, Lee 2004, Potter 2005, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=1): SUNOL032

Contra Costa County (n=0):

Santa Clara Co. (n=1): VAWA082

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Alnus rhombifolia</i>	100	66.3	62.5	70.0	Y	Y		Y
T	<i>Salix laevigata</i>	50	1.5	3.0	3.0				Y
T	<i>Platanus racemosa</i>	50	0.5	1.0	1.0				Y
T	<i>Quercus agrifolia</i>	50	0.3	0.5	0.5				Y
S	<i>Rubus ursinus</i>	50	31.3	62.5	62.5				Y
S	<i>Toxicodendron diversilobum</i>	50	5.0	10.0	10.0				Y
S	<i>Lonicera hispidula</i>	50	1.5	3.0	3.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.3	0.5	0.5				Y
S	<i>Baccharis pilularis</i>	50	0.3	0.5	0.5				Y
S	<i>Symphoricarpos albus</i>	50	0.3	0.5	0.5				Y
H	<i>Carex nudata</i>	100	6.0	2.0	10.0	Y	Y		Y
H	<i>Carex tumulicola</i>	50	1.5	3.0	3.0				Y
H	<i>Artemisia douglasiana</i>	50	1.5	3.0	3.0				Y
H	<i>Elymus glaucus</i>	50	0.3	0.5	0.5				Y
H	<i>Juncus xiphioides</i>	50	0.3	0.5	0.5				Y
H	<i>Achillea millefolium</i>	50	0.3	0.5	0.5				Y
H	<i>Stachys pycnantha</i>	50	0.3	0.5	0.5				Y
H	<i>Juncus arcticus</i>	50	0.3	0.5	0.5				Y
H	<i>Drymocallis glandulosa</i>	50	0.3	0.5	0.5				Y
H	<i>Asclepias fascicularis</i>	50	0.3	0.5	0.5				Y
H	<i>Melica imperfecta</i>	50	0.3	0.5	0.5				Y
H	<i>Lomatium californicum</i>	50	0.3	0.5	0.5				Y

***Arbutus menziesii* Forest Alliance**



Common Name: Madrone forest

NVC Alliance Code: A3357. *Notholithocarpus densiflorus* - *Arbutus menziesii* Forest Alliance

Statewide Description

Arbutus menziesii is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Notholithocarpus densiflorus*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus kelloggii*, *Quercus wislizeni*, and *Umbellularia californica*.

Arbutus menziesii groves have traditionally been considered part of the “mixed evergreen forest” and not treated as a separate type (Sawyer 2007). Although *A. menziesii* is common as a secondary species in many forest types, it does form distinctive stands of high cover worthy of recognition in parts of the state that have relatively snow-free winters but upwards of 100 cm of annual precipitation. Stands in northern parts of the state mix with those of the *Pseudotsuga menziesii* – (*Notholithocarpus densiflorus* – *Arbutus menziesii*) Alliance.

Local Vegetation Description

The Madrone Forest Alliance forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Arbutus menziesii*, and *Quercus agrifolia*, *Umbellularia californica*, and *Platanus racemosa* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, *Arbutus menziesii*, and *Quercus agrifolia*. Commonly associated shrubs include *Genista monspessulana*, *Heteromeles arbutifolia*, *Lonicera hispidula*, *Lotus scoparius*, *Rosa gymnocarpa*, *Symphoricarpos albus*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Cynosurus echinatus*, *Torilis arvensis*, *Carduus pycnocephalus*, *Galium* sp., *Lathyrus vestitus*, *Madia* sp., *Osmorhiza berteroi*, *Piperia* sp., *Pteridium aquilinum*, *Trifolium dubium*, and *Trifolium subterraneum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.0	32 – 42	15.0	10 – 20
Regenerating or Shrubby Tree	3.6	0 – 7	3.5	2 – 5
Shrub	6.0	1 – 11	2.1	0.5 – 5
Herb	4.5	2 – 7	0.3	0 – 0.5

Local Membership Rule

Arbutus menziesii > 50% relative cover with *Quercus agrifolia* < 30% relative cover in the tree canopy, or *Arbutus* > 30% relative cover with *Quercus kelloggii* and/or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 144 m, Range 103 – 184 m

Aspect: Flat (1), SW (1)

Slope: Mean 14 degrees, Range 2 – 25 degrees

Macro Topography: Lower 1/3 of slope (1), Lower to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.1%, Range 0 – 4%

Fines Cover: Mean 20.5%, Range 3 – 38%

Litter Cover: Mean 76.0%, Range 60 – 92%

Soil Texture (field assessed): Medium to very fine, sandy loam (2)

Geology (field or map data): Franciscan melange (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has low non-native plant cover (average 13.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Cynosurus echinatus*, *Genista monspessulana*, *Torilis arvensis*, *Trifolium dubium*, and *Trifolium subterraneum*.

Associations in Alameda & Contra Costa Counties

Arbutus menziesii – (*Quercus agrifolia*)

Arbutus menziesii – *Umbellularia californica*

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** SUNOL040

Contra Costa County (n=1): ALCC252

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Arbutus menziesii</i>	100	29.5	20.0	39.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	9.0	3.0	15.0	Y			Y
T	<i>Quercus agrifolia</i>	100	8.0	1.0	15.0	Y			Y
T	<i>Platanus racemosa</i>	50	0.5	1.0	1.0				Y
R	<i>Umbellularia californica</i> *	50	3.0	6.0	6.0				Y
R	<i>Quercus agrifolia</i> *	50	0.6	1.2	1.2				Y
R	<i>Arbutus menziesii</i>*	50	0.2	0.4	0.4				Y
S	<i>Genista monspessulana</i>	50	5.0	10.0	10.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.5	1.0	1.0				Y
S	<i>Lonicera hispidula</i>	50	0.5	1.0	1.0				Y
S	<i>Toxicodendron diversilobum</i>	50	0.5	1.0	1.0				Y
S	<i>Lotus scoparius</i>	50	0.1	0.2	0.2				Y
S	<i>Symphoricarpos albus</i>	50	0.1	0.2	0.2				Y
S	<i>Rosa gymnocarpa</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Cynosurus echinatus</i>	50	2.5	5.0	5.0				Y
H	<i>Trifolium subterraneum</i>	50	0.5	1.0	1.0				Y
H	<i>Piperia</i> spp.	50	0.1	0.2	0.2				Y
H	<i>Osmorhiza berteroi</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Lathyrus vestitus</i>	50	0.1	0.2	0.2				Y
H	<i>Pteridium aquilinum</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium dubium</i>	50	0.1	0.2	0.2				Y
H	<i>Madia</i> spp.	50	0.1	0.2	0.2				Y
H	<i>Galium</i> spp.	50	0.1	0.2	0.2				Y
NV	Moss	50	1.0	2.0	2.0				Y

***Arbutus menziesii* – (*Quercus agrifolia*) Association**

Common Name: Madrone – (Coast Live Oak) Woodland

Alliance: *Arbutus menziesii* Forest Alliance

Local Vegetation Description

The Madrone – (Coast Live Oak) Association forms an intermittent tree canopy with an open shrub understory in the single sample available. The dominant tree is *Arbutus menziesii*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, *Arbutus menziesii*, and *Quercus agrifolia*. Commonly associated shrubs include *Genista monspessulana*, *Lonicera hispidula*, *Lotus scoparius*, *Rosa gymnocarpa*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Galium* sp., *Lathyrus vestitus*, *Madia* sp., *Piperia* sp., *Pteridium aquilinum*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	42.0	42 – 42	17.5	15 – 20
Regenerating or Shrubby Tree	7.0	7 – 7	3.5	2 – 5
Shrub	11.0	11 – 11	3.5	2 – 5
Herb	2.0	2 – 2	0.3	0 – 0.5

Local Environmental Description

Elevation: 184 m

Aspect: SW (1)

Slope: 25 degrees

Macro Topography: Lower to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 4%

Fines Cover: 3%

Litter Cover: 92%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 15.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Genista monspessulana* and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3?

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC252

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Arbutus menziesii</i>	100	39.0	39.0	39.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	3.0	3.0	3.0	Y			Y
T	<i>Quercus agrifolia</i>	100	1.0	1.0	1.0	Y			Y
R	<i>Umbellularia californica</i> *	100	6.0	6.0	6.0	Y	Y		Y
R	<i>Quercus agrifolia</i> *	100	1.2	1.2	1.2	Y			Y
R	<i>Arbutus menziesii</i> *	100	0.4	0.4	0.4	Y			Y
S	<i>Genista monspessulana</i>	100	10.0	10.0	10.0	Y	Y		Y
S	<i>Lonicera hispidula</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Lotus scoparius</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Rosa gymnocarpa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Madia</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Pteridium aquilinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Torilis arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Piperia</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Galium</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Lathyrus vestitus</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	2.0	2.0	2.0	Y	Y		Y

***Arbutus menziesii* – *Umbellularia californica* Association**

Common Name: Madrone – California Bay Woodland

Alliance: *Arbutus menziesii* Forest Alliance

Local Vegetation Description

The Madrone – California Bay Association forms an intermittent tree canopy with a sparse shrub understory in the single sample available. The dominant tree is *Arbutus menziesii*, and *Platanus racemosa*, *Quercus agrifolia*, and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Heteromeles arbutifolia* and *Symphoricarpos albus*, and commonly associated herbs include *Cynosurus echinatus*, *Carduus pycnocephalus*, *Osmorhiza berteroi*, *Torilis arvensis*, *Trifolium dubium*, and *Trifolium subterraneum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	50.0	50 – 50	12.5	10 – 15
Regenerating or Shrubby Tree	0.2	0 – 0	no data	no data
Shrub	1.0	1 – 1	0.8	0.5 – 1
Herb	7.0	7 – 7	0.3	0 – 0.5

Local Environmental Description

Elevation: 103 m

Aspect: Flat (1)

Slope: 2 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0.2%

Fines Cover: 38%

Litter Cover: 60%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 11.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Cynosurus echinatus*, *Torilis arvensis*, *Trifolium dubium*, and *Trifolium subterraneum*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** SUNOL040

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Arbutus menziesii</i>	100	20.0	20.0	20.0	Y		Y	Y
T	<i>Quercus agrifolia</i>	100	15.0	15.0	15.0	Y			Y
T	<i>Umbellularia californica</i>	100	15.0	15.0	15.0	Y			Y
T	<i>Platanus racemosa</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	1.0	1.0	1.0	Y	Y		Y
S	<i>Symphoricarpos albus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Cynosurus echinatus</i>	100	5.0	5.0	5.0	Y	Y		Y
H	<i>Trifolium subterraneum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Osmorhiza berteroi</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium dubium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Torilis arvensis</i>	100	0.2	0.2	0.2	Y			Y

***Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia*
Woodland Semi-Natural Alliance**



Common Name: Eucalyptus – tree of heaven – black locust groves

NVC Alliance Code: A0084. *Eucalyptus* spp. Ruderal Forest Alliance

Statewide Description

Ailanthus altissima, *Acacia melanoxylon*, one or more species of *Eucalyptus*, and/or *Robinia pseudoacacia* is dominant in the tree canopy. Understories in groves of the fast-growing, long-lived *Eucalyptus* trees are usually depauperate. A buildup of allelopathic chemicals in the soil and high volumes of debris inhibit the establishment of other plants, though sometimes other non-natives, such as *Hedera helix*, clamber extensively in stands. Seeds of *Eucalyptus* germinate when tree crowns and built-up debris are removed by fire or in other ways. Tree stumps sprout readily from the lignotuber when trees are felled (Boyd 2000, Bean and Russo 2005, Esser 1993b, Skolmen and Ledig 1990).

In stands dominated by *Ailanthus altissima*, the understory may be dominated by non-native annual grasses. *Acacia melanoxylon* or *Robinia pseudoacacia* dominated stands

Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

have an open to intermittent shrub layer, and an herbaceous layer may be open or dominated by non-native grasses.

Local Vegetation Description

The Eucalyptus – tree of heaven – black locust groves Alliance forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Eucalyptus globulus*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia* and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 4	15.5	2 – 35
Hardwood	31.5	12 – 55	18.7	2 – 50
Regenerating or Shrubby Tree	9.3	0 – 49	3.5	0 – 10
Shrub	12.2	0 – 50	1.1	0 – 2
Herb	23.0	0 – 60	0.5	0 – 1

Local Membership Rule

A tree species of *Eucalyptus*, *Acacia*, or *Ailanthus altissima* > 50% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 203 m, Range 13 – 472 m

Aspect: SW (7), SE (5), NW (4), NE (3)

Slope: Mean 15 degrees, Range 1 – 30 degrees

Macro Topography: Upper 1/3 of slope (6), Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.6%, Range 0 – 7%

Small Rock: Mean 2.0%, Range 0 – 8%

Fines Cover: Mean 26.7%, Range 5 – 78%

Litter Cover: Mean 66.9%, Range 19 – 93%

Soil Texture (field assessed): Moderately fine clay loam (6), Moderately fine sandy clay loam (3), Medium loam (2), Moderately fine silty clay loam (2), Loam (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Sand (1)

Geology (field or map data): Basalt (3), Sandstone, shale, and gravel deposits (3), Conglomerate (2), Sedimentary (2), Alluvium (1), Franciscan melange (1), Mixed alluvium (1), Mixed igneous (1), Sandstone (1), Sandstone and other sedimentary (1), Siltstone (1)

Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

Alameda County Subsections: East Bay Hills - Mount Diablo (5), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (10), Suisun Hills and Valleys (3)

Site Impacts

This alliance has high non-native plant cover (average 71.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Eucalyptus globulus*, *Lolium perenne*, *Olea europaea*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Acacia melanoxylon

Ailanthus altissima

Eucalyptus (globulus, camaldulensis)

Olea europea

*Robinia pseudoacacia**

Ulmus spp.

Classification Comments

We have provisionally broadened the definition of this alliance to include two additional genera that are forming stands and naturalizing in this region, the cultivated olive and non-native elms.

References: AECOM 2013, AIS 2007b, AIS and ESRI 2007, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and San 2005, HDR 2014a, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Menke et al. 2011, Reyes et al. 2020a, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences 2007a, Thorne et al. 2004, VegCAMP 2005b, VegCAMP 2015a, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=19; Alameda County (n=6): ALCC610, ALCC760, ALCC837, ALCC838, ALCCREC201, EBRTA315

Contra Costa County (n=13): ALCC158, ALCC260, ALCC839, EBRTA101, EBRTA128, EBRTA138, EBRTA201, EBRTA205, EBRTA209, EBRTA321, EBRTA401, JOMU031, PPRA015

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Eucalyptus globulus</i>	53	13.1	5.0	45.0				Y
T	<i>Umbellularia californica</i>	53	3.0	0.2	20.0				Y
T	<i>Quercus agrifolia</i>	42	0.8	0.2	7.0				
T	<i>Olea europaea</i>	21	6.4	12.0	60.0				
R	<i>Umbellularia californica</i> *	37	2.3	0.4	16.0				
R	<i>Quercus agrifolia</i> *	37	0.2	0.2	1.0				
R	<i>Eucalyptus globulus</i>*	21	0.3	0.2	3.0				
S	<i>Toxicodendron diversilobum</i>	74	4.3	0.2	20.0				Y
S	<i>Rubus ursinus</i>	32	3.4	0.2	25.0				
S	<i>Symphoricarpos mollis</i>	32	1.5	0.2	20.0				
S	<i>Baccharis pilularis</i>	32	1.1	0.2	18.0				
S	<i>Heteromeles arbutifolia</i>	32	0.5	0.2	6.0				
S	<i>Diplacus aurantiacus</i>	26	0.9	0.2	11.0				
H	<i>Bromus diandrus</i>	63	4.5	0.2	30.0				Y
H	<i>Carduus pycnocephalus</i>	63	3.0	0.1	20.0				Y
H	<i>Torilis arvensis</i>	42	0.3	0.2	1.0				
H	<i>Avena barbata</i>	32	1.9	0.2	26.0				
H	<i>Cynosurus echinatus</i>	26	0.6	0.2	8.0				
H	<i>Elymus glaucus</i>	26	0.2	0.2	2.0				
H	<i>Marah fabaceus</i>	26	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	21	2.5	1.0	30.0				
H	<i>Galium aparine</i>	21	0.1	0.2	1.0				

***Acacia melanoxylon* Provisional Semi-natural Association**

Common Name: Blackwood Acacia Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Blackwood Acacia Association forms an open tree canopy with a sparse shrub understory in the single sample available. The dominant tree is *Acacia melanoxylon*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Acacia melanoxylon* and *Quercus agrifolia*. Commonly associated shrubs include *Adenostoma fasciculatum*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Ehrharta erecta*, *Avena barbata*, *Brachypodium* sp., *Bromus diandrus*, *Carduus pycnocephalus*, *Ehrharta erecta*, *Erodium cicutarium*, *Marah fabaceus*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	23.0	23 – 23	7.5	5 – 10
Regenerating or Shrubby Tree	4.0	4 – 4	3.5	2 – 5
Shrub	1.0	1 – 1	1.5	1 – 2
Herb	28.0	28 – 28	0.3	0 – 0.5

Local Environmental Description

Elevation: 161 m

Aspect: SW (1)

Slope: 20 degrees

Macro Topography: Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 8%

Fines Cover: 41%

Litter Cover: 50%

Soil Texture (field assessed): Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Acacia melanoxylon Provisional Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural
Alliance

Site Impacts

This association has high non-native plant cover (average 94.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Acacia melanoxylon*, *Brachypodium* sp., *Bromus diandrus*, *Carduus pycnocephalus*, *Ehrharta erecta*, *Erodium cicutarium*, and *Torilis arvensis*.

Classification Comments

This association remains provisional due to low overall sample size.

References: Sikes et al. 2021

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC610

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Acacia melanoxylon</i>	100	21.0	21.0	21.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	2.0	2.0	2.0	Y			Y
R	<i>Acacia melanoxylon</i> *	100	4.2	4.2	4.2	Y	Y		Y
R	<i>Quercus agrifolia</i> *	100	0.2	0.2	0.2	Y			Y
S	<i>Adenostoma fasciculatum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Diplacus aurantiacus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Ehrharta erecta</i>	100	18.0	18.0	18.0	Y	Y		Y
H	<i>Bromus diandrus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Brachypodium</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Avena barbata</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Erodium cicutarium</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Torilis arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Marah fabaceus</i>	100	0.2	0.2	0.2	Y			Y

Acacia melanoxylon Provisional Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

***Ailanthus altissima* Semi-natural Association**

Common Name: Tree of Heaven Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Tree of Heaven Association forms an intermittent tree canopy with a sparse shrub understory in the single survey available. The dominant tree is *Ailanthus altissima*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Ailanthus altissima*. Commonly associated shrubs include *Hedera helix* and *Sambucus nigra*, and commonly associated herbs include *Avena barbata*, *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Hirschfeldia incana*, *Hordeum vulgare*, *Malva nicaeensis*, *Raphanus sativus*, and *Silybum marianum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	30.0	30 – 30	12.5	10 – 15
Regenerating or Shrubby Tree	30.0	30 – 30	0.8	0.5 – 1
Shrub	0.2	0.2 – 0.2	1.5	1 – 2
Herb	47.0	47 – 47	0.8	0.5 – 1

Local Environmental Description

Elevation: 30 m

Aspect: SW (1)

Slope: 1 degree

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 5%

Litter Cover: 93%

Soil Texture (field assessed): Sand (1)

Geology (field or map data): Sandstone and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 98.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Ailanthus altissima Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural
Alliance

Ailanthus altissima, *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Hedera helix*, *Hirschfeldia incana*, *Hordeum vulgare*, *Malva nicaeensis*, *Raphanus sativus*, and *Silybum marianum*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Reyes et al. 2020a, VegCAMP 2015a

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=1; Alameda County (n=1): ALCC760

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Ailanthus altissima</i>	100	30.0	30.0	30.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	1.0	1.0	1.0	Y			Y
T	<i>Umbellularia californica</i>	100	0.2	0.2	0.2	Y			Y
R	<i>Ailanthus altissima</i>	100	30.0	30.0	30.0	Y	Y		Y
S	<i>Hedera helix</i>	100	0.2	0.2	0.2	Y	Y		Y
S	<i>Sambucus nigra</i>	100	0.2	0.2	0.2	Y	Y		Y
H	<i>Avena barbata</i>	100	26.0	26.0	26.0	Y		Y	Y
H	<i>Bromus diandrus</i>	100	23.0	23.0	23.0	Y		Y	Y
H	<i>Hordeum vulgare</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Hirschfeldia incana</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Raphanus sativus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Silybum marianum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Conium maculatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Malva nicaeensis</i>	100	0.2	0.2	0.2	Y			Y

Ailanthus altissima Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

***Eucalyptus (globulus, camaldulensis)* Semi-natural Association**

Common Name: Blue or Red Gum Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Blue or Red Gum Association forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Eucalyptus globulus*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are often present include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, *Rubus ursinus*, and *Symphoricarpos mollis*, and commonly associated herbs include *Bromus diandrus* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 4	15.5	2 – 35
Hardwood	32.3	20 – 55	25.2	15 – 50
Regenerating or Shrubby Tree	5.3	0 – 20	4.3	0 – 10
Shrub	16.4	0 – 50	1.0	0 – 2
Herb	21.1	0 – 55	0.4	0 – 1

Local Environmental Description

Elevation: Mean 240 m, Range 13 – 472 m

Aspect: SW (5), NE (3), SE (3), NW (1)

Slope: Mean 15 degrees, Range 3 – 30 degrees

Macro Topography: Upper 1/3 of slope (5), Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 1.0%, Range 0 – 7%

Small Rock: Mean 1.7%, Range 0 – 7%

Fines Cover: Mean 22.1%, Range 10 – 39%

Litter Cover: Mean 71.9%, Range 60 – 89%

Soil Texture (field assessed): Medium loam (2), Moderately coarse, sandy loam (1), Moderately fine clay loam (5), Moderately fine silty clay loam (1)

Geology (field or map data): Basalt (3), Conglomerate (2), Alluvium (1), Mixed alluvium (1), Mixed igneous (1), Sandstone (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (9), Suisun Hills and Valleys (1)

Eucalyptus (globulus, camaldulensis) Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

Site Impacts

This association has high non-native plant cover (average 60.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Eucalyptus globulus*, *Genista monspessulana*, *Geranium purpureum*, and *Torilis arvensis*.

Classification Comments

None.

References: AECOM 2013, AIS 2007b, AIS and ESRI 2007, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and San 2005, HDR 2014a, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Menke et al. 2011, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences 2007a, Thorne et al. 2004, VegCAMP 2005b, VegCAMP 2015a, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=12; Alameda County (n=2): ALCCREC201, EBRTA315

Contra Costa County (n=10): ALCC158, EBRTA101, EBRTA128, EBRTA138, EBRTA201, EBRTA205, EBRTA209, EBRTA321, EBRTA401, PPRA015

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Eucalyptus globulus</i>	83	20.7	5.0	45.0	Y	Y		Y
T	<i>Umbellularia californica</i>	67	4.5	1.0	20.0				Y
T	<i>Quercus agrifolia</i>	33	0.2	0.2	2.0				
R	<i>Umbellularia californica</i> *	58	3.7	0.4	16.0				Y
R	<i>Eucalyptus globulus</i>*	33	0.5	0.2	3.0				
R	<i>Quercus agrifolia</i> *	33	0.1	0.2	0.4				
S	<i>Toxicodendron diversilobum</i>	100	6.0	0.2	20.0	Y	Y		Y
S	<i>Rubus ursinus</i>	50	5.4	0.2	25.0				Y
S	<i>Symphoricarpos mollis</i>	50	2.4	0.2	20.0				Y
S	<i>Baccharis pilularis</i>	42	1.7	0.2	18.0				
S	<i>Heteromeles arbutifolia</i>	33	0.4	0.2	2.0				
S	<i>Genista monspessulana</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	50	3.1	0.2	20.0				Y
H	<i>Bromus diandrus</i>	50	2.0	0.2	20.0				Y
H	<i>Cynosurus echinatus</i>	33	0.3	0.2	2.0				
H	<i>Torilis arvensis</i>	33	0.2	0.2	1.0				
H	<i>Galium aparine</i>	33	0.1	0.2	1.0				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	25	0.2	0.2	2.0				
H	<i>Geranium purpureum</i>	25	0.2	0.2	1.0				
H	<i>Scrophularia californica</i>	25	0.1	0.2	0.2				
H	<i>Fragaria vesca</i>	25	0.1	0.2	0.2				

Eucalyptus (globulus, camaldulensis) Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

***Olea europea* Provisional Semi-natural Association**

Common Name: Olive Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Olive Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Olea europaea*. Regenerating or shrubby trees that are often present include *Olea europaea*. Commonly associated shrubs include *Diplacus aurantiacus*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, *Avena fatua*, *Carduus pycnocephalus*, and *Torilis arvensis*.

Lifeform	Cover (%)		Height (m)	
	Mean	Range	Mean	Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	32.6	12 – 67	6.5	2 – 10
Regenerating or Shrubby Tree	12.9	0 – 49	0.7	0 – 2
Shrub	3.5	0 – 9	1.1	0.5 – 2
Herb	22.5	1 – 60	0.5	0 – 1

Local Environmental Description

Elevation: Mean 184 m, Range 52 – 331 m

Aspect: NW (2), SE (2)

Slope: Mean 16 degrees, Range 12 – 22 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.7%, Range 0 – 2%

Fines Cover: Mean 43.5%, Range 15 – 78%

Litter Cover: Mean 43.3%, Range 19 – 58%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Loam (1),
Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Sedimentary
(1), Siltstone (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont -
Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover (average 88.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Anthriscus caucalis*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cotoneaster franchetii*, *Cotoneaster lacteus*, *Cynosurus echinatus*, *Elymus caput-medusae*, *Erodium cicutarium*, *Lolium perenne*, *Olea europaea*, *Torilis arvensis*, and *Ulmus* sp.

Classification Comments

This Association is newly described here and remains provisional until more survey data is available.

References: None

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=2): ALCC837, ALCC838

Contra Costa County (n=2): ALCC839, JOMU031

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Olea europaea</i>	100	30.3	12.0	60.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	25	1.8	7.0	7.0				
T	<i>Umbellularia californica</i>	25	0.5	2.0	2.0				
T	<i>Standing snag</i>	25	0.1	0.2	0.2				
R	<i>Olea europaea</i> *	50	12.8	2.0	49.0				Y
R	<i>Quercus agrifolia</i> *	25	0.1	0.4	0.4				
R	<i>Ulmus</i> sp.	25	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	50	0.8	0.2	3.0				Y
S	<i>Heteromeles arbutifolia</i>	25	1.5	6.0	6.0				
S	<i>Cotoneaster franchetii</i>	25	1.3	5.0	5.0				
S	<i>Cotoneaster lacteus</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	8.8	0.2	30.0	Y			Y
H	<i>Carduus pycnocephalus</i>	75	3.0	0.1	10.0	Y			Y
H	<i>Avena fatua</i>	50	1.5	1.0	5.0				Y
H	<i>Avena barbata</i>	50	0.6	0.2	2.0				Y
H	<i>Torilis arvensis</i>	50	0.3	0.2	1.0				Y

Olea europea Provisional Semi-Natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	25	10.0	40.0	40.0				
H	<i>Lolium perenne</i>	25	3.8	15.0	15.0				
H	<i>Cynosurus echinatus</i>	25	2.0	8.0	8.0				
H	<i>Melica</i> sp.	25	1.8	7.0	7.0				
H	<i>Micropus californicus</i>	25	0.5	2.0	2.0				
H	<i>Centaurea solstitialis</i>	25	0.5	2.0	2.0				
H	<i>Alopecurus geniculatus</i>	25	0.5	2.0	2.0				
H	<i>Elymus glaucus</i>	25	0.3	1.0	1.0				
H	<i>Chlorogalum pomeridianum</i>	25	0.3	1.0	1.0				
H	<i>Galium porrigens</i>	25	0.3	1.0	1.0				
H	<i>Solidago velutina</i>	25	0.3	1.0	1.0				
H	<i>Anthriscus caucalis</i>	25	0.3	1.0	1.0				
H	<i>Nassella</i> sp.	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	25	0.0	0.1	0.1				
H	<i>Elymus caput-medusae</i>	25	0.0	0.1	0.1				
NV	Moss	50	2.0	2.0	6.0				Y
NV	Lichen	50	1.3	1.0	4.0				Y

Olea europea Provisional Semi-Natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural
Alliance

***Robinia pseudoacacia* Provisional Semi-natural Association**

Common Name: Black Locust Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Black Locust Association forms a tree canopy dominated by *Robinia pseudoacacia*. Other trees that may be present include *Aesculus californica* and *Quercus lobata*. Shrubs that may be present include *Salix lasiolepis*.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover relative to native cover. Non-native species that occur with highest frequency and abundance include *Robinia pseudoacacia*.

Classification Comments

No survey data was available in the region, but 3 field observations were recorded.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Reyes et al. 2023b

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Ulmus* spp. Provisional Semi-natural Association**

Common Name: Elm Woodland

Alliance: *Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland
Semi-Natural Alliance

Local Vegetation Description

The Elm Association forms an intermittent tree canopy with an open shrub understory in the single sample available. Regenerating or shrubby trees that are dominant and characteristic include *Ulmus minor* and *Quercus agrifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	45.0	45 – 45	12.5	10 – 15
Regenerating or Shrubby Tree	27.0	27 – 27	7.5	5 – 10
Shrub	19.0	19 – 19	1.5	1 – 2
Herb	18.0	18 – 18	0.8	0.5 – 1

Local Environmental Description

Elevation: 52 m

Aspect: NW (1)

Slope: 15 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 6%

Fines Cover: 18%

Litter Cover: 73%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone, shale, and conglomerate (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has high non-native plant cover (average 75.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Carduus pycnocephalus*, *Cotoneaster* sp., *Lolium perenne*, *Torilis arvensis*, *Ulmus minor*, and *Vinca major*.

Classification Comments

This Association is newly described here and remains provisional until more survey data is available.

References: None.

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC260

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Ulmus minor</i>	100	45.0	45.0	45.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	2.0	2.0	2.0	Y			Y
R	<i>Ulmus minor</i> *	100	26.0	26.0	26.0	Y	Y		Y
R	<i>Quercus agrifolia</i> *	100	1.0	1.0	1.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	11.0	11.0	11.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	9.0	9.0	9.0	Y		Y	Y
S	<i>Baccharis pilularis</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Cotoneaster</i> sp.	100	0.2	0.2	0.2	Y			Y
S	<i>Artemisia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	7.0	7.0	7.0	Y		Y	Y
H	<i>Elymus trachycaulus</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Aira caryophyllea</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Vinca major</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Lolium perenne</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Dryopteris arguta</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Torilis arvensis</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus rubens</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Elymus glaucus</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	2.0	2.0	2.0	Y	Y		Y

Ulmus spp. Provisional Semi-natural Association
Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance

***Fraxinus latifolia* Forest & Woodland Alliance**



Common Name: Oregon ash groves

NVC Alliance Code: A4428. *Populus balsamifera* ssp. *trichocarpa* - *Alnus rubra* - *Fraxinus latifolia* Riparian Forest Alliance

Statewide Description

Fraxinus latifolia is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Pinus ponderosa*, *Quercus kelloggii*, *Quercus wislizeni*, and *Salix laevigata*.

In California, the *Fraxinus latifolia* Alliance has been most thoroughly sampled in the western Sierra Nevada, where it occurs adjacent to stands of the riparian *Populus fremontii* and *Salix laevigata* Alliances or adjacent to stands of the upland *Pinus ponderosa* and *Quercus chrysolepis* Alliances (Potter 2005). Larger, extensive, bottomland stands occur in the North Coast Ranges from Sonoma County north; however, these have been poorly described.

Local Vegetation Description

The Oregon ash groves Alliance forms a tree canopy with *Fraxinus latifolia* as the

dominant tree. Other trees that may be present include *Acer negundo*, *Populus fremontii*, *Quercus agrifolia*, and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*.

Local Membership Rule

Fraxinus latifolia > 50% relative cover in the tree canopy, or > 30% relative cover with *Acer negundo*, *Umbellularia californica*, or *Salix laevigata*.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Fremont - Livermore Hills and Valleys (3)

Associations in Alameda & Contra Costa Counties

*Fraxinus latifolia**

Fraxinus latifolia – *Salix laevigata**

Classification Comments

No survey data was available in the region, but 4 field observations were recorded. The NVC no longer accepts this alliance. In this region, stands are now treated in the *Populus trichocarpa* – (*Alnus rubra*) – *Fraxinus latifolia* Alliance.

References: Ratchford et al. 2024a, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Hesperocyparis (sargentii, macnabiana)* Woodland Alliance**



Common Name: Ultramafic cypress woodland

NVC Alliance Code: A3355. *Hesperocyparis sargentii* - *Hesperocyparis macnabiana* - *Hesperocyparis bakeri* Woodland Alliance

Statewide Description

Hesperocyparis sargentii and/or *Hesperocyparis macnabiana* is dominant in the tree canopy with *Pinus attenuata*, *Pinus sabiniana*, *Pseudotsuga menziesii*, *Quercus wislizeni*, and *Umbellularia californica*.

Hesperocyparis sargentii is an abundant and widespread cypress with two centers of distribution. The northern stands, centered in the San Francisco Bay area and southern North Coast Ranges, may contain *H. macnabiana* and different species of *Arctostaphylos*. *H. macnabiana* tends to grow on upper slopes, and *H. sargentii* often grows on lower slopes and in ravines. The upland stands of *H. sargentii* in the North Coast Ranges are associated with shallow water tables or impeded drainage (Alexander et al. 2007). The southern stands centered in Santa Lucia Mountains form purer stands. There are genetic differences between the two centers (Bartel et al. 2003). Stands also vary from < 5 to 15 m in height and from 20 to 60% in cover, which is probably more dependent on time since the last fire than on soil sterility and location.

Hesperocyparis macnabiana is the most abundant and widespread cypress in the state

(Griffin and Critchfield 1972). Several large stands are scattered throughout northern California mostly on serpentine or volcanic rocks (Alexander et al. 2007, Barbour 2007). The conifer typically attains a height of 3–6 m. Trees start bearing cones by 6–14 years of age. Plants produce abundant cone crops that require 2 years to mature. The serotinous cones remain closed on the tree until opened by the heat of a fire or from desiccation due to age. Seeds establish best on bare mineral soil. Seedling mortality is high on shaded sites with abundant litter because of damping-off fungi. Burned trees release large quantities of seed after a fire, and seedling establishment forms thickets of new trees (Esser 1994e).

Because they may occur together and share some understory species, these two cypress species (which typically occur on ultramafic soils) have been combined in a single alliance since the 2009 publication of *A Manual of California Vegetation, second edition*, where stands of these species were previously ascribed to the *Callitropsis sargentii* and *C. macnabiana* alliances.

Local Vegetation Description

The Ultramafic cypress woodland Alliance forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Hesperocyparis sargentii*.

Local Membership Rule

Hesperocyparis sargentii dominates on slopes, ridges, or along stream benches and terraces of serpentine, volcanic, or other ultramafic substrates. *Adenostoma fasciculatum*, *Arctostaphylos* spp., *Ceanothus jepsonii*, and *Quercus durata* are commonly found in stands.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: Diablo Range

Contra Costa County Subsections: none

Site Impacts

Associations in Alameda & Contra Costa Counties

Classification Comments

No survey data was available in the region, but stands are known to occur on Cedar Mountain.

References: Buck-Diaz et al. 2021a, Evens and Kentner 2006, Klein et al. 2015

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Hesperocyparis macrocarpa* – *Pinus radiata* Forest & Woodland Semi-Natural Alliance**



Common Name: Monterey cypress – Monterey pine Woodland stands

NVC Alliance Code: N/A.

Statewide Description

Hesperocyparis macrocarpa and/or *Pinus radiata* are dominant or co-dominant in the tree canopy. While native groves of these conifers are rare, they both are planted and can be invasive along the California coast. They have been planted along roads, as hedgerows, and as ornamentals throughout the region, where they continue to spread through natural regeneration.

Local Vegetation Description

The Monterey cypress – Monterey pine Woodland stands Alliance forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Pinus radiata*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus agrifolia* and *Umbellularia californica* and those that are often present include *Pinus radiata*. Commonly associated shrubs include *Rubus*

Hesperocyparis macrocarpa – *Pinus radiata* Forest & Woodland Semi-Natural Alliance

ursinus, *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	30.3	7 – 40	27.1	10 – 100
Hardwood	6.3	0 – 15	9.8	2 – 15
Regenerating or Shrubby Tree	3.8	0 – 12	3.2	1 – 5
Shrub	19.7	0 – 62	1.1	0 – 2
Herb	18.8	1 – 50	0.4	0 – 1

Local Membership Rule

Planted or naturalized Mediterranean conifer species including *Hesperocyparis macrocarpa*, *Pinus pinea*, and/or *Pinus radiata* > 50% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 273 m, Range 35 – 409 m

Aspect: SW (3), Flat (1), NE (1), NW (1), SE (1), Variable (1)

Slope: Mean 15 degrees, Range 0 – 30 degrees

Macro Topography: Upper 1/3 of slope (4), Bottom (1), Middle 1/3 of slope (1), Ridge top (1)

Large Rock: 0%

Small Rock: Mean 1.1%, Range 0 – 5%

Fines Cover: Mean 33.1%, Range 6 – 82%

Litter Cover: Mean 62.7%, Range 15 – 90%

Soil Texture (field assessed): Moderately fine clay loam (3), Moderately coarse, sandy loam (2), Loam (1), Medium silt loam (1)

Geology (field or map data): Basalt (2), Metamorphic (2), Sedimentary (2), Serpentine (1), Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), East Bay Terraces and Alluvium (1)

Site Impacts

This alliance has low non-native plant cover (average 18.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Cynosurus echinatus*, *Ehrharta erecta*, *Eucalyptus globulus*, *Genista monspessulana*, *Hedera helix*, *Lolium perenne*, *Torilis arvensis*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Hesperocyparis macrocarpa Ruderal*

Pinus radiata plantations

Classification Comments

None.

References: Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=8; Alameda County (n=2): ALCC202, EBAY0111

Contra Costa County (n=6): ALCC042, ALCCREC004, EBRTA001, EBRTA103, EBRTA141, EBRTA210

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus radiata</i>	100	31.0	8.0	40.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	75	1.7	0.2	5.0	Y			Y
T	<i>Umbellularia californica</i>	63	4.3	0.2	15.0				Y
T	<i>Eucalyptus globulus</i>	25	0.2	0.2	1.0				
R	<i>Quercus agrifolia</i> *	75	2.2	0.2	8.0	Y		Y	Y
R	<i>Umbellularia californica</i> *	75	1.4	0.1	8.0	Y			Y
R	<i>Pinus radiata</i>*	50	0.4	0.2	2.2				Y
S	<i>Toxicodendron diversilobum</i>	100	5.9	0.2	17.0	Y		Y	Y
S	<i>Rubus ursinus</i>	88	5.7	0.2	30.0	Y		Y	Y
S	<i>Lonicera hispidula</i>	38	0.1	0.2	0.2				
S	<i>Baccharis pilularis</i>	25	4.4	0.2	35.0				
S	<i>Diplacus aurantiacus</i>	25	1.6	1.0	12.0				
S	<i>Genista monspessulana</i>	25	0.3	0.2	2.0				
S	<i>Hedera helix</i>	25	0.1	0.2	0.2				
S	<i>Symphoricarpos mollis</i>	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	50	3.2	0.2	15.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.5	0.2	3.0				Y
H	<i>Cynosurus echinatus</i>	50	0.4	0.2	2.0				Y
H	<i>Avena barbata</i>	38	3.3	0.2	20.0				
H	<i>Elymus glaucus</i>	38	3.2	0.2	25.0				
H	<i>Torilis arvensis</i>	38	0.1	0.2	0.2				
H	<i>Ehrharta erecta</i>	25	3.8	10.0	20.0				
H	<i>Vicia sativa</i>	25	0.1	0.2	0.2				
H	<i>Plantago lanceolata</i>	25	0.1	0.2	0.2				
H	<i>Fragaria vesca</i>	25	0.1	0.2	0.2				

***Hesperocyparis macrocarpa* Ruderal Semi-natural Association**

Common Name: Monterey cypress plantations Woodland

Alliance: *Hesperocyparis macrocarpa* – *Pinus radiata* Woodland Semi-Natural Alliance

Local Vegetation Description

The Monterey cypress plantations Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Hesperocyparis macrocarpa*. *Pinus radiata* and *Eucalyptus* spp. may also be present. Regenerating or shrubby trees that are often present include *Acacia* sp. *Delairea odorata* may be present in the understory.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Site Impacts

This association has high non-native plant cover relative to native cover. Non-native species that occur with highest frequency and abundance include *Hesperocyparis macrocarpa* (not native to this area).

Classification Comments

No survey data was available in the region, but 4 field observations were recorded.

References: Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Pinus radiata* plantations Semi-natural Association**

Common Name: Monterey pine plantations Woodland

Alliance: *Hesperocyparis macrocarpa* – *Pinus radiata* Forest & Woodland Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Juglans hindsii* and Hybrids Forest & Woodland Alliance**



Common Name: Hinds's walnut and related stands

NVC Alliance Code: A3750. *Platanus racemosa* - *Quercus agrifolia* - *Juglans californica* Riparian Woodland Alliance

Statewide Description

Juglans hindsii or hybrids are dominant in the tree canopy with *Populus fremontii*, *Quercus lobata*, and *Salix gooddingii*. Shrubs may include *Salix exigua* or *Sambucus nigra*.

The natural distribution of this walnut has been debated since Richard Hinds found the walnut scattered along the lower Sacramento River in 1837. Jepson (1910) observed that some walnut localities coincided with Indian encampments, suggesting planted groves, but Thomsen (1963) largely discounted Indian influence. Griffin and Critchfield (1972) mapped three natural stands in Contra Costa Co., one natural stand in Solano Co., and 13 that were questionable. While the California Native Plant Society (CNPS) previously recognized three native stands of *J. hindsii* with a Rare Plant Rank of 1B.1, the taxon has since been removed from the list due to the hybrids being so intertwined with the native genetics in localized riparian areas across northern California.

Since Griffin and Critchfield (1972) reported natural-appearing stands of walnuts along the larger creeks and streams such as in the inner Coast Range foothills in Colusa, Glenn, and Tehama Cos., more genetic research has been done across 10 counties in California where Potter et al. (2018) found that at least 71% of the mostly wild trees were found to be pure members of *J. hindsii* and the remaining were found to be hybrids (with *J. californica*, *J. major*, and/or *J. nigra*). As exposed by Potter et al. (2018), *Juglans hindsii* is now known to be natively common throughout the Inner North Coast Ranges, Sacramento and San Joaquin Valleys, and San Francisco Bay Area of California, as well as southern Oregon. Vaghti (2003) found sufficient walnut trees along the Sacramento River to recognize a *Juglans hindsii*/*Sambucus nigra* forest type. Cal-IPC does not rank the naturalized species as invasive. Thus, many native and mixed hybrid walnut populations occur along small creeks to large rivers in central and northern California, including the Sacramento River. The plant also grows in southern Oregon along the Bear River, where botanists consider it native (F. Callahan, pers. comm. 2007).

Local Vegetation Description

The Hinds's walnut and related stands Alliance forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Juglans hindsii*, and *Salix laevigata* is characteristic or often present. Commonly associated shrubs include *Sambucus nigra*, and commonly associated herbs include *Conium maculatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	no data	no data
Hardwood	29.2	14 – 50	12.5	5 – 20
Regenerating or Shrubby Tree	0.8	0 – 4	7.5	5 – 10
Shrub	7.4	0 – 25	4.8	2 – 10
Herb	23.9	0 – 70	0.8	0 – 2

Local Membership Rule

Juglans hindsii or hybrids > 50% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 140 m, Range 68 – 260 m

Aspect: Flat (2), NE (2)

Slope: Mean 5 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (3)

Large Rock: 0%

Small Rock: Mean 0.7%, Range 0 – 2%

Fines Cover: Mean 17.3%, Range 1 – 44%

Litter Cover: Mean 80.0%, Range 55 – 95%

Soil Texture (field assessed): Coarse, loamy sand (1), Medium sand (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Mixed alluvium (1), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This alliance has moderate non-native plant cover (average 28.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Fumaria* sp., *Hirschfeldia incana*, *Prunus cerasifera*, *Raphanus sativus*, and *Silybum marianum*.

Associations in Alameda & Contra Costa Counties

Juglans hindsii

Juglans hindsii / *Sambucus nigra*

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein et al. 2007, Sikes et al. 2023, Vaghti 2003

Global Rarity Rank: G1

State Rarity Rank: S1

Surveys Used for Description

Total: N=5; Alameda County (n=3): ALCC254, SUNOL010, SUNOL027

Contra Costa County (n=2): ALCCREC109, SPCCA-057

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juglans hindsii</i>	100	20.0	9.0	37.0	Y	Y		Y
T	<i>Salix laevigata</i>	60	8.6	8.0	20.0				Y
T	<i>Quercus agrifolia</i>	40	0.4	1.0	1.0				
T	<i>Umbellularia californica</i>	20	0.6	3.0	3.0				
T	<i>Aesculus californica</i>	20	0.4	2.0	2.0				
T	<i>Platanus racemosa</i>	20	0.2	1.0	1.0				
T	<i>Prunus cerasifera</i>	20	0.2	1.0	1.0				
T	<i>Quercus lobata</i>	20	0.0	0.2	0.2				
T	Standing snag	20	0.0	0.2	0.2				
T	<i>Pinus sabiniana</i>	20	0.0	0.2	0.2				
R	<i>Juglans hindsii</i>*	20	0.8	4.2	4.2				
S	<i>Sambucus nigra</i>	60	1.4	0.2	4.0				Y
S	<i>Toxicodendron diversilobum</i>	40	3.0	5.0	10.0				
S	<i>Salix lasiolepis</i>	20	2.0	10.0	10.0				
S	<i>Baccharis pilularis</i>	20	1.6	8.0	8.0				
S	<i>Rubus ursinus</i>	20	0.0	0.2	0.2				
H	<i>Conium maculatum</i>	40	14.4	2.0	70.0				
H	<i>Avena barbata</i>	40	1.6	1.0	7.0				
H	<i>Raphanus sativus</i>	40	0.2	0.2	1.0				
H	<i>Urtica dioica</i>	40	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	20	6.0	30.0	30.0				
H	<i>Carduus pycnocephalus</i>	20	1.2	6.0	6.0				
H	<i>Silybum marianum</i>	20	0.4	2.0	2.0				
H	<i>Hirschfeldia incana</i>	20	0.0	0.2	0.2				
H	<i>Fumaria</i> sp.	20	0.0	0.2	0.2				
H	<i>Artemisia douglasiana</i>	20	0.0	0.2	0.2				
H	<i>Veronica</i> sp.	20	0.0	0.2	0.2				
H	<i>Galium aparine</i>	20	0.0	0.2	0.2				
H	<i>Marah fabaceus</i>	20	0.0	0.2	0.2				

***Juglans hindsii* Association**

Common Name: Hinds Walnut Woodland

Alliance: *Juglans hindsii* and Hybrids Forest & Woodland Alliance

Local Vegetation Description

The Hinds Walnut Association forms an open tree canopy with a sparse to open shrub understory. The dominant tree is *Juglans hindsii*, and *Salix laevigata* is characteristic or often present. Commonly associated shrubs include *Sambucus nigra*, and commonly associated herbs include *Artemisia douglasiana* and *Conium maculatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 1	no data	no data
Hardwood	19.3	14 – 22	12.5	5 – 20
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	8.4	0 – 25	7.5	5 – 10
Herb	24.4	0 – 70	0.9	0 – 2

Local Environmental Description

Elevation: Mean 179 m, Range 68 – 260 m

Aspect: Flat (1), NE (1)

Slope: Mean 7 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 1%

Litter Cover: 95%

Soil Texture (field assessed): Medium sand (1)

Geology (field or map data): Shale and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has moderate non-native plant cover (average 30.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Conium maculatum*, *Fumaria* sp., *Raphanus sativus*, and *Silybum marianum*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein et al. 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Juglans hindsii Association
Juglans hindsii and Hybrids Forest & Woodland Alliance

Surveys Used for Description

Total: N=3; Alameda County (n=1): SUNOL010

Contra Costa County (n=2): ALCCREC109, SPCCA-057

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juglans hindsii</i>	100	11.0	9.0	14.0	Y	Y		Y
T	<i>Salix laevigata</i>	67	7.7	8.0	15.0				Y
T	<i>Umbellularia californica</i>	33	1.0	3.0	3.0				
T	<i>Aesculus californica</i>	33	0.7	2.0	2.0				
T	<i>Quercus agrifolia</i>	33	0.3	1.0	1.0				
T	<i>Pinus sabiniana</i>	33	0.1	0.2	0.2				
S	<i>Salix lasiolepis</i>	33	3.3	10.0	10.0				
S	<i>Toxicodendron diversilobum</i>	33	3.3	10.0	10.0				
S	<i>Baccharis pilularis</i>	33	2.7	8.0	8.0				
S	<i>Sambucus nigra</i>	33	0.1	0.2	0.2				
H	<i>Conium maculatum</i>	33	23.3	70.0	70.0				
H	<i>Silybum marianum</i>	33	0.7	2.0	2.0				
H	<i>Avena barbata</i>	33	0.3	1.0	1.0				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Fumaria</i> sp.	33	0.1	0.2	0.2				
H	<i>Raphanus sativus</i>	33	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	33	0.1	0.2	0.2				
H	<i>Veronica</i> sp.	33	0.1	0.2	0.2				

***Juglans hindsii* / *Sambucus nigra* Provisional Association**

Common Name: Hinds Walnut / Mexican Elderberry Woodland

Alliance: *Juglans hindsii* and Hybrids Forest & Woodland Alliance

Local Vegetation Description

The Hinds Walnut / Mexican Elderberry Association forms an intermittent tree canopy with an open shrub understory. The dominant tree is *Juglans hindsii*, and *Platanus racemosa*, *Prunus cerasifera*, *Quercus agrifolia*, *Quercus lobata*, and *Salix laevigata* are characteristic or often present. Regenerating or shrubby trees that are often present include *Juglans hindsii*. Commonly associated shrubs include *Sambucus nigra*, *Rubus ursinus*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Avena barbata*, *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Galium aparine*, *Hirschfeldia incana*, *Marah fabaceus*, *Raphanus sativus*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	44.0	38 – 50	12.5	10 – 15
Regenerating or Shrubby Tree	2.0	0 – 4	7.5	5 – 10
Shrub	6.0	3 – 9	3.5	2 – 5
Herb	23.1	2 – 44	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 83 m, Range 69 – 97 m

Aspect: Flat (1), NE (1)

Slope: Mean 2 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: Mean 1.1%, Range 0 – 2%

Fines Cover: Mean 25.5%, Range 7 – 44%

Litter Cover: Mean 72.5%, Range 55 – 90%

Soil Texture (field assessed): Coarse, loamy sand (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Mixed alluvium (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 24.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Juglans hindsii / *Sambucus nigra* Provisional Association
Juglans hindsii and Hybrids Forest & Woodland Alliance

Bromus diandrus, *Carduus pycnocephalus*, *Conium maculatum*, *Hirschfeldia incana*, *Prunus cerasifera*, and *Raphanus sativus*.

Classification Comments

This association remains provisional due to low overall sample size.

References: Sikes et al. 2023, Vaghti 2003

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** ALCC254, SUNOL027

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juglans hindsii</i>	100	33.5	30.0	37.0	Y	Y		Y
T	<i>Salix laevigata</i>	50	10.0	20.0	20.0				Y
T	<i>Quercus agrifolia</i>	50	0.5	1.0	1.0				Y
T	<i>Platanus racemosa</i>	50	0.5	1.0	1.0				Y
T	<i>Prunus cerasifera</i>	50	0.5	1.0	1.0				Y
T	<i>Quercus lobata</i>	50	0.1	0.2	0.2				Y
T	<i>Standing snag</i>	50	0.1	0.2	0.2				Y
R	<i>Juglans hindsii</i> *	50	2.1	4.2	4.2				Y
S	<i>Sambucus nigra</i>	100	3.5	3.0	4.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	50	2.5	5.0	5.0				Y
S	<i>Rubus ursinus</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	15.0	30.0	30.0				Y
H	<i>Avena barbata</i>	50	3.5	7.0	7.0				Y
H	<i>Carduus pycnocephalus</i>	50	3.0	6.0	6.0				Y
H	<i>Conium maculatum</i>	50	1.0	2.0	2.0				Y
H	<i>Raphanus sativus</i>	50	0.5	1.0	1.0				Y
H	<i>Urtica dioica</i>	50	0.1	0.2	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Hirschfeldia incana</i>	50	0.1	0.2	0.2				Y
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				Y

***Juniperus californica* Woodland Alliance**



Common Name: California juniper woodland

NVC Alliance Code: A0502. *Juniperus californica* Mojave Scrub Alliance

Statewide Description

Juniperus californica is dominant or co-dominant in the small tree canopy with *Pinus monophylla*, *Pinus quadrifolia*, *Quercus cornelius-mulleri*, *Quercus douglasii* and *Yucca brevifolia*. Shrubs may include *Agave deserti*, *Artemisia tridentata*, *Coleogyne ramosissima*, *Ephedra* spp., *Hesperoyucca whipplei*, *Lepidospartum squamatum*, *Nolina parryi*, *Purshia stansburiana* or *Yucca schidigera*.

Juniperus californica occurs sporadically in both cismontane and transmontane California, often as individuals in many alliances. However, it dominates stands of varied species composition and structure, depending on their juxtaposition to other stands of chaparral, scrub, desert scrub, or woodland vegetation. In some stands, the junipers are open-grown trees over grassy understories. In others, the junipers form a mixed canopy with other trees or shrubs.

The similar *Juniperus osteosperma* alliance occupies an area east of the main distribution of *J. californica* (Griffin and Critchfield 1972). Overlap of the two juniper alliances occurs in several places in the Mojave Desert and in the southern California mountains, where identification of the two junipers is difficult. Mojave Desert plots of the two juniper alliances are strikingly similar in species composition (Thomas et al. 2004), but *J. californica* stands exist at lower elevations.

Local Vegetation Description

The California juniper woodland Alliance forms an open tree canopy with an open shrub understory. The dominant tree is *Juniperus californica*. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana* and *Quercus douglasii*. Commonly associated shrubs include *Ericameria linearifolia*, and commonly associated herbs include *Holocarpha virgata*, *Bromus rubens*, *Eriogonum nudum*, *Holocarpha virgata*, *Pellaea mucronata*, and *Salvia columbariae*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	7.0	5 – 8	3.5	2 – 5
Hardwood	0.3	0 – 1	3.5	2 – 5
Regenerating or Shrubby Tree	0.5	0 – 1	2.5	1 – 5
Shrub	4.3	3 – 6	1.5	0 – 5
Herb	6.3	1 – 12	0.3	0 – 0.5

Local Membership Rule

Juniperus californica > 50% relative cover in the tree canopy, often with *Pinus sabiniana* or *Quercus douglasii* present at lower cover.

Local Environmental Description

Elevation: Mean 1009 m, Range 929 – 1059 m

Aspect: SE (2), SW (1)

Slope: Mean 35 degrees, Range 30 – 40 degrees

Macro Topography: Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 6.5%, Range 2 – 11%

Small Rock: Mean 46.0%, Range 41 – 51%

Fines Cover: Mean 27.5%, Range 20 – 35%

Litter Cover: Mean 18.5%, Range 10 – 27%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Site Impacts

This alliance has moderate non-native plant cover (average 20.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus* and *Logfia gallica*.

Associations in Alameda & Contra Costa Counties

Juniperus californica – (*Cercocarpus montanus* – *Fraxinus dipetala*)

Juniperus californica / *Ericameria linearifolia* / annual – perennial herb

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2006, Reyes et al. 2020a

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=3): ALCC148, ALCCREC112, SPCCB-030

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	100	7.0	5.0	8.0	Y	Y		Y
T	<i>Umbellularia californica</i>	33	0.1	0.2	0.2				
T	<i>Pinus sabiniana</i>	33	0.1	0.2	0.2				
T	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
R	<i>Umbellularia californica</i> *	33	0.3	1.0	1.0				
R	<i>Juniperus californica</i>*	33	0.3	1.0	1.0				
R	<i>Quercus douglasii</i> *	33	0.1	0.2	0.2				
R	<i>Pinus sabiniana</i> *	33	0.0	0.1	0.1				
S	<i>Ericameria linearifolia</i>	67	2.7	3.0	5.0				Y
S	<i>Cercocarpus betuloides</i>	33	0.7	2.0	2.0				
S	<i>Rhamnus ilicifolia</i>	33	0.3	1.0	1.0				
S	<i>Eriodictyon californicum</i>	33	0.3	1.0	1.0				
S	<i>Keckiella corymbosa</i>	33	0.3	1.0	1.0				
S	<i>Lupinus albifrons</i>	33	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	33	0.0	0.1	0.1				
H	<i>Holocarpha virgata</i>	67	2.3	3.0	4.0				Y
H	<i>Bromus rubens</i>	67	0.4	0.2	1.0				Y
H	<i>Eriogonum nudum</i>	67	0.1	0.2	0.2				Y
H	<i>Salvia columbariae</i>	67	0.1	0.2	0.2				Y
H	<i>Pellaea mucronata</i>	67	0.1	0.2	0.2				Y
H	<i>Avena barbata</i>	33	2.0	6.0	6.0				
H	<i>Avena fatua</i>	33	1.3	4.0	4.0				
H	<i>Logfia gallica</i>	33	0.3	1.0	1.0				
H	<i>Chorizanthe membranacea</i>	33	0.3	1.0	1.0				
H	<i>Calochortus venustus</i>	33	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	33	0.1	0.2	0.2				
H	<i>Acmispon americanus</i>	33	0.1	0.2	0.2				
H	<i>Galium andrewsii</i>	33	0.0	0.1	0.1				
H	<i>Boechera</i> spp.	33	0.0	0.1	0.1				
H	<i>Melica californica</i>	33	0.0	0.1	0.1				
NV	Lichen	100	1.0	1.0	1.0	Y	Y		Y
NV	Moss	33	1.3	4.0	4.0				

***Juniperus californica* / (*Cercocarpus montanus* – *Fraxinus dipetala*) Association**

Common Name: California Juniper / (Birch Leaf Mountain Mahogany – Two Petaled Ash) Woodland

Alliance: *Juniperus californica* Woodland Alliance

Local Vegetation Description

The California Juniper / (Birch Leaf Mountain Mahogany – Two Petaled Ash) Association forms an open tree canopy with an open shrub understory in the single sample available. The dominant tree is *Juniperus californica*. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana*. Commonly associated shrubs include *Cercocarpus betuloides*, *Rhamnus ilicifolia*, and *Diplacus aurantiacus*, and commonly associated herbs include *Avena fatua*, *Boechera* sp., *Bromus hordeaceus*, *Bromus rubens*, *Calochortus venustus*, *Chorizanthe membranacea*, *Galium andrewsii*, *Logfia gallica*, *Melica californica*, *Pellaea mucronata*, and *Salvia columbariae*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	5.0	5 – 5	3.5	2 – 5
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 0	3.5	2 – 5
Shrub	3.0	3 – 3	3.5	2 – 5
Herb	6.0	6 – 6	0.3	0 – 0.5

Local Environmental Description

Elevation: 1059 m

Aspect: SE (1)

Slope: 30 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (1)

Large Rock: 2%

Small Rock: 51%

Fines Cover: 35%

Litter Cover: 10%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 34.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus* and *Logfia gallica*.

Classification Comments

None.

References: Evens et al. 2006

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-030

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	100	5.0	5.0	5.0	Y	Y		Y
R	<i>Pinus sabiniana</i>	100	0.1	0.1	0.1	Y	Y		Y
S	<i>Cercocarpus betuloides</i>	100	2.0	2.0	2.0	Y	Y		Y
S	<i>Rhamnus ilicifolia</i>	100	1.0	1.0	1.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Avena fatua</i>	100	4.0	4.0	4.0	Y	Y		Y
H	<i>Chorizanthe membranacea</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Logfia gallica</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Salvia columbariae</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pellaea mucronata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus rubens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Calochortus venustus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Boechera</i> sp.	100	0.1	0.1	0.1	Y			Y
H	<i>Galium andrewsii</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Melica californica</i>	100	0.1	0.1	0.1	Y			Y
NV	Lichen	100	1.0	1.0	1.0	Y	Y		Y

***Juniperus californica* / *Ericameria linearifolia* / annual – perennial herb Association**

Common Name: California Juniper – Narrowleaf Goldenbush / Annual – Perennial Herb Woodland

Alliance: *Juniperus californica* Woodland Alliance

Local Vegetation Description

The California Juniper – Narrowleaf Goldenbush / Annual – Perennial Herb Association forms an open tree canopy with an open shrub understory. The dominant tree is *Juniperus californica*, and *Pinus sabiniana*, *Quercus douglasii*, and *Umbellularia californica* are characteristic or often present. Regenerating trees that are often present include bay, juniper, and *Quercus douglasii*. Commonly associated shrubs include *Ericameria linearifolia*, *Eriodictyon californicum*, *Keckiella corymbosa*, and *Lupinus albifrons*, and commonly associated herbs include *Holocarpha virgata*, *Eriogonum nudum*, *Acmispon americanus*, *Pellaea mucronata*, and *Salvia columbariae*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	8.0	8 – 8	3.5	2 – 5
Hardwood	0.5	0 – 1	3.5	2 – 5
Regenerating or Shrubby Tree	0.6	0 – 1	1.5	1 – 2
Shrub	5.0	4 – 6	0.5	0 – 1
Herb	6.5	1 – 12	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 984 m, Range 929 – 1038 m

Aspect: SE (1), SW (1)

Slope: 40 degrees

Macro Topography: Middle to Upper 1/3 of slope (1)

Large Rock: 11%

Small Rock: 41%

Fines Cover: 20%

Litter Cover: 27%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 13.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Juniperus californica / *Ericameria linearifolia* / annual – perennial herb Association
Juniperus californica Woodland Alliance

Avena barbata and *Bromus rubens*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2006, Reyes et al. 2020a

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): ALCC148, ALCCREC112

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	100	8.0	8.0	8.0	Y	Y		Y
T	<i>Quercus douglasii</i>	50	0.1	0.2	0.2				Y
T	<i>Pinus sabiniana</i>	50	0.1	0.2	0.2				Y
T	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
R	<i>Juniperus californica</i> *	50	0.5	1.0	1.0				Y
R	<i>Umbellularia californica</i> *	50	0.5	1.0	1.0				Y
R	<i>Quercus douglasii</i> *	50	0.1	0.2	0.2				Y
S	<i>Ericameria linearifolia</i>	100	4.0	3.0	5.0	Y	Y		Y
S	<i>Keckiella corymbosa</i>	50	0.5	1.0	1.0				Y
S	<i>Eriodictyon californicum</i>	50	0.5	1.0	1.0				Y
S	<i>Lupinus albifrons</i>	50	0.1	0.2	0.2				Y
H	<i>Holocarpha virgata</i>	100	3.5	3.0	4.0	Y	Y		Y
H	<i>Eriogonum nudum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	50	3.0	6.0	6.0				Y
H	<i>Bromus rubens</i>	50	0.5	1.0	1.0				Y
H	<i>Acmispon americanus</i>	50	0.1	0.2	0.2				Y
H	<i>Pellaea mucronata</i>	50	0.1	0.2	0.2				Y
H	<i>Salvia columbariae</i>	50	0.1	0.2	0.2				Y
NV	Lichen	100	1.0	1.0	1.0	Y	Y		Y
NV	Moss	50	2.0	4.0	4.0				Y

Juniperus californica / *Ericameria linearifolia* / annual – perennial herb Association
Juniperus californica Woodland Alliance

***Pinus attenuata* Forest & Woodland Alliance**



Common Name: Knobcone pine forest and woodland

NVC Alliance Code: A3356. *Pinus attenuata* - *Pinus coulteri* - *Pinus sabiniana*
Woodland Alliance

Statewide Description

Pinus attenuata is dominant or co-dominant in the tree canopy with *Arbutus menziesii*, *Juniperus occidentalis*, *Notholithocarpus densiflorus*, *Pinus contorta*, *Pinus coulteri*, *Pinus monticola*, *Pinus radiata*, *Pinus sabiniana*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, and *Quercus wislizeni*.

Stands of *Pinus attenuata* typically occur on nutrient-deficient soils with and without dense understories (Minnich 2007). They tend to vary regionally in size and occurrence; the trees in many stands are dense, forming closed canopies, while in other stands, trees are scattered and canopies are open. Associated vegetation is often chaparral, but in some regions, the surrounding vegetation includes coniferous forests, montane chaparral, and oak woodlands. Individual *Pinus attenuata* trees often emerge through shrub canopies in stands of many chaparral alliances.

Local Vegetation Description

The Knobcone pine forest and woodland Alliance forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Pinus attenuata*, and *Arbutus menziesii*, *Arbutus menziesii*, *Quercus agrifolia*, and *Standing snag* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Pinus attenuata*, *Arbutus menziesii*, and *Quercus wislizeni* var. *frutescens* and those that are often present include *Arbutus menziesii*, *Quercus agrifolia*, *Quercus wislizeni* var. *frutescens*, and *Umbellularia californica*. Commonly associated shrubs include *Arctostaphylos auriculata*, *Diplacus aurantiacus*, *Eriodictyon californicum*, and *Heteromeles arbutifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	10.5	1 – 17	11.5	2 – 20
Hardwood	5.1	1 – 16	5.5	2 – 10
Regenerating or Shrubby Tree	17.5	10 – 25	3.5	1 – 10
Shrub	12.6	7 – 23	2.8	0.5 – 5
Herb	1.0	0 – 3	0.3	0 – 0.5

Local Membership Rule

Pinus attenuata > 50% relative cover in the tree canopy, or > 30% relative cover with *Quercus chrysolepis*.

Local Environmental Description

Elevation: Mean 415 m, Range 277 – 540 m

Aspect: SE (2), SW (2)

Slope: Mean 20 degrees, Range 8 – 43 degrees

Macro Topography: Entire slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.3%, Range 0 – 1%

Small Rock: Mean 2.9%, Range 1 – 5%

Fines Cover: Mean 4.3%, Range 1 – 9%

Litter Cover: Mean 89.8%, Range 85 – 96%

Soil Texture (field assessed): Coarse, loamy sand (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Shale and other sedimentary (2), Sandstone (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This alliance has very low non-native plant cover (average 0.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Pinus attenuata / *Arctostaphylos* (crustacea)

Pinus attenuata / *Arctostaphylos* (manzanita, canescens)

Pinus attenuata alliance

Classification Comments

None.

References: Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=4): ALCC009, ALCC087, ALCC154, SPCCB-021

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus attenuata</i>	100	10.5	1.0	17.0	Y	Y		Y
T	<i>Arbutus menziesii</i>	75	1.3	0.2	4.0	Y			Y
T	Standing snag	50	1.0	1.0	3.0				Y
T	<i>Quercus agrifolia</i>	50	0.8	1.0	2.0				Y
T	<i>Pinus radiata</i>	25	0.3	1.0	1.0				
R	<i>Pinus attenuata</i> *	75	7.3	0.2	26.0	Y		Y	Y
R	<i>Arbutus menziesii</i> *	50	1.4	0.2	5.2				Y
R	<i>Pinus sabiniana</i>	25	3.5	14.0	14.0				
R	<i>Quercus wislizeni</i> var. <i>frutescens</i>	25	2.8	11.0	11.0				
R	<i>Quercus agrifolia</i> *	25	2.1	8.2	8.2				
R	<i>Umbellularia californica</i>	25	1.8	7.2	7.2				
R	Standing snag*	25	0.1	0.2	0.2				
S	<i>Arctostaphylos auriculata</i>	50	1.3	0.2	5.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.6	0.2	2.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Diplacus aurantiacus</i>	50	0.5	1.0	1.0				Y
S	<i>Eriodictyon californicum</i>	50	0.1	0.2	0.2				Y
S	<i>Arctostaphylos crustacea</i>	25	3.8	15.0	15.0				
S	<i>Vaccinium ovatum</i>	25	2.0	8.0	8.0				
S	<i>Chrysopsis chrysophylla</i> var. <i>minor</i>	25	2.0	8.0	8.0				
S	<i>Toxicodendron diversilobum</i>	25	1.8	7.0	7.0				
S	<i>Arctostaphylos manzanita</i>	25	1.0	4.0	4.0				
S	<i>Quercus berberidifolia</i>	25	0.8	3.0	3.0				
S	<i>Baccharis pilularis</i>	25	0.3	1.0	1.0				
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	25	0.3	1.0	1.0				
S	<i>Frangula californica</i>	25	0.3	1.0	1.0				
S	<i>Rubus ursinus</i>	25	0.3	1.0	1.0				
S	<i>Lonicera hispidula</i>	25	0.1	0.2	0.2				
S	<i>Lotus scoparius</i>	25	0.1	0.2	0.2				
S	<i>Pickeringia montana</i>	25	0.0	0.1	0.1				
S	<i>Adenostoma fasciculatum</i>	25	0.0	0.1	0.1				
S	<i>Rosa californica</i>	25	0.0	0.1	0.1				
H	<i>Pteridium aquilinum</i>	25	0.8	3.0	3.0				
H	<i>Lysimachia arvensis</i>	25	0.1	0.2	0.2				
H	<i>Clinopodium douglasii</i>	25	0.1	0.2	0.2				
H	<i>Helenium puberulum</i>	25	0.1	0.2	0.2				
H	<i>Vulpia bromoides</i>	25	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	25	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.2				
NV	Lichen	50	0.1	0.2	0.2				Y
NV	Moss	50	0.1	0.1	0.2				Y

***Pinus attenuata* / *Arctostaphylos (crustacea)* Association**

Common Name: Knobcone Pine / Brittle Leaf Manzanita Woodland

Alliance: *Pinus attenuata* Forest & Woodland Alliance

Local Vegetation Description

The Knobcone Pine / Brittle Leaf Manzanita Association forms an open tree canopy with an open shrub understory in the single sample available. The dominant tree is *Pinus attenuata*, and *Arbutus menziesii* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus wislizeni* var. *frutescens* and *Pinus attenuata*. Commonly associated shrubs include *Arctostaphylos crustacea*, *Chrysolepis chrysophylla* var. *minor*, *Lotus scoparius*, and *Vaccinium ovatum*, and commonly associated herbs include *Pteridium aquilinum* and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	17.0	17 – 17	17.5	15 – 20
Hardwood	16.0	16 – 16	7.5	5 – 10
Regenerating or Shrubby Tree	10.0	10 – 10	1.5	1 – 2
Shrub	23.0	23 – 23	0.8	0.5 – 1
Herb	3.0	3 – 3	0.3	0 – 0.5

Local Environmental Description

Elevation: 277 m

Aspect: SE (1)

Slope: 3 degrees

Macro Topography: Entire slope (1)

Large Rock: 0%

Small Rock: 4%

Fines Cover: 9%

Litter Cover: 85%

Soil Texture (field assessed): Coarse, loamy sand (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has very low non-native plant cover (average 0.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Vulpia bromoides*.

Classification Comments

None.

References: Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC087

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus attenuata</i>	100	17.0	17.0	17.0	Y	Y		Y
T	<i>Arbutus menziesii</i>	100	4.0	4.0	4.0	Y			Y
R	<i>Quercus wislizeni</i> var. <i>frutescens</i>	100	11.0	11.0	11.0	Y	Y		Y
R	<i>Pinus attenuata</i> *	100	3.0	3.0	3.0	Y			Y
S	<i>Arctostaphylos crustacea</i>	100	15.0	15.0	15.0	Y		Y	Y
S	<i>Vaccinium ovatum</i>	100	8.0	8.0	8.0	Y			Y
S	<i>Chrysolepis chrysophylla</i> var. <i>minor</i>	100	8.0	8.0	8.0	Y			Y
S	<i>Lotus scoparius</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pteridium aquilinum</i>	100	3.0	3.0	3.0	Y	Y		Y
H	<i>Vulpia bromoides</i>	100	0.2	0.2	0.2	Y			Y
NV	Lichen	100	0.2	0.2	0.2	Y	Y		Y
NV	Moss	100	0.1	0.1	0.1	Y		Y	Y

***Pinus attenuata* / *Arctostaphylos* (manzanita, canescens) Association**

Common Name: Knobcone Pine / Common or Hoary Manzanita Woodland

Alliance: *Pinus attenuata* Forest & Woodland Alliance

Local Vegetation Description

The Knobcone Pine / Common or Hoary Manzanita Association forms an open tree canopy with an open shrub understory. The dominant tree is *Pinus attenuata*, and *Arbutus menziesii* and *Quercus agrifolia* are characteristic or often present.

Regenerating or shrubby trees that are often present include *Arbutus menziesii*, *Pinus attenuata*, and *Pinus sabiniana*. Commonly associated shrubs include *Arctostaphylos auriculata*, *Diplacus aurantiacus*, *Eriodictyon californicum*, *Adenostoma fasciculatum*, *Arctostaphylos manzanita*, *Arctostaphylos manzanita* ssp. *laevigata*, *Heteromeles arbutifolia*, *Pickeringia montana*, and *Quercus berberidifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	4.5	1 – 8	5.5	2 – 10
Hardwood	1.0	1 – 1	3.5	2 – 5
Regenerating or Shrubby Tree	19.5	14 – 25	2.5	1 – 5
Shrub	8.5	7 – 10	3.5	2 – 5
Herb	0.1	0 – 0.2	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 520 m, Range 501 – 540 m

Aspect: SW (2)

Slope: Mean 12 degrees, Range 8 – 15 degrees

Macro Topography: Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.5%, Range 0 – 1%

Small Rock: Mean 3.5%, Range 2 – 5%

Fines Cover: Mean 3.5%, Range 1 – 6%

Litter Cover: Mean 89.0%, Range 86 – 92%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Shale and other sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyors.

Classification Comments

Both *Arctostaphylos manzanita* ssp. *laevigata* (CRPR 1B.2) and *Arctostaphylos auriculata* (CRPR 1B.3) are rare manzanitas. Both the occurrences of *A. manzanita* may be the rare subspecies since both were collected on Mt. Diablo, however the surveyor did not identify to subspecies.

References: Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): ALCC154, SPCCB-021

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus attenuata</i>	100	4.5	1.0	8.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	50	0.5	1.0	1.0				Y
T	<i>Arbutus menziesii</i>	50	0.5	1.0	1.0				Y
R	<i>Pinus attenuata</i> *	50	13.0	26.0	26.0				Y
R	<i>Pinus sabiniana</i>	50	7.0	14.0	14.0				Y
R	<i>Arbutus menziesii</i> *	50	0.1	0.2	0.2				Y
S	<i>Arctostaphylos auriculata</i>	100	2.6	0.2	5.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Eriodictyon californicum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Arctostaphylos manzanita</i>	50	2.0	4.0	4.0				Y
S	<i>Quercus berberidifolia</i>	50	1.5	3.0	3.0				Y
S	<i>Heteromeles arbutifolia</i>	50	1.0	2.0	2.0				Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	50	0.5	1.0	1.0				Y
S	<i>Adenostoma fasciculatum</i>	50	0.1	0.1	0.1				Y
S	<i>Pickeringia montana</i>	50	0.1	0.1	0.1				Y
NV	Lichen	50	0.1	0.2	0.2				Y

***Pinus coulteri* Forest & Woodland Alliance**



Common Name: Coulter pine woodland and forest

NVC Alliance Code: A3356. *Pinus attenuata* - *Pinus coulteri* - *Pinus sabiniana*
Woodland Alliance

Statewide Description

Pinus coulteri is dominant or co-dominant in the tree canopy with *Calocedrus decurrens*, *Pinus jeffreyi*, *Pinus sabiniana*, *Pseudotsuga macrocarpa*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus kelloggii*, and *Quercus wislizeni*.

Pinus coulteri grows in a variety of vegetation types, but it also forms both pure and mixed stands containing various oaks and conifers. Tree canopies can be one or two tiered (Barbour 2007). *P. coulteri* grows on ridges and exposed, often-undissected slopes. Cones may open at or soon after maturity, slowly over several years, or only after a fire. Inland trees are more serotinous than coastal ones. Borchert (1985) and Johnson et al. (2003) state that serotiny is more strongly expressed in stands near chaparral than in stands near mixed evergreen forest. Minnich (2007) states that *P. coulteri* stands adjacent to chaparral experience stand-replacing burns 2 or 3 times per

century, whereas stands adjacent to oak woodland or mixed evergreen forest may burn in stand-replacement fires less frequently.

Local Vegetation Description

The Coulter pine woodland and forest Alliance forms an open tree canopy with an open shrub understory. The dominant tree is *Pinus coulteri*. Regenerating or shrubby trees that are dominant and characteristic include *Pinus coulteri*. Commonly associated shrubs include *Diplacus aurantiacus*, *Heteromeles arbutifolia*, *Adenostoma fasciculatum*, and *Arctostaphylos manzanita* ssp. *laevigata*, and commonly associated herbs include *Avena barbata* and *Bromus diandrus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	9.0	6 – 14	8.5	5 – 15
Hardwood	0.2	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	0.8	0 – 1	1.3	0.5 – 2
Shrub	17.0	13 – 27	2.7	1 – 5
Herb	3.4	1 – 8	0.3	0 – 0.5

Local Membership Rule

Pinus coulteri > 30% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 338 m, Range 203 – 435 m

Aspect: NE (2), NW (2), SW (1)

Slope: Mean 22 degrees, Range 9 – 48 degrees

Macro Topography: Bottom to Mid 1/3 of slope (1), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1),

Large Rock: Mean 1.2%, Range 0 – 3%

Small Rock: Mean 8.0%, Range 3 – 20%

Fines Cover: Mean 23.0%, Range 6 – 34%

Litter Cover: Mean 65.4%, Range 42 – 87%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Moderately fine clay loam (1)

Geology (field or map data): Shale and other sedimentary (4), Metamorphic (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (4), East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has low non-native plant cover (average 7.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira*

caryophyllea, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Hirschfeldia incana*, *Torilis arvensis*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Pinus coulteri / *Arctostaphylos (auriculata, manzanita)*

Pinus coulteri alliance

Classification Comments

None.

References: AECOM 2013. Borchert et al. 2004, Evens and San 2005, Evens et al. 2006, Klein and Evens 2005, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=5): ALCC125, ALCC127, ALCC128, ALCC129, ALCC835

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus coulteri</i>	80	7.2	6.0	14.0	Y	Y		Y
T	<i>Pinus sabiniana</i>	40	1.8	1.0	8.0				
T	<i>Quercus agrifolia</i>	20	0.6	3.0	3.0				
T	Standing snag	20	0.0	0.2	0.2				
T	<i>Juniperus californica</i>	20	0.0	0.1	0.1				
R	<i>Pinus coulteri</i> *	60	0.5	0.2	1.2				Y
R	<i>Pinus sabiniana</i> *	20	0.1	0.4	0.4				
R	<i>Quercus agrifolia</i> *	20	0.0	0.2	0.2				
R	<i>Quercus douglasii</i>	20	0.0	0.2	0.2				
R	<i>Quercus wislizeni</i>	20	0.0	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	100	3.4	1.0	7.0	Y			Y
S	<i>Diplacus aurantiacus</i>	80	1.3	0.2	5.0	Y			Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	60	2.6	2.0	6.0				Y
S	<i>Adenostoma fasciculatum</i>	60	1.6	2.0	4.0				Y
S	<i>Arctostaphylos auriculata</i>	40	2.8	7.0	7.0				
S	<i>Ptelea crenulata</i>	40	0.4	1.0	1.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Artemisia californica</i>	40	0.4	1.0	1.0				
S	<i>Toxicodendron diversilobum</i>	40	0.4	1.0	1.0				
S	Standing snag	40	0.1	0.2	0.2				
S	<i>Rhamnus crocea</i>	20	2.0	10.0	10.0				
S	<i>Arctostaphylos</i> sp.	20	2.0	10.0	10.0				
S	<i>Ericameria linearifolia</i>	20	0.4	2.0	2.0				
S	<i>Quercus berberidifolia</i>	20	0.2	1.0	1.0				
S	<i>Ceanothus cuneatus</i>	20	0.2	1.0	1.0				
S	<i>Salvia mellifera</i>	20	0.2	1.0	1.0				
S	<i>Lotus scoparius</i>	20	0.2	1.0	1.0				
S	<i>Eriophyllum confertiflorum</i>	20	0.0	0.2	0.2				
S	<i>Eriodictyon californicum</i>	20	0.0	0.2	0.2				
S	<i>Rosa</i> sp.	20	0.0	0.2	0.2				
S	<i>Ceanothus oliganthus</i>	20	0.0	0.2	0.2				
S	<i>Gutierrezia californica</i>	20	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	80	0.6	0.2	1.0	Y		Y	Y
H	<i>Avena barbata</i>	80	0.5	0.2	1.0	Y			Y
H	<i>Bromus rubens</i>	40	0.4	0.2	2.0				
H	<i>Pentagramma triangularis</i>	40	0.1	0.1	0.2				
H	<i>Aira caryophyllea</i>	20	0.4	2.0	2.0				
H	<i>Bromus hordeaceus</i>	20	0.2	1.0	1.0				
H	<i>Achillea millefolium</i>	20	0.0	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	20	0.0	0.2	0.2				
H	<i>Galium porrigens</i>	20	0.0	0.2	0.2				
H	<i>Hirschfeldia incana</i>	20	0.0	0.2	0.2				
H	<i>Melica</i> sp.	20	0.0	0.2	0.2				
H	<i>Vulpia myuros</i>	20	0.0	0.2	0.2				
H	<i>Poa secunda</i>	20	0.0	0.2	0.2				
H	<i>Torilis arvensis</i>	20	0.0	0.2	0.2				
H	<i>Wyethia angustifolia</i>	20	0.0	0.2	0.2				
H	<i>Pedicularis densiflora</i>	20	0.0	0.2	0.2				
NV	Moss	60	1.2	0.2	5.0				Y
NV	Lichen	20	0.0	0.1	0.1				

***Pinus coulteri* / *Arctostaphylos (auriculata, manzanita)* Provisional Association**

Common Name: Coulter Pine / Mt. Diablo or Common Manzanita Woodland

Alliance: *Pinus coulteri* Forest & Woodland Alliance

Local Vegetation Description

The Coulter Pine / Mt. Diablo or Common Manzanita Association forms an open tree canopy with an open shrub understory. The dominant tree is *Pinus coulteri*. Regenerating or shrubby trees that are often present include *Pinus coulteri*. Commonly associated shrubs include *Arctostaphylos manzanita* ssp. *laevigata*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, *Adenostoma fasciculatum*, and *Arctostaphylos auriculata*, and commonly associated herbs include *Bromus diandrus* and *Avena barbata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	9.0	6 – 14	7.5	5 – 10
Hardwood	0.3	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	0.8	0 – 1	1.3	0.5 – 2
Shrub	14.5	13 – 16	3.0	1 – 5
Herb	2.3	1 – 3	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 314 m, Range 203 – 388 m

Aspect: NE (2), NW (1), SW (1)

Slope: Mean 22 degrees, Range 9 – 48 degrees

Macro Topography: Bottom to Mid 1/3 of slope (1), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.8%, Range 0 – 2%

Small Rock: Mean 5.0%, Range 3 – 7%

Fines Cover: Mean 21.0%, Range 6 – 34%

Litter Cover: Mean 71.3%, Range 56 – 87%

Soil Texture (field assessed): Moderately coarse, sandy loam (2), Moderately fine clay loam (1)

Geology (field or map data): Shale and other sedimentary (4)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (4)

Site Impacts

This association has low non-native plant cover (average 6.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Carduus pycnocephalus*, *Hirschfeldia incana*, and *Vulpia myuros*.

Classification Comments

This association is newly described here and remains provisional until additional samples are available. Both *Arctostaphylos manzanita* ssp. *laevigata* (CRPR 1B.2) and *Arctostaphylos auriculata* (CRPR 1B.3) are rare manzanitas.

References: None.

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; **Alameda County** (n=0):

Contra Costa County (n=4): ALCC125, ALCC127, ALCC128, ALCC129

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus coulteri</i>	75	7.0	6.0	14.0	Y	Y		Y
T	<i>Pinus sabiniana</i>	25	2.0	8.0	8.0				
T	<i>Quercus agrifolia</i>	25	0.8	3.0	3.0				
T	<i>Standing snag</i>	25	0.1	0.2	0.2				
R	<i>Pinus coulteri</i>*	50	0.3	0.2	1.0				Y
R	<i>Quercus douglasii</i>	25	0.1	0.2	0.2				
R	<i>Quercus wislizeni</i>	25	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	100	4.0	2.0	7.0	Y			Y
S	<i>Arctostaphylos manzanita</i> <i>ssp. laevigata</i>	75	3.3	2.0	6.0	Y			Y
S	<i>Diplacus aurantiacus</i>	75	0.4	0.2	1.0	Y			Y
S	<i>Arctostaphylos auriculata</i>	50	3.5	7.0	7.0				Y
S	<i>Adenostoma fasciculatum</i>	50	1.0	2.0	2.0				Y
S	<i>Standing snag</i>	50	0.1	0.2	0.2				Y
S	<i>Arctostaphylos</i> sp.	25	2.5	10.0	10.0				
S	<i>Artemisia californica</i>	25	0.3	1.0	1.0				
S	<i>Toxicodendron diversilobum</i>	25	0.3	1.0	1.0				
S	<i>Quercus berberidifolia</i>	25	0.3	1.0	1.0				
S	<i>Lotus scoparius</i>	25	0.3	1.0	1.0				
S	<i>Ptelea crenulata</i>	25	0.3	1.0	1.0				
S	<i>Gutierrezia californica</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	0.8	0.2	1.0	Y		Y	Y
H	<i>Avena barbata</i>	75	0.4	0.2	1.0	Y			Y
H	<i>Aira caryophyllea</i>	25	0.5	2.0	2.0				
H	<i>Pedicularis densiflora</i>	25	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.0	0.1	0.1				
NV	Moss	50	0.3	0.2	1.0				Y

Pinus coulteri / *Arctostaphylos* (*auriculata*, *manzanita*) Provisional Association
Pinus coulteri Forest & Woodland Alliance

***Pinus sabiniana* Woodland Alliance**



Common Name: Foothill pine woodland

NVC Alliance Code: A3356. *Pinus attenuata* - *Pinus coulteri* - *Pinus sabiniana*
Woodland Alliance

Statewide Description

Pinus sabiniana is dominant or co-dominant in the tree canopy with *Aesculus californica*, *Juniperus californica*, *Juniperus occidentalis*, *Pinus coulteri*, *Quercus chrysolepis*, and *Quercus wislizeni*.

This extensive alliance occupies rough, foothill slopes intermixed with stands of chaparral (Allen-Diaz et al. 2007, Sawyer 2007). The northernmost California stand of this widespread species on serpentine is along the Salmon River in the Klamath Mountains (Griffin and Critchfield 1972); the range of the species extends into southern Oregon. *P. sabiniana* is also a common and important member of stands of the *Quercus douglasii* alliance; *Q. douglasii* may be present only at low cover in stands of this alliance. Mixed stands are placed in the *Q. douglasii* alliance. Another common place for *P. sabiniana* is as an emergent over chaparral in many shrubland alliances.

Local Vegetation Description

The Foothill pine woodland Alliance forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Pinus sabiniana*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana* and *Quercus agrifolia*. Commonly associated shrubs include *Heteromeles arbutifolia* and *Artemisia californica*, and commonly associated herbs include *Avena barbata*, *Bromus hordeaceus*, and *Bromus rubens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	11.8	5 – 30	11.0	2 – 20
Hardwood	0.9	0 – 2	6.5	2 – 10
Regenerating or Shrubby Tree	4.9	0 – 26	2.6	0 – 5
Shrub	7.3	0 – 18	2.5	1 – 5
Herb	11.4	6 – 20	0.4	0 – 1

Local Membership Rule

Pinus sabiniana > 50% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 389 m, Range 219 – 675 m

Aspect: NE (3), SE (2), NW (1)

Slope: Mean 26 degrees, Range 10 – 37 degrees

Macro Topography: Upper 1/3 of slope (4), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 4.4%, Range 0 – 12%

Fines Cover: Mean 23.5%, Range 4 – 40%

Litter Cover: Mean 69.8%, Range 59 – 90%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine sandy clay loam (2), Clay (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Volcanic and metavolcanic rocks (2), Franciscan melange (1), Metamorphic (1), Sandstone (1), Serpentine (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 17.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Logfia gallica*, *Lolium perenne*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Pinus sabiniana / *Adenostoma fasciculatum*

Pinus sabiniana / *Ceanothus cuneatus* – (*Rhamnus ilicifolia*)

Pinus sabiniana / herbaceous

Pinus sabiniana / *Quercus durata*

Classification Comments

None.

References: Buck-Diaz et al. 2012, Evens and San 2004, Evens et al. 2004, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023, Roach et al. 2011, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=8; Alameda County (n=3): ALCC225, AW041, SVRA_CA012

Contra Costa County (n=5): ALCC057, SPCCA-022, SPCCA-053, SPCCA-054, SPCCA-055

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	88	11.3	6.0	30.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	50	0.3	0.1	2.0				Y
T	<i>Quercus douglasii</i>	38	0.3	0.2	1.0				
T	Standing snag	25	0.5	1.0	3.0				
R	<i>Pinus sabiniana</i> *	75	4.1	0.2	22.0	Y	Y		Y
R	<i>Quercus agrifolia</i> *	75	0.5	0.2	2.2	Y			Y
R	<i>Juniperus californica</i>	25	0.0	0.1	0.1				
S	<i>Heteromeles arbutifolia</i>	88	1.6	0.1	6.0	Y			Y
S	<i>Artemisia californica</i>	50	0.7	0.2	4.0				Y
S	<i>Toxicodendron diversilobum</i>	38	1.2	0.2	7.0				
S	<i>Rhamnus ilicifolia</i>	38	0.8	0.2	5.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Diplacus aurantiacus</i>	38	0.3	0.1	2.0				
S	<i>Adenostoma fasciculatum</i>	25	1.0	0.2	8.0				
S	<i>Ericameria linearifolia</i>	25	0.5	2.0	2.0				
S	<i>Salvia mellifera</i>	25	0.4	1.0	2.0				
H	<i>Bromus hordeaceus</i>	63	1.2	0.2	6.0				Y
H	<i>Avena barbata</i>	50	1.6	0.2	7.0				Y
H	<i>Bromus rubens</i>	50	0.9	0.2	3.0				Y
H	<i>Melica californica</i>	38	1.6	0.2	12.0				
H	<i>Lolium perenne</i>	38	0.3	0.2	2.0				
H	<i>Holocarpha virgata</i>	38	0.2	0.2	1.0				
H	<i>Dichelostemma capitatum</i>	38	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	38	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	25	1.7	0.2	13.0				
H	<i>Bromus</i> spp.	25	0.5	1.0	3.0				
H	<i>Vulpia myuros</i>	25	0.4	1.0	2.0				
H	<i>Aira caryophyllea</i>	25	0.3	0.2	2.0				
H	<i>Trifolium</i> spp.	25	0.2	0.2	1.2				
H	<i>Nassella pulchra</i>	25	0.2	0.2	1.0				
H	<i>Achillea millefolium</i>	25	0.1	0.2	0.2				
H	<i>Eriophyllum lanatum</i>	25	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	25	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	25	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	25	0.1	0.2	0.2				
H	<i>Galium porrigens</i>	25	0.1	0.2	0.2				
H	<i>Madia gracilis</i>	25	0.0	0.1	0.2				
H	<i>Carduus pycnocephalus</i>	25	0.0	0.1	0.2				
NV	Moss	25	0.2	0.2	1.0				

***Pinus sabiniana* / *Adenostoma fasciculatum* Association**

Common Name: Foothill Pine / Chamise Woodland

Alliance: *Pinus sabiniana* Woodland Alliance

Local Vegetation Description

The Foothill Pine / Chamise Association forms an open tree canopy with an open shrub understory in the single sample available. The dominant tree is *Pinus sabiniana*, and *Quercus agrifolia* is present. Regenerating or shrubby trees that are present include *Pinus sabiniana* and *Quercus agrifolia*. Commonly associated shrubs include *Adenostoma fasciculatum*, *Arctostaphylos auriculata*, *Arctostaphylos manzanita*, and *Heteromeles arbutifolia*, and commonly associated herbs include *Aira caryophylla*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus rubens*, *Carduus pycnocephalus*, *Dichelostemma capitatum*, *Gastroidium phleoides*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Madia gracilis*, *Pentagramma triangularis*, *Sanicula crassicaulis*, *Torilis nodosa*, *Trifolium albopurpureum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	8.0	8 – 8	12.5	10 – 15
Hardwood	2.0	2 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.4	0 – 0.4	3.5	2 – 5
Shrub	18.0	18 – 18	3.5	2 – 5
Herb	15.0	15 – 15	0.3	0 – 0.5

Local Environmental Description

Elevation: 219 m

Aspect: NE (1)

Slope: 27 degrees

Macro Topography: Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0.2%

Fines Cover: 40%

Litter Cover: 59%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 37.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Pinus sabiniana / *Adenostoma fasciculatum* Association
Pinus sabiniana Woodland Alliance

Aira caryophyllaea, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Gastroidium phleoides*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Torilis nodosa*, and *Vulpia bromoides*.

Classification Comments

The survey includes significant cover of a rare manzanita, *Arctostaphylos auriculata* (CRPR 1B.3).

References: Klein et al. 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC057

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	100	8.0	8.0	8.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	2.0	2.0	2.0	Y			Y
R	<i>Quercus agrifolia</i> *	100	0.2	0.2	0.2	Y	Y		Y
R	<i>Pinus sabiniana</i>*	100	0.2	0.2	0.2	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	100	8.0	8.0	8.0	Y		Y	Y
S	<i>Arctostaphylos manzanita</i>	100	4.0	4.0	4.0	Y			Y
S	<i>Arctostaphylos auriculata</i>	100	4.0	4.0	4.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Bromus diandrus</i>	100	13.0	13.0	13.0	Y	Y		Y
H	<i>Bromus rubens</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Hypochaeris glabra</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Gastroidium phleoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Sanicula crassicaulis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vulpia bromoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Madia gracilis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Logfia gallica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium albopurpureum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Torilis nodosa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pentagramma triangularis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Dichelostemma capitatum</i>	100	0.2	0.2	0.2	Y			Y

***Pinus sabiniana* / *Ceanothus cuneatus* – (*Rhamnus ilicifolia*)
Association**

Common Name: Foothill Pine / Wedgeleaf Ceanothus – (Hollyleaf Redberry)
Woodland

Alliance: *Pinus sabiniana* Woodland Alliance

Local Vegetation Description

The Foothill Pine / Wedgeleaf Ceanothus – (Hollyleaf Redberry) Association forms an open tree canopy with an open shrub understory. The dominant tree is *Pinus sabiniana*, and *Quercus douglasii* and *Quercus agrifolia* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana* and *Quercus agrifolia* and those that are often present include *Juniperus californica* and *Umbellularia californica*. Commonly associated shrubs include *Artemisia californica*, *Diplacus aurantiacus*, *Ericameria linearifolia*, *Rhamnus ilicifolia*, *Heteromeles arbutifolia*, *Lupinus* sp., *Ptelea crenulata*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Avena barbata*, *Bromus hordeaceus*, *Dichelostemma capitatum*, *Lolium perenne*, and *Trifolium* sp.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	9.5	9 – 10	15.0	10 – 20
Hardwood	0.6	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	1.5	1 – 2	3.5	2 – 5
Shrub	8.0	4 – 12	3.5	2 – 5
Herb	14.5	9 – 20	0.5	0 – 1

Local Environmental Description

Elevation: Mean 311 m, Range 252 – 370 m

Aspect: NW (1), SE (1)

Slope: Mean 31 degrees, Range 24 – 37 degrees

Macro Topography: Upper 1/3 of slope (2)

Large Rock: 0%

Small Rock: Mean 4.6%, Range 3 – 6%

Fines Cover: Mean 12.0%, Range 4 – 20%

Litter Cover: Mean 80.5%, Range 71 – 90%

Soil Texture (field assessed): Moderately fine sandy clay loam (2)

Geology (field or map data): Metamorphic (1), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has moderate non-native plant cover (average 28.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Lolium perenne*, and *Vulpia myuros*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Evens et al. 2004, Kittel et al. 2012, Klein et al. 2007, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): SPCCA-053, SPCCA-055

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	100	10.0	10.0	10.0	Y	Y		Y
T	<i>Quercus douglasii</i>	100	0.6	0.2	1.0	Y			Y
T	<i>Quercus agrifolia</i>	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i> *	100	1.6	1.0	2.2	Y	Y		Y
R	<i>Quercus agrifolia</i> *	100	0.2	0.2	0.2	Y			Y
R	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
R	<i>Juniperus californica</i>	50	0.1	0.1	0.1				Y
S	<i>Rhamnus ilicifolia</i>	100	3.0	1.0	5.0	Y		Y	Y
S	<i>Ericameria linearifolia</i>	100	2.0	2.0	2.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Artemisia californica</i>	100	0.4	0.2	0.5	Y			Y
S	<i>Toxicodendron diversilobum</i>	50	1.0	2.0	2.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.5	1.0	1.0				Y
S	<i>Lupinus</i> sp.	50	0.1	0.2	0.2				Y
S	<i>Ptelea crenulata</i>	50	0.1	0.1	0.1				Y
H	<i>Avena barbata</i>	100	6.0	5.0	7.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Lolium perenne</i>	100	1.1	0.2	2.0	Y			Y

Pinus sabiniana / *Ceanothus cuneatus* – (*Rhamnus ilicifolia*) Association
Pinus sabiniana Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Trifolium</i> sp.	100	0.7	0.2	1.2	Y			Y
H	<i>Dichelostemma capitatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vulpia myuros</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Triteleia laxa</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia unguiculata</i>	50	0.1	0.2	0.2				Y
H	<i>Plagiobothrys nothofulvus</i>	50	0.1	0.2	0.2				Y
H	<i>Pellaea andromedifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Nassella pulchra</i>	50	0.1	0.2	0.2				Y
H	<i>Melica californica</i>	50	0.1	0.2	0.2				Y
H	<i>Brachypodium distachyon</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia purpurea</i>	50	0.1	0.2	0.2				Y
H	<i>Eriogonum nudum</i>	50	0.1	0.2	0.2				Y
H	<i>Galium porrigens</i>	50	0.1	0.2	0.2				Y
H	<i>Eriophyllum lanatum</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus glaucus</i>	50	0.1	0.2	0.2				Y
H	<i>Holocarpha virgata</i>	50	0.1	0.2	0.2				Y
H	<i>Solanum umbelliferum</i>	50	0.1	0.1	0.1				Y
H	<i>Madia gracilis</i>	50	0.1	0.1	0.1				Y
H	<i>Marah fabaceus</i>	50	0.1	0.1	0.1				Y

***Pinus sabiniana* / herbaceous Association**

Common Name: Foothill Pine / herbaceous Woodland

Alliance: *Pinus sabiniana* Woodland Alliance

Local Vegetation Description

The Foothill Pine / herbaceous Association forms an open tree canopy with a sparse to open shrub understory. The dominant tree is *Pinus sabiniana*, and *Quercus douglasii* is characteristic or often present. Regenerating or shrubby trees that are often present include *Pinus sabiniana*. Commonly associated shrubs include *Heteromeles arbutifolia*, and commonly associated herbs include *Avena fatua* and *Bromus rubens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	13.6	5 – 30	11.5	5 – 15
Hardwood	1.0	0 – 3	6.5	2 – 10
Regenerating or Shrubby Tree	1.5	0 – 5	0.6	0 – 2
Shrub	2.2	0 – 7	1.4	0.5 – 2
Herb	9.0	6 – 20	0.3	0 – 1

Local Environmental Description

Elevation: Mean 479 m, Range 269 – 792 m

Aspect: NE (2), NW (2), SE (1)

Slope: Mean 16 degrees, Range 10 – 25 degrees

Macro Topography: Middle 1/3 of slope (3), Lower to Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 3.7%, Range 0 – 8%

Fines Cover: Mean 63.8%, Range 33 – 91%

Litter Cover: Mean 28.6%, Range 3 – 64%

Soil Texture (field assessed): Moderately fine clay loam (3), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (3), Sandstone and other sedimentary (3), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Diablo Range (2), Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 12.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Torilis arvensis*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Evens and San 2004, Roach et al. 2011, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): AW041, SVRA_CA012

Contra Costa County (n=2): SPCCA-022, SPCCA-054

Santa Clara Co. (n=1): SCPOF014

Stanislaus Co. (n=2): SPCCA-008, SPCCB-001

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	86	12.7	6.0	30.0	Y	Y		Y
T	<i>Quercus douglasii</i>	57	0.6	0.2	3.0				Y
T	<i>Aesculus californica</i>	29	0.1	0.2	0.2				
R	<i>Pinus sabiniana</i> *	71	1.2	0.2	5.0				Y
R	<i>Quercus douglasii</i> *	43	0.1	0.2	0.4				
R	<i>Quercus agrifolia</i> *	29	0.2	0.2	1.2				
S	<i>Heteromeles arbutifolia</i>	71	0.6	0.1	3.0				Y
S	<i>Toxicodendron diversilobum</i>	43	0.2	0.2	1.0				
S	<i>Artemisia californica</i>	29	0.7	1.0	4.0				
S	<i>Salvia mellifera</i>	29	0.4	1.0	2.0				
S	<i>Arctostaphylos glauca</i>	29	0.1	0.2	0.2				
H	<i>Avena fatua</i>	57	1.2	0.2	6.0				Y
H	<i>Bromus rubens</i>	57	0.4	0.1	2.0				Y
H	<i>Vulpia microstachys</i>	43	0.6	0.2	3.0				
H	<i>Bromus hordeaceus</i>	43	0.5	0.2	3.0				
H	<i>Triteleia laxa</i>	43	0.2	0.2	1.0				
H	<i>Calochortus albus</i>	43	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	43	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	43	0.1	0.2	0.2				
H	<i>Collinsia heterophylla</i>	29	0.5	0.2	3.0				
H	<i>Vulpia myuros</i>	29	0.4	1.0	2.0				
H	<i>Madia gracilis</i>	29	0.3	0.2	2.0				
H	<i>Agoseris</i> sp.	29	0.2	0.2	1.0				
H	<i>Galium porrigens</i>	29	0.1	0.2	0.2				
H	<i>Wyethia</i> sp.	29	0.1	0.2	0.2				
H	<i>Clarkia purpurea</i>	29	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	29	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	29	0.1	0.2	0.2				
H	<i>Melica californica</i>	29	0.1	0.2	0.2				

***Pinus sabiniana* / *Quercus durata* Association**

Common Name: Foothill Pine / Leather Oak Woodland

Alliance: *Pinus sabiniana* Woodland Alliance

Local Vegetation Description

The Foothill Pine / Leather Oak Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Pinus sabiniana*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are often present include *Pinus sabiniana* and *Quercus agrifolia*. Commonly associated shrubs include *Heteromeles arbutifolia*, *Toxicodendron diversilobum*, *Arceuthobium campylopodum*, *Baccharis pilularis*, *Frangula californica* ssp. *tomentella*, *Quercus durata*, and *Sambucus nigra*, and commonly associated herbs include *Bromus hordeaceus* and *Plantago erecta*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	23.0	6 – 40	3.5	2 – 5
Hardwood	1.0	0 – 2	3.5	2 – 5
Regenerating or Shrubby Tree	13.0	0 – 26	3.5	2 – 5
Shrub	8.5	5 – 12	1.5	1 – 2
Herb	26.0	19 – 33	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 527 m, Range 379 – 675 m

Aspect: NE (2)

Slope: Mean 26 degrees, Range 21 – 30 degrees

Macro Topography: Upper 1/3 of slope (2)

Large Rock: 1%

Small Rock: 12%

Fines Cover: 10%

Litter Cover: 75%

Soil Texture (field assessed): Clay (1)

Geology (field or map data): Serpentine (2)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 21.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophylla*, *Bromus hordeaceus*, *Lolium perenne*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** ALCC225

Contra Costa County (n=0):

Santa Clara Co. (n=1): SCLAR005

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	100	23.0	6.0	40.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i>	50	11.0	22.0	22.0				Y
R	<i>Quercus agrifolia</i>	50	1.1	2.2	2.2				Y
S	<i>Toxicodendron diversilobum</i>	100	4.5	2.0	7.0	Y		Y	Y
S	<i>Heteromeles arbutifolia</i>	100	3.1	0.2	6.0	Y			Y
S	<i>Quercus durata</i>	50	1.0	2.0	2.0				Y
S	<i>Arceuthobium campylopodum</i>	50	0.5	1.0	1.0				Y
S	<i>Frangula californica</i> ssp. <i>tomentella</i>	50	0.5	1.0	1.0				Y
S	<i>Baccharis pilularis</i>	50	0.1	0.2	0.2				Y
S	<i>Sambucus nigra</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	100	6.5	6.0	7.0	Y			Y
H	<i>Plantago erecta</i>	100	2.6	0.2	5.0	Y			Y
H	<i>Lolium perenne</i>	50	7.5	15.0	15.0				Y
H	<i>Melica californica</i>	50	6.0	12.0	12.0				Y
H	<i>Nassella lepida</i>	50	2.0	4.0	4.0				Y
H	<i>Bromus rubens</i>	50	1.5	3.0	3.0				Y

Pinus sabiniana / *Quercus durata* Association
Pinus sabiniana Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Aira caryophyllea</i>	50	1.0	2.0	2.0				Y
H	<i>Perideridia kelloggii</i>	50	0.5	1.0	1.0				Y
H	<i>Grindelia</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Holocarpha virgata</i>	50	0.5	1.0	1.0				Y
H	<i>Vulpia myuros</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium willdenovii</i>	50	0.1	0.2	0.2				Y
H	<i>Lessingia</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	50	0.1	0.2	0.2				Y
H	<i>Koeleria macrantha</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus multisetus</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus elymoides</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Avena barbata</i>	50	0.1	0.2	0.2				Y
NV	Moss	50	0.5	1.0	1.0				Y

***Platanus racemosa* – *Quercus agrifolia* Woodland Alliance**



Common Name: California sycamore – coast live oak riparian woodlands

NVC Alliance Code: A3750. *Platanus racemosa* - *Quercus agrifolia* - *Juglans californica* Riparian Woodland Alliance

Statewide Description

Platanus racemosa and/or *Quercus agrifolia* is dominant or co-dominant in the tree canopy in riparian habitats with *Alnus rhombifolia*, *Juglans californica*, *Populus fremontii*, *Quercus lobata*, *Salix exigua*, *Salix gooddingii*, *Salix laevigata*, *Salix lasiolepis*, *Salix lutea*, *Schinus molle*, and *Umbellularia californica*.

This alliance includes *Platanus racemosa* woodlands whose status and distribution throughout California were summarized by Keeler-Wolf et al. (1997). We have also included stands of co-dominant *P. racemosa* and *Populus fremontii* within this alliance, though Klein and Evens (2005) placed these stands in a separate *Platanus racemosa*-*Populus fremontii* alliance. In addition, this alliance has been expanded since the 2009 publication, *A Manual of California Vegetation, second edition*, to include riparian stands dominated by *Quercus agrifolia*. Upland stands of *Q. agrifolia* remain in the *Quercus agrifolia* Alliance.

Local Vegetation Description

The California sycamore – coast live oak riparian woodlands Alliance forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Platanus racemosa*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	15.0	10 – 20
Hardwood	37.8	3 – 92	16.6	5 – 35
Regenerating or Shrubby Tree	0.5	0 – 9	2.4	0 – 10
Shrub	3.6	0 – 15	1.7	0.5 – 5
Herb	26.0	0 – 62	0.5	0 – 2

Local Membership Rule

Quercus agrifolia > 50% relative cover in a riparian setting, or *Platanus racemosa* > 15% relative cover with *Acer macrophyllum*, *Acer negundo*, *Aesculus californica*, *Juglans hindsii*, *Quercus agrifolia*, *Quercus lobata*, *Salix laevigata*, or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 160 m, Range 54 – 379 m

Aspect: Flat (16), SE (6), NE (4), SW (3), N (1), NW (1), Variable (1)

Slope: Mean 4 degrees, Range 0 – 35 degrees

Macro Topography: Bottom (17), Lower 1/3 of slope (4), Bottom to Lower 1/3 of slope (1)

Large Rock: Mean 4.7%, Range 0 – 70%

Small Rock: Mean 10.2%, Range 0 – 45%

Fines Cover: Mean 20.9%, Range 0 – 85%

Litter Cover: Mean 47.6%, Range 2 – 95%

Soil Texture (field assessed): Medium loam (8), Coarse sand (2), Medium to very fine, loamy sand (2), Medium to very fine, sandy loam (2), Sand (1), Moderately fine silty clay loam (1), Moderately fine sandy clay loam (1), Moderately fine clay loam (1), Medium silt loam (1), Coarse, loamy sand (1), Fine clay (1)

Geology (field or map data): Gravelly alluvium (8), Alluvium (5), Franciscan melange (3), Mixed alluvium (3), Sandstone, shale, and gravel deposits (3), Sedimentary (3), Clayey alluvium (2), Metamorphic (1), Mix of two or more rock types (1), Sandstone (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (28), Western Diablo Range (1), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 33.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Geranium dissectum*, *Geranium molle*, *Hordeum murinum*, *Lolium perenne*, *Torilis arvensis*, *Trifolium hirtum*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Platanus racemosa – *Aesculus californica*

Platanus racemosa – *Quercus agrifolia*

Platanus racemosa – *Quercus lobata*

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia*

Platanus racemosa / annual grass

Platanus racemosa / *Baccharis salicifolia*

Platanus racemosa / *Toxicodendron diversilobum*

Quercus agrifolia / *Salix lasiolepis*

Umbellularia californica – *Platanus racemosa*

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Campbell 1980, Evens and San 2005, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1997, Kittel et al. 2012, Klein and Evens 2005, Potter 2005, Reyes et al. 2019, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences and URS 2007, White 1994a

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=32; Alameda County (n=30): ALCC037, ALCC082, ALCC230, ALCC277, ALCCREC102, AW012, AW032, SUNOL001, SUNOL002, SUNOL004, SUNOL005, SUNOL006, SUNOL007, SUNOL008, SUNOL009, SUNOL013, SUNOL014, SUNOL019, SUNOL030, SUNOL033, SUNOL036, SYCAM043, SYCAM044, SYCAM054, SYCAM055, SYCAM056, SYCAM070, SYCAM071, SYCAM081, SYCAM082

Contra Costa County (n=2): ALCC143, EBAY0023

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	97	27.6	1.0	88.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	34	3.0	0.2	38.2				
T	<i>Umbellularia californica</i>	31	3.4	0.2	60.0				
T	<i>Quercus lobata</i>	22	1.5	0.2	15.0				
R	<i>Quercus agrifolia</i>*	28	0.1	0.2	1.0				
R	<i>Umbellularia californica</i> *	28	0.1	0.2	0.4				
S	<i>Toxicodendron diversilobum</i>	69	1.0	0.2	10.0				Y
S	<i>Symphoricarpos albus</i>	34	1.0	0.2	9.0				
S	<i>Baccharis salicifolia</i>	28	0.6	0.2	6.0				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				
S	<i>Sambucus nigra</i>	22	0.3	0.2	6.0				
S	<i>Artemisia californica</i>	22	0.2	0.2	5.0				
S	<i>Baccharis pilularis</i>	22	0.1	0.2	1.0				
S	<i>Rubus ursinus</i>	22	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	78	16.2	0.2	62.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	72	0.9	0.2	7.0				Y
H	<i>Bromus hordeaceus</i>	44	1.1	0.2	19.0				
H	<i>Lolium perenne</i>	41	0.5	0.2	15.0				
H	<i>Hordeum murinum</i>	34	0.2	0.2	2.0				
H	<i>Avena barbata</i>	31	0.8	0.2	10.0				
H	<i>Galium aparine</i>	31	0.2	0.2	4.0				
H	<i>Trifolium hirtum</i>	31	0.2	0.2	2.0				
H	<i>Geranium dissectum</i>	31	0.2	0.2	2.0				
H	<i>Torilis arvensis</i>	31	0.1	0.2	1.0				
H	<i>Vicia sativa</i>	31	0.1	0.2	1.0				
H	<i>Geranium molle</i>	31	0.1	0.2	1.0				
H	<i>Cynosurus echinatus</i>	25	0.2	0.2	2.0				
H	<i>Conium maculatum</i>	22	0.7	0.2	19.0				
H	<i>Elymus glaucus</i>	22	0.1	0.2	1.0				
H	<i>Avena fatua</i>	22	0.0	0.2	0.2				
NV	Moss	34	0.1	0.2	1.0				

***Platanus racemosa* – *Aesculus californica* Association**

Common Name: California Sycamore – California Buckeye Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore – California Buckeye Association forms an intermittent tree canopy with an open shrub understory in the single sample available. The dominant trees are *Aesculus californica* and *Platanus racemosa*, and *Juglans hindsii*, *Salix laevigata*, and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Rubus ursinus* and *Sambucus nigra*, and commonly associated herbs include *Artemisia douglasiana*, *Bromus diandrus*, *Bromus rubens*, *Conium maculatum*, *Galium aparine*, and *Marah fabaceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	40.0	40 – 40	12.5	10 – 15
Regenerating or Shrubby Tree	0.2	0 – 0	0.3	0 – 0.5
Shrub	2.0	2 – 2	3.5	2 – 5
Herb	3.0	3 – 3	1.5	1 – 2

Local Environmental Description

Elevation: 70 m

Aspect: Flat (1)

Slope: Mean 3 degrees, Range 1 – 5 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 3%

Litter Cover: 94%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Mixed alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 5.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus* and *Conium maculatum*.

Classification Comments

None.

References: Reyes et al. 2022

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** SUNOL030

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	20.0	20.0	20.0	Y		Y	Y
T	<i>Aesculus californica</i>	100	15.0	15.0	15.0	Y		Y	Y
T	<i>Umbellularia californica</i>	100	3.0	3.0	3.0	Y			Y
T	<i>Salix laevigata</i>	100	2.0	2.0	2.0	Y			Y
T	<i>Juglans hindsii</i>	100	2.0	2.0	2.0	Y			Y
S	<i>Sambucus nigra</i>	100	2.0	2.0	2.0	Y	Y		Y
S	<i>Rubus ursinus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Conium maculatum</i>	100	2.0	2.0	2.0	Y	Y		Y
H	<i>Galium aparine</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus rubens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus diandrus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Artemisia douglasiana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Marah fabaceus</i>	100	0.2	0.2	0.2	Y			Y

***Platanus racemosa* – *Quercus agrifolia* Association**

Common Name: California Sycamore – Coast Live Oak Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore – Coast Live Oak Association forms an open to continuous tree canopy with an open to intermittent shrub understory. The dominant trees are *Platanus racemosa* and *Quercus agrifolia*, and *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Symphoricarpos albus* and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	47.9	15 – 92	13.5	10 – 20
Regenerating or Shrubby Tree	0.5	0 – 3	1.5	1 – 2
Shrub	16.1	2 – 63	1.2	0.5 – 2
Herb	19.9	0 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 218 m, Range 91 – 448 m

Aspect: NE (2), SW (2), NW (1), SE (1)

Slope: Mean 9 degrees, Range 0 – 28 degrees

Macro Topography: Lower 1/3 of slope (2), Terrace (former floodplain) (2), Channel Bed, Floodplain, High-flow bank/slope (1)

Large Rock: Mean 4.1%, Range 0 – 10%

Small Rock: Mean 1.7%, Range 0 – 5%

Fines Cover: Mean 7.7%, Range 1 – 20%

Litter Cover: Mean 70.6%, Range 15 – 95%

Soil Texture (field assessed): Loam (3), Medium silt (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Franciscan melange (1), Mix of two or more rock types (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (3), Western Diablo Range (2)

Site Impacts

This association has low non-native plant cover (average 14.7%) relative to native

Platanus racemosa – *Quercus agrifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Geranium dissectum*, *Lolium perenne*, and *Torilis nodosa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1997, Kittel et al. 2012, Klein and Evens 2005, Reyes et al. 2019, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences and URS 2007

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): SUNOL019, SYCAM071

Contra Costa County (n=0):

Santa Clara Co. (n=5): SYCAM059, VAWA084, VAWA306, VAWA336, VAWA380

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	21.7	10.0	37.5	Y		Y	Y
T	<i>Platanus racemosa</i>	71	20.2	1.0	60.0				Y
T	<i>Umbellularia californica</i>	71	3.6	3.0	10.0				Y
T	<i>Quercus kelloggii</i>	29	0.9	3.0	3.0				
R	<i>Quercus agrifolia</i> *	29	0.5	0.2	3.0				
S	<i>Symphoricarpos albus</i>	86	12.8	2.0	62.5	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	57	1.0	0.5	3.0				Y
S	<i>Lonicera hispidula</i>	43	0.2	0.2	0.5				
H	<i>Bromus diandrus</i>	57	7.1	1.0	27.0				Y
H	<i>Geranium dissectum</i>	43	0.1	0.2	0.5				
H	<i>Cynosurus echinatus</i>	29	5.4	0.2	37.5				
H	<i>Lolium perenne</i>	29	2.9	0.2	20.0				
H	<i>Carduus pycnocephalus</i>	29	0.6	1.0	3.0				
H	<i>Sanicula crassicaulis</i>	29	0.5	0.2	3.0				
H	<i>Bromus hordeaceus</i>	29	0.5	0.2	3.0				
H	<i>Osmorhiza berteroi</i>	29	0.1	0.2	0.5				
NV	Moss	29	0.1	0.2	0.2				

Platanus racemosa – *Quercus agrifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

***Platanus racemosa* – *Quercus lobata* Association**

Common Name: California Sycamore – Valley Oak Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore – Valley Oak Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Platanus racemosa*, and *Quercus lobata* is characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Symphoricarpos albus* and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium molle*, *Lolium perenne*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	45.5	8 – 91	16.3	10 – 20
Regenerating or Shrubby Tree	0.3	0 – 1	2.1	0.5 – 5
Shrub	2.4	0 – 10	0.9	0.5 – 2
Herb	25.0	2 – 62	0.5	0 – 1

Local Environmental Description

Elevation: Mean 154 m, Range 82 – 322 m

Aspect: Flat (2), SE (2), NE (1), SW (1)

Slope: Mean 8 degrees, Range 0 – 35 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (2)

Large Rock: Mean 1.8%, Range 0 – 4%

Small Rock: Mean 15.8%, Range 4 – 45%

Fines Cover: Mean 26.7%, Range 0 – 85%

Litter Cover: Mean 42.7%, Range 2 – 70%

Soil Texture (field assessed): Medium loam (2), Medium silt loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Gravelly alluvium (2), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4)

Contra Costa County Subsections: Eastern Hills (1)

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has moderate non-native plant cover (average 34.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

Bromus diandrus, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cirsium vulgare*, *Cynosurus echinatus*, *Geranium dissectum*, *Geranium molle*, *Hordeum murinum*, *Lolium perenne*, *Marrubium vulgare*, *Sisymbrium officinale*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=4): AW032, SUNOL007, SUNOL014, SYCAM081

Contra Costa County (n=1): ALCC143

Santa Clara Co. (n=1): SYCAM042

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	29.5	4.0	69.0	Y	Y		Y
T	<i>Quercus lobata</i>	100	9.3	2.0	15.0	Y			Y
R	<i>Quercus agrifolia</i>	50	0.2	0.2	1.0				Y
S	<i>Toxicodendron diversilobum</i>	67	0.1	0.2	0.2				Y
S	<i>Symphoricarpos albus</i>	50	1.9	0.2	9.0				Y
S	<i>Diplacus aurantiacus</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	19.8	1.0	62.0	Y	Y		Y
H	<i>Bromus hordeaceus</i>	67	2.0	1.0	8.0				Y
H	<i>Carduus pycnocephalus</i>	67	1.2	1.0	3.0				Y
H	<i>Geranium molle</i>	50	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	50	0.1	0.2	0.2				Y
H	<i>Vicia sativa</i>	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	33	0.7	2.0	2.0				
H	<i>Hordeum murinum</i>	33	0.2	0.2	1.0				
H	<i>Elymus glaucus</i>	33	0.1	0.2	0.2				
H	<i>Galium aparine</i>	33	0.1	0.2	0.2				
NV	Moss	33	0.1	0.2	0.2				

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

***Platanus racemosa* – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association**

Common Name: California Sycamore – Red Willow / Arroyo Willow – Mulefat Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore – Red Willow / Arroyo Willow – Mulefat Association forms an open tree canopy with an open shrub understory. The dominant tree is *Platanus racemosa*, and *Salix laevigata*, *Acer macrophyllum*, *Alnus rhombifolia*, and *Juglans hindsii* are characteristic or often present. Regenerating trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Acer negundo*. Commonly associated shrubs include *Rubus ursinus*, *Salix lasiolepis*, *Sambucus nigra*, and *Toxicodendron diversilobum*. Commonly associated herbs include *Artemisia douglasiana*, *Carex nudata*, *Conium maculatum*, *Elymus triticoides*, *Galium aparine*, *Scrophularia californica*, *Stellaria media*, *Urtica dioica*, and *Vinca major*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	20.0	15 – 25	22.5	15 – 35
Regenerating or Shrubby Tree	0.2	0 – 0	2.5	1 – 5
Shrub	7.5	5 – 10	2.5	1 – 5
Herb	28.5	2 – 55	0.5	0 – 1

Local Environmental Description

Elevation: Mean 104 m, Range 67 – 142 m

Aspect: Flat (2)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: Mean 35.0%, Range 0 – 70%

Small Rock: Mean 9.0%, Range 0 – 18%

Fines Cover: Mean 2.1%, Range 0 – 4%

Litter Cover: Mean 48.5%, Range 2 – 95%

Soil Texture (field assessed): Coarse sand (1), Medium loam (1)

Geology (field or map data): Gravelly alluvium (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 30.2%) relative to native

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

cover. Non-native species that occur with highest frequency and abundance include *Conium maculatum*, *Stellaria media*, and *Vinca major*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein and Evens 2005, Sikes et al. 2023, Stillwater Sciences and URS 2007, White 1994a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** SUNOL009, SUNOL033

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	15.0	10.0	20.0	Y	Y		Y
T	<i>Salix laevigata</i>	100	1.5	1.0	2.0	Y			Y
T	<i>Juglans hindsii</i>	50	4.0	8.0	8.0				Y
T	<i>Alnus rhombifolia</i>	50	1.0	2.0	2.0				Y
T	<i>Acer macrophyllum</i>	50	0.1	0.2	0.2				Y
R	<i>Umbellularia californica</i>	100	0.2	0.2	0.2	Y	Y		Y
R	<i>Acer negundo</i>	50	0.1	0.2	0.2				Y
S	<i>Rubus ursinus</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Toxicodendron diversilobum</i>	50	5.0	10.0	10.0				Y
S	<i>Sambucus nigra</i>	50	3.0	6.0	6.0				Y
S	<i>Salix lasiolepis</i>	50	2.5	5.0	5.0				Y
H	<i>Vinca major</i>	50	27.5	55.0	55.0				Y
H	<i>Carex nudata</i>	50	1.0	2.0	2.0				Y
H	<i>Elymus triticoides</i>	50	0.5	1.0	1.0				Y
H	<i>Conium maculatum</i>	50	0.5	1.0	1.0				Y
H	<i>Urtica dioica</i>	50	0.1	0.2	0.2				Y
H	<i>Artemisia douglasiana</i>	50	0.1	0.2	0.2				Y
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Aster</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Stellaria media</i>	50	0.1	0.2	0.2				Y

Platanus racemosa – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

***Platanus racemosa* / annual grass Association**

Common Name: California Sycamore / Annual Grass-Herb Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore / Annual Grass-Herb Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Platanus racemosa*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, *Bromus hordeaceus*, *Hirschfeldia incana*, and *Hordeum murinum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	17.5	15 – 20
Hardwood	40.8	7 – 88	20.0	10 – 35
Regenerating or Shrubby Tree	0.9	0 – 9	3.5	1 – 10
Shrub	1.5	0 – 5	2.0	0.5 – 5
Herb	38.7	20 – 57	0.4	0 – 1

Local Environmental Description

Elevation: Mean 166 m, Range 88 – 322 m

Aspect: Flat (5), SE (4), NE (1), NW (1), SW (1)

Slope: Mean 2 degrees, Range 0 – 10 degrees

Macro Topography: Bottom (6)

Large Rock: Mean 0.7%, Range 0 – 2%

Small Rock: Mean 8.3%, Range 0 – 31%

Fines Cover: Mean 16.0%, Range 1 – 60%

Litter Cover: Mean 47.3%, Range 20 – 83%

Soil Texture (field assessed): Medium loam (4), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Alluvium (5), Gravelly alluvium (2), Clayey alluvium (1), Franciscan melange (1), Mixed alluvium (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (12)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 48.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium* sp., *Geranium dissectum*, *Geranium molle*, *Hirschfeldia incana*, *Hordeum murinum*, *Lolium perenne*, *Sherardia arvensis*, *Silybum marianum*, *Stellaria media*, *Torilis arvensis*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Campbell 1980, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1997, Klein and Evens 2005, Sikes et al. 2023, Stillwater Sciences and URS 2007, White 1994a

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=12; Alameda County (n=12): ALCC277, AW012, SUNOL001, SUNOL004, SUNOL006, SUNOL013, SYCAM043, SYCAM044, SYCAM054, SYCAM055, SYCAM056, SYCAM070

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	38.3	7.0	88.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	33	0.4	0.2	3.0				
T	<i>Juglans hindsii</i>	25	1.4	0.2	15.0				
S	<i>Toxicodendron diversilobum</i>	58	0.1	0.2	0.2				Y
S	<i>Baccharis salicifolia</i>	25	0.6	1.0	4.0				
S	<i>Symphoricarpos albus</i>	25	0.5	0.2	5.0				
S	<i>Sambucus nigra</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	92	25.6	0.2	48.0	Y	Y		Y
H	<i>Carduus pycnocephalus</i>	92	0.9	0.2	3.0	Y			Y
H	<i>Bromus hordeaceus</i>	75	2.6	0.2	19.0	Y			Y
H	<i>Avena barbata</i>	58	1.6	0.2	10.0				Y
H	<i>Hordeum murinum</i>	58	0.4	0.2	2.0				Y
H	<i>Hirschfeldia incana</i>	50	0.5	0.2	2.0				Y
H	<i>Lolium perenne</i>	42	1.3	0.2	15.0				
H	<i>Geranium dissectum</i>	33	0.3	0.2	2.0				
H	<i>Trifolium hirtum</i>	33	0.2	0.2	2.0				
H	<i>Geranium molle</i>	33	0.1	0.2	1.0				
H	<i>Galium aparine</i>	33	0.1	0.2	0.2				
H	<i>Hordeum</i> sp.	25	0.8	2.0	4.0				
H	<i>Erodium</i> sp.	25	0.5	0.2	5.0				
H	<i>Stipa miliacea</i>	25	0.4	0.2	4.0				
H	<i>Stellaria media</i>	25	0.1	0.2	1.0				
H	<i>Torilis arvensis</i>	25	0.1	0.2	1.0				
H	<i>Vicia sativa</i>	25	0.1	0.2	0.2				
H	<i>Silybum marianum</i>	25	0.1	0.2	0.2				
H	<i>Sherardia arvensis</i>	25	0.1	0.2	0.2				
NV	Moss	50	0.1	0.2	0.2				Y

***Platanus racemosa* / *Baccharis salicifolia* Association**

Common Name: California Sycamore / Mulefat Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Sycamore / Mulefat Association forms an open tree canopy with an open shrub understory. The dominant tree is *Platanus racemosa*, and *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Baccharis salicifolia*, *Brickellia californica*, *Toxicodendron diversilobum*, *Artemisia californica*, *Baccharis pilularis*, and *Heteromeles arbutifolia*, and commonly associated herbs include *Artemisia douglasiana*, *Brassica nigra*, *Bromus diandrus*, *Carex nudata*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Datisca glomerata*, *Dipsacus fullonum*, *Hoita macrostachya*, *Medicago polymorpha*, *Piptatherum miliaceum*, *Polypogon monspeliensis*, *Rumex crispus*, *Rumex salicifolius* var. *denticulatus*, and *Verbena lasiostachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	13.3	3 – 20	12.5	5 – 20
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	7.3	3 – 20	2.0	1 – 5
Herb	21.4	0 – 49	0.7	0 – 2

Local Environmental Description

Elevation: Mean 234 m, Range 160 – 302 m

Aspect: Flat (2), W (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (2), Channel Bed, Bench (1), Channel Bed, In-channel Bar (1)

Large Rock: Mean 9.5%, Range 0 – 25%

Small Rock: Mean 33.8%, Range 18 – 55%

Fines Cover: Mean 18.3%, Range 0 – 30%

Litter Cover: Mean 12.3%, Range 2 – 20%

Soil Texture (field assessed): Coarse sand (1), Medium silt (1), Sand (1)

Geology (field or map data): Franciscan melange (1), Gravelly alluvium (1), Sandstone and other sedimentary (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (2)

Site Impacts

This association has moderate non-native plant cover (average 32.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Dipsacus fullonum*, *Geranium dissectum*, *Piptatherum miliaceum*, *Polypogon monspeliensis*, *Rumex crispus*, *Torilis arvensis*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf et al. 1997, Sikes et al. 2023, Sproul et al. 2011, White 1994a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=2): SUNOL002, SUNOL036

Contra Costa County (n=0):

Santa Clara Co. (n=2): VAWA065, VAWA196

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	13.0	2.0	20.0	Y	Y		Y
T	<i>Umbellularia californica</i>	50	0.2	0.2	0.5				Y
T	<i>Quercus lobata</i>	25	0.8	3.0	3.0				
T	<i>Quercus agrifolia</i>	25	0.8	3.0	3.0				
T	<i>Arbutus menziesii</i>	25	0.1	0.5	0.5				
T	<i>Salix laevigata</i>	25	0.1	0.2	0.2				
S	<i>Baccharis salicifolia</i>	100	2.8	2.0	3.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	100	1.0	0.2	3.0	Y			Y
S	<i>Brickellia californica</i>	75	5.1	0.2	10.0	Y		Y	Y
S	<i>Heteromeles arbutifolia</i>	50	0.2	0.2	0.5				Y
S	<i>Baccharis pilularis</i>	50	0.2	0.2	0.5				Y
S	<i>Artemisia californica</i>	50	0.1	0.2	0.2				Y
S	<i>Frangula californica</i>	25	0.1	0.5	0.5				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				
S	<i>Salix exigua</i>	25	0.1	0.2	0.2				

Platanus racemosa / *Baccharis salicifolia* Association
Platanus racemosa – *Quercus agrifolia* Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Of
H	<i>Piptatherum miliaceum</i>	50	5.1	0.5	20.0				Y
H	<i>Brassica nigra</i>	50	5.1	0.2	20.0				Y
H	<i>Bromus diandrus</i>	50	3.6	0.5	14.0				Y
H	<i>Centaurea solstitialis</i>	50	0.9	0.5	3.0				Y
H	<i>Carex nudata</i>	50	0.8	0.2	3.0				Y
H	<i>Medicago polymorpha</i>	50	0.6	0.5	2.0				Y
H	<i>Artemisia douglasiana</i>	50	0.3	0.5	0.5				Y
H	<i>Polypogon monspeliensis</i>	50	0.3	0.5	0.5				Y
H	<i>Rumex crispus</i>	50	0.3	0.5	0.5				Y
H	<i>Dipsacus fullonum</i>	50	0.3	0.5	0.5				Y
H	<i>Verbena lasiostachys</i>	50	0.2	0.2	0.5				Y
H	<i>Datisca glomerata</i>	50	0.2	0.2	0.5				Y
H	<i>Hoita macrostachya</i>	50	0.2	0.2	0.5				Y
H	<i>Cynosurus echinatus</i>	50	0.2	0.2	0.5				Y
H	<i>Rumex salicifolius</i> var. <i>denticulatus</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	25	1.8	7.0	7.0				
H	<i>Acmispon americanus</i>	25	0.8	3.0	3.0				
H	<i>Trifolium hirtum</i>	25	0.5	2.0	2.0				
H	<i>Vicia sativa</i>	25	0.3	1.0	1.0				
H	<i>Geranium dissectum</i>	25	0.3	1.0	1.0				
H	<i>Torilis arvensis</i>	25	0.3	1.0	1.0				

***Platanus racemosa* / *Toxicodendron diversilobum* Association**

Common Name: California sycamore / Poison oak Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California sycamore / Poison oak Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Platanus racemosa*. Regenerating or shrubby trees that are often present include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Lolium perenne*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	12.5	10 – 15
Hardwood	30.5	10 – 79	12.5	5 – 20
Regenerating or Shrubby Tree	0.3	0 – 1	1.8	0 – 5
Shrub	10.0	1 – 38	0.9	0 – 2
Herb	17.5	4 – 38	0.5	0 – 1

Local Environmental Description

Elevation: Mean 184 m, Range 85 – 321 m

Aspect: Flat (3), E (1), N (1), NE (1), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degree

Macro Topography: Bottom (3), Channel Bed, Toe of Streambank (2)

Large Rock: Mean 3.5%, Range 0 – 10%

Small Rock: Mean 22.3%, Range 0 – 60%

Fines Cover: Mean 11.6%, Range 1 – 22%

Litter Cover: Mean 44.9%, Range 10 – 84%

Soil Texture (field assessed): Coarse, loamy sand (1), Loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Franciscan melange (1), Gravelly alluvium (1), Metamorphic (1), Mixed alluvium (1), Sandstone and other sedimentary (1), Sedimentary (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (1), Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (3)

Site Impacts

This association has moderate non-native plant cover (average 21.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Foeniculum vulgare*, *Geranium dissectum*, *Geranium molle*, *Lolium perenne*, *Polypogon monspeliensis*, *Rumex crispus*, *Torilis arvensis*, and *Trifolium hirtum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Potter 2005, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=8; Alameda County (n=5): ALCC037, ALCC230, ALCCREC102, SUNOL008, SYCAM082

Contra Costa County (n=0):

Santa Clara Co. (n=3): SYCAM040, VAWA069, VAWA209

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	100	29.1	5.0	79.0	Y	Y		Y
T	<i>Umbellularia californica</i>	38	0.9	0.2	4.0				
T	<i>Quercus agrifolia</i>	25	0.4	1.0	2.0				
R	<i>Umbellularia californica</i> *	50	0.1	0.2	0.5				Y
R	<i>Quercus agrifolia</i> *	38	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	3.1	0.5	10.0	Y		Y	Y
S	<i>Artemisia californica</i>	38	0.9	1.0	5.0				
S	<i>Rubus ursinus</i>	38	0.4	0.2	3.0				
S	<i>Symphoricarpos albus</i>	25	1.5	3.0	9.0				
S	<i>Brickellia californica</i>	25	0.6	2.0	3.0				
S	<i>Baccharis salicifolia</i>	25	0.3	0.2	2.0				
S	<i>Baccharis pilularis</i>	25	0.2	0.2	1.0				
S	<i>Frangula californica</i>	25	0.1	0.2	0.5				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	63	6.9	1.0	33.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.3	0.2	1.0				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.5				Y
H	<i>Lolium perenne</i>	50	0.1	0.2	0.5				Y
H	<i>Rumex salicifolius</i> var. <i>denticulatus</i>	38	0.5	0.2	3.0				
H	<i>Polypogon monspeliensis</i>	38	0.5	0.2	3.0				
H	<i>Asclepias fascicularis</i>	38	0.1	0.2	0.5				
H	<i>Foeniculum vulgare</i>	38	0.1	0.2	0.2				
H	<i>Carex nudata</i>	25	2.5	10.0	10.0				
H	<i>Avena barbata</i>	25	0.6	1.0	4.0				
H	<i>Artemisia douglasiana</i>	25	0.4	0.1	3.0				
H	<i>Cynosurus echinatus</i>	25	0.2	0.2	1.0				
H	<i>Holozonia filipes</i>	25	0.1	0.5	0.5				
H	<i>Acmispon americanus</i>	25	0.1	0.2	0.5				
H	<i>Cyperus eragrostis</i>	25	0.1	0.2	0.5				
H	<i>Rumex crispus</i>	25	0.1	0.1	0.5				
H	<i>Juncus xiphioides</i>	25	0.1	0.1	0.5				
H	<i>Bromus rubens</i>	25	0.1	0.2	0.2				
H	<i>Geranium dissectum</i>	25	0.1	0.2	0.2				
H	<i>Geranium molle</i>	25	0.1	0.2	0.2				
H	<i>Melilotus indicus</i>	25	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	25	0.1	0.2	0.2				
H	<i>Avena fatua</i>	25	0.1	0.2	0.2				
NV	Moss	25	0.1	0.2	0.2				

***Quercus agrifolia* / *Salix lasiolepis* Association**

Common Name: Coast Live Oak / Arroyo Willow Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The Coast Live Oak / Arroyo Willow Association forms an intermittent tree canopy with an open shrub understory in the single sample available. The dominant tree is *Quercus agrifolia*, and *Aesculus californica* and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Symphoricarpos albus*, *Baccharis pilularis*, *Heteromeles arbutifolia*, *Ribes* sp., *Rosa californica*, *Rubus ursinus*, *Salix lasiolepis*, *Sambucus nigra*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Claytonia perfoliata*, *Elymus triticoides*, *Juncus* sp., *Lolium perenne*, *Marah fabaceus*, *Melica* sp., *Pentagramma triangularis*, *Ranunculus californicus*, *Sanicula crassicaulis*, *Scrophularia californica*, *Stachys ajugoides*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	45.0	45 – 45	8.0	2 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	4.0	4 – 4	1.5	1 – 2
Herb	20.0	20 – 20	0.3	0 – 0.5

Local Environmental Description

Elevation: 54 m

Aspect: Variable (1)

Slope: 28 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 40%

Litter Cover: 55%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has very low non-native plant cover (average 0.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lolium perenne*.

Classification Comments

Riparian coast live oak is placed in this association even if willow is absent or at low cover.

References: AECOM 2013, Buck-Diaz et al. 2021, Evens and San 2005, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Reyes et al. 2019, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): EBAY0023

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	38.2	38.2	38.2	Y	Y		Y
T	<i>Aesculus californica</i>	100	7.0	7.0	7.0	Y			Y
T	<i>Umbellularia californica</i>	100	0.4	0.4	0.4	Y			Y
S	<i>Symphoricarpos albus</i>	100	2.0	2.0	2.0	Y		Y	Y
S	<i>Baccharis pilularis</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Rosa californica</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Ribes</i> sp.	100	0.2	0.2	0.2	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Rubus ursinus</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Salix lasiolepis</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Sambucus nigra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Claytonia perfoliata</i>	100	3.0	3.0	3.0	Y	Y		Y
H	<i>Stachys ajugoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Juncus</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Marah fabaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Scrophularia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Ranunculus californicus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Urtica dioica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Elymus triticoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Sanicula crassicaulis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pentagramma triangularis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melica</i> sp.	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	1.0	1.0	1.0	Y	Y		Y

***Umbellularia californica* – *Platanus racemosa* Association**

Common Name: California Bay – California Sycamore Woodland

Alliance: *Platanus racemosa* – *Quercus agrifolia* Woodland Alliance

Local Vegetation Description

The California Bay –Sycamore Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Umbellularia californica*, and *Platanus racemosa*, *Quercus agrifolia*, and *Quercus lobata* are characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, *Heteromeles arbutifolia*, *Rubus ursinus*, and *Symphoricarpos albus*, and commonly associated herbs include *Torilis arvensis*, *Carduus pycnocephalus*, and *Elymus glaucus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	51.7	20 – 80	12.7	2 – 20
Regenerating or Shrubby Tree	0.2	0 – 1	3.5	2 – 5
Shrub	20.8	1 – 38	1.3	0.5 – 2
Herb	12.4	3 – 35	0.4	0 – 1

Local Environmental Description

Elevation: Mean 270 m, Range 96 – 525 m

Aspect: Flat (2), NW (1), S (1), SW (1)

Slope: Mean 10 degrees, Range 0 – 29 degrees

Macro Topography: Bottom (3), Channel Bed, High-flow bank/slope (1), Floodplain (1), High-flow bank/slope (1)

Large Rock: Mean 16.4%, Range 0 – 60%

Small Rock: Mean 12.1%, Range 0 – 25%

Fines Cover: Mean 22.3%, Range 0 – 78%

Litter Cover: Mean 34.2%, Range 10 – 65%

Soil Texture (field assessed): Loam (3), Medium loam (1), Moderately coarse, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Sedimentary (2), Clayey alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (3), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 3.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf and Evens 2006, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC082, SUNOL005

Contra Costa County (n=0):

Santa Clara Co. (n=4): CDLO0026, VAWA080, VAWA156, VAWA349

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	26.8	8.0	60.0	Y		Y	Y
T	<i>Platanus racemosa</i>	100	10.8	3.0	20.0	Y			Y
T	<i>Quercus agrifolia</i>	83	7.7	0.2	35.0	Y			Y
T	<i>Quercus lobata</i>	50	1.1	0.5	5.0				Y
T	<i>Acer macrophyllum</i>	33	4.7	10.0	18.0				
S	<i>Toxicodendron diversilobum</i>	83	13.0	0.2	37.5	Y		Y	Y
S	<i>Symphoricarpos albus</i>	67	2.7	1.0	10.0				Y
S	<i>Rubus ursinus</i>	67	0.7	0.2	3.0				Y
S	<i>Heteromeles arbutifolia</i>	50	1.0	0.2	3.0				Y
S	<i>Diplacus aurantiacus</i>	33	0.1	0.2	0.5				
H	<i>Torilis arvensis</i>	83	0.9	0.2	3.0	Y			Y
H	<i>Carduus pycnocephalus</i>	67	0.2	0.2	0.5				Y
H	<i>Elymus glaucus</i>	50	0.3	0.5	1.0				Y
H	<i>Cynosurus echinatus</i>	33	0.6	0.5	3.0				
H	<i>Artemisia douglasiana</i>	33	0.2	0.5	0.5				
H	<i>Asclepias fascicularis</i>	33	0.2	0.5	0.5				
H	<i>Dryopteris arguta</i>	33	0.1	0.2	0.5				

***Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance**



Common Name: Fremont cottonwood forest and woodland

NVC Alliance Code: A3803. *Populus fremontii* - *Fraxinus velutina* - *Salix gooddingii*
Riparian Forest & Woodland Alliance

Statewide Description

Populus fremontii is dominant or co-dominant in the tree canopy with *Acer negundo*, *Baccharis sergiloides*, *Fraxinus latifolia*, *Fraxinus velutina*, *Juglans hindsii*, *Juglans hindsii* × *regia*, *Platanus racemosa*, *Quercus agrifolia*, *Salix exigua*, *Salix gooddingii*, *Salix laevigata*, *Salix lasiolepis*, *Salix lucida* ssp. *lasiandra* and *Salix lutea*.

Populus fremontii is a common plant at lower elevations, but most stands have endured negative impacts from reduced water availability (through groundwater pumping), livestock use, hydrologic alterations and irrigation schemes, competition from non-native plants, direct habitat destruction, and other human activities.

Populus fremontii may dominate stands or mix with other trees in riparian settings. Some uncertainty exists about the proper classification of mixed stands of *P. fremontii*

and *Salix gooddingii*. Vaghti (2003) places these in the *P. fremontii* alliance; Hickson and Keeler-Wolf (2007), in a larger survey from the Sacramento Delta, suggest they are better placed in the *Salix gooddingii* alliance. Furthermore, uncertainty exists about mixed stands of *P. fremontii* and *Platanus racemosa*. Klein and Evens (2005) and Evens and San (2005) place co-dominant stands in a mixed alliance, but we place them in the *Platanus racemosa* alliance. *Populus fremontii* also occurs in mixed stands with additional co-dominant species in southern California, including *S. laevigata* and other willows (*S. lucida* and *S. lasiolepis*), *Quercus agrifolia*, and *Juglans californica* (Klein and Evens 2005, Stillwater Sciences and URS 2007).

Local Vegetation Description

The Fremont cottonwood forest and woodland Alliance forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Populus fremontii*, and *Salix laevigata* is characteristic or often present. Commonly associated shrubs include *Rubus ursinus* and *Salix lasiolepis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	33.9	5 – 62	20.5	2 – 35
Regenerating or Shrubby Tree	2.4	0 – 10	8.2	0.5 – 15
Shrub	22.0	0 – 62	5.2	0.5 – 15
Herb	9.8	0 – 28	0.6	0 – 1

Local Membership Rule

Populus fremontii > 50% relative cover, or > 30% relative cover with *Acer negundo*, *Juglans*, and/or *Salix*, sometimes with *Populus* having as little as 5% absolute cover in riparian settings with a diverse mix of riparian species.

Local Environmental Description

Elevation: Mean 108 m, Range 7 – 230 m

Aspect: NE (3), Flat (1), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (5)

Large Rock: Mean 3.6%, Range 0 – 15%

Small Rock: Mean 13.8%, Range 3 – 27%

Fines Cover: Mean 24.2%, Range 5 – 73%

Litter Cover: Mean 55.4%, Range 22 – 82%

Soil Texture (field assessed): Coarse, loamy sand (3), Medium to very fine, loamy sand (1), Coarse sand (1)

Geology (field or map data): Mixed alluvium (4), Alluvium (1), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1)

Alameda County Subsections: Eastern Hills (1), Western Diablo Range (1), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1), Eastern Hills (1), Suisun Hills and Valleys (1), Westside Alluvial Fans and Terraces (1), East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has moderate non-native plant cover (average 21.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Hedera helix*, *Piptatherum miliaceum*, *Polypogon monspeliensis*, and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Populus fremontii

Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* alliance

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia*

Populus fremontii / *Baccharis salicifolia*

Classification Comments

None.

References: Buck-Diaz and Evens 2011a, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens and San 2005, Kittel et al. 2012, Klein and Evens 2005, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences and URS 2007, Vaghti 2003

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=8; Alameda County (n=3): ALCC235, ALCC256, SVRA_CA003

Contra Costa County (n=5): ALCC126, ALCC245, ALCC247, M1007291120, POA1007291524

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Populus fremontii</i>	100	22.3	3.0	60.0	Y	Y		Y
T	<i>Salix laevigata</i>	63	4.5	3.0	14.0				Y
T	<i>Juglans hindsii</i>	38	0.5	0.2	2.0				
T	<i>Quercus lobata</i>	25	2.1	2.0	15.0				
T	<i>Platanus racemosa</i>	25	1.4	1.0	10.0				
T	<i>Quercus agrifolia</i>	25	0.8	3.0	3.0				
R	<i>Fraxinus latifolia</i>*	38	0.1	0.2	0.2				
R	<i>Alnus rhombifolia</i>	25	1.0	4.0	4.0				
R	<i>Populus fremontii</i>*	25	0.7	0.2	5.0				
R	<i>Quercus agrifolia</i> *	25	0.5	0.2	4.0				
S	<i>Salix lasiolepis</i>	50	8.5	10.0	32.0				Y
S	<i>Rubus ursinus</i>	50	2.0	1.0	9.0				Y
S	<i>Hedera helix</i>	38	9.1	12.0	42.0				
S	<i>Toxicodendron diversilobum</i>	38	2.6	2.0	17.0				
S	<i>Rubus armeniacus</i>	25	1.8	5.0	9.0				
S	<i>Sambucus nigra</i>	25	0.1	0.2	0.2				
H	<i>Cyperus eragrostis</i>	38	0.3	0.2	1.0				
H	<i>Piptatherum miliaceum</i>	25	1.8	4.0	10.0				
H	<i>Bromus diandrus</i>	25	1.3	3.0	7.0				
H	<i>Urtica dioica</i>	25	0.3	0.2	2.0				
H	<i>Scirpus microcarpus</i>	25	0.3	0.2	2.0				
H	<i>Polypogon monspeliensis</i>	25	0.2	0.2	1.0				
H	<i>Baccharis glutinosa</i>	25	0.1	0.2	0.2				
H	<i>Veronica americana</i>	25	0.1	0.2	0.2				
H	<i>Grindelia camporum</i>	25	0.0	0.1	0.2				

***Populus fremontii* Association**

Common Name: Fremont Cottonwood Woodland

Alliance: *Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

Local Vegetation Description

The Fremont Cottonwood Association forms an open tree canopy with a sparse shrub understory in the single sample available. The dominant tree is *Populus fremontii*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus agrifolia*. Commonly associated shrubs include *Heteromeles arbutifolia*, *Nicotiana glauca*, and *Sambucus nigra*, and commonly associated herbs include *Hordeum marinum*, *Artemisia douglasiana*, *Asclepias fascicularis*, *Centaurea solstitialis*, *Chenopodium berlandieri* var. *sinuatum*, *Datura* sp., *Distichlis spicata*, *Foeniculum vulgare*, *Grindelia camporum*, *Hordeum marinum*, *Juncus patens*, *Lolium perenne*, *Rumex conglomeratus*, *Xanthium spinosum*, and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	19.0	19 – 19	3.5	2 – 5
Regenerating or Shrubby Tree	0.2	0.2 – 0.2	0.8	0.5 – 1
Shrub	0.2	0.2 – 0.2	0.8	0.5 – 1
Herb	10.0	10 – 10	0.3	0 – 0.5

Local Environmental Description

Elevation: 225 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 3%

Fines Cover: 73%

Litter Cover: 22%

Soil Texture (field assessed): Medium to very fine, loamy sand (1)

Geology (field or map data): Shale and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 22.5%) relative to native

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

cover. Non-native species that occur with highest frequency and abundance include *Centaurea solstitialis*, *Foeniculum vulgare*, *Hordeum marinum*, *Lolium perenne*, *Nicotiana glauca*, and *Rumex conglomeratus*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Vaghti 2003

Global Rarity Rank: G2Q **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC126

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Populus fremontii</i>	100	16.0	16.0	16.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	3.0	3.0	3.0	Y			Y
R	<i>Quercus agrifolia</i> *	100	0.2	0.2	0.2	Y	Y		Y
S	<i>Nicotiana glauca</i>	100	0.2	0.2	0.2	Y		Y	Y
S	<i>Heteromeles arbutifolia</i>	100	0.2	0.2	0.2	Y		Y	Y
S	<i>Sambucus nigra</i>	100	0.2	0.2	0.2	Y		Y	Y
H	<i>Hordeum marinum</i>	100	6.0	6.0	6.0	Y	Y		Y
H	<i>Distichlis spicata</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Foeniculum vulgare</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Chenopodium berlandieri</i> var. <i>sinuatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Grindelia camporum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Rumex conglomeratus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Juncus patens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Xanthium strumarium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Datura</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Artemisia douglasiana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Asclepias fascicularis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Centaurea solstitialis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Xanthium spinosum</i>	100	0.1	0.1	0.1	Y			Y

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

***Populus fremontii* – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association**

Common Name: Fremont Cottonwood – Red Willow / Arroyo Willow – Mulefat Woodland

Alliance: *Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

Local Vegetation Description

The Fremont Cottonwood – Red Willow / Arroyo Willow – Mulefat Association forms an intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Populus fremontii*, and *Salix laevigata* is characteristic or often present. Commonly associated shrubs include *Salix lasiolepis* and *Rubus ursinus*, and commonly associated herbs include *Polypogon monspeliensis*.

Lifeform	Cover (%)		Height (m)	
	Mean	Range	Mean	Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	49.6	38 – 62	27.5	10 – 50
Regenerating or Shrubby Tree	2.7	0 – 10	10.0	5 – 15
Shrub	25.8	2 – 62	4.4	0.5 – 15
Herb	12.4	4 – 28	0.8	0 – 2

Local Environmental Description

Elevation: Mean 87 m, Range 4 – 162 m

Aspect: NE (4), NW (1), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degree

Macro Topography: Bottom (5), Floodplain (1)

Large Rock: Mean 2.6%, Range 0 – 15%

Small Rock: Mean 11.3%, Range 0 – 27%

Fines Cover: Mean 25.7%, Range 5 – 97%

Litter Cover: Mean 57.3%, Range 0 – 82%

Soil Texture (field assessed): Coarse, loamy sand (3), Coarse sand (1), Loam (1)

Geology (field or map data): Mixed alluvium (4), Sedimentary (2), Alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1)

Other Subsections: Eastern Hills (2), East Bay Terraces and Alluvium (1)

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

Site Impacts

This association has low non-native plant cover (average 16.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus tenuiflorus*, *Hedera helix*, *Lepidium latifolium*, *Piptatherum miliaceum*, *Polypogon monspeliensis*, *Rubus armeniacus*, and *Silybum marianum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein and Evens 2005, Sikes et al. 2023, Stillwater Sciences and URS 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): ALCC235, ALCC256

Contra Costa County (n=2): ALCC245, ALCC247

San Joaquin Co. (n=2): LLNL038, LLNL084

Santa Clara Co. (n=1): VAWA405

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Populus fremontii</i>	100	33.5	12.0	60.0	Y	Y		Y
T	<i>Salix laevigata</i>	71	10.3	6.0	25.0				Y
T	<i>Aesculus californica</i>	43	1.7	1.0	10.0				
T	<i>Platanus racemosa</i>	29	1.6	1.0	10.0				
T	<i>Juglans hindsii</i>	29	0.3	0.2	2.0				
R	<i>Fraxinus latifolia</i>	43	0.1	0.2	0.2				
R	<i>Alnus rhombifolia</i>	29	1.1	4.0	4.0				
R	<i>Populus fremontii</i>*	29	0.7	0.2	5.0				
R	<i>Quercus agrifolia</i>	29	0.6	0.5	4.0				
R	<i>Juglans hindsii</i> *	29	0.1	0.2	0.5				
S	<i>Salix lasiolepis</i>	71	11.1	10.0	32.0				Y
S	<i>Rubus ursinus</i>	57	2.3	1.0	9.0				Y
S	<i>Hedera helix</i>	43	10.4	12.0	42.0				
S	<i>Toxicodendron diversilobum</i>	43	3.0	2.0	17.0				
S	<i>Rubus armeniacus</i>	29	2.0	5.0	9.0				
S	<i>Baccharis salicifolia</i>	29	0.2	0.2	1.0				
S	<i>Artemisia californica</i>	29	0.2	0.2	1.0				
S	<i>Sambucus nigra</i>	29	0.2	0.2	1.0				
H	<i>Polypogon monspeliensis</i>	57	0.2	0.2	1.0				Y
H	<i>Artemisia douglasiana</i>	43	3.0	0.2	20.0				
H	<i>Piptatherum miliaceum</i>	43	2.1	0.5	10.0				
H	<i>Bromus diandrus</i>	43	1.5	0.2	7.0				
H	<i>Urtica dioica</i>	43	0.3	0.2	2.0				
H	<i>Cyperus eragrostis</i>	43	0.3	0.2	1.0				
H	<i>Avena barbata</i>	29	0.6	0.2	4.0				
H	<i>Lepidium latifolium</i>	29	0.4	1.0	2.0				
H	<i>Carduus tenuiflorus</i>	29	0.3	0.2	2.0				
H	<i>Scirpus microcarpus</i>	29	0.3	0.2	2.0				
H	<i>Veronica americana</i>	29	0.1	0.2	0.2				
H	<i>Baccharis glutinosa</i>	29	0.1	0.2	0.2				
H	<i>Silybum marianum</i>	29	0.1	0.2	0.2				
H	<i>Juncus xiphioides</i>	29	0.1	0.2	0.2				

Populus fremontii – *Salix laevigata* / *Salix lasiolepis* – *Baccharis salicifolia* Association
Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

***Populus fremontii* / *Baccharis salicifolia* Association**

Common Name: Fremont Cottonwood / Mulefat Woodland

Alliance: *Populus fremontii* – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

Local Vegetation Description

The Fremont Cottonwood / Mulefat Association forms an open tree canopy with an open shrub understory. The dominant tree is *Populus fremontii*, and *Quercus lobata* is characteristic or often present. Regenerating or shrubby trees that are often present include *Populus fremontii*. Commonly associated shrubs include *Baccharis salicifolia*, *Artemisia californica*, *Baccharis pilularis*, *Nicotiana glauca*, and *Salix lasiolepis*, and commonly associated herbs include *Dittrichia graveolens*, *Grindelia camporum*, and *Heliotropium curassavicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	17.5	5 – 30	12.5	10 – 15
Regenerating or Shrubby Tree	1.0	0 – 2	1.5	1 – 2
Shrub	19.0	8 – 30	3.5	2 – 5
Herb	3.5	2 – 5	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 223 m, Range 216 – 230 m

Aspect: SW (1)

Slope: 2 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1)

Large Rock: 1%

Small Rock: 13%

Fines Cover: 55%

Litter Cover: 30%

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sandstone, shale, and gravel deposits (2)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: None

Other Subsections: Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 4.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Carduus pycnocephalus*, *Dittrichia graveolens*, *Hirschfeldia*

Populus fremontii / *Baccharis salicifolia* Association

Populus fremontii – *Fraxinus velutina* – *Salix gooddingii* Forest & Woodland Alliance

incana, *Koeleria gerardii*, *Lepidium latifolium*, *Marrubium vulgare*, *Nicotiana glauca*, *Polypogon monspeliensis*, and *Sonchus asper*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011a, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens and San 2005, Kittel et al. 2012, Klein and Evens 2005, Sikes et al. 2021, Sproul et al. 2011, Stillwater Sciences and URS 2007

Global Rarity Rank: G2 **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; Alameda County (n=1): SVRA_CA003

Contra Costa County (n=0):

San Joaquin Co. (n=1): LLNL004

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Populus fremontii</i>	100	15.5	5.0	26.0	Y	Y		Y
T	<i>Quercus lobata</i>	50	1.0	2.0	2.0				Y
R	<i>Populus fremontii</i>*	50	1.0	2.0	2.0				Y
S	<i>Baccharis salicifolia</i>	100	18.5	7.0	30.0	Y	Y		Y
S	<i>Salix lasiolepis</i>	50	1.0	2.0	2.0				Y
S	<i>Artemisia californica</i>	50	0.5	1.0	1.0				Y
S	<i>Nicotiana glauca</i>	50	0.2	0.4	0.4				Y
S	<i>Baccharis pilularis</i>	50	0.1	0.2	0.2				Y
H	<i>Dittrichia graveolens</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Heliotropium curassavicum</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Grindelia camporum</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Elymus triticoides</i>	50	0.5	1.0	1.0				Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Melilotus indicus</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y
H	<i>Brassica nigra</i>	50	0.1	0.2	0.2				Y
H	<i>Koeleria gerardii</i>	50	0.1	0.2	0.2				Y
H	<i>Hirschfeldia incana</i>	50	0.1	0.2	0.2				Y
H	<i>Marrubium vulgare</i>	50	0.1	0.2	0.2				Y
H	<i>Lepidium latifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus rubens</i>	50	0.1	0.2	0.2				Y
H	<i>Sonchus asper</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.1	0.1				Y
H	<i>Epilobium canum</i>	50	0.1	0.1	0.1				Y
H	<i>Phyla nodiflora</i>	50	0.1	0.1	0.1				Y

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)
Forest & Woodland Alliance



Common Name: Mixed oak forest and woodland

NVC Alliance Code: A0371. *Quercus agrifolia* - *Quercus douglasii* - *Quercus kelloggii*
Coastal Forest Alliance

Statewide Description

Quercus agrifolia, *Quercus douglasii*, *Quercus garryana*, *Quercus kelloggii*, *Quercus lobata* and/or *Quercus wislizeni* are co-dominant in the tree canopy with *Aesculus californica*, *Arbutus menziesii*, *Pinus sabiniana*, *Pseudotsuga menziesii*, and *Umbellularia californica*.

Allen et al. (1989, 1991) recognized a mixed oak series with 10 subseries; they based the subseries on the species composition of the woody plants since they lacked information on the herbaceous species. Their definition was followed in the 1995 edition of the *Manual of California Vegetation* (MCV) (Sawyer et al. 1995) and the subseries were listed as associations.

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland
Alliance

A careful study of the key (Allen et al. 1989, 1991) permitted some of the subseries to be placed in other alliances if the definitions allow the characteristic oak to be co-dominant. For example, “valley oak and blue oak are co-dominant; coast live oak is present” becomes the *Quercus lobata* – *Quercus douglasii* Association in the *Quercus lobata* Alliance. The *Quercus wislizeni* – *Quercus douglasii* – *Pinus sabiniana* Association was placed in the *Quercus wislizeni* Alliance because the third tree is not an oak. However, some subseries remains within this alliance, specifically when three or more oaks co-dominate.

Local Vegetation Description

The Mixed oak forest and woodland Alliance forms an open to intermittent tree canopy with a sparse to open shrub understory. *Quercus agrifolia*, *Quercus lobata*, *Aesculus californica*, *Quercus douglasii*, *Quercus kelloggii*, and/or *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Diplacus aurantiacus*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Bromus rubens*, *Cynosurus echinatus*, *Lolium perenne*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	3.5	2 – 5
Hardwood	36.4	21 – 54	14.4	5 – 20
Regenerating or Shrubby Tree	1.3	0 – 5	3.5	1 – 10
Shrub	3.0	0 – 7	2.7	0.5 – 15
Herb	33.1	17 – 70	0.5	0 – 1

Local Membership Rule

Quercus agrifolia, *Quercus douglasii*, *Quercus lobata*, and/or other oaks share the tree canopy at significant cover. Typically, three or more oak species co-dominate.

Local Environmental Description

Elevation: Mean 391 m, Range 152 – 655 m

Aspect: NW (5), NE (2), SE (1)

Slope: Mean 21 degrees, Range 5 – 33 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.5%, Range 0 – 2%

Small Rock: Mean 5.4%, Range 0 – 20%

Fines Cover: Mean 45.9%, Range 10 – 92%

Litter Cover: Mean 39.4%, Range 4 – 80%

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Soil Texture (field assessed): Moderately fine silty clay loam (2), Moderately fine clay loam (2), Moderately fine sandy clay loam (1), Moderately coarse, sandy loam (1), Medium silt loam (1), Loam (1)

Geology (field or map data): Sedimentary (4), Franciscan melange (1), Sandstone and other sedimentary (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (1)

Site Impacts

This alliance has moderate non-native plant cover (average 37.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Hordeum murinum*, *Lolium perenne*, *Stellaria media*, *Torilis arvensis*, *Trifolium hirtum*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Mixed oak – *Aesculus californica* / grass

Mixed oak – *Quercus agrifolia* / *Toxicodendron diversilobum*

Mixed oak – *Quercus kelloggii* / grass

Classification Comments

None.

References: Allen et al. 1989, Allen et al. 1991, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=8; Alameda County (n=2): ALCC083, AW013

Contra Costa County (n=6): ALCC024, ALCC026, ALCC237, JOMU040, SPCCA-019, SPCCA-058

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	14.8	4.0	22.0	Y		Y	Y
T	<i>Quercus lobata</i>	75	4.3	0.2	15.0	Y			Y
T	<i>Quercus kelloggii</i>	63	8.0	3.0	26.0				Y
T	<i>Quercus douglasii</i>	63	5.4	1.0	20.0				Y
T	<i>Aesculus californica</i>	63	3.3	0.2	20.0				Y
T	<i>Umbellularia californica</i>	50	3.3	5.0	10.0				Y

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus chrysolepis</i>	25	0.7	0.2	5.0				
R	<i>Umbellularia californica</i> *	63	0.9	0.1	3.2				Y
R	<i>Quercus agrifolia</i>*	38	0.4	0.2	2.0				
S	<i>Toxicodendron diversilobum</i>	75	1.4	0.2	3.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	50	0.9	0.2	5.0				Y
S	<i>Lonicera hispidula</i>	38	0.4	0.1	2.0				
H	<i>Bromus diandrus</i>	100	12.3	3.0	40.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	88	3.4	0.2	9.0	Y			Y
H	<i>Cynosurus echinatus</i>	50	1.8	3.0	4.0				Y
H	<i>Torilis arvensis</i>	50	0.9	1.0	2.0				Y
H	<i>Bromus rubens</i>	50	0.7	0.2	3.0				Y
H	<i>Lolium perenne</i>	50	0.3	0.2	1.0				Y
H	<i>Avena fatua</i>	38	9.0	8.0	45.0				
H	<i>Avena barbata</i>	38	0.6	1.0	3.0				
H	<i>Sanicula crassicaulis</i>	38	0.3	0.2	2.0				
H	<i>Achillea millefolium</i>	38	0.1	0.2	0.2				
H	<i>Collinsia sparsiflora</i>	25	0.9	0.2	7.0				
H	<i>Vicia sativa</i>	25	0.4	0.2	3.0				
H	<i>Elymus glaucus</i>	25	0.4	1.0	2.0				
H	<i>Melica torreyana</i>	25	0.3	0.2	2.0				
H	<i>Stellaria media</i>	25	0.3	0.2	2.0				
H	<i>Galium aparine</i>	25	0.3	0.2	2.0				
H	<i>Hordeum murinum</i>	25	0.3	1.0	1.0				
H	<i>Melica californica</i>	25	0.0	0.1	0.2				
H	<i>Chlorogalum pomeridianum</i>	25	0.0	0.1	0.2				
H	<i>Trifolium hirtum</i>	25	0.0	0.1	0.2				
NV	Lichen	25	0.1	0.2	0.2				
NV	Moss	25	0.1	0.2	0.2				

Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Mixed oak – *Aesculus californica* / grass Association

Common Name: Mixed Oak – California Buckeye / Grass Woodland

Alliance: *Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)* Forest & Woodland Alliance

Local Vegetation Description

The Mixed Oak – California Buckeye / Grass Association forms an open to intermittent tree canopy with a sparse shrub understory. The tree canopy is composed of *Quercus douglasii*, *Aesculus californica*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus lobata*, and/or *Umbellularia californica*. Regenerating or shrubby trees that are often present include *Pinus sabiniana*, *Quercus douglasii*, *Quercus lobata*, and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Vitis californica*, and commonly associated herbs include *Avena fatua*, *Bromus diandrus*, *Bromus rubens*, *Carduus pycnocephalus*, *Collinsia sparsiflora*, *Achillea millefolium*, *Chlorogalum pomeridianum*, *Clarkia unguiculata*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, *Melica californica*, *Sanicula crassicaulis*, *Trifolium hirtum*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	3.5	2 – 5
Hardwood	28.0	21 – 35	12.5	10 – 15
Regenerating or Shrubby Tree	0.1	0 – 0.2	1.5	1 – 2
Shrub	1.0	1 – 1	6.6	0.5 – 15
Herb	26.0	19 – 33	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 451 m, Range 247 – 655 m

Aspect: NW (1), SE (1)

Slope: Mean 11 degrees, Range 7 – 15 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 1.7%, Range 1 – 2%

Small Rock: Mean 13.6%, Range 7 – 20%

Fines Cover: Mean 64.5%, Range 50 – 79%

Litter Cover: Mean 17.5%, Range 10 – 25%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Mixed oak – *Aesculus californica* / grass Association
Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Site Impacts

This association has moderate non-native plant cover (average 40.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, *Trifolium hirtum*, and *Vulpia myuros*.

Classification Comments

None.

References: Allen et al. 1989, Allen et al. 1991

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): SPCCA-019, SPCCA-058

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	11.0	2.0	20.0	Y			Y
T	<i>Quercus douglasii</i>	100	8.5	5.0	12.0	Y		Y	Y
T	<i>Quercus agrifolia</i>	100	4.5	4.0	5.0	Y			Y
T	<i>Quercus chrysolepis</i>	50	2.5	5.0	5.0				Y
T	<i>Umbellularia californica</i>	50	2.5	5.0	5.0				Y
T	<i>Quercus lobata</i>	50	1.5	3.0	3.0				Y
T	<i>Pinus sabiniana</i>	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i> *	50	0.2	0.4	0.4				Y
R	<i>Quercus douglasii</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus lobata</i> *	50	0.1	0.1	0.1				Y
R	<i>Umbellularia californica</i> *	50	0.1	0.1	0.1				Y
S	<i>Toxicodendron diversilobum</i>	50	0.5	1.0	1.0				Y
S	<i>Vitis californica</i>	50	0.5	1.0	1.0				Y
H	<i>Avena fatua</i>	100	13.5	8.0	19.0	Y		Y	Y
H	<i>Bromus diandrus</i>	100	5.0	3.0	7.0	Y			Y
H	<i>Collinsia sparsiflora</i>	100	3.6	0.2	7.0	Y			Y
H	<i>Bromus rubens</i>	100	1.6	0.2	3.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Hordeum marinum</i>	50	1.5	3.0	3.0				Y
H	<i>Lolium perenne</i>	50	0.5	1.0	1.0				Y
H	<i>Hordeum murinum</i>	50	0.5	1.0	1.0				Y
H	<i>Trifolium hirtum</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia unguiculata</i>	50	0.1	0.2	0.2				Y
H	<i>Melica californica</i>	50	0.1	0.1	0.1				Y
NV	Lichen	50	0.1	0.2	0.2				Y

Mixed oak – *Aesculus californica* / grass Association
Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Mixed oak – *Quercus agrifolia* / *Toxicodendron diversilobum* Association

Common Name: Mixed Oak – Coast Live Oak / Poison Oak Woodland

Alliance: *Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)* Forest & Woodland Alliance

Local Vegetation Description

The Mixed Oak – Coast Live Oak / Poison Oak Association forms an intermittent to continuous tree canopy with a sparse to intermittent shrub understory. *Quercus agrifolia*, *Quercus kelloggii*, *Quercus lobata*, and/or *Umbellularia californica* make up the tree layer. Commonly associated shrubs include *Toxicodendron diversilobum*, *Diplacus aurantiacus*, and *Heteromeles arbutifolia*, and commonly associated herbs include *Bromus diandrus*, *Cynosurus echinatus*, and *Elymus glaucus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.4	0 – 3	no data	no data
Hardwood	47.9	35 – 63	14.2	5 – 20
Regenerating or Shrubby Tree	1.9	0 – 10	4.2	1 – 10
Shrub	22.5	1 – 63	1.5	0 – 5
Herb	35.8	10 – 70	0.5	0 – 1

Local Environmental Description

Elevation: Mean 476 m, Range 152 – 622 m

Aspect: NW (5), N (1), NE (1)

Slope: Mean 21 degrees, Range 5 – 33 degrees

Macro Topography: Middle 1/3 of slope (2), Lower 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.1%, Range 0 – 1%

Small Rock: Mean 6.1%, Range 0 – 29%

Fines Cover: Mean 19.7%, Range 0 – 54%

Litter Cover: Mean 37.3%, Range 0 – 71%

Soil Texture (field assessed): Loam (2), Clay (1), Medium to very fine, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Fremont - Livermore Hills and Valleys (2), Western Diablo Range (2)

Site Impacts

This association has moderate non-native plant cover (average 21.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen et al. 1989, Allen et al. 1991, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=7; Alameda County (n=2): ALCC083, AW013

Contra Costa County (n=1): JOMU040

Santa Clara Co. (n=4): SCRUZ551, T0823210446, VAWA079, VAWA158

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	15.9	3.0	20.0	Y		Y	Y
T	<i>Quercus kelloggii</i>	86	13.5	10.0	37.5	Y			Y
T	<i>Quercus lobata</i>	86	8.0	3.0	20.0	Y			Y
T	<i>Umbellularia californica</i>	71	8.6	0.2	20.0				Y
T	<i>Aesculus californica</i>	57	0.4	0.2	2.0				Y
T	<i>Quercus douglasii</i>	43	6.3	5.0	20.0				
R	<i>Quercus agrifolia</i> *	43	0.5	0.2	3.2				
R	<i>Umbellularia californica</i> *	29	1.5	0.2	10.0				
S	<i>Toxicodendron diversilobum</i>	86	6.9	2.0	14.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	71	1.3	0.2	5.0				Y
S	<i>Heteromeles arbutifolia</i>	57	1.6	0.2	10.0				Y
S	<i>Symphoricarpos albus</i>	43	11.8	0.2	62.5				
S	<i>Lonicera hispidula</i>	43	1.9	0.1	10.0				
S	<i>Baccharis pilularis</i>	29	0.8	0.5	5.0				

Mixed oak – *Quercus agrifolia* / *Toxicodendron diversilobum* Association
Quercus (*agrifolia*, *douglasii*, *garryana*, *kelloggii*, *lobata*, *wislizeni*) Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Frangula californica</i>	29	0.7	0.2	5.0				
S	<i>Ribes californicum</i>	29	0.5	0.2	3.0				
S	<i>Symphoricarpos mollis</i>	29	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	57	10.4	5.0	40.0				Y
H	<i>Cynosurus echinatus</i>	57	3.9	1.0	20.0				Y
H	<i>Elymus glaucus</i>	57	0.8	0.5	3.0				Y
H	<i>Galium aparine</i>	43	0.7	0.2	3.0				
H	<i>Torilis arvensis</i>	43	0.4	0.5	1.0				
H	<i>Achillea millefolium</i>	43	0.1	0.2	0.5				
H	<i>Pentagramma triangularis</i>	29	1.5	0.5	10.0				
H	<i>Carduus pycnocephalus</i>	29	0.9	1.0	5.0				
H	<i>Avena barbata</i>	29	0.9	3.0	3.0				
H	<i>Adiantum jordanii</i>	29	0.5	0.2	3.0				
H	<i>Dryopteris arguta</i>	29	0.4	0.1	3.0				
H	<i>Sanicula crassicaulis</i>	29	0.3	0.2	2.0				
H	<i>Melica torreyana</i>	29	0.3	0.2	2.0				
H	<i>Vicia</i> sp.	29	0.2	0.5	1.0				
H	<i>Sanicula</i> sp.	29	0.1	0.5	0.5				
H	<i>Bromus rubens</i>	29	0.1	0.2	0.2				
NV	Moss	29	0.2	0.2	1.0				

Mixed oak – *Quercus agrifolia* / *Toxicodendron diversilobum* Association
Quercus (*agrifolia*, *douglasii*, *garryana*, *kelloggii*, *lobata*, *wislizeni*) Forest & Woodland
Alliance

Mixed oak – *Quercus kelloggii* / grass Association

Common Name: Mixed Oak – California Black Oak / Grass Woodland

Alliance: *Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)* Forest & Woodland Alliance

Local Vegetation Description

The Mixed Oak – California Black Oak / Grass Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The tree canopy is composed of *Quercus agrifolia*, *Quercus kelloggii*, *Quercus lobata*, *Quercus douglasii*, and/or *Umbellularia californica*. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum*, *Diplacus aurantiacus*, and *Lonicera hispidula*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Avena barbata*, *Elymus glaucus*, *Lolium perenne*, *Torilis arvensis*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	40.5	25 – 54	15.8	10 – 20
Regenerating or Shrubby Tree	2.5	0 – 5	3.5	2 – 5
Shrub	4.3	1 – 6	1.5	1 – 2
Herb	28.3	17 – 40	0.6	0 – 1

Local Environmental Description

Elevation: Mean 433 m, Range 290 – 612 m

Aspect: NE (2), NW (2)

Slope: Mean 28 degrees, Range 15 – 32 degrees

Macro Topography: Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.3%, Range 0 – 3%

Fines Cover: Mean 37.3%, Range 0 – 92%

Litter Cover: Mean 34.8%, Range 0 – 80%

Soil Texture (field assessed): Moderately fine silty clay loam (2), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Other Subsections: Western Diablo Range (1)

Mixed oak – *Quercus kelloggii* / grass Association
Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Site Impacts

This association has moderate non-native plant cover (average 30.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Hordeum murinum*, *Lolium perenne*, *Petrorhagia dubia*, *Stellaria media*, *Torilis arvensis*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen et al. 1989, Allen et al. 1991, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=3): ALCC024, ALCC026, ALCC237

Santa Clara Co. (n=1): T0823210333

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	14.0	7.0	22.0	Y		Y	Y
T	<i>Quercus kelloggii</i>	100	14.0	3.0	26.0	Y		Y	Y
T	<i>Quercus lobata</i>	100	2.9	0.2	8.0	Y			Y
T	<i>Umbellularia californica</i>	75	7.0	6.0	12.0	Y			Y
T	<i>Quercus douglasii</i>	50	3.3	1.0	12.0				Y
T	<i>Aesculus californica</i>	50	0.6	0.2	2.0				Y
T	<i>Juglans hindsii</i>	25	0.3	1.0	1.0				
T	<i>Arbutus menziesii</i>	25	0.3	1.0	1.0				
T	<i>Quercus chrysolepis</i>	25	0.1	0.2	0.2				
R	<i>Umbellularia californica</i> *	100	1.9	0.4	3.2	Y	Y		Y
R	<i>Quercus agrifolia</i> *	50	0.8	1.2	2.0				Y
R	<i>Aesculus californica</i> *	25	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	2.3	0.2	3.0	Y	Y		Y
S	<i>Lonicera hispidula</i>	50	0.8	1.0	2.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.6	0.2	2.0				Y

Mixed oak – *Quercus kelloggii* / grass Association
Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Lupinus</i> sp.	25	0.1	0.2	0.2				
S	<i>Symphoricarpos albus</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	8.3	5.0	10.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	75	5.0	3.0	9.0	Y			Y
H	<i>Cynosurus echinatus</i>	75	2.8	3.0	4.0	Y			Y
H	<i>Torilis arvensis</i>	75	1.5	2.0	2.0	Y			Y
H	<i>Elymus glaucus</i>	50	1.3	2.0	3.0				Y
H	<i>Vicia sativa</i>	50	0.8	0.2	3.0				Y
H	<i>Avena barbata</i>	50	0.5	1.0	1.0				Y
H	<i>Lolium perenne</i>	50	0.3	0.2	1.0				Y
H	<i>Brachypodium distachyon</i>	25	1.8	7.0	7.0				
H	<i>Stellaria media</i>	25	0.5	2.0	2.0				
H	<i>Bromus rubens</i>	25	0.5	2.0	2.0				
H	<i>Hordeum murinum</i>	25	0.3	1.0	1.0				
H	<i>Centaurea solstitialis</i>	25	0.3	1.0	1.0				
H	<i>Bromus laevipes</i>	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Wyethia</i> sp.	25	0.1	0.2	0.2				
H	<i>Melica californica</i>	25	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	25	0.1	0.2	0.2				
H	<i>Lathyrus vestitus</i>	25	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	25	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	25	0.1	0.2	0.2				
H	<i>Petrorhagia dubia</i>	25	0.1	0.2	0.2				
H	<i>Lathyrus</i> sp.	25	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	25	0.0	0.1	0.1				
H	<i>Trifolium hirtum</i>	25	0.0	0.1	0.1				
NV	Moss	25	0.1	0.2	0.2				
NV	Lichen	25	0.1	0.2	0.2				

Mixed oak – *Quercus kelloggii* / grass Association
Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni) Forest & Woodland
Alliance

***Quercus agrifolia* Forest & Woodland Alliance**



Common Name: Coast live oak woodland and forest

NVC Alliance Code: A3346. *Quercus agrifolia* Woodland Alliance

Statewide Description

Quercus agrifolia is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Acer negundo*, *Arbutus menziesii*, *Juglans californica*, *Platanus racemosa*, *Populus fremontii*, *Quercus douglasii*, *Quercus engelmannii*, *Quercus kelloggii*, *Quercus lobata*, *Salix lasiolepis*, and *Umbellularia californica*.

Stands of this extensive alliance vary from upland savannas and woodlands to moist north-facing slope forests with closed tree canopies (Allen-Diaz et al. 2007). Genetic variation is high in the species, with two main recognized varieties. Most plants represent *Quercus agrifolia* var. *agrifolia*; plants recognized as *Quercus agrifolia* var. *oxyadenia* in the Peninsular Ranges of southern California have hairs completely covering the lower leaf surfaces (Roberts 1995). *Quercus agrifolia* hybrids include *Quercus* ×*ganderi* (*Q. agrifolia* var. *oxyadenia* × *Q. kelloggii*) in San Diego County and *Quercus* ×*chasei* (*Q. agrifolia* var. *agrifolia* × *Q. kelloggii*) in Monterey and Santa Cruz Counties. The species also hybridizes with *Quercus dumosa*, *Q. lobata*, and *Q. wislizeni*.

to varying degrees (Kathleen et al. 2002, Dodd et al. 1993, Brophy and Parnell 1974). A shrub form, *Quercus agrifolia* var. *frutescens*, may only represent frequently burned or salt-spray-pruned plants. See the mixed oak (*Quercus wislizeni* – *Quercus chrysolepis*) shrub alliance for that distinction.

Local Vegetation Description

The Coast live oak woodland and forest Alliance forms an open to continuous tree canopy with a sparse to continuous shrub understory. The dominant tree is *Quercus agrifolia*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	1.2	0 – 25	14.4	5 – 35
Hardwood	35.4	0 – 79	11.7	2 – 35
Regenerating or Shrubby Tree	3.5	0 – 18	3.3	0 – 15
Shrub	13.8	0 – 80	1.5	0 – 10
Herb	15.6	0 – 60	0.4	0 – 1

Local Membership Rule

Quercus agrifolia > 50% relative cover in the tree canopy, or > 30% relative cover with *Arbutus menziesii*.

Local Environmental Description

Elevation: Mean 286 m, Range 26 – 682 m

Aspect: NW (15), NE (13), Variable (10), SW (6), SE (4), Flat (1)

Slope: Mean 22 degrees, Range 0 – 44 degrees

Macro Topography: Lower 1/3 of slope (9), Middle 1/3 of slope (7), Upper 1/3 of slope (7), Middle to Upper 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (3), Bottom to Mid 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Lower to Upper 1/3 of slope (2), Bottom (1), Bottom to Lower 1/3 of slope (1), Entire slope (1), Middle 1/3 of slope to Ridgetop (1), Ridge top (1)

Large Rock: Mean 1.8%, Range 0 – 14%

Small Rock: Mean 5.9%, Range 0 – 55%

Fines Cover: Mean 24.3%, Range 1 – 74%

Litter Cover: Mean 63.5%, Range 2 – 96%

Soil Texture (field assessed): Moderately fine clay loam (9), Medium to very fine, sandy loam (8), Medium silt loam (5), Medium loam (4), Moderately coarse, sandy loam (3), Loam (3), Moderately fine silty clay loam (2), Medium silt (2), Moderately

fine sandy clay loam (1), Clay (1), Medium to very fine, loamy sand (1), Fine sandy clay (1)

Geology (field or map data): Sedimentary (9), Franciscan melange (8), Sandstone and other sedimentary (6), Shale and other sedimentary (6), Shale (5), Metamorphic (3), Sandstone (3), Basalt (1), Igneous (1), Mixed igneous (1), Mixed sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (9), Fremont - Livermore Hills and Valleys (9), Eastern Hills (3), Western Diablo Range (2), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (17), Suisun Hills and Valleys (8), East Bay Terraces and Alluvium (1)

Site Impacts

This alliance has low non-native plant cover (average 15.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Quercus agrifolia

Quercus agrifolia – *Aesculus californica*

Quercus agrifolia – *Arbutus menziesii* – *Umbellularia californica*

Quercus agrifolia – *Pinus coulteri*

Quercus agrifolia – *Quercus kelloggii*

Quercus agrifolia – *Umbellularia californica*

Quercus agrifolia – *Umbellularia californica* / *Heteromeles arbutifolia* – *Quercus berberidifolia*

Quercus agrifolia / *Adenostoma fasciculatum* – (*Salvia mellifera*)

Quercus agrifolia / *Arctostaphylos* (*crustacea*)

Quercus agrifolia / *Artemisia californica*

Quercus agrifolia / grass

Quercus agrifolia / *Toxicodendron diversilobum*

Classification Comments

None.

References: AECOM 2013, Allen et al. 1989, Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Campbell 1980, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1998b, Keeler-Wolf et al. 2003a, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2015, O’Neil and Egan 2004, Parker 1990b, Reyes et al. 2019, Rodriguez et al. 2017, Shuford and Timossi 1989, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Wainwright and Barbour 1984

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=50; Alameda County (n=24): ALCC038, ALCC040, ALCC114, ALCC115, ALCC507, ALCC509, ALCCREC011, ALCCREC101, ALCCREC106, ALCCREC211, ALCCREC213, AW002, AW028, AW031, AW033, EBAY0053, EBRTA109, EBRTA120, EBRTA215, EBRTA306, EBRTA308, EBRTA314, LLNL096, SUNOL017

Contra Costa County (n=26): ALCC007, ALCC008, ALCC027, ALCC046, ALCC123, ALCC124, ALCC151, ALCC159, ALCC164, ALCC218, ALCCREC218, ALCCREC221, EBAY0031, EBAY0032, EBAY0033, EBRTA102, EBRTA144, JOMU009, JOMU041, JOMU044, SPCCA-041, SPCCA-044, SPCCA-048, SPCCB-087, SPCCB-089, SRRP001

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	98	28.8	4.0	65.0	Y	Y		Y
T	<i>Umbellularia californica</i>	68	6.2	0.2	35.0				Y
T	<i>Aesculus californica</i>	28	1.1	0.2	25.0				
R	<i>Quercus agrifolia</i> *	42	1.2	0.2	12.0				
R	<i>Umbellularia californica</i> *	40	1.6	0.2	16.2				
S	<i>Toxicodendron diversilobum</i>	88	5.0	0.2	35.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	40	0.5	0.2	8.0				
S	<i>Baccharis pilularis</i>	28	0.6	0.2	12.0				
S	<i>Heteromeles arbutifolia</i>	26	0.5	0.1	5.0				
S	<i>Rubus ursinus</i>	24	0.8	0.2	15.0				
H	<i>Carduus pycnocephalus</i>	56	0.9	0.2	5.0				Y
H	<i>Bromus diandrus</i>	54	4.1	0.2	30.0				Y
H	<i>Torilis arvensis</i>	44	0.7	0.1	10.0				
H	<i>Avena barbata</i>	32	1.3	0.2	20.0				
H	<i>Cynosurus echinatus</i>	32	0.6	0.2	7.0				
H	<i>Elymus glaucus</i>	26	0.3	0.1	10.0				
H	<i>Chlorogalum pomeridianum</i>	22	0.1	0.2	1.0				
H	<i>Sanicula crassicaulis</i>	22	0.0	0.2	0.2				

***Quercus agrifolia* Association**

Common Name: Coast Live Oak Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak Association forms an intermittent to continuous tree canopy with an open shrub understory. The dominant tree is *Quercus agrifolia*, and *Umbellularia californica* is often present. Commonly associated shrubs include *Heteromeles arbutifolia*, *Arctostaphylos glauca*, *Genista monspessulana*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Avena barbata*, *Elymus triticoides*, *Lolium perenne*, and *Melica torreyana*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	67.0	64 – 70	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	3.5	2 – 5	1.5	1 – 2
Herb	3.6	0 – 7	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 92 m, Range 26 – 158 m

Aspect: NE (1), SE (1)

Slope: Mean 25 degrees, Range 22 – 28 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sandstone and other sedimentary (1), Serpentine (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 4.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Genista monspessulana*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Campbell 1980, Keeler-Wolf and Evens 2006, Parker 1990b, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=1): ALCCREC221

Santa Clara Co. (n=1): SCLAR051

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	67.0	64.0	70.0	Y	Y		Y
T	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
S	<i>Heteromeles arbutifolia</i>	100	0.6	0.2	1.0	Y			Y
S	<i>Genista monspessulana</i>	50	2.0	4.0	4.0				Y
S	<i>Toxicodendron diversilobum</i>	50	1.0	2.0	2.0				Y
S	<i>Arctostaphylos glauca</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus diandrus</i>	100	0.6	0.2	1.0	Y	Y		Y
H	<i>Melica torreyana</i>	50	1.0	2.0	2.0				Y
H	<i>Avena barbata</i>	50	0.5	1.0	1.0				Y
H	<i>Lolium perenne</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus triticoides</i>	50	0.1	0.2	0.2				Y

***Quercus agrifolia* – *Aesculus californica* Association**

Common Name: Coast Live Oak – California Buckeye Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – California Buckeye Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant trees are *Quercus agrifolia* and *Aesculus californica*, and *Umbellularia californica* is often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Artemisia californica* and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.8	0 – 5	no data	no data
Hardwood	33.5	10 – 56	10.0	5 – 20
Regenerating or Shrubby Tree	0.4	0 – 2	1.3	0.5 – 2
Shrub	5.0	1 – 12	0.8	0 – 2
Herb	13.8	2 – 40	0.5	0 – 1

Local Environmental Description

Elevation: Mean 275 m, Range 47 – 529 m

Aspect: NE (3), Variable (2), SW (1)

Slope: Mean 24 degrees, Range 14 – 32 degrees

Macro Topography: Lower 1/3 of slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.7%, Range 0 – 1%

Fines Cover: Mean 38.7%, Range 17 – 64%

Litter Cover: Mean 58.3%, Range 35 – 80%

Soil Texture (field assessed): Loam (1), Medium silt loam (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Metamorphic (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Other Subsections: Fremont - Livermore Hills and Valleys (2)

Site Impacts

This association has low non-native plant cover (average 17.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, and *Cynosurus echinatus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Kittel et al. 2012, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC038, ALCCREC106

Contra Costa County (n=2): ALCC123, JOMU044

Santa Clara Co. (n=2): SCRUZ540, SCRUZ950

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	17.3	8.0	25.0	Y	Y		Y
T	<i>Aesculus californica</i>	100	10.5	2.0	25.0	Y			Y
T	<i>Umbellularia californica</i>	67	7.3	3.0	18.0				Y
T	<i>Quercus douglasii</i>	33	1.7	5.0	5.0				
T	<i>Quercus lobata</i>	33	0.4	0.1	2.0				
R	<i>Quercus agrifolia</i> *	50	0.4	0.2	2.2				Y
S	<i>Toxicodendron diversilobum</i>	67	1.5	0.2	5.0				Y
S	<i>Artemisia californica</i>	33	3.3	8.0	12.0				
H	<i>Bromus diandrus</i>	50	0.9	0.2	3.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.5	0.2	2.0				Y
H	<i>Cynosurus echinatus</i>	33	0.8	2.0	3.0				
H	<i>Adiantum jordanii</i>	33	0.2	0.2	1.0				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				

***Quercus agrifolia* – *Arbutus menziesii* – *Umbellularia californica* Association**

Common Name: Coast Live Oak – Madrone – California Bay Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – Madrone – California Bay Association forms an intermittent to continuous tree canopy with an open shrub understory. The dominant tree is *Quercus agrifolia*, and *Arbutus menziesii* and *Umbellularia californica* are characteristic. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Quercus agrifolia* and *Quercus chrysolepis*. Commonly associated shrubs include *Diplacus aurantiacus*, *Lonicera hispidula*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.6	0 – 1	15.0	10 – 20
Hardwood	45.5	31 – 60	12.5	10 – 15
Regenerating or Shrubby Tree	1.1	0 – 2	1.5	1 – 2
Shrub	14.5	7 – 22	1.5	1 – 2
Herb	15.0	12 – 18	0.5	0 – 1

Local Environmental Description

Elevation: Mean 346 m, Range 320 – 371 m

Aspect: SE (1), SW (1)

Slope: Mean 26 degrees, Range 23 – 29 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 0.4%

Small Rock: Mean 7.6%, Range 1 – 14%

Fines Cover: Mean 7.9%, Range 2 – 14%

Litter Cover: Mean 83.0%, Range 70 – 96%

Soil Texture (field assessed): Medium to very fine, sandy loam (2)

Geology (field or map data): Metamorphic (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 7.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cotoneaster* sp., *Cynosurus echinatus*, *Ehrharta erecta*, *Genista monspessulana*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC007

Santa Clara Co. (n=1): SCRUZ539

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	36.5	18.0	55.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	8.0	6.0	10.0	Y			Y
T	<i>Arbutus menziesii</i>	100	7.0	6.0	8.0	Y			Y
T	<i>Pinus sabiniana</i>	50	0.5	1.0	1.0				Y
T	<i>Pinus radiata</i>	50	0.1	0.2	0.2				Y
R	<i>Umbellularia californica</i> *	100	0.2	0.2	0.2	Y	Y		Y
R	<i>Quercus agrifolia</i> *	50	1.0	2.0	2.0				Y
R	<i>Quercus chrysolepis</i>	50	0.2	0.4	0.4				Y
S	<i>Diplacus aurantiacus</i>	100	3.1	0.2	6.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	2.1	0.2	4.0	Y			Y
S	<i>Lonicera hispidula</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Vaccinium ovatum</i>	50	3.0	6.0	6.0				Y
S	<i>Heteromeles arbutifolia</i>	50	3.0	6.0	6.0				Y
S	<i>Artemisia californica</i>	50	1.0	2.0	2.0				Y
S	<i>Lotus scoparius</i>	50	1.0	2.0	2.0				Y
S	<i>Rubus ursinus</i>	50	0.5	1.0	1.0				Y

Quercus agrifolia – *Arbutus menziesii* – *Umbellularia californica* Association
Quercus agrifolia Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rhamnus ilicifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Genista monspessulana</i>	50	0.1	0.2	0.2				Y
S	<i>Cotoneaster</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Bromus diandrus</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Cynosurus echinatus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Melica</i> sp.	50	2.5	5.0	5.0				Y
H	<i>Nassella</i> sp.	50	1.5	3.0	3.0				Y
H	<i>Ehrharta erecta</i>	50	1.0	2.0	2.0				Y
H	<i>Pteridium aquilinum</i>	50	1.0	2.0	2.0				Y
H	<i>Clinopodium douglasii</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus carinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Iris</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Adiantum jordanii</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Epilobium canum</i>	50	0.1	0.2	0.2				Y
H	<i>Calochortus</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella villosa</i>	50	0.1	0.2	0.2				Y
H	<i>Stachys</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Elymus glaucus</i>	50	0.1	0.2	0.2				Y
H	<i>Festuca californica</i>	50	0.1	0.2	0.2				Y
H	<i>Galium porrigens</i>	50	0.1	0.2	0.2				Y
H	<i>Lathyrus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Bromus laevipes</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
NV	Moss	100	1.1	0.2	2.0	Y	Y		Y

***Quercus agrifolia* – *Pinus coulteri* Association**

Common Name: Coast Live Oak – Coulter Pine Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – Coulter Pine Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus agrifolia*, and *Pinus coulteri*, *Pinus sabiniana*, and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Pinus coulteri*, *Quercus agrifolia*, and *Umbellularia californica*. Commonly associated shrubs include *Diplacus aurantiacus*, *Toxicodendron diversilobum*, *Arctostaphylos manzanita* ssp. *laevigata*, and *Heteromeles arbutifolia*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Conium maculatum*, *Cortaderia jubata*, *Cynosurus echinatus*, *Lolium perenne*, *Nassella cernua*, *Silybum marianum*, and *Torilis nodosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	14.0	12 – 16	10.0	5 – 15
Hardwood	20.0	16 – 24	5.5	2 – 10
Regenerating or Shrubby Tree	3.0	0 – 6	1.5	1 – 2
Shrub	17.0	14 – 20	2.1	0.5 – 5
Herb	10.0	5 – 15	0.5	0 – 1

Local Environmental Description

Elevation: Mean 314 m, Range 223 – 404 m

Aspect: NW (1), Variable (1)

Slope: Mean 17 degrees, Range 16 – 18 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1)

Large Rock: Mean 1.5%, Range 0 – 3%

Small Rock: Mean 3.0%, Range 3 – 3%

Fines Cover: Mean 32.0%, Range 25 – 39%

Litter Cover: Mean 61.0%, Range 55 – 67%

Soil Texture (field assessed): Medium to very fine, loamy sand (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 18.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cortaderia jubata*, *Crataegus monogyna*, *Cynosurus echinatus*, *Lolium perenne*, *Silybum marianum*, and *Torilis nodosa*.

Classification Comments

One survey has significant cover of a rare manzanita, *Arctostaphylos manzanita* ssp. *laevigata* (CRPR 1B.2).

References: Keeler-Wolf et al. 1998b

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** EBRTA308

Contra Costa County (n=1): ALCC124

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	19.0	18.0	20.0	Y	Y		Y
T	<i>Pinus coulteri</i>	100	9.0	2.0	16.0	Y			Y
T	<i>Pinus sabiniana</i>	50	5.0	10.0	10.0				Y
T	<i>Umbellularia californica</i>	50	2.0	4.0	4.0				Y
R	<i>Quercus agrifolia</i>*	50	3.0	6.0	6.0				Y
R	<i>Umbellularia californica</i> *	50	0.5	1.0	1.0				Y
R	<i>Pinus coulteri</i>*	50	0.5	1.0	1.0				Y
S	<i>Toxicodendron diversilobum</i>	100	4.5	1.0	8.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	100	0.6	0.2	1.0	Y			Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	50	4.0	8.0	8.0				Y
S	<i>Heteromeles arbutifolia</i>	50	2.5	5.0	5.0				Y
S	<i>Lepechinia calycina</i>	50	0.5	1.0	1.0				Y
S	<i>Crataegus monogyna</i>	50	0.5	1.0	1.0				Y
S	<i>Sambucus nigra</i>	50	0.5	1.0	1.0				Y
S	<i>Ptelea crenulata</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	100	4.0	3.0	5.0	Y	Y		Y
H	<i>Carduus pycnocephalus</i>	100	1.1	0.2	2.0	Y			Y
H	<i>Avena barbata</i>	50	2.0	4.0	4.0				Y
H	<i>Conium maculatum</i>	50	2.0	4.0	4.0				Y
H	<i>Lolium perenne</i>	50	1.0	2.0	2.0				Y
H	<i>Torilis nodosa</i>	50	1.0	2.0	2.0				Y
H	<i>Silybum marianum</i>	50	0.5	1.0	1.0				Y
H	<i>Nassella cernua</i>	50	0.5	1.0	1.0				Y
H	<i>Cynosurus echinatus</i>	50	0.5	1.0	1.0				Y
H	<i>Cortaderia jubata</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus hordeaceus</i>	50	0.5	1.0	1.0				Y
H	<i>Brachypodium distachyon</i>	50	0.5	1.0	1.0				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
NV	Lichen	50	0.5	1.0	1.0				Y

***Quercus agrifolia* – *Quercus kelloggii* Association**

Common Name: Coast Live Oak – California Black Oak Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – California Black Oak Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus agrifolia*, and *Quercus kelloggii*, *Umbellularia californica*, and *Aesculus californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia* and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Baccharis pilularis*, and commonly associated herbs include *Carduus pycnocephalus* and *Elymus glaucus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	48.0	27 – 60	10.0	5 – 15
Regenerating or Shrubby Tree	1.8	0 – 4	3.5	2 – 5
Shrub	11.8	5 – 20	1.5	1 – 2
Herb	39.3	27 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 308 m, Range 122 – 532 m

Aspect: NW (3), NE (1)

Slope: Mean 19 degrees, Range 0 – 45 degrees

Macro Topography: Lower 1/3 of slope (1), Other (1)

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): Loam (2)

Geology (field or map data): Sedimentary (3), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Other Subsections: Fremont - Livermore Hills and Valleys (2)

Site Impacts

This association has low non-native plant cover (average 8.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, and *Cynosurus echinatus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Buck-Diaz et al. 2021, Evens and San 2005, Sikes et al. 2021, Sikes et al. 2023, Wainwright and Barbour 1984

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=2): JOMU009, JOMU041

Santa Clara Co. (n=2): SCRUZ513, SCRUZ947

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	29.5	18.0	40.0	Y	Y		Y
T	<i>Quercus kelloggii</i>	100	10.3	6.0	18.0	Y			Y
T	<i>Umbellularia californica</i>	100	7.3	2.0	15.0	Y			Y
T	<i>Aesculus californica</i>	50	1.6	0.2	6.0				Y
T	<i>Quercus lobata</i>	25	0.5	2.0	2.0				
R	<i>Quercus agrifolia</i> *	50	1.4	1.2	4.2				Y
R	<i>Umbellularia californica</i> *	50	0.6	0.2	2.0				Y
R	<i>Quercus lobata</i> *	25	0.0	0.1	0.1				
S	<i>Toxicodendron diversilobum</i>	100	5.8	1.0	15.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	75	1.3	1.0	2.0	Y			Y
S	<i>Holodiscus discolor</i>	25	3.0	12.0	12.0				
S	<i>Symphoricarpos mollis</i>	25	1.0	4.0	4.0				
S	<i>Artemisia californica</i>	25	0.3	1.0	1.0				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	25	0.1	0.2	0.2				
S	<i>Frangula californica</i>	25	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	75	3.3	0.2	10.0	Y			Y
H	<i>Carduus pycnocephalus</i>	50	2.8	1.0	10.0				Y
H	<i>Bromus diandrus</i>	25	3.8	15.0	15.0				
H	<i>Achillea millefolium</i>	25	2.0	8.0	8.0				
H	<i>Collinsia</i> sp.	25	0.8	3.0	3.0				
H	<i>Cynosurus echinatus</i>	25	0.8	3.0	3.0				
H	<i>Marah fabaceus</i>	25	0.5	2.0	2.0				
H	<i>Dryopteris arguta</i>	25	0.3	1.0	1.0				
H	<i>Bromus carinatus</i>	25	0.1	0.2	0.2				
NV	Moss	25	2.5	10.0	10.0				

***Quercus agrifolia* – *Umbellularia californica* Association**

Common Name: Coast Live Oak – California Bay Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – California Bay Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Quercus agrifolia*, and *Umbellularia californica* is characteristic. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Torilis arvensis* and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	49.1	25 – 79	14.0	10 – 35
Regenerating or Shrubby Tree	6.6	0 – 17	3.2	0.5 – 10
Shrub	12.9	0 – 45	1.1	0.5 – 2
Herb	15.3	1 – 35	0.4	0 – 1

Local Environmental Description

Elevation: Mean 322 m, Range 76 – 682 m

Aspect: NW (5), NE (3), SW (2), Variable (2), SE (1)

Slope: Mean 24 degrees, Range 12 – 44 degrees

Macro Topography: Upper 1/3 of slope (4), Bottom to Mid 1/3 of slope (2), Bottom (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 1.8%, Range 0 – 14%

Small Rock: Mean 3.6%, Range 0 – 13%

Fines Cover: Mean 27.0%, Range 3 – 62%

Litter Cover: Mean 65.2%, Range 34 – 92%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Moderately coarse, sandy loam (2), Moderately fine clay loam (2), Medium loam (1), Medium silt (1), Medium silt loam (1)

Geology (field or map data): Sedimentary (4), Shale (3), Franciscan melange (1), Metamorphic (1), Mixed igneous (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (4), Western Diablo Range (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 10.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

None.

References: Evens and San 2004, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, O'Neil and Egan 2004

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=13; Alameda County (n=7): ALCC507, ALCC509, ALCCREC211, ALCCREC213, EBRTA109, EBRTA120, EBRTA314

Contra Costa County (n=6): ALCC027, ALCC046, ALCC164, ALCCREC218, EBAY0031, EBRTA144

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	35.9	18.0	65.0	Y	Y		Y
T	<i>Umbellularia californica</i>	92	16.1	6.0	35.0	Y			Y
R	<i>Umbellularia californica</i> *	85	5.0	1.0	16.2	Y	Y		Y
R	<i>Quercus agrifolia</i> *	46	0.8	0.2	5.2				
S	<i>Toxicodendron diversilobum</i>	85	6.8	0.2	35.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	46	1.0	0.2	8.0				
S	<i>Rubus ursinus</i>	38	1.0	0.2	7.0				
S	<i>Baccharis pilularis</i>	38	0.4	0.2	2.0				
S	<i>Sambucus nigra</i>	23	0.6	0.2	6.0				
S	<i>Lonicera hispidula</i>	23	0.2	0.2	2.0				
H	<i>Torilis arvensis</i>	77	1.7	0.1	10.0	Y			Y
H	<i>Carduus pycnocephalus</i>	62	1.2	1.0	5.0				Y
H	<i>Bromus diandrus</i>	46	3.4	1.0	15.0				
H	<i>Cynosurus echinatus</i>	38	0.6	0.2	5.0				
H	<i>Chlorogalum pomeridianum</i>	38	0.1	0.2	1.0				
H	<i>Melica imperfecta</i>	23	0.8	1.0	5.0				
H	<i>Avena barbata</i>	23	0.3	0.2	3.0				
H	<i>Bromus carinatus</i>	23	0.3	0.2	3.0				
H	<i>Clinopodium douglasii</i>	23	0.3	0.2	3.0				
H	<i>Galium aparine</i>	23	0.2	0.2	1.0				
H	<i>Osmorhiza berteroi</i>	23	0.1	0.2	1.0				

***Quercus agrifolia* – *Umbellularia californica* / *Heteromeles arbutifolia* – *Quercus berberidifolia* Association**

Common Name: Coast Live Oak – California Bay / Toyon – Scrub Oak Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak – California Bay / Toyon – Scrub Oak Association forms an open to intermittent tree canopy with an open shrub understory. The dominant trees are *Quercus agrifolia* and *Umbellularia californica*, and *Acer macrophyllum* is often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia* and *Umbellularia californica*. Commonly associated shrubs include *Baccharis pilularis*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, *Rubus ursinus*, *Toxicodendron diversilobum*, *Frangula californica*, *Holodiscus discolor*, and *Symphoricarpos mollis*, and commonly associated herbs include *Dryopteris arguta*, *Avena barbata*, *Bromus carinatus*, *Cirsium vulgare*, *Clinopodium douglasii*, *Conium maculatum*, *Drymocallis glandulosa*, *Juncus patens*, *Lathyrus vestitus*, *Nassella lepida*, *Silybum marianum*, *Verbena lasiostachys*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	25.0	15 – 35	10.0	5 – 15
Regenerating or Shrubby Tree	3.0	0 – 6	6.6	0.5 – 15
Shrub	24.0	18 – 30	2.5	1 – 5
Herb	8.0	3 – 13	0.5	0 – 1

Local Environmental Description

Elevation: Mean 188 m, Range 168 – 208 m

Aspect: NW (1), SE (1)

Slope: Mean 23 degrees, Range 6 – 40 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 0.4%

Small Rock: Mean 18.0%, Range 8 – 28%

Fines Cover: Mean 39.0%, Range 23 – 55%

Litter Cover: Mean 41.5%, Range 35 – 48%

Soil Texture (field assessed): Medium loam (1), Moderately fine clay loam (1)

Geology (field or map data): Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Quercus agrifolia – *Umbellularia californica* / *Heteromeles arbutifolia* – *Quercus berberidifolia* Association

Quercus agrifolia Forest & Woodland Alliance

Site Impacts

This association has low non-native plant cover (average 6.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cirsium vulgare*, *Conium maculatum*, *Cynosurus echinatus*, *Silybum marianum*, *Torilis arvensis*, and *Vulpia bromoides*.

Classification Comments

None.

References: Allen et al. 1989, Buck-Diaz et al. 2021, Evens and San 2004, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** AW031, EBRTA306

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	14.0	8.0	20.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	11.0	7.0	15.0	Y		Y	Y
T	<i>Acer macrophyllum</i>	50	0.1	0.2	0.2				Y
R	<i>Quercus agrifolia</i> *	50	3.0	6.0	6.0				Y
R	<i>Umbellularia californica</i> *	50	0.1	0.2	0.2				Y
S	<i>Baccharis pilularis</i>	100	4.6	0.2	9.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	4.5	4.0	5.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	3.5	2.0	5.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	1.5	1.0	2.0	Y			Y
S	<i>Rubus ursinus</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Symphoricarpos mollis</i>	50	5.0	10.0	10.0				Y
S	<i>Holodiscus discolor</i>	50	1.5	3.0	3.0				Y
S	<i>Frangula californica</i>	50	0.5	1.0	1.0				Y
S	<i>Symphoricarpos albus</i>	50	0.1	0.2	0.2				Y
S	<i>Lonicera hispidula</i>	50	0.1	0.2	0.2				Y
S	<i>Rhamnus ilicifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Oemleria cerasiformis</i>	50	0.1	0.2	0.2				Y

Quercus agrifolia – *Umbellularia californica* / *Heteromeles arbutifolia* – *Quercus berberidifolia* Association

Quercus agrifolia Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Dryopteris arguta</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Clinopodium douglasii</i>	50	2.0	4.0	4.0				Y
H	<i>Avena barbata</i>	50	1.5	3.0	3.0				Y
H	<i>Nassella lepida</i>	50	1.0	2.0	2.0				Y
H	<i>Silybum marianum</i>	50	0.5	1.0	1.0				Y
H	<i>Cirsium vulgare</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus carinatus</i>	50	0.5	1.0	1.0				Y
H	<i>Conium maculatum</i>	50	0.5	1.0	1.0				Y
H	<i>Juncus patens</i>	50	0.5	1.0	1.0				Y
H	<i>Vulpia bromoides</i>	50	0.5	1.0	1.0				Y
H	<i>Lathyrus vestitus</i>	50	0.5	1.0	1.0				Y
H	<i>Verbena lasiostachys</i>	50	0.5	1.0	1.0				Y
H	<i>Drymocallis glandulosa</i>	50	0.5	1.0	1.0				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Stachys</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Maianthemum stellatum</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Adiantum jordanii</i>	50	0.1	0.2	0.2				Y
H	<i>Melica torreyana</i>	50	0.1	0.2	0.2				Y
H	<i>Calochortus albus</i>	50	0.1	0.2	0.2				Y
H	<i>Aquilegia formosa</i>	50	0.1	0.2	0.2				Y
H	<i>Osmorhiza berteroi</i>	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella villosa</i>	50	0.1	0.2	0.2				Y

***Quercus agrifolia* / *Adenostoma fasciculatum* – (*Salvia mellifera*) Association**

Common Name: Coast Live Oak / Chamise – Black Sage Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak / Chamise – Black Sage Association forms an open tree canopy with an open to continuous shrub understory. The dominant tree is *Quercus agrifolia*. Regenerating or shrubby trees that are dominant and characteristic include *Quercus agrifolia*. Commonly associated shrubs include *Adenostoma fasciculatum*, *Baccharis pilularis*, *Ceanothus cuneatus*, *Heteromeles arbutifolia*, *Salvia mellifera*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Marah fabaceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	7.5	0 – 15	7.5	5 – 10
Regenerating or Shrubby Tree	7.5	3 – 12	0.8	0.5 – 1
Shrub	50.5	21 – 80	1.5	1 – 2
Herb	8.5	3 – 14	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 454 m, Range 244 – 665 m

Aspect: Variable (1)

Slope: Mean 15 degrees, Range 5 – 25 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 55%

Fines Cover: 20%

Litter Cover: 10%

Soil Texture (field assessed): Fine sandy clay (1)

Geology (field or map data): Igneous (1), Sandstone and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 6.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Genista monspessulana*, and *Nerium oleander*.

Classification Comments

None.

References: Allen et al. 1989, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Keeler-Wolf and Evens 2006, Klein and Evens 2005

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** EBAY0053

Contra Costa County (n=1): SPCCA-048

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	50	7.5	15.0	15.0				Y
R	<i>Quercus agrifolia</i> *	100	7.5	3.0	12.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	100	25.0	10.0	40.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Salvia mellifera</i>	50	15.0	30.0	30.0				Y
S	<i>Heteromeles arbutifolia</i>	50	1.5	3.0	3.0				Y
S	<i>Ceanothus cuneatus</i>	50	1.0	2.0	2.0				Y
S	<i>Toxicodendron diversilobum</i>	50	1.0	2.0	2.0				Y
S	<i>Nerium oleander</i>	50	0.5	1.0	1.0				Y
S	<i>Eriogonum fasciculatum</i>	50	0.5	1.0	1.0				Y
S	<i>Arctostaphylos crustacea</i>	50	0.1	0.2	0.2				Y
S	<i>Genista monspessulana</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	2.0	4.0	4.0				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y

***Quercus agrifolia* / *Arctostaphylos (crustacea)* Association**

Common Name: Coast Live Oak / Brittle Leaf Manzanita Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak / Brittle Leaf Manzanita Association forms an open tree canopy with an open shrub understory. The dominant tree is *Quercus agrifolia*, and *Pinus sabiniana*, *Quercus parvula* var. *shrevei*, and *Quercus wislizeni* are characteristic or often present. Commonly associated shrubs include *Diplacus aurantiacus*, *Heteromeles arbutifolia*, *Toxicodendron diversilobum*, *Arctostaphylos crustacea*, *Arctostaphylos manzanita* ssp. *laevigata*, *Arctostaphylos pallida*, and *Ptelea crenulata*, and commonly associated herbs include *Avena barbata*, *Briza* sp., *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Galium* sp., *Pedicularis densiflora*, *Pteridium aquilinum*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.5	0 – 1	12.5	10 – 15
Hardwood	25.5	25 – 26	7.5	5 – 10
Regenerating or Shrubby Tree	9.0	0 – 18	3.5	2 – 5
Shrub	26.7	26 – 27	3.5	2 – 5
Herb	25.5	16 – 35	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 294 m, Range 219 – 368 m

Aspect: NW (1), SW (1)

Slope: Mean 21 degrees, Range 14 – 28 degrees

Macro Topography: Entire slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 6.5%, Range 0 – 13%

Small Rock: Mean 7.5%, Range 0 – 15%

Fines Cover: Mean 8.5%, Range 6 – 11%

Litter Cover: Mean 73.0%, Range 71 – 75%

Soil Texture (field assessed): Medium loam (1)

Geology (field or map data): Sandstone (1), Shale (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 20.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Briza* sp., *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

Rare manzanitas present in these surveys include *Arctostaphylos auriculata* (CRPR 1B.3), *Arctostaphylos manzanita* ssp. *laevigata* (CRPR 1B.2), and *Arctostaphylos pallida* (CRPR 1B.1).

References: Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): ALCC218, SRRP001

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	16.0	6.0	26.0	Y	Y		Y
T	<i>Quercus wislizeni</i>	50	3.0	6.0	6.0				Y
T	<i>Quercus parvula</i> var. <i>shrevei</i>	50	3.0	6.0	6.0				Y
T	<i>Pinus sabiniana</i>	50	0.5	1.0	1.0				Y
S	<i>Toxicodendron diversilobum</i>	100	2.5	1.0	4.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	2.5	1.0	4.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Arctostaphylos pallida</i>	50	10.5	21.0	21.0				Y
S	<i>Ptelea crenulata</i>	50	6.0	12.0	12.0				Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	50	6.0	12.0	12.0				Y
S	<i>Arctostaphylos crustacea</i>	50	0.5	1.0	1.0				Y
S	<i>Arctostaphylos auriculata</i>	50	0.1	0.2	0.2				Y
S	<i>Gutierrezia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	11.0	22.0	22.0				Y
H	<i>Cynosurus echinatus</i>	50	3.5	7.0	7.0				Y
H	<i>Pteridium aquilinum</i>	50	2.5	5.0	5.0				Y
H	<i>Carduus pycnocephalus</i>	50	2.0	4.0	4.0				Y
H	<i>Avena barbata</i>	50	2.0	4.0	4.0				Y
H	<i>Torilis arvensis</i>	50	1.5	3.0	3.0				Y
H	<i>Pedicularis densiflora</i>	50	1.0	2.0	2.0				Y
H	<i>Galium</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Briza</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Vicia</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Artemisia douglasiana</i>	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Stachys</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Helianthella castanea</i>	50	0.1	0.2	0.2				Y
H	<i>Galium porrigens</i>	50	0.1	0.2	0.2				Y
H	<i>Pellaea andromedifolia</i>	50	0.1	0.2	0.2				Y
NV	Lichen	50	2.0	4.0	4.0				Y
NV	Moss	50	0.5	1.0	1.0				Y

***Quercus agrifolia* / *Artemisia californica* Association**

Common Name: Coast Live Oak / California Sagebrush Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak / California Sagebrush Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. The dominant tree is *Quercus agrifolia*. Commonly associated shrubs include *Artemisia californica*, *Diplacus aurantiacus*, *Toxicodendron diversilobum*, and *Sambucus nigra*, and commonly associated herbs include *Bromus diandrus*, *Bromus hordeaceus*, and *Pseudognaphalium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	21.1	10 – 35	7.8	2 – 15
Regenerating or Shrubby Tree	0.1	0 – 0.2	3.5	2 – 5
Shrub	37.9	21 – 63	1.9	0.5 – 5
Herb	23.0	8 – 51	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 395 m, Range 311 – 519 m

Aspect: SE (1), SW (1), Variable (1)

Slope: Mean 26 degrees, Range 21 – 30 degrees

Macro Topography: Middle 1/3 of slope (2), Lower to Upper 1/3 of slope (1)

Large Rock: Mean 14.4%, Range 2 – 30%

Small Rock: Mean 11.7%, Range 10 – 15%

Fines Cover: Mean 20.7%, Range 1 – 50%

Litter Cover: Mean 41.0%, Range 23 – 75%

Soil Texture (field assessed): Fine silty clay (1), Loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sedimentary (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (2)

Site Impacts

This association has moderate non-native plant cover (average 24.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Avena* sp., *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Hirschfeldia incana*, *Silybum marianum*, *Torilis arvensis*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Allen et al. 1989, Evens and San 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC114

Contra Costa County (n=0):

Santa Clara Co. (n=2): SCRUZ549, VAWA055

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	21.0	10.0	35.0	Y	Y		Y
T	<i>Umbellularia californica</i>	33	0.1	0.2	0.2				
T	Standing snag	33	0.1	0.2	0.2				
R	<i>Quercus agrifolia</i> *	33	0.1	0.4	0.4				
R	<i>Umbellularia californica</i> *	33	0.1	0.4	0.4				
S	<i>Artemisia californica</i>	100	13.3	10.0	20.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	100	3.2	0.2	9.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	3.0	1.0	5.0	Y			Y
S	<i>Sambucus nigra</i>	67	1.3	1.0	3.0				Y
S	<i>Prunus ilicifolia</i>	33	12.5	37.5	37.5				
S	<i>Baccharis pilularis</i>	33	1.7	5.0	5.0				
S	<i>Ribes californicum</i>	33	1.0	3.0	3.0				
S	<i>Rhamnus ilicifolia</i>	33	0.1	0.2	0.2				
S	<i>Clematis</i> sp.	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	67	13.8	4.0	37.5				Y
H	<i>Bromus hordeaceus</i>	67	1.7	2.0	3.0				Y

Quercus agrifolia / *Artemisia californica* Association
Quercus agrifolia Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Pseudognaphalium californicum</i>	67	0.2	0.2	0.5				Y
H	<i>Carduus pycnocephalus</i>	33	3.3	10.0	10.0				
H	<i>Vulpia myuros</i>	33	1.3	4.0	4.0				
H	<i>Avena</i> sp.	33	1.3	4.0	4.0				
H	<i>Avena barbata</i>	33	0.7	2.0	2.0				
H	<i>Melica</i> sp.	33	0.3	1.0	1.0				
H	<i>Elymus glaucus</i>	33	0.3	1.0	1.0				
H	<i>Bromus madritensis</i>	33	0.2	0.5	0.5				
H	<i>Silybum marianum</i>	33	0.2	0.5	0.5				
H	<i>Scrophularia californica</i>	33	0.2	0.5	0.5				
H	<i>Phacelia</i> sp.	33	0.2	0.5	0.5				
H	<i>Solanum umbelliferum</i>	33	0.2	0.5	0.5				
H	<i>Hirschfeldia incana</i>	33	0.2	0.5	0.5				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Galium aparine</i>	33	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	33	0.1	0.2	0.2				
H	<i>Brassica nigra</i>	33	0.1	0.2	0.2				
NV	Moss	33	0.3	1.0	1.0				

***Quercus agrifolia* / grass Association**

Common Name: California Live Oak / Grass Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The California Live Oak / Grass Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus agrifolia*, and *Umbellularia californica* is often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, and *Sanicula crassicaulis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	2.5	0 – 25	12.5	5 – 20
Hardwood	32.2	19 – 50	13.0	5 – 35
Regenerating or Shrubby Tree	2.6	0 – 11	4.2	0 – 15
Shrub	2.4	0 – 8	1.3	0.5 – 5
Herb	20.4	3 – 37	0.3	0 – 1

Local Environmental Description

Elevation: Mean 298 m, Range 105 – 518 m

Aspect: NE (3), NW (3), Variable (3), Flat (1), SW (1)

Slope: Mean 22 degrees, Range 0 – 40 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 2.1%, Range 0 – 8%

Small Rock: Mean 2.9%, Range 0 – 19%

Fines Cover: Mean 21.6%, Range 1 – 74%

Litter Cover: Mean 71.7%, Range 20 – 96%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine silty clay loam (2), Medium loam (1), Medium silt loam (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Franciscan melange (5), Sandstone and other sedimentary (2), Sedimentary (2), Shale and other sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5), Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 28.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Stellaria media*, and *Torilis arvensis*.

Classification Comments

None.

References: AECOM 2013, Allen et al. 1989, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2015, Shuford and Timossi 1989, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=11; Alameda County (n=6): ALCC040, ALCC115, ALCCREC011, AW002, AW033, SUNOL017

Contra Costa County (n=5): ALCC151, ALCC159, EBAY0032, SPCCA-041, SPCCB-089

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	30.7	18.0	50.0	Y	Y		Y
T	<i>Umbellularia californica</i>	64	1.0	0.2	4.0				Y
T	<i>Aesculus californica</i>	36	0.1	0.2	1.0				
R	<i>Quercus agrifolia</i>*	55	1.4	0.2	6.2				Y
R	<i>Umbellularia californica</i> *	36	0.8	0.2	6.0				
S	<i>Toxicodendron diversilobum</i>	91	1.6	0.2	8.0	Y		Y	Y
S	<i>Heteromeles arbutifolia</i>	36	0.2	0.1	2.0				
S	<i>Diplacus aurantiacus</i>	27	0.2	0.2	2.0				
H	<i>Bromus diandrus</i>	91	10.4	0.2	30.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	82	1.3	0.2	3.0	Y			Y
H	<i>Avena barbata</i>	64	3.7	0.2	20.0				Y
H	<i>Sanicula crassicaulis</i>	55	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	36	0.7	0.2	4.0				
H	<i>Torilis arvensis</i>	36	0.3	0.2	2.0				
H	<i>Claytonia perfoliata</i>	27	0.7	0.2	5.0				
H	<i>Galium aparine</i>	27	0.3	0.2	2.0				
H	<i>Elymus glaucus</i>	27	0.1	0.2	1.0				
H	<i>Chlorogalum pomeridianum</i>	27	0.1	0.2	0.2				
H	<i>Stellaria media</i>	27	0.1	0.2	0.2				
H	<i>Adiantum jordanii</i>	27	0.1	0.2	0.2				

***Quercus agrifolia* / *Toxicodendron diversilobum* Association**

Common Name: Coast Live Oak / Poison Oak Woodland

Alliance: *Quercus agrifolia* Forest & Woodland Alliance

Local Vegetation Description

The Coast Live Oak / Poison Oak Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. The dominant tree is *Quercus agrifolia*, and *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Elymus glaucus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 1	20.0	10 – 35
Hardwood	30.4	5 – 65	11.9	5 – 20
Regenerating or Shrubby Tree	1.2	0 – 3	2.5	0.5 – 5
Shrub	20.4	7 – 42	1.9	0 – 10
Herb	7.6	1 – 25	0.5	0 – 1

Local Environmental Description

Elevation: Mean 266 m, Range 80 – 510 m

Aspect: NE (5), NW (2), SE (1), SW (1)

Slope: Mean 20 degrees, Range 3 – 30 degrees

Macro Topography: Lower 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (2), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 0.7%, Range 0 – 3%

Small Rock: Mean 4.4%, Range 0 – 20%

Fines Cover: Mean 20.3%, Range 3 – 40%

Litter Cover: Mean 72.2%, Range 40 – 92%

Soil Texture (field assessed): Medium silt loam (2), Medium to very fine, sandy loam (2), Clay (1), Medium silt (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (2), Shale and other sedimentary (2), Basalt (1), Mixed sedimentary (1), Sandstone (1), Sandstone and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Diablo Range (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5)

Site Impacts

This association has low non-native plant cover (average 10.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

None.

References: AECOM 2013, Allen et al. 1989, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=9; Alameda County (n=4): ALCCREC101, AW028, EBRTA215, LLNL096

Contra Costa County (n=5): ALCC008, EBAY0033, EBRTA102, SPCCA-044,
SPCCB-087

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	27.4	4.0	60.0	Y	Y		Y
T	<i>Umbellularia californica</i>	78	1.0	0.2	5.0	Y			Y
T	<i>Aesculus californica</i>	33	0.3	0.2	2.0				
T	<i>Arbutus menziesii</i>	22	0.4	0.2	3.0				
T	<i>Quercus lobata</i>	22	0.4	0.2	3.0				
R	<i>Quercus agrifolia</i>*	33	0.4	0.4	2.0				
R	<i>Arbutus menziesii</i> *	33	0.1	0.2	0.4				
R	<i>Umbellularia californica</i> *	22	0.4	1.2	2.0				
R	<i>Pinus radiata</i>	22	0.0	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	9.9	4.0	20.0	Y	Y		Y
S	<i>Rubus ursinus</i>	44	2.6	1.0	15.0				
S	<i>Baccharis pilularis</i>	33	1.4	0.2	12.0				
S	<i>Diplacus aurantiacus</i>	33	0.3	0.2	2.0				
S	<i>Lonicera</i> sp.	22	0.4	2.0	2.0				
S	<i>Symphoricarpos mollis</i>	22	0.4	0.2	3.0				
S	<i>Heteromeles arbutifolia</i>	22	0.0	0.2	0.2				
S	<i>Rosa californica</i>	22	0.0	0.2	0.2				
H	<i>Elymus glaucus</i>	56	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	44	0.4	0.2	3.0				
H	<i>Carduus pycnocephalus</i>	44	0.4	0.2	2.0				
H	<i>Bromus diandrus</i>	33	0.9	0.2	7.0				
H	<i>Sanicula crassicaulis</i>	33	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	22	0.5	0.2	4.0				
H	<i>Dryopteris arguta</i>	22	0.0	0.2	0.2				
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	22	0.0	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	22	0.0	0.2	0.2				
NV	Moss	44	0.8	0.2	5.0				

***Quercus chrysolepis* (tree) Forest & Woodland Alliance**



Common Name: Canyon live oak forest and woodland

NVC Alliance Code: A3349. *Quercus chrysolepis* - *Quercus kelloggii* Forest & Woodland Alliance

Statewide Description

Quercus chrysolepis is dominant or co-dominant in the tree canopy with *Abies concolor*, *Acer macrophyllum*, *Arbutus menziesii*, *Calocedrus decurrens*, *Notholithocarpus densiflorus*, *Pinus coulteri*, *Pinus lambertiana*, *Pinus monophylla*, *Pinus ponderosa*, *Pseudotsuga menziesii*, *Quercus garryana* var. *garryana*, *Quercus kelloggii*, *Quercus wislizeni*, and *Umbellularia californica*.

Quercus chrysolepis grows on the east side of the Sierra Nevada, in the Mojave Desert, and in most of cismontane California typically at middle and upper elevations (Griffin and Critchfield 1972). *Quercus chrysolepis* is present in many different alliances and it shares dominance with several other tree species in this alliance (Allen-Diaz et al. 2007). Most *Quercus chrysolepis* stands that are free of recent major disturbance have trees of all sizes and all ages (Tirmenstein 1989b, Thornburgh 1990b).

Local Vegetation Description

The Canyon live oak forest and woodland Alliance forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus chrysolepis*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus chrysolepis* and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, *Diplacus aurantiacus*, *Holodiscus discolor*, and *Lonicera hispidula*, and commonly associated herbs include *Bromus diandrus*, *Torilis arvensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Dryopteris arguta*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	36.2	26 – 50	11.5	2 – 20
Regenerating or Shrubby Tree	3.1	1 – 5	3.5	1 – 10
Shrub	10.2	1 – 22	1.0	0 – 2
Herb	9.0	1 – 20	0.5	0 – 1

Local Membership Rule

Quercus chrysolepis is > 50% relative cover in the tree canopy, or > 30% relative cover with *Arbutus menziesii* or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 717 m, Range 503 – 1113 m

Aspect: NE (3), NW (2)

Slope: Mean 31 degrees, Range 24 – 40 degrees

Macro Topography: Middle 1/3 of slope to Ridgetop (2), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 3.9%, Range 0 – 10%

Small Rock: Mean 7.6%, Range 0 – 23%

Fines Cover: Mean 30.4%, Range 22 – 40%

Litter Cover: Mean 56.4%, Range 30 – 75%

Soil Texture (field assessed): Medium loam (2), Moderately fine clay loam (2), Medium to very fine, sandy loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone (1), Sedimentary (1), Serpentine (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Site Impacts

This alliance has low non-native plant cover (average 5.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Brachypodium distachyon, *Briza maxima*, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Polypogon monspeliensis*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Quercus chrysolepis

Quercus chrysolepis – *Umbellularia californica*

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2005, Evens et al. 2006, Keeler-Wolf et al. 2003a, Keeler-Wolf et al. 2003b, Klein and Evens 2005, Klein et al. 2007, Meier 1979, NPS-SEKI 2009, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=5; Alameda County (n=2): ALCC073, ALCC080

Contra Costa County (n=3): ALCC023, ALCC061, ALCC152

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus chrysolepis</i>	100	25.2	14.0	45.0	Y	Y		Y
T	<i>Umbellularia californica</i>	80	10.0	2.0	20.0	Y			Y
T	<i>Quercus kelloggii</i>	20	0.8	4.0	4.0				
T	<i>Quercus wislizeni</i>	20	0.6	3.0	3.0				
T	<i>Aesculus californica</i>	20	0.4	2.0	2.0				
T	Standing snag	20	0.0	0.2	0.2				
R	<i>Quercus chrysolepis</i> *	100	1.4	0.1	4.0	Y		Y	Y
R	<i>Umbellularia californica</i> *	80	2.0	0.4	5.2	Y	Y		Y
R	<i>Quercus kelloggii</i> *	20	0.1	0.4	0.4				
R	<i>Quercus wislizeni</i> *	20	0.1	0.4	0.4				
R	<i>Quercus agrifolia</i>	20	0.0	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	60	8.0	2.0	30.0				Y
S	<i>Holodiscus discolor</i>	60	1.0	0.2	4.0				Y
S	<i>Lonicera hispidula</i>	60	0.5	0.2	2.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Diplacus aurantiacus</i>	60	0.4	0.2	1.0				Y
S	<i>Rubus ursinus</i>	40	0.4	0.2	2.0				
S	<i>Symphoricarpos albus</i>	40	0.4	1.0	1.0				
S	<i>Symphoricarpos mollis</i>	40	0.2	0.2	1.0				
S	<i>Rosa californica</i>	40	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	20	0.8	4.0	4.0				
S	<i>Rosa gymnocarpa</i>	20	0.0	0.2	0.2				
S	<i>Ribes menziesii</i>	20	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	80	2.3	0.2	10.0	Y			Y
H	<i>Torilis arvensis</i>	80	0.8	0.2	2.0	Y			Y
H	<i>Dryopteris arguta</i>	60	1.4	0.2	5.0				Y
H	<i>Carduus pycnocephalus</i>	60	0.4	0.2	1.0				Y
H	<i>Cynosurus echinatus</i>	60	0.3	0.2	1.0				Y
H	<i>Galium aparine</i>	40	0.6	0.2	3.0				
H	<i>Elymus glaucus</i>	40	0.2	0.2	1.0				
H	<i>Clinopodium douglasii</i>	40	0.2	0.2	1.0				
H	<i>Bromus rubens</i>	40	0.2	0.2	1.0				
H	<i>Sanicula crassicaulis</i>	40	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	40	0.1	0.1	0.2				
H	<i>Melica torreyana</i>	20	0.6	3.0	3.0				
H	<i>Claytonia perfoliata</i>	20	0.6	3.0	3.0				
H	<i>Rafinesquia californica</i>	20	0.2	1.0	1.0				
H	<i>Bromus madritensis</i>	20	0.0	0.2	0.2				
H	<i>Bromus carinatus</i>	20	0.0	0.2	0.2				
H	<i>Briza maxima</i>	20	0.0	0.2	0.2				
H	<i>Melica imperfecta</i>	20	0.0	0.2	0.2				
H	<i>Avena barbata</i>	20	0.0	0.2	0.2				
H	<i>Madia</i> sp.	20	0.0	0.2	0.2				
H	<i>Osmorhiza berteroi</i>	20	0.0	0.2	0.2				
H	<i>Pentagramma triangularis</i>	20	0.0	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	20	0.0	0.2	0.2				
H	<i>Scrophularia californica</i>	20	0.0	0.2	0.2				
H	<i>Achillea millefolium</i>	20	0.0	0.2	0.2				
H	<i>Brachypodium distachyon</i>	20	0.0	0.2	0.2				
H	<i>Agrostis pallens</i>	20	0.0	0.2	0.2				
NV	Moss	80	0.5	0.2	1.0	Y	Y		Y
NV	Lichen	40	0.1	0.2	0.2				

***Quercus chrysolepis* – *Umbellularia californica* Association**

Common Name: Canyon Live Oak – California Bay Woodland

Alliance: *Quercus chrysolepis* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Canyon Live Oak – California Bay Association forms an open to intermittent tree canopy with an open shrub understory. The dominant trees are *Quercus chrysolepis* and *Umbellularia californica*, which also dominate the regenerating or shrubby tree layer. Commonly associated shrubs include *Lonicera hispidula*, *Toxicodendron diversilobum*, *Diplacus aurantiacus*, *Holodiscus discolor*, *Rosa californica*, *Rubus ursinus*, and *Symphoricarpos albus*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Dryopteris arguta*, *Torilis arvensis*, *Clinopodium douglasii*, *Cynosurus echinatus*, *Galium aparine*, and *Triteleia laxa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	35.0	28 – 45	15.0	10 – 20
Regenerating or Shrubby Tree	3.4	1 – 5	4.5	1 – 10
Shrub	15.0	3 – 22	0.9	0 – 2
Herb	12.7	3 – 20	0.6	0 – 1

Local Environmental Description

Elevation: Mean 634 m, Range 503 – 850 m

Aspect: NE (2), NW (1)

Slope: Mean 36 degrees, Range 29 – 40 degrees

Macro Topography: Middle 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 3.5%, Range 0 – 10%

Small Rock: Mean 0.3%, Range 0 – 0%

Fines Cover: Mean 30.7%, Range 22 – 40%

Litter Cover: Mean 64.0%, Range 58 – 75%

Soil Texture (field assessed): Medium loam (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 6.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Quercus chrysolepis – *Umbellularia californica* Association
Quercus chrysolepis (tree) Forest & Woodland Alliance

Brachypodium distachyon, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Keeler-Wolf et al. 2003b, Klein et al. 2007, NPS-SEKI 2009, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4? **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=3; **Alameda County (n=1):** ALCC080

Contra Costa County (n=2): ALCC023, ALCC061

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus chrysolepis</i>	100	19.0	14.0	25.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	16.0	10.0	20.0	Y		Y	Y
T	<i>Quercus wislizeni</i>	33	1.0	3.0	3.0				
T	<i>Aesculus californica</i>	33	0.7	2.0	2.0				
R	<i>Umbellularia californica</i> *	100	3.2	1.2	5.2	Y	Y		Y
R	<i>Quercus chrysolepis</i> *	100	0.9	0.1	2.2	Y			Y
R	<i>Quercus wislizeni</i> *	33	0.1	0.4	0.4				
R	<i>Quercus agrifolia</i>	33	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	13.3	2.0	30.0	Y	Y		Y
S	<i>Lonicera hispidula</i>	100	0.8	0.2	2.0	Y			Y
S	<i>Holodiscus discolor</i>	67	1.4	0.2	4.0				Y
S	<i>Rubus ursinus</i>	67	0.7	0.2	2.0				Y
S	<i>Symphoricarpos albus</i>	67	0.7	1.0	1.0				Y
S	<i>Diplacus aurantiacus</i>	67	0.4	0.2	1.0				Y
S	<i>Rosa californica</i>	67	0.1	0.2	0.2				Y
S	<i>Symphoricarpos mollis</i>	33	0.3	1.0	1.0				
S	<i>Rosa gymnocarpa</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	3.7	0.2	10.0	Y			Y
H	<i>Dryopteris arguta</i>	100	2.4	0.2	5.0	Y		Y	Y
H	<i>Torilis arvensis</i>	100	1.1	0.2	2.0	Y			Y

Quercus chrysolepis – *Umbellularia californica* Association
Quercus chrysolepis (tree) Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Carduus pycnocephalus</i>	100	0.7	0.2	1.0	Y			Y
H	<i>Galium aparine</i>	67	1.1	0.2	3.0				Y
H	<i>Clinopodium douglasii</i>	67	0.4	0.2	1.0				Y
H	<i>Cynosurus echinatus</i>	67	0.4	0.2	1.0				Y
H	<i>Triteleia laxa</i>	67	0.1	0.1	0.2				Y
H	<i>Melica torreyana</i>	33	1.0	3.0	3.0				
H	<i>Elymus glaucus</i>	33	0.3	1.0	1.0				
H	<i>Rafinesquia californica</i>	33	0.3	1.0	1.0				
H	<i>Brachypodium distachyon</i>	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Avena barbata</i>	33	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				
H	<i>Bromus carinatus</i>	33	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Madia</i> sp.	33	0.1	0.2	0.2				
H	<i>Osmorhiza berteroi</i>	33	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	33	0.1	0.2	0.2				
H	<i>Agrostis pallens</i>	33	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	33	0.1	0.2	0.2				
H	<i>Melica californica</i>	33	0.0	0.1	0.1				
NV	Moss	67	0.4	0.2	1.0				Y
NV	Lichen	33	0.1	0.2	0.2				

***Quercus chrysolepis* tree Association**

Common Name: Canyon Live Oak Woodland

Alliance: *Quercus chrysolepis* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Canyon Live Oak Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus chrysolepis*, and *Quercus kelloggii* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus chrysolepis*, and those that are often present include *Quercus kelloggii* and *Umbellularia californica*. Commonly associated shrubs include *Heteromeles arbutifolia*, *Holodiscus discolor*, *Diplacus aurantiacus*, *Ribes menziesii*, and *Symphoricarpos mollis*, and commonly associated herbs include *Briza maxima*, *Bromus diandrus*, *Bromus rubens*, *Claytonia perfoliata*, *Cynosurus echinatus*, *Elymus glaucus*, *Galium* sp., *Melica imperfecta*, *Polypogon monspeliensis*, *Sanicula crassicaulis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	38.0	26 – 50	8.0	2 – 15
Regenerating or Shrubby Tree	2.5	1 – 4	2.5	1 – 5
Shrub	3.0	1 – 5	1.1	0.5 – 2
Herb	3.5	1 – 6	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 842 m, Range 571 – 1113 m

Aspect: NE (1), NW (1)

Slope: Mean 25 degrees, Range 24 – 25 degrees

Macro Topography: Middle 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 4.5%, Range 1 – 8%

Small Rock: Mean 18.5%, Range 14 – 23%

Fines Cover: Mean 30.0%, Range 23 – 37%

Litter Cover: Mean 45.0%, Range 30 – 60%

Soil Texture (field assessed): Medium loam (1), Moderately fine clay loam (1)

Geology (field or map data): Serpentine (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 2.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Briza maxima*, *Bromus diandrus*, *Cynosurus echinatus*, *Polypogon monspeliensis*, and *Torilis arvensis*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Evens and San 2005, Evens et al. 2006, Keeler-Wolf et al. 2003b, Klein and Evens 2005, Klein et al. 2007, Meier 1979, Reyes et al. 2020a, Reyes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** ALCC073

Contra Costa County (n=1): ALCC152

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus chrysolepis</i>	100	34.5	24.0	45.0	Y	Y		Y
T	<i>Quercus kelloggii</i>	50	2.0	4.0	4.0				Y
T	<i>Umbellularia californica</i>	50	1.0	2.0	2.0				Y
R	<i>Quercus chrysolepis</i>*	100	2.2	0.4	4.0	Y	Y		Y
R	<i>Umbellularia californica</i> *	50	0.2	0.4	0.4				Y
R	<i>Quercus kelloggii</i> *	50	0.2	0.4	0.4				Y
S	<i>Heteromeles arbutifolia</i>	50	2.0	4.0	4.0				Y
S	<i>Holodiscus discolor</i>	50	0.5	1.0	1.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.5	1.0	1.0				Y
S	<i>Ribes menziesii</i>	50	0.1	0.2	0.2				Y
S	<i>Symphoricarpos mollis</i>	50	0.1	0.2	0.2				Y
H	<i>Claytonia perfoliata</i>	50	1.5	3.0	3.0				Y
H	<i>Torilis arvensis</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus rubens</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y
H	<i>Melica imperfecta</i>	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Galium</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Elymus glaucus</i>	50	0.1	0.2	0.2				Y
H	<i>Briza maxima</i>	50	0.1	0.2	0.2				Y
NV	Moss	100	0.6	0.2	1.0	Y	Y		Y
NV	Lichen	50	0.1	0.2	0.2				Y

***Quercus douglasii* Forest & Woodland Alliance**



Common Name: Blue oak woodland and forest

NVC Alliance Code: A3348. *Quercus douglasii* - *Quercus wislizeni* - *Pinus sabiniana*
Woodland Alliance

Statewide Description

Quercus douglasii is dominant or co-dominant in the tree canopy with *Aesculus californica*, *Juniperus californica*, *Pinus sabiniana*, *Quercus agrifolia*, *Quercus lobata*, and *Quercus wislizeni*.

The *Quercus douglasii* Alliance, in its varied forms, is one of the most extensive and conspicuous oak woodland vegetation types in the state. In some cases, oak savannas of *Quercus douglasii* trees are scattered across the landscape, and in other cases, trees of mixed composition form a closed tree canopy. Genetic variation is high in the species. Environmental factors controlling this variation include moisture availability, substrate, fire, and other disturbances (Allen-Diaz and Bartolome 1992, Allen-Diaz et al. 2007, Keeley 2002c). Named *Quercus douglasii* hybrids include those with *Q. john-tuckeri* (*Quercus* × *alvordiana*), *Q. garryana* (*Quercus* × *eplingii*), and *Q. lobata* (*Quercus* × *jolonensis*) (Griffin and Critchfield 1972).

Local Vegetation Description

The Blue oak woodland and forest Alliance forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus douglasii*.

Commonly herbs include *Bromus diandrus*, *Avena barbata*, and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.5	0 – 14	9.0	1 – 35
Hardwood	26.0	8 – 60	9.0	2 – 20
Regenerating or Shrubby Tree	0.8	0 – 7	1.9	0 – 10
Shrub	4.7	0 – 29	1.7	0 – 5
Herb	34.4	3 – 90	0.4	0 – 1

Local Membership Rule

Quercus douglasii > 50% relative cover in the tree canopy, or > 30% relative cover with *Aesculus californica*, *Pinus sabiniana*, *Quercus agrifolia*, or *Arbutus menziesii*.

Local Environmental Description

Elevation: Mean 324 m, Range 83 – 763 m

Aspect: NE (12), NW (11), Variable (9), SE (3), Flat (1), SW (1)

Slope: Mean 22 degrees, Range 0 – 40 degrees

Macro Topography: Middle 1/3 of slope (9), Upper 1/3 of slope (7), Lower 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Middle 1/3 of slope to Ridgetop (2), Middle to Upper 1/3 of slope (2), Bottom (1), Bottom to Upper 1/3 of slope (1), Entire slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 1.8%, Range 0 – 10%

Small Rock: Mean 5.6%, Range 0 – 33%

Fines Cover: Mean 36.1%, Range 1 – 91%

Litter Cover: Mean 44.4%, Range 0 – 90%

Soil Texture (field assessed): Moderately fine silty clay loam (5), Moderately fine clay loam (5), Medium to very fine, sandy loam (5), Loam (3), Moderately coarse, sandy loam (3), Moderately fine sandy clay loam (2), Medium to very fine, loamy sand (2), Fine clay (1), Medium silt loam (1)

Geology (field or map data): Sedimentary (13), Franciscan melange (9), Sandstone and other sedimentary (4), Shale and other sedimentary (3), Alluvium (1), Metamorphic (1), Sandstone (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (8), Diablo Range (8), Western Diablo Range (3), Eastern Hills (2)

Contra Costa County Subsections: Suisun Hills and Valleys (10), East Bay Hills - Mount Diablo (8), Eastern Hills (3)

Site Impacts

This alliance has moderate non-native plant cover (average 40.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Lolium perenne*, *Torilis arvensis*, and *Trifolium hirtum*.

Associations in Alameda & Contra Costa Counties

Quercus douglasii – *Aesculus californica* / grass

Quercus douglasii – *Quercus agrifolia*

Quercus douglasii – *Quercus wislizeni*

Quercus douglasii / *Arctostaphylos manzanita* / herbaceous

Quercus douglasii / *Ericameria linearifolia*

Quercus douglasii / Mixed herbaceous

Classification Comments

None.

References: Allen et al. 1989, Allen et al. 1991, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2004, Evens et al. 2006, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, NPS-SEKI 2009, O’Neil and Egan 2004, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, VegCAMP 2015a

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=42; Alameda County (n=21): ALCC033, ALCC227, ALCC229, ALCC273, ALCC756, ALCC830, ALCCREC214, AW003, AW023, EBAY0056, GARA-02, GUMP-002, GUMP-005, GUMP-016, LLNL050, LLNL072, LLNL095, MULL-01, SVRA_CA005, SVRA_CA006, SVRA_CA014

Contra Costa County (n=21): ALCC049, ALCC053, ALCC060, ALCC066, ALCC112, ALCC116, ALCC119, ALCC122, ALCC144, ALCC220, ALCC238, ALCCREC007, ALCCREC105, JOMU008, JOMU025, JOMU029, JOMU034, JOMU037, JOMU039, SPCCA-036, X2105181631

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	21.6	5.0	60.0	Y	Y		Y
T	<i>Aesculus californica</i>	38	1.5	0.2	15.0				
T	<i>Quercus agrifolia</i>	36	3.0	0.1	26.0				
R	<i>Quercus douglasii</i>*	21	0.4	0.1	11.0				
S	<i>Toxicodendron diversilobum</i>	45	0.5	0.1	5.0				
S	<i>Artemisia californica</i>	33	2.4	0.1	29.0				
H	<i>Bromus diandrus</i>	81	7.2	0.2	40.0	Y			Y
H	<i>Carduus pycnocephalus</i>	67	2.1	0.1	20.0				Y
H	<i>Avena barbata</i>	57	3.1	0.2	20.0				Y
H	<i>Bromus hordeaceus</i>	48	2.0	0.1	20.0				
H	<i>Bromus rubens</i>	48	1.5	0.1	14.0				
H	<i>Achillea millefolium</i>	45	0.2	0.1	5.0				
H	<i>Lolium perenne</i>	43	2.3	0.2	20.0				
H	<i>Torilis arvensis</i>	33	0.3	0.1	3.0				
H	<i>Brachypodium distachyon</i>	24	2.8	0.2	24.8				
H	<i>Avena fatua</i>	21	4.7	0.4	60.0				
H	<i>Trifolium hirtum</i>	21	0.1	0.1	1.0				
H	<i>Triteleia laxa</i>	21	0.1	0.1	1.0				
NV	Moss	29	0.1	0.2	1.0				

***Quercus douglasii* – *Aesculus californica* / grass Association**

Common Name: Blue Oak – California Buckeye / Grass Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak – California Buckeye / Grass Association forms an open tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus douglasii*, and *Aesculus californica* is characteristically present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus* and *Bromus rubens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 2	17.5	15 – 20
Hardwood	20.2	8 – 38	10.0	5 – 15
Regenerating or Shrubby Tree	0.4	0 – 2	0.3	0 – 0.5
Shrub	1.9	0 – 10	0.9	0 – 2
Herb	24.8	8 – 55	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 434 m, Range 83 – 657 m

Aspect: NW (3), Variable (3), E (1), NE (1)

Slope: Mean 21 degrees, Range 5 – 40 degrees

Macro Topography: Middle 1/3 of slope (2), Upper 1/3 of slope (2), Bottom to Upper 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1)

Large Rock: Mean 3.7%, Range 0 – 15%

Small Rock: Mean 11.8%, Range 0 – 28%

Fines Cover: Mean 40.2%, Range 0 – 84%

Litter Cover: Mean 38.7%, Range 1 – 86%

Soil Texture (field assessed): Moderately fine clay loam (2), Loam (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (4), Sandstone and other sedimentary (3), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Diablo Range (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Other Subsections: Diablo Range (2), Western Diablo Range (2)

Site Impacts

This association has moderate non-native plant cover (average 23.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Geranium molle*, *Hordeum murinum*, *Lolium perenne*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Evens et al. 2004, Klein et al. 2007, NPS-SEKI 2009, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=9; Alameda County (n=3): GUMP-005, SVRA_CA005, SVRA_CA006

Contra Costa County (n=2): ALCC112, ALCC116

Santa Clara Co. (n=4): SCPOF001, SPCCA-010, SPCCB-011, VAWA067

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	12.8	5.0	25.0	Y	Y		Y
T	<i>Aesculus californica</i>	100	4.7	1.0	12.0	Y			Y
R	<i>Aesculus californica</i> *	22	0.0	0.1	0.2				
R	<i>Quercus douglasii</i> *	22	0.0	0.1	0.2				
S	<i>Toxicodendron diversilobum</i>	56	1.3	0.1	10.0				Y
S	<i>Artemisia californica</i>	44	0.2	0.1	1.0				
S	<i>Ribes californicum</i>	22	0.1	0.1	0.5				
S	<i>Heteromeles arbutifolia</i>	22	0.0	0.1	0.2				
H	<i>Bromus diandrus</i>	67	2.0	0.2	5.0				Y
H	<i>Bromus rubens</i>	56	0.9	0.2	3.0				Y
H	<i>Lolium perenne</i>	44	2.3	0.2	10.0				
H	<i>Bromus hordeaceus</i>	44	0.5	0.2	2.8				
H	<i>Carduus pycnocephalus</i>	44	0.4	0.2	1.9				
H	<i>Triteleia laxa</i>	33	0.1	0.1	0.2				
H	<i>Avena barbata</i>	22	1.6	1.0	13.1				
H	<i>Brachypodium distachyon</i>	22	0.7	3.0	3.3				
H	<i>Galium aparine</i>	22	0.7	0.2	6.0				
H	<i>Hordeum murinum</i>	22	0.5	0.1	4.0				
H	<i>Geranium molle</i>	22	0.4	0.5	3.0				
H	<i>Claytonia perfoliata</i>	22	0.3	1.0	2.0				
H	<i>Elymus glaucus</i>	22	0.2	0.5	1.4				
H	<i>Geranium dissectum</i>	22	0.2	0.2	1.4				
H	<i>Pterostegia drymarioides</i>	22	0.1	0.2	1.0				
H	<i>Achillea millefolium</i>	22	0.1	0.5	0.5				
H	<i>Torilis arvensis</i>	22	0.0	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	22	0.0	0.1	0.1				
H	<i>Clarkia</i> sp.	22	0.0	0.1	0.1				
NV	Moss	22	0.2	1.0	1.0				

***Quercus douglasii* – *Quercus agrifolia* Association**

Common Name: Blue Oak – Coast Live Oak Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak – Coast Live Oak Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant trees are *Quercus agrifolia* and *Quercus douglasii*, and *Aesculus californica* is often present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Avena barbata*, *Bromus diandrus*, *Bromus rubens*, *Carduus pycnocephalus*, *Achillea millefolium*, *Lolium perenne*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	1.8	0 – 14	10.8	1 – 35
Hardwood	35.0	18 – 49	11.3	5 – 20
Regenerating or Shrubby Tree	2.0	0 – 7	1.7	0 – 5
Shrub	2.0	0 – 5	2.0	0 – 5
Herb	34.1	15 – 75	0.6	0 – 1

Local Environmental Description

Elevation: Mean 266 m, Range 122 – 559 m

Aspect: Variable (3), NE (2), NW (2), Flat (1)

Slope: Mean 23 degrees, Range 0 – 38 degrees

Macro Topography: Middle 1/3 of slope (2), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.6%, Range 0 – 3%

Small Rock: Mean 2.4%, Range 0 – 5%

Fines Cover: Mean 29.7%, Range 5 – 84%

Litter Cover: Mean 47.0%, Range 15 – 75%

Soil Texture (field assessed): Moderately fine clay loam (2), Loam (1), Medium silt loam (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (3), Metamorphic (1), Sandstone (1)

Alameda County Subsections: Western Diablo Range (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (4), East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 34.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Lolium perenne*, and *Torilis arvensis*.

Classification Comments

None.

References: Allen et al. 1989, Allen et al. 1991, Buck-Diaz et al. 2023, Klein et al. 2015, O'Neil and Egan 2004, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=8; Alameda County (n=3): ALCC033, ALCC227, ALCCREC214

Contra Costa County (n=5): ALCC060, ALCC119, ALCC220, JOMU034, JOMU037

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	20.1	9.0	35.0	Y		Y	Y
T	<i>Quercus agrifolia</i>	100	14.1	3.0	26.0	Y		Y	Y
T	<i>Aesculus californica</i>	63	3.0	0.2	15.0				Y
T	<i>Pinus sabiniana</i>	25	1.8	0.2	14.0				
T	<i>Umbellularia californica</i>	25	1.0	3.0	5.0				
R	<i>Quercus douglasii</i> *	38	1.4	0.1	11.0				
R	<i>Quercus agrifolia</i> *	38	0.9	0.2	4.2				
R	<i>Pinus sabiniana</i> *	38	0.7	0.2	4.0				
R	<i>Aesculus californica</i> *	38	0.1	0.1	0.2				
S	<i>Toxicodendron diversilobum</i>	75	1.6	0.2	5.0	Y	Y		Y
S	<i>Heteromeles arbutifolia</i>	38	0.2	0.2	1.0				
H	<i>Bromus diandrus</i>	88	12.0	1.0	40.0	Y			Y
H	<i>Carduus pycnocephalus</i>	75	3.1	1.0	10.0	Y			Y
H	<i>Avena barbata</i>	75	2.4	0.2	7.0	Y			Y
H	<i>Bromus rubens</i>	75	2.2	0.2	5.0	Y			Y
H	<i>Torilis arvensis</i>	63	0.8	0.1	3.0				Y
H	<i>Lolium perenne</i>	50	3.4	0.2	20.0				Y
H	<i>Achillea millefolium</i>	50	0.2	0.1	1.0				Y
H	<i>Perideridia kelloggii</i>	25	1.3	5.0	5.0				
H	<i>Elymus glaucus</i>	25	0.5	1.0	3.0				
H	<i>Nassella pulchra</i>	25	0.3	0.2	2.0				
H	<i>Triteleia laxa</i>	25	0.2	0.2	1.0				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	25	0.1	0.2	0.2				
NV	Moss	38	0.1	0.2	0.2				

***Quercus douglasii* – *Quercus wislizeni* Association**

Common Name: Blue Oak – Interior Live Oak Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak – Interior Live Oak Association forms an open tree canopy with an open shrub understory. The dominant tree is *Quercus douglasii*, and *Quercus wislizeni* is characteristically present. Regenerating or shrubby trees that are often present include *Quercus douglasii*, *Quercus wislizeni*, and *Umbellularia californica*. Commonly associated shrubs include *Arctostaphylos manzanita*, *A. manzanita* ssp. *laevigata*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Achillea millefolium*, *Aira caryophyllea*, *Brachypodium distachyon*, *Bromus diandrus*, *Cynosurus echinatus*, and *Hypochaeris glabra*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	15.0	12 – 18	5.5	2 – 10
Regenerating or Shrubby Tree	0.1	0 – 0	0.3	0 – 0.5
Shrub	3.5	2 – 5	2.5	1 – 5
Herb	29.0	15 – 43	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 464 m, Range 344 – 583 m

Aspect: NE (2)

Slope: Mean 18 degrees, Range 12 – 24 degrees

Macro Topography: Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 8.5%, Range 7 – 10%

Small Rock: Mean 0.6%, Range 0 – 1%

Fines Cover: Mean 78.0%, Range 76 – 80%

Litter Cover: Mean 11.5%, Range 7 – 16%

Soil Texture (field assessed): Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): no data

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has high non-native plant cover (average 56.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus*

hordeaceus, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Erodium botrys*, *Hypochaeris glabra*, *Lolium perenne*, *Silene gallica*, *Torilis arvensis*, *Trifolium glomeratum*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

One survey has significant cover of a rare manzanita, *Arctostaphylos manzanita* ssp. *laevigata* (CRPR 1B.2).

References: Allen et al. 1991, Buck-Diaz et al. 2012, Klein et al. 2007

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): ALCC053, ALCC066

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	12.0	9.0	15.0	Y	Y		Y
T	<i>Quercus wislizeni</i>	100	3.0	3.0	3.0	Y			Y
T	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
R	<i>Umbellularia californica</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus douglasii</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus wislizeni</i> *	50	0.1	0.2	0.2				Y
S	<i>Arctostaphylos manzanita</i>	50	2.5	5.0	5.0				Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	50	1.0	2.0	2.0				Y
S	<i>Toxicodendron diversilobum</i>	50	0.1	0.2	0.2				Y
S	<i>Rhamnus ilicifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Brachypodium distachyon</i>	100	10.1	0.2	20.0	Y			Y
H	<i>Cynosurus echinatus</i>	100	3.1	0.2	6.0	Y			Y
H	<i>Bromus diandrus</i>	100	2.0	1.0	3.0	Y			Y
H	<i>Hypochaeris glabra</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Aira caryophyllea</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Achillea millefolium</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Bromus madritensis</i>	50	7.5	15.0	15.0				Y
H	<i>Avena barbata</i>	50	1.5	3.0	3.0				Y
H	<i>Avena fatua</i>	50	1.0	2.0	2.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Vulpia bromoides</i>	50	1.0	2.0	2.0				Y
H	<i>Vulpia myuros</i>	50	0.5	1.0	1.0				Y
H	<i>Pentagramma triangularis</i>	50	0.5	1.0	1.0				Y
H	<i>Micropus californicus</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium willdenovii</i>	50	0.1	0.2	0.2				Y
H	<i>Erodium botrys</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Briza minor</i>	50	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium glomeratum</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium hirtum</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella villosa</i>	50	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	50	0.1	0.2	0.2				Y
H	<i>Silene gallica</i>	50	0.1	0.1	0.1				Y
H	<i>Galium porrigens</i>	50	0.1	0.1	0.1				Y
NV	Moss	100	0.6	0.2	1.0	Y	Y		Y
NV	Lichen	50	0.1	0.2	0.2				Y

***Quercus douglasii* / *Arctostaphylos manzanita* / herbaceous Association**

Common Name: Blue Oak / Common Manzanita / herbaceous Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak / Common Manzanita / herbaceous Association forms an intermittent tree canopy with an open shrub understory in the single survey available. The dominant tree is *Quercus douglasii*. Commonly associated shrubs include *Arctostaphylos manzanita*, and commonly associated herbs include *Achillea millefolium*, *Avena barbata*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus rubens*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Erodium botrys*, *Lolium perenne*, *Madia* sp., *Microseris* sp., *Silene gallica*, *Torilis arvensis*, *Trifolium hirtum*, *Trifolium willdenovii*, and *Triteleia laxa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.0	37 – 37	3.5	2 – 5
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	20.0	20 – 20	3.5	2 – 5
Herb	42.0	42 – 42	0.8	0.5 – 1

Local Environmental Description

Elevation: 522 m

Aspect: NE (1)

Slope: 5 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 1%

Small Rock: 5%

Fines Cover: 13%

Litter Cover: 80%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (field or map data): no data

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 46.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus*

Quercus douglasii / *Arctostaphylos manzanita* / herbaceous Association
Quercus douglasii Forest & Woodland Alliance

pycnocephalus, *Cynosurus echinatus*, *Erodium botrys*, *Lolium perenne*, *Silene gallica*, *Torilis arvensis*, and *Trifolium hirtum*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC238

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	37.0	37.0	37.0	Y	Y		Y
S	<i>Arctostaphylos manzanita</i>	100	20.0	20.0	20.0	Y	Y		Y
H	<i>Brachypodium distachyon</i>	100	14.0	14.0	14.0	Y			Y
H	<i>Bromus diandrus</i>	100	13.0	13.0	13.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	11.0	11.0	11.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Bromus rubens</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Avena barbata</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Cynosurus echinatus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Trifolium hirtum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Torilis arvensis</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Lolium perenne</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Erodium botrys</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Madia</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Achillea millefolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Silene gallica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Microseris</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium willdenovii</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Triteleia laxa</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y

Quercus douglasii / *Arctostaphylos manzanita* / herbaceous Association
Quercus douglasii Forest & Woodland Alliance

***Quercus douglasii* / *Ericameria linearifolia* Association**

Common Name: Blue Oak / Narrowleaf Goldenbush Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak / Narrowleaf Goldenbush Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus douglasii*. Commonly associated shrubs include *Artemisia californica* or *Ericameria linearifolia* and *Diplacus aurantiacus*, and commonly associated herbs include *Bromus diandrus*, *Avena barbata*, *Bromus hordeaceus*, and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.7	0 – 5	3.5	2 – 5
Hardwood	27.7	10 – 60	10.0	5 – 15
Regenerating or Shrubby Tree	0.5	0 – 3	5.5	2 – 10
Shrub	19.3	9 – 29	0.9	0 – 2
Herb	29.0	10 – 40	0.6	0 – 1

Local Environmental Description

Elevation: Mean 394 m, Range 209 – 763 m

Aspect: NW (2), NE (1), SE (1)

Slope: Mean 32 degrees, Range 24 – 40 degrees

Macro Topography: Entire slope (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 1.0%, Range 0 – 3%

Small Rock: Mean 4.3%, Range 3 – 5%

Fines Cover: Mean 32.6%, Range 9 – 91%

Litter Cover: Mean 63.3%, Range 9 – 90%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (4), Alluvium (1), Sedimentary (1)

Alameda County Subsections: Diablo Range (3), Fremont - Livermore Hills and Valleys (3), Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 34.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis*, *Brachypodium distachyon*, *Brassica* sp., *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Erodium botrys*, *Erodium*

cicutarium, Erodium moschatum, Hordeum murinum, Hypochaeris glabra, Lolium perenne, Silybum marianum, Torilis arvensis, Trifolium hirtum, and Vulpia bromoides.

Classification Comments

Surveys with an understory of California sagebrush are placed in this association.

References: Allen et al. 1991, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Reyes et al. 2020a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=7; Alameda County (n=7): ALCC229, ALCC273, ALCC830, GARA-02, GUMP-002, MULL-01, SVRA_CA014

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	26.7	10.0	60.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	29	0.4	1.0	2.0				
R	<i>Pinus sabiniana</i>	29	1.0	2.0	5.0				
S	<i>Artemisia californica</i>	86	14.0	5.0	29.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	57	0.5	0.2	2.0				Y
S	<i>Toxicodendron diversilobum</i>	43	0.7	1.0	3.0				
S	<i>Ericameria linearifolia</i>	29	4.6	5.0	27.0				
H	<i>Bromus diandrus</i>	86	4.7	2.8	12.0	Y			Y
H	<i>Avena barbata</i>	71	3.6	1.0	12.2				Y
H	<i>Bromus hordeaceus</i>	57	5.1	0.4	19.7				Y
H	<i>Carduus pycnocephalus</i>	57	0.8	0.1	3.4				Y
H	<i>Brachypodium distachyon</i>	43	6.1	0.6	24.8				
H	<i>Bromus rubens</i>	43	2.3	0.9	14.0				
H	<i>Torilis arvensis</i>	43	0.3	0.2	1.0				
H	<i>Nassella pulchra</i>	43	0.3	0.1	1.0				
H	<i>Triteleia laxa</i>	43	0.1	0.1	0.5				
H	<i>Trifolium hirtum</i>	43	0.1	0.1	0.5				
H	<i>Hypochaeris glabra</i>	43	0.0	0.1	0.1				
H	<i>Centaurea melitensis</i>	29	1.6	3.0	8.0				
H	<i>Hordeum murinum</i>	29	0.8	0.3	5.6				

Quercus douglasii / *Ericameria linearifolia* Association
Quercus douglasii Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	29	0.8	1.2	4.7				
H	<i>Erodium botrys</i>	29	0.4	0.1	2.8				
H	<i>Melica californica</i>	29	0.3	0.1	2.0				
H	<i>Vulpia bromoides</i>	29	0.2	0.5	0.9				
H	<i>Erodium cicutarium</i>	29	0.2	0.1	1.0				
H	<i>Trifolium</i> sp.	29	0.2	0.5	0.6				
H	<i>Lupinus</i> sp.	29	0.1	0.1	0.6				
H	<i>Brassica</i> sp.	29	0.1	0.1	0.5				
H	<i>Anagallis arvensis</i>	29	0.1	0.1	0.3				
H	<i>Galium</i> sp.	29	0.1	0.1	0.3				
H	<i>Achillea millefolium</i>	29	0.0	0.1	0.2				
H	<i>Silybum marianum</i>	29	0.0	0.1	0.2				
H	<i>Erodium moschatum</i>	29	0.0	0.1	0.1				
H	<i>Claytonia</i> sp.	29	0.0	0.1	0.1				
H	<i>Dichelostemma capitatum</i>	29	0.0	0.1	0.1				
NV	Moss	29	0.1	0.2	0.4				

***Quercus douglasii* / Mixed herbaceous Association**

Common Name: Blue Oak / Mixed herbaceous Woodland

Alliance: *Quercus douglasii* Forest & Woodland Alliance

Local Vegetation Description

The Blue Oak / Mixed herbaceous Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus douglasii*. Commonly associated herbs include *Bromus diandrus*, *Bromus hordeaceus*, and *Carduus pycnocephalus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 1	no data	no data
Hardwood	24.2	10 – 55	8.7	2 – 20
Regenerating or Shrubby Tree	0.5	0 – 5	1.4	0 – 5
Shrub	0.6	0 – 6	1.2	0 – 5
Herb	38.7	3 – 90	0.4	0 – 1

Local Environmental Description

Elevation: Mean 298 m, Range 108 – 605 m

Aspect: NE (6), NW (5), Variable (4), SE (2), SW (1)

Slope: Mean 20 degrees, Range 4 – 38 degrees

Macro Topography: Middle 1/3 of slope (5), Upper 1/3 of slope (5), Middle to Upper 1/3 of slope (2), Bottom (1), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Ridge top (1)

Large Rock: Mean 1.1%, Range 0 – 10%

Small Rock: Mean 6.2%, Range 0 – 33%

Fines Cover: Mean 36.0%, Range 1 – 83%

Litter Cover: Mean 38.0%, Range 0 – 82%

Soil Texture (field assessed): Moderately fine silty clay loam (3), Loam (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Fine clay (1), Medium to very fine, loamy sand (1), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (8), Franciscan melange (4), Sandstone and other sedimentary (2), Shale and other sedimentary (2)

Alameda County Subsections: Diablo Range (3), Fremont - Livermore Hills and Valleys (3), Eastern Hills (2)

Contra Costa County Subsections: Suisun Hills and Valleys (6), East Bay Hills - Mount Diablo (3), Eastern Hills (2)

Site Impacts

This association has moderate non-native plant cover (average 48.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Lolium perenne*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens et al. 2006, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, O'Neil and Egan 2004, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, VegCAMP 2015a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=19; Alameda County (n=8): ALCC756, AW003, AW023, EBAY0056, GUMP-016, LLNL050, LLNL072, LLNL095

Contra Costa County (n=11): ALCC049, ALCC122, ALCC144, ALCCREC007, ALCCREC105, JOMU008, JOMU025, JOMU029, JOMU039, SPCCA-036, X2105181631

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	100	22.6	10.0	55.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	26	0.5	0.1	6.0				
T	<i>Aesculus californica</i>	26	0.5	0.2	3.0				
R	<i>Quercus douglasii</i> *	21	0.4	0.1	5.0				
S	<i>Toxicodendron diversilobum</i>	32	0.1	0.2	1.0				
S	<i>Artemisia californica</i>	21	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	79	7.6	0.2	30.0	Y			Y
H	<i>Carduus pycnocephalus</i>	68	2.2	0.2	20.0				Y
H	<i>Bromus hordeaceus</i>	53	2.1	0.1	20.0				Y
H	<i>Avena barbata</i>	47	3.6	1.0	20.0				
H	<i>Lolium perenne</i>	47	2.8	0.2	20.0				
H	<i>Achillea millefolium</i>	47	0.3	0.2	5.0				
H	<i>Bromus rubens</i>	42	1.3	0.1	6.0				
H	<i>Avena fatua</i>	32	9.3	10.0	60.0				

Quercus douglasii / Mixed herbaceous Association
Quercus douglasii Forest & Woodland Alliance

***Quercus kelloggii* Forest & Woodland Alliance**



Common Name: California black oak forest and woodland

NVC Alliance Code: A3349. *Quercus chrysolepis* - *Quercus kelloggii* Forest & Woodland Alliance

Statewide Description

Quercus kelloggii is dominant or co-dominant in the tree canopy with *Abies concolor*, *Arbutus menziesii*, *Calocedrus decurrens*, *Pinus attenuata*, *Pinus ponderosa*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus garryana*, *Quercus lobata*, and *Umbellularia californica*.

The range of *Quercus kelloggii* is sufficiently wide that it mixes with many species in many alliances (Gaman and Casey 2002), though it tends to occur in higher elevations than most tree oaks other than *Q. chrysolepis*. The *Quercus kelloggii* Alliance occurs from the foothills to mid-montane elevations, from the Coast Ranges to the Klamath Mountains and the western Sierra Nevada (Barbour et al. 2007a). Conifers replace *Quercus kelloggii* on productive sites in the absence of fire. Conifer replacement is slower or lacking on unproductive sites (Howard 1992I). Stands commonly have *Pinus ponderosa*, *Pinus sabiniana*, and less commonly *Pinus jeffreyi*.

Local Vegetation Description

The California black oak forest and woodland Alliance forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus kelloggii*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Pinus coulteri*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Achillea millefolium*, *Cynosurus echinatus*, *Geranium molle*, *Sanicula crassicaulis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	1.2	0 – 6	6.2	2 – 10
Hardwood	31.1	13 – 45	13.6	5 – 20
Regenerating or Shrubby Tree	2.1	0 – 14	4.1	0.5 – 15
Shrub	7.6	0 – 26	1.4	0 – 5
Herb	13.6	1 – 30	0.3	0 – 0.5

Local Membership Rule

Quercus kelloggii or *Quercus* × *morehus* > 50% relative cover in the tree canopy, or > 30% relative cover with *Pinus ponderosa*, *Q. agrifolia*, *Q. chrysolepis* and/or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 650 m, Range 285 – 1086 m

Aspect: NE (5), NW (3), Variable (2)

Slope: Mean 18 degrees, Range 5 – 44 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (2), Lower to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.2%, Range 0 – 2%

Small Rock: Mean 2.7%, Range 0 – 18%

Fines Cover: Mean 35.1%, Range 10 – 68%

Litter Cover: Mean 59.6%, Range 27 – 87%

Soil Texture (field assessed): Moderately fine clay loam (7), Moderately fine sandy clay loam (1), Medium silt loam (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Franciscan melange (4), Sedimentary (4), Sandstone and other sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (7), Western Diablo Range (3)

Contra Costa County Subsections: None

Site Impacts

This alliance has low non-native plant cover (average 18.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Cynosurus echinatus*, *Geranium molle*, *Lolium perenne*, *Polypogon monspeliensis*, *Sherardia arvensis*, *Stellaria media*, *Torilis arvensis*, and *Vicia villosa*.

Associations in Alameda & Contra Costa Counties

Quercus kelloggii – *Arbutus menziesii* – *Quercus agrifolia*

Quercus kelloggii – *Pinus coulteri*

Quercus kelloggii / grass – herb

Quercus kelloggii / *Toxicodendron diversilobum*

Classification Comments

None.

References: Allen et al. 1991, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2005, Keeler-Wolf 1986d, Keeler-Wolf 1987a, Keeler-Wolf 1990c, Klein et al. 2007, Klein et al. 2015, Lee 2004, NPS-SEKI 2009, Reyes et al. 2020a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=10; Alameda County (n=10): ALCC077, ALCC134, ALCC137, ALCC141, AW011, AW014, AW016, AW019, AW053, AW054

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus kelloggii</i>	100	27.5	12.0	45.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	70	2.8	0.2	10.0				Y
T	<i>Umbellularia californica</i>	50	0.5	0.2	3.0				Y
T	<i>Pinus coulteri</i>	30	1.2	1.0	6.0				
T	<i>Quercus lobata</i>	20	0.4	2.0	2.0				
T	<i>Quercus douglasii</i>	20	0.3	1.0	2.0				
T	<i>Aesculus californica</i>	20	0.1	0.2	1.0				
R	<i>Pinus coulteri</i> *	30	1.9	2.2	13.0				
R	<i>Umbellularia californica</i> *	30	0.1	0.2	0.4				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus kelloggii</i>*	30	0.1	0.2	0.2				
R	<i>Quercus agrifolia</i> *	20	0.1	0.2	0.4				
S	<i>Toxicodendron diversilobum</i>	50	3.7	0.2	26.0				Y
S	<i>Frangula californica</i>	40	1.1	0.2	6.0				
S	<i>Baccharis pilularis</i>	40	0.1	0.2	0.2				
S	<i>Holodiscus discolor</i>	30	2.2	0.2	22.0				
S	<i>Diplacus aurantiacus</i>	30	0.1	0.2	0.2				
S	<i>Ribes menziesii</i>	30	0.1	0.2	0.2				
S	<i>Phoradendron</i> sp.	20	0.2	0.2	2.0				
S	<i>Symphoricarpos mollis</i>	20	0.2	0.2	2.0				
S	<i>Heteromeles arbutifolia</i>	20	0.1	0.2	1.0				
S	<i>Symphoricarpos albus</i>	20	0.0	0.2	0.2				
S	<i>Sambucus nigra</i>	20	0.0	0.2	0.2				
H	<i>Cynosurus echinatus</i>	50	2.5	2.0	10.0				Y
H	<i>Geranium molle</i>	50	1.7	0.2	10.0				Y
H	<i>Torilis arvensis</i>	50	1.1	0.2	10.0				Y
H	<i>Sanicula crassicaulis</i>	50	0.6	0.2	4.0				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	40	0.3	0.2	2.0				
H	<i>Elymus glaucus</i>	40	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	30	1.8	0.2	15.0				
H	<i>Stellaria media</i>	30	0.1	0.2	0.2				
H	<i>Ranunculus californicus</i>	30	0.1	0.2	0.2				
H	<i>Sherardia arvensis</i>	30	0.1	0.2	0.2				
H	<i>Melica torreyana</i>	20	0.3	0.2	3.0				
H	<i>Cerastium glomeratum</i>	20	0.1	0.2	1.0				
H	<i>Adiantum jordanii</i>	20	0.1	0.2	1.0				
H	<i>Claytonia parviflora</i>	20	0.1	0.2	1.0				
H	<i>Polypogon monspeliensis</i>	20	0.1	0.2	1.0				
H	<i>Bromus diandrus</i>	20	0.0	0.2	0.2				
H	<i>Vicia villosa</i>	20	0.0	0.2	0.2				
H	<i>Aira caryophyllea</i>	20	0.0	0.2	0.2				
H	<i>Bromus rubens</i>	20	0.0	0.2	0.2				
H	<i>Bromus carinatus</i>	20	0.0	0.2	0.2				
NV	Moss	20	0.3	1.0	2.0				

***Quercus kelloggii* – *Arbutus menziesii* – *Quercus agrifolia* Association**

Common Name: California Black Oak – Madrone – Coast Live Oak Woodland

Alliance: *Quercus kelloggii* Forest & Woodland Alliance

Local Vegetation Description

The California Black Oak – Madrone – Coast Live Oak Association forms an intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus kelloggii*, and *Quercus agrifolia* and *Quercus lobata* are characteristic or often present. Commonly associated shrubs include *Holodiscus discolor*, *Ribes menziesii*, *Symphoricarpos mollis*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Cerastium glomeratum*, *Cynoglossum grande*, *Cynosurus echinatus*, *Geranium molle*, *Sanicula crassicaulis*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.5	35 – 40	15.0	10 – 20
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	12.5	0 – 25	3.5	2 – 5
Herb	8.0	1 – 15	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 576 m, Range 548 – 604 m

Aspect: NE (1), NW (1)

Slope: Mean 18 degrees, Range 15 – 20 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 0.6%

Fines Cover: Mean 51.5%, Range 35 – 68%

Litter Cover: Mean 45.0%, Range 30 – 60%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 10.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cerastium glomeratum*, *Cynosurus echinatus*, and *Geranium molle*.

Classification Comments

None.

References: Allen et al. 1991, Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** AW016, AW053

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus kelloggii</i>	100	27.5	25.0	30.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	10.0	10.0	10.0	Y			Y
T	<i>Quercus lobata</i>	50	1.0	2.0	2.0				Y
S	<i>Holodiscus discolor</i>	50	11.0	22.0	22.0				Y
S	<i>Symphoricarpos mollis</i>	50	1.0	2.0	2.0				Y
S	<i>Toxicodendron diversilobum</i>	50	0.5	1.0	1.0				Y
S	<i>Ribes menziesii</i>	50	0.1	0.2	0.2				Y
H	<i>Geranium molle</i>	50	2.5	5.0	5.0				Y
H	<i>Cynosurus echinatus</i>	50	2.5	5.0	5.0				Y
H	<i>Cerastium glomeratum</i>	50	0.1	0.2	0.2				Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Cynoglossum grande</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y

***Quercus kelloggii* – *Pinus coulteri* Association**

Common Name: California Black Oak – Coulter Pine Woodland

Alliance: *Quercus kelloggii* Forest & Woodland Alliance

Local Vegetation Description

The California Black Oak – Coulter Pine Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus kelloggii*, and *Pinus coulteri* and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Pinus coulteri*, and those that are often present include *Quercus kelloggii*. Commonly associated shrubs include *Frangula californica*, *Phoradendron* sp., and *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus rubens*, *Polypogon monspeliensis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	4.0	1 – 6	6.2	2 – 10
Hardwood	22.0	13 – 33	10.8	5 – 15
Regenerating or Shrubby Tree	6.7	2 – 14	2.8	1 – 5
Shrub	7.7	3 – 14	1.3	0.5 – 2
Herb	5.0	1 – 9	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 1059 m, Range 1014 – 1086 m

Aspect: Variable (2), NE (1)

Slope: Mean 10 degrees, Range 5 – 18 degrees

Macro Topography: Middle to Upper 1/3 of slope (2), Lower to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 7.3%, Range 2 – 18%

Fines Cover: Mean 26.7%, Range 10 – 54%

Litter Cover: Mean 64.7%, Range 27 – 86%

Soil Texture (field assessed): Moderately fine clay loam (3)

Geology (field or map data): Sedimentary (2), Sandstone and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (3)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 8.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Polypogon monspeliensis*, *Torilis arvensis*, and *Vulpia myuros*.

Classification Comments

None.

References: Keeler-Wolf 1986d, Keeler-Wolf 1990c

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC134, ALCC137, ALCC141

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus kelloggii</i>	100	19.7	13.0	28.0	Y	Y		Y
T	<i>Pinus coulteri</i>	100	4.0	1.0	6.0	Y			Y
T	<i>Umbellularia californica</i>	67	1.3	1.0	3.0				Y
T	<i>Quercus lobata</i>	33	0.7	2.0	2.0				
T	<i>Juglans hindsii</i>	33	0.3	1.0	1.0				
T	<i>Quercus douglasii</i>	33	0.3	1.0	1.0				
R	<i>Pinus coulteri</i> *	100	6.5	2.2	13.0	Y	Y		Y
R	<i>Quercus kelloggii</i> *	67	0.1	0.2	0.2				Y
R	<i>Quercus chrysolepis</i> *	33	0.3	1.0	1.0				
R	<i>Umbellularia californica</i> *	33	0.1	0.4	0.4				
R	<i>Quercus lobata</i> *	33	0.1	0.2	0.2				
S	<i>Frangula californica</i>	100	3.7	0.2	6.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	67	3.3	2.0	8.0				Y
S	<i>Phoradendron</i> sp.	67	0.7	0.2	2.0				Y
S	<i>Oemleria cerasiformis</i>	33	0.3	1.0	1.0				
S	<i>Quercus berberidifolia</i>	33	0.3	1.0	1.0				
S	<i>Amelanchier utahensis</i>	33	0.1	0.2	0.2				
S	<i>Sambucus nigra</i>	33	0.1	0.2	0.2				
S	<i>Ribes menziesii</i>	33	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	67	0.4	0.2	1.0				Y
H	<i>Bromus rubens</i>	67	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	33	2.7	8.0	8.0				
H	<i>Melica torreyana</i>	33	1.0	3.0	3.0				
H	<i>Nassella lepida</i>	33	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	33	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	33	0.1	0.2	0.2				
H	<i>Lathyrus</i> sp.	33	0.0	0.1	0.1				
H	<i>Stephanomeria exigua</i>	33	0.0	0.1	0.1				
NV	Moss	67	1.0	1.0	2.0				Y

***Quercus kelloggii* / grass – herb Association**

Common Name: California Black Oak / grass - herb Woodland

Alliance: *Quercus kelloggii* Forest & Woodland Alliance

Local Vegetation Description

The California Black Oak / grass - herb Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus kelloggii*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Cynosurus echinatus*, *Elymus glaucus*, *Achillea millefolium*, *Avena fatua*, *Bromus diandrus*, *Calochortus albus*, *Carduus pycnocephalus*, *Geranium molle*, *Lolium perenne*, *Sanicula crassicaulis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	12.5	10 – 15
Hardwood	31.4	20 – 45	14.6	10 – 20
Regenerating or Shrubby Tree	0.2	0 – 1	2.9	0 – 15
Shrub	2.0	0 – 8	2.2	0 – 10
Herb	16.6	10 – 25	0.4	0 – 1

Local Environmental Description

Elevation: Mean 490 m, Range 285 – 638 m

Aspect: NE (4), NW (4)

Slope: Mean 17 degrees, Range 11 – 20 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.3%, Range 0 – 2%

Small Rock: Mean 4.0%, Range 0 – 25%

Fines Cover: Mean 32.9%, Range 4 – 62%

Litter Cover: Mean 60.3%, Range 30 – 90%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine sandy clay loam (2), Medium loam (1), Medium silt loam (1)

Geology (field or map data): Sandstone and other sedimentary (5), Franciscan melange (2), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (3), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 22.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Geranium molle*, *Lolium perenne*, *Sherardia arvensis*, *Stellaria media*, *Torilis arvensis*, and *Vicia villosa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen et al. 1991, Evens and San 2005, NPS-SEKI 2009, Reyes et al. 2020a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=8; Alameda County (n=4): AW011, AW014, AW019, AW054

Contra Costa County (n=0):

Santa Clara Co. (n=4): AW026, SPCCA-031, SPCCA-154, SPCCB-035

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus kelloggii</i>	100	28.9	18.0	45.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	63	0.8	0.2	5.0				Y
T	<i>Umbellularia californica</i>	63	0.6	0.2	2.0				Y
T	<i>Quercus douglasii</i>	38	0.4	0.2	2.0				
T	<i>Pinus sabiniana</i>	38	0.3	0.1	1.0				
T	<i>Aesculus californica</i>	25	0.2	0.2	1.0				
T	<i>Quercus lobata</i>	25	0.0	0.1	0.2				
T	<i>Acer macrophyllum</i>	25	0.0	0.1	0.2				
R	<i>Pinus sabiniana</i> *	38	0.1	0.1	0.4				
R	<i>Umbellularia californica</i> *	38	0.1	0.1	0.2				
S	<i>Toxicodendron diversilobum</i>	63	0.8	0.2	4.0				Y
S	<i>Symphoricarpos mollis</i>	38	0.1	0.2	0.2				
S	<i>Baccharis pilularis</i>	38	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	38	0.1	0.2	0.2				
S	<i>Symphoricarpos albus</i>	25	0.1	0.2	0.2				

Quercus kelloggii / grass – herb Association
Quercus kelloggii Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Holodiscus discolor</i>	25	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	25	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	88	0.4	0.2	1.0	Y			Y
H	<i>Cynosurus echinatus</i>	75	3.3	1.0	10.0	Y			Y
H	<i>Torilis arvensis</i>	63	2.4	0.2	10.0				Y
H	<i>Avena fatua</i>	63	0.4	0.2	1.0				Y
H	<i>Carduus pycnocephalus</i>	63	0.3	0.1	2.0				Y
H	<i>Achillea millefolium</i>	63	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	50	2.9	0.2	15.0				Y
H	<i>Geranium molle</i>	50	1.5	0.2	10.0				Y
H	<i>Sanicula crassicaulis</i>	50	0.7	0.2	4.0				Y
H	<i>Bromus diandrus</i>	50	0.3	0.2	2.0				Y
H	<i>Calochortus albus</i>	50	0.1	0.2	0.2				Y
H	<i>Melica imperfecta</i>	38	0.8	0.2	4.0				
H	<i>Sherardia arvensis</i>	38	0.1	0.2	0.2				
H	<i>Stellaria media</i>	38	0.1	0.2	0.2				
H	<i>Ranunculus californicus</i>	38	0.1	0.2	0.2				
H	<i>Vicia villosa</i>	38	0.1	0.1	0.2				
H	<i>Lathyrus vestitus</i>	25	0.4	1.0	2.0				
H	<i>Dryopteris arguta</i>	25	0.3	0.2	2.0				
H	<i>Galium porrigens</i>	25	0.3	1.0	1.0				
H	<i>Claytonia parviflora</i>	25	0.2	0.2	1.0				
H	<i>Bromus carinatus</i>	25	0.1	0.2	0.2				
H	<i>Trifolium microcephalum</i>	25	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	25	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	25	0.1	0.2	0.2				
H	<i>Adiantum jordanii</i>	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Galium aparine</i>	25	0.1	0.2	0.2				
H	<i>Dodecatheon hendersonii</i>	25	0.1	0.2	0.2				

***Quercus kelloggii* / *Toxicodendron diversilobum* Association**

Common Name: California Black Oak / Poison Oak Woodland

Alliance: *Quercus kelloggii* Forest & Woodland Alliance

Local Vegetation Description

The California Black Oak / Poison Oak Association forms an open tree canopy with an open shrub understory. The dominant tree is *Quercus kelloggii*, and *Aesculus californica*, *Quercus agrifolia*, *Quercus douglasii*, and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia*, *Quercus douglasii*, and *Quercus kelloggii*. Commonly associated shrubs include *Baccharis pilularis*, *Toxicodendron diversilobum*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, and *Symphoricarpos mollis*, and commonly associated herbs include *Achillea millefolium*, *Carduus pycnocephalus*, *Adiantum jordanii*, *Avena barbata*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Cynosurus echinatus*, *Elymus glaucus*, *Madia gracilis*, *Madia sativa*, *Melica imperfecta*, *Monardella villosa*, *Torilis arvensis*, and *Wyethia helenioides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	18.5	15 – 22	12.5	10 – 15
Regenerating or Shrubby Tree	0.2	0 – 0.4	3.5	2 – 5
Shrub	24.5	23 – 26	1.5	1 – 2
Herb	32.5	30 – 35	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 527 m, Range 452 – 602 m

Aspect: NW (2)

Slope: Mean 38 degrees, Range 32 – 44 degrees

Macro Topography: Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.4%, Range 0 – 0.8%

Small Rock: Mean 2.2%, Range 2 – 2%

Fines Cover: Mean 15.0%, Range 15 – 15%

Litter Cover: Mean 80.0%, Range 80 – 80%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 40.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen et al. 1991, Keeler-Wolf 1987a, Klein et al. 2007, Lee 2004, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=1): ALCC077

Contra Costa County (n=0):

Santa Clara Co. (n=1): SCRUZ949

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus kelloggii</i>	100	17.0	12.0	22.0	Y	Y		Y
T	<i>Aesculus californica</i>	100	0.6	0.2	1.0	Y			Y
T	<i>Quercus douglasii</i>	50	1.0	2.0	2.0				Y
T	<i>Quercus agrifolia</i>	50	1.0	2.0	2.0				Y
T	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
R	<i>Quercus douglasii</i> *	50	0.2	0.4	0.4				Y
R	<i>Quercus agrifolia</i> *	50	0.2	0.4	0.4				Y
R	<i>Quercus kelloggii</i>*	50	0.1	0.2	0.2				Y
S	<i>Toxicodendron diversilobum</i>	100	19.0	12.0	26.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	100	2.6	0.2	5.0	Y			Y
S	<i>Symphoricarpos mollis</i>	50	2.5	5.0	5.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.5	1.0	1.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	100	3.6	0.2	7.0	Y			Y
H	<i>Achillea millefolium</i>	100	2.6	0.2	5.0	Y			Y
H	<i>Brachypodium distachyon</i>	50	10.0	20.0	20.0				Y
H	<i>Bromus diandrus</i>	50	5.0	10.0	10.0				Y
H	<i>Avena barbata</i>	50	5.0	10.0	10.0				Y
H	<i>Cynosurus echinatus</i>	50	5.0	10.0	10.0				Y
H	<i>Bromus hordeaceus</i>	50	5.0	10.0	10.0				Y
H	<i>Madia sativa</i>	50	1.0	2.0	2.0				Y
H	<i>Melica imperfecta</i>	50	0.5	1.0	1.0				Y
H	<i>Adiantum jordanii</i>	50	0.5	1.0	1.0				Y
H	<i>Elymus glaucus</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella villosa</i>	50	0.1	0.2	0.2				Y
H	<i>Wyethia helenioides</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella</i> sp.	50	0.1	0.2	0.2				Y

***Quercus lobata* Woodland Alliance**



Common Name: Valley oak woodland and forest

NVC Alliance Code: A3347. *Quercus lobata* Woodland Alliance

Statewide Description

Quercus lobata is dominant or co-dominant in the tree canopy with *Acer negundo*, *Alnus rhombifolia*, *Fraxinus latifolia*, *Juglans hindsii*, *Juglans hindsii* × *regia*, *Platanus racemosa*, *Populus fremontii*, *Quercus agrifolia*, *Quercus douglasii*, *Quercus kelloggii*, *Quercus wislizeni*, *Salix gooddingii*, and *Salix lasiolepis*. Shrubs and lianas may include *Aristolochia californica* or *Vitis californica*.

Quercus lobata is endemic to California, and stands vary from open savannas to closed-canopy forests (Allen-Diaz et al. 2007). Riparian and upland forests of *Quercus lobata* occur in the deep, rich soil typical of floodplains and valley floors. This alliance includes the upland forests. These forests are only remnants of what once existed in the Central Valley, other valleys, and foothill locations (Allen-Diaz et al. 2007).

Local Vegetation Description

The Valley oak woodland and forest Alliance forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus lobata*, and *Quercus agrifolia* is characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, *Cynosurus echinatus*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 2	12.5	5 – 20
Hardwood	21.0	5 – 52	13.3	5 – 35
Regenerating or Shrubby Tree	1.2	0 – 16	3.0	0 – 10
Shrub	2.2	0 – 16	1.7	0.5 – 5
Herb	31.3	1 – 75	0.4	0 – 2

Local Membership Rule

Quercus lobata > 50% relative cover in the tree canopy, or > 30% relative cover with *Quercus agrifolia*, *Q. douglasii*, *Q. kelloggii*, and/or *Umbellularia californica* in upland habitats.

Local Environmental Description

Elevation: Mean 324 m, Range 107 – 1024 m

Aspect: NE (6), NW (4), SE (4), SW (3), Flat (1), Variable (1)

Slope: Mean 16 degrees, Range 1 – 38 degrees

Macro Topography: Middle 1/3 of slope (7), Lower 1/3 of slope (4), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope (2), Bottom (1), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.6%, Range 0 – 4%

Small Rock: Mean 3.4%, Range 0 – 12%

Fines Cover: Mean 37.4%, Range 1 – 90%

Litter Cover: Mean 54.6%, Range 5 – 94%

Soil Texture (field assessed): Moderately fine clay loam (5), Moderately fine silty clay loam (4), Loam (2), Fine clay (1), Medium loam (1), Medium silt loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (10), Sandstone and other sedimentary (4), Sandstone, shale, and gravel deposits (3), Sedimentary (3), Calcareous (1), Sandstone (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (9), Western Diablo Range (1), Diablo Range (1), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (9), Eastern Hills (1), Suisun Hills and Valleys (1)

Site Impacts

This alliance has high non-native plant cover (average 50.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Geranium dissectum*, *Hordeum murinum*, *Lolium perenne*, *Torilis arvensis*, *Trifolium hirtum*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Quercus lobata – *Quercus agrifolia* / grass

Quercus lobata – *Quercus douglasii*

Quercus lobata / grass

Classification Comments

None.

References: Allen et al. 1989, Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein et al. 2015, O’Neil and Egan 2004, Reyes et al. 2019, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=23; Alameda County (n=12): ALCC041, ALCC076, ALCC136, ALCC249, ALCC275, AW004, AW034, GUMP-008, GUMP-010, GUMP-019, MULL-03, SUNOL042

Contra Costa County (n=11): ALCC055, ALCC213, ALCC239, ALCC246, EBAY0014, EBAY0021, EBAY0025, JOMU033, SPCCA-015, SPCCA-040, SPCCB-061

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	15.3	5.0	40.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	65	4.6	0.2	28.0				Y
T	<i>Quercus douglasii</i>	30	1.2	0.2	10.0				
T	<i>Aesculus californica</i>	30	0.5	0.2	4.0				
R	<i>Quercus agrifolia</i> *	26	0.4	0.1	7.0				
S	<i>Toxicodendron diversilobum</i>	52	1.6	0.2	15.0				Y
S	<i>Phoradendron</i> sp.	26	0.2	0.1	2.0				
H	<i>Carduus pycnocephalus</i>	87	2.3	0.1	15.0	Y			Y
H	<i>Bromus diandrus</i>	83	8.4	1.0	25.0	Y			Y
H	<i>Lolium perenne</i>	57	3.5	0.2	25.0				Y
H	<i>Avena barbata</i>	57	3.2	0.2	17.0				Y
H	<i>Cynosurus echinatus</i>	52	0.8	0.1	8.0				Y
H	<i>Trifolium hirtum</i>	48	0.6	0.2	4.3				
H	<i>Torilis arvensis</i>	48	0.5	0.1	2.6				
H	<i>Bromus hordeaceus</i>	43	2.9	1.0	20.0				
H	<i>Brachypodium distachyon</i>	30	2.4	0.4	23.0				
H	<i>Hordeum murinum</i>	30	0.8	0.2	11.0				
H	<i>Geranium dissectum</i>	30	0.3	0.1	2.0				
H	<i>Bromus rubens</i>	26	0.5	0.1	5.0				
H	<i>Chlorogalum pomeridianum</i>	26	0.3	0.1	5.0				
H	<i>Avena fatua</i>	22	2.6	0.2	45.0				
H	<i>Vulpia myuros</i>	22	0.4	0.1	3.8				
H	<i>Nassella pulchra</i>	22	0.0	0.1	0.2				
NV	Moss	22	0.2	0.2	3.0				

***Quercus lobata* – *Quercus agrifolia* / grass Association**

Common Name: Valley Oak – Coast Live Oak / Grass Woodland

Alliance: *Quercus lobata* Woodland Alliance

Local Vegetation Description

The Valley Oak – Coast Live Oak / Grass Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus agrifolia*, *Quercus lobata*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Avena barbata*, *Torilis arvensis*, and *Trifolium hirtum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	17.5	15 – 20
Hardwood	25.3	13 – 52	15.8	5 – 35
Regenerating or Shrubby Tree	2.1	0 – 16	4.4	0.5 – 10
Shrub	3.5	0 – 16	1.8	0.5 – 5
Herb	28.5	1 – 65	0.3	0 – 1

Local Environmental Description

Elevation: Mean 283 m, Range 139 – 511 m

Aspect: NE (2), SE (2), NW (1), SW (1)

Slope: Mean 21 degrees, Range 9 – 38 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Bottom (1), Lower 1/3 of slope (1)

Large Rock: Mean 0.4%, Range 0 – 2%

Small Rock: Mean 2.8%, Range 0 – 10%

Fines Cover: Mean 35.6%, Range 4 – 90%

Litter Cover: Mean 61.2%, Range 10 – 94%

Soil Texture (field assessed): Fine clay (1), Medium loam (1), Medium silt loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (5), Sandstone, shale, and gravel deposits (2), Sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), Diablo Range (1), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This association has moderate non-native plant cover (average 38.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Anagallis arvensis, *Anthriscus caucalis*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Erodium* sp., *Geranium dissectum*, *Hordeum murinum*, *Lolium perenne*, *Stellaria media*, *Torilis arvensis*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia myuros*.

Classification Comments

None.

References: Allen et al. 1989, Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein et al. 2015, O'Neil and Egan 2004, Reyes et al. 2019, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=9; Alameda County (n=5): ALCC076, ALCC249, GUMP-008, GUMP-019, MULL-03

Contra Costa County (n=4): ALCC246, EBAY0021, EBAY0025, SPCCA-040

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	13.6	5.0	39.0	Y		Y	Y
T	<i>Quercus agrifolia</i>	100	10.7	3.0	28.0	Y		Y	Y
T	<i>Quercus douglasii</i>	33	0.9	1.1	4.0				
T	<i>Umbellularia californica</i>	22	0.8	3.0	4.0				
T	<i>Aesculus californica</i>	22	0.6	2.0	3.0				
R	<i>Quercus agrifolia</i> *	44	1.1	0.2	7.0				
R	<i>Umbellularia californica</i> *	22	1.0	0.2	9.2				
S	<i>Toxicodendron diversilobum</i>	67	3.0	0.2	15.0				Y
S	<i>Baccharis pilularis</i>	22	0.2	0.2	2.0				
S	<i>Symphoricarpos albus</i>	22	0.2	1.0	1.0				
S	<i>Diplacus aurantiacus</i>	22	0.0	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	89	1.5	0.2	7.0	Y			Y
H	<i>Bromus diandrus</i>	78	5.7	1.3	12.0	Y			Y
H	<i>Cynosurus echinatus</i>	78	0.6	0.1	2.0	Y			Y
H	<i>Torilis arvensis</i>	67	0.8	0.2	2.6				Y
H	<i>Avena barbata</i>	56	1.8	0.2	5.8				Y
H	<i>Trifolium hirtum</i>	56	1.1	0.2	4.3				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Brachypodium distachyon</i>	44	2.9	0.4	23.0				
H	<i>Vulpia myuros</i>	44	0.5	0.1	3.0				
H	<i>Geranium dissectum</i>	44	0.3	0.1	2.0				
H	<i>Bromus hordeaceus</i>	33	2.6	3.9	11.2				
H	<i>Lolium perenne</i>	33	2.5	1.4	17.7				
H	<i>Galium</i> sp.	33	1.4	0.2	7.8				
H	<i>Hordeum murinum</i>	33	0.5	0.3	4.0				
H	<i>Lupinus</i> sp.	33	0.1	0.1	0.9				
H	<i>Anagallis arvensis</i>	33	0.1	0.1	0.6				
H	<i>Micropus californicus</i>	33	0.0	0.1	0.1				
H	<i>Erodium</i> sp.	22	1.7	0.4	14.9				
H	<i>Claytonia perfoliata</i>	22	1.6	4.0	10.0				
H	<i>Avena fatua</i>	22	1.4	0.4	12.0				
H	<i>Stellaria media</i>	22	0.4	1.0	3.0				
H	<i>Vicia sativa</i>	22	0.2	0.2	2.0				
H	<i>Anthriscus caucalis</i>	22	0.2	0.2	2.0				
H	<i>Trifolium</i> sp.	22	0.2	0.4	1.2				
H	<i>Lithophragma</i> sp.	22	0.1	0.2	1.0				
H	<i>Vicia villosa</i>	22	0.1	0.2	0.6				
H	<i>Geranium molle</i>	22	0.0	0.1	0.3				
H	<i>Nassella pulchra</i>	22	0.0	0.1	0.2				
H	<i>Pentagramma triangularis</i>	22	0.0	0.1	0.2				
H	<i>Chlorogalum pomeridianum</i>	22	0.0	0.1	0.2				
H	<i>Achyrrachaena mollis</i>	22	0.0	0.1	0.1				
H	<i>Bromus rubens</i>	22	0.0	0.1	0.1				
H	<i>Claytonia</i> sp.	22	0.0	0.1	0.1				
H	<i>Ranunculus</i> sp.	22	0.0	0.1	0.1				
H	<i>Dichelostemma capitatum</i>	22	0.0	0.1	0.1				
NV	Moss	33	0.1	0.2	0.2				

***Quercus lobata* – *Quercus douglasii* Association**

Common Name: Valley Oak – Blue Oak Woodland

Alliance: *Quercus lobata* Woodland Alliance

Local Vegetation Description

The Valley Oak – Blue Oak Association forms an open tree canopy with a sparse to open shrub understory. The dominant trees are *Quercus douglasii* and *Quercus lobata*. Regenerating or shrubby trees that are often present include *Pinus sabiniana*, *Quercus douglasii*, and *Quercus lobata*. Commonly associated shrubs include *Toxicodendron diversilobum* and *Phoradendron* sp., and commonly associated herbs include *Avena barbata*, *Bromus hordeaceus*, *Bromus rubens*, *Carduus pycnocephalus*, *Brachypodium distachyon*, *Lolium perenne*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	21.0	16 – 26	7.5	5 – 10
Regenerating or Shrubby Tree	3.0	0 – 6	1.5	1 – 2
Shrub	3.1	1 – 5	0.8	0.5 – 1
Herb	22.5	10 – 35	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 828 m, Range 632 – 1024 m

Aspect: Variable (1)

Slope: 26 degrees

Macro Topography: Lower 1/3 of slope to Ridgetop (1)

Large Rock: 1%

Small Rock: 12%

Fines Cover: Mean 60.5%, Range 60 – 61%

Litter Cover: Mean 32.2%, Range 25 – 39%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 46.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium*

botrys, *Hordeum murinum*, *Lolium perenne*, *Sherardia arvensis*, *Trifolium dubium*, *Trifolium hirtum*, and *Vulpia myuros*.

Classification Comments

None.

References: Allen et al. 1989, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** ALCC136, GUMP-010

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	12.0	6.0	18.0	Y	Y		Y
T	<i>Quercus douglasii</i>	100	9.0	8.0	10.0	Y		Y	Y
R	<i>Quercus lobata</i> *	50	1.5	3.0	3.0				Y
R	<i>Quercus douglasii</i> *	50	1.1	2.2	2.2				Y
R	<i>Pinus sabiniana</i>	50	0.5	1.0	1.0				Y
S	<i>Toxicodendron diversilobum</i>	100	3.0	1.0	5.0	Y	Y		Y
S	<i>Phoradendron</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Bromus hordeaceus</i>	100	6.1	1.0	11.2	Y			Y
H	<i>Avena barbata</i>	100	6.1	6.0	6.2	Y		Y	Y
H	<i>Bromus rubens</i>	100	2.8	2.6	3.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Brachypodium distachyon</i>	50	6.9	13.9	13.9				Y
H	<i>Vulpia myuros</i>	50	1.9	3.8	3.8				Y
H	<i>Lolium perenne</i>	50	1.7	3.3	3.3				Y
H	<i>Hordeum murinum</i>	50	0.8	1.7	1.7				Y
H	<i>Trifolium dubium</i>	50	0.8	1.7	1.7				Y
H	<i>Trifolium hirtum</i>	50	0.8	1.7	1.7				Y
H	<i>Bromus diandrus</i>	50	0.5	1.0	1.0				Y
H	<i>Erodium botrys</i>	50	0.5	1.0	1.0				Y
H	<i>Sherardia arvensis</i>	50	0.5	1.0	1.0				Y
H	<i>Lotus</i> sp.	50	0.4	0.7	0.7				Y
H	<i>Hordeum marinum</i>	50	0.1	0.2	0.2				Y

Quercus lobata – *Quercus douglasii* Association
Quercus lobata Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Viola pedunculata</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Logfia gallica</i>	50	0.1	0.2	0.2				Y
H	<i>Nassella pulchra</i>	50	0.1	0.2	0.2				Y
H	<i>Madia</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Silene gallica</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Silybum marianum</i>	50	0.1	0.2	0.2				Y
H	<i>Madia exigua</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella villosa</i>	50	0.1	0.2	0.2				Y
H	<i>Vicia</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Torilis arvensis</i>	50	0.1	0.1	0.1				Y
H	<i>Sisyrinchium bellum</i>	50	0.1	0.1	0.1				Y
H	<i>Melica californica</i>	50	0.1	0.1	0.1				Y
H	<i>Lamarckia aurea</i>	50	0.1	0.1	0.1				Y
H	<i>Calystegia subacaulis</i>	50	0.1	0.1	0.1				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.1	0.1				Y
H	<i>Amsinckia</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Pterostegia drymarioides</i>	50	0.1	0.1	0.1				Y
H	<i>Scrophularia californica</i>	50	0.1	0.1	0.1				Y
H	<i>Galium aparine</i>	50	0.1	0.1	0.1				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.1	0.1				Y
H	<i>Geranium dissectum</i>	50	0.1	0.1	0.1				Y
NV	Moss	50	1.5	3.0	3.0				Y

***Quercus lobata* / grass Association**

Common Name: Valley Oak / Grass Woodland

Alliance: *Quercus lobata* Woodland Alliance

Local Vegetation Description

The Valley Oak / Grass Association forms an open to intermittent tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus lobata*, and *Quercus agrifolia* is characteristic or often present. Commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 2	7.5	5 – 10
Hardwood	17.7	5 – 44	12.5	5 – 20
Regenerating or Shrubby Tree	0.2	0 – 2	1.2	0 – 5
Shrub	1.0	0 – 8	1.8	0.5 – 5
Herb	34.8	6 – 75	0.5	0 – 2

Local Environmental Description

Elevation: Mean 271 m, Range 107 – 553 m

Aspect: NE (4), NW (3), SE (2), SW (2), Flat (1)

Slope: Mean 13 degrees, Range 1 – 30 degrees

Macro Topography: Middle 1/3 of slope (5), Lower 1/3 of slope (3), Upper 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.7%, Range 0 – 4%

Small Rock: Mean 3.0%, Range 0 – 10%

Fines Cover: Mean 34.9%, Range 1 – 88%

Litter Cover: Mean 53.4%, Range 5 – 92%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine silty clay loam (3), Loam (2), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Franciscan melange (4), Sandstone and other sedimentary (3), Calcareous (1), Sandstone (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Eastern Hills (1), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 59.8%) relative to native

cover. Non-native species that occur with highest frequency and abundance include *Avena barbata*, *Bromus diandrus*, *Carduus pycnocephalus*, and *Lolium perenne*.

Classification Comments

None.

References: Allen et al. 1989, Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf and Evens 2006, Klein et al. 2015, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=12; Alameda County (n=5): ALCC041, ALCC275, AW004, AW034, SUNOL042

Contra Costa County (n=7): ALCC055, ALCC213, ALCC239, EBAY0014, JOMU033, SPCCA-015, SPCCB-061

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	17.2	5.0	40.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	50	0.9	0.2	5.0				Y
T	<i>Aesculus californica</i>	42	0.5	0.2	4.0				
S	<i>Phoradendron</i> sp.	33	0.3	0.2	2.0				
S	<i>Toxicodendron diversilobum</i>	33	0.3	0.2	1.0				
H	<i>Bromus diandrus</i>	92	11.8	2.0	25.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	83	3.4	0.2	15.0	Y			Y
H	<i>Lolium perenne</i>	75	4.6	0.2	25.0	Y			Y
H	<i>Avena barbata</i>	50	3.8	1.0	17.0				Y
H	<i>Bromus hordeaceus</i>	42	2.7	1.0	20.0				
H	<i>Cynosurus echinatus</i>	42	1.0	0.1	8.0				
H	<i>Trifolium hirtum</i>	42	0.2	0.2	1.0				
H	<i>Torilis arvensis</i>	33	0.4	0.2	2.0				
H	<i>Avena fatua</i>	25	3.9	0.2	45.0				
H	<i>Hordeum murinum</i>	25	1.0	0.2	11.0				
H	<i>Chlorogalum pomeridianum</i>	25	0.5	0.2	5.0				
H	<i>Silybum marianum</i>	25	0.3	0.2	2.0				
H	<i>Achillea millefolium</i>	25	0.1	0.2	1.0				

***Quercus lobata* Riparian Forest & Woodland Alliance**



Common Name: Valley oak riparian forest and woodland

NVC Alliance Code: A0618. *Quercus lobata* Riparian Forest Alliance

Statewide Description

Quercus lobata is dominant to co-dominant in the riparian tree canopy with *Acer negundo*, *Alnus rhombifolia*, *Fraxinus latifolia*, *Quercus agrifolia*, *Quercus wislizeni*, *Salix gooddingii*, *S. laevigata*, *S. lasiolepis*, and/or *Umbellularia californica*

Quercus lobata is endemic to California, and stands vary from open savannas to closed-canopy forests (Allen-Diaz et al. 2007). Riparian and upland forests of *Q. lobata* occur in the deep, rich soil typical of floodplains and valley floors. Riparian stands typically exist on higher portions of the floodplain than do stands of *Populus fremontii* and willows (Holstein 1984, Vaghti and Greco 2007). What remains of these forests are only remnants of what once existed in the Central Valley, other valleys, and foothill locations in California (Allen-Diaz et al. 2007).

This alliance has been split from the upland stands, which were previously combined in a single alliance in *A Manual of California Vegetation, Second Edition* (2009). This follows the revised National Vegetation Classification's recognition of riparian groups

separately from upland groups (NatureServe 2020).

Local Vegetation Description

The Valley oak riparian forest and woodland Alliance forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Quercus lobata*, and *Aesculus californica*, *Platanus racemosa*, *Quercus agrifolia*, and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus*, *Avena barbata*, *Bromus diandrus*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	39.9	22 – 59	22.5	15 – 35
Regenerating or Shrubby Tree	3.8	0 – 10	6.0	1 – 15
Shrub	13.0	0 – 50	3.0	0.5 – 5
Herb	22.1	2 – 42	0.5	0 – 1

Local Membership Rule

Quercus lobata > 50% relative cover in the tree canopy, or > 30% relative cover with riparian and upland trees including *Fraxinus latifolia*, *Quercus agrifolia*, *Quercus kelloggii*, *Salix lasiolepis* and/or *Umbellularia californica*, occurring in a riparian habitat.

Local Environmental Description

Elevation: Mean 170 m, Range 84 – 309 m

Aspect: Flat (3), NE (2), SW (1)

Slope: Mean 4 degrees, Range 0 – 19 degrees

Macro Topography: Bottom (3), Lower 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.8%, Range 0 – 5%

Fines Cover: Mean 27.5%, Range 10 – 48%

Litter Cover: Mean 69.5%, Range 53 – 85%

Soil Texture (field assessed): Medium to very fine, sandy loam (4), Moderately fine silty clay loam (1), Coarse, loamy sand (1)

Geology (field or map data): Franciscan melange (2), Mixed alluvium (2), Sandstone, shale, and gravel deposits (2), Metamorphic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This alliance has moderate non-native plant cover (average 28.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Geranium molle*, *Hordeum murinum*, *Lolium perenne*, *Prunus cerasifera*, *Torilis arvensis*, and *Trifolium dubium*.

Associations in Alameda & Contra Costa Counties

Quercus lobata – *Quercus agrifolia* / *Toxicodendron diversilobum* –
(*Symphoricarpos* spp.)

Quercus lobata / herbaceous semi-riparian

Quercus lobata / *Rubus ursinus* – *Rosa californica*

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=7; Alameda County (n=5): ALCC255, ALCC271, GUMP-018, SUNOL034, SUNOL041

Contra Costa County (n=2): ALCC044, SPCCA-052

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	32.1	18.0	55.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	71	5.7	2.0	15.0				Y
T	<i>Umbellularia californica</i>	71	2.2	1.0	7.0				Y
T	<i>Aesculus californica</i>	57	1.9	2.0	4.0				Y
T	<i>Platanus racemosa</i>	57	0.3	0.2	1.0				Y
T	<i>Juglans hindsii</i>	29	1.1	4.0	4.0				
T	<i>Prunus cerasifera</i>	29	0.9	1.0	5.0				
R	<i>Juglans hindsii</i> *	29	1.0	0.2	7.0				
R	<i>Quercus agrifolia</i> *	29	0.5	1.2	2.2				
R	<i>Umbellularia californica</i> *	29	0.2	0.2	1.2				
S	<i>Toxicodendron diversilobum</i>	86	7.0	1.0	20.0	Y	Y		Y
S	<i>Sambucus nigra</i>	29	0.6	1.0	3.0				
S	<i>Symphoricarpos albus</i>	29	0.4	1.0	2.0				
S	<i>Frangula californica</i>	29	0.3	1.0	1.0				
S	<i>Baccharis pilularis</i>	29	0.2	0.1	1.0				
H	<i>Carduus pycnocephalus</i>	100	4.5	0.1	16.0	Y			Y
H	<i>Bromus diandrus</i>	71	8.2	3.5	23.0				Y
H	<i>Avena barbata</i>	57	2.4	0.2	8.5				Y
H	<i>Torilis arvensis</i>	57	1.0	0.1	5.0				Y
H	<i>Cynosurus echinatus</i>	43	2.3	0.1	10.0				
H	<i>Brachypodium distachyon</i>	43	1.6	0.2	10.2				
H	<i>Artemisia douglasiana</i>	43	0.1	0.1	0.2				
H	<i>Bromus hordeaceus</i>	29	1.8	0.2	12.4				
H	<i>Conium maculatum</i>	29	0.6	0.2	4.0				
H	<i>Lolium perenne</i>	29	0.6	1.0	3.0				
H	<i>Hordeum murinum</i>	29	0.1	0.2	0.4				
H	<i>Chlorogalum pomeridianum</i>	29	0.1	0.2	0.4				
H	<i>Sanicula crassicaulis</i>	29	0.1	0.2	0.2				
H	<i>Geranium molle</i>	29	0.0	0.1	0.2				
NV	Moss	29	0.2	0.2	1.0				
NV	Lichen	29	0.1	0.2	0.2				

***Quercus lobata* – *Quercus agrifolia* / *Toxicodendron diversilobum* –
(*Symphoricarpos* spp.) Association**

Common Name: Valley Oak – Coast Live Oak / Poison Oak – (Snowberry) Woodland

Alliance: *Quercus lobata* Riparian Forest & Woodland Alliance

Local Vegetation Description

The Valley Oak – Coast Live Oak / Poison Oak – (Snowberry) Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Quercus lobata*, and *Quercus agrifolia* and *Umbellularia californica* are characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus* and *Conium maculatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	45.9	20 – 90	18.9	10 – 35
Regenerating or Shrubby Tree	2.4	0 – 10	6.2	2 – 10
Shrub	20.8	0 – 63	3.0	1 – 5
Herb	13.9	0 – 37	0.5	0 – 1

Local Environmental Description

Elevation: Mean 302 m, Range 84 – 560 m

Aspect: Flat (2), NE (2), SW (2), NW (1), SE (1)

Slope: Mean 11 degrees, Range 0 – 28 degrees

Macro Topography: Bottom (3), Middle 1/3 of slope (2), High-flow bank/slope (1),
Lower 1/3 of slope (1)

Large Rock: Mean 5.7%, Range 0 – 35%

Small Rock: Mean 5.8%, Range 0 – 20%

Fines Cover: Mean 35.7%, Range 10 – 60%

Litter Cover: Mean 49.3%, Range 5 – 85%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Moderately fine silty clay loam (2), Coarse, loamy sand (1), Loam (1)

Geology (field or map data): Sedimentary (3), Franciscan melange (1), Metamorphic (1), Mixed alluvium (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (3), Western Diablo Range (2)

Site Impacts

This association has low non-native plant cover (average 11.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Lolium perenne*, *Rumex crispus*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=8; Alameda County (n=2): ALCC271, SUNOL041

Contra Costa County (n=1): SPCCA-052

Santa Clara Co. (n=5): AW047, CDLO0044, CDLO0046, SCRUZ519, VAWA298

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	26.9	10.0	47.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	75	12.1	2.0	30.0	Y			Y
T	<i>Umbellularia californica</i>	75	8.6	2.0	25.0	Y			Y
T	<i>Aesculus californica</i>	38	0.8	0.2	4.0				
T	<i>Platanus racemosa</i>	25	0.2	0.2	1.0				
R	<i>Quercus agrifolia</i>*	25	0.4	1.2	2.2				
R	<i>Umbellularia californica</i> *	25	0.2	0.2	1.2				
S	<i>Toxicodendron diversilobum</i>	88	15.2	0.2	50.0	Y	Y		Y
S	<i>Symphoricarpos albus</i>	38	3.9	1.0	20.0				
S	<i>Baccharis pilularis</i>	25	2.6	0.5	20.0				
S	<i>Frangula californica</i>	25	0.4	0.2	3.0				
S	<i>Ribes californicum</i>	25	0.4	0.2	3.0				
S	<i>Artemisia californica</i>	25	0.3	0.2	2.0				
S	<i>Sambucus nigra</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	75	3.4	0.2	16.0	Y			Y
H	<i>Conium maculatum</i>	50	0.7	0.2	5.0				Y
H	<i>Bromus diandrus</i>	38	3.3	0.2	20.0				
H	<i>Lolium perenne</i>	38	0.4	0.2	3.0				
H	<i>Avena barbata</i>	38	0.2	0.2	1.0				
H	<i>Pentagramma triangularis</i>	38	0.1	0.2	0.5				
H	<i>Cynosurus echinatus</i>	25	0.8	0.2	6.0				
H	<i>Brachypodium distachyon</i>	25	0.4	1.0	2.0				
H	<i>Torilis arvensis</i>	25	0.3	0.2	2.0				
H	<i>Dryopteris arguta</i>	25	0.1	0.2	0.5				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.5				
H	<i>Artemisia douglasiana</i>	25	0.1	0.2	0.4				
H	<i>Elymus glaucus</i>	25	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	25	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	25	0.1	0.2	0.2				
NV	Lichen	25	0.1	0.2	0.2				

***Quercus lobata* / herbaceous semi-riparian Association**

Common Name: Valley Oak / herbaceous semi-riparian Woodland

Alliance: *Quercus lobata* Riparian Forest & Woodland Alliance

Local Vegetation Description

The Valley Oak / herbaceous semi-riparian Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus lobata*, and *Aesculus californica*, *Juglans hindsii*, *Platanus racemosa*, *Prunus cerasifera*, *Quercus agrifolia*, and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Juglans hindsii*. Commonly associated shrubs include *Toxicodendron diversilobum*, *Frangula californica*, *Ribes californicum*, and *Sambucus nigra*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Avena barbata*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Conium maculatum*, *Cynosurus echinatus*, *Geranium molle*, *Hirschfeldia incana*, *Hordeum murinum*, *Lolium perenne*, *Sisymbrium officinale*, *Stellaria media*, *Torilis arvensis*, *Trifolium dubium*, and *Trifolium glomeratum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	42.0	25 – 59	27.5	20 – 35
Regenerating or Shrubby Tree	3.6	0 – 7	8.0	2 – 15
Shrub	7.0	2 – 12	3.5	2 – 5
Herb	31.0	20 – 42	0.5	0 – 1

Local Environmental Description

Elevation: Mean 150 m, Range 95 – 206 m

Aspect: Flat (1), NE (1)

Slope: Mean 2 degrees, Range 0 – 5 degrees

Macro Topography: Bottom (1), Lower 1/3 of slope (1)

Large Rock: Mean 0.1%, Range 0 – 0.2%

Small Rock: Mean 2.6%, Range 0 – 5%

Fines Cover: Mean 15.0%, Range 10 – 20%

Litter Cover: Mean 80.0%, Range 77 – 83%

Soil Texture (field assessed): Coarse, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Franciscan melange (1), Mixed alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 39.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Geranium molle*, *Hirschfeldia incana*, *Hordeum murinum*, *Lolium perenne*, *Prunus cerasifera*, *Sisymbrium officinale*, *Stellaria media*, *Torilis arvensis*, *Trifolium dubium*, and *Trifolium glomeratum*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein et al. 2007, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; Alameda County (n=2): ALCC255, SUNOL034

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	40.0	25.0	55.0	Y	Y		Y
T	<i>Aesculus californica</i>	50	2.0	4.0	4.0				Y
T	<i>Juglans hindsii</i>	50	2.0	4.0	4.0				Y
T	<i>Quercus agrifolia</i>	50	1.5	3.0	3.0				Y
T	<i>Umbellularia californica</i>	50	0.5	1.0	1.0				Y
T	<i>Prunus cerasifera</i>	50	0.5	1.0	1.0				Y
T	<i>Platanus racemosa</i>	50	0.1	0.2	0.2				Y
R	<i>Juglans hindsii</i>	50	3.5	7.0	7.0				Y
S	<i>Toxicodendron diversilobum</i>	100	6.0	1.0	11.0	Y	Y		Y
S	<i>Sambucus nigra</i>	50	1.5	3.0	3.0				Y
S	<i>Frangula californica</i>	50	0.5	1.0	1.0				Y
S	<i>Ribes californicum</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	100	14.0	5.0	23.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	100	6.5	3.0	10.0	Y			Y
H	<i>Cynosurus echinatus</i>	50	5.0	10.0	10.0				Y
H	<i>Avena barbata</i>	50	3.5	7.0	7.0				Y
H	<i>Torilis arvensis</i>	50	2.5	5.0	5.0				Y
H	<i>Conium maculatum</i>	50	2.0	4.0	4.0				Y
H	<i>Lolium perenne</i>	50	0.5	1.0	1.0				Y
H	<i>Hordeum murinum</i>	50	0.1	0.2	0.2				Y
H	<i>Brachypodium distachyon</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Hirschfeldia incana</i>	50	0.1	0.2	0.2				Y
H	<i>Sisymbrium officinale</i>	50	0.1	0.2	0.2				Y
H	<i>Stellaria media</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium dubium</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium glomeratum</i>	50	0.1	0.2	0.2				Y
H	<i>Geranium molle</i>	50	0.1	0.2	0.2				Y

***Quercus lobata* / *Rubus ursinus* – *Rosa californica* Association**

Common Name: Valley Oak / California Blackberry – California Wild Rose Woodland

Alliance: *Quercus lobata* Riparian Forest & Woodland Alliance

Local Vegetation Description

The Valley Oak / California Blackberry – California Wild Rose Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. The dominant tree is *Quercus lobata*, and *Umbellularia californica* is characteristic or often present. Commonly associated shrubs include *Toxicodendron diversilobum* and *Baccharis pilularis*, and commonly associated herbs include *Artemisia douglasiana*, *Carduus pycnocephalus*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.7	20 – 63	15.0	10 – 20
Regenerating or Shrubby Tree	0.2	0 – 1	2.5	1 – 5
Shrub	40.8	14 – 63	1.8	0.5 – 5
Herb	26.9	2 – 53	0.4	0 – 1

Local Environmental Description

Elevation: Mean 217 m, Range 8 – 361 m

Aspect: Flat (2), NW (2)

Slope: Mean 5 degrees, Range 0 – 25 degrees

Macro Topography: Bottom (2), Terrace (former floodplain) (1), Toe of Streambank (1)

Large Rock: 0%

Small Rock: Mean 3.5%, Range 0 – 10%

Fines Cover: Mean 17.5%, Range 0 – 48%

Litter Cover: Mean 56.3%, Range 5 – 75%

Soil Texture (field assessed): Clay (1), Loam (1), Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Alluvium (1), Franciscan melange (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Delta (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 15.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Geranium dissectum*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=5; Alameda County (n=1): GUMP-018

Contra Costa County (n=1): ALCC044

San Joaquin Co. (n=1): SSJD0016

Santa Clara Co. (n=2): VAWA208, VAWA255

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus lobata</i>	100	33.1	20.0	62.5	Y	Y		Y
T	<i>Umbellularia californica</i>	60	1.1	1.0	3.0				Y
S	<i>Toxicodendron diversilobum</i>	80	19.5	5.0	62.5	Y		Y	Y
S	<i>Baccharis pilularis</i>	60	0.3	0.1	1.0				Y
S	<i>Symphoricarpos albus</i>	40	12.9	2.0	62.5				
S	<i>Rubus ursinus</i>	40	6.0	0.2	30.0				
S	<i>Rosa californica</i>	40	2.0	3.0	7.0				
S	<i>Frangula californica</i>	40	0.8	1.0	3.0				
H	<i>Artemisia douglasiana</i>	80	2.2	0.1	10.0	Y			Y
H	<i>Carduus pycnocephalus</i>	60	1.0	0.1	3.0				Y
H	<i>Torilis arvensis</i>	60	0.7	0.1	3.0				Y
H	<i>Bromus hordeaceus</i>	40	3.1	3.0	12.4				
H	<i>Bromus diandrus</i>	40	2.7	3.5	10.0				
H	<i>Geranium dissectum</i>	40	0.7	0.7	3.0				
H	<i>Sanicula crassicaulis</i>	40	0.6	0.2	3.0				
H	<i>Ranunculus californicus</i>	40	0.6	0.1	3.0				
H	<i>Dryopteris arguta</i>	40	0.1	0.2	0.5				

***Quercus wislizeni* – *Quercus parvula* (tree) Forest & Woodland Alliance**



Common Name: Interior live oak – shreve oak woodland and forest

NVC Alliance Code: A3348. *Quercus douglasii* - *Quercus wislizeni* - *Pinus sabiniana*
Woodland Alliance

Statewide Description

Quercus wislizeni or *Quercus parvula* is dominant or co-dominant in the tree canopy with *Acer macrophyllum*, *Aesculus californica*, *Arbutus menziesii*, *Notholithocarpus densiflorus*, *Pinus sabiniana*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus douglasii*, *Quercus kelloggii*, *Sequoia sempervirens*, and *Umbellularia californica*.

Quercus parvula var. *shrevei* is a large tree of low elevation, coastal forests in central California. It has been confused with *Quercus wislizeni* for many years. Current taxonomic research individuates *Q. p.* var. *shrevei* from *Q. wislizeni* and also suggests a close relationship to *Q. agrifolia* (Nixon 1980, Kashani and Dodd 2002, Hauser et al. 2017). Most references to stands of *Q. wislizeni* in the mixed evergreen forests of the outer central Coast Ranges (e.g., Sawyer and Keeler-Wolf 1995, Thomas 1961) appear

now to be *Q. p.* var. *shrevei* (Dodd et al. 2002, Hauser et al. 2017). However, oaks north of San Francisco in the North Coast and North Coast Ranges appear to be a hybrid swarm of *Q. parvula* and *Q. wislizeni*, with some mixing of *Q. agrifolia*, and a new subspecies of *Q. parvula* var. *tamalpaisensis* was noted as a narrow endemic from Mt. Tamalpais (Dodd and Afzal-Rafii 2004, Hauser et al. 2017). For this reason, we have combined the two species into a single alliance since the 2009 publication of *A Manual of California Vegetation, second edition*.

Unlike *Q. agrifolia* and *Q. wislizeni*, *Q. parvula* var. *shrevei* usually occurs as tall single-trunked trees within a matrix of conifers and broadleaf, evergreen trees. Stands are closely associated with but distinct from stands of *Sequoia sempervirens* or *Umbellularia californica* alliances. Stands are typically intermediate in moisture conditions between redwood and coast live oak alliances. Stands of *Q. parvula* often form dense forests on slopes and on the margins of continuous *S. sempervirens* forest patches.

Stands of this extensive alliance vary from savannas to closed forests, but commonly they form woodlands (Allen-Diaz et al. 2007). The tree form of *Q. w.* var. *wislizeni* is also distinguished from the shrub form (var. *frutescens*), but form and height may be only the result of high fire frequencies (White and Sawyer 1995). The species also hybridizes with other oaks. The most commonly encountered hybrid is the deciduous *Q. xmorehus* (*Q. kelloggii* x *Q. wislizeni*).

Local Vegetation Description

The Interior live oak – shreve oak woodland and forest Alliance forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus wislizeni*. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Pinus sabiniana*. Commonly associated shrubs include *Heteromeles arbutifolia*, *Toxicodendron diversilobum*, *Artemisia californica*, and *Diplacus aurantiacus*, and commonly associated herbs include *Bromus diandrus*, *Carduus pycnocephalus*, and *Melica torreyana*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	no data	no data
Hardwood	23.2	0 – 49	10.0	5 – 20
Regenerating or Shrubby Tree	5.5	0 – 21	2.7	1 – 5
Shrub	15.2	5 – 29	2.3	1 – 5
Herb	15.2	0 – 63	0.3	0 – 0.5

Local Membership Rule

Quercus parvula and/or *Quercus wislizeni* > 30% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 510 m, Range 284 – 720 m

Aspect: NW (3), NE (2), Variable (1)

Slope: Mean 19 degrees, Range 10 – 27 degrees

Macro Topography: Lower 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 8.7%, Range 0 – 40%

Small Rock: Mean 7.5%, Range 0 – 21%

Fines Cover: Mean 35.0%, Range 16 – 54%

Litter Cover: Mean 47.0%, Range 15 – 80%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Shale and other sedimentary (1), Siltstone (1), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5)

Other Subsections: Diablo Range (1)

Site Impacts

This alliance has low non-native plant cover (average 13.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, and *Cynosurus echinatus*.

Associations in Alameda & Contra Costa Counties

Quercus wislizeni – *Aesculus californica*

Quercus wislizeni / *Eriodictyon californicum*

Quercus wislizeni / *Heteromeles arbutifolia*

Quercus wislizeni / *Toxicodendron diversilobum*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen et al. 1991, Buck and Evens 2010, Buck-Diaz et al. 2012, Evens and Kentner 2006, Evens et al. 2004, Klein et al. 2007, Lee 2004, NPS-SEKI 2009, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=5): ALCC051, ALCC065, ALCC150, SPCCA-045, X2105181501

Santa Clara Co. (n=1): SCLAR803

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	83	18.3	5.0	37.0	Y	Y		Y
T	<i>Aesculus californica</i>	33	4.2	3.0	22.0				
T	<i>Umbellularia californica</i>	33	0.8	1.0	4.0				
R	<i>Umbellularia californica</i> *	50	2.0	2.0	6.0				Y
R	<i>Quercus wislizeni</i>*	33	2.2	1.0	12.0				
R	<i>Pinus sabiniana</i>	33	0.1	0.2	0.4				
S	<i>Toxicodendron diversilobum</i>	100	3.6	0.2	7.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	83	2.5	0.2	6.0	Y			Y
S	<i>Artemisia californica</i>	50	0.4	0.2	2.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.2	0.2	1.0				Y
S	<i>Eriodictyon californicum</i>	33	0.8	2.0	3.0				
S	<i>Adenostoma fasciculatum</i>	33	0.4	0.2	2.0				
H	<i>Melica torreyana</i>	50	8.4	0.2	50.0				Y
H	<i>Bromus diandrus</i>	50	1.2	0.2	4.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.7	0.2	3.0				Y
H	<i>Cynosurus echinatus</i>	33	0.4	0.2	2.0				
H	<i>Avena barbata</i>	33	0.3	1.0	1.0				
H	<i>Marah fabaceus</i>	33	0.2	0.2	1.0				
H	<i>Galium porrigens</i>	33	0.2	0.2	1.0				
H	<i>Avena fatua</i>	33	0.2	0.2	1.0				
H	<i>Sanicula crassicaulis</i>	33	0.1	0.2	0.2				
NV	Moss	50	0.7	0.2	2.0				Y

***Quercus wislizeni* – *Aesculus californica* Association**

Common Name: Interior Live Oak – California Buckeye Woodland

Alliance: *Quercus wislizeni* – *Quercus parvula* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Interior Live Oak – California Buckeye Association forms an open to intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus wislizeni*, and *Aesculus californica*, *Arbutus menziesii*, *Platanus racemosa*, *Quercus chrysolepis*, and *Umbellularia californica* are characteristic or often present. Regenerating or shrubby trees that are often present include *Aesculus californica*. Commonly associated shrubs include *Heteromeles arbutifolia* and *Toxicodendron diversilobum*, and commonly associated herbs include *Avena barbata* and *Melica torreyana*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	38.0	27 – 49	12.5	5 – 20
Regenerating or Shrubby Tree	1.5	1 – 2	2.5	1 – 5
Shrub	21.0	13 – 29	2.5	1 – 5
Herb	33.0	3 – 63	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 554 m, Range 387 – 720 m

Aspect: NW (1), Variable (1)

Slope: Mean 17 degrees, Range 10 – 23 degrees

Macro Topography: Lower to Upper 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 1.0%, Range 0 – 2%

Small Rock: Mean 11.0%, Range 1 – 21%

Fines Cover: Mean 28.5%, Range 16 – 41%

Litter Cover: Mean 57.5%, Range 35 – 80%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Shale and other sedimentary (1), Siltstone (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 4.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anthriscus*

caucalis, *Briza maxima*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Rubus armeniacus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Klein et al. 2007, NPS-SEKI 2009, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): ALCC150

Santa Clara Co. (n=1): SCLAR803

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	100	26.0	15.0	37.0	Y	Y		Y
T	<i>Aesculus californica</i>	100	12.5	3.0	22.0	Y			Y
T	<i>Umbellularia californica</i>	50	2.0	4.0	4.0				Y
T	<i>Quercus chrysolepis</i>	50	1.5	3.0	3.0				Y
T	<i>Arbutus menziesii</i>	50	0.5	1.0	1.0				Y
T	<i>Platanus racemosa</i>	50	0.5	1.0	1.0				Y
R	<i>Aesculus californica</i> *	50	0.5	1.0	1.0				Y
S	<i>Toxicodendron diversilobum</i>	100	5.5	4.0	7.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	2.5	2.0	3.0	Y			Y
S	<i>Quercus berberidifolia</i>	50	4.0	8.0	8.0				Y
S	<i>Holodiscus discolor</i>	50	3.0	6.0	6.0				Y
S	<i>Cercocarpus betuloides</i>	50	2.0	4.0	4.0				Y
S	<i>Symphoricarpos mollis</i>	50	1.5	3.0	3.0				Y
S	<i>Symphoricarpos albus</i>	50	1.0	2.0	2.0				Y
S	<i>Rubus armeniacus</i>	50	1.0	2.0	2.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.5	1.0	1.0				Y
S	<i>Adenostoma fasciculatum</i>	50	0.1	0.2	0.2				Y
S	<i>Lonicera hispidula</i>	50	0.1	0.2	0.2				Y
H	<i>Melica torreyana</i>	50	25.0	50.0	50.0				Y

Quercus wislizeni – *Aesculus californica* Association
Quercus wislizeni – *Quercus parvula* (tree) Forest & Woodland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Anthriscus caucalis</i>	50	2.5	5.0	5.0				Y
H	<i>Pentagramma triangularis</i>	50	1.0	2.0	2.0				Y
H	<i>Galium porrigens</i>	50	0.5	1.0	1.0				Y
H	<i>Collinsia heterophylla</i>	50	0.5	1.0	1.0				Y
H	<i>Avena barbata</i>	50	0.5	1.0	1.0				Y
H	<i>Marah fabaceus</i>	50	0.5	1.0	1.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Adiantum jordanii</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y
H	<i>Calochortus albus</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Briza maxima</i>	50	0.1	0.2	0.2				Y
H	<i>Artemisia douglasiana</i>	50	0.1	0.2	0.2				Y
H	<i>Claytonia parviflora</i>	50	0.1	0.2	0.2				Y
H	<i>Triteleia laxa</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia purpurea</i>	50	0.1	0.2	0.2				Y
H	<i>Dryopteris arguta</i>	50	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Micropus californicus</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Cynoglossum grande</i>	50	0.1	0.2	0.2				Y
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				Y
NV	Moss	50	1.0	2.0	2.0				Y

***Quercus wislizeni* / *Eriodictyon californicum* Association**

Common Name: Interior Live Oak / Yerba Santa Woodland

Alliance: *Quercus wislizeni* – *Quercus parvula* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Interior Live Oak / Yerba Santa Association forms an open tree canopy with an open shrub understory in the single survey available. The dominant tree is *Quercus wislizeni*, and *Umbellularia californica* is present. Regenerating or shrubby trees that are dominant and characteristic include *Quercus wislizeni* and *Umbellularia californica*. Commonly associated shrubs include *Malacothamnus fremontii* and *Eriodictyon californicum*, and commonly associated herbs include *Bromus diandrus*, *Avena barbata*, *Bromus rubens*, *Calystegia purpurata*, *Carduus pycnocephalus*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	5.0	5 – 5	7.5	5 – 10
Regenerating or Shrubby Tree	3.0	3 – 3	1.5	1 – 2
Shrub	10.0	10 – 10	1.5	1 – 2
Herb	10.0	10 – 10	0.3	0 – 0.5

Local Environmental Description

Elevation: 284 m

Aspect: NE (1)

Slope: 27 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 40%

Small Rock: 12%

Fines Cover: 32%

Litter Cover: 15%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (field or map data): no data

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 34.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophylla*, *Bromus diandrus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Gastridium phleoides*, *Hypochaeris glabra*, *Lactuca serriola*, and *Vulpia myuros*.

Classification Comments

The single sample was a post-burn survey with low overall vegetation cover.

References: Allen et al. 1991

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC065

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	100	5.0	5.0	5.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	1.0	1.0	1.0	Y			Y
R	<i>Umbellularia californica</i> *	100	2.0	2.0	2.0	Y	Y		Y
R	<i>Quercus wislizeni</i>*	100	1.0	1.0	1.0	Y		Y	Y
S	<i>Malacothamnus fremontii</i>	100	7.0	7.0	7.0	Y	Y		Y
S	<i>Eriodictyon californicum</i>	100	2.0	2.0	2.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Clematis lasiantha</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Diplacus aurantiacus</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Heteromeles arbutifolia</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Lotus scoparius</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Rhamnus ilicifolia</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Artemisia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus diandrus</i>	100	4.0	4.0	4.0	Y		Y	Y
H	<i>Bromus rubens</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Vulpia myuros</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Calystegia purpurata</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Avena barbata</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Cynosurus echinatus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Marah fabaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melica torreyana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lactuca serriola</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Gastroidium phleoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Cirsium occidentale</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Aira caryophyllea</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hypochaeris glabra</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	2.0	2.0	2.0	Y	Y		Y

***Quercus wislizeni* / *Heteromeles arbutifolia* Association**

Common Name: Interior Live Oak / Toyon Woodland

Alliance: *Quercus wislizeni* – *Quercus parvula* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Interior Live Oak / Toyon Association forms an intermittent tree canopy with an open shrub understory. The dominant tree is *Quercus wislizeni*, and *Pinus sabiniana* and *Quercus douglasii* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana*, and those that are often present include *Quercus agrifolia*, *Quercus wislizeni*, and *Umbellularia californica*. Commonly associated shrubs include *Artemisia californica*, *Heteromeles arbutifolia*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Galium sp.* and *Solanum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.5	0 – 1	no data	no data
Hardwood	20.0	0 – 40	no data	no data
Regenerating or Shrubby Tree	10.6	0 – 21	3.5	2 – 5
Shrub	16.5	5 – 28	3.5	2 – 5
Herb	0.2	0.2 – 0.2	no data	no data

Local Environmental Description

Elevation: Mean 532 m, Range 385 – 680 m

Aspect: NE (1), NW (1)

Slope: Mean 17 degrees, Range 16 – 17 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0.4%

Small Rock: 0.4%

Fines Cover: 32%

Litter Cover: 65%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyors.

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2012, Evens and Kentner 2006, Evens et al. 2004, Klein et al. 2007

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): SPCCA-045, X2105181501

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	50	17.5	35.0	35.0				Y
T	<i>Pinus sabiniana</i>	50	0.1	0.2	0.2				Y
T	<i>Quercus douglasii</i>	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i> *	100	0.3	0.2	0.4	Y	Y		Y
R	<i>Quercus wislizeni</i> *	50	6.0	12.0	12.0				Y
R	<i>Quercus agrifolia</i>	50	2.5	5.0	5.0				Y
R	<i>Umbellularia californica</i>	50	2.0	4.0	4.0				Y
S	<i>Heteromeles arbutifolia</i>	100	5.0	4.0	6.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	3.6	0.2	7.0	Y			Y
S	<i>Artemisia californica</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Ceanothus cuneatus</i>	50	2.0	4.0	4.0				Y
S	<i>Eriodictyon californicum</i>	50	1.5	3.0	3.0				Y
S	<i>Adenostoma fasciculatum</i>	50	1.0	2.0	2.0				Y
S	<i>Salvia mellifera</i>	50	1.0	2.0	2.0				Y
S	<i>Lepechinia calycina</i>	50	0.5	1.0	1.0				Y
S	<i>Clematis</i> sp.	50	0.5	1.0	1.0				Y
S	<i>Ericameria</i> sp.	50	0.1	0.2	0.2				Y
S	<i>Diplacus aurantiacus</i>	50	0.1	0.2	0.2				Y
H	<i>Solanum</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Galium</i> sp.	50	0.1	0.2	0.2				Y

***Quercus wislizeni* / *Toxicodendron diversilobum* Association**

Common Name: Interior Live Oak / Poison Oak Woodland

Alliance: *Quercus wislizeni* – *Quercus parvula* (tree) Forest & Woodland Alliance

Local Vegetation Description

The Interior Live Oak / Poison Oak Association forms an open tree canopy with an open shrub understory in the single sample available. The dominant tree is *Quercus wislizeni*. Regenerating or shrubby trees that are present include *Umbellularia californica*.

Commonly associated shrubs include *Arctostaphylos manzanita* and *Toxicodendron diversilobum*, and commonly associated herbs include *Achillea millefolium*, *Avena fatua*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Eurybia radulina*, *Galium porrigens*, *Hordeum murinum*, *Melica torreyana*, *Monardella villosa*, *Sanicula crassicaulis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	18.0	18 – 18	7.5	5 – 10
Regenerating or Shrubby Tree	6.0	6 – 6	3.5	2 – 5
Shrub	6.0	6 – 6	1.5	1 – 2
Herb	15.0	15 – 15	0.3	0 – 0.5

Local Environmental Description

Elevation: 606 m

Aspect: NW (1)

Slope: 23 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 1%

Small Rock: 3%

Fines Cover: 54%

Litter Cover: 40%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone, shale, and conglomerate (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 34.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Brachypodium distachyon, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Hordeum murinum*, and *Torilis arvensis*.

Classification Comments

None.

References: Evens et al. 2004, Klein et al. 2007, Lee 2004, Reyes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC051

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	100	18.0	18.0	18.0	Y	Y		Y
R	<i>Umbellularia californica</i>	100	6.0	6.0	6.0	Y	Y		Y
S	<i>Arctostaphylos manzanita</i>	100	3.0	3.0	3.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	3.0	3.0	3.0	Y	Y		Y
H	<i>Bromus diandrus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Bromus madritensis</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Brachypodium distachyon</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Cynosurus echinatus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Hordeum murinum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Avena fatua</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Eurybia radulina</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Galium porrigens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melica torreyana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Monardella villosa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Achillea millefolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Torilis arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Sanicula crassicaulis</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y
NV	Lichen	100	0.2	0.2	0.2	Y	Y		Y

***Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance**



Common Name: Goodding's willow – red willow riparian woodland and forest

NVC Alliance Code: A3752. *Salix gooddingii* - *Salix laevigata* Riparian Forest Alliance

Statewide Description

Salix gooddingii and/or *Salix laevigata* is dominant or co-dominant in the tree or shrub canopy with *Acer negundo*, *Aesculus californica*, *Alnus rhombifolia*, *Calocedrus decurrens*, *Fraxinus latifolia*, *Pinus sabiniana*, *Platanus racemosa*, *Populus fremontii*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus lobata*, *Salix lucida* var. *lasiandra* or *Washingtonia filifera*. Shrubs include *Baccharis salicifolia*, *Cornus sericea*, *Rosa californica*, *Rubus armeniacus*, *Salix exigua*, *Salix lasiolepis* or *Sambucus nigra*.

Salix gooddingii and *Salix laevigata* were formerly described and treated as separate alliances, but the two types have been merged since they often occur together and/or share similar habitats. *Salix laevigata* grows commonly with various willows and other riparian trees, but it also can solely dominate sites. Researchers have mainly recognized mixed associations that include *S. laevigata* or *S. gooddingii* in the *Alnus rhombifolia*, *Populus fremontii*, and *Quercus agrifolia* alliances, too. Various

associations of *Salix laevigata*-*Salix lasiolepis* exist, where several studies done in coastal and southern California describe mainly associations characterized by two trees. We need more sampling and study to understand this complex.

Salix gooddingii is a common riparian tree or shrub in the West, and stands of the species occur in the southwestern United States and northern Mexico (NatureServe 2007a). Mixed and pure stands of *S. gooddingii* occur regularly in the Central Valley and southern California. When *S. gooddingii* or *S. laevigata* co-dominates with *Populus fremontii*, the alliance is determined as *Populus fremontii* - *Fraxinus velutina* - *Salix gooddingii* Alliance.

Local Vegetation Description

The Goodding's willow – red willow riparian woodland and forest Alliance forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Salix laevigata*. Commonly associated shrubs include *Salix lasiolepis* and *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 4	3.5	2 – 5
Hardwood	29.5	12 – 65	16.1	5 – 50
Regenerating or Shrubby Tree	2.0	0 – 16	4.3	0 – 15
Shrub	19.7	0 – 57	2.2	0.5 – 5
Herb	12.5	0 – 35	0.6	0 – 2

Local Membership Rule

Salix laevigata or *Salix gooddingii* > 50% relative cover in the tree canopy.

Local Environmental Description

Elevation: Mean 139 m, Range 2 – 324 m

Aspect: Flat (5), NE (4), SW (3), NW (2), Variable (1)

Slope: Mean 2 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (12), Lower 1/3 of slope (1)

Large Rock: Mean 3.1%, Range 0 – 40%

Small Rock: Mean 20.2%, Range 0 – 84%

Fines Cover: Mean 22.1%, Range 0 – 83%

Litter Cover: Mean 40.6%, Range 1 – 92%

Soil Texture (field assessed): Clay (2), Coarse, loamy sand (2), Medium silt loam (1), Muck (1), Moderately fine clay loam (1), Sand (1), Medium to very fine, sandy loam (1), Fine silty clay (1), Coarse sand (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Mixed alluvium (6), Shale and other sedimentary (2), Franciscan melange (1), Sandstone (1), Sandstone, shale, and gravel deposits (1),

Sandy alluvium (most alluvial fans and washes) (1), Sedimentary (1), Silty alluvium (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3), Fremont - Livermore Hills and Valleys (3), East Bay Terraces and Alluvium (1), Western Diablo Range (1), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Eastern Hills (1), Westside Alluvial Fans and Terraces (1), Suisun Hills and Valleys (1)

Other Subsections: None

Site Impacts

This alliance has moderate non-native plant cover (average 20.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Cirsium vulgare*, *Conium maculatum*, *Polypogon monspeliensis*, and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Salix gooddingii

Salix gooddingii / *Baccharis salicifolia*

Salix gooddingii / *Rubus armeniacus*

Salix laevigata

Salix laevigata / *Salix lasiolepis*

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and San 2005, Evens et al. 2014, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, Potter 2005, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences and URS 2007, VegCAMP 2015a

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=15; Alameda County (n=9): ALCC102, ALCC170, ALCC205, ALCC232, ALCC257, ALCCREC202, LLNL098, SUNOL023, SUNOL024

Contra Costa County (n=6): ALCC216, ALCC251, ALCC609, ALCC836, CVRP0052, SPCCB-088

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	87	16.8	4.0	52.0	Y	Y		Y
T	<i>Salix gooddingii</i>	27	9.1	12.0	63.0				
T	<i>Populus fremontii</i>	20	1.4	1.0	17.0				
T	<i>Alnus rhombifolia</i>	20	0.4	1.0	4.0				
S	<i>Salix lasiolepis</i>	60	9.3	0.2	57.0				Y
S	<i>Toxicodendron diversilobum</i>	60	2.5	0.2	22.0				Y
S	<i>Rubus ursinus</i>	47	3.8	0.2	26.0				
S	<i>Baccharis salicifolia</i>	27	0.7	0.2	7.0				
S	<i>Rubus armeniacus</i>	20	3.7	2.0	39.0				
H	<i>Carduus pycnocephalus</i>	40	0.6	0.2	7.0				
H	<i>Urtica dioica</i>	33	0.3	0.2	2.0				
H	<i>Bromus diandrus</i>	27	0.7	0.2	4.0				
H	<i>Conium maculatum</i>	20	0.9	1.0	8.0				
H	<i>Cyperus eragrostis</i>	20	0.7	0.2	8.0				
H	<i>Polypogon monspeliensis</i>	20	0.5	0.2	7.0				
H	<i>Carex nudata</i>	20	0.4	0.2	5.0				
H	<i>Xanthium strumarium</i>	20	0.1	0.2	1.0				
H	<i>Hoita macrostachya</i>	20	0.1	0.2	1.0				
H	<i>Cirsium vulgare</i>	20	0.1	0.2	1.0				
H	<i>Rumex</i> sp.	20	0.0	0.2	0.2				
H	<i>Equisetum arvense</i>	20	0.0	0.2	0.2				
NV	Moss	20	0.2	0.2	2.0				

***Salix gooddingii* Association**

Common Name: Goodding's Willow Woodland

Alliance: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance

Local Vegetation Description

The Goodding's Willow Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Salix gooddingii*, and *Salix laevigata* is characteristic or often present. Commonly associated shrubs include *Salix exigua*, and commonly associated herbs include *Carduus pycnocephalus* and *Conium maculatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	35.5	18 – 75	10.0	5 – 15
Regenerating or Shrubby Tree	2.0	0 – 8	3.9	0 – 10
Shrub	7.5	0 – 26	4.8	2 – 10
Herb	26.6	8 – 60	1.1	0 – 2

Local Environmental Description

Elevation: Mean 36 m, Range 3 – 79 m

Aspect: Flat (3), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degree

Macro Topography: Bottom (3), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 46.0%, Range 5 – 83%

Litter Cover: Mean 50.0%, Range 15 – 90%

Soil Texture (field assessed): Fine sand (1), Fine silty clay (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Alluvium (1), Mixed alluvium (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Delta (1), Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 15.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Convolvulus arvensis*, *Cynara cardunculus*, *Foeniculum vulgare*,

Salix gooddingii Association

Salix gooddingii – *Salix laevigata* Forest & Woodland Alliance

Helminthotheca echioides, *Lepidium latifolium*, *Lolium perenne*, *Lotus corniculatus*, *Mentha arvensis*, *Paspalum dilatatum*, *Torilis arvensis*, and *Tragopogon porrifolius*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Evens et al. 2014, Klein and Evens 2005, Klein et al. 2007, Reyes et al. 2020a, Sproul et al. 2011

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=1): ALCC102

Contra Costa County (n=1): CVRP0052

Solano Co. (n=2): SSJD0272, SUMA12004

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix gooddingii</i>	100	31.5	12.0	75.0	Y	Y		Y
T	<i>Salix laevigata</i>	50	3.0	4.0	8.0				Y
T	<i>Populus fremontii</i>	25	0.8	3.0	3.0				
R	<i>Salix laevigata</i> *	25	0.3	1.0	1.0				
S	<i>Salix exigua</i>	50	1.5	3.0	3.0				Y
S	<i>Salix lasiolepis</i>	25	6.5	26.0	26.0				
S	<i>Rubus ursinus</i>	25	0.1	0.2	0.2				
S	<i>Prunus</i> sp.	25	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	25	0.1	0.2	0.2				
H	<i>Conium maculatum</i>	50	5.8	8.0	15.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus triticoides</i>	25	11.3	45.0	45.0				
H	<i>Hordeum</i> sp.	25	2.5	10.0	10.0				
H	<i>Lepidium latifolium</i>	25	1.8	7.0	7.0				
H	<i>Xanthium spinosum</i>	25	1.0	4.0	4.0				
H	<i>Galium aparine</i>	25	1.0	4.0	4.0				
H	<i>Bromus diandrus</i>	25	0.8	3.0	3.0				
H	<i>Torilis arvensis</i>	25	0.5	2.0	2.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Avena barbata</i>	25	0.5	2.0	2.0				
H	<i>Malva neglecta</i>	25	0.3	1.0	1.0				
H	<i>Helminthotheca echioides</i>	25	0.1	0.2	0.2				
H	<i>Phalaris</i> sp.	25	0.1	0.2	0.2				
H	<i>Tragopogon porrifolius</i>	25	0.1	0.2	0.2				
H	<i>Lotus corniculatus</i>	25	0.1	0.2	0.2				
H	<i>Schoenoplectus americanus</i>	25	0.1	0.2	0.2				
H	<i>Paspalum dilatatum</i>	25	0.1	0.2	0.2				
H	<i>Epilobium ciliatum</i>	25	0.1	0.2	0.2				
H	<i>Equisetum arvense</i>	25	0.1	0.2	0.2				
H	<i>Mentha arvensis</i>	25	0.1	0.2	0.2				
H	<i>Polygonum</i> sp.	25	0.1	0.2	0.2				
H	<i>Lepidium</i> sp.	25	0.1	0.2	0.2				
H	<i>Rumex</i> sp.	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	25	0.1	0.2	0.2				
H	<i>Polypogon</i> sp.	25	0.1	0.2	0.2				
H	<i>Cynara cardunculus</i>	25	0.1	0.2	0.2				
H	<i>Convolvulus arvensis</i>	25	0.1	0.2	0.2				
H	<i>Typha latifolia</i>	25	0.1	0.2	0.2				
H	<i>Xanthium strumarium</i>	25	0.1	0.2	0.2				
H	<i>Bolboschoenus maritimus</i>	25	0.1	0.2	0.2				
H	<i>Brassica nigra</i>	25	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	25	0.1	0.2	0.2				
H	<i>Distichlis spicata</i>	25	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	25	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	25	0.1	0.2	0.2				

***Salix gooddingii* / *Baccharis salicifolia* Association**

Common Name: Goodding's Willow / Mulefat Woodland

Alliance: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance

Local Vegetation Description

The Goodding's Willow / Mulefat Association forms an intermittent tree canopy with an open shrub understory. The dominant tree is *Salix gooddingii*. Regenerating or shrubby trees that are present include *Quercus agrifolia*. Commonly associated shrubs include *Artemisia californica*, *Baccharis salicifolia*, and *Salix lasiolepis*, and commonly associated herbs include *Bromus diandrus*, *Cyperus eragrostis*, *Melilotus indica*, *Paspalum dilatatum*, *Typha latifolia*, and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	63.0	63 – 63	12.5	10 – 15
Regenerating or Shrubby Tree	0.2	0 – 0	3.5	2 – 5
Shrub	7.0	7 – 7	1.5	1 – 2
Herb	26.0	26 – 26	0.8	0.5 – 1

Local Environmental Description

Elevation: 217 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 2%

Fines Cover: 17%

Litter Cover: 32%

Soil Texture (field assessed): Medium silt loam (1)

Geology (field or map data): Mixed alluvium (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 17.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Kickxia elatine*, *Marrubium vulgare*, *Paspalum dilatatum*, *Pseudognaphalium luteoalbum*, and *Rumex pulcher*.

Classification Comments

None.

References: Evens and San 2005, Klein and Evens 2005

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC232

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix gooddingii</i>	100	63.0	63.0	63.0	Y	Y		Y
R	<i>Quercus agrifolia</i>	100	0.2	0.2	0.2	Y	Y		Y
S	<i>Baccharis salicifolia</i>	100	7.0	7.0	7.0	Y	Y		Y
S	<i>Salix lasiolepis</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Artemisia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melilotus indica</i>	100	10.0	10.0	10.0	Y			Y
H	<i>Cyperus eragrostis</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Typha latifolia</i>	100	6.0	6.0	6.0	Y			Y
H	<i>Bromus diandrus</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Paspalum dilatatum</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Xanthium strumarium</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Kickxia elatine</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Phyla nodiflora</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lysimachia arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Marrubium vulgare</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pseudognaphalium luteoalbum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Rumex pulcher</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Erigeron bonariensis</i>	100	0.2	0.2	0.2	Y			Y

***Salix gooddingii* / *Rubus armeniacus* Association**

Common Name: Goodding's Willow / Himalayan Blackberry Woodland

Alliance: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance

Local Vegetation Description

The Goodding's Willow / Himalayan Blackberry Association forms an intermittent tree canopy with an open to continuous shrub understory. The dominant tree is *Salix gooddingii*. Regenerating or shrubby trees that are often present include *Quercus lobata* and *Salix gooddingii*. Commonly associated shrubs include *Rubus armeniacus*, *Salix lasiolepis*, *Cephalanthus occidentalis*, and *Rosa californica*, and commonly associated herbs include *Anemopsis californica*, *Asparagus officinalis*, *Atriplex prostrata*, *Cirsium vulgare*, *Cortaderia selloana*, *Cressa truxillensis*, *Distichlis spicata*, *Euthamia occidentalis*, *Festuca arundinacea*, *Juncus mexicanus*, *Rumex crispus*, *Schoenoplectus americanus*, and *Sonchus oleraceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	37.5	35 – 40	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	3.5	2 – 5
Shrub	64.0	30 – 98	2.5	1 – 5
Herb	8.7	0 – 17	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 3 m, Range 2 – 4 m

Aspect: Flat (2)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 21%

Soil Texture (field assessed): Medium loam (1), Muck (1)

Geology (field or map data): Alluvium (1), Silty alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (1)

Site Impacts

This association has moderate non-native plant cover (average 43.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Salix laevigata Association

Salix gooddingii – *Salix laevigata* Forest & Woodland Alliance

Asparagus officinalis, *Atriplex prostrata*, *Cirsium vulgare*, *Cortaderia selloana*, *Festuca arundinacea*, *Rubus armeniacus*, *Rumex crispus*, and *Sonchus oleraceus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Hickson and Keeler-Wolf 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): ALCC609

San Joaquin Co. (n=1): SSJD0024

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix gooddingii</i>	100	37.5	35.0	40.0	Y	Y		Y
R	<i>Salix gooddingii</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus lobata</i>	50	0.1	0.2	0.2				Y
S	<i>Rubus armeniacus</i>	100	55.0	15.0	95.0	Y	Y		Y
S	<i>Salix lasiolepis</i>	100	7.6	0.2	15.0	Y			Y
S	<i>Cephalanthus occidentalis</i>	50	5.0	10.0	10.0				Y
S	<i>Rosa californica</i>	50	2.5	5.0	5.0				Y
H	<i>Schoenoplectus americanus</i>	50	2.0	4.0	4.0				Y
H	<i>Anemopsis californica</i>	50	2.0	4.0	4.0				Y
H	<i>Festuca arundinacea</i>	50	1.5	3.0	3.0				Y
H	<i>Euthamia occidentalis</i>	50	1.0	2.0	2.0				Y
H	<i>Distichlis spicata</i>	50	1.0	2.0	2.0				Y
H	<i>Cressa truxillensis</i>	50	0.5	1.0	1.0				Y
H	<i>Cortaderia selloana</i>	50	0.1	0.2	0.2				Y
H	<i>Cirsium vulgare</i>	50	0.1	0.2	0.2				Y
H	<i>Asparagus officinalis</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus mexicanus</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex crispus</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.2	0.2				Y
H	<i>Sonchus oleraceus</i>	50	0.1	0.1	0.1				Y

Salix laevigata Association

Salix gooddingii – *Salix laevigata* Forest & Woodland Alliance

***Salix laevigata* Association**

Common Name: Red Willow Woodland

Alliance: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance

Local Vegetation Description

The Red Willow Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Salix laevigata*. Commonly associated shrubs include *Baccharis salicifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	26.6	0 – 70	8.2	1 – 15
Regenerating or Shrubby Tree	4.2	0 – 35	1.5	0 – 5
Shrub	5.2	0 – 21	1.6	0.5 – 5
Herb	19.5	0 – 85	0.7	0 – 2

Local Environmental Description

Elevation: Mean 194 m, Range 1 – 379 m

Aspect: Flat (3), NE (2), NW (1), SE (1), Variable (1)

Slope: Mean 3 degrees, Range 0 – 25 degrees

Macro Topography: Bottom (7), Floodplain (1), Lower 1/3 of slope (1)

Large Rock: Mean 6.0%, Range 0 – 40%

Small Rock: Mean 39.4%, Range 0 – 84%

Fines Cover: Mean 24.9%, Range 3 – 85%

Litter Cover: Mean 11.6%, Range 1 – 50%

Soil Texture (field assessed): Sand (2), Clay (1), Coarse sand (1), Coarse, loamy sand (1), Fine sandy clay (1)

Geology (field or map data): Mixed alluvium (3), Franciscan melange (2), Alluvium (1), Clayey alluvium (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), Diablo Range (1)

Contra Costa County Subsections: Eastern Hills (1)

Other Subsections: Western Diablo Range (2), Delta (1), Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 19.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Hirschfeldia incana*, *Lolium perenne*,

Plantago lanceolata, *Polypogon monspeliensis*, *Rumex crispus*, *Silybum marianum*, *Trifolium hirtum*, and *Verbascum thapsus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, Evens et al. 2014, Kittel et al. 2012, Klein et al. 2007, Potter 2005, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=9; Alameda County (n=4): ALCC170, LLNL098, SUNOL023, SUNOL024

Contra Costa County (n=1): ALCC216

San Joaquin Co. (n=1): LLNL022

Santa Clara Co. (n=2): SPCCA-025, VAWA112

Solano Co. (n=1): SUMA9019

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	89	24.8	9.0	70.0	Y	Y		Y
T	<i>Platanus racemosa</i>	33	0.9	1.0	4.0				
T	<i>Alnus rhombifolia</i>	33	0.7	1.0	4.0				
S	<i>Baccharis salicifolia</i>	56	2.2	0.2	10.0				Y
S	<i>Toxicodendron diversilobum</i>	44	0.3	0.2	2.0				
S	<i>Brickellia californica</i>	33	0.2	0.2	1.0				
S	<i>Baccharis pilularis</i>	22	0.1	0.2	1.0				
S	<i>Rubus ursinus</i>	22	0.0	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	44	1.6	0.2	7.0				
H	<i>Carduus pycnocephalus</i>	44	0.8	0.2	7.0				
H	<i>Carex nudata</i>	44	0.8	0.2	5.0				
H	<i>Hirschfeldia incana</i>	44	0.7	0.2	3.0				
H	<i>Urtica dioica</i>	33	0.7	0.2	5.0				
H	<i>Juncus xiphioides</i>	33	0.2	0.2	1.0				
H	<i>Artemisia douglasiana</i>	33	0.2	0.2	1.0				
H	<i>Hoita macrostachya</i>	33	0.2	0.2	1.0				
H	<i>Lolium perenne</i>	22	0.8	0.2	7.0				
H	<i>Xanthium strumarium</i>	22	0.6	0.2	5.0				
H	<i>Plantago lanceolata</i>	22	0.5	0.2	4.0				
H	<i>Silybum marianum</i>	22	0.4	0.2	3.0				
H	<i>Cyperus eragrostis</i>	22	0.4	0.2	3.0				
H	<i>Bromus diandrus</i>	22	0.2	0.2	2.0				
H	<i>Mimulus guttatus</i>	22	0.1	0.2	1.0				
H	<i>Bromus rubens</i>	22	0.0	0.2	0.2				
H	<i>Verbascum thapsus</i>	22	0.0	0.2	0.2				
H	<i>Verbena lasiostachys</i>	22	0.0	0.2	0.2				
H	<i>Rumex crispus</i>	22	0.0	0.2	0.2				
H	<i>Trifolium hirtum</i>	22	0.0	0.2	0.2				
H	<i>Equisetum arvense</i>	22	0.0	0.2	0.2				
H	<i>Rumex salicifolius</i> var. <i>denticulatus</i>	22	0.0	0.2	0.2				
NV	Moss	22	0.0	0.2	0.2				

***Salix laevigata* / *Salix lasiolepis* Association**

Common Name: Red Willow / Arroyo Willow Woodland

Alliance: *Salix gooddingii* – *Salix laevigata* Forest & Woodland Alliance

Local Vegetation Description

The Red Willow / Arroyo Willow Association forms an open to continuous tree canopy with an open to intermittent shrub understory. The dominant tree is *Salix laevigata*. Commonly associated shrubs include *Salix lasiolepis*, *Toxicodendron diversilobum*, and *Rubus ursinus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.7	0 – 4	3.5	2 – 5
Hardwood	28.0	12 – 65	22.5	10 – 50
Regenerating or Shrubby Tree	4.3	0 – 16	9.5	2 – 15
Shrub	38.8	7 – 57	2.5	1 – 5
Herb	12.0	1 – 35	0.6	0 – 1

Local Environmental Description

Elevation: Mean 122 m, Range 18 – 193 m

Aspect: Flat (2), SW (2), NE (1), NW (1)

Slope: Mean 1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (4)

Large Rock: 0%

Small Rock: Mean 2.2%, Range 1 – 5%

Fines Cover: Mean 20.2%, Range 5 – 41%

Litter Cover: Mean 74.2%, Range 53 – 92%

Soil Texture (field assessed): Coarse, loamy sand (2), Clay (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Mixed alluvium (2), Sandstone, shale, and gravel deposits (1), Sandy alluvium (most alluvial fans and washes) (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Site Impacts

This association has moderate non-native plant cover (average 29.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cirsium vulgare*, *Conium maculatum*, and *Rubus armeniacus*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2020a, Sikes et al. 2021, Sikes et al. 2023, Stillwater Sciences and URS 2007, VegCAMP 2015a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC205, ALCC257, ALCCREC202

Contra Costa County (n=3): ALCC251, ALCC836, SPCCB-088

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	100	22.2	9.0	45.0	Y	Y		Y
T	<i>Juglans hindsii</i>	33	0.1	0.2	0.2				
S	<i>Salix lasiolepis</i>	100	20.7	1.0	57.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	83	5.9	0.2	22.0	Y			Y
S	<i>Rubus ursinus</i>	67	9.3	2.0	26.0				Y
S	<i>Rubus armeniacus</i>	33	6.8	2.0	39.0				
H	<i>Conium maculatum</i>	33	0.8	1.0	4.0				
H	<i>Urtica dioica</i>	33	0.5	1.0	2.0				
H	<i>Baccharis glutinosa</i>	33	0.4	0.2	2.0				
H	<i>Persicaria</i> sp.	33	0.4	0.2	2.0				
H	<i>Scirpus microcarpus</i>	33	0.2	0.2	1.0				
H	<i>Cirsium vulgare</i>	33	0.2	0.2	1.0				
H	<i>Rumex</i> sp.	33	0.1	0.2	0.2				
H	<i>Juncus effusus</i>	33	0.1	0.2	0.2				
H	<i>Juncus patens</i>	33	0.1	0.1	0.2				
NV	Moss	33	0.4	0.2	2.0				

***Salix lucida* ssp. *lasiandra* Forest & Woodland Alliance**



Common Name: Shining willow groves

NVC Alliance Code: A3748. *Salix lucida* Riparian Scrub Alliance

Statewide Description

Salix lucida is dominant or co-dominant in the tree or shrub canopy with *Acer macrophyllum*, *Alnus rhombifolia*, *Cornus sericea*, *Platanus racemosa*, *Populus fremontii*, *Populus trichocarpa*, *Quercus agrifolia*, *Salix* spp., and *Sambucus nigra*.

In California, *Salix lucida* stands appear to be limited to relatively moist coastal areas, permanently flooded swampy bottomlands, saturated montane meadows, or along low-gradient streams. Disturbances during winter floods modify stands; the timing of seed dispersal and spring flood patterns determine seedling success. There are two subspecies of *Salix lucida*: *S. lucida* ssp. *lasiandra*, which is usually a tree, and *S. lucida* ssp. *caudata*, a montane shrub. Only *Salix lucida* ssp. *lasiandra* is included in this alliance.

Local Vegetation Description

The Shining willow groves Alliance forms an open to continuous tree canopy with a

sparse to intermittent shrub understory. The dominant tree is *Salix lasiandra*. Trees that may be present include *Acer negundo*, *Juglans hindsii*, and *Populus fremontii*. Commonly associated shrubs include *Salix lasiolepis*.

Local Membership Rule

Salix lucida ssp. *lasiandra* > 50% relative cover in the tree canopy, sometimes with higher or similar cover by shrubs in the understory.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (1),

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Site Impacts

Associations in Alameda & Contra Costa Counties

Salix lucida ssp. *lasiandra**

Classification Comments

No survey data was available in the region, but 7 field observations were recorded.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Schinus (molle, terebinthifolius) – Myoporum laetum* Forest & Woodland Semi-Natural Alliance**



Common Name: Pepper tree or Myoporum groves

NVC Alliance Code: A3329.

Statewide Description

Myoporum laetum, *Schinus molle* or *Schinus terebinthifolius* is dominant in the tree canopy. DiTomaso and Healey (2007) considered these trees as invasive in California. These trees are evergreen with aromatic compound leaves. Birds disperse the colored fruits allowing seedlings to establish in wildland vegetation. The trees are common ornamentals that have escaped from cultivation.

Local Vegetation Description

The Pepper tree or Myoporum groves Alliance forms an intermittent tree canopy with an open shrub understory in the single survey available. The dominant tree is *Schinus*

Schinus (molle, terebinthifolius) – Myoporum laetum Forest & Woodland Semi-Natural Alliance

molle, *Aesculus californica* may be present. Commonly associated shrubs include *Artemisia californica*, *Rhamnus ilicifolia*, and *Toxicodendron diversilobum*, and commonly associated herbs include *Avena* sp., *Bromus* sp., and *Conium maculatum*.

Local Membership Rule

Myoporum laetum or *Schinus molle* is strongly dominant in open to dense stands.

Local Environmental Description

Elevation: 182 m

Aspect: SW (1)

Slope: 24 degrees

Macro Topography: Not recorded (1)

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): Not recorded (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: none

Contra Costa County Subsections: none

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has high non-native plant cover relative to native cover. Non-native species that occur with highest frequency and abundance include *Schinus molle*.

Associations in Alameda & Contra Costa Counties

*Schinus molle**

Classification Comments

The single survey available was a reconnaissance without cover estimates, so no stand table is available. Since there were no surveys of this alliance in Alameda and Contra Costa Counties, data from nearby counties were included.

References: Keeler Wolf and Evens 2006, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=0):

Santa Clara Co. (n=1): SCRUZ929

Schinus (molle, terebinthifolius) – *Myoporum laetum* Forest & Woodland Semi-Natural Alliance

***Schinus molle* Semi-Natural Association**

Common Name: Pepper Tree Woodland

Alliance: *Schinus (molle, terebinthifolius)* – *Myoporum laetum* Forest & Woodland
Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Keeler Wolf and Evens 2006, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Sequoia sempervirens* Forest & Woodland Alliance**



Common Name: Redwood forest and woodland

NVC Alliance Code: A3403. *Sequoia sempervirens* Forest Alliance

Statewide Description

Sequoia sempervirens is dominant or co-dominant in the tree canopy with *Abies grandis*, *Acer macrophyllum*, *Alnus rubra*, *Arbutus menziesii*, *Chrysolepis chrysophylla*, *Notholithocarpus densiflorus*, *Picea sitchensis*, *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Umbellularia californica*.

Sequoia sempervirens occurs in moist coastal areas with heavy summer fog. Stands generally occur below 600 meters in elevation, from southern Oregon to the Santa Lucia Mountains in central California. Scattered stands also occur along streams, springs, seeps, and sheltered moist locations up to about 975 meters in elevation, where they usually occur as mixed hardwood forests (Sawyer 2006, 2007). *Sequoia sempervirens* is probably limited in its northern extent by freezing temperatures and in its southern extent by low winter rainfall (Lanner 1999).

Ecologists differentiate forests on alluvial streamside terraces, where *S. sempervirens* is usually the dominant canopy tree, from those in upland settings, where *S. sempervirens* shares the canopy with other conifers and with hardwood trees (NatureServe 2007a). However, these differences are best understood when the associations are placed in three geographic regions (Sawyer et al. 2000b). *Tsuga heterophylla* plays an important role in the northern forest region, and it is absent from the other two regions, where *Notholithocarpus densiflorus* plays an important role. Additionally, redwood genetics in the southern forest region differs from that in the other regions (Sawyer et al. 2000a, b). Precipitation varies significantly between northern and southern regions with fog-drip playing an increasingly important role in the southern portion of the range (Olsen et al. 1990).

Local Vegetation Description

The Redwood forest and woodland alliance forms an intermittent to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Sequoia sempervirens*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica* and *Sequoia sempervirens*. Commonly associated shrubs include *Rubus ursinus* and *Toxicodendron diversilobum*, and commonly associated herbs include *Polystichum munitum*, *Dryopteris arguta*, *Pentagramma triangularis*, and *Stachys rigida* var. *quercetorum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	42.3	18 – 68	32.5	20 – 50
Hardwood	11.2	0 – 24	16.5	2 – 35
Regenerating or Shrubby Tree	6.2	1 – 17	6.0	0.5 – 15
Shrub	6.3	1 – 21	1.4	0 – 5
Herb	8.0	2 – 33	0.6	0 – 1

Local Membership Rule

Sequoia sempervirens dominant or co-dominant (>30% relative cover) in the overstory with *Pseudotsuga menziesii*, *Arbutus menziesii*, *Quercus agrifolia*, and *Umbellularia californica*; rarely *S. sempervirens* is characteristic in the tree canopy, with as little as 5% absolute cover, when other trees are also lower in cover and co-dominant.

Local Environmental Description

Elevation: Mean 277 m, Range 140 – 465 m

Aspect: NE (5), SW (2), NW (1), Variable (1)

Slope: Mean 26 degrees, Range 4 – 55 degrees

Macro Topography: Entire slope (2), Bottom (1), Bottom to Lower 1/3 of slope (1), Bottom to Mid 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 1.5%, Range 0 – 6%

Small Rock: Mean 2.2%, Range 0 – 8%
Fines Cover: Mean 11.7%, Range 1 – 34%
Litter Cover: Mean 82.6%, Range 50 – 97%

Soil Texture (field assessed): Moderately fine clay loam (4), Medium loam (1), Medium to very fine, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (2), Sedimentary (2), Sandstone (1), Volcanic flow rocks (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (4)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5)

Site Impacts

This alliance has low non-native plant cover (average 4.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cirsium vulgare*, *Ehrharta erecta*, *Hedera helix*, and *Myosotis latifolia*.

Associations in Alameda & Contra Costa Counties

Sequoia sempervirens
Sequoia sempervirens – *Umbellularia californica*
Sequoia sempervirens / *Polystichum munitum*

Classification Comments

None.

References: Borchert et al. 1988, Buck and Evens 2010, Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Lenihan 1990, Mahony and Stuart 2000, Sikes et al. 2021, Sikes et al. 2023, Stumpf et al. 2017, Taylor 1982

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=9; Alameda County (n=4): ALCC011, ALCC018, ALCC020, ALCC611

Contra Costa County (n=5): ALCC014, ALCC084, ALCC242, EBRTA310, EBRTA322

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Sequoia sempervirens</i>	100	41.7	18.0	63.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	9.9	0.2	20.0	Y			Y
T	<i>Arbutus menziesii</i>	33	0.7	0.2	4.0				
T	<i>Quercus agrifolia</i>	22	0.2	0.2	2.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Umbellularia californica</i> *	100	5.0	0.4	17.2	Y	Y		Y
R	<i>Sequoia sempervirens</i>*	56	1.5	1.0	6.0				Y
R	<i>Quercus agrifolia</i> *	44	0.1	0.1	0.2				
R	<i>Arbutus menziesii</i> *	22	0.0	0.2	0.2				
S	<i>Rubus ursinus</i>	100	2.7	0.2	9.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	100	1.1	0.2	3.0	Y			Y
S	<i>Vaccinium ovatum</i>	44	0.5	0.2	2.0				
S	<i>Corylus cornuta</i>	44	0.5	0.2	2.0				
S	<i>Hedera helix</i>	33	1.2	0.2	9.0				
S	<i>Symphoricarpos mollis</i>	33	0.2	0.2	1.0				
S	<i>Symphoricarpos albus</i>	22	0.2	0.2	2.0				
S	<i>Lonicera hispidula</i>	22	0.0	0.2	0.2				
S	<i>Rosa californica</i>	22	0.0	0.1	0.2				
H	<i>Polystichum munitum</i>	89	2.3	1.0	6.0	Y		Y	Y
H	<i>Dryopteris arguta</i>	78	0.7	0.2	2.0	Y			Y
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	56	0.4	0.2	1.0				Y
H	<i>Pentagramma triangularis</i>	56	0.1	0.2	0.2				Y
H	<i>Ehrrharta erecta</i>	44	0.6	0.2	2.0				
H	<i>Myosotis latifolia</i>	44	0.3	0.2	1.0				
H	<i>Galium aparine</i>	44	0.3	0.2	1.0				
H	<i>Maianthemum racemosum</i>	33	0.1	0.2	0.2				
H	<i>Stachys bullata</i>	22	0.1	0.2	1.0				
H	<i>Trientalis latifolia</i>	22	0.1	0.2	1.0				
H	<i>Prosartes hookeri</i>	22	0.0	0.2	0.2				
H	<i>Carex</i> sp.	22	0.0	0.2	0.2				
H	<i>Osmorhiza berteroi</i>	22	0.0	0.2	0.2				
H	<i>Maianthemum stellatum</i>	22	0.0	0.2	0.2				
H	<i>Pteridium aquilinum</i>	22	0.0	0.2	0.2				
H	<i>Cirsium vulgare</i>	22	0.0	0.1	0.2				
NV	Moss	33	0.5	0.2	3.0				

***Sequoia sempervirens* Association**

Common Name: Redwood Woodland

Alliance: *Sequoia sempervirens* Forest & Woodland Alliance

Local Vegetation Description

The Redwood Association forms an intermittent to continuous tree canopy with an open shrub understory. The dominant tree is *Sequoia sempervirens*, and *Umbellularia californica*, *Arbutus menziesii*, *Pinus radiata*, and *Quercus agrifolia* are characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Sequoia sempervirens* and *Umbellularia californica*, and those that are often present include *Quercus agrifolia*. Commonly associated shrubs include *Rubus ursinus*, *Toxicodendron diversilobum*, *Corylus cornuta*, *Hedera helix*, and *Vaccinium ovatum*, and commonly associated herbs include *Ehrharta erecta*, *Polystichum munitum*, *Pteridium aquilinum*, and *Stachys rigida* var. *quercetorum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	59.0	50 – 68	42.5	35 – 50
Hardwood	6.1	0 – 12	10.5	2 – 20
Regenerating or Shrubby Tree	3.0	2 – 4	5.5	2 – 10
Shrub	8.0	2 – 14	2.1	0.5 – 5
Herb	4.5	4 – 5	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 364 m, Range 263 – 465 m

Aspect: NE (2)

Slope: Mean 25 degrees, Range 9 – 40 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Entire slope (1)

Large Rock: 0%

Small Rock: Mean 0.2%, Range 0 – 0.4%

Fines Cover: Mean 4.5%, Range 1 – 8%

Litter Cover: Mean 93.3%, Range 90 – 97%

Soil Texture (field assessed): Medium loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 3.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Ehrharta erecta*, *Hedera helix*, *Ilex aquifolium*, and *Myosotis latifolia*.

Classification Comments

None.

References: Borchert et al. 1988, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** ALCC018

Contra Costa County (n=1): ALCC014

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Sequoia sempervirens</i>	100	56.5	50.0	63.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	5.1	0.2	10.0	Y			Y
T	<i>Quercus agrifolia</i>	50	0.1	0.2	0.2				Y
T	<i>Pinus radiata</i>	50	0.1	0.2	0.2				Y
T	<i>Arbutus menziesii</i>	50	0.1	0.2	0.2				Y
R	<i>Umbellularia californica</i> *	100	1.7	0.4	3.0	Y	Y		Y
R	<i>Sequoia sempervirens</i>*	100	1.0	1.0	1.0	Y		Y	Y
R	<i>Quercus agrifolia</i> *	50	0.1	0.1	0.1				Y
S	<i>Rubus ursinus</i>	100	5.0	1.0	9.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	1.6	0.2	3.0	Y			Y
S	<i>Vaccinium ovatum</i>	50	1.0	2.0	2.0				Y
S	<i>Hedera helix</i>	50	1.0	2.0	2.0				Y
S	<i>Corylus cornuta</i>	50	0.5	1.0	1.0				Y
S	<i>Frangula californica</i>	50	0.1	0.2	0.2				Y
S	<i>Ilex aquifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Ehrharta erecta</i>	100	1.5	1.0	2.0	Y		Y	Y
H	<i>Polystichum munitum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Pteridium aquilinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Galium aparine</i>	50	0.5	1.0	1.0				Y
H	<i>Heuchera micrantha</i>	50	0.1	0.2	0.2				Y
H	<i>Myosotis latifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Maianthemum racemosum</i>	50	0.1	0.2	0.2				Y
H	<i>Osmorhiza berteroi</i>	50	0.1	0.2	0.2				Y
H	<i>Dryopteris arguta</i>	50	0.1	0.2	0.2				Y
H	<i>Carex</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Maianthemum stellatum</i>	50	0.1	0.2	0.2				Y
NV	Lichen	50	0.1	0.2	0.2				Y

***Sequoia sempervirens* – *Umbellularia californica* Association**

Common Name: Redwood – California Bay Woodland

Alliance: *Sequoia sempervirens* Forest & Woodland Alliance

Local Vegetation Description

The Redwood – California Bay Association forms an intermittent tree canopy with a sparse to open shrub understory. The dominant trees are *Sequoia sempervirens* and *Umbellularia californica*. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*. Commonly associated shrubs include *Rubus ursinus*, *Toxicodendron diversilobum*, *Corylus cornuta*, and *Symphoricarpos mollis*, and commonly associated herbs include *Dryopteris arguta*, *Polystichum munitum*, and *Pentagramma triangularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	28.2	18 – 52	30.5	20 – 50
Hardwood	14.6	8 – 24	20.5	10 – 35
Regenerating or Shrubby Tree	5.6	1 – 12	5.9	2 – 10
Shrub	6.8	1 – 21	1.4	0 – 5
Herb	9.1	2 – 33	0.7	0 – 1

Local Environmental Description

Elevation: Mean 233 m, Range 140 – 297 m

Aspect: NE (2), NW (1), SW (1), Variable (1)

Slope: Mean 26 degrees, Range 4 – 55 degrees

Macro Topography: Bottom (1), Bottom to Mid 1/3 of slope (1), Entire slope (1), Lower 1/3 of slope to Ridgetop (1), Middle 1/3 of slope (1)

Large Rock: Mean 1.7%, Range 0 – 6%

Small Rock: Mean 1.9%, Range 0 – 5%

Fines Cover: Mean 16.6%, Range 8 – 34%

Litter Cover: Mean 77.6%, Range 50 – 90%

Soil Texture (field assessed): Moderately fine clay loam (2), Medium to very fine, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (1), Sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 6.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cirsium vulgare*, *Ehrharta erecta*, and *Myosotis latifolia*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=5; Alameda County (n=3): ALCC011, ALCC020, ALCC611

Contra Costa County (n=2): ALCC084, EBRTA322

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Sequoia sempervirens</i>	100	28.0	18.0	52.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	13.2	7.0	20.0	Y		Y	Y
T	<i>Arbutus menziesii</i>	40	1.2	2.0	4.0				
R	<i>Umbellularia californica</i> *	100	4.4	1.0	10.0	Y	Y		Y
R	<i>Sequoia sempervirens</i> *	40	1.0	2.2	3.0				
R	<i>Quercus agrifolia</i>	40	0.1	0.2	0.2				
R	<i>Arbutus menziesii</i> *	40	0.1	0.2	0.2				
S	<i>Rubus ursinus</i>	100	2.5	0.2	9.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	100	0.9	0.2	3.0	Y			Y
S	<i>Corylus cornuta</i>	60	0.6	0.2	2.0				Y
S	<i>Symphoricarpos mollis</i>	60	0.4	0.2	1.0				Y
S	<i>Vaccinium ovatum</i>	40	0.1	0.2	0.2				
H	<i>Dryopteris arguta</i>	100	0.9	0.2	2.0	Y			Y
H	<i>Polystichum munitum</i>	80	1.6	1.0	4.0	Y		Y	Y
H	<i>Pentagramma triangularis</i>	60	0.1	0.2	0.2				Y
H	<i>Ehrharta erecta</i>	40	0.4	0.2	2.0				
H	<i>Myosotis latifolia</i>	40	0.2	0.2	1.0				
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	40	0.2	0.2	1.0				
H	<i>Galium aparine</i>	40	0.1	0.2	0.2				
H	<i>Prosartes hookeri</i>	40	0.1	0.2	0.2				
H	<i>Cirsium vulgare</i>	40	0.1	0.1	0.2				
NV	Moss	40	0.2	0.2	1.0				

***Sequoia sempervirens* / *Polystichum munitum* Association**

Common Name: Redwood / Sword Fern Woodland

Alliance: *Sequoia sempervirens* Forest & Woodland Alliance

Local Vegetation Description

The Redwood / Sword Fern Association forms an intermittent to continuous tree canopy with an open shrub understory. The dominant tree is *Sequoia sempervirens*, and *Umbellularia californica* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*, and those that are often present include *Quercus agrifolia* and *Sequoia sempervirens*. Commonly associated shrubs include *Rubus ursinus*, *Toxicodendron diversilobum*, *Symphoricarpos albus*, and *Vaccinium ovatum*, and commonly associated herbs include *Polystichum munitum*, *Dryopteris arguta*, *Galium aparine*, *Maianthemum* spp., *Myosotis latifolia*, *Osmorhiza berteroi*, *Pentagramma triangularis*, *Scrophularia californica*, *Stachys* spp., *Trientalis latifolia*, *Trillium ovatum*, and *Viola sempervirens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	61.0	60 – 62	27.5	20 – 35
Hardwood	8.0	4 – 12	12.5	5 – 20
Regenerating or Shrubby Tree	11.0	5 – 17	6.6	0.5 – 15
Shrub	3.5	2 – 5	0.5	0 – 1
Herb	8.5	7 – 10	0.5	0 – 1

Local Environmental Description

Elevation: Mean 301 m, Range 295 – 307 m

Aspect: NE (1), SW (1)

Slope: Mean 28 degrees, Range 12 – 43 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 2.5%, Range 1 – 4%

Small Rock: Mean 5.0%, Range 2 – 8%

Fines Cover: Mean 6.5%, Range 1 – 12%

Litter Cover: Mean 84.5%, Range 74 – 95%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has very low non-native plant cover (average 0.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus sterilis*, *Hedera helix*, and *Myosotis latifolia*.

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2021, Lenihan 1990, Mahony and Stuart 2000, Sikes et al. 2021, Sikes et al. 2023, Stumpf et al. 2017, Taylor 1982

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC242, EBRTA310

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Sequoia sempervirens</i>	100	61.0	60.0	62.0	Y	Y		Y
T	<i>Umbellularia californica</i>	100	6.5	1.0	12.0	Y			Y
R	<i>Umbellularia californica</i> *	100	9.6	2.0	17.2	Y	Y		Y
R	<i>Sequoia sempervirens</i>*	50	3.0	6.0	6.0				Y
R	<i>Quercus agrifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Toxicodendron diversilobum</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Rubus ursinus</i>	100	1.0	1.0	1.0	Y		Y	Y
S	<i>Vaccinium ovatum</i>	50	1.0	2.0	2.0				Y
S	<i>Symphoricarpos albus</i>	50	1.0	2.0	2.0				Y
S	<i>Lonicera hispidula</i>	50	0.1	0.2	0.2				Y
S	<i>Hedera helix</i>	50	0.1	0.2	0.2				Y
S	<i>Rosa californica</i>	50	0.1	0.2	0.2				Y
H	<i>Polystichum munitum</i>	100	5.5	5.0	6.0	Y	Y		Y
H	<i>Dryopteris arguta</i>	50	1.0	2.0	2.0				Y
H	<i>Trientalis latifolia</i>	50	0.5	1.0	1.0				Y
H	<i>Myosotis latifolia</i>	50	0.5	1.0	1.0				Y
H	<i>Galium aparine</i>	50	0.5	1.0	1.0				Y
H	<i>Stachys bullata</i>	50	0.5	1.0	1.0				Y
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	50	0.5	1.0	1.0				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Trillium</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Carex</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Bromus sterilis</i>	50	0.1	0.2	0.2				Y
H	<i>Viola sempervirens</i>	50	0.1	0.2	0.2				Y
H	<i>Maianthemum racemosum</i>	50	0.1	0.2	0.2				Y
H	<i>Maianthemum stellatum</i>	50	0.1	0.2	0.2				Y
H	<i>Osmorhiza berteroi</i>	50	0.1	0.2	0.2				Y
H	<i>Trillium ovatum</i>	50	0.1	0.2	0.2				Y
NV	Moss	50	1.5	3.0	3.0				Y

***Umbellularia californica* Forest & Woodland Alliance**



Common Name: California bay forest and woodland

NVC Alliance Code: A3346. *Quercus agrifolia* Woodland Alliance

Statewide Description

Umbellularia californica is dominant or co-dominant in the tree or tall shrub canopy with *Acer macrophyllum*, *Aesculus californica*, *Alnus rhombifolia*, *Alnus rubra*, *Arbutus menziesii*, *Corylus cornuta*, *Juglans californica*, *Notholithocarpus densiflorus*, *Pinus sabiniana*, *Platanus racemosa*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus wislizeni*, and *Sequoia sempervirens*.

In many cases, *Umbellularia californica* is the only tree species in older stands with few shrubs and herbs present (McBride 1974). Stands occur near the coast and inland in both mesic and riparian settings, usually in a patchwork with stands of other evergreen forest or chaparral alliances. Coastal stands have characteristically wind-pruned trees or shrubs, and both coastal and inland stands typically have dense, clonally sprouted plants. The stands may be shrubby, as on ultramafic soils such as in the western Klamath Mountains, or they may be trees within a larger matrix of chaparral, as in

central and southern California. Historically productive stands were cleared for agriculture and residential development (Stein 1990b).

Local Vegetation Description

The California bay forest and woodland Alliance forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Umbellularia californica*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are dominant and characteristic include *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 1	12.5	5 – 20
Hardwood	47.7	5 – 88	11.8	2 – 20
Regenerating or Shrubby Tree	2.4	0 – 30	2.9	0 – 10
Shrub	8.4	0 – 62	1.2	0 – 5
Herb	11.2	0 – 50	0.4	0 – 1

Local Membership Rule

Umbellularia californica > 50% relative cover in the tree canopy, or > 30% relative cover with *Quercus agrifolia* or *Quercus wislizeni*.

Local Environmental Description

Elevation: Mean 273 m, Range 59 – 952 m

Aspect: NE (14), NW (11), Variable (7), SW (5), SE (4), Flat (3)

Slope: Mean 22 degrees, Range 0 – 48 degrees

Macro Topography: Middle 1/3 of slope (12), Bottom (11), Lower 1/3 of slope (5), Lower to Middle 1/3 of slope (4), Middle to Upper 1/3 of slope (3), Bottom to Lower 1/3 of slope (2), Middle 1/3 of slope to Ridgetop (2), Ridge top (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 1.0%, Range 0 – 15%

Small Rock: Mean 5.5%, Range 0 – 67%

Fines Cover: Mean 28.2%, Range 1 – 90%

Litter Cover: Mean 56.0%, Range 3 – 97%

Soil Texture (field assessed): Loam (9), Moderately fine clay loam (7), Medium to very fine, sandy loam (7), Moderately coarse, sandy loam (5), Moderately fine silty clay loam (4), Medium loam (3), Clay (3), Moderately fine sandy clay loam (2), Medium silt loam (1), Fine clay (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Sedimentary (16), Franciscan melange (7), Sandstone and other sedimentary (5), Basalt (3), Chert (2), Metamorphic (2), Sandstone, shale, and gravel deposits (2), Clayey alluvium (1), Mix of two or more rock types (1), Mixed alluvium (1), Mixed igneous (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (7), Fremont - Livermore Hills and Valleys (6)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (21), Suisun Hills and Valleys (10)

Site Impacts

This alliance has low non-native plant cover (average 8.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus* and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Umbellularia californica

Umbellularia californica – *Quercus agrifolia* / *Toxicodendron diversilobum*

Umbellularia californica / *Toxicodendron diversilobum*

Classification Comments

Riparian stands of California bay may be placed in the *Acer macrophyllum* – *Alnus rubra* Alliance.

References: Allen-Diaz et al. 2001, Buck-Diaz et al. 2021, Campbell 1980, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=44; Alameda County (n=13): ALCC012, ALCC015, ALCC034, ALCC039, ALCC104, ALCC161, ALCC204, ALCCREC010, AW001, EBRTA319, SUNOL015, SUNOL018, WRBL093

Contra Costa County (n=31): ALCC043, ALCC045, ALCC063, ALCC106, ALCC107, ALCC111, ALCC167, EBAY0010, EBAY0013, EBAY0016, EBAY0029, EBAY0030, EBRTA003, EBRTA005, EBRTA112, EBRTA143, EBRTA213, EBRTA304, JOMU006, JOMU010, JOMU016, JOMU018, JOMU021, JOMU023, JOMU030, JOMU038, JOMU045, SPCCA-035, SPCCB-018, SPCCB-028, SPCCB-029

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	35.1	4.0	88.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	86	12.7	0.2	60.0	Y			Y
T	<i>Aesculus californica</i>	34	1.7	0.2	16.0				
R	<i>Umbellularia californica</i>*	52	2.2	0.2	30.0				Y
R	<i>Quercus agrifolia</i> *	32	0.4	0.1	10.0				
S	<i>Toxicodendron diversilobum</i>	91	3.8	0.2	20.0	Y		Y	Y
S	<i>Rubus ursinus</i>	41	1.0	0.2	10.0				
S	<i>Symphoricarpos albus</i>	30	0.4	0.2	7.0				
S	<i>Sambucus nigra</i>	23	0.2	0.2	3.0				
S	<i>Symphoricarpos mollis</i>	20	0.1	0.1	1.0				
S	<i>Diplacus aurantiacus</i>	20	0.1	0.2	1.0				
H	<i>Dryopteris arguta</i>	48	1.1	0.1	20.0				
H	<i>Torilis arvensis</i>	45	0.2	0.2	2.0				
H	<i>Carduus pycnocephalus</i>	43	0.7	0.2	8.0				
H	<i>Pentagramma triangularis</i>	30	0.1	0.2	2.0				
H	<i>Galium aparine</i>	25	0.0	0.1	0.2				
H	<i>Sanicula crassicaulis</i>	20	0.4	0.2	10.0				
H	<i>Marah fabaceus</i>	20	0.1	0.2	1.0				
NV	Moss	20	0.2	0.1	2.0				

***Umbellularia californica* Association**

Common Name: California Bay Woodland

Alliance: *Umbellularia californica* Forest & Woodland Alliance

Local Vegetation Description

The California Bay Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Umbellularia californica*, and *Quercus agrifolia* is characteristic or often present. Regenerating or shrubby trees that are often present include *Quercus agrifolia* and *Umbellularia californica*. Commonly associated shrubs include *Rubus ursinus* and *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	12.5	10 – 15
Hardwood	50.7	5 – 88	11.6	5 – 20
Regenerating or Shrubby Tree	2.2	0 – 6	2.6	0 – 5
Shrub	6.7	0 – 40	1.3	0 – 5
Herb	9.1	1 – 44	0.3	0 – 1

Local Environmental Description

Elevation: Mean 260 m, Range 107 – 573 m

Aspect: NE (3), NW (3), Flat (2), SW (2), Variable (2)

Slope: Mean 27 degrees, Range 0 – 48 degrees

Macro Topography: Bottom (5), Middle 1/3 of slope (3), Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 2.4%, Range 0 – 15%

Small Rock: Mean 5.9%, Range 0 – 19%

Fines Cover: Mean 29.7%, Range 5 – 68%

Litter Cover: Mean 58.4%, Range 30 – 80%

Soil Texture (field assessed): Clay (3), Medium to very fine, sandy loam (2), Medium loam (1), Medium silt loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Basalt (2), Franciscan melange (2), Metamorphic (2), Sandstone, shale, and gravel deposits (2), Chert (1), Mixed igneous (1), Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7)

Site Impacts

This association has low non-native plant cover (average 10.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Campbell 1980, Evens and Kentner 2006, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=12; Alameda County (n=5): ALCC034, ALCC204, ALCCREC010, EBRTA319, WRBL093

Contra Costa County (n=7): ALCC043, ALCC106, ALCC111, EBAY0030, EBRTA003, EBRTA005, EBRTA112

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	42.4	4.0	88.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	75	1.9	0.2	5.0	Y			Y
T	<i>Acer macrophyllum</i>	33	0.7	0.2	7.0				
R	<i>Umbellularia californica</i> *	67	2.1	0.3	6.0				Y
R	<i>Quercus agrifolia</i> *	50	0.9	0.2	10.0				Y
S	<i>Toxicodendron diversilobum</i>	75	1.2	0.2	8.0	Y			Y
S	<i>Rubus ursinus</i>	50	1.4	0.2	10.0				Y
S	<i>Symphoricarpos albus</i>	33	0.3	0.2	1.0				
S	<i>Symphoricarpos mollis</i>	25	0.2	0.2	1.0				
S	<i>Sambucus nigra</i>	25	0.1	0.2	1.0				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	1.0				
S	<i>Baccharis pilularis</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	42	0.1	0.2	0.2				
H	<i>Dryopteris arguta</i>	33	1.9	0.2	20.0				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Galium aparine</i>	25	0.0	0.1	0.2				
NV	Moss	25	0.2	0.1	1.0				

***Umbellularia californica* – *Quercus agrifolia* / *Toxicodendron diversilobum* Association**

Common Name: California Bay – Coast Live Oak / Poison Oak Woodland

Alliance: *Umbellularia californica* Forest & Woodland Alliance

Local Vegetation Description

The California Bay – Coast Live Oak / Poison Oak Association forms an open to continuous tree canopy with a sparse to open shrub understory. The dominant tree is *Quercus agrifolia* and *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*, and commonly associated herbs include *Carduus pycnocephalus* and *Dryopteris arguta*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	7.5	5 – 10
Hardwood	50.6	24 – 80	11.9	5 – 20
Regenerating or Shrubby Tree	1.4	0 – 10	2.7	0 – 10
Shrub	7.0	0 – 20	1.1	0.5 – 2
Herb	12.8	0 – 50	0.5	0 – 1

Local Environmental Description

Elevation: Mean 218 m, Range 59 – 513 m

Aspect: NE (10), NW (6), Variable (5), SE (3), SW (2), Flat (1)

Slope: Mean 20 degrees, Range 0 – 38 degrees

Macro Topography: Bottom (5), Middle 1/3 of slope (5), Lower 1/3 of slope (4), Lower to Middle 1/3 of slope (4), Bottom to Lower 1/3 of slope (2), Middle 1/3 of slope to Ridgetop (2), Middle to Upper 1/3 of slope (2), Ridge top (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.1%, Range 0 – 1%

Small Rock: Mean 2.0%, Range 0 – 20%

Fines Cover: Mean 29.1%, Range 1 – 90%

Litter Cover: Mean 54.3%, Range 3 – 97%

Soil Texture (field assessed): Loam (9), Moderately fine clay loam (6), Medium to very fine, sandy loam (4), Moderately fine silty clay loam (3), Medium loam (2), Moderately coarse, sandy loam (2), Medium to very fine, loamy sand (1)

Geology (field or map data): Sedimentary (14), Franciscan melange (5), Basalt (1), Chert (1), Clayey alluvium (1), Mix of two or more rock types (1), Mixed alluvium (1), Sandstone and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (4), Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (10), Suisun Hills and Valleys (10)

Site Impacts

This association has low non-native plant cover (average 7.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus* and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=27; Alameda County (n=7): ALCC012, ALCC015, ALCC104, ALCC161, AW001, SUNOL015, SUNOL018

Contra Costa County (n=20): ALCC063, ALCC107, ALCC167, EBAY0010, EBAY0013, EBAY0016, EBAY0029, EBRTA143, EBRTA213, EBRTA304, JOMU006, JOMU010, JOMU016, JOMU018, JOMU021, JOMU023, JOMU030, JOMU038, JOMU045, SPCCA-035

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	34.1	15.0	64.0	Y	Y		Y
T	<i>Quercus agrifolia</i>	100	19.6	1.0	60.0	Y		Y	Y
T	<i>Aesculus californica</i>	44	2.0	0.2	10.0				
R	<i>Umbellularia californica</i>*	41	1.2	0.2	8.2				
R	<i>Quercus agrifolia</i>*	22	0.2	0.1	2.0				
S	<i>Toxicodendron diversilobum</i>	96	4.4	0.2	20.0	Y	Y		Y
S	<i>Rubus ursinus</i>	41	1.0	0.2	9.2				
S	<i>Symphoricarpos albus</i>	30	0.5	0.2	7.0				
S	<i>Sambucus nigra</i>	22	0.2	0.2	3.0				
S	<i>Holodiscus discolor</i>	22	0.1	0.2	1.0				
H	<i>Carduus pycnocephalus</i>	67	1.1	0.2	8.0				Y
H	<i>Dryopteris arguta</i>	56	0.6	0.1	4.0				Y
H	<i>Torilis arvensis</i>	41	0.3	0.2	2.0				
H	<i>Sanicula crassicaulis</i>	30	0.6	0.2	10.0				
H	<i>Pentagramma triangularis</i>	30	0.1	0.2	2.0				
H	<i>Claytonia perfoliata</i>	22	0.5	0.2	10.0				
H	<i>Perideridia kelloggii</i>	22	0.4	1.0	4.0				
H	<i>Marah fabaceus</i>	22	0.1	0.2	1.0				
H	<i>Galium aparine</i>	22	0.0	0.2	0.2				

***Umbellularia californica* / *Toxicodendron diversilobum* Association**

Common Name: California Bay / Poison Oak Woodland

Alliance: *Umbellularia californica* Forest & Woodland Alliance

Local Vegetation Description

The California Bay / Poison Oak Association forms an open to intermittent tree canopy with a sparse to intermittent shrub understory. The dominant tree is *Umbellularia californica*. Commonly associated shrubs include *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 1	17.5	15 – 20
Hardwood	33.9	8 – 63	10.1	2 – 20
Regenerating or Shrubby Tree	4.7	0 – 30	4.0	0 – 10
Shrub	27.1	1 – 62	1.6	0.5 – 5
Herb	10.5	0 – 33	0.4	0 – 1

Local Environmental Description

Elevation: Mean 510 m, Range 217 – 952 m

Aspect: NW (3), SW (2), N (1), NE (1), SE (1)

Slope: Mean 19 degrees, Range 1 – 31 degrees

Macro Topography: Middle 1/3 of slope (5), Bottom (1), Bottom to Lower 1/3 of slope (1), Toe of Streambank (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.8%, Range 0 – 3%

Small Rock: Mean 10.8%, Range 0 – 67%

Fines Cover: Mean 15.9%, Range 2 – 34%

Litter Cover: Mean 53.9%, Range 15 – 76%

Soil Texture (field assessed): Loam (2), Moderately coarse, sandy loam (2), Clay (1), Fine clay (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (5), Franciscan melange (1), Sedimentary (1), Serpentine (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Other Subsections: Fremont - Livermore Hills and Valleys (4)

Site Impacts

This association has low non-native plant cover (average 7.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anthriscus caucalis*, *Bromus madritensis*, *Cynosurus echinatus*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Allen-Diaz et al. 2001, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=9; Alameda County (n=1): ALCC039

Contra Costa County (n=4): ALCC045, SPCCB-018, SPCCB-028, SPCCB-029

Santa Clara Co. (n=4): SCLAR079, VAWA075, VAWA087, VAWA089

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	100	33.1	5.0	62.5	Y	Y		Y
T	<i>Quercus agrifolia</i>	33	0.6	1.0	2.0				
T	<i>Aesculus californica</i>	22	0.4	1.0	3.0				
R	<i>Umbellularia californica</i> *	44	4.4	0.2	30.0				
R	<i>Quercus agrifolia</i> *	22	0.2	0.4	1.0				
S	<i>Toxicodendron diversilobum</i>	100	15.0	0.2	37.5	Y		Y	Y
S	<i>Symphoricarpos albus</i>	44	1.9	1.0	10.0				
S	<i>Heteromeles arbutifolia</i>	33	2.6	0.2	20.0				
S	<i>Ptelea crenulata</i>	33	0.5	0.1	3.0				
S	<i>Rhamnus ilicifolia</i>	33	0.1	0.1	0.2				
S	<i>Lonicera hispidula</i>	22	7.1	1.0	62.5				
S	<i>Symphoricarpos mollis</i>	22	1.1	0.1	10.0				
S	<i>Ceanothus cuneatus</i>	22	0.6	0.1	5.0				
S	<i>Baccharis pilularis</i>	22	0.4	0.5	3.0				
S	<i>Clematis lasiantha</i>	22	0.2	0.2	2.0				
S	<i>Oemleria cerasiformis</i>	22	0.2	0.5	1.0				
H	<i>Pentagramma triangularis</i>	44	0.7	0.2	3.0				
H	<i>Torilis arvensis</i>	44	0.1	0.2	0.2				
H	<i>Dryopteris arguta</i>	33	2.1	0.2	10.0				
H	<i>Melica imperfecta</i>	33	0.5	0.2	3.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Cynosurus echinatus</i>	33	0.4	0.2	3.0				
H	<i>Bromus madritensis</i>	22	0.4	0.2	3.0				
H	<i>Clinopodium douglasii</i>	22	0.4	0.2	3.0				
H	<i>Anthriscus caucalis</i>	22	0.1	0.5	0.5				
H	<i>Artemisia douglasiana</i>	22	0.1	0.2	0.5				
H	<i>Scrophularia californica</i>	22	0.1	0.1	0.5				
H	<i>Elymus glaucus</i>	22	0.0	0.2	0.2				
H	<i>Galium andrewsii</i>	22	0.0	0.2	0.2				
H	<i>Galium porrigens</i>	22	0.0	0.2	0.2				
H	<i>Stachys rigida</i>	22	0.0	0.2	0.2				
H	<i>Galium aparine</i>	22	0.0	0.1	0.2				
NV	Bryophyte (moss, liverwort, hornwort)	22	0.4	1.0	3.0				

SHRUB-OVERSTORY VEGETATION

***Acacia* spp. – *Grevillea* spp. – *Leptospermum laevigatum* Shrubland Provisional Semi-Natural Alliance**



Common Name: Australian wattle - Grevillea - Tea tree ruderal patches

NVC Alliance Code: N/A.

Statewide Description

Acacia species are in the family Fabaceae and known for their yellow flowers and dissected leaves. Various shrubs are non-natives from Australia that thrive in coastal ranges and transverse ranges of California. Flowers of *Acacia* spp. can be pollinated by beetles, bees, and wasps. Its seeds, spread by ants, birds, wind, water, or waste, can be long-lived and germinate after fire or other disturbance.

Leptospermum laevigatum belongs to the family Myrtaceae and is native to southeastern Australia. This small tree has white flowers and narrow leaves and grows in sand dunes in the San Francisco Bay and central and south coast ranges of California. Its seeds are spread via wind, vehicles, soil movement, water and dumped garden waste (CAL-IPC 2017).

Acacia spp. – *Grevillea* spp. – *Leptospermum laevigatum* Shrubland Provisional Semi-Natural Alliance

Grevillea species are evergreen trees and shrubs distributed in central and southern coastal California (Calflora 2017). They are native to Australia and naturalized in California along with tropical and subtropical regions of the world (CAL-IPC 2017). They are prolific seeders with light weight seeds dispersed by wind. They can also spread via root suckers.

Stands of *Acacia* spp., *Albizia lophantha*, *Leptospermum laevigatum*, *Grevillea* spp. or related shrubs to small trees occur sporadically in California, particularly along the coast and in the Coast Ranges. They are often near development or from horticultural plantings, where these plants have escaped and are sometimes naturally reproducing in the wild along coastal hills.

Local Vegetation Description

The Australian wattle - *Grevillea* - Tea tree ruderal patches Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse and may include *Quercus agrifolia*. Dominant and characteristic shrubs include *Acacia dealbata* or *Acacia longifolia*. *Delairea odorata* may also be present.

Local Membership Rule

A non-native shrub *Acacia* spp., *Albizia lophantha*, *Grevillea* spp. and/or *Leptospermum laevigatum* are together > 60% of the shrub canopy.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: none

Site Impacts

This alliance has high non-native plant cover relative to native cover. Non-native species that occur with highest frequency and abundance include *Acacia dealbata* and *A. longifolia*.

Associations in Alameda & Contra Costa Counties

*Acacia (cyclops, dealbata)**

Acacia spp. – *Grevillea* spp. – *Leptospermum laevigatum* Shrubland Provisional Semi-Natural Alliance

Classification Comments

No survey data was available in the region, but 2 field observations were recorded.

References: Buck-Diaz and Evens 2015, Sikes et al. 2021, Sikes et al. 2023,
VegCAMP 2007a, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=0; Alameda County (n=0):

Contra Costa County (n=0):

***Adenostoma fasciculatum* Shrubland Alliance**



Common Name: Chamise chaparral

NVC Alliance Code: A3868. *Adenostoma fasciculatum* Chaparral Alliance

Statewide Description

Adenostoma fasciculatum is dominant in the shrub canopy with *Adenostoma sparsifolium*, *Arctostaphylos glandulosa*, *Arctostaphylos manzanita*, *Arctostaphylos viscida*, *Ceanothus* spp., *Diplacus aurantiacus*, *Eriodictyon californicum*, *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus wislizeni*, *Salvia apiana*, *Salvia leucophylla*, *Salvia mellifera*, and *Toxicodendron diversilobum*. Emergent trees may be present at low cover.

This alliance occurs across cismontane California in a variety of topographic settings from coastal bluffs to steep, lower montane slopes. In stands older than 60 years of age, little new growth is produced as dead stem biomass increases. In earlier treatments, several chaparral series were assigned to mixed alliances other than *Adenostoma fasciculatum* when other shrubs were co-dominant (Sawyer and Keeler-Wolf 1995). Following extensive review and the analysis of many more plots, most mixed stands where another indicator species is either strongly dominant or co-

dominant with *A. fasciculatum* were treated as part of other alliances, such as the *Quercus durata* Alliance, with the exception of the *Adenostoma fasciculatum* – *Salvia* spp. Alliance.

Local Vegetation Description

The Chamise chaparral Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The dominant shrub is *Adenostoma fasciculatum*, and those that are often present include *Diplacus aurantiacus*. Herbs that are sometimes present include *Bromus diandrus*, *Bromus rubens*, and *Chlorogalum pomeridianum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	7.5	5 – 10
Hardwood	0.2	0 – 2	4.0	1 – 10
Regenerating or Shrubby Tree	0.2	0 – 5	1.7	0 – 5
Shrub	51.3	17 – 75	1.9	0.5 – 5
Herb	4.9	0 – 36	0.3	0 – 1

Local Membership Rule

Adenostoma fasciculatum > 50% relative cover in the shrub canopy, or > 60% relative cover if *Arctostaphylos* spp., *Ceanothus cuneatus*, *Cercocarpus montanus*, *Quercus berberidifolia*, or *Q. durata* are > 30% relative cover.

Local Environmental Description

Elevation: Mean 423 m, Range 1 – 948 m

Aspect: SE (9), SW (8), NW (3), NE (1)

Slope: Mean 27 degrees, Range 7 – 42 degrees

Macro Topography: Middle 1/3 of slope (5), Upper 1/3 of slope (5), Middle to Upper 1/3 of slope (3), Entire slope (1), Lower 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Ridge top (1)

Large Rock: Mean 5.0%, Range 0 – 40%

Small Rock: Mean 9.9%, Range 0 – 60%

Fines Cover: Mean 48.8%, Range 2 – 86%

Litter Cover: Mean 28.6%, Range 2 – 75%

Soil Texture (field assessed): Moderately coarse, sandy loam (5), Medium to very fine, sandy loam (3), Moderately fine clay loam (2), Medium loam (2), Loam (2), Moderately fine sandy clay loam (1), Medium silt (1)

Geology (field or map data): Sandstone and other sedimentary (5), Sedimentary (4), Sandstone (3), Shale and other sedimentary (3), Franciscan melange (2), General igneous intrusives (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Fremont - Livermore Hills and Valleys (2), Western Diablo Range (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (11), Suisun Hills and Valleys (4), Eastern Hills (1)

Site Impacts

This alliance has low non-native plant cover (average 5.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Associations in Alameda & Contra Costa Counties

Adenostoma fasciculatum

Adenostoma fasciculatum – (*Ceanothus cuneatus*)

Adenostoma fasciculatum – (*Lotus scoparius* – *Eriodictyon* spp.)

Adenostoma fasciculatum – *Diplacus aurantiacus*

Classification Comments

None.

References: AECOM 2013, Borchert et al. 2004, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Evens et al. 2004, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Keeler-Wolf et al. 2003b, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, NPS-SEKI 2009, Reyes et al. 2019, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=22; Alameda County (n=6): ALCC031, ALCC612, ALCCREC210, AW020, AW021, EBAY0045

Contra Costa County (n=16): ALCC050, ALCC052, ALCC067, ALCC113, ALCC118, ALCC147, ALCC217, ALCC834, ALCCREC103, ALCCREC209, JOMU003, JOMU005, SPCCA-032, SPCCA-047, SPCCB-090, X2105181211

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Adenostoma fasciculatum</i>	100	43.8	10.0	75.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	50	0.9	0.2	5.0				Y
S	<i>Salvia mellifera</i>	45	2.2	2.0	10.0				
S	<i>Toxicodendron diversilobum</i>	41	0.8	0.2	4.0				
S	<i>Heteromeles arbutifolia</i>	32	1.0	0.2	10.0				
S	<i>Artemisia californica</i>	32	0.8	0.2	10.0				
S	<i>Ceanothus cuneatus</i>	27	1.3	0.2	12.0				
S	<i>Lotus scoparius</i>	23	0.5	0.1	5.0				
H	<i>Bromus diandrus</i>	41	0.8	0.2	6.0				
H	<i>Chlorogalum pomeridianum</i>	27	0.1	0.2	1.0				
H	<i>Bromus rubens</i>	23	0.3	0.2	5.0				
NV	Lichen	27	0.2	0.2	2.0				
NV	Moss	23	0.1	0.2	1.0				

***Adenostoma fasciculatum* Association**

Common Name: Chamise Shrubland

Alliance: *Adenostoma fasciculatum* Shrubland Alliance

Local Vegetation Description

The Chamise Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The dominant and characteristic shrub is *Adenostoma fasciculatum*, and shrubs that are often present include *Salvia mellifera*. Herbs that are sometimes present include *Bromus diandrus*, *Bromus rubens*, and *Chlorogalum pomeridianum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	7.5	5 – 10
Hardwood	0.3	0 – 2	4.8	2 – 10
Regenerating or Shrubby Tree	0.4	0 – 5	1.9	0 – 5
Shrub	52.6	17 – 75	2.1	1 – 5
Herb	3.9	0 – 36	0.3	0 – 1

Local Environmental Description

Elevation: Mean 419 m, Range 1 – 948 m

Aspect: SE (7), SW (5), NW (2)

Slope: Mean 26 degrees, Range 7 – 42 degrees

Macro Topography: Upper 1/3 of slope (4), Middle to Upper 1/3 of slope (3), Not recorded (2), Lower 1/3 of slope (1), Middle 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Ridge top (1)

Large Rock: Mean 2.6%, Range 0 – 18%

Small Rock: Mean 12.5%, Range 0 – 60%

Fines Cover: Mean 58.9%, Range 19 – 85%

Litter Cover: Mean 24.5%, Range 2 – 75%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Moderately coarse, sandy loam (2), Moderately fine clay loam (2), Medium loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Shale and other sedimentary (3), Franciscan melange (2), Sedimentary (2), General igneous intrusives (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Western Diablo Range (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7), Eastern Hills (1), Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 3.2%) relative to native cover. Non-native species that occur with highest frequency and abundance includes *Bromus diandrus*.

Classification Comments

None.

References: AECOM 2013, Borchert et al. 2004, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Evens et al. 2004, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003b, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2019, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

Surveys Used for Description

Total: N=14; Alameda County (n=5): ALCC031, ALCC612, ALCCREC210, AW021, EBAY0045

Contra Costa County (n=9): ALCC050, ALCC052, ALCC113, ALCC147, ALCCREC103, ALCCREC209, SPCCA-032, SPCCB-090, X2105181211

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Adenostoma fasciculatum</i>	100	48.2	14.0	75.0	Y	Y		Y
S	<i>Salvia mellifera</i>	50	2.1	2.0	7.0				Y
S	<i>Artemisia californica</i>	36	0.8	0.2	10.0				
S	<i>Diplacus aurantiacus</i>	36	0.5	0.2	3.0				
S	<i>Toxicodendron diversilobum</i>	29	0.6	0.2	4.0				
S	<i>Ceanothus cuneatus</i>	21	0.7	0.2	8.0				
S	<i>Sambucus nigra</i>	21	0.2	0.2	2.0				
H	<i>Bromus diandrus</i>	36	0.4	0.2	5.0				
H	<i>Bromus rubens</i>	21	0.1	0.2	1.0				
H	<i>Chlorogalum pomeridianum</i>	21	0.0	0.2	0.2				
NV	Lichen	36	0.3	0.2	2.0				

***Adenostoma fasciculatum* – (*Ceanothus cuneatus*) Association**

Common Name: Chamise – (Wedgeleaf Ceanothus) Shrubland

Alliance: *Adenostoma fasciculatum* Shrubland Alliance

Local Vegetation Description

The Chamise – (Wedgeleaf Ceanothus) Association forms an open to continuous shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum*, *Ceanothus cuneatus*, and *Heteromeles arbutifolia*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana*. Herbs that are often present include *Marah fabaceus*, and herbs that are sometimes present include *Aira caryophyllea*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus rubens*, *Chlorogalum pomeridianum*, *Cynosurus echinatus*, *Gastroidium phleoides*, *Hypochaeris glabra*, *Melica torreyana*, *Sanicula crassicaulis*, *Torilis arvensis*, *Torilis nodosa*, and *Zigadenus* sp.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.1	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	62.0	30 – 90	1.0	0.5 – 2
Herb	0.8	0 – 3	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 777 m, Range 596 – 950 m

Aspect: NW (1), SE (1), SW (1)

Slope: Mean 14 degrees, Range 9 – 22 degrees

Macro Topography: Middle 1/3 of slope (2), Ridge top (1)

Large Rock: Mean 0.1%, Range 0 – 0.2%

Small Rock: Mean 2.5%, Range 1 – 5%

Fines Cover: Mean 29.5%, Range 1 – 73%

Litter Cover: Mean 11.5%, Range 3 – 25%

Soil Texture (field assessed): Moderately coarse, sandy loam (3)

Geology (field or map data): Sandstone (2), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Diablo Range (1), Western Diablo Range (1)

Site Impacts

This association has very low non-native plant cover (average 0.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Brachypodium distachyon*, *Bromus diandrus*, *Cynosurus echinatus*, *Gastridium phleoides*, *Hypochaeris glabra*, *Torilis arvensis*, and *Torilis nodosa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2023, Gordon and White 1994, Kittel et al. 2012, Klein et al. 2007, NPS-SEKI 2009, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: G4? **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=2): ALCC067, SPCCA-047

Santa Clara Co. (n=2): VASE0004, VASE0022

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	25	0.0	0.1	0.1				
S	<i>Adenostoma fasciculatum</i>	100	50.3	30.0	71.4	Y	Y		Y
S	<i>Ceanothus cuneatus</i>	100	12.0	7.0	19.5	Y			Y
S	<i>Heteromeles arbutifolia</i>	75	1.6	0.2	6.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	25	1.0	4.0	4.0				
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	25	0.5	2.0	2.0				
S	<i>Arctostaphylos glauca</i>	25	0.2	0.6	0.6				
S	<i>Malacothamnus fasciculatus</i>	25	0.1	0.2	0.2				
S	<i>Rhamnus ilicifolia</i>	25	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				
S	<i>Lepechinia calycina</i>	25	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Melica torreyana</i>	25	0.3	1.0	1.0				
H	<i>Bromus rubens</i>	25	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	25	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	25	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	25	0.1	0.2	0.2				
H	<i>Zigadenus</i> sp.	25	0.1	0.2	0.2				
H	<i>Torilis nodosa</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.2				
H	<i>Brachypodium distachyon</i>	25	0.1	0.2	0.2				
H	<i>Gastroidium phleoides</i>	25	0.1	0.2	0.2				
NV	Moss	25	0.3	1.0	1.0				
NV	Lichen	25	0.1	0.2	0.2				

***Adenostoma fasciculatum* – (*Lotus scoparius* – *Eriodictyon* spp.)
Association**

Common Name: Chamise – (Deerweed – Yerba Santa) Shrubland

Alliance: *Adenostoma fasciculatum* Shrubland Alliance

Local Vegetation Description

The Chamise – (Deerweed – Yerba Santa) Association forms a sparse to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum*, *Ceanothus cuneatus*, and *Eriodictyon californicum*. The herbaceous layer typically includes *Bromus rubens* and *Centaurea melitensis*, and herbs that are often present include *Apiastrum angustifolium*, *Avena fatua*, *Bromus hordeaceus*, *Marah fabaceus*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	29.0	1 – 40	1.5	0 – 5
Herb	2.3	1 – 4	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 597 m, Range 555 – 692 m

Aspect: SE (2), NE (1), NW (1)

Slope: Mean 18 degrees, Range 8 – 24 degrees

Macro Topography: Upper 1/3 of slope (2), Ridge top (1)

Large Rock: Mean 10.4%, Range 0 – 40%

Small Rock: Mean 7.3%, Range 5 – 10%

Fines Cover: Mean 67.8%, Range 5 – 93%

Litter Cover: Mean 13.0%, Range 1 – 42%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Medium loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Franciscan melange (3), Sandstone (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Diablo Range (3)

Site Impacts

This association has low non-native plant cover (average 11.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Adenostoma fasciculatum – (*Lotus scoparius* – *Eriodictyon* spp.) Association
Adenostoma fasciculatum Shrubland Alliance

Aira caryophyllea, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Erodium cicutarium*, *Gastroidium phleoides*, *Logfia gallica*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Evens and San 2005, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Klein et al. 2007, Reyes et al. 2023, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=1): ALCC834

Stanislaus Co. (n=3): SPCCA-004, SPCCA-007, SPCCB-005

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Adenostoma fasciculatum</i>	100	17.1	0.2	29.0	Y		Y	Y
S	<i>Eriodictyon californicum</i>	100	4.5	1.0	10.0	Y		Y	Y
S	<i>Ceanothus cuneatus</i>	75	2.6	0.2	5.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	25	2.5	10.0	10.0				
S	<i>Malacothamnus fremontii</i>	25	2.5	10.0	10.0				
S	<i>Lepechinia calycina</i>	25	0.5	2.0	2.0				
S	<i>Lotus scoparius</i>	25	0.1	0.2	0.2				
S	<i>Arctostaphylos auriculata</i>	25	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	25	0.1	0.2	0.2				
S	<i>Rhamnus ilicifolia</i>	25	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	75	0.1	0.1	0.2	Y			Y
H	<i>Centaurea melitensis</i>	75	0.1	0.1	0.2	Y			Y
H	<i>Vulpia myuros</i>	50	0.3	0.2	1.0				Y
H	<i>Apiastrum angustifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.1	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.1	0.1				Y

Adenostoma fasciculatum – (*Lotus scoparius* – *Eriodictyon* spp.) Association
Adenostoma fasciculatum Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Vulpia bromoides</i>	25	1.0	4.0	4.0				
H	<i>Calystegia purpurata</i>	25	0.5	2.0	2.0				
H	<i>Emmenanthe penduliflora</i>	25	0.3	1.0	1.0				
H	<i>Erodium cicutarium</i>	25	0.3	1.0	1.0				
H	<i>Bromus madritensis</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.2				
H	<i>Claytonia perfoliata</i>	25	0.1	0.2	0.2				
H	<i>Ehrendorferia chrysantha</i>	25	0.1	0.2	0.2				
H	<i>Calochortus albus</i>	25	0.1	0.2	0.2				
H	<i>Allium unifolium</i>	25	0.1	0.2	0.2				
H	<i>Calochortus venustus</i>	25	0.1	0.2	0.2				
H	<i>Bloomeria crocea</i>	25	0.1	0.2	0.2				
H	<i>Trifolium</i> sp.	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	25	0.1	0.2	0.2				
H	<i>Gastroidium phleoides</i>	25	0.1	0.2	0.2				
H	<i>Helianthus gracilentus</i>	25	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	25	0.1	0.2	0.2				
H	<i>Zigadenus</i> sp.	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Salvia columbariae</i>	25	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	25	0.1	0.2	0.2				
H	<i>Collinsia</i> sp.	25	0.1	0.2	0.2				
H	<i>Madia gracilis</i>	25	0.0	0.1	0.1				
H	<i>Daucus pusillus</i>	25	0.0	0.1	0.1				
H	<i>Eriogonum</i> sp.	25	0.0	0.1	0.1				
NV	Moss	50	0.1	0.2	0.2				Y

Adenostoma fasciculatum – (*Lotus scoparius* – *Eriodictyon* spp.) Association
Adenostoma fasciculatum Shrubland Alliance

***Adenostoma fasciculatum* – *Diplacus aurantiacus* Association**

Common Name: Chamise – Bush Monkeyflower Shrubland

Alliance: *Adenostoma fasciculatum* Shrubland Alliance

Local Vegetation Description

The Chamise – Bush Monkeyflower Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum* and *Diplacus aurantiacus*, and those that are often present include *Artemisia californica*, *Baccharis pilularis*, *Heteromeles arbutifolia*, *Lotus scoparius*, *Salvia mellifera*, and *Toxicodendron diversilobum*. Herbs that are often present include *Bromus diandrus*, and herbs that are sometimes present include *Avena barbata*, *Centaurea melitensis*, *Chlorogalum pomeridianum*, *Cynosurus echinatus*, and *Pseudognaphalium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	4.5	1 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	1.3	0.5 – 2
Shrub	56.0	30 – 74	1.9	0.5 – 5
Herb	8.3	1 – 30	0.4	0 – 1

Local Environmental Description

Elevation: Mean 381 m, Range 122 – 704 m

Aspect: SW (4), SE (2)

Slope: Mean 34 degrees, Range 20 – 38 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (2), Entire slope (1)

Large Rock: Mean 2.2%, Range 0 – 7%

Small Rock: Mean 14.0%, Range 3 – 43%

Fines Cover: Mean 35.0%, Range 2 – 86%

Litter Cover: Mean 31.0%, Range 7 – 75%

Soil Texture (field assessed): Loam (2), Moderately coarse, sandy loam (2), Medium silt (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Sandstone (2), Sandstone and other sedimentary (2), Sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (3), East Bay Hills - Mount Diablo (1)

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 10.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Centaurea melitensis*, and *Cynosurus echinatus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Klein and Evens 2005, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=6; Alameda County (n=1): AW020

Contra Costa County (n=4): ALCC118, ALCC217, JOMU003, JOMU005

Santa Clara Co. (n=1): SCRUZ931

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Adenostoma fasciculatum</i>	100	42.3	15.0	62.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	83	3.5	0.2	9.0	Y			Y
S	<i>Lotus scoparius</i>	67	1.7	0.1	5.0				Y
S	<i>Heteromeles arbutifolia</i>	67	1.0	0.2	3.0				Y
S	<i>Toxicodendron diversilobum</i>	67	1.0	0.2	4.0				Y
S	<i>Salvia mellifera</i>	50	3.3	4.0	10.0				Y
S	<i>Artemisia californica</i>	50	2.0	2.0	7.0				Y
S	<i>Baccharis pilularis</i>	50	1.9	0.1	10.0				Y
H	<i>Bromus diandrus</i>	50	1.8	2.0	6.0				Y
H	<i>Avena barbata</i>	33	0.4	0.2	2.0				
H	<i>Chlorogalum pomeridianum</i>	33	0.2	0.2	1.0				
H	<i>Pseudognaphalium californicum</i>	33	0.2	0.2	1.0				
H	<i>Centaurea melitensis</i>	33	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	33	0.1	0.2	0.2				

***Adenostoma fasciculatum* – *Salvia* spp. Shrubland Alliance**



Common Name: Chamise – Sage chaparral

NVC Alliance Code: A3867. *Salvia apiana* - *Salvia mellifera* - *Adenostoma fasciculatum* Chaparral Alliance

Statewide Description

Adenostoma fasciculatum, *Salvia apiana* and *Salvia mellifera* are co-dominant in the shrub canopy with *Arctostaphylos* spp., *Artemisia californica*, *Ceanothus* spp., *Encelia farinosa*, *Eriodictyon* spp., *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Lotus scoparius*, *Malosma laurina*, *Quercus berberidifolia*, *Rhamnus ilicifolia*, *Rhus ovata*, and *Xylococcus bicolor*. Emergent trees may be at low cover, including *Juglans californica* or *Quercus agrifolia*.

Stands have relatively open canopies with a structure and species composition intermediate between chaparral and coastal sage scrub. They occupy warm, well-drained slopes of coastal southern California. Conditions include stabilized alluvium, colluvium, and crystalline basement rocks including granite and gabbro. Holland (1986) used the name “alluvial fan chaparral” for those on alluvium. Recent fires have burned many stands of this alliance. In the A Manual of California Vegetation, Second Edition, stands co-dominated by *Adenostoma fasciculatum* and *Salvia apiana* were treated

under a separate alliance from stands co-dominated by *Adenostoma fasciculatum* and *Salvia mellifera*. With an ecoregion-wide classification analysis done for Southern California (VegCAMP, in progress), we have deemed them to be ecologically similar enough to merge them into a single alliance.

Local Vegetation Description

The Chamise – Sage chaparral Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum*, *Salvia mellifera*, *Ceanothus cuneatus*, and *Lotus scoparius*, and those that are often present include *Baccharis pilularis* and *Diplacus aurantiacus*. Regenerating or shrubby trees that are dominant and characteristic include *Quercus agrifolia*. Herbs that are sometimes present include *Bromus diandrus*, *Bromus rubens*, *Marah fabaceus*, *Nassella lepida*, and *Pseudognaphalium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0.2	7.5	5 – 10
Regenerating or Shrubby Tree	0.1	0 – 0	4.5	1 – 10
Shrub	62.3	32 – 100	1.4	0.5 – 2
Herb	1.6	0 – 3	0.4	0 – 1

Local Membership Rule

Adenostoma fasciculatum > 30% relative cover with *Salvia mellifera*, *Artemisia californica*, *Eriogonum fasciculatum*, and/or other sage scrub species together > 30% relative cover.

Local Environmental Description

Elevation: Mean 405 m, Range 296 – 507 m

Aspect: SW (4), SE (1)

Slope: Mean 33 degrees, Range 19 – 44 degrees

Macro Topography: Middle 1/3 of slope to Ridgetop (2), Entire slope (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 16.3%, Range 0 – 50%

Small Rock: Mean 13.1%, Range 1 – 32%

Fines Cover: Mean 31.5%, Range 4 – 64%

Litter Cover: Mean 28.0%, Range 19 – 43%

Soil Texture (field assessed): Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Coarse, loamy sand (1)

Geology (field or map data): Sedimentary (3), Sandstone (2), Metamorphic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (6)

Site Impacts

This alliance has low non-native plant cover (average 1.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Associations in Alameda & Contra Costa Counties

Adenostoma fasciculatum – *Salvia mellifera*

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens and San 2004, Evens et al. 2006, Gordon and White 1994, Hogan et al. 1996, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Reyes et al. 2019, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=6): ALCC021, ALCC062, ALCC146, SPCCA-037, SPCCB-063, VASE0082

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus agrifolia</i>	33	0.1	0.2	0.2				
S	<i>Adenostoma fasciculatum</i>	100	41.8	17.0	88.9	Y	Y		Y
S	<i>Salvia mellifera</i>	100	19.1	10.0	27.0	Y		Y	Y
S	<i>Ceanothus cuneatus</i>	83	4.4	0.2	18.4	Y			Y
S	<i>Lotus scoparius</i>	83	1.0	0.2	3.0	Y			Y
S	<i>Diplacus aurantiacus</i>	50	2.6	0.2	12.1				Y
S	<i>Baccharis pilularis</i>	50	1.2	1.0	3.1				Y
S	<i>Artemisia californica</i>	33	0.7	0.2	4.0				
S	<i>Heteromeles arbutifolia</i>	33	0.2	0.2	1.0				
H	<i>Marah fabaceus</i>	33	0.3	0.2	1.6				
H	<i>Bromus rubens</i>	33	0.2	0.2	1.0				
H	<i>Pseudognaphalium californicum</i>	33	0.1	0.2	0.2				
H	<i>Nassella lepida</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	33	0.1	0.1	0.2				
NV	Lichen	50	1.2	1.0	5.0				Y

***Adenostoma fasciculatum* – *Salvia mellifera* Association**

Common Name: Chamise – Black Sage / Herb Shrubland

Alliance: *Adenostoma fasciculatum* – *Salvia* spp. Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens and San 2004, Evens et al. 2006, Gordon and White 1994, Hogan et al. 1996, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Reyes et al. 2019, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

State Rare: N

Adenostoma fasciculatum – *Salvia mellifera* Association
Adenostoma fasciculatum – *Salvia* spp. Shrubland Alliance

***Allenrolfea occidentalis* Shrubland Alliance**



Common Name: Iodine bush scrub

NVC Alliance Code: A0866. *Allenrolfea occidentalis* Wet Alkaline Scrub Alliance

Statewide Description

Allenrolfea occidentalis is dominant or co-dominant in the shrub and herbaceous layers with *Atriplex canescens*, *Distichlis spicata*, *Frankenia salina*, *Kochia californica*, *Sarcobatus vermiculatus*, *Sporobolus airoides*, and *Suaeda moquinii*. In general, stands in the Mojave and Colorado deserts have small, low, and widely to intermittently spaced shrubs. San Joaquin Valley stands have shrubs up to 2 m in height and width. Based on the substantial woody bases of these shrubs, they are old.

Local Vegetation Description

The Iodine bush scrub Alliance forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Allenrolfea occidentalis*. Herbs that are often present include *Distichlis spicata* and *Frankenia salina*, and herbs that are sometimes present include *Avena barbata*, *Bolboschoenus maritimus*, *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum depressum*, *Hordeum marinum*, *Juncus bufonius*, *Lasthenia*

californica, *Lepidium acutidens*, *Lolium perenne*, *Spergularia macrotheca*, and *Spergularia marina*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	14.1	3 – 24	0.7	0 – 2
Herb	32.8	11 – 60	0.3	0 – 0.5

Local Membership Rule

Allenrolfea occidentalis > 2% absolute cover in the shrub canopy, and no other shrub species with greater or equal cover.

Local Environmental Description

Elevation: Mean 74 m, Range 8 – 159 m

Aspect: Flat (4), NE (3), SE (1)

Slope: Mean 1 degrees, Range 0 – 4 degrees

Macro Topography: Bottom (6), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 3.0%, Range 0 – 6%

Fines Cover: Mean 60.0%, Range 17 – 95%

Litter Cover: Mean 30.4%, Range 1 – 75%

Soil Texture (field assessed): Fine clay (2), Medium silt (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (4), Clayey alluvium (2), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (3), Eastern Hills (2)

Site Impacts

This alliance has moderate non-native plant cover (average 35.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum marinum*, and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Allenrolfea occidentalis / (*Frankenia salina* – *Centromadia* spp.)

Allenrolfea occidentalis / *Distichlis spicata*

Classification Comments

The *Allenrolfea occidentalis* / (*Frankenia salina* – *Centromadia* spp.) Association is newly described here.

References: Bradley 1970, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2014, Reyes et al. 2020a, Reyes et al. 2023a

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=8; Alameda County (n=3): ALCC266, ALCC269, ALCCREC851

Contra Costa County (n=5): ALCC155, ALCC595, SSJD0377, SSJD0381, SSJD0382

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Allenrolfea occidentalis</i>	100	13.6	3.0	24.0	Y	Y		Y
S	<i>Suaeda moquinii</i>	25	0.5	0.2	4.0				
H	<i>Distichlis spicata</i>	63	4.7	0.2	25.0				Y
H	<i>Frankenia salina</i>	50	0.4	0.2	1.0				Y
H	<i>Bromus hordeaceus</i>	38	3.6	2.0	16.0				
H	<i>Hordeum marinum</i>	38	1.8	3.0	7.0				
H	<i>Bromus diandrus</i>	25	2.6	7.0	14.0				
H	<i>Lolium perenne</i>	25	1.4	3.0	8.0				
H	<i>Juncus bufonius</i>	25	1.3	3.0	7.0				
H	<i>Bolboschoenus maritimus</i>	25	0.9	3.0	4.0				
H	<i>Lepidium acutidens</i>	25	0.8	1.0	5.0				
H	<i>Spergularia marina</i>	25	0.4	1.0	2.0				
H	<i>Spergularia macrotheca</i>	25	0.2	0.2	1.0				
H	<i>Avena barbata</i>	25	0.2	0.2	1.0				
H	<i>Lasthenia californica</i>	25	0.1	0.2	0.2				
H	<i>Hordeum depressum</i>	25	0.1	0.2	0.2				

***Allenrolfea occidentalis* / (*Frankenia salina* – *Centromadia* spp.)
Association**

Common Name: Iodine Bush / (Alkali Heath – Tar Plant) Shrubland

Alliance: *Allenrolfea occidentalis* Shrubland Alliance

Local Vegetation Description

The Iodine Bush / (Alkali Heath – Tar Plant) Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Allenrolfea occidentalis*. Herbs that are often present include *Bromus hordeaceus*, *Distichlis spicata*, *Frankenia salina*, and *Hordeum marinum*, and herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Hordeum depressum*, *Juncus bufonius*, *Lepidium acutidens*, *Lolium perenne*, and *Spergularia marina*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	12.8	3 – 24	0.7	0 – 2
Herb	28.7	11 – 50	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 93 m, Range 8 – 159 m

Aspect: Flat (3), NE (2), SE (1)

Slope: Mean 1 degrees, Range 0 – 4 degrees

Macro Topography: Bottom (4), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 3.0%, Range 0 – 6%

Fines Cover: Mean 60.0%, Range 17 – 95%

Litter Cover: Mean 30.4%, Range 1 – 75%

Soil Texture (field assessed): Fine clay (2), Medium silt (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (3), Clayey alluvium (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: Eastern Hills (2), Westside Alluvial Fans and Terraces (1)

Site Impacts

This association has moderate non-native plant cover (average 43.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum marinum*, and *Lolium perenne*.

Classification Comments

This association is newly described here, though its concept includes surveys from other regions that were previously assigned to a plain *Allenrolfea occidentalis* Association. The previously used *Allenrolfea occidentalis* Association has been inactivated and split into this association with a significant herbaceous understory and an *Allenrolfea occidentalis* / Sparse Association which is not known from these counties. One survey included the rare *Puccinellia simplex* (CRPR 1B.2).

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC266, ALCC269, ALCCREC851

Contra Costa County (n=3): ALCC155, ALCC595, SSJD0377

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Allenrolfea occidentalis</i>	100	12.2	3.0	24.0	Y	Y		Y
S	<i>Suaeda moquinii</i>	33	0.7	0.2	4.0				
H	<i>Frankenia salina</i>	67	0.5	0.2	1.0				Y
H	<i>Bromus hordeaceus</i>	50	4.8	2.0	16.0				Y
H	<i>Hordeum marinum</i>	50	2.3	3.0	7.0				Y
H	<i>Distichlis spicata</i>	50	0.4	0.2	1.0				Y
H	<i>Bromus diandrus</i>	33	3.5	7.0	14.0				
H	<i>Lolium perenne</i>	33	1.8	3.0	8.0				
H	<i>Juncus bufonius</i>	33	1.7	3.0	7.0				
H	<i>Lepidium acutidens</i>	33	1.0	1.0	5.0				
H	<i>Spergularia marina</i>	33	0.5	1.0	2.0				
H	<i>Avena barbata</i>	33	0.2	0.2	1.0				
H	<i>Hordeum depressum</i>	33	0.1	0.2	0.2				

***Allenrolfea occidentalis* / *Distichlis spicata* Association**

Common Name: Iodine Bush / Saltgrass Shrubland

Alliance: *Allenrolfea occidentalis* Shrubland Alliance

Local Vegetation Description

The Iodine Bush / Saltgrass Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Allenrolfea occidentalis*. The herbaceous layer typically includes *Bolboschoenus maritimus* and *Distichlis spicata*, and herbs that are often present include *Asparagus officinalis*, *Grindelia stricta*, *Hordeum* sp., *Lactuca* sp., *Lasthenia californica*, *Rumex crispus*, and *Spergularia macrotheca*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	18.0	16 – 20	0.8	0.5 – 1
Herb	45.0	30 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 17 m, Range 10 – 24 m

Aspect: Flat (1), NE (1)

Slope: Mean 1 degrees, Range 0 – 1 degree

Macro Topography: Bottom (2)

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): Not recorded

Geology (field or map data): Alluvium (1), Clayey alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (2)

Site Impacts

This association has low non-native plant cover (average 11.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Asparagus officinalis*, *Hordeum murinum*, *Lactuca* sp., and *Rumex crispus*.

Classification Comments

None.

References: Bradley 1970, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, Evens et al. 2014, Reyes et al. 2020a, Reyes et al. 2023a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): SSJD0381, SSJD0382

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Allenrolfea occidentalis</i>	100	18.0	16.0	20.0	Y	Y		Y
H	<i>Distichlis spicata</i>	100	17.5	10.0	25.0	Y	Y		Y
H	<i>Bolboschoenus maritimus</i>	100	3.5	3.0	4.0	Y			Y
H	<i>Hordeum murinum</i>	50	5.0	10.0	10.0				Y
H	<i>Hordeum</i> sp.	50	1.0	2.0	2.0				Y
H	<i>Grindelia stricta</i>	50	0.5	1.0	1.0				Y
H	<i>Rumex crispus</i>	50	0.1	0.2	0.2				Y
H	<i>Spergularia macrotheca</i>	50	0.1	0.2	0.2				Y
H	<i>Asparagus officinalis</i>	50	0.1	0.2	0.2				Y
H	<i>Lactuca</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Lasthenia californica</i>	50	0.1	0.2	0.2				Y

***Arctostaphylos* (*canescens*, *manzanita*, *stanfordiana*) Shrubland Alliance**



Common Name: Hoary, common, and Stanford manzanita chaparral

NVC Alliance Code: A3859. *Arctostaphylos nummularia* - *Arctostaphylos stanfordiana*
- *Chrysolepis chrysophylla* var. *minor* North Coast Chaparral Alliance

Statewide Description

Arctostaphylos canescens, *A. manzanita*, and/or *A. stanfordiana* dominate or co-dominate in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos auriculata*, *Arctostaphylos glandulosa*, *Arctostaphylos stanfordiana*, *Arctostaphylos viscida*, *Baccharis pilularis*, *Ceanothus* spp., *Diplacus aurantiacus*, *Eriodictyon californicum*, *Heteromeles arbutifolia*, *Lotus scoparius*, *Pickeringia montana*, *Quercus berberidifolia*, and *Quercus wislizeni*. Emergent trees may be present at low cover, including *Pinus attenuata*, *Pseudotsuga menziesii*, *Quercus chrysolepis*, *Quercus douglasii*, or *Quercus wislizeni*.

Arctostaphylos canescens appears as a dominant or co-dominant with other chaparral species, forming small stands within a matrix of chaparral and conifers.

Arctostaphylos manzanita is a variable species with six subspecies: ssp. *elegans*, ssp. *glaucescens*, ssp. *laevigata*, ssp. *manzanita*, ssp. *roofii*, and ssp. *wieslanderii* (Parker et al. 2007, 2012). The most widely ranging subspecies is ssp. *manzanita*, and it occurs in many chaparral and woodland types. The other subspecies have smaller ranges. This alliance includes stands of ssp. *laevigata* and ssp. *manzanita*.

Arctostaphylos stanfordiana has three subspecies, two of which, ssp. *decumbens* and ssp. *raichei*, are listed as California rare plants with a rank of 1B.1. *A. stanfordiana* ssp. *decumbens* is low in stature and is endemic to Sonoma County in the southern North Coast Ranges at around 100 m elevation. *A. stanfordiana* ssp. *stanfordiana* is larger in size and wider-ranging, found in both southern and central North Coast Ranges up to 1300 m elevation. The third subspecies, ssp. *raichei*, with finely hairy and glandular leaves, is more restricted to Lake and Mendocino Cos. in the central North Coast Ranges.

Local Vegetation Description

The Hoary, common, and Stanford manzanita chaparral Alliance forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Arctostaphylos auriculata*, *Arctostaphylos manzanita* ssp. *laevigata*, *Adenostoma fasciculatum*, and *Diplacus aurantiacus*, and those that are often present include *Pickeringia montana*. Commonly associated emergent trees at sparse cover include *Pinus attenuata*, *Pinus sabiniana*, and *Quercus wislizeni*. Herbs that are sometimes present include *Aira caryophyllaea*, *Bromus diandrus*, *Pedicularis densiflora*, *Sanicula crassicaulis*, and *Zigadenus fremontii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	1.8	0 – 8	7.5	5 – 10
Hardwood	0.6	0 – 5	3.5	2 – 5
Regenerating or Shrubby Tree	0.6	0 – 3	2.1	0.5 – 5
Shrub	55.1	36 – 100	2.4	1 – 5
Herb	3.1	0 – 10	0.3	0 – 1

Local Membership Rule

Arctostaphylos auriculata and/or *A. manzanita* > 30% relative in the shrub canopy.
Adenostoma fasciculatum may be present at < 60% relative cover.

Local Environmental Description

Elevation: Mean 441 m, Range 222 – 569 m

Aspect: NW (5), SE (2), NE (1), SW (1)

Slope: Mean 18 degrees, Range 3 – 32 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (3), Middle to Upper 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 1.7%, Range 0 – 7%

Small Rock: Mean 10.9%, Range 1 – 23%
Fines Cover: Mean 29.5%, Range 5 – 50%
Litter Cover: Mean 40.8%, Range 6 – 80%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Moderately fine sandy clay loam (2), Clay (1), Moderately fine clay loam (1), Coarse, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone (5), Shale and other sedimentary (3), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (6), Suisun Hills and Valleys (3)

Site Impacts

This alliance has low non-native plant cover (average 4.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea* and *Bromus diandrus*.

Associations in Alameda & Contra Costa Counties

Arctostaphylos auriculata
Arctostaphylos manzanita

Classification Comments

The *Arctostaphylos auriculata* Provisional Association is newly described here.

References: Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Klein et al. 2015, Reyes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3

Surveys Used for Description

Total: N=9; Alameda County (n=0):

Contra Costa County (n=9): ALCC153, ALCC221, ALCC224, EBAY0035, EBAY0036, SPCCB-022, SPCCB-081, VASE0021, VASE0048

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus attenuata</i>	44	0.6	0.2	2.6				
T	<i>Quercus wislizeni</i>	22	0.6	0.2	5.4				
T	<i>Pinus sabiniana</i>	22	0.2	0.2	2.0				
S	<i>Adenostoma fasciculatum</i>	89	9.6	3.0	35.0	Y			Y
S	<i>Diplacus aurantiacus</i>	78	1.2	0.2	3.5	Y			Y
S	<i>Arctostaphylos auriculata</i>	67	17.9	3.0	57.7				Y
S	<i>Arctostaphylos manzanita</i> <i>ssp. laevigata</i>	67	13.6	1.0	52.4				Y
S	<i>Pickeringia montana</i>	56	2.3	0.2	10.0				Y
S	<i>Heteromeles arbutifolia</i>	44	2.5	1.0	12.3				
S	<i>Salvia mellifera</i>	44	0.7	0.2	4.0				
S	<i>Ceanothus cuneatus</i>	44	0.6	0.2	5.0				
S	<i>Lepechinia calycina</i>	44	0.3	0.2	2.0				
S	<i>Arctostaphylos manzanita</i>	33	4.8	12.0	16.2				
S	<i>Eriodictyon californicum</i>	33	0.3	0.2	2.2				
H	<i>Pedicularis densiflora</i>	33	0.7	0.2	5.5				
H	<i>Aira caryophyllea</i>	33	0.5	0.2	4.0				
H	<i>Bromus diandrus</i>	22	1.1	2.0	8.0				
H	<i>Zigadenus fremontii</i>	22	0.0	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	22	0.0	0.1	0.2				
NV	Moss	56	1.6	0.2	10.0				Y
NV	Lichen	33	0.1	0.2	0.2				

***Arctostaphylos auriculata* Provisional Association**

Common Name: Mt. Diablo Manzanita Shrubland

Alliance: *Arctostaphylos (canescens, manzanita, stanfordiana)* Shrubland Alliance

Local Vegetation Description

The Mt. Diablo Manzanita Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum*, *Arctostaphylos auriculata*, *Diplacus aurantiacus*, and *Pickeringia montana*, and those that are often present include *Arctostaphylos manzanita*, *Arctostaphylos manzanita* ssp. *laevigata*, *Ceanothus cuneatus*, *Heteromeles arbutifolia*, and *Lepechinia calycina*. Commonly associated emergent trees at sparse cover include *Pinus attenuata* and *Quercus wislizeni*. Herbs that are sometimes present include *Pedicularis densiflora*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	2.6	0 – 8	7.5	5 – 10
Hardwood	0.9	0 – 5	3.5	2 – 5
Regenerating or Shrubby Tree	0.5	0 – 3	1.8	0.5 – 5
Shrub	62.5	37 – 100	2.2	1 – 5
Herb	1.1	0 – 6	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 499 m, Range 346 – 569 m

Aspect: NW (3), SE (2), SW (1)

Slope: Mean 14 degrees, Range 3 – 29 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.6%, Range 0 – 2%

Small Rock: Mean 13.5%, Range 1 – 23%

Fines Cover: Mean 31.0%, Range 5 – 50%

Litter Cover: Mean 30.0%, Range 6 – 50%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Clay (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone (4), Shale and other sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (1)

Site Impacts

This association has very low non-native plant cover (average 0.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*.

Classification Comments

This association is newly described here, since *Arctostaphylos auriculata* is a rare manzanita restricted to the vicinity of Mt. Diablo (CRPR 1B.3). It remains provisional since the sample size is small.

References: None.

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=6): ALCC153, EBAY0035, EBAY0036, SPCCB-022, VASE0021, VASE0048

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus attenuata</i>	67	0.8	0.2	2.6				Y
T	<i>Quercus wislizeni</i>	33	0.9	0.2	5.4				
S	<i>Arctostaphylos auriculata</i>	100	26.8	3.0	57.7	Y		Y	Y
S	<i>Adenostoma fasciculatum</i>	100	7.5	3.0	16.0	Y			Y
S	<i>Pickeringia montana</i>	83	3.4	0.2	10.0	Y			Y
S	<i>Diplacus aurantiacus</i>	83	1.4	0.2	3.5	Y			Y
S	<i>Ceanothus cuneatus</i>	67	0.9	0.2	5.0				Y
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	50	9.4	1.0	52.4				Y
S	<i>Arctostaphylos manzanita</i>	50	7.2	12.0	16.2				Y
S	<i>Heteromeles arbutifolia</i>	50	2.9	1.0	12.3				Y
S	<i>Lepechinia calycina</i>	50	0.4	0.2	2.0				Y
S	<i>Salvia mellifera</i>	33	0.7	0.2	4.0				
S	<i>Eriodictyon californicum</i>	33	0.4	0.2	2.2				
H	<i>Pedicularis densiflora</i>	33	1.0	0.2	5.5				
NV	Moss	50	0.2	0.2	1.0				Y
NV	Lichen	50	0.1	0.2	0.2				Y

***Arctostaphylos manzanita* Association**

Common Name: Common Manzanita Shrubland

Alliance: *Arctostaphylos (canescens, manzanita, stanfordiana)* Shrubland Alliance

Local Vegetation Description

The Common Manzanita Association forms an intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Arctostaphylos manzanita* ssp. *laevigata*, and those that are often present include *Adenostoma fasciculatum*, *Diplacus aurantiacus*, and *Salvia mellifera*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana*. The herbaceous layer typically includes *Bromus diandrus*, and herbs that are often present include *Aira caryophyllea*, and herbs that are sometimes present include *Calochortus albus*, *Cynosurus echinatus*, *Eriophyllum lanatum*, *Gastroidium phleoides*, *Hesperolinon* sp., *Melica* sp., *Pedicularis densiflora*, *Pentagramma triangularis*, *Sanicula crassicaulis*, *Silene gallica*, *Vulpia myuros*, and *Zigadenus fremontii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	7.5	5 – 10
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.7	0 – 2	3.5	2 – 5
Shrub	40.3	36 – 48	2.8	1 – 5
Herb	7.0	1 – 10	0.4	0 – 1

Local Environmental Description

Elevation: Mean 326 m, Range 222 – 409 m

Aspect: NW (2), NE (1)

Slope: Mean 26 degrees, Range 21 – 32 degrees

Macro Topography: Upper 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: Mean 3.3%, Range 1 – 7%

Small Rock: Mean 5.7%, Range 2 – 10%

Fines Cover: Mean 26.7%, Range 15 – 45%

Litter Cover: Mean 62.3%, Range 47 – 80%

Soil Texture (field assessed): Coarse, loamy sand (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone (1), Sandstone and other sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (2), East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 12.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Cynosurus echinatus*, *Gastridium phleoides*, *Silene gallica*, and *Vulpia myuros*.

Classification Comments

The subspecies of *Arctostaphylos manzanita* found in these surveys is rare (CRPR 1B.2), but is lumped with other subspecies into this association.

References: Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Klein et al. 2015, Reyes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=3; **Alameda County (n=0):**

Contra Costa County (n=3): ALCC221, ALCC224, SPCCB-081

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	33	0.1	0.2	0.2				
R	<i>Pinus sabiniana</i> *	33	0.7	2.0	2.0				
R	<i>Quercus</i> sp.	33	0.1	0.2	0.2				
S	<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i>	100	22.0	17.0	32.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	67	13.7	6.0	35.0				Y
S	<i>Salvia mellifera</i>	67	0.7	0.2	2.0				Y
S	<i>Diplacus aurantiacus</i>	67	0.7	0.2	2.0				Y
S	<i>Arctostaphylos glauca</i>	33	5.7	17.0	17.0				
S	<i>Heteromeles arbutifolia</i>	33	1.7	5.0	5.0				
S	<i>Toxicodendron diversilobum</i>	33	0.1	0.2	0.2				
S	<i>Eriodictyon californicum</i>	33	0.1	0.2	0.2				
S	<i>Lepechinia calycina</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	67	3.3	2.0	8.0				Y
H	<i>Aira caryophyllea</i>	67	1.4	0.2	4.0				Y
H	<i>Bromus rubens</i>	33	1.7	5.0	5.0				
H	<i>Gastridium phleoides</i>	33	0.7	2.0	2.0				
H	<i>Pentagramma triangularis</i>	33	0.3	1.0	1.0				
H	<i>Cynosurus echinatus</i>	33	0.3	1.0	1.0				
H	<i>Calochortus albus</i>	33	0.1	0.2	0.2				
H	<i>Eriophyllum lanatum</i>	33	0.1	0.2	0.2				
H	<i>Galium</i> sp.	33	0.1	0.2	0.2				
H	<i>Hesperolinon</i>	33	0.1	0.2	0.2				
H	<i>Melica</i> sp.	33	0.1	0.2	0.2				
H	<i>Pedicularis densiflora</i>	33	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	33	0.1	0.2	0.2				
H	<i>Zigadenus fremontii</i>	33	0.1	0.2	0.2				
H	<i>Bromus</i> sp.	33	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	33	0.0	0.1	0.1				
H	<i>Silene gallica</i>	33	0.0	0.1	0.1				
NV	Moss	67	4.3	3.0	10.0				Y

***Arctostaphylos (crustacea, tomentosa)* Shrubland Alliance**



Common Name: Brittle leaf – woolly leaf manzanita chaparral

NVC Alliance Code: A3858. *Arctostaphylos tomentosa* ssp. *crustacea* -
Arctostaphylos tomentosa Central Coast & Island Chaparral
Alliance

Statewide Description

Arctostaphylos andersonii, *Arctostaphylos crustacea*, *Arctostaphylos regismontana*, *Arctostaphylos silvicola*, or *Arctostaphylos tomentosa* is dominant, co-dominant, or characteristically present in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos* spp., *Artemisia californica*, *Baccharis pilularis*, *Ceanothus* spp., *Cercocarpus montanus*, *Chrysolepis chrysophylla* var. *minor*, *Ericameria ericoides*, *Eriogonum fasciculatum*, *Frangula californica*, *Heteromeles arbutifolia*, *Salvia mellifera* and *Toxicodendron diversilobum*. Emergent trees may be present at low cover, including *Pinus coulteri* or *Quercus agrifolia*.

The alliance includes stands where *A. crustacea* ssp. *crustacea*, ssp. *crinita*, and ssp. *rosei* are dominant or codominant in the shrub canopy; ssp. *eastwoodiana* grows in the *Arctostaphylos (purissima, rudis)* special stands at Burton Mesa in Santa Barbara Co.

Some stands in the East Bay Hills are fragmented and degraded, with only remnant scattered individuals of *A. crustacea* and a significantly higher cover of *Adenostoma fasciculatum*. We still consider such stands as members of the *A. crustacea* alliance. Additionally, other stands include *A. tomentosa* ssp. *tomentosa* as the dominant or co-dominant in the shrub canopy. Since *A. crustacea* and *A. tomentosa* overlap ecologically (for example, at Fort Ord Military Reservation), we have some evidence for merging of these two taxa into this one alliance. However, we need more data and analysis to understand relationships between this and other maritime chaparral types.

Local Vegetation Description

The Brittle leaf – woolly leaf manzanita chaparral Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Arctostaphylos crustacea* and *Arctostaphylos pallida*, and those that are often present include *Adenostoma fasciculatum* and *Vaccinium ovatum*. Regenerating or shrubby trees that are characteristic include *Quercus agrifolia*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Arbutus menziesii*. Herbs that are often present include *Pteridium aquilinum*, and herbs that are sometimes present include *Airca caryophyllea* and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.6	0 – 5	9.5	2 – 15
Hardwood	2.2	0 – 5	4.8	2 – 10
Regenerating or Shrubby Tree	2.2	0 – 21	1.9	0 – 5
Shrub	58.5	10 – 90	2.4	0.5 – 5
Herb	1.8	0 – 14	0.3	0 – 0.5

Local Membership Rule

Arctostaphylos crustacea or *Arctostaphylos pallida* > 30% relative cover with *Adenostoma fasciculatum*, *Ceanothus cuneatus*, *C. papillosus*, *Frangula californica*, *Heteromeles arbutifolia*, *Quercus parvula*, or *Q. wislizeni* var. *frutescens*.

Local Environmental Description

Elevation: Mean 320 m, Range 206 – 399 m

Aspect: SE (6), NE (2), NW (2), SW (1), Variable (1)

Slope: Mean 26 degrees, Range 8 – 47 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (4), Upper 1/3 of slope (3), Ridge top (2), Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 3.3%, Range 0 – 15%

Small Rock: Mean 29.1%, Range 0 – 87%

Fines Cover: Mean 15.4%, Range 2 – 40%

Litter Cover: Mean 47.4%, Range 3 – 93%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Coarse sand (3), Coarse, loamy sand (2), Moderately coarse, sandy loam (2), Medium to very fine, loamy sand (1), Loam (1)

Geology (field or map data): Sedimentary (5), Shale (2), Slate (2), Chert (1), Sandstone (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (9)

Site Impacts

This alliance has low non-native plant cover (average 1.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea* and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Arctostaphylos (andersonii, pallida)

Arctostaphylos crustacea

Arctostaphylos crustacea – *Adenostoma fasciculatum* – *Ceanothus (cuneatus, papillosus)*

Classification Comments

None.

References: Keeler-Wolf et al. 2003a, Rodriguez et al. 2017, Sawyer and Evens 2007, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=12; Alameda County (n=3): ALCC019, CHBR-01, EBAY0058

Contra Costa County (n=9): ALCC006, ALCC047, ALCC085, ALCC086, ALCC109, ALCC110, EBAY0052, EBRTA105, EBRTA145

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	58	1.1	0.2	4.0				Y
T	<i>Arbutus menziesii</i>	25	0.1	0.2	1.0				
R	<i>Quercus agrifolia</i> *	42	0.4	0.2	4.2				
S	<i>Arctostaphylos crustacea</i>	92	40.3	7.0	72.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	67	5.9	0.2	30.0				Y
S	<i>Vaccinium ovatum</i>	50	4.1	0.2	40.0				Y
S	<i>Diplacus aurantiacus</i>	42	0.2	0.2	1.0				
S	<i>Arctostaphylos pallida</i>	33	5.3	4.0	42.0				
S	<i>Chrysolepis chrysophylla</i> var. <i>minor</i>	33	2.1	3.0	10.0				
S	<i>Lotus scoparius</i>	33	0.5	0.2	4.0				
S	<i>Toxicodendron diversilobum</i>	25	0.1	0.2	1.0				
H	<i>Pteridium aquilinum</i>	50	0.6	0.1	5.0				Y
H	<i>Vulpia bromoides</i>	25	0.5	0.2	5.0				
H	<i>Aira caryophyllea</i>	25	0.1	0.1	1.0				
NV	Lichen	42	0.3	0.2	1.0				
NV	Moss	50	0.5	0.2	6.0				

***Arctostaphylos (andersonii, pallida)* Provisional Association**

Common Name: Anderson's or Alameda manzanita Shrubland

Alliance: *Arctostaphylos (crustacea, tomentosa)* Shrubland Alliance

Local Vegetation Description

The Anderson's or Alameda manzanita Association forms an intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Vaccinium ovatum*, *Arctostaphylos pallida*, and *Toxicodendron diversilobum*, and those that are often present include *Arctostaphylos crustacea*, *Chrysopsis chrysophylla* var. *minor*, *Diplacus aurantiacus*, and *Lonicera hispidula*. Regenerating or shrubby trees that are dominant and characteristic include *Quercus agrifolia* and *Umbellularia californica*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Quercus parvula* var. *shrevei*. The herbaceous layer typically includes *Aira caryophyllea*, and herbs that are often present include *Bromus diandrus*, *Cynosurus echinatus*, *Polystichum munitum*, *Pteridium aquilinum*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	4.5	4 – 5	3.5	2 – 5
Regenerating or Shrubby Tree	0.2	0 – 0	1.9	0 – 5
Shrub	55.0	50 – 60	2.5	1 – 5
Herb	1.6	0 – 3	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 294 m, Range 206 – 382 m

Aspect: NE (1), NW (1)

Slope: Mean 23 degrees, Range 15 – 30 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: Mean 2.5%, Range 0 – 5%

Small Rock: Mean 49.6%, Range 35 – 64%

Fines Cover: Mean 27.0%, Range 25 – 29%

Litter Cover: Mean 20.0%, Range 10 – 30%

Soil Texture (field assessed): Coarse sand (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Chert (1), Shale (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 1.7%) relative to native cover.

Arctostaphylos (andersonii, pallida) Provisional Association
Arctostaphylos (crustacea, tomentosa) Shrubland Alliance

Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Cynosurus echinatus*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

Both of the manzanitas assigned to this association are rare. *Arctostaphylos pallida* (CRPR 1B.1) is restricted to Alameda and Contra Costa Counties. The association remains provisional due to low sample size.

References: Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): EBRTA105, EBRTA145

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus parvula</i> var. <i>shrevei</i>	50	2.0	4.0	4.0				Y
T	<i>Quercus agrifolia</i>	50	0.5	1.0	1.0				Y
R	<i>Quercus agrifolia</i>	100	2.2	0.2	4.2	Y	Y		Y
R	<i>Umbellularia californica</i>	100	0.3	0.2	0.4	Y			Y
S	<i>Arctostaphylos pallida</i>	100	27.0	12.0	42.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	0.6	0.2	1.0	Y			Y
S	<i>Vaccinium ovatum</i>	50	20.0	40.0	40.0				Y
S	<i>Chrysopsis chrysophylla</i> var. <i>minor</i>	50	3.5	7.0	7.0				Y
S	<i>Arctostaphylos crustacea</i>	50	3.5	7.0	7.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.5	1.0	1.0				Y
S	<i>Lonicera hispidula</i>	50	0.1	0.2	0.2				Y
H	<i>Aira caryophyllea</i>	100	0.6	0.2	1.0	Y		Y	Y
H	<i>Pteridium aquilinum</i>	50	1.0	2.0	2.0				Y
H	<i>Cynosurus echinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia bromoides</i>	50	0.1	0.2	0.2				Y
H	<i>Polystichum munitum</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y

Arctostaphylos (andersonii, pallida) Provisional Association
Arctostaphylos (crustacea, tomentosa) Shrubland Alliance

***Arctostaphylos crustacea* Association**

Common Name: Brittle Leaf Manzanita Shrubland

Alliance: *Arctostaphylos (crustacea, tomentosa)* Shrubland Alliance

Local Vegetation Description

The Brittle Leaf Manzanita Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum* and *Arctostaphylos crustacea*, and those that are often present include *Diplacus aurantiacus* and *Lotus scoparius*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*, *Arbutus menziesii*, and *Pinus attenuata*. The herbaceous layer typically includes *Pteridium aquilinum*, and herbs that are sometimes present include *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.9	0 – 5	9.5	2 – 15
Hardwood	1.7	0 – 5	4.3	2 – 10
Regenerating or Shrubby Tree	3.3	0 – 21	1.9	0 – 5
Shrub	51.6	10 – 75	2.2	0.5 – 5
Herb	2.1	0 – 14	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 326 m, Range 252 – 399 m

Aspect: SE (4), NE (1), NW (1), SW (1), Variable (1)

Slope: Mean 27 degrees, Range 8 – 47 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (4), Ridge top (2), Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.5%, Range 0 – 3%

Small Rock: Mean 31.2%, Range 0 – 87%

Fines Cover: Mean 13.1%, Range 2 – 40%

Litter Cover: Mean 51.1%, Range 3 – 93%

Soil Texture (field assessed): Coarse sand (2), Coarse, loamy sand (2), Loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (3), Slate (2), Sandstone (1), Shale (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7)

Site Impacts

This association has low non-native plant cover (average 1.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Vulpia bromoides*.

Classification Comments

Two surveys of this association included the rare *Arctostaphylos pallida* (CRPR 1B.1) at significant cover.

References: Keeler-Wolf et al. 2003a, Rodriguez et al. 2017, Sawyer and Evens 2007, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=8; Alameda County (n=1): ALCC019

Contra Costa County (n=7): ALCC006, ALCC047, ALCC085, ALCC086, ALCC109, ALCC110, EBAY0052

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	50	1.1	0.2	4.0				Y
T	<i>Arbutus menziesii</i>	38	0.2	0.2	1.0				
T	<i>Pinus attenuata</i>	25	0.9	2.0	5.0				
R	<i>Quercus agrifolia</i> *	38	0.1	0.2	0.4				
R	<i>Quercus wislizeni</i> var. <i>frutescens</i>	25	2.1	3.0	14.0				
R	<i>Pinus attenuata</i> *	25	1.0	1.0	7.0				
S	<i>Arctostaphylos crustacea</i>	100	44.5	8.0	72.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	75	1.4	0.2	3.0	Y			Y
S	<i>Lotus scoparius</i>	50	0.7	0.2	4.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.2	0.2	1.0				Y
S	<i>Chrysolepis chrysophylla</i> var. <i>minor</i>	38	2.3	3.0	10.0				
S	<i>Vaccinium ovatum</i>	38	0.7	0.2	4.0				
S	<i>Arctostaphylos pallida</i>	25	1.1	4.0	5.0				
S	<i>Dendromecon rigida</i>	25	0.2	0.2	1.0				
H	<i>Pteridium aquilinum</i>	63	0.7	0.1	5.0				Y
H	<i>Vulpia bromoides</i>	25	0.7	0.2	5.0				
NV	Lichen	63	0.4	0.2	1.0				Y
NV	Moss	38	0.3	0.2	1.0				

***Arctostaphylos crustacea* – *Adenostoma fasciculatum* – *Ceanothus (cuneatus, papillosus)* Association**

Common Name: Brittle Leaf Manzanita – Chamise – Ceanothus Shrubland

Alliance: *Arctostaphylos (crustacea, tomentosa)* Shrubland Alliance

Local Vegetation Description

The Brittle Leaf Manzanita – Chamise – Ceanothus Association forms a continuous shrub layer in the single sample available. The emergent tree layer is sparse, and the herbaceous layer is sparse. Dominant and characteristic shrubs include *Adenostoma fasciculatum*, *Arctostaphylos crustacea*, and *Vaccinium ovatum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	2.0	2 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	90.0	90 – 90	3.5	2 – 5
Herb	1.0	1 – 1	0.3	0 – 0.5

Local Environmental Description

Elevation: 320 m

Aspect: SE (1)

Slope: >25 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 15%

Small Rock: 0%

Fines Cover: 13%

Litter Cover: 60%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-natives were recorded by the surveyors.

Classification Comments

None.

Arctostaphylos crustacea – *Adenostoma fasciculatum* – *Ceanothus (cuneatus, papillosus)* Association
Arctostaphylos (crustacea, tomentosa) Shrubland Alliance

References: Sawyer and Evens 2007, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** EBAY0058

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	100	2.0	2.0	2.0	Y	Y		Y
S	<i>Arctostaphylos crustacea</i>	100	60.0	60.0	60.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	100	30.0	30.0	30.0	Y		Y	Y
S	<i>Vaccinium ovatum</i>	100	2.0	2.0	2.0	Y			Y
NV	Bryophyte (moss, liverwort, hornwort)	100	1.0	1.0	1.0	Y	Y		Y

Arctostaphylos crustacea – *Adenostoma fasciculatum* – *Ceanothus (cuneatus, papillosus)* Association
Arctostaphylos (crustacea, tomentosa) Shrubland Alliance

***Arctostaphylos glauca* Shrubland Alliance**

Date & Time: Thu, May 20, 2021, 09:47:44 PDT
Position: 10 N 594091 4194453 (± 15.6 ft)
Altitude: 2205ft (± 11.1 ft)
Datum: WGS-84
Azimuth/Bearing: 269° S89W 4782mils True ($\pm 11^\circ$)
Elevation Grade: -025%
Horizon Grade: +000%
Zoom: 1.0X
SPCCB-031W



Common Name: Bigberry manzanita chaparral

NVC Alliance Code: A3866. *Arctostaphylos glauca* Chaparral Alliance

Statewide Description

Arctostaphylos glauca is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos glauca*, *Artemisia californica*, *Ceanothus crassifolius*, *Ceanothus cuneatus*, *Ceanothus leucodermis*, *Cercocarpus montanus*, *Garrya flavescens*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus durata*, *Quercus wislizeni*, *Rhamnus ilicifolia*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Quercus agrifolia* or *Quercus wislizeni* var. *wislizeni*.

Stands of *A. glauca* occupy mid to upper slopes of moderate to high elevations for chaparral. Stands in southern California occur more often on north-facing slopes on granitic and metamorphic bedrocks. Small stands also occur in central California on south-facing serpentine slopes and on north-facing slopes of sandstone and other sedimentary substrates.

Mixed stands occur in the coastal mountains of central and southern California on a

variety of rock types. Southern California stands usually occupy steep upper and middle slopes, whereas those in central California prefer middle to upper slopes but also may extend onto ridges in a patchwork with other chaparral alliances. This alliance has been formerly considered two alliances, the *Adenostoma fasciculatum* - *Arctostaphylos glauca* where the two main species co-dominate, and the *Arctostaphylos glauca* alliance, where that species is strongly dominant (Gordon and White 1994, Sawyer and Keeler-Wolf 1995). Recent studies in southern and central California suggest that there is substantial ecological overlap between these two conditions and the presence of any significant cover of *A. glauca* is sufficient to define the alliance.

Local Vegetation Description

The Bigberry manzanita chaparral Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Arctostaphylos glauca*, and those that are often present include *Adenostoma fasciculatum* and *Heteromeles arbutifolia*. Regenerating or shrubby trees that are often present include *Pinus sabiniana*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana* and *Quercus agrifolia*. Herbs that are sometimes present include *Aira caryophyllaea*, *Avena barbata*, *Bromus hordeaceus*, *Bromus rubens*, *Chlorogalum pomeridianum*, *Galium porrigens*, *Melica californica*, *Nassella lepida*, *Pedicularis densiflora*, and *Pentagramma triangularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	6.2	2 – 10
Hardwood	0.7	0 – 3	5.5	2 – 10
Regenerating or Shrubby Tree	0.3	0 – 1	2.7	0 – 5
Shrub	60.0	30 – 100	4.5	2 – 10
Herb	4.4	0 – 13	0.4	0 – 1

Local Membership Rule

Arctostaphylos glauca > 50% relative cover in the shrub canopy, or > 30% with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa*, *Artemisia californica*, *Ceanothus cuneatus*, *Cercocarpus montanus*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus durata*, *Quercus wislizeni*, *Rhamnus ilicifolia*, and/or *Salvia mellifera*.

Local Environmental Description

Elevation: Mean 530 m, Range 320 – 974 m

Aspect: NW (3), SW (3), NE (2), SE (2)

Slope: Mean 21 degrees, Range 10 – 35 degrees

Macro Topography: Upper 1/3 of slope (5), Middle 1/3 of slope (3), Ridge top (1),
Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 2.1%, Range 0 – 8%

Small Rock: Mean 8.3%, Range 0 – 32%

Fines Cover: Mean 18.8%, Range 3 – 45%
Litter Cover: Mean 52.5%, Range 10 – 95%

Soil Texture (field assessed): Moderately fine sandy clay loam (3), Clay (1), Loam (1), Medium loam (1), Medium sand (1), Moderately fine silty clay loam (1)

Geology (field or map data): Serpentine (4), Ultramafic (3), Diabase (2), Sandstone and other sedimentary (1)

Alameda County Subsections: Diablo Range (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Fremont - Livermore Hills and Valleys (4), Western Diablo Range (2)

Site Impacts

This alliance has low non-native plant cover (average 2.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea* and *Bromus hordeaceus*.

Associations in Alameda & Contra Costa Counties

Arctostaphylos glauca

Arctostaphylos glauca – *Adenostoma fasciculatum*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens and San 2005, Gordon and White 1994, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G4 **State Rarity Rank:** S4

Surveys Used for Description

Total: N=10; Alameda County (n=2): ALCC226, ALCC832

Contra Costa County (n=2): SPCCB-031, SPCCB-068

Santa Clara Co. (n=6): SCLAR029, SCLAR031, SCLAR099, SCRUZ556, VASE0019, VAWA053

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	40	0.1	0.2	0.5				
T	<i>Quercus agrifolia</i>	20	0.4	1.0	3.0				
R	<i>Pinus sabiniana</i>	40	0.2	0.2	1.0				
R	<i>Juniperus californica</i>	20	0.0	0.1	0.2				
S	<i>Arctostaphylos glauca</i>	100	40.2	8.0	73.9	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	50	8.8	0.2	35.0				Y
S	<i>Heteromeles arbutifolia</i>	50	3.2	0.2	20.8				Y
S	<i>Toxicodendron diversilobum</i>	40	3.1	2.0	20.0				
S	<i>Diplacus aurantiacus</i>	30	1.6	0.2	14.0				
S	<i>Rhamnus crocea</i>	30	0.6	1.0	3.0				
S	<i>Symphoricarpos mollis</i>	20	0.6	0.2	6.0				
S	<i>Frangula californica</i>	20	0.3	0.2	3.0				
S	<i>Salvia mellifera</i>	20	0.0	0.2	0.2				
H	<i>Bromus rubens</i>	40	0.7	0.2	5.0				
H	<i>Chlorogalum pomeridianum</i>	30	0.6	0.2	4.0				
H	<i>Melica californica</i>	30	0.5	0.2	3.0				
H	<i>Pedicularis densiflora</i>	30	0.2	0.2	1.0				
H	<i>Galium porrigens</i>	30	0.1	0.2	0.5				
H	<i>Avena barbata</i>	20	0.3	0.2	3.0				
H	<i>Pentagramma triangularis</i>	20	0.1	0.2	1.0				
H	<i>Nassella lepida</i>	20	0.1	0.2	1.0				
H	<i>Bromus hordeaceus</i>	20	0.0	0.2	0.2				
H	<i>Aira caryophyllea</i>	20	0.0	0.2	0.2				
NV	Moss	40	0.3	0.2	1.0				

***Arctostaphylos glauca* Association**

Common Name: Bigberry Manzanita Shrubland

Alliance: *Arctostaphylos glauca* Shrubland Alliance

Local Vegetation Description

The Bigberry Manzanita Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Arctostaphylos glauca*, and those that are often present include *Heteromeles arbutifolia* and *Toxicodendron diversilobum*. Regenerating or shrubby trees that are often present include *Pinus sabiniana*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana* and *Quercus agrifolia*. Herbs that are often present include *Bromus rubens*, *Galium porrigens* and *Melica californica*, and herbs that are sometimes present include *Pedicularis densiflora* and *Pentagramma triangularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	6.2	2 – 10
Hardwood	1.2	0 – 3	5.5	2 – 10
Regenerating or Shrubby Tree	0.4	0 – 1	2.7	0 – 5
Shrub	63.8	33 – 100	4.8	2 – 10
Herb	3.2	0 – 7	0.5	0 – 1

Local Environmental Description

Elevation: Mean 629 m, Range 320 – 974 m

Aspect: NW (2), SE (2), NE (1), SW (1)

Slope: Mean 20 degrees, Range 10 – 32 degrees

Macro Topography: Upper 1/3 of slope (4), Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 2.5%, Range 0 – 8%

Small Rock: Mean 4.4%, Range 0 – 11%

Fines Cover: Mean 15.0%, Range 3 – 45%

Litter Cover: Mean 57.1%, Range 10 – 95%

Soil Texture (field assessed): Clay (1), Loam (1), Medium loam (1), Medium sand (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Serpentine (3), Ultramafic (2), Sandstone and other sedimentary (1)

Alameda County Subsections: Diablo Range (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Western Diablo Range (2), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 1.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens and San 2005, Gordon and White 1994, Kittel et al. 2012, Sikes et al. 2023

Global Rarity Rank: G3G4 **State Rarity Rank:** S3S4 **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC226, ALCC832

Contra Costa County (n=1): SPCCB-031

Santa Clara Co. (n=3): SCRUZ556, VASE0019, VAWA053

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	67	0.2	0.2	0.5				Y
T	<i>Quercus agrifolia</i>	33	0.7	1.0	3.0				
R	<i>Pinus sabiniana</i> *	50	0.3	0.2	1.0				Y
S	<i>Arctostaphylos glauca</i>	100	51.1	32.0	73.9	Y	Y		Y
S	<i>Heteromeles arbutifolia</i>	67	5.3	1.0	20.8				Y
S	<i>Toxicodendron diversilobum</i>	67	5.1	2.0	20.0				Y
S	<i>Symphoricarpos mollis</i>	33	1.0	0.2	6.0				
S	<i>Frangula californica</i>	33	0.5	0.2	3.0				
H	<i>Melica californica</i>	50	0.9	0.2	3.0				Y
H	<i>Bromus rubens</i>	50	0.4	0.2	2.0				Y
H	<i>Galium porrigens</i>	50	0.2	0.2	0.5				Y
H	<i>Pentagramma triangularis</i>	33	0.2	0.2	1.0				
H	<i>Pedicularis densiflora</i>	33	0.2	0.2	1.0				
NV	Moss	33	0.3	1.0	1.0				

***Arctostaphylos glauca* – *Adenostoma fasciculatum* Association**

Common Name: Bigberry Manzanita – Chamise Shrubland

Alliance: *Arctostaphylos glauca* Shrubland Alliance

Local Vegetation Description

The Bigberry Manzanita – Chamise Association forms an open to continuous shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum* and *Arctostaphylos glauca*, and those that are often present include *Diplacus aurantiacus*, *Rhamnus crocea*, and *Salvia mellifera*. Herbs that are often present include *Avena barbata*, *Chlorogalum pomeridianum*, and *Nassella lepida*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.4	no data	no data
Shrub	54.5	30 – 78	3.5	2 – 5
Herb	6.3	0 – 13	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 381 m, Range 322 – 479 m

Aspect: SW (2), NE (1), NW (1)

Slope: Mean 23 degrees, Range 10 – 35 degrees

Macro Topography: Middle 1/3 of slope (2), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: 32%

Fines Cover: 42%

Litter Cover: 25%

Soil Texture (field assessed): Moderately fine sandy clay loam (2)

Geology (field or map data): Diabase (2), Serpentine (1), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has low non-native plant cover (average 4.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Anagallis arvensis*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Centaurea melitensis*.

Arctostaphylos glauca – *Adenostoma fasciculatum* Association
Arctostaphylos glauca Shrubland Alliance

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included. Only one of the four surveys included surface cover data.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens and San 2005, Gordon and White 1994, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-068

Santa Clara Co. (n=3): SCLAR029, SCLAR031, SCLAR099

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Pinus sabiniana</i>	25	0.1	0.2	0.2				
R	<i>Juniperus californica</i>	25	0.1	0.2	0.2				
S	<i>Arctostaphylos glauca</i>	100	24.0	8.0	55.0	Y		Y	Y
S	<i>Adenostoma fasciculatum</i>	100	22.0	10.0	35.0	Y		Y	Y
S	<i>Diplacus aurantiacus</i>	50	4.0	2.0	14.0				Y
S	<i>Rhamnus crocea</i>	50	0.8	1.0	2.0				Y
S	<i>Salvia mellifera</i>	50	0.1	0.2	0.2				Y
S	<i>Artemisia californica</i>	25	0.5	2.0	2.0				
S	<i>Garrya congdonii</i>	25	0.1	0.2	0.2				
S	<i>Baccharis pilularis</i>	25	0.1	0.2	0.2				
S	<i>Rhamnus ilicifolia</i>	25	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	25	0.1	0.2	0.2				
H	<i>Avena barbata</i>	50	0.8	0.2	3.0				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.6	0.2	2.0				Y
H	<i>Nassella lepida</i>	50	0.3	0.2	1.0				Y
H	<i>Melica torreyana</i>	25	2.0	8.0	8.0				
H	<i>Bromus rubens</i>	25	1.3	5.0	5.0				
H	<i>Lomatium utriculatum</i>	25	0.5	2.0	2.0				
H	<i>Pedicularis densiflora</i>	25	0.3	1.0	1.0				
H	<i>Nassella pulchra</i>	25	0.3	1.0	1.0				
H	<i>Cynoglossum grande</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	25	0.1	0.2	0.2				
H	<i>Anagallis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Navarretia heterodoxa</i>	25	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	25	0.1	0.2	0.2				
H	<i>Melica imperfecta</i>	25	0.1	0.2	0.2				
H	<i>Lomatium dasycarpum</i>	25	0.1	0.2	0.2				
H	<i>Zigadenus fremontii</i>	25	0.1	0.2	0.2				
NV	Moss	50	0.3	0.2	1.0				Y

***Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance**



Common Name: California sagebrush – (purple sage) scrub

NVC Alliance Code: A3883. *Artemisia californica* - *Salvia leucophylla* Mesic Scrub Alliance

Statewide Description

Artemisia californica is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Baccharis pilularis*, *Cleome isomeris*, *Diplacus aurantiacus*, *Encelia californica*, *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Isocoma menziesii*, *Keckiella cordifolia*, *Lotus scoparius*, *Opuntia littoralis*, *Rhus integrifolia*, *Salvia apiana*, *Salvia leucophylla*, *Salvia mellifera*, *Sambucus nigra*, and *Toxicodendron diversilobum*. Emergent trees or tall shrubs may be present at low cover.

Stands of this alliance occur in modal settings of coastal scrub throughout the central and southern California Coast Ranges. It is found particularly on steep slopes and in high abundance on protected, north-facing hillsides. Closer to the coast in the northern portion of its range, *A. californica* commonly mixes with *Baccharis pilularis* and transitions into the *Baccharis pilularis* alliance when that species becomes co-dominant. Farther inland and in drier portions of the southern coastal area, *A. californica* mixes

with *Eriogonum fasciculatum* and transitions to the *Eriogonum fasciculatum* alliance where both species can co-dominate (Rundel 2007).

This alliance merges the *Artemisia californica*, *Artemisia californica* - *Eriogonum fasciculatum*, and *Salvia leucophylla* alliances that were treated separately in the 2009 book, *A Manual of California Vegetation, Second Edition*. A southern California ecoregional analysis conducted by VegCAMP showed much overlap in species composition of the three alliances merged here, further suggesting the need to treat them as a single alliance (VegCAMP, in progress).

Local Vegetation Description

The California sagebrush – (purple sage) scrub Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Artemisia californica*, and those that are often present include *Baccharis pilularis*, *Diplacus aurantiacus*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus rubens*, *Epilobium canum*, *Eriogonum nudum*, *Lysimachia arvensis*, *Monardella villosa*, *Nassella lepida*, *Nassella pulchra*, and *Pentagramma triangularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 1	3.5	2 – 5
Hardwood	0.3	0 – 3	7.8	1 – 35
Regenerating or Shrubby Tree	0.2	0 – 1	2.4	0.5 – 5
Shrub	31.6	12 – 68	1.4	0 – 5
Herb	10.6	0 – 40	0.3	0 – 1

Local Membership Rule

Artemisia californica > 50% relative cover in the shrub canopy and may intermix with *Baccharis pilularis*, *Diplacus aurantiacus*, and/or *Toxicodendron diversilobum*.

Local Environmental Description

Elevation: Mean 272 m, Range 6 – 502 m

Aspect: SE (10), SW (9), NE (4), Variable (4), NW (2)

Slope: Mean 36 degrees, Range 12 – 60 degrees

Macro Topography: Middle 1/3 of slope (8), Upper 1/3 of slope (7), Lower 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Bottom (1), Bottom to Upper 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 2.4%, Range 0 – 10%

Small Rock: Mean 20.1%, Range 0 – 55%

Fines Cover: Mean 50.1%, Range 0 – 90%

Litter Cover: Mean 20.8%, Range 0 – 75%

Soil Texture (field assessed): Medium to very fine, sandy loam (5), Moderately coarse, sandy loam (5), Moderately fine clay loam (2), Medium silt loam (2), Clay (2), Fine sandy clay (1), Moderately fine silty clay loam (1), Medium loam (1)

Geology (field or map data): Metamorphic (4), Sandstone and other sedimentary (4), Sandstone, shale, and gravel deposits (4), Franciscan melange (3), Sedimentary (3), Shale and other sedimentary (2), Gravelly alluvium (1), Igneous (1), Mixed igneous (1), Mixed sedimentary (1), Sandstone (1), Shale (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (5), Fremont - Livermore Hills and Valleys (4), Diablo Range (3), Western Diablo Range (2), Eastern Hills (1), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (8), Suisun Hills and Valleys (2), East Bay Terraces and Alluvium (2), Eastern Hills (1)

Site Impacts

This alliance has low non-native plant cover (average 17.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Associations in Alameda & Contra Costa Counties

Artemisia californica

Artemisia californica – *Diplacus aurantiacus*

Artemisia californica – *Eriogonum fasciculatum*

Artemisia californica / *Nassella (pulchra)*

Classification Comments

None.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Dixon 2019, Evens and San 2004, Evens and San 2005, Evens et al. 2006, Gordon and White 1994, HDR 2014b, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Kirkpatrick and Hutchinson 1977, Kittel et al. 2012, Klein and Evens 2005, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=29; Alameda County (n=16): ALCC029, ALCC030, ALCC032, ALCC035, ALCC503, AW006, AW022, EBRTA122, EBRTA202, EBRTA309, LLNL051, LLNL092, LLNL093, LLNL099, WRBL091, WRBL092

Contra Costa County (n=13): ALCC003, ALCC028, ALCC108, ALCC120, ALCCREC108, ALCCREC115, ALCCREC219, ALCCREC612, ALCCREC614, EBRTA323, SPCCA-033, SPCCB-064, SPCCB-082

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	21	0.2	0.2	3.0				
S	<i>Artemisia californica</i>	100	21.7	8.0	38.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	66	3.2	0.2	20.0				Y
S	<i>Baccharis pilularis</i>	62	4.0	0.1	25.0				Y
S	<i>Toxicodendron diversilobum</i>	62	2.7	0.2	35.0				Y
S	<i>Heteromeles arbutifolia</i>	24	0.1	0.2	1.0				
H	<i>Bromus diandrus</i>	41	1.3	0.2	10.0				
H	<i>Avena barbata</i>	41	1.2	0.2	10.0				
H	<i>Nassella lepida</i>	34	1.5	0.1	25.0				
H	<i>Eriogonum nudum</i>	34	0.4	0.1	3.0				
H	<i>Epilobium canum</i>	28	0.4	0.2	5.0				
H	<i>Lysimachia arvensis</i>	28	0.1	0.2	1.0				
H	<i>Bromus rubens</i>	24	0.5	0.2	5.0				
H	<i>Nassella pulchra</i>	24	0.2	0.1	3.0				
H	<i>Monardella villosa</i>	21	0.1	0.2	1.0				
H	<i>Pentagramma triangularis</i>	21	0.0	0.1	0.2				

***Artemisia californica* Association**

Common Name: California Sagebrush Shrubland

Alliance: *Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance

Local Vegetation Description

The California Sagebrush Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Artemisia californica*, and those that are often present include *Baccharis pilularis*. Herbs that are often present include *Bromus diandrus*, and herbs that are sometimes present include *Avena barbata*, *Bromus rubens*, *Eriogonum nudum*, and *Lysimachia arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 1	3.5	2 – 5
Hardwood	0.4	0 – 3	5.1	2 – 10
Regenerating or Shrubby Tree	0.2	0 – 1	2.6	0.5 – 5
Shrub	27.8	12 – 45	1.5	0.5 – 5
Herb	10.1	0 – 33	0.3	0 – 1

Local Environmental Description

Elevation: Mean 242 m, Range 6 – 425 m

Aspect: SW (6), SE (4), NE (2), Variable (2), NW (1)

Slope: Mean 34 degrees, Range 12 – 60 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (2), Bottom (1), Bottom to Upper 1/3 of slope (1), Lower 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 1.5%, Range 0 – 10%

Small Rock: Mean 17.0%, Range 2 – 55%

Fines Cover: Mean 48.9%, Range 18 – 90%

Litter Cover: Mean 31.4%, Range 6 – 75%

Soil Texture (field assessed): Medium to very fine, sandy loam (4), Moderately coarse, sandy loam (3), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Sandstone, shale, and gravel deposits (3), Metamorphic (2), Sedimentary (2), Shale and other sedimentary (2), Franciscan melange (1), Gravelly alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2), Western Diablo Range (2), Diablo Range (1), Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), East Bay Terraces and Alluvium (2), Eastern Hills (1), Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 22.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Dixon 2019, Evens and San 2004, Evens and San 2005, Evens et al. 2006, Gordon and White 1994, HDR 2014b, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Kirkpatrick and Hutchinson 1977, Kittel et al. 2012, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Verdane and Evens 2010

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=15; Alameda County (n=6): ALCC029, ALCC030, ALCC032, ALCC035, LLNL051, LLNL093

Contra Costa County (n=9): ALCC108, ALCC120, ALCCREC108, ALCCREC219, ALCCREC612, ALCCREC614, EBRTA323, SPCCA-033, SPCCB-064

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Artemisia californica</i>	100	22.7	9.0	38.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	53	2.1	1.0	12.0				Y
S	<i>Toxicodendron diversilobum</i>	47	1.7	0.2	10.0				
S	<i>Diplacus aurantiacus</i>	40	0.3	0.2	2.0				
S	<i>Heteromeles arbutifolia</i>	27	0.1	0.2	1.0				
H	<i>Bromus diandrus</i>	60	2.0	0.2	10.0				Y
H	<i>Avena barbata</i>	40	1.1	0.2	10.0				
H	<i>Bromus rubens</i>	27	0.5	0.2	3.0				
H	<i>Eriogonum nudum</i>	27	0.2	0.2	2.0				
H	<i>Lysimachia arvensis</i>	27	0.1	0.2	1.0				
NV	Moss	33	0.9	0.2	12.0				

***Artemisia californica* – *Diplacus aurantiacus* Association**

Common Name: California Sagebrush – Bush Monkeyflower Shrubland

Alliance: *Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance

Local Vegetation Description

The California Sagebrush – Bush Monkeyflower Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Artemisia californica*, *Diplacus aurantiacus*, and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are often present include *Nassella lepida*, and herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus rubens*, *Centaurea melitensis*, *Epilobium canum*, *Eriogonum nudum*, *Eschscholzia californica*, *Gastroidium phleoides*, *Lysimachia arvensis*, *Monardella villosa*, *Nassella pulchra*, *Pentagramma triangularis*, and *Pseudognaphalium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 2	10.0	1 – 35
Regenerating or Shrubby Tree	0.3	0 – 1	2.3	0.5 – 5
Shrub	37.3	13 – 68	1.4	0 – 5
Herb	10.3	1 – 40	0.3	0 – 1

Local Environmental Description

Elevation: Mean 324 m, Range 118 – 502 m

Aspect: SE (4), SW (3), Variable (2), NE (1), NW (1)

Slope: Mean 38 degrees, Range 20 – 55 degrees

Macro Topography: Upper 1/3 of slope (5), Middle 1/3 of slope (3), Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 3.4%, Range 0 – 8%

Small Rock: Mean 26.3%, Range 1 – 49%

Fines Cover: Mean 56.1%, Range 34 – 78%

Litter Cover: Mean 11.9%, Range 2 – 25%

Soil Texture (field assessed): Medium silt loam (2), Moderately coarse, sandy loam (2), Clay (1), Medium loam (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Igneous (1), Metamorphic (1), Mixed igneous (1), Mixed sedimentary (1), Sandstone (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Shale (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (4), Fremont - Livermore Hills and Valleys (2), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 12.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Centaurea melitensis*, *Gastroidium phleoides*, and *Genista monspessulana*.

Classification Comments

None.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=11; Alameda County (n=7): AW006, AW022, EBRTA122, EBRTA202, EBRTA309, LLNL099, WRBL092

Contra Costa County (n=4): ALCC003, ALCC028, ALCCREC115, SPCCB-082

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	36	0.3	0.2	2.0				
S	<i>Artemisia californica</i>	100	20.6	8.0	35.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	100	7.7	0.2	20.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	82	4.7	0.2	35.0	Y			Y
S	<i>Baccharis pilularis</i>	64	7.2	1.0	25.0				Y
S	<i>Lupinus albifrons</i>	27	0.5	0.1	5.0				
S	<i>Genista monspessulana</i>	27	0.3	0.2	3.0				
H	<i>Nassella lepida</i>	55	1.7	0.2	15.0				Y
H	<i>Avena barbata</i>	45	1.7	0.2	10.0				
H	<i>Epilobium canum</i>	45	0.5	0.2	3.0				
H	<i>Monardella villosa</i>	45	0.2	0.2	1.0				
H	<i>Pseudognaphalium californicum</i>	45	0.1	0.2	0.5				
H	<i>Eriogonum nudum</i>	36	0.4	0.1	3.0				
H	<i>Lysimachia arvensis</i>	36	0.1	0.2	1.0				
H	<i>Gastroidium phleoides</i>	36	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	27	0.7	0.2	6.0				
H	<i>Bromus rubens</i>	27	0.7	1.0	5.0				
H	<i>Nassella pulchra</i>	27	0.2	0.2	1.0				
H	<i>Eschscholzia californica</i>	27	0.1	0.2	0.5				
H	<i>Pentagramma triangularis</i>	27	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	27	0.1	0.2	0.2				

***Artemisia californica* – *Eriogonum fasciculatum* Association**

Common Name: California Sagebrush – California Buckwheat Shrubland

Alliance: *Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance

Local Vegetation Description

The California Sagebrush – California Buckwheat Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Artemisia californica* and *Eriogonum fasciculatum*, and those that are often present include *Gutierrezia californica* and *Lupinus albifrons*. Herbs that are often present include *Avena barbata*, *Bromus diandrus*, *Bromus madritensis* and *Hirschfeldia incana*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	20.7	10 – 27	0.8	0.5 – 1
Herb	22.9	5 – 52	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 360 m, Range 295 – 455 m

Aspect: NE (1), SE (1), SW (1)

Slope: Mean 36 degrees, Range 20 – 60 degrees

Macro Topography: Upper 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: Mean 3.3%, Range 0 – 10%

Small Rock: Mean 14.0%, Range 0 – 40%

Fines Cover: Mean 29.3%, Range 0 – 48%

Litter Cover: Mean 13.7%, Range 0 – 40%

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Franciscan melange (1)

Alameda County Subsections: Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Eastern Hills (2)

Site Impacts

This association has moderate non-native plant cover (average 39.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anthriscus caucalis*, *Bromus diandrus*, *Bromus madritensis*, *Centaurea melitensis*,

Erodium botrys, *Erodium cicutarium*, *Hirschfeldia incana*, *Salsola tragus*, *Silene gallica*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Reyes et al. 2019

Global Rarity Rank: G4 **State Rarity Rank:** S4

State Rare: N

Surveys Used for Description

Total: N=3; Alameda County (n=1): LLNL092

Contra Costa County (n=0):

San Joaquin Co. (n=2): LLNL067, LLNL080

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Artemisia californica</i>	100	10.7	4.0	15.0	Y		Y	Y
S	<i>Eriogonum fasciculatum</i>	100	8.3	6.0	12.0	Y		Y	Y
S	<i>Gutierrezia californica</i>	67	1.7	0.2	5.0				Y
S	<i>Lupinus albifrons</i>	67	0.1	0.2	0.2				Y
S	<i>Eriogonum wrightii</i>	33	1.0	3.0	3.0				
S	<i>Baccharis pilularis</i>	33	0.3	1.0	1.0				
S	<i>Heteromeles arbutifolia</i>	33	0.1	0.2	0.2				
S	<i>Eriophyllum confertiflorum</i>	33	0.1	0.2	0.2				
S	<i>Diplacus aurantiacus</i>	33	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	67	14.4	0.2	43.0				Y
H	<i>Bromus madritensis</i>	67	2.0	1.0	5.0				Y
H	<i>Avena barbata</i>	67	1.7	2.0	3.0				Y
H	<i>Hirschfeldia incana</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia bromoides</i>	33	3.0	9.0	9.0				
H	<i>Poa secunda</i>	33	0.3	1.0	1.0				
H	<i>Eriastrum</i> sp.	33	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	33	0.1	0.2	0.2				

Artemisia californica – *Eriogonum fasciculatum* Association
Artemisia californica – (*Salvia leucophylla*) Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium botrys</i>	33	0.1	0.2	0.2				
H	<i>Salsola tragus</i>	33	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	33	0.1	0.2	0.2				
H	<i>Grindelia camporum</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Anthriscus caucalis</i>	33	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	33	0.1	0.2	0.2				
H	<i>Amsinckia</i> sp.	33	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	33	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Micropus californicus</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum angulosum</i>	33	0.1	0.2	0.2				
H	<i>Holocarpha obconica</i>	33	0.1	0.2	0.2				
H	<i>Melilotus indicus</i>	33	0.1	0.2	0.2				
H	<i>Luzula</i> sp.	33	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				
H	<i>Logfia californica</i>	33	0.1	0.2	0.2				
H	<i>Silene gallica</i>	33	0.1	0.2	0.2				
H	<i>Lomatium californicum</i>	33	0.1	0.2	0.2				

***Artemisia californica* / *Nassella (pulchra)* Association**

Common Name: California Sagebrush / Purple Needlegrass Shrubland

Alliance: *Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance

Local Vegetation Description

The California Sagebrush / Purple Needlegrass Association forms an open to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Artemisia californica*, and those that are often present include *Baccharis pilularis*. Herbs that are often present include *Avena barbata*, *Nassella lepida*, and *Nassella pulchra*, and herbs that are sometimes present include *Bromus hordeaceus*, *Epilobium canum*, *Eriogonum nudum*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	33.8	5 – 55	0.6	0 – 1
Herb	24.2	6 – 45	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 299 m, Range 12 – 396 m

Aspect: SE (3), SW (2)

Slope: Mean 30 degrees, Range 16 – 42 degrees

Macro Topography: Middle 1/3 of slope (2), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: Mean 6.0%, Range 6 – 6%

Small Rock: Mean 18.0%, Range 18 – 18%

Fines Cover: Mean 58.5%, Range 58 – 59%

Litter Cover: Mean 9.0%, Range 0 – 15%

Soil Texture (field assessed): Clay (1), Fine sandy clay (1)

Geology (field or map data): Serpentine (2), Metamorphic (1), Sedimentary (1),
Volcanic flow rocks (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces
and Alluvium (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has moderate non-native plant cover (average 22.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus* and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Dixon 2019, Evens and San 2004, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=5; Alameda County (n=2): ALCC503, WRBL091

Contra Costa County (n=0):

Santa Clara Co. (n=3): SCLAR057, SCLAR111, SCLAV006

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Artemisia californica</i>	100	28.8	5.0	50.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	60	1.1	0.1	5.0				Y
S	<i>Diplacus aurantiacus</i>	40	1.4	2.0	5.0				
S	<i>Toxicodendron diversilobum</i>	40	1.0	0.2	5.0				
H	<i>Nassella lepida</i>	60	5.4	1.0	25.0				Y
H	<i>Avena barbata</i>	60	4.4	1.0	15.0				Y
H	<i>Nassella pulchra</i>	60	1.0	1.0	3.0				Y
H	<i>Bromus hordeaceus</i>	40	1.8	1.0	8.0				
H	<i>Epilobium canum</i>	40	1.0	0.2	5.0				
H	<i>Eriogonum nudum</i>	40	1.0	2.0	3.0				
H	<i>Vulpia myuros</i>	40	0.1	0.2	0.2				

***Atriplex lentiformis* Shrubland Alliance**



Common Name: Quailbush scrub

NVC Alliance Code: A3173.

Statewide Description

Atriplex lentiformis or *Atriplex torreyi* is dominant in the shrub canopy with *Artemisia californica*, *Atriplex canescens*, *Baccharis pilularis*, *Baccharis salicifolia*, *Distichlis spicata*, *Encelia californica*, *Kochia americana*, *Malosma laurina*, *Pluchea sericea*, *Rhus integrifolia*, *Sporobolus airoides*, *Suaeda taxifolia* and *Tamarix* spp. Emergent trees may be present at low cover, including *Myoporum laetum* or *Prosopis glandulosa*.

This alliance has been segregated from the previously defined *Atriplex lentiformis*-*A. polycarpa* alliance (Sawyer and Keeler-Wolf 1995). Based on plot data collected over the past 10 years, both of these species apparently segregate and form their own alliances with frequently different environmental and species characteristics. Stands may be found in a variety of settings, from coastal shrublands to alkali sinks and alkali meadows, to desert washes and oases in southern California, and to saline, intermittently flooded wetlands in the Central Valley. The alliance especially occurs in disturbed areas, including roadsides and fluvial areas with alkaline soils.

Local Vegetation Description

The Quailbush scrub Alliance forms an open to continuous shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to continuous. Dominant and characteristic shrubs include *Atriplex lentiformis*. The herbaceous layer typically includes *Bromus diandrus*, *Conium maculatum*, *Frankenia salina*, *Polypogon monspeliensis*, and herbs that are often present include *Atriplex prostrata*, *Hordeum marinum*, *Lactuca serriola*, *Rumex crispus*, and *Thinopyrum ponticum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	40.4	28 – 70	2.3	1 – 5
Herb	37.5	8 – 72	no data	no data

Local Membership Rule

Atriplex lentiformis > 50% relative cover in the shrub canopy, often with a high cover of herbaceous native and non-native herbs including *Bromus diandrus*, *Conium maculatum*, *Polypogon monspeliensis*, and *Frankenia salina*.

Local Environmental Description

Elevation: Mean 1 m, Range 1 – 2 m

Aspect: Flat (5)

Slope: Mean 0 degrees, Range 0 – 0 degrees

Macro Topography: Bottom (3), Lower 1/3 of slope (2)

Large Rock: Mean 0.0%, Range 0 – 0%

Small Rock: Mean 0.0%, Range 0 – 0%

Fines Cover: Mean 23.2%, Range 0 – 67%

Litter Cover: Mean 40.8%, Range 10 – 80%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (2), Moderately fine silty clay loam (2)

Geology (field or map data): Clayey alluvium (4), Mixed alluvium (1)

Alameda County Subsections: none

Contra Costa County Subsections: none

Other Subsections: Delta (5)

Site Impacts

This alliance has moderate non-native plant cover (average 43.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bromus diandrus*, *Conium maculatum*, *Hordeum marinum*, *Lactuca serriola*, *Polypogon monspeliensis*, *Rumex crispus*, and *Thinopyrum ponticum*.

Associations in Alameda & Contra Costa Counties

*Atriplex lentiformis**

Classification Comments

Note that only two locations were surveyed in this case, but revisits were included. Since there were no surveys of this alliance in Alameda and Contra Costa Counties, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al 2012, Buck-Diaz et al 2023, Keeler-Wolf and Evens 2006, Verdone and Evens 2010

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=0):

Solano Co. (n=5): SUMA12094, SUMA12118, SUMA6118, SUMA9094, SUMA9118

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Atriplex lentiformis</i>	100	40.4	28	70	Y	Y	Y	
S	<i>Baccharis pilularis</i>	20	1.0	1.0	1.0				
H	<i>Atriplex prostrata</i>	60	15.7	1.0	30.0				Y
H	<i>Bromus diandrus</i>	100	11.4	1.0	27.0	Y		Y	
H	<i>Bromus hordeaceus</i>	20	1.0	1.0	1.0				
H	<i>Cirsium vulgare</i>	20	0.2	0.2	0.2				
H	<i>Conium maculatum</i>	80	11.9	0.2	25.0	Y			
H	<i>Distichlis spicata</i>	20	0.2	0.2	0.2				
H	<i>Frankenia salina</i>	80	0.9	0.2	3.0	Y			
H	<i>Heliotropium curassavicum</i>	20	0.2	0.2	0.2				
H	<i>Hordeum marinum</i>	60	1.1	0.2	3.0				Y
H	<i>Lactuca serriola</i>	60	0.2	0.2	0.2				Y
H	<i>Lepidium latifolium</i>	20	3.0	3.0	3.0				
H	<i>Lolium perenne</i>	40	2.5	1.0	4.0				
H	<i>Lotus corniculatus</i>	40	0.6	0.2	1.0				
H	<i>Polypogon monspeliensis</i>	80	2.1	0.2	6.0	Y			
H	<i>Rumex crispus</i>	60	0.2	0.1	0.2				Y
H	<i>Salicornia pacifica</i>	40	0.6	0.2	1.0				
H	<i>Sonchus oleraceus</i>	20	0.2	0.2	0.2				
H	<i>Thinopyrum ponticum</i>	60	1.1	0.2	3.0				Y
H	<i>Vulpia bromoides</i>	40	2.0	1.0	3.0				

***Baccharis pilularis* Shrubland Alliance**



Common Name: Coyote brush scrub

NVC Alliance Code: A0836. *Baccharis pilularis* Scrub Alliance

Statewide Description

Baccharis pilularis is dominant or co-dominant in the shrub canopy with *Artemisia californica*, *Ceanothus thyrsiflorus*, *Corylus cornuta*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, *Eriophyllum staechadifolium*, *Frangula californica*, *Garrya elliptica*, *Gaultheria shallon*, *Holodiscus discolor*, *Lotus scoparius*, *Lupinus arboreus*, *Morella californica*, *Rubus ursinus*, *Salvia apiana*, *Salvia leucophylla*, and *Toxicodendron diversilobum*. Emergent trees may be present at low cover, including *Pinus muricata*, *Pseudotsuga menziesii*, *Quercus agrifolia*, or *Umbellularia californica*.

Stands can be transitory to forest and woodland types or persistent for a long time (Heady et al. 1977). Seedlings of *Baccharis pilularis* invade grasslands in the central coast, forming stands when grazing and fire decrease (McBride and Heady 1968). Older, shady stands are transitional to forest types with *Pinus muricata*, *Pseudotsuga menziesii*, *Quercus agrifolia*, and *Umbellularia californica* (Grams et al. 1977, McBride 1974). *Baccharis pilularis* invades recently logged land in northern California well away

from the coast. *B. pilularis* also invades coastal dunes stabilized by *Ammophila arenaria* or *Lupinus arboreus* (Pickart and Sawyer 1998).

Baccharis pilularis stands in the Sierra Nevada foothills, along the central coast, and in southern California tend to be largely seral to other scrub and woodland types. However, the natural seral relationships between *Baccharis pilularis* and adjacent herbaceous and woody alliances are complex and varied. The core of diverse, older stands of *Baccharis pilularis* lies along the coast from Monterey County to Sonoma County. For example, Borchert et al. (2004) identify a *Baccharis pilularis* Alliance in the northern Santa Lucia Range, where they sampled mid- to late-seral stands (with >25 years since fire).

Local Vegetation Description

The Coyote brush scrub Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to continuous. Dominant and characteristic shrubs include *Baccharis pilularis* and *Toxicodendron diversilobum*, and those that are often present include *Diplacus aurantiacus*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are sometimes present include *Avena barbata*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Clinopodium douglasii*, *Conium maculatum*, *Lysimachia arvensis*, *Nassella pulchra*, *Pseudognaphalium californicum*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 1	5.5	2 – 10
Hardwood	1.2	0 – 10	8.4	1 – 50
Regenerating or Shrubby Tree	0.4	0 – 7	2.5	0 – 10
Shrub	49.5	4 – 100	2.6	0.5 – 35
Herb	15.8	0 – 88	0.4	0 – 2

Local Membership Rule

Baccharis pilularis > 50% relative cover in the shrub canopy, or > 30% with *Frangula californica*, *Toxicodendron diversilobum*, and/or *Rubus* spp. Additionally, *Frangula californica* can be > 30% relative cover with *Baccharis pilularis* or other coastal scrub species in the shrub canopy for this alliance.

Local Environmental Description

Elevation: Mean 313 m, Range 3 – 591 m

Aspect: SE (14), SW (14), NE (12), NW (9), Variable (4), Flat (2)

Slope: Mean 18 degrees, Range 0 – 43 degrees

Macro Topography: Upper 1/3 of slope (19), Middle 1/3 of slope (13), Lower 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (4), Middle to Upper 1/3 of slope (3), Ridge top (2), Bottom (1), Bottom to Lower 1/3 of slope (1), Entire slope (1), Lower 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.6%, Range 0 – 7%
Small Rock: Mean 6.6%, Range 0 – 42%
Fines Cover: Mean 56.9%, Range 3 – 97%
Litter Cover: Mean 31.6%, Range 1 – 80%

Soil Texture (field assessed): Moderately fine clay loam (11), Clay (6), Medium silt loam (5), Moderately coarse, sandy loam (5), Loam (4), Moderately fine silty clay loam (4), Medium loam (4), Medium to very fine, sandy loam (4), Moderately fine sandy clay loam (3), Sand (1), Fine silty clay (1), Fine clay (1)

Geology (field or map data): Sandstone and other sedimentary (12), Sedimentary (9), Franciscan melange (8), Sandstone (6), Basalt (3), Sandstone, shale, and gravel deposits (3), Metamorphic (2), Shale and other sedimentary (2), Volcanic flow rocks (2), Chert (1), Conglomerate (1), Igneous (1), Mixed sedimentary (1), Sand dunes (1), Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (21), Fremont - Livermore Hills and Valleys (12), Western Diablo Range (3), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (15), Suisun Hills and Valleys (3), East Bay Terraces and Alluvium (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has low non-native plant cover (average 15.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus* and *Conium maculatum*.

Associations in Alameda & Contra Costa Counties

Baccharis pilularis

Baccharis pilularis – (*Frangula californica*) – *Rubus* spp.

Baccharis pilularis – *Artemisia californica*

Baccharis pilularis – *Toxicodendron diversilobum*

Baccharis pilularis / (*Nassella pulchra* – *Elymus glaucus* – *Bromus carinatus*)

Baccharis pilularis / Annual Grass – Herb

Baccharis pilularis alliance

Frangula californica ssp. *californica* – *Baccharis pilularis* / *Scrophularia californica*

Classification Comments

None.

References: AECOM 2013, Belsher 1999, Borchert et al. 2004, Buck-Diaz and Evens 2015, Buck-Diaz et al. 2012, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Grams et al. 1977, HDR 2014b, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Keeler-

Wolf et al. 2003a, Kirkpatrick and Hutchinson 1977, Kittel et al. 2012, Klein et al. 2015, McBride and Stone 1976, O'Neil and Egan 2004, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Stillwater Sciences and URS 2007, Verdone and Evens 2010

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=57; Alameda County (n=37): ALCC016, ALCC017, ALCC078, ALCC103, ALCC169, ALCC201, ALCC508, ALCCREC005, ALCCREC212, ALCCREC215, AW005, AW008, AW009, AW010, AW015, AW018, AW040, AW042, AW043, AW051, AW052, EBAY0046, EBAY0047, EBRTA113, EBRTA115, EBRTA203, EBRTA301, EBRTA307, EBRTA313, EBRTA316, EBRTA317, GUMP-023, WRBL005, WRBL006, WRBL007, WRBL089, WRBL094

Contra Costa County (n=20): ALCC002, ALCC064, ALCC165, ALCCREC613, EBAY0008, EBAY0022, EBAY0026, EBRTA002, EBRTA211, EBRTA214, EBRTA402, JOMU007, JOMU011, SPCCA-017, SPCCA-021, SPCCA-043, SPCCB-085, WRBL098, WRBL101, WRBL102

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	38	0.4	0.2	7.0				
T	<i>Umbellularia californica</i>	31	0.6	0.2	10.0				
S	<i>Baccharis pilularis</i>	98	32.7	3.0	88.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	79	5.7	0.2	30.0	Y			Y
S	<i>Diplacus aurantiacus</i>	62	4.3	0.2	38.0				Y
S	<i>Frangula californica</i>	38	2.9	0.2	30.0				
S	<i>Rubus ursinus</i>	29	2.1	0.2	68.0				
S	<i>Artemisia californica</i>	24	1.9	0.5	20.0				
S	<i>Heteromeles arbutifolia</i>	21	0.3	0.2	10.0				
H	<i>Avena barbata</i>	29	1.1	0.2	10.0				
H	<i>Pseudognaphalium californicum</i>	29	0.1	0.1	1.0				
H	<i>Clinopodium douglasii</i>	28	1.2	0.2	20.0				
H	<i>Conium maculatum</i>	26	1.4	0.1	60.0				
H	<i>Carduus pycnocephalus</i>	26	0.7	0.1	25.0				
H	<i>Chlorogalum pomeridianum</i>	24	0.8	0.2	13.8				
H	<i>Nassella pulchra</i>	22	0.7	0.2	10.0				
H	<i>Scrophularia californica</i>	22	0.2	0.2	3.0				
H	<i>Lysimachia arvensis</i>	21	0.2	0.2	6.0				

***Baccharis pilularis* Association**

Common Name: Coyote Brush Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Baccharis pilularis*, and those that are often present include *Diplacus aurantiacus* and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are sometimes present include *Conium maculatum*, *Lysimachia arvensis*, and *Pseudognaphalium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 1	no data	no data
Hardwood	0.2	0 – 1	9.2	5 – 15
Regenerating or Shrubby Tree	0.1	0 – 1	3.5	2 – 5
Shrub	54.2	25 – 90	1.9	1 – 5
Herb	3.2	0 – 20	0.3	0 – 1

Local Environmental Description

Elevation: Mean 306 m, Range 5 – 500 m

Aspect: SW (3), Flat (2), NW (2), SE (2), NE (1)

Slope: Mean 14 degrees, Range 0 – 30 degrees

Macro Topography: Middle 1/3 of slope (3), Lower 1/3 of slope (2), Upper 1/3 of slope (2), Bottom (1)

Large Rock: 0%

Small Rock: Mean 3.2%, Range 0 – 10%

Fines Cover: Mean 60.5%, Range 30 – 77%

Litter Cover: Mean 33.9%, Range 20 – 69%

Soil Texture (field assessed): Medium silt loam (2), Moderately fine clay loam (2), Clay (1), Fine clay (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Franciscan melange (1), Igneous (1), Metamorphic (1), Mixed sedimentary (1), Sedimentary (1), Shale and other sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Fremont - Livermore Hills and Valleys (2), East Bay Terraces and Alluvium (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This association has low non-native plant cover (average 3.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Conium maculatum*.

Classification Comments

None.

References: Borchert et al. 2004, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Verdone and Evens 2010

Global Rarity Rank: G4 **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=10; Alameda County (n=6): ALCC016, ALCC169, ALCCREC215, AW005, AW015, EBRTA203

Contra Costa County (n=4): ALCC002, SPCCA-017, SPCCB-085, WRBL101

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	30	0.1	0.2	0.2				
S	<i>Baccharis pilularis</i>	100	50.9	20.0	88.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	50	2.1	0.2	18.0				Y
S	<i>Toxicodendron diversilobum</i>	50	1.9	0.2	15.0				Y
S	<i>Frangula californica</i>	30	0.2	0.2	1.0				
H	<i>Conium maculatum</i>	40	0.4	0.2	3.0				
H	<i>Pseudognaphalium californicum</i>	40	0.1	0.1	0.2				
H	<i>Lysimachia arvensis</i>	30	0.1	0.2	0.2				
NV	Moss	30	1.0	0.2	10.0				

***Baccharis pilularis* – (*Frangula californica*) – *Rubus* spp. Association**

Common Name: Coyote Brush – (California Coffeeberry) – Berry bramble Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush – (California Coffeeberry) – Berry bramble Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Baccharis pilularis*, *Diplacus aurantiacus*, *Frangula californica*, and *Toxicodendron diversilobum*, and those that are often present include *Sambucus nigra*. The herbaceous layer typically includes *Clinopodium douglasii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.6	0 – 5	10.0	5 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	0.3	0 – 0.5
Shrub	65.8	40 – 100	3.0	1 – 5
Herb	6.2	0 – 25	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 390 m, Range 155 – 579 m

Aspect: NE (3), NW (2)

Slope: Mean 17 degrees, Range 2 – 30 degrees

Macro Topography: Upper 1/3 of slope (2), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 2.6%, Range 0 – 10%

Small Rock: Mean 10.2%, Range 0 – 20%

Fines Cover: Mean 51.0%, Range 20 – 64%

Litter Cover: Mean 34.3%, Range 20 – 50%

Soil Texture (field assessed): Clay (1), Medium loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has very low non-native plant cover (average 0.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Centaurea melitensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Grams et al. 1977, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=5; Alameda County (n=4): AW040, AW043, AW051, WRBL094

Contra Costa County (n=0):

Santa Clara Co. (n=1): CDLO0013

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	100	49.6	20.0	75.0	Y	Y		Y
S	<i>Frangula californica</i>	100	11.2	1.0	25.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	8.0	0.2	10.0	Y			Y
S	<i>Diplacus aurantiacus</i>	80	4.6	0.2	10.0	Y			Y
S	<i>Sambucus nigra</i>	60	0.3	0.2	1.0				Y
S	<i>Artemisia californica</i>	40	0.2	0.2	1.0				
H	<i>Clinopodium douglasii</i>	60	0.6	1.0	1.0				Y

***Baccharis pilularis* – *Artemisia californica* Association**

Common Name: Coyote Brush – California Sagebrush Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush – California Sagebrush Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Artemisia californica*, *Baccharis pilularis*, *Diplacus aurantiacus*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are often present include *Chlorogalum pomeridianum*, and herbs that are sometimes present include *Avena barbata*, *Bromus hordeaceus*, *Centaurea solstitialis*, *Clinopodium douglasii*, *Epilobium canum*, *Eriogonum nudum*, *Gastroidium phleoides*, *Hirschfeldia incana*, *Nassella pulchra*, *Navarretia squarrosa*, *Pseudognaphalium* spp., *Pteridium aquilinum*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.9	0 – 3	7.8	2 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	60.8	33 – 90	2.2	0.5 – 5
Herb	18.1	2 – 50	0.4	0 – 1

Local Environmental Description

Elevation: Mean 338 m, Range 118 – 485 m

Aspect: SE (4), SW (2), NW (1), Variable (1)

Slope: Mean 25 degrees, Range 15 – 43 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (3), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.3%, Range 0 – 1%

Small Rock: Mean 17.5%, Range 1 – 42%

Fines Cover: Mean 66.0%, Range 45 – 84%

Litter Cover: Mean 24.5%, Range 2 – 75%

Soil Texture (field assessed): Loam (2), Moderately coarse, sandy loam (2), Clay (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (2), Sandstone (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3), Fremont - Livermore Hills and Valleys (2), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 7.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Centaurea solstitialis*, *Gastidium phleoides*, and *Hirschfeldia incana*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz and Evens 2015, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2004, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003a, Kirkpatrick and Hutchinson 1977, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Stillwater Sciences and URS 2007, Verdone and Evens 2010

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

Surveys Used for Description

Total: N=8; Alameda County (n=6): ALCC078, AW009, AW042, EBAY0047, EBRTA115, WRBL089

Contra Costa County (n=2): WRBL098, WRBL102

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	50	1.0	1.0	3.0				Y
T	<i>Umbellularia californica</i>	38	0.7	0.2	3.0				
S	<i>Baccharis pilularis</i>	100	28.6	10.0	58.1	Y		Y	Y
S	<i>Artemisia californica</i>	100	12.8	0.5	20.0	Y			Y
S	<i>Diplacus aurantiacus</i>	88	9.0	3.0	15.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	88	4.5	1.0	12.0	Y			Y
S	<i>Heteromeles arbutifolia</i>	38	0.2	0.2	1.0				
S	<i>Rhamnus crocea</i>	25	1.5	2.0	10.0				
S	<i>Lupinus albifrons</i>	25	0.4	0.2	3.0				
S	<i>Rubus ursinus</i>	25	0.1	0.5	0.5				
S	<i>Frangula californica</i>	25	0.1	0.2	0.5				
H	<i>Chlorogalum pomeridianum</i>	50	3.1	0.2	13.8				Y
H	<i>Avena barbata</i>	38	1.3	0.2	10.0				
H	<i>Nassella pulchra</i>	38	0.9	0.2	4.0				
H	<i>Eriogonum nudum</i>	38	0.2	0.2	1.0				
H	<i>Pseudognaphalium californicum</i>	38	0.2	0.2	1.0				
H	<i>Centaurea solstitialis</i>	25	1.3	0.2	10.0				
H	<i>Bromus hordeaceus</i>	25	1.3	0.2	10.0				
H	<i>Clinopodium douglasii</i>	25	1.0	2.0	6.3				
H	<i>Epilobium canum</i>	25	0.8	3.0	3.0				
H	<i>Hirschfeldia incana</i>	25	0.5	1.0	3.0				
H	<i>Pseudognaphalium ramosissimum</i>	25	0.1	0.2	1.0				
H	<i>Pteridium aquilinum</i>	25	0.1	0.2	0.5				
H	<i>Navarretia squarrosa</i>	25	0.1	0.2	0.5				
H	<i>Scrophularia californica</i>	25	0.1	0.2	0.4				
H	<i>Gastroidium phleoides</i>	25	0.1	0.2	0.2				

***Baccharis pilularis* – *Toxicodendron diversilobum* Association**

Common Name: Coyote Brush – Poison Oak Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush – Poison Oak Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Baccharis pilularis* and *Toxicodendron diversilobum*, and those that are often present include *Diplacus aurantiacus*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Lysimachia arvensis*, *Pseudognaphalium californicum*, *Pteridium aquilinum*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	5.5	2 – 10
Hardwood	2.0	0 – 8	8.5	2 – 50
Regenerating or Shrubby Tree	0.5	0 – 3	2.8	0.5 – 5
Shrub	45.6	12 – 95	3.3	0.5 – 35
Herb	17.5	1 – 65	0.4	0 – 1

Local Environmental Description

Elevation: Mean 317 m, Range 99 – 591 m

Aspect: SE (5), NE (4), SW (4), NW (3), Variable (3)

Slope: Mean 19 degrees, Range 5 – 40 degrees

Macro Topography: Upper 1/3 of slope (8), Middle 1/3 of slope (4), Entire slope (1), Lower 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 1.4%, Range 0 – 7%

Small Rock: Mean 7.5%, Range 0 – 25%

Fines Cover: Mean 54.4%, Range 5 – 97%

Litter Cover: Mean 30.3%, Range 1 – 70%

Soil Texture (field assessed): Moderately fine clay loam (5), Medium silt loam (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Clay (1), Fine silty clay (1), Loam (1), Medium loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (5), Sandstone (4), Franciscan melange (3), Basalt (2), Sandstone and other sedimentary (2), Chert (1), Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (10), Fremont - Livermore Hills and Valleys (3), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (2)

Site Impacts

This association has moderate non-native plant cover (average 22.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Conium maculatum*.

Classification Comments

None.

References: Belsher 1999, Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2015, McBride and Stone 1976, O'Neil and Egan 2004, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5 **State Rarity Rank:** S5? **State Rare:** N

Surveys Used for Description

Total: N=20; Alameda County (n=14): ALCC201, ALCC508, ALCCREC005, ALCCREC212, AW010, AW018, EBAY0046, EBRTA113, EBRTA301, EBRTA313, EBRTA316, EBRTA317, GUMP-023, WRBL005

Contra Costa County (n=6): ALCC064, ALCC165, EBAY0022, EBRTA002, EBRTA211, JOMU007

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	60	0.8	0.2	7.0				Y
T	<i>Umbellularia californica</i>	40	0.7	0.2	5.0				
R	<i>Quercus agrifolia</i>	25	0.3	0.2	2.0				
S	<i>Baccharis pilularis</i>	100	31.0	5.0	65.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	9.3	2.0	30.0	Y			Y
S	<i>Diplacus aurantiacus</i>	65	3.8	2.0	25.0				Y
S	<i>Rubus ursinus</i>	40	1.1	0.2	6.0				
S	<i>Frangula californica</i>	35	0.5	0.2	3.0				
S	<i>Sambucus nigra</i>	30	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	45	1.7	0.1	25.0				
H	<i>Avena barbata</i>	45	1.1	0.2	7.0				
H	<i>Conium maculatum</i>	30	3.4	0.2	60.0				
H	<i>Scrophularia californica</i>	30	0.1	0.2	1.0				
H	<i>Pseudognaphalium californicum</i>	30	0.1	0.2	1.0				
H	<i>Bromus hordeaceus</i>	25	0.8	0.5	5.0				
H	<i>Bromus diandrus</i>	25	0.7	1.0	6.7				
H	<i>Lysimachia arvensis</i>	25	0.6	0.2	6.0				
H	<i>Pteridium aquilinum</i>	25	0.4	0.2	5.0				

***Baccharis pilularis* / (*Nassella pulchra* – *Elymus glaucus* – *Bromus carinatus*) Association**

Common Name: Coyote Brush – / (Purple Needlegrass – Blue Wild Rye – California Brome) Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush – / (Purple Needlegrass – Blue Wild Rye – California Brome) Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Baccharis pilularis* and *Toxicodendron diversilobum*. The herbaceous layer typically includes *Nassella pulchra*, and herbs that are sometimes present include *Anagallis arvensis*, *Avena barbata*, *Chlorogalum pomeridianum*, *Clinopodium douglasii*, *Conium maculatum*, *Pseudognaphalium ramosissimum*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.2	0 – 1	3.5	2 – 5
Regenerating or Shrubby Tree	0.0	0 – 0	1.5	1 – 2
Shrub	43.8	12 – 90	1.9	1 – 5
Herb	15.8	10 – 20	0.3	0 – 1

Local Environmental Description

Elevation: Mean 259 m, Range 7 – 440 m

Aspect: SE (2), SW (2), NW (1)

Slope: Mean 19 degrees, Range 2 – 35 degrees

Macro Topography: Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.1%, Range 0 – 2%

Fines Cover: Mean 50.5%, Range 17 – 84%

Litter Cover: Mean 58.8%, Range 15 – 80%

Soil Texture (field assessed): Clay (2), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Conglomerate (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Baccharis pilularis / (*Nassella pulchra* – *Elymus glaucus* – *Bromus carinatus*)
Association

Baccharis pilularis Shrubland Alliance

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1)

Site Impacts

This association has low non-native plant cover (average 16.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis* and *Conium maculatum*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=5; **Alameda County (n=3):** ALCC103, WRBL006, WRBL007

Contra Costa County (n=2): ALCCREC613, EBRTA402

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	100	36.2	8.0	88.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	80	2.4	2.0	5.0	Y			Y
S	<i>Diplacus aurantiacus</i>	40	9.6	10.0	38.0				
H	<i>Nassella pulchra</i>	80	5.6	5.0	10.0	Y			Y
H	<i>Clinopodium douglasii</i>	40	4.0	10.0	10.0				
H	<i>Avena barbata</i>	40	3.0	7.0	8.0				
H	<i>Chlorogalum pomeridianum</i>	40	1.0	2.0	3.0				
H	<i>Conium maculatum</i>	40	0.3	0.5	1.0				
H	<i>Scrophularia californica</i>	40	0.2	0.2	1.0				
H	<i>Anagallis arvensis</i>	40	0.2	0.5	0.5				
H	<i>Pseudognaphalium ramosissimum</i>	40	0.2	0.5	0.5				

Baccharis pilularis / (*Nassella pulchra* – *Elymus glaucus* – *Bromus carinatus*)
Association

Baccharis pilularis Shrubland Alliance

***Baccharis pilularis* / Annual Grass – Herb Association**

Common Name: Coyote Brush / Annual Grass-Herb Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The Coyote Brush / Annual Grass-Herb Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to continuous. Dominant and characteristic shrubs include *Baccharis pilularis*, and those that are often present include *Diplacus aurantiacus*. Commonly associated emergent trees at sparse cover include *Umbellularia californica*. Herbs that are often present include *Bromus diandrus*, *Carduus pycnocephalus*, and *Lolium perenne*, and herbs that are sometimes present include *Avena barbata*, *Bromus hordeaceus*, *Bromus rubens*, *Chlorogalum pomeridianum*, *Epilobium* sp., *Erodium botrys*, *Eschscholzia californica*, and *Melica californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.2	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	0.3	0 – 1	2.2	1 – 5
Shrub	19.7	4 – 60	1.5	1 – 2
Herb	42.8	15 – 88	0.5	0 – 1

Local Environmental Description

Elevation: Mean 324 m, Range 3 – 562 m

Aspect: NE (2), SW (2), SE (1)

Slope: Mean 9 degrees, Range 0 – 23 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1), Other (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.5%, Range 0 – 2%

Small Rock: Mean 2.8%, Range 0 – 7%

Fines Cover: Mean 57.6%, Range 3 – 95%

Litter Cover: Mean 25.8%, Range 3 – 40%

Soil Texture (field assessed): Medium loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1), Sand (1)

Geology (field or map data): Basalt (1), Franciscan melange (1), Sand dunes (1), Sandstone (1), Sandstone and other sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Westside
Alluvial Fans and Terraces (1)

Site Impacts

This association has moderate non-native plant cover (average 41.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, and *Lolium perenne*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz and Evens 2015, Buck-Diaz et al. 2021, Evens and San 2004, Evens and San 2005, HDR 2014b, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Kittel et al. 2012, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

Surveys Used for Description

Total: N=6; Alameda County (n=1): EBRTA307

Contra Costa County (n=5): EBAY0008, EBAY0026, EBRTA214, SPCCA-021,
SPCCA-043

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	33	0.2	0.2	1.0				
R	<i>Quercus agrifolia</i>	33	0.2	0.2	1.0				
S	<i>Baccharis pilularis</i>	100	18.2	3.0	55.0	Y	Y		Y
S	<i>Diplacus aurantiacus</i>	50	0.5	0.2	2.0				Y
S	<i>Toxicodendron diversilobum</i>	33	0.5	0.2	3.0				
S	<i>Heteromeles arbutifolia</i>	33	0.2	0.2	1.0				
H	<i>Lolium perenne</i>	67	4.1	0.2	20.0				Y
H	<i>Bromus diandrus</i>	50	3.7	5.0	12.0				Y
H	<i>Carduus pycnocephalus</i>	50	1.2	0.2	7.0				Y
H	<i>Bromus rubens</i>	33	10.7	1.0	63.0				
H	<i>Avena barbata</i>	33	2.5	5.0	10.0				
H	<i>Erodium botrys</i>	33	0.5	0.2	3.0				
H	<i>Eschscholzia californica</i>	33	0.5	1.0	2.0				
H	<i>Bromus hordeaceus</i>	33	0.3	1.0	1.0				
H	<i>Chlorogalum pomeridianum</i>	33	0.2	0.2	1.0				
H	<i>Epilobium</i> sp.	33	0.2	0.2	1.0				
H	<i>Melica californica</i>	33	0.2	0.2	1.0				

***Frangula californica* ssp. *californica* – *Baccharis pilularis* /
Scrophularia californica Association**

Common Name: California Coffeeberry – Coyote Brush / California Figwort Shrubland

Alliance: *Baccharis pilularis* Shrubland Alliance

Local Vegetation Description

The California Coffeeberry – Coyote Brush / California Figwort Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Baccharis pilularis*, *Frangula californica*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are often present include *Galium porrigens* and *Pseudognaphalium californicum*, and herbs that are sometimes present include *Clinopodium douglasii*, *Dryopteris arguta*, and *Sanicula crassicaulis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	9.0	2 – 15
Regenerating or Shrubby Tree	0.1	0 – 0.5	7.5	5 – 10
Shrub	57.6	38 – 88	3.5	2 – 5
Herb	6.8	2 – 15	0.6	0 – 2

Local Environmental Description

Elevation: Mean 381 m, Range 290 – 507 m

Aspect: NE (2), SW (2), S (1)

Slope: Mean 18 degrees, Range 5 – 40 degrees

Macro Topography: Upper 1/3 of slope (2), Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: Mean 2.1%, Range 0 – 10%

Fines Cover: Mean 48.2%, Range 10 – 77%

Litter Cover: Mean 30.8%, Range 10 – 64%

Soil Texture (field assessed): Clay (2), Medium loam (1), Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Franciscan melange (1), Metamorphic (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2), East Bay Hills - Mount Diablo (1)

Frangula californica ssp. *californica* – *Baccharis pilularis* / *Scrophularia californica*
Association

Baccharis pilularis Shrubland Alliance

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 1.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Conium maculatum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Grams et al. 1977, Keeler-Wolf et al. 2003a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4 **State Rarity Rank:** S4

State Rare: N

Surveys Used for Description

Total: N=5; Alameda County (n=3): ALCC017, AW008, AW052

Contra Costa County (n=0):

Santa Clara Co. (n=2): VAWA051, VAWA157

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	60	0.2	0.2	0.5				Y
S	<i>Frangula californica</i>	100	29.7	18.0	37.5	Y		Y	Y
S	<i>Baccharis pilularis</i>	100	19.5	3.0	37.5	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	12.0	0.5	37.5	Y			Y
S	<i>Diplacus aurantiacus</i>	40	3.4	2.0	15.0				
S	<i>Sambucus nigra</i>	40	2.0	0.2	10.0				
S	<i>Heteromeles arbutifolia</i>	40	0.1	0.2	0.2				
H	<i>Galium porrigens</i>	60	0.2	0.2	0.5				Y
H	<i>Pseudognaphalium californicum</i>	60	0.1	0.2	0.2				Y
H	<i>Clinopodium douglasii</i>	40	1.2	1.0	5.0				
H	<i>Sanicula crassicaulis</i>	40	1.0	0.2	5.0				
H	<i>Dryopteris arguta</i>	40	0.4	1.0	1.0				

Frangula californica ssp. *californica* – *Baccharis pilularis* / *Scrophularia californica*
Association

Baccharis pilularis Shrubland Alliance

***Baccharis salicifolia* Shrubland Alliance**



Common Name: Mulefat thickets

NVC Alliance Code: A0933. *Baccharis salicifolia* Wet Shrubland Alliance

Statewide Description

Baccharis salicifolia is dominant or co-dominant in the shrub canopy with *Artemisia californica*, *Baccharis emoryi*, *Baccharis pilularis*, *Malosma laurina*, *Nicotiana glauca*, *Plucea sericea*, *Rubus* sp., *Salix exigua*, *Salix lasiolepis*, *Sambucus nigra*, and *Tamarix* app. Emergent trees may be present at low cover, including *Pinus sabiniana*, *Platanus racemosa*, *Populus fremontii*, *Quercus* spp. or *Salix* sp.

The alliance occurs in both seasonally or intermittently flooded habitats, and stands are inherently variable depending on the amount of inundation and scouring. Stands usually form open shrublands or thickets in riparian corridors and along lake margins. They are especially common in southern California.

Local Vegetation Description

The Mulefat thickets Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Baccharis salicifolia*. Commonly associated emergent trees at sparse cover include *Platanus racemosa*. Herbs that are sometimes present include *Bromus diandrus*, *Carduus pycnocephalus*, *Heterotheca oregona*, *Hirschfeldia incana*, *Hordeum murinum*, *Juncus xiphioides*, *Lolium perenne*, *Melilotus indicus*, *Mimulus guttatus*, *Polypogon monspeliensis*, *Rumex salicifolius* var. *denticulatus*, *Verbascum thapsus*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.6	0 – 6	10.5	5 – 20
Regenerating or Shrubby Tree	0.3	0 – 2	3.5	2 – 5
Shrub	18.2	3 – 49	1.3	0.5 – 2
Herb	9.4	0 – 27	0.5	0 – 1

Local Membership Rule

Baccharis salicifolia > 50% relative cover in the shrub canopy, or > 30% with *Artemisia californica*, *Baccharis pilularis*, *Rubus* spp., *Salix exigua*, *Salix lasiolepis*, and *Sambucus nigra*.

Local Environmental Description

Elevation: Mean 183 m, Range 81 – 339 m

Aspect: Flat (3), NW (2), SE (1), Variable (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (6), Lower 1/3 of slope (1)

Large Rock: Mean 4.9%, Range 0 – 15%

Small Rock: Mean 49.6%, Range 21 – 84%

Fines Cover: Mean 20.6%, Range 5 – 35%

Litter Cover: Mean 17.9%, Range 0 – 48%

Soil Texture (field assessed): Medium sand (2), Sand (2), Coarse sand (1)

Geology (field or map data): Gravelly alluvium (2), Mixed alluvium (2), Franciscan melange (1), Sandy alluvium (most alluvial fans and washes) (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5), Diablo Range (1), Eastern Hills (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has moderate non-native plant cover (average 28.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Amaranthus albus*, *Brachypodium distachyon*, *Brassica nigra*, *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Dysphania botrys*, *Foeniculum vulgare*, *Hirschfeldia incana*, *Hordeum murinum*, *Lolium perenne*, *Polypogon monspeliensis*, *Polypogon viridis*, *Trifolium dubium*, *Verbascum thapsus*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Baccharis salicifolia

Classification Comments

None.

References: AECOM 2013, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1998b, Kittel et al. 2012, Potter 2005, Reyes et al. 2019, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=7; Alameda County (n=7): ALCC274, ALCC278, LLNL002, LLNL094, SUNOL037, SUNOL044, SUNOL045

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Platanus racemosa</i>	57	0.9	0.2	6.0				Y
S	<i>Baccharis salicifolia</i>	100	14.2	0.2	30.0	Y	Y		Y
S	<i>Salix lasiolepis</i>	29	2.4	1.0	16.0				
S	<i>Brickellia californica</i>	29	0.3	0.2	2.0				
S	<i>Artemisia californica</i>	29	0.3	1.0	1.0				
S	<i>Salix exigua</i>	29	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	43	0.7	0.2	3.0				
H	<i>Lolium perenne</i>	43	0.2	0.2	1.0				
H	<i>Rumex salicifolius</i> var. <i>denticulatus</i>	43	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	43	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	43	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	29	1.5	0.2	10.0				
H	<i>Carduus pycnocephalus</i>	29	0.5	0.2	3.0				
H	<i>Hordeum murinum</i>	29	0.3	0.2	2.0				
H	<i>Juncus xiphioides</i>	29	0.3	0.2	2.0				
H	<i>Heterotheca oregona</i>	29	0.2	0.2	1.0				
H	<i>Verbascum thapsus</i>	29	0.2	0.2	1.0				
H	<i>Melilotus indicus</i>	29	0.2	0.2	1.0				
H	<i>Dysphania botrys</i>	29	0.1	0.2	0.2				
H	<i>Brassica nigra</i>	29	0.1	0.2	0.2				
H	<i>Amaranthus albus</i>	29	0.1	0.2	0.2				
H	<i>Mimulus guttatus</i>	29	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	29	0.1	0.2	0.2				
H	<i>Polypogon viridis</i>	29	0.1	0.2	0.2				
H	<i>Trifolium dubium</i>	29	0.1	0.2	0.2				
H	<i>Brachypodium distachyon</i>	29	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	29	0.1	0.2	0.2				

***Baccharis salicifolia* Association**

Common Name: Mulefat Shrubland

Alliance: *Baccharis salicifolia* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: AECOM 2013, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1998b, Kittel et al. 2012, Potter 2005, Reyes et al. 2019, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

***Ceanothus cuneatus* Shrubland Alliance**



Common Name: Wedge leaf ceanothus chaparral, Buck brush chaparral

NVC Alliance Code: A3869. *Ceanothus cuneatus* Chaparral Alliance

Statewide Description

Ceanothus cuneatus is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos glauca*, *Arctostaphylos manzanita*, *Arctostaphylos patula*, *Arctostaphylos tomentosa*, *Ceanothus integerrimus*, *Cercocarpus montanus*, *Eriogonum fasciculatum*, *Garrya fremontii*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus john-tuckeri*, *Rhus ovata*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Calocedrus decurrens*, *Juniperus californica*, *Pinus jeffreyi*, *Pinus ponderosa*, *Pinus sabiniana*, *Quercus douglasii*, or *Quercus wislizeni*.

Ceanothus cuneatus occurs as an understory shrub in various forest and woodland types in northern California, and it is present as a secondary species in many chaparral alliances in California. Self-perpetuating stands are typically restricted to rocky, harsh exposures or substrates. Many stands establish after fire, and they form an important

part of the chaparral in northern and central California. *Ceanothus cuneatus* stands are often dense, with interlocking crowns that may contain abundant deadwood. *Ceanothus cuneatus* may also form open stands with much bare ground.

Mixed stands with co-dominant *Adenostoma fasciculatum* are common in the central coast and inner North Coast Ranges, and occur more sporadically in the Sierra Nevada and in southern California. These mixed stands occur on a variety of exposures along steep lower to upper slopes. Substrates are usually sedimentary and metamorphic. Because of ecological overlap between mixed and pure *Ceanothus cuneatus* stands, the former practice of segregating them into separate series or alliances has been discontinued.

Local Vegetation Description

The Wedge leaf ceanothus chaparral, Buck brush chaparral Alliance forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Adenostoma fasciculatum* and *Ceanothus cuneatus*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana* and *Quercus agrifolia*. Herbs that are sometimes present include *Acmispon* sp., *Bromus hordeaceus*, *Bromus rubens*, *Centaurea melitensis*, *Chlorogalum pomeridianum*, *Clarkia modesta*, *Erodium brachycarpum*, *Galium porrigens*, *Lomatium dasycarpum*, *Marah fabaceus*, *Micropus californicus*, *Pentagramma triangularis*, *Sanicula crassicaulis*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	7.5	5 – 10
Hardwood	0.0	0 – 0.2	3.5	2 – 5
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	63.6	37 – 100	1.7	0 – 5
Herb	2.4	0 – 10	0.3	0 – 0.5

Local Membership Rule

Ceanothus cuneatus > 50% relative cover in the shrub canopy, or > 30% relative cover with *Adenostoma fasciculatum*.

Local Environmental Description

Elevation: Mean 736 m, Range 564 – 903 m

Aspect: SW (2), NE (1), Variable (1)

Slope: Mean 17 degrees, Range 9 – 35 degrees

Macro Topography: Entire slope (1), Lower 1/3 of slope to Ridgetop (1), Ridge top (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.5%, Range 0 – 1%

Small Rock: Mean 25.5%, Range 1 – 50%

Fines Cover: Mean 30.5%, Range 3 – 52%

Litter Cover: Mean 18.6%, Range 4 – 35%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Fine sandy clay (1)

Geology (field or map data): Sandstone and other sedimentary (2), Franciscan melange (1), Sandstone (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Western Diablo Range (2), Diablo Range (1)

Site Impacts

This alliance has low non-native plant cover (average 2.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Centaurea melitensis*, *Erodium brachycarpum*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Ceanothus cuneatus – *Adenostoma fasciculatum*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Borchert et al. 2004, Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Gordon and White 1994, Keeler-Wolf et al. 2003b, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=2): ALCC145, SPCCA-049

Santa Clara Co. (n=3): SCLAV014, SPCCB-150, VASE0024

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	20	0.2	1.0	1.0				
T	<i>Quercus agrifolia</i>	20	0.0	0.2	0.2				
R	<i>Quercus douglasii</i>	20	0.0	0.2	0.2				
R	<i>Quercus agrifolia</i> *	20	0.0	0.2	0.2				
S	<i>Adenostoma fasciculatum</i>	100	39.3	19.0	78.5	Y	Y		Y
S	<i>Ceanothus cuneatus</i>	100	31.6	17.0	60.2	Y		Y	Y
S	<i>Heteromeles arbutifolia</i>	40	0.2	0.1	1.0				
S	<i>Eriodictyon californicum</i>	20	0.7	3.3	3.3				
S	Standing snag	20	0.6	3.0	3.0				
S	<i>Arctostaphylos crustacea</i>	20	0.2	1.0	1.0				
S	<i>Salvia mellifera</i>	20	0.2	1.0	1.0				
S	<i>Arctostaphylos manzanita</i>	20	0.2	1.0	1.0				
S	<i>Helianthemum scoparium</i>	20	0.0	0.2	0.2				
S	<i>Baccharis pilularis</i>	20	0.0	0.2	0.2				
S	<i>Artemisia californica</i>	20	0.0	0.2	0.2				
S	<i>Lepechinia calycina</i>	20	0.0	0.2	0.2				
S	<i>Lotus scoparius</i>	20	0.0	0.1	0.1				
H	<i>Bromus rubens</i>	40	0.4	0.2	2.0				
H	<i>Chlorogalum pomeridianum</i>	40	0.2	0.2	1.0				
H	<i>Galium porrigens</i>	40	0.2	0.1	1.0				
H	<i>Vulpia myuros</i>	20	0.4	2.0	2.0				
H	<i>Marah fabaceus</i>	20	0.3	1.4	1.4				
H	<i>Lomatium dasycarpum</i>	20	0.2	1.0	1.0				
H	<i>Bromus hordeaceus</i>	20	0.2	1.0	1.0				
H	<i>Erodium brachycarpum</i>	20	0.2	1.0	1.0				
H	<i>Sanicula crassicaulis</i>	20	0.0	0.2	0.2				
H	<i>Clarkia modesta</i>	20	0.0	0.2	0.2				
H	<i>Pentagramma triangularis</i>	20	0.0	0.2	0.2				
H	<i>Micropus californicus</i>	20	0.0	0.2	0.2				
NV	Lichen	40	0.4	1.0	1.0				
NV	Moss	20	0.0	0.2	0.2				

***Ceanothus cuneatus* – *Adenostoma fasciculatum* Association**

Common Name: Wedgeleaf Ceanothus – Chamise Shrubland

Alliance: *Ceanothus cuneatus* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Borchert et al. 2004, Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Gordon and White 1994, Keeler-Wolf et al. 2003b, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

***Ceanothus (oliganthus, leucodermis, tomentosus)* Shrubland Alliance**



Common Name: Hairy leaf – woolly leaf ceanothus chaparral

NVC Alliance Code: A3861. *Ceanothus oliganthus* - *Ceanothus leucodermis* - *Ceanothus tomentosus* Pre-montane Chaparral Alliance

Statewide Description

Ceanothus leucodermis, *Ceanothus oliganthus*, or *Ceanothus tomentosus* is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Adenostoma sparsifolium*, *Arctostaphylos glandulosa*, *Ceanothus megacarpus*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Rhus ovata*, *Salvia mellifera*, *Toxicodendron diversilobum* or *Xylococcus bicolor*. Emergent trees may be present at low cover, including *Calocedrus decurrens*, *Juglans californica*, *Pseudotsuga macrocarpa*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus wislizeni* or *Umbellularia californica*.

Stands of *C. oliganthus* or *C. tomentosus* tend to occur as small, localized patches after recent fire disturbance, and they senesce after about 30-40 years. Stands occur on northerly slopes and adjacent to riparian areas in southern California, and they occur on a wide range of slopes and exposures in central California.

This alliance has been expanded to include additional *Ceanothus* species of the subgenus *Ceanothus* since the 2009 publication of *A Manual of California Vegetation*, second edition.

Local Vegetation Description

The Hairy leaf – woolly leaf ceanothus chaparral Alliance forms an intermittent shrub layer in the single sample available. The emergent tree layer is absent, and the herbaceous layer is open. Dominant and characteristic shrubs include *Ceanothus leucodermis*, *Arctostaphylos glauca*, and *Eriodictyon californicum*. The herbaceous layer typically includes *Bromus rubens*, *Avena barbata*, *Bromus hordeaceus*, and *Melica imperfecta*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	35.0	35 – 35	1.5	1 – 2
Herb	20.0	20 – 20	0.8	0.5 – 1

Local Membership Rule

Ceanothus leucodermis or *Ceanothus oliganthus* > 50% relative cover in the shrub canopy that are often found in localized patches following fires.

Local Environmental Description

Elevation: 737 m

Aspect: SE (1)

Slope: 26 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 2%

Small Rock: 4%

Fines Cover: 7%

Litter Cover: 85%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (field or map data): Serpentine (1)

Alameda County Subsections: Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has moderate non-native plant cover (average 30.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*.

Associations in Alameda & Contra Costa Counties

Ceanothus leucodermis

Classification Comments

Ceanothus leucodermis has previously been treated separately as its own alliance. Here we follow the NVC concept which treats this species in a merged alliance along with that of other lower elevation *Ceanothus* species of central and southern California from the *Ceanothus (oliganthus, leucodermis, tomentosus)* alliance.

References: Borchert et al. 2004, Evens and San 2005, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Klein et al. 2015, Reyes et al. 2019, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC831

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Ceanothus leucodermis</i>	100	30.0	30.0	30.0	Y	Y		Y
S	<i>Eriodictyon californicum</i>	100	5.0	5.0	5.0	Y			Y
S	<i>Arctostaphylos glauca</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Bromus rubens</i>	100	17.0	17.0	17.0	Y	Y		Y
H	<i>Melica imperfecta</i>	100	6.0	6.0	6.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Avena barbata</i>	100	0.2	0.2	0.2	Y			Y

***Ceanothus leucodermis* Association**

Common Name: Chaparral Whitethorn Shrubland

Alliance: *Ceanothus (oliganthus, leucodermis, tomentosus)* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Evens and San 2005, Evens et al. 2006, Gordon and White 1994, Klein and Evens 2005, Sproul et al. 2011

Global Rarity Rank: G4? **State Rarity Rank:** S4 **State Rare:** N

***Cephalanthus occidentalis* – *Rosa californica* Shrubland Alliance**



Common Name: Button willow – California rose thickets

NVC Alliance Code: A3875. *Cephalanthus occidentalis* - *Rosa californica* Wet Shrubland Alliance

Statewide Description

Rosa californica is dominant or co-dominant in the shrub canopy with *Artemisia californica*, *Baccharis pilularis*, *Rubus armeniacus*, *Salix lasiolepis*, *Salvia mellifera*, *Sambucus nigra*, and *Symphoricarpos mollis*. Emergent trees may be present at low cover, including *Salix laevigata*.

Rosa californica forms extensive thickets bordering creeks, rivers, and levees in southern California and the Central Valley, where *R. californica* is typically the dominant native shrub adjacent to coyote bush scrub, tules, and willow scrub types.

Local Vegetation Description

The Button willow – California rose thickets Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Rosa californica*. Commonly associated emergent trees at sparse cover include *Aesculus californica* and *Salix gooddingii*. Herbs that are sometimes present include *Bromus diandrus*, *Conium maculatum*, *Cynodon dactylon*, *Frankenia salina*, *Heliotropium curassavicum*, *Lepidium latifolium*, *Melilotus indicus*, *Mentha pulegium*, *Poa* sp., *Pogogyne serpylloides*, *Raphanus sativus*, *Rumex crispus*, *Schoenoplectus californicus*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 0.2	12.5	5 – 20
Regenerating or Shrubby Tree	0.6	0 – 3	3.5	2 – 5
Shrub	60.8	25 – 86	2.0	1 – 5
Herb	16.3	1 – 52	0.3	0 – 0.5

Local Membership Rule

Cephalanthus occidentalis and/or *Rosa californica* > 50% relative cover in the shrub canopy, or > 30% relative cover with *Artemisia californica*, *Baccharis pilularis*, *Rubus armeniacus*, *Salix lasiolepis*, *Salvia mellifera*, *Sambucus nigra*, and/or *Symphoricarpos mollis*.

Local Environmental Description

Elevation: Mean 190 m, Range 0 – 536 m

Aspect: NE (2), NW (2), Flat (1)

Slope: Mean 12 degrees, Range 0 – 40 degrees

Macro Topography: Lower 1/3 of slope (2), Bottom (1)

Large Rock: 0%

Small Rock: Mean 0.8%, Range 0 – 3%

Fines Cover: Mean 23.0%, Range 13 – 38%

Litter Cover: Mean 67.5%, Range 55 – 85%

Soil Texture (field assessed): Medium silt loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (1), Clayey alluvium (1), Mixed alluvium (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Delta (2), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 4.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Cirsium vulgare*, *Conium maculatum*, *Cynodon dactylon*, *Gastroidium phleoides*, *Helminthotheca echioides*, *Lepidium latifolium*, *Mentha pulegium*, *Plantago major*, *Polypogon monspeliensis*, *Raphanus sativus*, *Rumex crispus*, *Sonchus oleraceus*, and *Thinopyrum ponticum*.

Associations in Alameda & Contra Costa Counties

*Cephalanthus occidentalis**

Rosa californica

Classification Comments

This alliance has been newly merged to align with the NVC alliance. While no surveys of *Cephalanthus occidentalis* stands were available, the association is expected to occur in the Delta area. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Kittel et al. 2012, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

Surveys Used for Description

Total: N=5; Alameda County (n=1): ALCC234

Contra Costa County (n=1): ALCC223

Santa Clara Co. (n=1): SCRUZ517

Solano Co. (n=2): SUMA12087, SUMA6195

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix gooddingii</i>	20	0.0	0.2	0.2				
T	<i>Aesculus californica</i>	20	0.0	0.1	0.1				
R	<i>Quercus lobata</i>	20	0.4	2.0	2.0				
R	<i>Quercus douglasii</i>	20	0.2	1.0	1.0				
R	<i>Aesculus californica</i> *	20	0.0	0.1	0.1				
S	<i>Rosa californica</i>	100	59.0	25.0	79.0	Y	Y		Y
S	<i>Baccharis salicifolia</i>	20	1.8	9.0	9.0				
S	<i>Toxicodendron diversilobum</i>	20	0.2	1.0	1.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	20	0.2	1.0	1.0				
H	<i>Conium maculatum</i>	40	0.8	2.0	2.0				
H	<i>Bromus diandrus</i>	40	0.2	0.2	1.0				
H	<i>Rumex crispus</i>	40	0.1	0.2	0.2				
H	<i>Lepidium latifolium</i>	40	0.1	0.2	0.2				
H	<i>Melilotus indicus</i>	40	0.1	0.2	0.2				
H	<i>Poa</i> sp.	20	7.4	37.0	37.0				
H	<i>Schoenoplectus californicus</i>	20	3.0	15.0	15.0				
H	<i>Frankenia salina</i>	20	2.4	12.0	12.0				
H	<i>Raphanus sativus</i>	20	0.6	3.0	3.0				
H	<i>Cynodon dactylon</i>	20	0.4	2.0	2.0				
H	<i>Pogogyne serpylloides</i>	20	0.2	1.0	1.0				
H	<i>Scrophularia californica</i>	20	0.2	1.0	1.0				
H	<i>Mentha pulegium</i>	20	0.2	1.0	1.0				
H	<i>Heliotropium curassavicum</i>	20	0.2	1.0	1.0				
H	<i>Typha</i> sp.	20	0.0	0.2	0.2				
H	<i>Helminthotheca echioides</i>	20	0.0	0.2	0.2				
H	<i>Apocynum cannabinum</i>	20	0.0	0.2	0.2				
H	<i>Phyla nodiflora</i>	20	0.0	0.2	0.2				
H	<i>Plantago major</i>	20	0.0	0.2	0.2				
H	<i>Euthamia occidentalis</i>	20	0.0	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	20	0.0	0.2	0.2				
H	<i>Artemisia douglasiana</i>	20	0.0	0.2	0.2				
H	<i>Juncus</i> sp.	20	0.0	0.2	0.2				
H	<i>Thinopyrum ponticum</i>	20	0.0	0.2	0.2				
H	<i>Calystegia sepium</i>	20	0.0	0.2	0.2				
H	<i>Sonchus oleraceus</i>	20	0.0	0.2	0.2				
H	<i>Cirsium vulgare</i>	20	0.0	0.1	0.1				
H	<i>Bromus hordeaceus</i>	20	0.0	0.1	0.1				
H	<i>Gastrium phleoides</i>	20	0.0	0.1	0.1				

***Rosa californica* Association**

Common Name: California Wild Rose Shrubland

Alliance: *Cephalanthus occidentalis* – *Rosa californica* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2012, Evens and San 2005, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Kittel et al. 2012, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Cercocarpus montanus* Shrubland Alliance**



Common Name: Birch leaf mountain mahogany chaparral

NVC Alliance Code: A0587. *Cercocarpus montanus* var. *glaber* Mesic Chaparral Alliance

Statewide Description

Cercocarpus montanus is dominant or co-dominant in the shrub or small tree canopy with *Adenostoma fasciculatum*, *Adenostoma sparsifolium*, *Arctostaphylos glandulosa*, *Arctostaphylos glauca*, *Artemisia californica*, *Ceanothus crassifolius*, *Ceanothus cuneatus*, *Ceanothus megacarpus*, *Ceanothus spinosus*, *Eriogonum fasciculatum*, *Eriogonum wrightii*, *Fremontodendron californicum*, *Garrya flavescens*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Malosma laurina*, *Prunus ilicifolia*, *Quercus berberidifolia*, *Quercus john-tuckeri*, *Rhamnus ilicifolia*, *Salvia apiana*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Juglans californica*, *Juniperus californica*, *Pinus monophylla*, *Pinus sabiniana*, *Platanus racemosa*, *Quercus agrifolia*, *Quercus chrysolepis*, *Quercus douglasii*, or *Umbellularia californica*.

Most *Cercocarpus montanus* stands are open and they frequently occur on steep, north-facing slopes, where the plant dominates on rocky ridges and steep slopes with

thin soil (Uchytel 1991b). They typically occupy rockier sites than do denser *Ceanothus*- and *Quercus*-dominated chaparral types. In many recent taxonomic treatments, *Cercocarpus montanus* is considered to be a widespread polymorphic species throughout the western United States, with several varieties occurring in California. Since the varieties have similar ecology, all are included in this alliance. The most recent California reference (UCB 2004-2013) uses the names *Cercocarpus betuloides* for *C. montanus* and *Cercocarpus minutiflorus* for *C. montanus* var. *minutiflorus*.

Local Vegetation Description

The Birch leaf mountain mahogany chaparral Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Cercocarpus betuloides* (= *C. montanus*) and *Toxicodendron diversilobum*, and those that are often present include *Ericameria linearifolia*. Regenerating or shrubby trees that are dominant and characteristic include *Pinus sabiniana* and those that are often present include *Quercus wislizeni*. Commonly associated emergent trees at sparse cover include *Juniperus californica*. Herbs often present include *Avena fatua*, *Bromus hordeaceus*, *Madia gracilis*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 1	3.5	2 – 5
Hardwood	0	0 – 0	no data	no data
Regenerating or Shrubby Tree	7.8	0 – 23	1.9	0 – 5
Shrub	16.7	12 – 25	2.2	1 – 5
Herb	8.3	5 – 10	0.4	0 – 1

Local Membership Rule

Cercocarpus montanus > 50% relative cover in the shrub canopy, sometimes with *Adenostoma fasciculatum* or *Prunus ilicifolia*.

Local Environmental Description

Elevation: Mean 708 m, Range 400 – 994 m

Aspect: NE (1), NW (1), SW (1)

Slope: Mean 24 degrees, Range 17 – 32 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.7%, Range 0 – 2%

Small Rock: Mean 13.7%, Range 3 – 34%

Fines Cover: Mean 56.7%, Range 35 – 95%

Litter Cover: Mean 27.3%, Range 1 – 56%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (2), Franciscan melange (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Diablo Range (1)

Site Impacts

This alliance has low non-native plant cover (average 15.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Cardamine hirsuta*, *Galium divaricatum*, *Torilis arvensis*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Cercocarpus montanus var. *glaber*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003b, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2007, Reyes et al. 2019, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=2): ALCC149, SPCCB-032

Stanislaus Co. (n=1): SPCCA-001

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	33	0.3	1.0	1.0				
R	<i>Quercus wislizeni</i>	67	1.7	0.1	5.0				Y
R	<i>Pinus sabiniana</i>	67	1.1	0.1	3.2				Y
R	<i>Umbellularia californica</i>	33	5.0	15.0	15.0				
R	<i>Juniperus californica</i> *	33	0.1	0.2	0.2				
R	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
R	<i>Quercus chrysolepis</i>	33	0.0	0.1	0.1				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Cercocarpus betuloides</i>	100	13.7	11.0	18.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	1.7	1.0	3.0	Y			Y
S	<i>Ericameria linearifolia</i>	67	2.0	1.0	5.0				Y
S	<i>Eriodictyon californicum</i>	33	0.3	1.0	1.0				
S	<i>Ptelea crenulata</i>	33	0.1	0.2	0.2				
S	<i>Rhamnus ilicifolia</i>	33	0.1	0.2	0.2				
S	<i>Ceanothus cuneatus</i>	33	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	67	1.4	0.2	4.0				Y
H	<i>Avena fatua</i>	67	0.7	1.0	1.0				Y
H	<i>Bromus hordeaceus</i>	67	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	33	1.3	4.0	4.0				
H	<i>Bromus rubens</i>	33	1.3	4.0	4.0				
H	<i>Holocarpha virgata</i>	33	1.0	3.0	3.0				
H	<i>Trifolium</i> sp.	33	0.7	2.0	2.0				
H	<i>Salvia columbariae</i>	33	0.7	2.0	2.0				
H	<i>Avena barbata</i>	33	0.7	2.0	2.0				
H	<i>Triteleia laxa</i>	33	0.3	1.0	1.0				
H	<i>Poa secunda</i>	33	0.3	1.0	1.0				
H	<i>Calochortus albus</i>	33	0.1	0.2	0.2				
H	<i>Cirsium cymosum</i>	33	0.1	0.2	0.2				
H	<i>Allium</i> sp.	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	33	0.1	0.2	0.2				
H	<i>Cardamine hirsuta</i>	33	0.1	0.2	0.2				
H	<i>Clarkia concinna</i>	33	0.1	0.2	0.2				
H	<i>Clarkia purpurea</i>	33	0.1	0.2	0.2				
H	<i>Clarkia unguiculata</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Galium divaricatum</i>	33	0.1	0.2	0.2				
H	<i>Melica californica</i>	33	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	33	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Wyethia helenioides</i>	33	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	33	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	33	0.0	0.1	0.1				
NV	Moss	33	0.1	0.2	0.2				
NV	Lichen	33	0.1	0.2	0.2				

***Cercocarpus montanus* var. *glaber* Association**

Common Name: Birch Leaf Mountain Mahogany Shrubland

Alliance: *Cercocarpus montanus* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: AECOM 2013, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 2003b, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2007, Reyes et al. 2019, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

State Rare: N

***Cornus sericea* Shrubland Alliance**



Common Name: Red osier thickets

NVC Alliance Code: A4419. *Spiraea douglasii* - *Malus fusca* - *Salix sitchensis*
Lowland Wet Shrubland Alliance

Statewide Description

Cornus sericea is dominant or co-dominant in the shrub canopy with *Cephalanthus occidentalis*, *Rubus armeniacus*, *Rubus parviflorus*, *Salix exigua* and *Salix lasiolepis*. Emergent trees may be present at low cover, including *Alnus rhombifolia* or *Quercus lobata*.

Hickson and Keeler-Wolf (2007) and Buck-Diaz et al. (2012) recognized two associations in the Central Valley; *S. lasiolepis* occurred as the more common association, and the other appeared to be rarer or was undersampled. Other stands with *Cornus sericea* exist closer to the coast, but more sampling and analysis is needed to determine their relationships. Other stands in the foothills and montane Sierra Nevada to eastern California with *Cornus sericea* are now placed in a separate mixed riparian alliance with *Rosa woodsii* and other shrubs.

Local Vegetation Description

The Red osier thickets Alliance forms an open to continuous shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to continuous.

Dominant and characteristic shrubs include *Cornus sericea* and *Salix lasiolepis*, and those that are often present include *Cephalanthus occidentalis*. The herbaceous layer typically includes *Phragmites australis*, and herbs that are often present include *Schoenoplectus acutus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	61.4	10 – 82	3.5	1 – 10
Herb	24.5	0 – 70	2.0	0 – 5

Local Membership Rule

Cornus sericea or *Cornus glabrata* > 50% relative cover in the shrub layer, or > 30% relative cover with *Salix* spp.

Local Environmental Description

Elevation: Mean 1 m, Range 0 – 2 m

Aspect: Flat (9)

Slope: 0 degrees

Macro Topography: Bottom (9)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 30.7%, Range 8 – 75%

Litter Cover: Mean 57.4%, Range 23 – 90%

Soil Texture (field assessed): no data

Geology (field or map data): Alluvium (5)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1)

Other Subsections: Delta (8)

Site Impacts

This alliance has low non-native plant cover (average 6.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Arundo donax*, *Eichhornia crassipes*, *Iris pseudacorus*, *Ludwigia peploides*, and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Cornus sericea – *Salix (lasiolepis, exigua)*

Classification Comments

Cornus glabrata has been added as another species that can dominate this alliance since it is found in similar habitats. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S3?

Surveys Used for Description

Total: N=9; Alameda County (n=0):

Contra Costa County (n=1): SSJD0345

San Joaquin Co. (n=8): SSJD0231, SSJD0241, SSJD0268, SSJD0270, SSJD0341, SSJD0342, SSJD0343, SSJD0344

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Cornus sericea</i>	100	44.2	10.0	68.0	Y	Y		Y
S	<i>Salix lasiolepis</i>	89	18.0	0.2	65.0	Y			Y
S	<i>Cephalanthus occidentalis</i>	67	1.7	0.2	7.0				Y
S	<i>Rubus armeniacus</i>	22	0.0	0.2	0.2				
H	<i>Phragmites australis</i>	100	9.6	1.0	20.0	Y	Y		Y
H	<i>Schoenoplectus acutus</i>	67	4.0	0.2	20.0				Y
H	<i>Typha</i> sp.	44	2.0	1.0	8.0				
H	<i>Hibiscus lasiocarpus</i>	44	0.2	0.2	1.0				
H	<i>Typha latifolia</i>	33	0.4	1.0	2.0				
H	<i>Bidens frondosa</i>	33	0.1	0.2	0.2				
H	<i>Cyperus eragrostis</i>	33	0.1	0.2	0.2				
H	<i>Eichhornia crassipes</i>	22	4.9	4.0	40.0				
H	<i>Arundo donax</i>	22	0.1	0.2	1.0				
H	<i>Schoenoplectus californicus</i>	22	0.1	0.2	1.0				
H	<i>Bidens laevis</i>	22	0.0	0.2	0.2				
H	<i>Iris pseudacorus</i>	22	0.0	0.2	0.2				
H	<i>Sagittaria</i> sp.	22	0.0	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Ludwigia peploides</i>	22	0.0	0.2	0.2				
H	<i>Persicaria punctata</i>	22	0.0	0.2	0.2				
H	<i>Verbena</i> sp.	22	0.0	0.2	0.2				
H	<i>Hydrocotyle verticillata</i>	22	0.0	0.2	0.2				

***Cornus sericea* – *Salix (lasiolepis, exigua)* Association**

Common Name: Red Osier Dogwood – Willow Shrubland

Alliance: *Cornus sericea* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Corylus cornuta* var. *californica* Shrubland Alliance**



Common Name: Hazelnut scrub

NVC Alliance Code: A4089. *Corylus cornuta* var. *californica* Scrub Alliance

Statewide Description

Corylus cornuta is dominant in the shrub canopy with *Holodiscus discolor*, *Marah fabaceus*, *Ribes sanguineum*, *R. parviflorus*, *R. ursinus*, *Toxicodendron diversilobum* and *Vaccinium ovatum*.

Corylus cornuta is a common understory shrub in many forest types because of its extensive range in the United States. The western form, var. *californica*, grows along the Pacific coast; the eastern form, var. *cornuta*, occurs in and east of the Rocky Mountains. NatureServe (2007a) suggests very different environmental conditions for the eastern form, so we include only the western subspecies in this alliance. The western form sprouts only from the root crown and not from lateral root suckers, as in var. *cornuta* (Zimmerman 1991b). Plants grow in moist, well-drained soils and cool,

shaded sites on north-facing slopes; along stream banks; in moist, wooded canyons and slopes; and as understory species in woodlands and forests. They also are abundant on stony soils of slopes, on dry and rocky islands, and along stream banks (Zimmerman 1991b). Shrubland stands occur in the coastal fog zone adjacent to stands of the *Pseudotsuga menziesii* – (*Notholithocarpus densiflorus* – *Arbutus menziesii*) alliance. The range of the plant is more extensive than is the alliance.

Local Vegetation Description

The Hazelnut scrub Alliance forms a continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open. Dominant and characteristic shrubs include *Corylus cornuta*, *Frangula californica*, *Rubus ursinus*, and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis* and *Heteromeles arbutifolia*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. The herbaceous layer typically includes *Holcus lanatus*, and herbs that are often present include *Conium maculatum*, *Polystichum munitum*, *Scrophularia californica*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	6.5	3 – 10	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	97.5	95 – 100	no data	no data
Herb	15.0	15 – 15	no data	no data

Local Membership Rule

Corylus cornuta > 50% relative cover in the shrub canopy, or > 30% relative cover with *Baccharis pilularis*, *Toxicodendron diversilobum*, and/or *Holodiscus discolor*.

Local Environmental Description

Elevation: Mean 342 m, Range 320 – 365 m

Aspect: NW (2)

Slope: Mean 35 degrees, Range 30 – 40 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): Clay (1), Loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: None

Site Impacts

This alliance has low non-native plant cover (average 5.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Holcus lanatus* and *Conium maculatum*.

Associations in Alameda & Contra Costa Counties

Corylus cornuta / *Polystichum munitum*

Classification Comments

None.

References: Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S2?

Surveys Used for Description

Total: N=; **Alameda County (n=2):** WRBL090, WRBL095

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	50	5.0	10.0	10.0				Y
T	<i>Quercus agrifolia</i>	50	1.5	3.0	3.0				Y
S	<i>Corylus cornuta</i>	100	59.0	30.0	88.0	Y		Y	Y
S	<i>Rubus ursinus</i>	100	44.0	20.0	68.0	Y			Y
S	<i>Frangula californica</i>	100	15.5	1.0	30.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	11.5	3.0	20.0	Y			Y
S	<i>Baccharis pilularis</i>	50	5.0	10.0	10.0				Y
S	<i>Heteromeles arbutifolia</i>	50	1.5	3.0	3.0				Y
S	<i>Rosa californica</i>	50	0.5	1.0	1.0				Y
S	<i>Sambucus nigra</i>	50	0.5	1.0	1.0				Y
S	<i>Symphoricarpos albus</i>	50	0.5	1.0	1.0				Y
H	<i>Holcus lanatus</i>	100	3.0	3.0	3.0	Y	Y		Y
H	<i>Urtica dioica</i>	50	5.0	10.0	10.0				Y
H	<i>Conium maculatum</i>	50	5.0	10.0	10.0				Y
H	<i>Scrophularia californica</i>	50	1.5	3.0	3.0				Y
H	<i>Polystichum munitum</i>	50	0.5	1.0	1.0				Y

***Corylus cornuta* / *Polystichum munitum* Association**

Common Name: Hazel / Western Sword Fern Shrubland

Alliance: *Corylus cornuta* var. *californica* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G2

State Rarity Rank: S2?

State Rare: Y

***Cytisus scoparius* – *Genista monspessulana* – *Cotoneaster* spp.
Shrubland Semi-Natural Alliance**



Common Name: Broom patches

NVC Alliance Code: A2062. *Cytisus scoparius* - *Ulex europaeus* Coastal Ruderal Scrub Alliance

Statewide Description

Cytisus scoparius, *Genista monspessulana*, *Spartium junceum*, *Ulex europaeus* or other broom species are dominant in the shrub canopy. Additionally, stands of *Cotoneaster lacteus*, *Cotoneaster pannosus*, *Pyracantha* sp., or other Mediterranean shrubs may be dominant and are also placed in this alliance. Emergent trees may be present at low cover. This alliance has been expanded since 2009 to include other non-native, primarily Mediterranean scrub species including *Cistus* and *Erica* spp., as well as *Hypericum canariense* which can form dense stands.

Genista monspessulana, French broom, has a Cal-IPC rank of High and a CDFA list of C. It has 8-10-ridged stems, leafy branches, and small clusters of yellow flowers. Stands occur throughout cismontane California. Many stands on the Central California Coast (261A) are hybrids with *G. canariensis* or *G. stenopetala* (DiTomaso and Healy 2007).

Cytisus scoparius – *Genista monspessulana* – *Cotoneaster* spp. Shrubland Semi-Natural Alliance

Local Vegetation Description

The Broom patches Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Genista monspessulana*, *Baccharis pilularis*, *Rubus ursinus*, and *Toxicodendron diversilobum*, and those that are often present include *Sambucus nigra*. Regenerating or shrubby trees that are often present include *Eucalyptus globulus*. The herbaceous layer typically includes *Carduus pycnocephalus* and *Conium maculatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.8	0.5 – 1
Shrub	22.5	20 – 25	1.9	0 – 5
Herb	16.0	2 – 30	0.9	0 – 2

Local Membership Rule

Cistus spp., *Cotoneaster* spp., *Cytisus scoparius*, *Genista monspessulana*, *Hypericum canariense*, *Ulex europaeus*, or other broom species/hybrids > 60% relative cover in the shrub overstory.

Local Environmental Description

Elevation: Mean 368 m, Range 349 – 386 m

Aspect: NE (1), NW (1)

Slope: Mean 16 degrees, Range 10 – 22 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.5%, Range 0 – 1%

Fines Cover: Mean 45.5%, Range 44 – 47%

Litter Cover: Mean 52.5%, Range 50 – 55%

Soil Texture (field assessed): Moderately fine silty clay loam (2)

Geology (field or map data): Basalt (1), Siltstone (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has high non-native plant cover (average 76.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Agrostis avenacea*, *Aira caryophyllea*, *Briza maxima*, *Bromus catharticus*, *Carduus pycnocephalus*, *Conium maculatum*, *Eucalyptus globulus*, *Euphorbia oblongata*, *Genista monspessulana*, *Geranium molle*, *Plantago lanceolata*, *Torilis*, *Trifolium campestre*, *Trifolium hirtum*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Genista monspessulana

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=2; Alameda County (n=1): EBRTA302

Contra Costa County (n=1): EBRTA100

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Eucalyptus globulus</i>	50	0.1	0.2	0.2				Y
S	<i>Genista monspessulana</i>	100	20.0	17.0	23.0	Y	Y		Y
S	<i>Rubus ursinus</i>	100	4.1	0.2	8.0	Y			Y
S	<i>Baccharis pilularis</i>	100	3.6	0.2	7.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Sambucus nigra</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	100	12.6	0.2	25.0	Y		Y	Y
H	<i>Conium maculatum</i>	100	1.6	0.2	3.0	Y			Y
H	<i>Bromus rubens</i>	50	0.1	0.2	0.2				Y
H	<i>Artemisia douglasiana</i>	50	0.1	0.2	0.2				Y
H	<i>Aira caryophyllea</i>	50	0.1	0.2	0.2				Y
H	<i>Pteridium aquilinum</i>	50	0.1	0.2	0.2				Y
H	<i>Briza maxima</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Calystegia purpurata</i>	50	0.1	0.2	0.2				Y
H	<i>Cardamine oligosperma</i>	50	0.1	0.2	0.2				Y
H	<i>Agrostis avenacea</i>	50	0.1	0.2	0.2				Y
H	<i>Euphorbia oblongata</i>	50	0.1	0.2	0.2				Y
H	<i>Avena barbata</i>	50	0.1	0.2	0.2				Y
H	<i>Heracleum maximum</i>	50	0.1	0.2	0.2				Y
H	<i>Geranium molle</i>	50	0.1	0.2	0.2				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Plantago lanceolata</i>	50	0.1	0.2	0.2				Y
H	<i>Sanicula crassicaulis</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus catharticus</i>	50	0.1	0.2	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium hirtum</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium campestre</i>	50	0.1	0.2	0.2				Y
H	<i>Lysimachia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia bromoides</i>	50	0.1	0.2	0.2				Y
H	<i>Phacelia nemoralis</i> ssp. <i>nemoralis</i>	50	0.1	0.2	0.2				Y
H	<i>Urtica dioica</i>	50	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	50	0.1	0.2	0.2				Y

***Genista monspessulana* Semi-natural Association**

Common Name: French Broom Shrubland

Alliance: *Cytisus scoparius* – *Genista monspessulana* – *Cotoneaster* spp. Shrubland
Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Diplacus aurantiacus* Shrubland Alliance**



Common Name: Bush monkeyflower scrub

NVC Alliance Code: A2672. *Dendromecon rigida* - *Diplacus aurantiacus* - *Eriodictyon californicum* Scrub Alliance

Statewide Description

Diplacus aurantiacus or *Diplacus parviflorus* is dominant in the shrub canopy with *Artemisia californica*, *Baccharis pilularis*, *Ceanothus megacarpus*, *Ceanothus spinosus*, *Eriogonum cinereum*, *Heteromeles arbutifolia*, *Malosma laurina*, *Salvia leucophylla*, *Salvia mellifera*, *Sambucus nigra* and *Toxicodendron diversilobum*. Emergent trees may be present at low cover, including *Juglans californica*, *Platanus racemosa* or *Quercus agrifolia*.

Diplacus aurantiacus is a widespread plant in many coastal scrub, chaparral, and woodland alliances (Rundel 2007), but the presence of stands primarily dominated by this species leaves little doubt that this is a distinct type. The alliance appears on generally steep, often somewhat unstable slopes in relatively mesic settings within the general vicinity of recent burns and stands of *Artemisia californica*, *Quercus agrifolia*, or *Salvia leucophylla* alliances. In some cases, this type also appears to be associated

with natural ground disturbances, such as rockslides (Keeler-Wolf and Evens 2006) and road cuts.

Local Vegetation Description

The Bush monkeyflower scrub Alliance forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open. Dominant and characteristic shrubs include *Diplacus aurantiacus*, *Baccharis pilularis*, and *Toxicodendron diversilobum*, and those that are often present include *Artemisia californica* and *Baccharis pilularis*. Commonly associated emergent trees at sparse cover include *Umbellularia californica*, *Quercus agrifolia*, *Aesculus californica*, and *Quercus lobata*. Herbs that are often present include *Chlorogalum pomeridianum*, *Nassella pulchra*, *Pentagramma triangularis*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	3.5	0 – 10	10.0	5 – 15
Regenerating or Shrubby Tree	0.3	0 – 1	3.5	2 – 5
Shrub	65.4	42 – 90	1.5	1 – 2
Herb	13.6	5 – 27	0.4	0 – 1

Local Membership Rule

Diplacus aurantiacus > 60% relative cover in the shrub canopy.

Local Environmental Description

Elevation: Mean 325 m, Range 61 – 460 m

Aspect: NW (2), SW (1), W (1)

Slope: Mean 22 degrees, Range 5 – 38 degrees

Macro Topography: Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 5.0%, Range 0 – 10%

Small Rock: Mean 6.5%, Range 5 – 8%

Fines Cover: Mean 13.5%, Range 5 – 22%

Litter Cover: Mean 41.0%, Range 15 – 67%

Soil Texture (field assessed): Loam (2), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 11.9%) relative to native cover.

Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Avena* sp., *Brassica rapa*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Hirschfeldia incana*, and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Diplacus (aurantiacus, puniceus)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3?

Surveys Used for Description

Total: N=4; Alameda County (n=1): ALCCREC827

Contra Costa County (n=2): ALCC259, WRBL104

Santa Clara Co. (n=1): VAWA083

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	75	0.4	0.2	1.0	Y			Y
T	<i>Quercus agrifolia</i>	50	0.3	0.2	1.0				Y
T	<i>Aesculus californica</i>	25	2.5	10.0	10.0				
T	<i>Quercus lobata</i>	25	0.8	3.0	3.0				
S	<i>Diplacus aurantiacus</i>	100	36.9	34.0	38.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	14.0	3.0	26.0	Y			Y
S	<i>Baccharis pilularis</i>	75	8.8	5.0	20.0	Y			Y
S	<i>Artemisia californica</i>	50	5.0	10.0	10.0				Y
S	<i>Rhamnus crocea</i>	25	9.5	38.0	38.0				
S	<i>Oemleria cerasiformis</i>	25	0.8	3.0	3.0				
S	<i>Sambucus nigra</i>	25	0.1	0.2	0.2				
S	<i>Symphoricarpos albus</i>	25	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	50	0.9	0.5	3.0				Y
H	<i>Nassella pulchra</i>	50	0.4	0.5	1.0				Y
H	<i>Pentagramma triangularis</i>	50	0.3	0.2	1.0				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.3	0.2	1.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hirschfeldia incana</i>	25	3.0	12.0	12.0				
H	<i>Avena</i> sp.	25	2.5	10.0	10.0				
H	<i>Aira caryophyllea</i>	25	2.5	10.0	10.0				
H	<i>Brassica rapa</i>	25	1.0	4.0	4.0				
H	<i>Clinopodium douglasii</i>	25	0.8	3.0	3.0				
H	<i>Monardella odoratissima</i>	25	0.5	2.0	2.0				
H	<i>Centaurea solstitialis</i>	25	0.3	1.0	1.0				
H	<i>Elymus triticoides</i>	25	0.3	1.0	1.0				
H	<i>Marah fabaceus</i>	25	0.3	1.0	1.0				
H	<i>Avena barbata</i>	25	0.3	1.0	1.0				
H	<i>Lysimachia arvensis</i>	25	0.3	1.0	1.0				
H	<i>Pseudognaphalium californicum</i>	25	0.3	1.0	1.0				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.5	0.5				
H	<i>Eriogonum nudum</i>	25	0.1	0.5	0.5				
H	<i>Navarretia squarrosa</i>	25	0.1	0.5	0.5				
H	<i>Wyethia</i> sp.	25	0.1	0.5	0.5				
H	<i>Pteridium aquilinum</i>	25	0.1	0.5	0.5				
H	<i>Dryopteris arguta</i>	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	25	0.1	0.2	0.2				
NV	Moss	25	0.5	2.0	2.0				

Diplacus (aurantiacus, puniceus) Association

Common Name: Bush Monkeyflower Shrubland

Alliance: *Diplacus aurantiacus* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Reyes et al. 2022, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3

State Rare: Y

***Ericameria linearifolia* – *Cleome isomeris* Shrubland Alliance**



Common Name: Narrowleaf goldenbush – bladderpod scrub

NVC Alliance Code: A4101. *Ericameria linearifolia* - *Cleome isomeris* Scrub Alliance

Statewide Description

Cleome isomeris, *Eastwoodia elegans*, *Ericameria linearifolia*, and/or *Gutierrezia californica* are dominant or co-dominant in the shrub canopy with *Ephedra californica*, *Ericameria nauseosa*, *Eriogonum fasciculatum*, *Eriophyllum confertiflorum* and *Krascheninnikovia lanata*. Emergent trees or tall shrubs may be present at low cover, including *Juniperus californica*.

Ericameria linearifolia and *Cleome isomeris* are widespread species of inland central and southern California. The former species typically blooms in spring and summer and fruits in summer and fall. The latter can bloom and fruit year-round when moisture is available. These two species are common in the upper Mojave Desert and may become abundant following disturbances, including fire, flooding, and grazing. *Ericameria linearifolia* is also common as an understory species in stands of the *Quercus douglasii* or *Juniperus californica* alliances in the inner southern and central Coast Ranges. *E. linearifolia* dominates stands locally in these situations (Twisselmann 1967). This

species is also an associate in related scrub of *Ephedra californica* alliance along Monocline Ridge in the inner South Coast Ranges, where sometimes *Ericameria linearifolia* is co-dominant (Evens et al. 2006).

This alliance was previously cited as *Ericameria linearifolia* Provisional Shrubland Alliance in the *A Manual of California Vegetation, second edition*. Additional classification analyses and surveys from the Carrizo Plain National Monument (Buck-Diaz et al. 2011) and the Inner Central Coast Ranges (Buck-Diaz et al. 2023) have expanded our understanding of the alliance to include additional characteristic species.

Local Vegetation Description

The Narrowleaf goldenbush – bladderpod scrub Alliance forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Gutierrezia californica*. The herbaceous layer typically includes *Hirschfeldia incana*, and herbs that are often present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, and *Bromus rubens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	13.3	5 – 25	0.5	0 – 1
Herb	32.4	10 – 60	0.3	0 – 0.5

Local Membership Rule

Ericameria linearifolia and/or *Gutierrezia californica* > 50% relative cover in the shrub canopy, or > 30% relative cover with *Eriogonum fasciculatum* or *Eriophyllum confertiflorum*.

Local Environmental Description

Elevation: Mean 424 m, Range 226 – 933 m

Aspect: SW (3), NE (2), SE (1), Variable (1)

Slope: Mean 16 degrees, Range 3 – 38 degrees

Macro Topography: Upper 1/3 of slope (2), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 10.0%, Range 0 – 36%

Small Rock: Mean 13.1%, Range 0 – 30%

Fines Cover: Mean 50.6%, Range 20 – 83%

Litter Cover: Mean 24.2%, Range 5 – 73%

Soil Texture (field assessed): Coarse, loamy sand (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Sedimentary (2), Sandstone and other sedimentary (1)

Alameda County Subsections: Eastern Hills (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Other Subsections: Eastern Hills (3)

Site Impacts

This alliance has high non-native plant cover (average 51.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Logfia gallica*, and *Salsola tragus*.

Associations in Alameda & Contra Costa Counties

Ericameria linearifolia

Gutierrezia californica / *Poa secunda*

Classification Comments

Gutierrezia californica stands were previously placed in their own provisional alliance but are now lumped into this related seral scrub alliance. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2006, Reyes et al. 2019, Reyes et al. 2020a, VegCAMP 2010

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=7; Alameda County (n=2): LLNL017, LLNL064

Contra Costa County (n=2): ALCCREC204, SPCCB-019

San Joaquin Co. (n=3): LLNL008, LLNL023, LLNL027

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Gutierrezia californica</i>	86	9.7	5.0	22.0	Y	Y		Y
H	<i>Hirschfeldia incana</i>	86	0.5	0.1	2.0	Y			Y
H	<i>Bromus diandrus</i>	71	8.9	3.0	40.0				Y
H	<i>Avena barbata</i>	71	3.6	3.0	10.0				Y
H	<i>Bromus hordeaceus</i>	71	3.0	0.2	8.0				Y
H	<i>Bromus rubens</i>	57	3.7	2.0	10.0				Y
H	<i>Erodium botrys</i>	43	1.9	2.0	7.0				
H	<i>Eriogonum nudum</i>	43	1.6	1.0	6.0				
H	<i>Erodium cicutarium</i>	43	0.5	0.2	3.0				
H	<i>Holocarpha obconica</i>	43	0.3	0.2	2.0				
H	<i>Logfia gallica</i>	43	0.3	0.2	2.0				
H	<i>Logfia californica</i>	43	0.2	0.2	1.0				
H	<i>Croton setigerus</i>	43	0.1	0.2	0.2				
H	<i>Avena fatua</i>	29	2.4	5.0	12.0				
H	<i>Nassella cernua</i>	29	1.9	5.0	8.0				
H	<i>Grindelia camporum</i>	29	0.6	0.2	4.0				
H	<i>Nassella pulchra</i>	29	0.6	0.2	4.0				
H	<i>Salsola tragus</i>	29	0.5	0.2	3.0				

***Ericameria linearifolia* Association**

Common Name: Narrowleaf Goldenbush Shrubland

Alliance: *Ericameria linearifolia* – *Cleome isomeris* Shrubland Alliance

Local Vegetation Description

The Narrowleaf Goldenbush Association forms an open shrub layer in the single sample available. The emergent tree layer is absent, and the herbaceous layer is open.

Dominant and characteristic shrubs include *Ericameria linearifolia*. The herbaceous layer typically includes *Avena fatua*, *Acmispon* sp., *Avena fatua*, *Bromus rubens*, *Cirsium occidentale*, *Clarkia modesta*, *Dichelostemma capitatum*, *Eriogonum nudum*, *Erodium cicutarium*, *Eschscholzia californica*, *Hirschfeldia incana*, *Logfia gallica*, *Melica californica*, *Nassella pulchra*, and *Trifolium* sp.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	22.0	22 – 22	0.8	0.5 – 1
Herb	13.0	13 – 13	0.3	0 – 0.5

Local Environmental Description

Elevation: 933 m

Aspect: SW (1)

Slope: 20 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 0.4%

Small Rock: 8%

Fines Cover: 83%

Litter Cover: 7%

Soil Texture (field assessed): Coarse, loamy sand (1)

Geology (field or map data): Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 25.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Erodium cicutarium*, *Hirschfeldia incana*, and *Logfia gallica*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Reyes et al. 2019, Reyes et al. 2020a, VegCAMP 2010

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-019

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Ericameria linearifolia</i>	100	22.0	22.0	22.0	Y	Y		Y
H	<i>Avena fatua</i>	100	5.0	5.0	5.0	Y		Y	Y
H	<i>Bromus rubens</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Logfia gallica</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Acmispon</i> sp.	100	1.0	1.0	1.0	Y			Y
H	<i>Melica californica</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Eriogonum nudum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Clarkia modesta</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Cirsium occidentale</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Erodium cicutarium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eschscholzia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Nassella pulchra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Dichelostemma capitatum</i>	100	0.1	0.1	0.1	Y			Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y

***Gutierrezia californica* / *Poa secunda* Association**

Common Name: California Match Weed / Pine Bluegrass Shrubland

Alliance: *Ericameria linearifolia* – *Cleome isomeris* Shrubland Alliance

Local Vegetation Description

The California Match Weed / Pine Bluegrass Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Gutierrezia californica*. The herbaceous layer typically includes *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, and *Hirschfeldia incana*, and herbs that are often present include *Bromus rubens*, *Croton setigerus*, *Erodium botrys*, *Holocarpha obconica*, and *Logfia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	11.8	5 – 25	0.5	0 – 1
Herb	35.7	10 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 339 m, Range 226 – 443 m

Aspect: NE (2), SW (2), SE (1), Variable (1)

Slope: Mean 15 degrees, Range 3 – 38 degrees

Macro Topography: Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 11.9%, Range 0 – 36%

Small Rock: Mean 14.0%, Range 0 – 30%

Fines Cover: Mean 44.2%, Range 20 – 65%

Litter Cover: Mean 27.6%, Range 5 – 73%

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Sedimentary (2)

Alameda County Subsections: Eastern Hills (2)

Contra Costa County Subsections: Eastern Hills (1)

Other Subsections: Eastern Hills (3)

Site Impacts

This association has high non-native plant cover (average 56.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Bromus diandrus, *Bromus hordeaceus*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Logfia gallica*, and *Salsola tragus*.

Classification Comments

This association was previously placed in a provisional *Gutierrezia californica* Alliance. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2006

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): LLNL017, LLNL064

Contra Costa County (n=1): ALCCREC204

San Joaquin Co. (n=3): LLNL008, LLNL023, LLNL027

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Gutierrezia californica</i>	100	11.3	5.0	22.0	Y	Y		Y
H	<i>Bromus diandrus</i>	83	10.3	3.0	40.0	Y			Y
H	<i>Avena barbata</i>	83	4.2	3.0	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	83	3.5	0.2	8.0	Y			Y
H	<i>Hirschfeldia incana</i>	83	0.6	0.2	2.0	Y			Y
H	<i>Bromus rubens</i>	50	4.0	4.0	10.0				Y
H	<i>Erodium botrys</i>	50	2.2	2.0	7.0				Y
H	<i>Holocarpha obconica</i>	50	0.4	0.2	2.0				Y
H	<i>Logfia californica</i>	50	0.2	0.2	1.0				Y
H	<i>Croton setigerus</i>	50	0.1	0.2	0.2				Y
H	<i>Nassella cernua</i>	33	2.2	5.0	8.0				
H	<i>Eriogonum nudum</i>	33	1.7	4.0	6.0				
H	<i>Grindelia camporum</i>	33	0.7	0.2	4.0				
H	<i>Salsola tragus</i>	33	0.5	0.2	3.0				
H	<i>Erodium cicutarium</i>	33	0.5	0.2	3.0				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				

***Ericameria nauseosa* Shrubland Alliance**



Common Name: Rubber rabbitbrush scrub

NVC Alliance Code: A3196. *Ericameria nauseosa* Steppe & Shrubland Alliance

Statewide Description

Ericameria nauseosa is dominant or co-dominant in the shrub canopy with *Artemisia tridentata*, *Chrysothamnus viscidiflorus*, *Ephedra* spp., *Eriogonum fasciculatum*, *Lepidospartum squamatum* and *Purshia tridentata*. Emergent trees may be present at low cover, including *Juniperus californica*, *Pinus jeffreyi*, *Pinus monophylla* or *Yucca brevifolia*.

California has eight of the 26 subspecies of *Ericameria nauseosa*. Some subspecies are local; others have extensive ranges. We do not know which subspecies are sufficiently common to characterize California's vegetation, since few ecologists make subspecies determinations when describing vegetation. Some botanists place this species in the genus *Chrysothamnus*.

Stands of this alliance exist throughout the semiarid regions in the state. They typically grow in disturbed areas, whether naturally disturbed by intermittent flooding or disturbed by overgrazing, road cuts, clearings, or old mine tailings. Plants colonize and persist for

at least 10 years, including after changes in grazing regimes or after fires (Tirmenstein 1999c).

Local Vegetation Description

The Rubber rabbitbrush scrub Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Ericameria nauseosa*, and those that are often present include *Eriogonum wrightii*, *Eriophyllum confertiflorum*, and *Frangula californica* ssp. *tomentella*. Regenerating or shrubby trees that are often present include *Pinus sabiniana* and *Quercus douglasii*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana*. The herbaceous layer typically includes *Avena barbata* and *Trichostema lanceolatum*, and herbs that are often present include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus tectorum*, *Calycadenia truncata*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Elymus elymoides*, *Elymus multisetus*, *Eriogonum gracile*, *Erodium cicutarium*, *Holocarpha virgata*, *Leptosiphon* sp., *Logfia californica*, *Melica californica*, *Nassella lepida*, and *Selaginella bigelovii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0	3.5	2 – 5
Hardwood	0.0	0 – 0.2	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	1.5	1 – 2
Shrub	9.0	8 – 10	0.5	0 – 1
Herb	5.5	3 – 8	0.3	0 – 0.5

Local Membership Rule

Ericameria nauseosa > 50% relative cover in the shrub canopy.

Local Environmental Description

Elevation: Mean 1056 m, Range 1031 – 1080 m

Aspect: SW (2)

Slope: Mean 12 degrees, Range 3 – 21 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 5.6%, Range 4 – 7%

Small Rock: Mean 59.0%, Range 29 – 89%

Fines Cover: Mean 32.5%, Range 3 – 62%

Litter Cover: Mean 2.0%, Range 1 – 3%

Soil Texture (field assessed): Coarse sand (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Serpentine (1)

Alameda County Subsections: Western Diablo Range (2)

Contra Costa County Subsections: None

Site Impacts

This alliance has low non-native plant cover (average 18.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus tectorum*, and *Erodium cicutarium*.

Associations in Alameda & Contra Costa Counties

Ericameria nauseosa

Classification Comments

None.

References: Boul et al. 2021b, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens et al. 2014, Reyes et al. 2020a

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=2; **Alameda County (n=2):** ALCC072, ALCC138

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus douglasii</i>	50	0.1	0.2	0.2				Y
S	<i>Ericameria nauseosa</i>	100	7.0	6.0	8.0	Y	Y		Y
S	<i>Eriogonum wrightii</i>	50	2.0	4.0	4.0				Y
S	<i>Frangula californica</i> ssp. <i>tomentella</i>	50	0.1	0.2	0.2				Y
S	<i>Eriophyllum confertiflorum</i>	50	0.1	0.2	0.2				Y
H	<i>Avena barbata</i>	100	1.0	1.0	1.0	Y		Y	Y
H	<i>Trichostema lanceolatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Selaginella bigelovii</i>	50	0.5	1.0	1.0				Y
H	<i>Logfia californica</i>	50	0.5	1.0	1.0				Y
H	<i>Leptosiphon</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Erodium cicutarium</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus tectorum</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus hordeaceus</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus diandrus</i>	50	0.5	1.0	1.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Elymus multisetus</i>	50	0.1	0.2	0.2				Y
H	<i>Melica californica</i>	50	0.1	0.2	0.2				Y
H	<i>Calycadenia truncata</i>	50	0.1	0.2	0.2				Y
H	<i>Holocarpha virgata</i>	50	0.1	0.2	0.2				Y
H	<i>Eriogonum gracile</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus elymoides</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Nassella lepida</i>	50	0.1	0.1	0.1				Y
H	<i>Clarkia</i> sp.	50	0.1	0.1	0.1				Y
NV	Moss	50	0.5	1.0	1.0				Y

***Ericameria nauseosa* Association**

Common Name: Rubber Rabbitbrush Shrubland

Alliance: *Ericameria nauseosa* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Boul et al. 2021b, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2023, Evens et al. 2014, Reyes et al. 2020a

Global Rarity Rank: G5

State Rarity Rank: SNR

State Rare: N

***Eriogonum fasciculatum* Shrubland Alliance**



Common Name: California buckwheat scrub

NVC Alliance Code: A3884. *Eriogonum fasciculatum* - *Salvia apiana* Xeric Scrub Alliance

Statewide Description

Eriogonum fasciculatum or *Hesperoyucca whipplei* is dominant or co-dominant in the shrub canopy in cismontane stands with *Artemisia californica*, *Baccharis pilularis*, *Diplacus aurantiacus*, *Encelia californica*, *Encelia farinosa*, *Isocoma menziesii*, *Lotus scoparius*, *Malacothamnus fasciculatus*, *Salvia apiana* or *Salvia mellifera*. Emergent trees may be present at low cover including *Juniperus californica*.

Stands do well on rocky sites and in shallow soils, and they establish after disturbance by fire or flood or after heavy grazing. In southern coastal California, this alliance is usually one of the first of the coastal scrubs to establish in mechanically disturbed areas, such as road cuts or slope failures, and it persists in areas with light to moderate grazing.

In the 2009 book, *A Manual of California Vegetation*, second edition, all stands of

Eriogonum fasciculatum throughout California were included in this alliance. With additional surveys and analysis in desert regions, transmontane stands are included within an expanded *Eriogonum fasciculatum* - *Viguiera parishii* Alliance (Evens et al. 2014).

Local Vegetation Description

The California buckwheat scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open. Dominant and characteristic shrubs include *Eriogonum fasciculatum* and *Artemisia californica*, and those that are often present include *Baccharis pilularis*, *Gutierrezia californica*, and *Lupinus albifrons*. Commonly associated emergent trees at sparse cover include *Juniperus californica*. The herbaceous layer typically includes *Avena barbata*, *Bromus diandrus*, and *Bromus rubens*, and herbs that are often present include *Amsinckia* sp., *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Eriogonum angulosum*, *Hirschfeldia incana*, *Logfia gallica*, *Lolium perenne*, *Melilotus indicus*, *Trifolium hirtum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	1.0	0 – 4	1.5	1 – 2
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.3	0 – 1	0.8	0.5 – 1
Shrub	28.8	15 – 40	0.6	0 – 1
Herb	10.8	3 – 20	0.3	0 – 0.5

Local Membership Rule

Eriogonum fasciculatum > 50% relative cover in the shrub canopy or > 30% relative cover with *Baccharis pilularis*, *Diplacus aurantiacus*, *Isocoma menziesii*, *Lotus scoparius*, *Malacothamnus fasciculatus*, or *Salvia mellifera*.

Local Environmental Description

Elevation: Mean 257 m, Range 95 – 399 m

Aspect: SW (2), SE (1)

Slope: Mean 32 degrees, Range 23 – 44 degrees

Macro Topography: Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 11.1%, Range 0 – 30%

Small Rock: Mean 23.5%, Range 9 – 40%

Fines Cover: Mean 45.5%, Range 28 – 65%

Litter Cover: Mean 16.5%, Range 1 – 30%

Soil Texture (field assessed): Coarse, loamy sand (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (1), Sedimentary (1), Shale (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1), Eastern Hills (1)

Other Subsections: Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 22.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *B. hordeaceus*, *Erodium cicutarium*, *Hirschfeldia incana*, *Koeleria gerardii*, *Logfia gallica*, *Lolium perenne*, *Plantago lanceolata*, and *Trifolium hirtum*.

Associations in Alameda & Contra Costa Counties

Eriogonum fasciculatum alliance

Eriogonum fasciculatum var. *foliolosum* – *Juniperus californica*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens et al. 2006

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=4; Alameda County (n=1): LLNL012

Contra Costa County (n=2): ALCC048, EBRTA142

San Joaquin Co. (n=1): LLNL068

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	25	1.0	4.0	4.0				
R	<i>Juniperus californica</i> *	25	0.3	1.0	1.0				
S	<i>Eriogonum fasciculatum</i>	100	20.5	9.0	38.0	Y	Y		Y
S	<i>Artemisia californica</i>	75	3.1	0.2	8.0	Y			Y
S	<i>Lupinus albifrons</i>	50	1.5	1.0	5.0				Y
S	<i>Gutierrezia californica</i>	50	0.8	0.2	3.0				Y
S	<i>Baccharis pilularis</i>	50	0.3	0.2	1.0				Y
S	<i>Lotus scoparius</i>	25	1.3	5.0	5.0				
S	<i>Eriogonum wrightii</i>	25	0.5	2.0	2.0				
S	<i>Baccharis salicifolia</i>	25	0.3	1.0	1.0				
S	<i>Heteromeles arbutifolia</i>	25	0.3	1.0	1.0				
S	<i>Eriophyllum confertiflorum</i>	25	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	1.1	0.2	3.0	Y			Y
H	<i>Avena barbata</i>	75	1.1	0.2	4.0	Y			Y
H	<i>Bromus rubens</i>	75	1.0	1.0	2.0	Y			Y
H	<i>Vulpia bromoides</i>	50	1.3	0.2	5.0				Y
H	<i>Bromus hordeaceus</i>	50	0.6	0.2	2.0				Y
H	<i>Melilotus indicus</i>	50	0.6	0.2	2.0				Y
H	<i>Trifolium hirtum</i>	50	0.5	0.1	2.0				Y
H	<i>Amsinckia</i> sp.	50	0.3	0.2	1.0				Y
H	<i>Logfia gallica</i>	50	0.3	0.2	1.0				Y
H	<i>Hirschfeldia incana</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Eriogonum angulosum</i>	50	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	50	0.1	0.1	0.2				Y
H	<i>Avena fatua</i>	25	1.0	4.0	4.0				
H	<i>Lupinus microcarpus</i>	25	0.5	2.0	2.0				
H	<i>Erodium cicutarium</i>	25	0.5	2.0	2.0				
H	<i>Plantago lanceolata</i>	25	0.3	1.0	1.0				
H	<i>Koeleria macrantha</i>	25	0.3	1.0	1.0				
H	<i>Grindelia camporum</i>	25	0.3	1.0	1.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eremothera boothii</i>	25	0.3	1.0	1.0				
H	<i>Holocarpha obconica</i>	25	0.1	0.2	0.2				
H	<i>Clarkia tembloriensis</i>	25	0.1	0.2	0.2				
H	<i>Blepharizonia</i> sp.	25	0.1	0.2	0.2				
H	<i>Elymus triticoides</i>	25	0.1	0.2	0.2				
H	<i>Acmispon wrangelianus</i>	25	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	25	0.1	0.2	0.2				
H	<i>Koeleria gerardii</i>	25	0.1	0.2	0.2				
H	<i>Herniaria hirsuta</i> ssp. <i>cinerea</i>	25	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	25	0.1	0.2	0.2				
H	<i>Logfia californica</i>	25	0.1	0.2	0.2				
H	<i>Silene gallica</i>	25	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	25	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	25	0.1	0.2	0.2				
H	<i>Malvella leprosa</i>	25	0.1	0.2	0.2				
H	<i>Sisyrinchium bellum</i>	25	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	25	0.1	0.2	0.2				
H	<i>Salvia columbariae</i>	25	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	25	0.1	0.2	0.2				
H	<i>Gilia achilleifolia</i>	25	0.1	0.2	0.2				
NV	Moss	25	0.1	0.2	0.2				
NV	Lichen	25	0.0	0.1	0.1				

***Eriogonum fasciculatum* var. *foliolosum* – *Juniperus californica* Association**

Common Name: California Buckwheat – California Juniper Shrubland

Alliance: *Eriogonum fasciculatum* Shrubland Alliance

Local Vegetation Description

The California Buckwheat – California Juniper Association forms an open shrub layer in the single sample available. The emergent tree layer is open, and the herbaceous layer is open. The dominant shrub is *Eriogonum fasciculatum*, and characteristic shrubs include *Artemisia californica* and *Lupinus albifrons*. Emergent and regenerating trees that are characteristic include *Juniperus californica*. The herbaceous layer includes *Amsinckia* sp., *Avena fatua*, *Blepharizonia* sp., *Bromus diandrus*, *Bromus rubens*, *Clarkia tembloriensis*, *Eremothera boothii*, *Eriogonum angulosum*, *Erodium cicutarium*, *Grindelia camporum*, *Hirschfeldia incana*, *Lupinus microcarpus*, and *Melilotus indicus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	4.0	4 – 4	1.5	1 – 2
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	1.0	1 – 1	0.8	0.5 – 1
Shrub	15.0	15 – 15	0.8	0.5 – 1
Herb	20.0	20 – 20	0.3	0 – 0.5

Local Environmental Description

Elevation: 322 m

Aspect: SW (1)

Slope: 44 degrees

Macro Topography: Lower to Upper 1/3 of slope (1)

Large Rock: 14%

Small Rock: 10%

Fines Cover: 35%

Litter Cover: 30%

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 33.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Erodium cicutarium*, and *Hirschfeldia incana*.

Eriogonum fasciculatum var. *foliolosum* – *Juniperus californica* Association
Eriogonum fasciculatum Shrubland Alliance

Classification Comments

None.

References: Evens et al. 2006

Global Rarity Rank: G3 **State Rarity Rank:** S3

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** LLNL012

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	100	4.0	4.0	4.0	Y	Y		Y
R	<i>Juniperus californica</i> *	100	1.0	1.0	1.0	Y	Y		Y
S	<i>Eriogonum fasciculatum</i>	100	9.0	9.0	9.0	Y	Y		Y
S	<i>Artemisia californica</i>	100	4.0	4.0	4.0	Y			Y
S	<i>Baccharis salicifolia</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Lupinus albifrons</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Baccharis pilularis</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Gutierrezia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena fatua</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Bromus diandrus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Melilotus indicus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Bromus rubens</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Lupinus microcarpus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Erodium cicutarium</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Eremothera boothii</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Grindelia camporum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Amsinckia</i> sp.	100	1.0	1.0	1.0	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eriogonum angulosum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Elymus triticoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Clarkia tembloriensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Blepharizonia</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Malvella leprosa</i>	100	0.2	0.2	0.2	Y			Y

Eriogonum fasciculatum var. *foliolosum* – *Juniperus californica* Association
Eriogonum fasciculatum Shrubland Alliance

***Eriogonum wrightii* – *Eriogonum heermannii* – *Buddleja utahensis*
Shrubland Alliance**



Common Name: Wright's buckwheat – Heermann's buckwheat – Utah butterfly-bush scrub

NVC Alliance Code: A4167. *Eriogonum wrightii* - *Eriogonum heermannii* - *Buddleja utahensis* Scrub Alliance

Statewide Description

Buddleja utahensis, *Eriogonum heermannii* and/or *Eriogonum wrightii* is/are dominant, co-dominant, or characteristically present in the shrub canopy with *Arctostaphylos glauca*, *Artemisia tridentata*, *Corethrogyne filaginifolia*, *Dedeckera eurekaensis*, *Ericameria nauseosa*, *Ericameria teretifolia*, *Eriogonum fasciculatum*, *Eriogonum prattenianum*, *Eriophyllum confertiflorum*, *Grayia spinosa*, *Gutierrezia* spp. *Hecastocleis shockleyi*, *Hesperocyparis whipplei*, *Lupinus albifrons*, and *Rhus trilobata*. Emergent trees may be present at low cover, including *Juniperus californica*, *Juniperus osteosperma*, *Pinus sabiniana*, *Quercus x alvordiana*, and *Quercus douglasii*.

Eriogonum wrightii and *Eriogonum heermannii* were treated in separate alliances in the 2009 book, *A Manual of California Vegetation*, second edition, and have since been

combined in this alliance with *Buddleja utahensis*; stands are typically on gravelly and/or rocky, nutrient-poor substrates (Evens et al. 2014, NatureServe 2016). The sampled stands of *E. wrightii* var. *subscaposum* in the inner Coast Ranges are relatively small (usually < 1 ha) and have a similar range as the *Juniperus californica* alliance. The studies in southern California did not typically distinguish plants to the variety level. Future sampling should identify plants completely. Varieties overlap in elevation and range, but they may vary in habitat conditions. We include all varieties in this alliance at this time.

Local Vegetation Description

The Wright's buckwheat – Heermann's buckwheat – Utah butterfly-bush scrub Alliance forms an open shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open. Dominant and characteristic shrubs include *Eriogonum wrightii*. The herbaceous layer typically includes *Bromus hordeaceus*, and herbs that are often present include *Bromus diandrus*, *Bromus rubens*, and *Logfia gallica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.3	0 – 2	8.0	2 – 15
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 1	0.4	0 – 1
Shrub	16.9	10 – 27	0.5	0 – 2
Herb	16.0	10 – 25	0.3	0 – 0.5

Local Membership Rule

Eriogonum wrightii > 50% relative cover in the shrub canopy.

Local Environmental Description

Elevation: Mean 607 m, Range 433 – 909 m

Aspect: SW (3), SE (2), Variable (2), NW (1)

Slope: Mean 28 degrees, Range 18 – 41 degrees

Macro Topography: Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 13.9%, Range 0 – 34%

Small Rock: Mean 35.6%, Range 10 – 69%

Fines Cover: Mean 39.4%, Range 1 – 71%

Litter Cover: Mean 9.0%, Range 2 – 25%

Soil Texture (field assessed): Coarse sand (1), Moderately fine sandy clay loam (1), Moderately coarse, sandy loam (1), Medium to very fine, sandy loam (1), Loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Franciscan melange (6), Sedimentary (2)

Alameda County Subsections: Eastern Hills (2), Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (4), Diablo Range (1)

Site Impacts

This alliance has moderate non-native plant cover (average 23.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Erodium cicutarium*, *Logfia gallica*, *Silene gallica*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Eriogonum wrightii – *Juniperus californica*

Eriogonum wrightii (ssp. *subscaposum*, ssp. *wrightii*)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens et al. 2006, Evens et al. 2014, Reyes et al. 2020a, Reyes et al. 2023a, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=8; Alameda County (n=3): ALCC130, LLNL009, LLNL011

Contra Costa County (n=0):

Santa Clara Co. (n=5): SCLAV012, SPCCA-027, SPCCB-154, SPCCB-157, VAWA274

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Eriogonum wrightii</i>	100	14.6	8.0	27.0	Y	Y		Y
S	<i>Artemisia californica</i>	25	1.7	0.2	13.0				
S	<i>Gutierrezia californica</i>	25	0.6	1.0	4.0				
H	<i>Bromus hordeaceus</i>	75	0.7	0.2	3.0	Y			Y
H	<i>Logfia gallica</i>	50	0.5	0.2	3.0				Y
H	<i>Bromus diandrus</i>	50	0.4	0.1	2.0				Y
H	<i>Bromus rubens</i>	50	0.2	0.2	1.0				Y
H	<i>Vulpia myuros</i>	38	1.4	0.2	10.0				
H	<i>Avena barbata</i>	38	1.0	0.2	4.0				
H	<i>Avena fatua</i>	38	1.0	1.0	4.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium cicutarium</i>	38	0.6	0.2	4.0				
H	<i>Silene gallica</i>	38	0.1	0.2	0.5				
H	<i>Dichelostemma capitatum</i>	38	0.1	0.2	0.2				
H	<i>Grindelia camporum</i>	25	0.8	2.0	4.0				
H	<i>Erodium botrys</i>	25	0.7	0.5	5.0				
H	<i>Eriogonum nudum</i>	25	0.5	2.0	2.0				
H	<i>Vulpia microstachys</i>	25	0.4	0.2	3.0				
H	<i>Dudleya setchellii</i>	25	0.3	0.2	2.0				
H	<i>Logfia californica</i>	25	0.3	0.2	2.0				
H	<i>Castilleja exserta</i>	25	0.3	0.1	2.0				
H	<i>Lupinus bicolor</i>	25	0.1	0.2	0.5				
H	<i>Nassella pulchra</i>	25	0.1	0.2	0.5				
H	<i>Chlorogalum pomeridianum</i>	25	0.1	0.2	0.5				
H	<i>Corethrogyne filaginifolia</i>	25	0.1	0.1	0.5				
H	<i>Acmispon</i> sp.	25	0.1	0.2	0.2				
H	<i>Cryptantha</i> sp.	25	0.1	0.2	0.2				
H	<i>Plantago erecta</i>	25	0.1	0.2	0.2				
H	<i>Phacelia imbricata</i>	25	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	25	0.1	0.2	0.2				
H	<i>Clarkia</i> sp.	25	0.1	0.2	0.2				
H	<i>Trifolium</i> sp.	25	0.1	0.2	0.2				
H	<i>Lupinus</i> sp.	25	0.0	0.1	0.2				
H	<i>Melica californica</i>	25	0.0	0.1	0.2				
NV	Moss	38	2.4	1.0	10.0				
NV	Lichen	25	0.8	2.0	4.0				

***Eriogonum wrightii* – *Juniperus californica* Association**

Common Name: Wright's Buckwheat – California Juniper Shrubland

Alliance: *Eriogonum wrightii* – *Eriogonum heermannii* – *Buddleja utahensis* Shrubland Alliance

Local Vegetation Description

The Wright's Buckwheat – California Juniper Association forms an open shrub layer in the single sample available. The emergent tree layer is sparse, and the herbaceous layer is open. *Eriogonum wrightii* and *Artemisia californica* are co-dominant shrubs, and *Gutierrezia californica* is also present. Emergent and regenerating trees that are characteristic include *Juniperus californica*. The herbaceous layer includes *Acmispon wrangelianus*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus rubens*, *Castilleja foliolosa*, *Eriogonum angulosum*, *Eriogonum nudum*, *Erodium cicutarium*, *Grindelia camporum*, *Holocarpha obconica*, *Hypochaeris glabra*, *Logfia californica*, *Salvia columbariae*, and *Silene gallica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	2.0	2 – 2	3.5	2 – 5
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	1.0	1 – 1	0.8	0.5 – 1
Shrub	25.0	25 – 25	0.8	0.5 – 1
Herb	20.0	20 – 20	0.3	0 – 0.5

Local Environmental Description

Elevation: 433 m

Aspect: Variable (1)

Slope: 26 degrees

Macro Topography: Lower to Upper 1/3 of slope (1)

Large Rock: 18%

Small Rock: 10%

Fines Cover: 45%

Litter Cover: 25%

Soil Texture (field assessed): Not recorded

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 20.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Eriogonum wrightii – *Juniperus californica* Association
Eriogonum wrightii – *Eriogonum heermannii* – *Buddleja utahensis* Shrubland Alliance

Bromus diandrus, *Bromus hordeaceus*, *Erodium cicutarium*, *Hypochaeris glabra*, and *Silene gallica*.

Classification Comments

None.

References: Evens et al. 2006

Global Rarity Rank: G3 **State Rarity Rank:** S3

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** LLNL009

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	100	2.0	2.0	2.0	Y	Y		Y
R	<i>Juniperus californica</i> *	100	1.0	1.0	1.0	Y	Y		Y
S	<i>Artemisia californica</i>	100	13.0	13.0	13.0	Y	Y		Y
S	<i>Eriogonum wrightii</i>	100	8.0	8.0	8.0	Y		Y	Y
S	<i>Gutierrezia californica</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Grindelia camporum</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Avena barbata</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Erodium cicutarium</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Castilleja foliolosa</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Eriogonum nudum</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Bromus rubens</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Eriogonum angulosum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Hypochaeris glabra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Silene gallica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Logfia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Salvia columbariae</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Holocarpha obconica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus diandrus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Acemispion wrangelianus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y

***Eriogonum wrightii* (ssp. *subscaposum*, ssp. *wrightii*) Association**

Common Name: Wright's Buckwheat Shrubland

Alliance: *Eriogonum wrightii* – *Eriogonum heermannii* – *Buddleja utahensis* Shrubland Alliance

Local Vegetation Description

The Wright's Buckwheat Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Eriogonum wrightii*. Herbs that are often present include *Bromus hordeaceus* and *Logfia gallica*, and herbs that are sometimes present include *Avena barbata*, *Avena fatua*, *Bromus diandrus*, *Bromus rubens*, *Castilleja exserta*, *Dichelostemma capitatum*, *Dudleya setchellii*, *Erodium botrys*, *Vulpia microstachys*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	12.5	10 – 15
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	15.7	10 – 27	0.4	0 – 2
Herb	15.4	10 – 25	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 632 m, Range 438 – 909 m

Aspect: SW (3), SE (2), NW (1), Variable (1)

Slope: Mean 29 degrees, Range 18 – 41 degrees

Macro Topography: Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 13.3%, Range 0 – 34%

Small Rock: Mean 39.3%, Range 20 – 69%

Fines Cover: Mean 38.6%, Range 1 – 71%

Litter Cover: Mean 6.7%, Range 2 – 15%

Soil Texture (field assessed): Coarse sand (1), Loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (6), Sedimentary (1)

Alameda County Subsections: Eastern Hills (1), Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (4), Diablo Range (1)

Site Impacts

This association has moderate non-native plant cover (average 24.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Erodium cicutarium*, *Logfia gallica*, *Silene gallica*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens et al. 2014, Reyes et al. 2020a, Reyes et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): ALCC130, LLNL011

Contra Costa County (n=0):

Santa Clara Co. (n=5): SCLAV012, SPCCA-027, SPCCB-154, SPCCB-157, VAWA274

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Eriogonum wrightii</i>	100	15.6	10.0	27.0	Y	Y		Y
H	<i>Bromus hordeaceus</i>	71	0.8	0.2	3.0				Y
H	<i>Logfia gallica</i>	57	0.5	0.2	3.0				Y
H	<i>Vulpia myuros</i>	43	1.6	0.2	10.0				
H	<i>Avena fatua</i>	43	1.1	1.0	4.0				
H	<i>Bromus diandrus</i>	43	0.4	0.1	2.0				
H	<i>Bromus rubens</i>	43	0.1	0.2	0.5				
H	<i>Dichelostemma capitatum</i>	43	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	29	0.8	0.5	5.0				
H	<i>Avena barbata</i>	29	0.6	0.2	4.0				
H	<i>Vulpia microstachys</i>	29	0.5	0.2	3.0				
H	<i>Dudleya setchellii</i>	29	0.3	0.2	2.0				
H	<i>Castilleja exserta</i>	29	0.3	0.1	2.0				
H	<i>Nassella pulchra</i>	29	0.1	0.2	0.5				
H	<i>Lupinus bicolor</i>	29	0.1	0.2	0.5				
H	<i>Silene gallica</i>	29	0.1	0.2	0.5				
H	<i>Chlorogalum pomeridianum</i>	29	0.1	0.2	0.5				
H	<i>Corethrogyne filaginifolia</i>	29	0.1	0.1	0.5				
H	<i>Eschscholzia californica</i>	29	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	29	0.1	0.2	0.2				
H	<i>Clarkia</i> sp.	29	0.1	0.2	0.2				
H	<i>Acmispon</i> sp.	29	0.1	0.2	0.2				
H	<i>Phacelia imbricata</i>	29	0.1	0.2	0.2				
H	<i>Cryptantha</i> sp.	29	0.1	0.2	0.2				
H	<i>Trifolium</i> sp.	29	0.1	0.2	0.2				
H	<i>Plantago erecta</i>	29	0.1	0.2	0.2				
H	<i>Melica californica</i>	29	0.0	0.1	0.2				
H	<i>Lupinus</i> sp.	29	0.0	0.1	0.2				
NV	Moss	43	2.7	1.0	10.0				
NV	Lichen	29	0.9	2.0	4.0				

Eriogonum wrightii (ssp. *subscaposum*, ssp. *wrightii*) Association
Eriogonum wrightii – *Eriogonum heermannii* – *Buddleja utahensis* Shrubland Alliance

***Gaultheria shallon* – *Rubus (ursinus)* Shrubland Alliance**



Common Name: Salal – berry brambles

NVC Alliance Code: N/A.

Statewide Description

Rubus parviflorus, *Rubus ursinus*, *Holodiscus discolor*, or *Gaultheria shallon* dominates solely or co-dominate, forming various mixtures in the shrub canopy with *Baccharis pilularis*, *Garrya elliptica*, *Gaultheria shallon*, *Heracleum maximum*, *Lonicera involucrata*, *Marah oreganus*, *Morella californica*, *Ribes menziesii*, *Sambucus racemosa*, *Toxicodendron diversilobum*, and *Vaccinium ovatum*. Emergent trees may be present at low cover, including *Picea sitchensis*, *Pinus muricata*, or *Pseudotsuga menziesii*.

The nominate species of this alliance were segregated from the previous *Rubus* spp. Alliance in Sawyer et al. (2009) based on peer review of the NVC and interpretation of California data. The new convention is followed here: Stands, which were previously thought to be part of a mixed *Rubus* Alliance (Sawyer et al. 2009), have recently been reconsidered as two different alliances (*Morella californica* – *Rubus spectabilis* and *Gaultheria shallon* – *Rubus (ursinus)* Provisional Alliances). *Holodiscus discolor*, *Rubus*

ursinus, and *Gaultheria shallon* are widespread shrubs found in mesic woodlands and forests in the coastal areas of central and northern California. These species tend to emerge from forest or woodland cover on exposed coastal bluffs, mesic slopes, or in coastal grasslands.

Local Vegetation Description

The Salal – berry brambles Alliance forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Rubus ursinus*, *Baccharis pilularis*, *Holodiscus discolor*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are often present include *Dryopteris arguta* and *Scrophularia californica*, and herbs that are sometimes present include *Artemisia douglasiana*, *Conium maculatum*, *Galium aparine*, *Heracleum maximum*, *Pentagramma triangularis*, *Pseudognaphalium californicum*, *Stachys rigida* var. *quercetorum*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.0	0 – 6	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 0.4	1.5	0 – 5
Shrub	59.4	40 – 100	1.7	0.5 – 5
Herb	7.3	1 – 20	0.6	0 – 2

Local Membership Rule

Gaultheria shallon, *Holodiscus discolor*, *Rubus parviflorus*, or *R. ursinus* > 50% relative cover in the shrub cover, or > 30% relative cover with *Baccharis pilularis* or *Toxicodendron diversilobum*.

Local Environmental Description

Elevation: Mean 491 m, Range 307 – 944 m

Aspect: NE (5), NW (1)

Slope: Mean 27 degrees, Range 3 – 38 degrees

Macro Topography: Upper 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.6%, Range 0 – 3%

Small Rock: Mean 14.5%, Range 0 – 44%

Fines Cover: Mean 46.4%, Range 20 – 83%

Litter Cover: Mean 36.0%, Range 15 – 75%

Soil Texture (field assessed): Loam (2), Clay (1), Medium loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Basalt (1), Chert (1), Igneous (1), Mixed igneous (1), Sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5)

Site Impacts

This alliance has low non-native plant cover (average 4.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Conium maculatum* and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Holodiscus discolor – *Baccharis pilularis* – *Rubus ursinus*
Rubus ursinus

Classification Comments

None.

References: Buck-Diaz et al. 2021, Duebendorfer 1989, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: S4

Surveys Used for Description

Total: N=6; Alameda County (n=1): ALCC135

Contra Costa County (n=5): ALCC004, EBRTA207, EBRTA212, EBRTA305, WRBL105

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
R	<i>Quercus agrifolia</i> *	33	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	9.8	4.0	20.0	Y			Y
S	<i>Baccharis pilularis</i>	83	7.7	2.0	20.0	Y			Y
S	<i>Rubus ursinus</i>	67	20.0	2.0	63.0				Y
S	<i>Holodiscus discolor</i>	50	18.8	25.0	50.0				Y
S	<i>Frangula californica</i>	33	1.8	1.0	10.0				
S	<i>Oemleria cerasiformis</i>	33	2.2	5.0	8.0				
S	<i>Symphoricarpos albus</i>	33	0.6	0.5	3.0				
S	<i>Sambucus nigra</i>	33	0.5	0.2	3.0				
S	<i>Ribes menziesii</i>	33	0.3	0.5	1.0				
H	<i>Dryopteris arguta</i>	83	0.7	0.1	2.0				Y
H	<i>Scrophularia californica</i>	67	0.6	0.2	2.0				Y
H	<i>Conium maculatum</i>	50	2.6	0.2	15.0				
H	<i>Heracleum maximum</i>	50	0.6	0.2	3.0				
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	33	0.2	0.2	1.0				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Pseudognaphalium californicum</i>	33	0.1	0.2	0.2				

***Holodiscus discolor* – *Baccharis pilularis* – *Rubus ursinus* Association**

Common Name: Ocean Spray – Coyote Brush – California Blackberry Shrubland

Alliance: *Gaultheria shallon* – *Rubus (ursinus)* Shrubland Alliance

Local Vegetation Description

The Ocean Spray – Coyote Brush – California Blackberry Association forms an intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Holodiscus discolor* and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis*. Regenerating or shrubby trees that are often present include *Umbellularia californica*. The herbaceous layer typically includes *Dryopteris arguta*, and herbs that are often present include *Pentagramma triangularis*. Herbs that are sometimes present include *Aira caryophyllea*, *Bromus rubens*, *Monardella villosa*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.3	0 – 0.4	0.8	0 – 2
Shrub	55.4	45 – 65	2.2	1 – 5
Herb	7.3	1 – 20	0.4	0 – 1

Local Environmental Description

Elevation: Mean 579 m, Range 380 – 944 m

Aspect: NE (3)

Slope: Mean 33 degrees, Range 28 – 38 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 1.0%, Range 0 – 3%

Small Rock: Mean 23.3%, Range 0 – 44%

Fines Cover: Mean 50.7%, Range 32 – 83%

Litter Cover: Mean 23.3%, Range 15 – 35%

Soil Texture (field assessed): Loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Chert (1), Igneous (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 2.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bromus catharticus*, *Conium maculatum*, *Torilis arvensis*, and *Vulpia myuros*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Sikes et al. 2021

Global Rarity Rank: G3 **State Rarity Rank:** S3? **State Rare:** Y

Surveys Used for Description

Total: N=3; **Alameda County (n=1):** ALCC135

Contra Costa County (n=2): ALCC004, EBRTA305

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Umbellularia californica</i>	67	0.1	0.2	0.2				Y
R	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
R	<i>Quercus agrifolia</i>	33	0.1	0.2	0.2				
R	<i>Quercus kelloggii</i>	33	0.1	0.2	0.2				
S	<i>Holodiscus discolor</i>	100	37.7	25.0	50.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	9.0	5.0	14.0	Y			Y
S	<i>Baccharis pilularis</i>	67	4.0	2.0	10.0				Y
S	<i>Oemleria cerasiformis</i>	33	2.7	8.0	8.0				
S	<i>Rubus ursinus</i>	33	0.7	2.0	2.0				
S	<i>Symphoricarpos mollis</i>	33	0.7	2.0	2.0				
S	<i>Diplacus aurantiacus</i>	33	0.7	2.0	2.0				
S	<i>Ribes menziesii</i>	33	0.3	1.0	1.0				
S	<i>Standing snag</i>	33	0.3	1.0	1.0				
S	<i>Actaea rubra</i>	33	0.1	0.2	0.2				
S	<i>Prunus emarginata</i>	33	0.1	0.2	0.2				
S	<i>Prunus</i> sp.	33	0.1	0.2	0.2				
S	<i>Sambucus nigra</i>	33	0.1	0.2	0.2				
H	<i>Dryopteris arguta</i>	100	0.4	0.1	1.0	Y			Y
H	<i>Pentagramma triangularis</i>	67	0.1	0.2	0.2				Y

Holodiscus discolor – *Baccharis pilularis* – *Rubus ursinus* Association
Gaultheria shallon – *Rubus (ursinus)* Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Monardella villosa</i>	33	1.3	4.0	4.0				
H	<i>Bromus rubens</i>	33	1.0	3.0	3.0				
H	<i>Vulpia myuros</i>	33	0.3	1.0	1.0				
H	<i>Aira caryophyllea</i>	33	0.3	1.0	1.0				
H	<i>Bromus catharticus</i>	33	0.1	0.2	0.2				
H	<i>Galium aparine</i>	33	0.1	0.2	0.2				
H	<i>Galium</i> sp.	33	0.1	0.2	0.2				
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Lathyrus</i> sp.	33	0.1	0.2	0.2				
H	<i>Madia exigua</i>	33	0.1	0.2	0.2				
H	<i>Madia gracilis</i>	33	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
H	<i>Phacelia nemoralis</i> ssp. <i>nemoralis</i>	33	0.1	0.2	0.2				
H	<i>Polystichum munitum</i>	33	0.1	0.2	0.2				
H	<i>Pseudognaphalium</i> <i>californicum</i>	33	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	33	0.1	0.2	0.2				
H	<i>Maianthemum racemosum</i>	33	0.1	0.2	0.2				
H	<i>Conium maculatum</i>	33	0.1	0.2	0.2				
H	<i>Melica torreyana</i>	33	0.1	0.2	0.2				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	33	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
NV	Moss	33	3.3	10.0	10.0				
NV	Bryophyte (moss, liverwort, hornwort)	33	0.1	0.2	0.2				

***Rubus ursinus* Association**

Common Name: California Blackberry Shrubland

Alliance: *Gaultheria shallon* – *Rubus (ursinus)* Shrubland Alliance

Local Vegetation Description

The California Blackberry Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Baccharis pilularis*, *Rubus ursinus*, and *Toxicodendron diversilobum*, and those that are often present include *Frangula californica*, *Sambucus nigra*, and *Symphoricarpos albus*. Commonly associated emergent trees at low cover include *Quercus agrifolia* and *Umbellularia californica*. The herbaceous layer typically includes *Scrophularia californica* and *Heracleum maximum*. herbs that are often present include *Carduus pycnocephalus*, *Conium maculatum*, *Dryopteris arguta*, *Galium aparine*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.5	0 – 6	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	3.5	2 – 5
Shrub	57.5	40 – 100	1.4	0.5 – 2
Herb	10.5	1 – 20	0.9	0 – 2

Local Environmental Description

Elevation: Mean 377 m, Range 300 – 509 m

Aspect: NE (2), NW (1), SE (1)

Slope: Mean 19 degrees, Range 3 – 30 degrees

Macro Topography: Upper 1/3 of slope (2), Middle 1/3 of slope (2)

Large Rock: Mean 0.4%, Range 0 – 1%

Small Rock: Mean 5.9%, Range 0 – 15%

Fines Cover: Mean 36.7%, Range 20 – 60%

Litter Cover: Mean 53.3%, Range 35 – 75%

Soil Texture (field assessed): Clay (1), Loam (1), Medium loam (1)

Geology (field or map data): Basalt (1), Mixed igneous (1), Sandstone, shale, and gravel deposits (1), Volcanic flow rocks (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Other Subsections: Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 6.6%) relative to native cover.

Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus* and *Conium maculatum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Duebendorfer 1989, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=3): EBRTA207, EBRTA212, WRBL105

San Joaquin Co. (n=1): LLNL020

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	25	0.8	3.0	3.0				
T	<i>Quercus agrifolia</i>	25	0.8	3.0	3.0				
R	<i>Quercus agrifolia</i> *	25	0.1	0.2	0.2				
R	<i>Umbellularia californica</i> *	25	0.1	0.2	0.2				
S	<i>Rubus ursinus</i>	100	37.0	20.0	63.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	100	11.0	4.0	20.0	Y			Y
S	<i>Toxicodendron diversilobum</i>	75	8.0	4.0	20.0	Y			Y
S	<i>Frangula californica</i>	50	2.8	1.0	10.0				Y
S	<i>Sambucus nigra</i>	50	2.0	3.0	5.0				Y
S	<i>Symphoricarpos albus</i>	50	0.9	0.5	3.0				Y
S	<i>Oemleria cerasiformis</i>	25	1.3	5.0	5.0				
S	<i>Ribes menziesii</i>	25	0.1	0.5	0.5				
S	<i>Ribes californicum</i>	25	0.1	0.2	0.2				
S	<i>Ribes quercetorum</i>	25	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	100	0.9	0.2	2.0	Y			Y
H	<i>Heracleum maximum</i>	75	0.9	0.2	3.0	Y			Y
H	<i>Urtica dioica</i>	50	5.3	1.0	20.0				Y
H	<i>Conium maculatum</i>	50	3.8	0.2	15.0				Y
H	<i>Dryopteris arguta</i>	50	0.8	1.0	2.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Carduus pycnocephalus</i>	50	0.3	0.2	1.0				Y
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				Y
H	<i>Hirschfeldia incana</i>	25	0.3	1.0	1.0				
H	<i>Bromus diandrus</i>	25	0.3	1.0	1.0				
H	<i>Stachys rigida</i> var. <i>quercetorum</i>	25	0.3	1.0	1.0				
H	<i>Marrubium vulgare</i>	25	0.3	1.0	1.0				
H	<i>Carduus tenuiflorus</i>	25	0.3	1.0	1.0				
H	<i>Artemisia douglasiana</i>	25	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	25	0.1	0.2	0.2				
H	<i>Bromus commutatus</i>	25	0.1	0.2	0.2				
H	<i>Castilleja</i>	25	0.1	0.2	0.2				
H	<i>Elymus triticoides</i>	25	0.1	0.2	0.2				
H	<i>Raphanus sativus</i>	25	0.1	0.2	0.2				
H	<i>Pseudognaphalium californicum</i>	25	0.1	0.2	0.2				
H	<i>Phacelia californica</i>	25	0.1	0.2	0.2				

***Lotus scoparius* – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance**



Common Name: Deerweed – silver lupine – yerba santa scrub

NVC Alliance Code: A3886. *Lotus scoparius* - *Lupinus albifrons* Scrub Alliance

Statewide Description

Lotus scoparius or *Lupinus albifrons*, *Eriodictyon californicum* or another *Eriodictyon* sp. is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Artemisia californica*, *Baccharis pilularis*, *Ephedra californica*, *Ericameria linearifolia*, *Eriodictyon californicum*, *Eriogonum fasciculatum*, *Hazardia squarrosa*, *Malacothamnus densiflorus*, *Prunus fremontii*, *Rhus ovata*, *Ribes quercetorum* and *Salvia apiana*.

Lotus scoparius, *Lupinus albifrons*, and *Eriodictyon californicum* are early colonizing shrubs of disturbed sites throughout much of central and southern California. Stands of the alliance dominate recently burned patches of chaparral and coastal scrub (e.g., *Adenostoma fasciculatum*, *Artemisia californica*, and *Eriogonum fasciculatum* alliances).

Local Vegetation Description

The Deerweed – silver lupine – yerba santa scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to continuous. Dominant and characteristic shrubs include *Lupinus albifrons*. Herbs that are often present include *Bromus diandrus*, *Bromus rubens*, and *Carduus pycnocephalus*, and herbs that are sometimes present include *Achillea millefolium*, *Avena barbata*, *Avena fatua*, *Bromus hordeaceus*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Clarkia unguiculata*, *Croton californicus*, *Eriogonum nudum*, *Erodium botrys*, *Eschscholzia californica*, *Heterotheca grandiflora*, *Hirschfeldia incana*, *Hypochaeris radicata*, *Lolium perenne*, *Nassella pulchra*, *Torilis arvensis*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0.2	3.5	2 – 5
Regenerating or Shrubby Tree	0.1	0 – 1	1.5	1 – 2
Shrub	17.0	3 – 35	1.0	0 – 2
Herb	46.1	7 – 88	0.4	0 – 1

Local Membership Rule

Eriodictyon californicum, *Lepechinia calycina*, *Lotus scoparius*, *Lupinus albifrons*, or *Pickeringia montana* > 50% relative cover in the shrub canopy, or > 30% relative cover with other seral shrubs; found in localized patches following fire or other disturbance.

Local Environmental Description

Elevation: Mean 371 m, Range 7 – 992 m

Aspect: NE (5), SW (5), NW (1), Variable (1)

Slope: Mean 22 degrees, Range 1 – 90 degrees

Macro Topography: Upper 1/3 of slope (4), Other (3), Bottom to Lower 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 3.0%, Range 0 – 13%

Small Rock: Mean 12.0%, Range 0 – 57%

Fines Cover: Mean 22.6%, Range 3 – 56%

Litter Cover: Mean 46.9%, Range 2 – 88%

Soil Texture (field assessed): Sand (3), Moderately fine clay loam (2), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Fine clay (1), Coarse sand (1), Loam (1)

Geology (field or map data): Sand dunes (4), General volcanic extrusives (2), Sedimentary (2), Metamorphic (1), Sandstone and other sedimentary (1), Shale and other sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7), Westside Alluvial Fans and Terraces (4)

Site Impacts

This alliance has high non-native plant cover (average 54.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Hirschfeldia incana*, *Hypochaeris radicata*, *Lolium perenne*, *Torilis arvensis*, and *Vicia villosa*.

Associations in Alameda & Contra Costa Counties

Eriodictyon californicum / herbaceous

Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. alliance

Lupinus albifrons

Lupinus albifrons – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*)

Classification Comments

One of the associations listed here is newly described, the *Lupinus albifrons* – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*) Association.

References: Buck-Diaz and Evens 2011a, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2004, Evens et al. 2006, Keeler-Wolf et al. 2003b, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2022, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=12; Alameda County (n=1): LLNL074

Contra Costa County (n=11): ALCC240, ALCC751, ALCCREC009, EBAY0003, EBAY0004, EBAY0007, EBAY0009, SPCCA-023, SPCCB-025, SPCCB-062, WRBL099

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus agrifolia</i>	25	0.1	0.2	0.2				
S	<i>Lupinus albifrons</i>	75	8.9	0.2	30.0	Y	Y		Y
S	<i>Lotus scoparius</i>	33	4.4	3.0	20.2				
S	<i>Toxicodendron diversilobum</i>	25	0.1	0.1	1.0				
H	<i>Bromus diandrus</i>	58	13.6	0.2	38.0				Y
H	<i>Bromus rubens</i>	58	6.8	0.2	63.0				Y
H	<i>Carduus pycnocephalus</i>	58	1.5	0.1	8.0				Y
H	<i>Lolium perenne</i>	42	1.9	0.2	18.0				
H	<i>Bromus hordeaceus</i>	42	1.7	0.2	18.0				
H	<i>Eriogonum nudum</i>	42	1.1	0.2	10.0				
H	<i>Avena fatua</i>	42	0.6	0.2	4.0				
H	<i>Chlorogalum pomeridianum</i>	42	0.2	0.2	1.0				
H	<i>Eschscholzia californica</i>	42	0.2	0.2	1.0				
H	<i>Erodium botrys</i>	33	2.5	0.2	10.0				
H	<i>Hirschfeldia incana</i>	33	1.8	1.0	10.0				
H	<i>Heterotheca grandiflora</i>	33	0.3	0.2	3.0				
H	<i>Avena barbata</i>	25	2.1	0.2	15.0				
H	<i>Vicia villosa</i>	25	1.3	3.0	10.0				
H	<i>Nassella pulchra</i>	25	0.6	0.2	4.0				
H	<i>Clarkia unguiculata</i>	25	0.3	0.2	3.0				
H	<i>Croton californicus</i>	25	0.3	0.2	3.0				
H	<i>Torilis arvensis</i>	25	0.2	0.2	2.0				
H	<i>Achillea millefolium</i>	25	0.1	0.1	1.0				
H	<i>Hypochaeris radicata</i>	25	0.1	0.2	1.0				
H	<i>Centaurea solstitialis</i>	25	0.1	0.2	0.5				

***Eriodictyon californicum* / herbaceous Association**

Common Name: California Yerba Santa / herbaceous Shrubland

Alliance: *Lotus scoparius* – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Local Vegetation Description

The California Yerba Santa / herbaceous Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The dominant shrub is *Eriodictyon californicum* and characteristic shrubs include *Adenostoma fasciculatum* and *Diplacus aurantiacus*. Regenerating or shrubby trees that may be present include *Pinus sabiniana* and *Quercus* spp. Commonly associated emergent trees at sparse cover include *Quercus douglasii*. The herbaceous layer typically includes *Solanum umbelliferum*, and herbs that are often present include *Avena fatua*, *Bromus hordeaceus*, *Bromus rubens*, *Emmenanthe penduliflora*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	no data	no data
Hardwood	0.1	0 – 0.2	3.5	2 – 5
Regenerating or Shrubby Tree	0.6	0 – 1	0.9	0 – 2
Shrub	16.0	13 – 19	0.9	0 – 2
Herb	4.5	2 – 7	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 538 m, Range 411 – 666 m

Aspect: NE (1), SE (1)

Slope: Mean 16 degrees, Range 11 – 20 degrees

Macro Topography: Middle to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 1.6%, Range 0 – 3%

Small Rock: Mean 43.5%, Range 30 – 57%

Fines Cover: Mean 34.5%, Range 32 – 37%

Litter Cover: Mean 18.5%, Range 2 – 35%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Metamorphic (1), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 15.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Eriodictyon californicum / herbaceous Association
Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Bromus hordeaceus, *Centaurea melitensis*, *Geranium molle*, *Logfia gallica*, *Torilis arvensis*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011a, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens et al. 2004, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2022, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-062

Santa Clara Co. (n=1): SPCCA-151

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	50	0.1	0.2	0.2				Y
R	<i>Quercus wislizeni</i>	50	0.5	1.0	1.0				Y
R	<i>Quercus douglasii</i> *	50	0.1	0.2	0.2				Y
R	<i>Quercus</i> sp.	50	0.1	0.2	0.2				Y
R	<i>Pinus sabiniana</i>	50	0.1	0.1	0.1				Y
S	<i>Eriodictyon californicum</i>	100	14.0	11.0	17.0	Y	Y		Y
S	<i>Adenostoma fasciculatum</i>	100	1.1	0.2	2.0	Y			Y
S	<i>Diplacus aurantiacus</i>	100	0.2	0.1	0.2	Y			Y
S	<i>Lotus scoparius</i>	50	0.5	1.0	1.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.5	1.0	1.0				Y
S	<i>Rhamnus ilicifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Sambucus nigra</i>	50	0.1	0.2	0.2				Y
S	<i>Toxicodendron diversilobum</i>	50	0.1	0.2	0.2				Y
S	<i>Baccharis pilularis</i>	50	0.1	0.2	0.2				Y
S	<i>Artemisia californica</i>	50	0.1	0.2	0.2				Y
S	<i>Ptelea crenulata</i>	50	0.1	0.2	0.2				Y
S	<i>Ericameria linearifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Arctostaphylos</i> sp.	50	0.1	0.1	0.1				Y

Eriodictyon californicum / herbaceous Association
Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Salvia mellifera</i>	50	0.1	0.1	0.1				Y
H	<i>Solanum umbelliferum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena fatua</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus hordeaceus</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus rubens</i>	50	1.0	2.0	2.0				Y
H	<i>Vulpia myuros</i>	50	0.5	1.0	1.0				Y
H	<i>Emmenanthe penduliflora</i>	50	0.5	1.0	1.0				Y
H	<i>Geranium molle</i>	50	0.1	0.2	0.2				Y
H	<i>Logfia gallica</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia purpurea</i>	50	0.1	0.2	0.2				Y
H	<i>Wyethia helenioides</i>	50	0.1	0.2	0.2				Y
H	<i>Rafinesquia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Galium porrigens</i>	50	0.1	0.2	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Acmispon brachycarpus</i>	50	0.1	0.2	0.2				Y
H	<i>Calystegia macrostegia</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.2	0.2				Y
H	<i>Centaurea melitensis</i>	50	0.1	0.2	0.2				Y
H	<i>Monardella purpurea</i>	50	0.1	0.2	0.2				Y
H	<i>Calochortus venustus</i>	50	0.1	0.1	0.1				Y
H	<i>Melica imperfecta</i>	50	0.1	0.1	0.1				Y
H	<i>Calandrinia ciliata</i>	50	0.1	0.1	0.1				Y
H	<i>Galium</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Allophyllum gilioides</i>	50	0.1	0.1	0.1				Y
H	<i>Sanicula</i> sp.	50	0.1	0.1	0.1				Y
NV	Moss	50	0.5	1.0	1.0				Y

***Lupinus albifrons* Association**

Common Name: Silver Bush Lupine Shrubland

Alliance: *Lotus scoparius* – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Local Vegetation Description

The Silver Bush Lupine Association forms an open to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Lupinus albifrons*. The herbaceous layer typically includes *Carduus pycnocephalus*, and herbs that are often present include *Achillea millefolium*, *Bromus diandrus*, *Chlorogalum pomeridianum*, *Eriogonum nudum*, *Eschscholzia californica*, *Hirschfeldia incana*, *Lolium perenne*, and *Nassella pulchra*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	14.8	6 – 35	0.8	0 – 2
Herb	35.3	16 – 65	0.4	0 – 1

Local Environmental Description

Elevation: Mean 502 m, Range 382 – 619 m

Aspect: SW (3), NE (2), Variable (1)

Slope: Mean 21 degrees, Range 3 – 38 degrees

Macro Topography: Upper 1/3 of slope (3), Bottom to Lower 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 6.8%, Range 2 – 13%

Small Rock: Mean 11.8%, Range 5 – 20%

Fines Cover: Mean 28.8%, Range 15 – 56%

Litter Cover: Mean 51.0%, Range 35 – 70%

Soil Texture (field assessed): Fine clay (1), Loam (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): General volcanic extrusives (2), Sedimentary (2), Shale and other sedimentary (1), Volcanic flow rocks (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5)

Site Impacts

This association has high non-native plant cover (average 55.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Bromus diandrus, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium cicutarium*, *Hirschfeldia incana*, *Lolium perenne*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2006, Keeler-Wolf et al. 2003b, Klein et al. 2015, Reyes et al. 2022, Reyes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=6; Alameda County (n=1): LLNL074

Contra Costa County (n=5): ALCC240, ALCC751, ALCCREC009, SPCCB-025, WRBL099

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Lupinus albifrons</i>	100	14.3	6.0	30.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	33	0.8	2.0	3.0				
S	<i>Toxicodendron diversilobum</i>	33	0.2	0.1	1.0				
H	<i>Carduus pycnocephalus</i>	83	2.6	0.1	8.0	Y			Y
H	<i>Lolium perenne</i>	67	3.7	0.2	18.0				Y
H	<i>Chlorogalum pomeridianum</i>	67	0.4	0.2	1.0				Y
H	<i>Eschscholzia californica</i>	67	0.3	0.2	1.0				Y
H	<i>Bromus diandrus</i>	50	8.3	10.0	30.0				Y
H	<i>Hirschfeldia incana</i>	50	3.5	2.0	10.0				Y
H	<i>Nassella pulchra</i>	50	1.2	0.2	4.0				Y
H	<i>Eriogonum nudum</i>	50	0.5	0.2	2.0				Y
H	<i>Achillea millefolium</i>	50	0.3	0.1	1.0				Y
H	<i>Avena barbata</i>	33	4.2	10.0	15.0				
H	<i>Heterotheca sessiliflora</i>	33	0.5	1.0	2.0				
H	<i>Erodium cicutarium</i>	33	0.4	0.5	2.0				
H	<i>Torilis arvensis</i>	33	0.4	0.2	2.0				
H	<i>Phacelia californica</i>	33	0.2	0.2	1.0				
H	<i>Solidago velutina</i>	33	0.1	0.2	0.5				
H	<i>Centaurea solstitialis</i>	33	0.1	0.2	0.5				
H	<i>Castilleja exserta</i>	33	0.1	0.2	0.2				

***Lupinus albifrons* – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*) Provisional Association**

Common Name: Silver Bush Lupine – Deerweed / (Birdcage Evening Primrose – California Croton) Shrubland

Alliance: *Lotus scoparius* – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Local Vegetation Description

The Silver Bush Lupine – Deerweed / (Birdcage Evening Primrose – California Croton) Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is intermittent to continuous. Dominant and characteristic shrubs include *Lotus scoparius* and *Lupinus albifrons*. Regenerating or shrubby trees that are characteristic include *Quercus agrifolia*. The herbaceous layer typically includes *Bromus diandrus*, *Bromus rubens*, *Clarkia unguiculata*, *Croton californicus*, *Erodium botrys*, *Heterotheca grandiflora*, and *Vicia villosa*, and herbs that are often present include *Acmispon americanus*, *Clarkia unguiculata*, *Eriogonum nudum*, *Gilia capitata*, *Lupinus bicolor*, and *Oenothera deltoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 0.2	no data	no data
Shrub	18.5	3 – 30	no data	no data
Herb	81.8	63 – 88	no data	no data

Local Environmental Description

Elevation: Mean 10 m, Range 7 – 13 m

Aspect: NE (2), NW (1), SW (1)

Slope: Mean 31 degrees, Range 1 – 90 degrees

Macro Topography: Other (3), Lower to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 11.5%, Range 3 – 20%

Litter Cover: Mean 52.3%, Range 20 – 88%

Soil Texture (field assessed): Sand (3), Coarse sand (1)

Geology (field or map data): Sand dunes (4)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (4)

Lupinus albifrons – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*)
Provisional Association

Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Site Impacts

This association has high non-native plant cover (average 66.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Hypochaeris radicata*, *Lactuca serriola*, *Logfia gallica*, *Lolium perenne*, *Pseudognaphalium luteoalbum*, *Salsola tragus*, *Silene gallica*, *Sonchus asper*, *Stellaria media*, *Tribulus terrestris*, *Trifolium hirtum*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

This association is newly described here and remains provisional due to low sample size. It represents a rare interior stabilized dune community of the Antioch Dunes which sometimes includes the rare *Oenothera deltoides* ssp. *howellii* (CRPR 1B.1).

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=4): EBAY0003, EBAY0004, EBAY0007, EBAY0009

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus agrifolia</i>	75	0.2	0.2	0.2	Y	Y		Y
S	<i>Lotus scoparius</i>	100	13.3	3.0	20.2	Y	Y		Y
S	<i>Lupinus albifrons</i>	75	5.2	0.2	10.2	Y			Y
S	<i>Gutierrezia californica</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	28.3	0.2	38.0	Y		Y	Y
H	<i>Bromus rubens</i>	100	18.4	0.2	63.0	Y			Y
H	<i>Erodium botrys</i>	100	7.6	0.2	10.0	Y			Y
H	<i>Heterotheca grandiflora</i>	100	0.9	0.2	3.0	Y			Y
H	<i>Vicia villosa</i>	75	4.0	3.0	10.0	Y			Y
H	<i>Clarkia unguiculata</i>	75	0.9	0.2	3.0	Y			Y
H	<i>Croton californicus</i>	75	0.9	0.2	3.0	Y			Y
H	<i>Gilia capitata</i>	50	3.3	3.0	10.0				Y
H	<i>Eriogonum nudum</i>	50	2.6	0.2	10.0				Y
H	<i>Pseudognaphalium luteoalbum</i>	50	0.1	0.2	0.2				Y

Lupinus albifrons – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*)
Provisional Association

Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Lupinus bicolor</i>	50	0.1	0.2	0.2				Y
H	<i>Silene gallica</i>	50	0.1	0.2	0.2				Y
H	<i>Lactuca serriola</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia bromoides</i>	50	0.1	0.2	0.2				Y
H	<i>Acemispia americanus</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris radicata</i>	50	0.1	0.2	0.2				Y
H	<i>Oenothera deltoides</i> ssp. <i>cognata</i>	25	0.8	3.0	3.0				
H	<i>Erysimum capitatum</i>	25	0.8	3.0	3.0				
H	<i>Lotus strigosus</i>	25	0.1	0.2	0.2				
H	<i>Camissonia contorta</i>	25	0.1	0.2	0.2				
H	<i>Conyza canadensis</i>	25	0.1	0.2	0.2				
H	<i>Avena barbata</i>	25	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	25	0.1	0.2	0.2				
H	<i>Lessingia glandulifera</i>	25	0.1	0.2	0.2				
H	<i>Camissonia micrantha</i>	25	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	25	0.1	0.2	0.2				
H	<i>Salsola tragus</i>	25	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	25	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	25	0.1	0.2	0.2				
H	<i>Stellaria media</i>	25	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	25	0.1	0.2	0.2				
H	<i>Oenothera deltoides</i> ssp. <i>howellii</i>	25	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	25	0.1	0.2	0.2				
H	<i>Sonchus asper</i>	25	0.1	0.2	0.2				
H	<i>Trifolium bifidum</i>	25	0.1	0.2	0.2				
H	<i>Tribulus terrestris</i>	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	25	0.1	0.2	0.2				
H	<i>Castilleja attenuata</i>	25	0.1	0.2	0.2				

Lupinus albifrons – *Lotus scoparius* / (*Oenothera deltoides* – *Croton californicus*)

Provisional Association

Lotus scoparius – *Lupinus albifrons* – *Eriodictyon* spp. Shrubland Alliance

***Lupinus arboreus* Shrubland Alliance**



Common Name: Yellow bush lupine scrub

NVC Alliance Code: A4120. *Lupinus arboreus* Dune Scrub Alliance

Statewide Description

Lupinus arboreus is dominant or co-dominant in the shrub canopy with *Ammophila arenaria*, *Baccharis pilularis*, *Ericameria ericoides*, and *Lupinus chamissonis*. Emergent trees or tall shrubs may be present at low cover, including *Alnus rubra* or *Morella californica*.

Stands of *Lupinus arboreus* occur natively in central and southern California from Sonoma to Ventura counties. They have become widely naturalized in northern California along the coast from Mendocino and Humboldt Counties to Vancouver, Canada. However, demarcation between native and naturalized populations is still disputed (Pickart 2000). Native stands often occupy stabilized dunes, coastal bluffs, and disturbed areas (e.g., pastures) near the coast, and they appear to have a short temporal nature (Keeler-Wolf et al. 2003a, Ross 2002b). Dune scrub, which includes stands of the native *Lupinus arboreus*, is characteristic of backdunes along the coast, south of Bodega Head in Sonoma County. Dune mat, a collection of annuals and

perennials of the *Abronia latifolia* – *Ambrosia chamissonis* Alliance, exists on the northern California coast (Pickart and Barbour 2007) where it covers nearshore dune ridges. Dune mat is now rare. *Lupinus arboreus* aggressively invades dune mat and modifies environmental conditions to facilitate the invasion of non-native annual grasses, other weeds, and long-lived natives that replaces the dune mat (Pickart 2000, Pickart and Sawyer 1998, Ross 2002b).

Local Vegetation Description

The Yellow bush lupine scrub Alliance forms an open to continuous shrub layer. Dominant and characteristic shrubs include *Lupinus arboreus*.

Local Membership Rule

Lupinus arboreus > 50% relative cover in the shrub canopy, or > 30% relative cover with *Baccharis pilularis* and/or *Rubus ursinus*.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: none

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Site Impacts

Associations in Alameda & Contra Costa Counties

*Lupinus arboreus**

Classification Comments

No survey data was available, but this alliance was mapped on Brooks Island.

References: Buck-Diaz et al. 2021, Holton and Johnson 1979, Klein et al. 2015, LaBanca 1993, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Malacothamnus fasciculatus* – *Malacothamnus* spp. Shrubland Alliance**



Common Name: Bush mallow scrub

NVC Alliance Code: A2671. *Malacothamnus fasciculatus* - *Malacothamnus* spp.
Scrub Alliance

Statewide Description

Malacothamnus aboriginum, *Malacothamnus arcuatus*, *Malacothamnus fasciculatus*, *Malacothamnus fremontii*, and/or other *Malacothamnus* sp. is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Artemisia californica*, *Ceanothus megacarpus*, *Ceanothus spinosus*, *Cercocarpus montanus*, *Encelia californica*, *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Lotus scoparius*, *Malosma laurina*, *Rhus ovata*, and *Salvia mellifera*. Emergent trees may be present at low cover, including *Juglans californica*, *Platanus racemosa*, or *Quercus agrifolia*.

The diversity in the alliance's associations indicates that stands have developed from many types of chaparral and coastal sage scrub after recent fires. Some stands contained many shrubs that sprouted after a fire, some obligate seeding species, and

others a mixture. Individual *M. fasciculatus* shrubs are suppressed by the shade of longer-lived shrubs within a decade of the fire event (Lloret et al. 2005). Associations in this alliance reflect post-fire conditions. Other *Malacothamnus* (e.g., *M. fremontii* and *M. aboriginum*) develop short-lived stands in other regions of California including the central Coast Ranges. Therefore we have updated the name from the *Malacothamnus fasciculatus* Shrubland Alliance published in the 2009 book to include these similar species as characteristic of the alliance.

Local Vegetation Description

The Bush mallow scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is open. Dominant and characteristic shrubs include *Malacothamnus fremontii*, *Artemisia californica*, *Eriodictyon californicum*, and *Salvia mellifera*, and those that are often present include *Diplacus aurantiacus*. The herbaceous layer typically includes *Bromus* sp., and herbs that are sometimes present include *Avena fatua*, *Brassica nigra*, *Bromus hordeaceus*, *Bromus madritensis*, *Calystegia occidentalis*, *Erodium* sp., *Eschscholzia californica*, *Lolium perenne*, *Lupinus* sp., *Marah fabaceus*, *Medicago polymorpha*, *Nassella pulchra*, and *Triteleia laxa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	28.8	10 – 40	1.5	1 – 2
Herb	6.4	3 – 10	0.3	0 – 0.5

Local Membership Rule

A species of *Malacothamnus* > 50% relative cover in the shrub canopy, with *Artemisia californica*, *Diplacus aurantiacus*, *Eriodictyon californicum*, *Heteromeles arbutifolia*, and *Salvia mellifera*.

Local Environmental Description

Elevation: Mean 388 m, Range 319 – 495 m

Aspect: SE (2), NE (1), SW (1), Variable (1)

Slope: Mean 30 degrees, Range 20 – 40 degrees

Macro Topography: Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 1.3%, Range 1 – 2%

Small Rock: Mean 36.3%, Range 3 – 80%

Fines Cover: Mean 38.0%, Range 5 – 60%

Litter Cover: Mean 21.3%, Range 10 – 44%

Soil Texture (field assessed): Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Serpentine (1)

Alameda County Subsections: Diablo Range (2)

Contra Costa County Subsections: None

Other Subsections: Diablo Range (1), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 7.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus hordeaceus*, *Bromus madritensis*, *Erodium* sp., and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Malacothamnus (*aboriginum*, *arcuatus*, *fremontii*)

Classification Comments

Malacothamnus hallii is now considered a synonym of *Malacothamnus arcuatus* var. *elmeri* (Jepson Flora Project 2024). Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=4; Alameda County (n=2): SVRA_CA001, SVRA_CA004

Contra Costa County (n=0):

San Joaquin Co. (n=1): SVRA_CA010

Santa Clara Co. (n=1): SCLAR142

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Malacothamnus fremontii</i>	80	13.6	15.0	20.0	Y		Y	Y
S	<i>Salvia mellifera</i>	80	8.6	1.0	15.0	Y			Y
S	<i>Artemisia californica</i>	80	4.6	0.2	14.0	Y			Y
S	<i>Eriodictyon californicum</i>	80	2.0	1.0	5.0	Y			Y
S	<i>Diplacus aurantiacus</i>	60	0.3	0.1	1.0				Y
S	<i>Malacothamnus hallii</i>	20	1.0	5.0	5.0				
S	<i>Heteromeles arbutifolia</i>	20	0.0	0.1	0.1				
S	<i>Sambucus nigra</i>	20	0.0	0.1	0.1				
S	<i>Toxicodendron diversilobum</i>	20	0.0	0.1	0.1				
H	<i>Bromus</i> sp.	80	1.8	0.2	5.0	Y		Y	Y
H	<i>Marah fabaceus</i>	40	0.1	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Brassica nigra</i>	40	0.1	0.1	0.2				
H	<i>Bromus madritensis</i>	20	0.6	3.0	3.0				
H	<i>Avena fatua</i>	20	0.4	2.0	2.0				
H	<i>Erodium</i> sp.	20	0.4	2.0	2.0				
H	<i>Bromus hordeaceus</i>	20	0.2	1.0	1.0				
H	<i>Medicago polymorpha</i>	20	0.0	0.2	0.2				
H	<i>Lolium perenne</i>	20	0.0	0.2	0.2				
H	<i>Eschscholzia californica</i>	20	0.0	0.2	0.2				
H	<i>Calystegia occidentalis</i>	20	0.0	0.2	0.2				
H	<i>Lupinus</i> sp.	20	0.0	0.2	0.2				
H	<i>Nassella pulchra</i>	20	0.0	0.2	0.2				
H	<i>Triteleia laxa</i>	20	0.0	0.1	0.1				

***Malacothamnus (aboriginum, arcuatus, fremontii)* Provisional Association**

Common Name: Bush Mallow Shrubland

Alliance: *Malacothamnus fasciculatus* – *Malacothamnus* spp. Shrubland Alliance

Classification Comments

The name of this association has been updated to reflect a new taxonomic treatment (Jepson Flora Project 2024), previously the *Malacothamnus (aboriginum, fremontii, hallii)* Association. *Malacothamnus hallii* is now considered a synonym of *M. arcuatus* var. *elmeri*, which is sometimes the dominant plant in this association, and is still ranked as rare (Morse 2023, CRPR 1B.2). The association is provisional due to low sample size. The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Prunus ilicifolia* – *Heteromeles arbutifolia* – *Ceanothus spinosus*
Shrubland Alliance**



Common Name: Holly leaf cherry – toyon – greenbark ceanothus chaparral

NVC Alliance Code: A3863. *Prunus ilicifolia* - *Heteromeles arbutifolia* - *Ceanothus spinosus* Mesic Chaparral Alliance

Statewide Description

Ceanothus spinosus, *Heteromeles arbutifolia* and/or *Prunus ilicifolia* is dominant or co-dominant in the shrub canopy with *Artemisia californica*, *Ceanothus megacarpus*, *Cercocarpus montanus*, *Clematis lasiantha*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, *Fraxinus dipetala*, *Keckiella antirrhinoides*, *Keckiella cordifolia*, *Quercus berberidifolia*, *Rhamnus ilicifolia*, *Rhus ovata* and *Salvia mellifera*. Emergent trees may be present at low cover, including *Juglans californica* or *Quercus agrifolia*.

Both *H. arbutifolia* and *P. ilicifolia* are variable in size and growth habit, being low and dense in exposed places, becoming open and rangy, or tree like in protected areas with long intervals between fires. Stands are heterogeneous in mesic chaparral habitats on north-facing slopes. The differences between this and other chaparral types appears to be mostly related to site history, largely time since last fire, fire frequency, and adjacent

alliances. In many cases, stands appear to be small fragments in suburban landscapes where fires are rare but human disturbance is high.

Local Vegetation Description

The Holly leaf cherry – toyon – greenbark ceanothus chaparral Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Heteromeles arbutifolia* and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis* and *Diplacus aurantiacus*. Herbs that are often present include *Chlorogalum pomeridianum*. Commonly associated non-vascular plants include Moss.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	7.5	5 – 10
Hardwood	0.2	0 – 1	17.5	5 – 35
Regenerating or Shrubby Tree	0.2	0 – 1	3.8	0 – 10
Shrub	52.3	25 – 78	3.5	2 – 5
Herb	3.5	0 – 11	0.3	0 – 0.5

Local Membership Rule

Heteromeles arbutifolia, *Prunus ilicifolia*, and/or *Ptelea crenulata* > 50% relative cover in the shrub layer, or > 30% relative cover with *Baccharis pilularis*, *Rhamus crocea*, *R. ilicifolia*, and/or *Toxicodendron diversilobum*.

Local Environmental Description

Elevation: Mean 280 m, Range 7 – 680 m

Aspect: NW (2), SW (2), NE (1)

Slope: Mean 23 degrees, Range 20 – 26 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 11.0%, Range 0 – 33%

Small Rock: Mean 22.0%, Range 4 – 50%

Fines Cover: Mean 15.7%, Range 10 – 21%

Litter Cover: Mean 48.3%, Range 25 – 84%

Soil Texture (field assessed): Medium loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone and other sedimentary (4), Sandstone (1), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), East Bay Terraces and Alluvium (3)

Site Impacts

This alliance has low non-native plant cover (average 8.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Eucalyptus globulus* and *Cortaderia jubata*.

Associations in Alameda & Contra Costa Counties

Heteromeles arbutifolia

Prunus ilicifolia – *Rhamnus (crocea, ilicifolia)*

Classification Comments

None.

References: CDFG 2008, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=6): ALCC244, ALCC833, ALCCREC222, ALCCREC616, SPCCA-046, SPCCB-027

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Heteromeles arbutifolia</i>	100	25.8	7.0	45.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	83	6.5	1.0	17.0	Y			Y
S	<i>Diplacus aurantiacus</i>	67	4.0	0.2	14.0				Y
S	<i>Baccharis pilularis</i>	67	2.4	0.2	8.0				Y
S	<i>Rhamnus ilicifolia</i>	33	2.3	2.0	12.0				
S	<i>Clematis lasiantha</i>	33	2.0	0.2	12.0				
S	<i>Adenostoma fasciculatum</i>	33	2.0	2.0	10.0				
S	<i>Artemisia californica</i>	33	0.8	1.0	4.0				
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.1	0.2				Y
NV	Moss	33	5.2	1.0	30.0				

***Heteromeles arbutifolia* Association**

Common Name: Toyon Shrubland

Alliance: *Prunus ilicifolia* – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance

Local Vegetation Description

The Toyon Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Heteromeles arbutifolia* and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis* and *Diplacus aurantiacus*. Herbs that are sometimes present include *Chlorogalum pomeridianum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	7.5	5 – 10
Hardwood	0.2	0 – 1	17.5	5 – 35
Regenerating or Shrubby Tree	0.2	0 – 1	3.9	0 – 10
Shrub	52.6	25 – 78	3.5	2 – 5
Herb	4.0	0.2 – 11	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 263 m, Range 7 – 680 m

Aspect: SW (2), NE (1), NW (1)

Slope: Mean 19 degrees, Range 5 – 26 degrees

Macro Topography: Middle to Upper 1/3 of slope (1)

Large Rock: Mean 16.5%, Range 0 – 33%

Small Rock: Mean 8.0%, Range 4 – 12%

Fines Cover: Mean 13.0%, Range 10 – 16%

Litter Cover: Mean 60.0%, Range 36 – 84%

Soil Texture (field assessed): Medium loam (1)

Geology (field or map data): Sandstone and other sedimentary (4), Sandstone (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Terraces and Alluvium (3), East Bay Hills - Mount Diablo (2)

Site Impacts

This association has low non-native plant cover (average 10.4%) relative to native cover.

Classification Comments

None.

Heteromeles arbutifolia Association

Prunus ilicifolia – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance

References: Rodriguez et al. 2017

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=5): ALCC244, ALCC833, ALCCREC222, ALCCREC616, SPCCA-046

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Heteromeles arbutifolia</i>	100	29.6	18.0	45.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	80	7.6	1.0	17.0	Y			Y
S	<i>Baccharis pilularis</i>	60	2.8	1.0	8.0				Y
S	<i>Diplacus aurantiacus</i>	60	2.0	0.2	5.0				Y
S	<i>Adenostoma fasciculatum</i>	40	2.4	2.0	10.0				
H	<i>Chlorogalum pomeridianum</i>	40	0.1	0.2	0.2				

Heteromeles arbutifolia Association

Prunus ilicifolia – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance

***Prunus ilicifolia* – *Rhamnus (crocea, ilicifolia)* Provisional Association**

Common Name: Holly Leaf Cherry – Redberry Shrubland

Alliance: *Prunus ilicifolia* – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance

Local Vegetation Description

The Holly Leaf Cherry – Redberry Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Prunus ilicifolia*, *Toxicodendron diversilobum*, and either *Rhamnus crocea* or *Rhamnus ilicifolia*. Shrubs that are often present include *Artemisia californica*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, and *Ribes californicum*. Commonly associated emergent trees at sparse cover include *Quercus douglasii*. Herbs that are often present include *Bromus diandrus*, *Carduus pycnocephalus*, and *Marah fabaceus*, and herbs that are sometimes present include *Avena* sp., *Bromus madritensis*, *Chlorogalum pomeridianum*, and *Scrophularia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	2.8	0 – 10	12.5	10 – 15
Regenerating or Shrubby Tree	1.3	0 – 6	2.5	1 – 5
Shrub	53.7	35 – 75	3.5	2 – 5
Herb	15.8	1 – 30	0.5	0 – 1

Local Environmental Description

Elevation: Mean 448 m, Range 211 – 621 m

Aspect: NW (2), SE (2), NE (1)

Slope: Mean 35 degrees, Range 20 – 50 degrees

Macro Topography: Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 3.2%, Range 0 – 15%

Small Rock: Mean 20.6%, Range 0 – 50%

Fines Cover: Mean 40.2%, Range 21 – 65%

Litter Cover: Mean 23.0%, Range 15 – 30%

Soil Texture (field assessed): Loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (2), Conglomerate (1), Sandstone and other sedimentary (1), Volcanic and metavolcanic rocks (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Prunus ilicifolia – *Rhamnus (crocea, ilicifolia)* Provisional Association
Prunus ilicifolia – *Heteromeles arbutifolia* – *Ceanothus spinosus* Shrubland Alliance

Other Subsections: Western Diablo Range (2), Diablo Range (1), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 9.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Avena* sp., *Bromus diandrus*, *Bromus madritensis*, and *Carduus pycnocephalus*.

Classification Comments

This association remains provisional due to low sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: CDFG 2008, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-027

Santa Clara Co. (n=4): CDLO0016, CDLO0052, SCRUZ547, VAWA131

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	40	1.0	2.0	3.0				
S	<i>Toxicodendron diversilobum</i>	100	7.2	0.2	15.0	Y			Y
S	<i>Prunus ilicifolia</i>	80	16.0	15.0	25.0	Y			Y
S	<i>Rhamnus crocea</i>	60	21.5	25.0	45.0				Y
S	<i>Artemisia californica</i>	60	10.8	1.0	28.0				Y
S	<i>Heteromeles arbutifolia</i>	60	4.6	1.0	15.0				Y
S	<i>Diplacus aurantiacus</i>	60	3.4	1.0	14.0				Y
S	<i>Ribes californicum</i>	60	2.1	0.2	10.0				Y
S	<i>Rhamnus ilicifolia</i>	40	4.4	10.0	12.0				
S	<i>Clematis lasiantha</i>	40	2.4	0.2	12.0				
S	<i>Ptelea crenulata</i>	40	1.4	3.0	4.0				
S	<i>Lonicera subspicata</i> var. <i>denudata</i>	40	1.0	0.2	5.0				
S	<i>Sambucus nigra</i>	40	0.6	0.2	3.0				
H	<i>Marah fabaceus</i>	60	4.1	0.2	20.0				Y
H	<i>Bromus diandrus</i>	60	2.5	0.2	12.0				Y
H	<i>Carduus pycnocephalus</i>	60	1.0	0.2	3.0				Y
H	<i>Avena</i> sp.	40	1.0	2.0	3.0				
H	<i>Scrophularia californica</i>	40	0.6	0.2	3.0				
H	<i>Bromus madritensis</i>	40	0.6	0.2	3.0				
H	<i>Chlorogalum pomeridianum</i>	40	0.1	0.1	0.2				

***Quercus berberidifolia* Shrubland Alliance**



Common Name: Scrub oak chaparral

NVC Alliance Code: A2673. *Quercus berberidifolia* - *Adenostoma fasciculatum* Mesic Chaparral Alliance

Statewide Description

Quercus berberidifolia is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Adenostoma sparsifolium*, *Arctostaphylos glandulosa*, *Arctostaphylos glauca*, *Ceanothus crassifolius*, *Ceanothus cuneatus*, *Ceanothus greggii*, *Ceanothus integerrimus*, *Ceanothus leucodermis*, *Ceanothus oliganthus*, *Ceanothus spinosus*, *Ceanothus thyrsiflorus*, *Ceanothus tomentosus*, *Cercocarpus montanus*, *Frangula californica*, *Fraxinus dipetala*, *Heteromeles arbutifolia*, *Pickeringia montana*, *Prunus ilicifolia*, *Quercus wislizeni*, *Rhamnus ilicifolia*, *Rhus ovata*, *Toxicodendron diversilobum* and *Xylococcus bicolor*. Emergent trees may be present at low cover, including *Aesculus californica*, *Juglans californica*, *Pinus attenuata*, *Pinus sabiniana*, *Quercus agrifolia* or *Quercus engelmannii*.

Stands of *Q. berberidifolia* occur typically on mesic, north-facing slopes in cismontane California. This is the most common scrub oak alliance in the state, and it occurs on many substrates. Careful oak identification is necessary in correctly identifying *Q. berberidifolia*. The term “scrub oak” has been used for several shrubby live oaks: *Q.*

berberidifolia, *Q. chrysolepis*, *Q. dumosa* (a CNPS list 1B plant), *Q. john-tuckeri*, *Q. pacifica*, *Q. palmeri*, *Q. turbinella*, *Q. cornelius-mulleri*, and *Q. wislizeni*. *Q. berberidifolia* hybridizes with *Q. dumosa*, *Q. durata*, and *Q. john-tuckeri* and with the tree *Q. engelmannii* (Nixon 2002). Many other shrub species occur in *Q. berberidifolia* stands, though usually at low cover. Sometimes they approach *Q. berberidifolia* in cover, such as the Scrub oak-birchleaf mountain mahogany series described by Gordon and White (1994) and Sawyer and Keeler-Wolf (1995).

Expressions of this alliance where *Q. berberidifolia* and *Adenostoma fasciculatum* co-dominate typically mark an ecological interface between relatively mesic and relatively xeric sites. These settings are commonly on lower to upper concave southerly aspects, or upper convex northerly-facing aspects with well-drained soil. *Heteromeles arbutifolia* is often found in these settings but with low cover. This alliance concept has been expanded since the MCV second edition (2009) to include the *Quercus berberidifolia* - *Adenostoma fasciculatum* alliance and associations.

Local Vegetation Description

The Scrub oak chaparral Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Quercus berberidifolia* and *Toxicodendron diversilobum*, and those that are often present include *Cercocarpus betuloides*, *Clematis lasiantha*, *Heteromeles arbutifolia*, *Holodiscus discolor*, *Rhamnus ilicifolia*, and *Symphoricarpos albus*. Regenerating or shrubby trees that are often present include *Quercus wislizeni* and *Umbellularia californica*. Commonly associated emergent trees at sparse cover include *Quercus kelloggii* and *Quercus xmacdonaldii*. The herbaceous layer typically includes *Cynosurus echinatus*, *Sanicula crassicaulis*, and *Torilis arvensis*, and herbs that are often present include *Achillea millefolium*, *Avena barbata*, *Brachypodium distachyon*, *Bromus rubens*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Chlorogalum pomeridianum*, *Clarkia rubicunda*, *Dryopteris arguta*, *Elymus glaucus*, *Festuca californica*, *Galium aparine*, *Galium porrigens*, *Helianthella castanea*, *Madia gracilis*, *Melica imperfecta*, *Perideridia kelloggii*, *Triteleia laxa*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.0	0 – 2	3.5	2 – 5
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	27.0	25 – 29	3.5	2 – 5
Herb	12.0	2 – 22	0.3	0 – 0.5

Local Membership Rule

Quercus berberidifolia > 50% relative cover in the shrub canopy, or > 30% relative cover with *Adenostoma fasciculatum*, *Ceanothus cuneatus* and/or other chaparral shrubs.

Local Environmental Description

Elevation: Mean 546 m, Range 487 – 604 m

Aspect: NE (2)

Slope: Mean 25 degrees, Range 23 – 27 degrees

Macro Topography: Middle 1/3 of slope to Ridgtop (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.1%, Range 0 – 0.2%

Small Rock: Mean 0.2%, Range 0 – 0.4%

Fines Cover: Mean 35.0%, Range 31 – 39%

Litter Cover: Mean 63.5%, Range 60 – 67%

Soil Texture (field assessed): Clay (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This alliance has low non-native plant cover (average 4.9%) relative to native cover.

Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Cynosurus echinatus*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Quercus berberidifolia

Classification Comments

None.

References: AECOM 2013, Borchert et al. 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2023, White 1994a

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC022, ALCC068

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus xmacdonaldii</i>	50	0.5	1.0	1.0				Y
T	<i>Quercus kelloggii</i>	50	0.5	1.0	1.0				Y
R	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus wislizeni</i>	50	0.1	0.2	0.2				Y
S	<i>Quercus berberidifolia</i>	100	17.0	16.0	19.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	5.0	4.0	6.0	Y			Y
S	<i>Holodiscus discolor</i>	50	6.5	13.0	13.0				Y
S	<i>Heteromeles arbutifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Cercocarpus betuloides</i>	50	0.1	0.2	0.2				Y
S	<i>Symphoricarpos albus</i>	50	0.1	0.2	0.2				Y
S	<i>Rhamnus ilicifolia</i>	50	0.1	0.2	0.2				Y
S	<i>Clematis lasiantha</i>	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	100	1.1	0.2	2.0	Y			Y
H	<i>Torilis arvensis</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Sanicula crassicaulis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Festuca californica</i>	50	1.5	3.0	3.0				Y
H	<i>Perideridia kelloggii</i>	50	1.0	2.0	2.0				Y
H	<i>Melica imperfecta</i>	50	0.5	1.0	1.0				Y
H	<i>Avena barbata</i>	50	0.5	1.0	1.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.5	1.0	1.0				Y
H	<i>Achillea millefolium</i>	50	0.5	1.0	1.0				Y
H	<i>Cerastium glomeratum</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia rubicunda</i>	50	0.1	0.2	0.2				Y
H	<i>Dryopteris arguta</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus glaucus</i>	50	0.1	0.2	0.2				Y
H	<i>Galium aparine</i>	50	0.1	0.2	0.2				Y
H	<i>Galium porrigens</i>	50	0.1	0.2	0.2				Y
H	<i>Madia gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Triteleia laxa</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus rubens</i>	50	0.1	0.2	0.2				Y
H	<i>Brachypodium distachyon</i>	50	0.1	0.2	0.2				Y
H	<i>Helianthella castanea</i>	50	0.1	0.2	0.2				Y
NV	Lichen	50	0.1	0.2	0.2				Y
NV	Moss	50	0.1	0.2	0.2				Y

***Quercus berberidifolia* Association**

Common Name: Scrub Oak Shrubland

Alliance: *Quercus berberidifolia* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: AECOM 2013, Borchert et al. 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2023, White 1994a

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

***Quercus durata* Shrubland Alliance**



Common Name: Leather oak chaparral

NVC Alliance Code: A3862. *Quercus durata* Ultramafic Chaparral Alliance

Statewide Description

Quercus durata is dominant, co-dominant, or characteristic in the shrub canopy with *Adenostoma fasciculatum*, *Arctostaphylos glandulosa*, *Arctostaphylos glauca*, *Arctostaphylos pungens*, *Arctostaphylos viscida*, *Ceanothus jepsonii*, *Cercocarpus montanus*, *Eriodictyon californicum*, *Fremontodendron californicum*, *Garrya congdonii*, *Heteromeles arbutifolia*, *Quercus berberidifolia*, *Quercus wislizeni*, and *Umbellularia californica*. Emergent trees may be present at low cover, including *Hesperocyparis macnabiana*, *Hesperocyparis sargentii*, *Juniperus californica*, *Pinus attenuata*, or *Pinus sabiniana*.

Stands of this alliance have high fidelity to serpentine or other ultramafic substrates (Alexander et al. 2007, Kruckeberg 1984), typically occupying mesic sites, including north-facing slopes. *Quercus durata* includes two varieties: var. *durata* and var. *gabrielensis*. This alliance mainly describes *Quercus durata* var. *durata*, which grows on serpentine substrates in the Coastal Ranges and the foothills of the Sierra Nevada. The

southern variety, *Q. durata* var. *gabrielensis*, occupies barren gneiss-derived soils in the San Gabriel Mountains.

Local Vegetation Description

The Leather oak chaparral Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Quercus durata* and *Toxicodendron diversilobum*. Regenerating or shrubby trees that are often present include *Umbellularia californica*. Commonly associated emergent trees at sparse cover include *Pinus ponderosa*, *Juniperus californica*, and *Quercus douglasii*. The herbaceous layer typically includes *Melica torreyana*, and herbs that are often present include *Chlorogalum pomeridianum* and *Triteleia laxa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.7	0 – 1	8.0	2 – 15
Hardwood	0.1	0 – 0.2	3.5	2 – 5
Regenerating or Shrubby Tree	1.1	0 – 3	1.8	0 – 5
Shrub	37.0	5 – 65	1.9	0.5 – 5
Herb	3.0	2 – 5	0.4	0 – 1

Local Membership Rule

Quercus durata > 50% relative cover in the shrub canopy, or is characteristically present at significant cover with *Adenostoma fasciculatum*, *Arctostaphylos glauca*, *Frangula californica* ssp. *tomentella*, *Heteromeles arbutifolia* and/or *Umbellularia californica*.

Local Environmental Description

Elevation: Mean 782 m, Range 762 – 810 m

Aspect: NE (3)

Slope: Mean 11 degrees, Range 1 – 18 degrees

Macro Topography: Upper 1/3 of slope (2), Lower 1/3 of slope (1)

Large Rock: Mean 0.4%, Range 0 – 1%

Small Rock: Mean 3.3%, Range 0 – 5%

Fines Cover: Mean 31.3%, Range 0 – 89%

Litter Cover: Mean 62.3%, Range 3 – 96%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Serpentine (2), Franciscan melange (1)

Alameda County Subsections: Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (2)

Site Impacts

This alliance has low non-native plant cover (average 1.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea* and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Quercus durata

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2007, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC829

Contra Costa County (n=0):

Santa Clara Co. (n=2): SCPOF011, SPCCB-161

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Juniperus californica</i>	33	0.3	1.0	1.0				
T	<i>Pinus ponderosa</i>	33	0.3	1.0	1.0				
T	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
R	<i>Umbellularia californica</i>	67	1.1	0.2	3.0				Y
R	<i>Quercus</i> sp.	33	0.0	0.1	0.1				
S	<i>Quercus durata</i>	100	36.7	5.0	65.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	2.1	0.2	5.0	Y			Y
S	<i>Garrya elliptica</i>	33	0.7	2.0	2.0				
S	<i>Clematis</i> sp.	33	0.3	1.0	1.0				
S	<i>Ceanothus cuneatus</i>	33	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	33	0.1	0.2	0.2				
S	<i>Symphoricarpos mollis</i>	33	0.1	0.2	0.2				
S	<i>Adenostoma fasciculatum</i>	33	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	67	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	67	0.1	0.2	0.2				Y
H	<i>Melica torreyana</i>	33	0.7	2.0	2.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Acmispon wrangelianus</i>	33	0.7	2.0	2.0				
H	<i>Bromus rubens</i>	33	0.3	1.0	1.0				
H	<i>Melica imperfecta</i>	33	0.3	1.0	1.0				
H	<i>Eschscholzia californica</i>	33	0.1	0.2	0.2				
H	<i>Claytonia perfoliata</i>	33	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
H	<i>Galium</i> sp.	33	0.1	0.2	0.2				
H	<i>Emmenanthe penduliflora</i>	33	0.1	0.2	0.2				
H	<i>Cynoglossum grande</i>	33	0.1	0.2	0.2				
H	<i>Calystegia purpurata</i>	33	0.1	0.2	0.2				
H	<i>Calochortus albus</i>	33	0.1	0.2	0.2				
H	<i>Calochortus</i> sp.	33	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	33	0.1	0.2	0.2				
H	<i>Bromus carinatus</i>	33	0.1	0.2	0.2				
H	<i>Stachys</i> sp.	33	0.1	0.2	0.2				
H	<i>Koeleria macrantha</i>	33	0.1	0.2	0.2				
H	<i>Leptosiphon</i> sp.	33	0.1	0.2	0.2				
H	<i>Lomatium</i> sp.	33	0.1	0.2	0.2				
H	<i>Festuca</i> sp.	33	0.1	0.2	0.2				
H	<i>Lupinus</i> sp.	33	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	33	0.1	0.2	0.2				
H	<i>Madia gracilis</i>	33	0.1	0.2	0.2				
H	<i>Galium porrigens</i>	33	0.1	0.2	0.2				
NV	Lichen	33	0.1	0.2	0.2				

***Quercus durata* Association**

Common Name: Leather Oak Shrubland

Alliance: *Quercus durata* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Klein et al. 2007, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

***Quercus wislizeni* – *Quercus chrysolepis* (shrub) Shrubland Alliance**



Common Name: Canyon live oak - Interior live oak chaparral

NVC Alliance Code: A3860. *Quercus wislizeni* var. *frutescens* - *Arctostaphylos glandulosa* Pre-montane Chaparral Alliance

Statewide Description

Quercus chrysolepis, *Quercus parvula* and/or *Quercus wislizeni* is dominant or co-dominate together or with other *Quercus* spp. in the shrub canopy with *Adenostoma fasciculatum*, *Adenostoma sparsifolium*, *Arctostaphylos glandulosa*, *Arctostaphylos glauca*, *Carpenteria californica*, *Ceanothus cuneatus*, *Ceanothus integerrimus*, *Ceanothus leucodermis*, *Ceanothus oliganthus*, *Cercocarpus montanus*, *Frangula californica*, *Fraxinus dipetala*, *Hesperoyucca whipplei*, *Heteromeles arbutifolia*, *Prunus ilicifolia*, *Quercus agrifolia*, *Quercus berberidifolia*, *Rhamnus ilicifolia* and/or *Toxicodendron diversilobum*. Emergent trees may be present at low cover, including *Aesculus californica*, *Juniperus californica*, *Pinus attenuata*, *Pinus coulteri*, *Pinus sabiniana* or *Umbellularia californica*.

Quercus wislizeni is a widespread and common species in shrublands, forests, and woodlands of the state. Shrubby stands, either because they represent the possible

distinct var. *frutescens* or because of age-related limited height growth, are included in this alliance. White and Sawyer (1995) consider that many southern California shrublands are the result of frequent sprouting after fires. However, plants previously identified as *Quercus wislizeni* in the coastal regions from parts of Mendocino County south to Santa Barbara County, are now considered a variety of *Quercus parvula* or a related hybrid (Hauser et al. 2017, Al Keuter, pers. comm. 2020). *Quercus chrysolepis* is also a widespread and common species in chaparral, forests, and woodlands throughout the state. It is a slow-growing, evergreen shrub or tree. The shrubby nature of this alliance in the landscape arises because of various limiting factors, such as repeat fires, nutrient poor soils, rocky slopes and ridgetops with poor soil development, wind shearing, etc. These stands are shorter than their tree-alliance counterpart, and other shrubs are often present and contribute overall to the shrubby character of the stands.

Local Vegetation Description

The Canyon live oak - Interior live oak chaparral Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Quercus palmeri* or *Quercus chrysolepis*, and those that are often present include *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Quercus wislizeni*. The herbaceous layer typically includes *Avena barbata* and *Carduus pycnocephalus*, and herbs that are often present include *Bromus diandrus*, and *Centaurea solstitialis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.8	0 – 4	3.5	2 – 5
Regenerating or Shrubby Tree	0.1	0 – 0.4	1.5	1 – 2
Shrub	33.5	20 – 46	3.5	2 – 5
Herb	22.3	10 – 39	0.6	0 – 1

Local Membership Rule

Regenerating or shrubby *Quercus palmeri*, *Q. wislizeni*, *Q. parvula* and/or *Q. agrifolia* > 30% relative cover in the shrub layer.

Local Environmental Description

Elevation: Mean 456 m, Range 205 – 809 m

Aspect: NW (1), SE (1), SW (1), Variable (1)

Slope: Mean 18 degrees, Range 0 – 45 degrees

Macro Topography: Ridge top (2), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 18.9%, Range 0 – 47%

Small Rock: Mean 5.7%, Range 0 – 20%

Fines Cover: Mean 35.3%, Range 10 – 63%

Litter Cover: Mean 39.0%, Range 20 – 55%

Soil Texture (field assessed): Medium to very fine, loamy sand (2), Medium to very fine, sandy loam (1), Medium silt loam (1)

Geology (field or map data): Sandstone (2), Franciscan melange (1), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 32.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cichorium intybus*, *Cynosurus echinatus*, *Erodium botrys*, *Hirschfeldia incana*, *Hordeum murinum*, *Marrubium vulgare*, *Sherardia arvensis*, *Silybum marianum*, and *Torilis arvensis*.

Associations in Alameda & Contra Costa Counties

Quercus palmeri

Quercus wislizeni – *Quercus berberidifolia*

Classification Comments

One of the associations listed here is newly described and included with this alliance, the *Quercus palmeri* Association. Previously, all *Quercus palmeri* stands were in the *Quercus palmeri* alliance, which has a range limited to southern California.

References: Evens and San 2005, Klein and Evens 2005, Reyes et al. 2023, White and Sawyer 1994

Global Rarity Rank: G4

State Rarity Rank: S3S4

Surveys Used for Description

Total: N=4; Alameda County (n=3): ALCC074, ALCC081, ALCC506

Contra Costa County (n=1): ALCC211

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	25	1.0	4.0	4.0				
T	<i>Quercus agrifolia</i>	25	0.8	3.0	3.0				
R	<i>Quercus chrysolepis</i>	25	5.0	20.0	20.0				
R	<i>Quercus wislizeni</i> *	25	0.1	0.2	0.2				
R	<i>Umbellularia californica</i>	25	0.1	0.2	0.2				
S	<i>Quercus palmeri</i>	75	21.5	18.0	40.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	50	1.6	0.2	6.0				Y
S	<i>Quercus berberidifolia</i>	25	5.0	20.0	20.0				
S	<i>Quercus durata</i>	25	0.5	2.0	2.0				
S	<i>Artemisia californica</i>	25	0.3	1.0	1.0				
S	<i>Ceanothus cuneatus</i>	25	0.3	1.0	1.0				
S	<i>Sambucus nigra</i>	25	0.3	1.0	1.0				
S	<i>Rhamnus crocea</i>	25	0.1	0.2	0.2				
S	<i>Arctostaphylos crustacea</i>	25	0.1	0.2	0.2				
S	<i>Gutierrezia californica</i>	25	0.1	0.2	0.2				
S	<i>Lonicera hispidula</i>	25	0.1	0.2	0.2				
S	<i>Holodiscus discolor</i>	25	0.1	0.2	0.2				
S	<i>Lotus scoparius</i>	25	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	100	2.4	0.2	8.0	Y			Y
H	<i>Avena barbata</i>	75	3.1	0.2	10.0	Y			Y
H	<i>Bromus diandrus</i>	50	8.5	9.0	25.0				Y
H	<i>Centaurea solstitialis</i>	50	0.6	0.2	2.0				Y
H	<i>Brassica nigra</i>	25	2.5	10.0	10.0				
H	<i>Hordeum</i> sp.	25	2.0	8.0	8.0				
H	<i>Pholistoma auritum</i>	25	1.0	4.0	4.0				
H	<i>Hirschfeldia incana</i>	25	0.8	3.0	3.0				
H	<i>Cynosurus echinatus</i>	25	0.5	2.0	2.0				
H	<i>Torilis arvensis</i>	25	0.5	2.0	2.0				
H	<i>Bromus madritensis</i>	25	0.5	2.0	2.0				
H	<i>Bromus rubens</i>	25	0.3	1.0	1.0				
H	<i>Hordeum murinum</i>	25	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	25	0.1	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium botrys</i>	25	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	25	0.1	0.2	0.2				
H	<i>Dudleya cymosa</i>	25	0.1	0.2	0.2				
H	<i>Stephanomeria virgata</i>	25	0.1	0.2	0.2				
H	<i>Bromus carinatus</i>	25	0.1	0.2	0.2				
H	<i>Galium aparine</i>	25	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i>	25	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	25	0.1	0.2	0.2				
H	<i>Monardella villosa</i>	25	0.1	0.2	0.2				
H	<i>Psilocarphus tenellus</i>	25	0.1	0.2	0.2				
H	<i>Sanicula crassicaulis</i>	25	0.1	0.2	0.2				
H	<i>Sherardia arvensis</i>	25	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	25	0.1	0.2	0.2				
H	<i>Cichorium intybus</i>	25	0.1	0.2	0.2				
H	<i>Marrubium vulgare</i>	25	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	25	0.0	0.1	0.1				
H	<i>Silybum marianum</i>	25	0.0	0.1	0.1				
H	<i>Melica imperfecta</i>	25	0.0	0.1	0.1				
H	<i>Chlorogalum pomeridianum</i>	25	0.0	0.1	0.1				
NV	Lichen	50	0.1	0.2	0.2				Y
NV	Moss	50	0.1	0.2	0.2				Y

***Quercus palmeri* Provisional Association**

Common Name: Palmer's Oak Shrubland

Alliance: *Quercus wislizeni* – *Quercus chrysolepis* (shrub) Shrubland Alliance

Local Vegetation Description

The Palmer's Oak Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Quercus palmeri*, and those that are often present include *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. The herbaceous layer typically includes *Brassica nigra*, *Bromus diandrus*, and *Carduus pycnocephalus*, and herbs that are often present include *Avena barbata*, *Bromus diandrus*, and *Centaurea solstitialis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.0	0 – 3	3.5	2 – 5
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	31.3	20 – 46	3.5	2 – 5
Herb	26.3	10 – 39	0.6	0 – 1

Local Environmental Description

Elevation: Mean 338 m, Range 205 – 506 m

Aspect: SE (1), SW (1), Variable (1)

Slope: Mean 17 degrees, Range 0 – 45 degrees

Macro Topography: Ridge top (2), Upper 1/3 of slope (1)

Large Rock: Mean 25.0%, Range 13 – 47%

Small Rock: Mean 7.4%, Range 1 – 20%

Fines Cover: Mean 27.7%, Range 10 – 63%

Litter Cover: Mean 38.7%, Range 20 – 55%

Soil Texture (field assessed): Medium to very fine, loamy sand (2), Medium silt loam (1)

Geology (field or map data): Sandstone (2), Ultramafic (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This association has moderate non-native plant cover (average 36.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*,

Quercus palmeri Provisional Association
Quercus wislizeni – *Quercus chrysolepis* (shrub) Shrubland Alliance

Centaurea solstitialis, *Cichorium intybus*, *Erodium botrys*, *Hirschfeldia incana*, *Hordeum murinum*, *Marrubium vulgare*, and *Silybum marianum*.

Classification Comments

This association is newly described here as a provisional type due to low sample size. Previously, all stands dominated by *Quercus palmeri* were placed in the *Quercus palmeri* Alliance which has a range limited to southern California.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; **Alameda County (n=2):** ALCC074, ALCC506

Contra Costa County (n=1): ALCC211

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	33	1.0	3.0	3.0				
S	<i>Quercus palmeri</i>	100	28.7	18.0	40.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	67	2.1	0.2	6.0				Y
S	<i>Artemisia californica</i>	33	0.3	1.0	1.0				
S	<i>Sambucus nigra</i>	33	0.3	1.0	1.0				
S	<i>Gutierrezia californica</i>	33	0.1	0.2	0.2				
S	<i>Holodiscus discolor</i>	33	0.1	0.2	0.2				
S	<i>Lotus scoparius</i>	33	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Bromus diandrus</i>	67	11.3	9.0	25.0				Y
H	<i>Avena barbata</i>	67	4.0	2.0	10.0				Y
H	<i>Centaurea solstitialis</i>	67	0.7	0.2	2.0				Y
H	<i>Brassica nigra</i>	33	3.3	10.0	10.0				
H	<i>Hordeum</i> sp.	33	2.7	8.0	8.0				
H	<i>Pholistoma auritum</i>	33	1.3	4.0	4.0				
H	<i>Hirschfeldia incana</i>	33	1.0	3.0	3.0				
H	<i>Bromus madritensis</i>	33	0.7	2.0	2.0				
H	<i>Bromus rubens</i>	33	0.3	1.0	1.0				
H	<i>Eriogonum nudum</i>	33	0.1	0.2	0.2				
H	<i>Cichorium intybus</i>	33	0.1	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eschscholzia californica</i>	33	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i>	33	0.1	0.2	0.2				
H	<i>Bromus carinatus</i>	33	0.1	0.2	0.2				
H	<i>Dudleya cymosa</i>	33	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	33	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	33	0.1	0.2	0.2				
H	<i>Monardella villosa</i>	33	0.1	0.2	0.2				
H	<i>Psilocarphus tenellus</i>	33	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	33	0.1	0.2	0.2				
H	<i>Stephanomeria virgata</i>	33	0.1	0.2	0.2				
H	<i>Marrubium vulgare</i>	33	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.0	0.1	0.1				
H	<i>Melica imperfecta</i>	33	0.0	0.1	0.1				
H	<i>Chlorogalum pomeridianum</i>	33	0.0	0.1	0.1				
H	<i>Silybum marianum</i>	33	0.0	0.1	0.1				
NV	Lichen	33	0.1	0.2	0.2				
NV	Moss	33	0.1	0.2	0.2				

***Quercus wislizeni* – *Quercus berberidifolia* Association**

Common Name: Interior Live Oak – Scrub Oak Shrubland

Alliance: *Quercus wislizeni* – *Quercus chrysolepis* (shrub) Shrubland Alliance

Local Vegetation Description

The Interior Live Oak – Scrub Oak Association forms an intermittent shrub layer in the single sample available. The emergent tree layer is open, and the herbaceous layer is open. Characteristic shrubs include *Quercus berberidifolia*, *Ceanothus cuneatus*, and *Quercus durata*. Shrubby trees that are characteristic include *Quercus chrysolepis*. Emergent trees at low cover include *Quercus wislizeni*. The herbaceous layer includes *Avena barbata*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Galium aparine*, *Sanicula crassicaulis*, *Sherardia arvensis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	4.0	4 – 4	3.5	2 – 5
Regenerating or Shrubby Tree	0.4	0.4 – 0.4	1.5	1 – 2
Shrub	40.0	40 – 40	3.5	2 – 5
Herb	10.0	10 – 10	0.8	0.5 – 1

Local Environmental Description

Elevation: 809 m

Aspect: NW (1)

Slope: 18 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0.4%

Small Rock: 0.4%

Fines Cover: 58%

Litter Cover: 40%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 20.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Cynosurus echinatus*, *Sherardia arvensis*, and *Torilis arvensis*.

Classification Comments

None.

References: Evens and San 2005, Klein and Evens 2005, Reyes et al. 2023, White and Sawyer 1994

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC081

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus wislizeni</i>	100	4.0	4.0	4.0	Y	Y		Y
R	<i>Quercus chrysolepis</i>	100	20.0	20.0	20.0	Y	Y		Y
R	<i>Umbellularia californica</i>	100	0.2	0.2	0.2	Y			Y
R	<i>Quercus wislizeni</i> *	100	0.2	0.2	0.2	Y			Y
S	<i>Quercus berberidifolia</i>	100	20.0	20.0	20.0	Y	Y		Y
S	<i>Quercus durata</i>	100	2.0	2.0	2.0	Y			Y
S	<i>Ceanothus cuneatus</i>	100	1.0	1.0	1.0	Y			Y
S	<i>Rhamnus crocea</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Lonicera hispidula</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Arctostaphylos crustacea</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	8.0	8.0	8.0	Y	Y		Y
H	<i>Cynosurus echinatus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Torilis arvensis</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Sanicula crassicaulis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Sherardia arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Galium aparine</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	100	0.2	0.2	0.2	Y			Y
NV	Lichen	100	0.2	0.2	0.2	Y	Y		Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y

***Rhus trilobata* – *Crataegus rivularis* – *Forestiera pubescens*
Shrubland Alliance**



Common Name: Basket bush – river hawthorn – desert olive patches

NVC Alliance Code: A3799. *Rhus trilobata* - *Crataegus rivularis* - *Forestiera pubescens* Shrubland Alliance

Statewide Description

Forestiera pubescens, *Rhus trilobata* and/or *Sambucus nigra* are dominant or co-dominant in the shrub canopy with *Atriplex canescens*, *Baccharis emoryi*, *Baccharis sergiloides*, *Ericameria linearifolia*, *Gutierrezia sarothrae*, *Phragmites australis*, *Prunus fasciculata*, *Salix exigua* and *Vitis girdiana*. Emergent trees may be present at low cover, including *Populus fremontii*, *Quercus* spp. or *Salix laevigata*.

The *Forestiera pubescens* Shrubland Alliance has been expanded to include stands dominated or co-dominated by *Rhus trilobata* or *Sambucus nigra* (NatureServe 2015, Evens et al. 2014). Stands occur as scattered, small patches in California (McMinn 1939). They are not common and usually occur in slightly drier conditions upslope from flowing water in areas with subsurface moisture such as washes and river terraces, springs in hilly terrain, and narrows in desert canyon bottoms where moisture is forced

to the surface. These stands are often associated with other riparian types dominated by *Baccharis salicifolia*, *B. sergiloides*, *Populus fremontii*, *Salix exigua*, and *Tamarix*.

Local Vegetation Description

The Basket bush – river hawthorn – desert olive patches Alliance forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Forestiera pubescens*, and those that are often present include *Artemisia californica*, *Diplacus aurantiacus*, *Sambucus nigra*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Aesculus californica*. The herbaceous layer typically includes *Marah fabaceus*, and herbs that are often present include *Grindelia camporum*, *Hirschfeldia incana*, *Hordeum murinum*, *Lupinus microcarpus*, *Marah fabaceus*, *Polypogon monspeliensis*, and *Stachys albens*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	4.0	3 – 5	3.5	2 – 5
Regenerating or Shrubby Tree	0.1	0 – 0.1	no data	no data
Shrub	60.5	45 – 76	3.5	2 – 5
Herb	14.0	1 – 27	0.8	0.5 – 1

Local Membership Rule

Forestiera pubescens or *Sambucus nigra* > 50% relative cover in the shrub canopy.

Local Environmental Description

Elevation: Mean 286 m, Range 285 – 288 m

Aspect: SE (1)

Slope: 2 degrees

Macro Topography: Bottom (1)

Large Rock: 4%

Small Rock: 13%

Fines Cover: 45%

Litter Cover: 35%

Soil Texture (field assessed): Unknown (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: Diablo Range (1), Eastern Hills (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has low non-native plant cover (average 17.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Carduus tenuiflorus*,

Centaurea melitensis, *Hirschfeldia incana*, *Hordeum murinum*, and *Polypogon monspeliensis*.

Associations in Alameda & Contra Costa Counties

Forestiera pubescens

Classification Comments

None.

References: Evens et al. 2014, Keeler-Wolf and Thomas 2000, Reyes et al. 2020a, VegCAMP 2015a

Global Rarity Rank: G4

State Rarity Rank: S3?

Surveys Used for Description

Total: N=2; Alameda County (n=2): LLNL018, SVRA_CA002

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	100	4.0	3.0	5.0	Y	Y		Y
S	<i>Forestiera pubescens</i>	100	56.5	38.0	75.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	50	3.5	7.0	7.0				Y
S	<i>Sambucus nigra</i>	50	1.0	2.0	2.0				Y
S	<i>Diplacus aurantiacus</i>	50	0.1	0.2	0.2				Y
S	<i>Artemisia californica</i>	50	0.1	0.1	0.1				Y
H	<i>Hirschfeldia incana</i>	50	7.0	14.0	14.0				Y
H	<i>Bromus rubens</i>	50	2.0	4.0	4.0				Y
H	<i>Bromus diandrus</i>	50	1.5	3.0	3.0				Y
H	<i>Avena barbata</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus hordeaceus</i>	50	1.0	2.0	2.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.5	1.0	1.0				Y
H	<i>Marah fabaceus</i>	50	0.5	1.0	1.0				Y
H	<i>Stachys albens</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Achillea millefolium</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus tenuiflorus</i>	50	0.1	0.2	0.2				Y
H	<i>Centaurea melitensis</i>	50	0.1	0.2	0.2				Y
H	<i>Clarkia affinis</i>	50	0.1	0.2	0.2				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Elymus triticoides</i>	50	0.1	0.2	0.2				Y
H	<i>Hordeum murinum</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Grindelia camporum</i>	50	0.1	0.2	0.2				Y
H	<i>Lupinus microcarpus</i>	50	0.1	0.2	0.2				Y

***Forestiera pubescens* Provisional Association**

Common Name: Desert Olive Shrubland

Alliance: *Rhus trilobata* – *Crataegus rivularis* – *Forestiera pubescens* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description. The association remains provisional due to low sample size.

References: Evens et al. 2014, Keeler-Wolf and Thomas 2000, Reyes et al. 2020a, VegCAMP 2015a

Global Rarity Rank: G1G2

State Rarity Rank: S1S2

State Rare: Y

***Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Shrubland Alliance**



Common Name: Oak gooseberry – basket bush – coffeeberry thickets

NVC Alliance Code: A2375. *Ribes quercetorum* - *Rhus trilobata* - *Frangula californica*
Scrub Alliance

Statewide Description

Stands are dominated by mesic shrubs such as *Ribes quercetorum*, *Rhus trilobata*, *Frangula californica*, *Sambucus nigra*, and *Cercis occidentalis* in mesic upland settings. Stands are often small, less than 1 acres found on rocky outcrops and north-facing slopes at low to mid-elevation in the Sierra Nevada Foothills and other cismontane locations.

Local Vegetation Description

The Oak gooseberry – basket bush – coffeeberry thickets Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. Dominant and characteristic shrubs include *Toxicodendron diversilobum*, *Frangula californica*, and *Prunus emarginata*, and those

that are often present include *Ribes menziesii* and *Sambucus nigra*. Herbs that are often present include *Scrophularia californica*, and herbs that are sometimes present include *Achillea millefolium*, *Aira caryophyllea*, *Bromus diandrus*, *Bromus hordeaceus*, *Claytonia perfoliata*, *Lolium perenne*, *Lysimachia arvensis*, *Monardella villosa*, *Sanicula crassicaulis*, *Sanicula laciniata*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	7.5	5 – 10
Hardwood	0.1	0 – 0.2	11.3	5 – 20
Regenerating or Shrubby Tree	0.3	0 – 2	2.2	0 – 5
Shrub	36.9	20 – 61	2.9	1 – 5
Herb	7.3	0 – 37	0.3	0 – 1

Local Membership Rule

Amelanchier utahensis, *Frangula californica*, *Oemleria cerasiformis*, *Prunus emarginata*, *Prunus virginiana*, *Ribes menziesii*, and/or *Ribes quercetorum* > 50% relative cover, alone or in combination, in the shrub canopy.

Local Environmental Description

Elevation: Mean 884 m, Range 499 – 1125 m

Aspect: NE (7), NW (2), SE (1)

Slope: Mean 15 degrees, Range 2 – 38 degrees

Macro Topography: Middle to Upper 1/3 of slope (3), Lower 1/3 of slope (2), Middle 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.3%, Range 0 – 2%

Small Rock: Mean 25.4%, Range 3 – 60%

Fines Cover: Mean 43.6%, Range 6 – 76%

Litter Cover: Mean 29.2%, Range 1 – 80%

Soil Texture (field assessed): Moderately coarse, sandy loam (5), Coarse sand (1), Medium silt loam (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (4), Franciscan melange (2), General volcanic extrusives (1), Mixed sedimentary (1), Sandstone (1), Sandstone and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (7), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1), East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has low non-native plant cover (average 9.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Bromus hordeaceus*, *Lolium perenne*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Frangula californica – (*Prunus emarginata* – *Ribes menziesii*)

Prunus emarginata Foothills

Prunus virginiana Foothills

Ribes quercetorum – *Rhus trilobata* – *Frangula californica* alliance

Classification Comments

This merged alliance has been expanded to contain additional dominants and co-dominants including *Prunus emarginata*.

References: Buck-Diaz et al. 2012, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

Surveys Used for Description

Total: N=10; Alameda County (n=8): ALCC069, ALCC070, ALCC131, ALCC132, ALCC133, ALCC139, ALCC140, ALCC761

Contra Costa County (n=2): ALCC236, ALCC763

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Pinus sabiniana</i>	20	0.1	0.2	0.4				
R	<i>Quercus douglasii</i>	20	0.0	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	90	3.8	1.0	10.0	Y			Y
S	<i>Ribes menziesii</i>	70	0.8	0.2	3.0				Y
S	<i>Prunus emarginata</i>	50	11.4	1.0	42.0				Y
S	<i>Frangula californica</i>	50	7.1	5.0	20.0				Y
S	<i>Sambucus nigra</i>	50	0.7	0.2	5.0				Y
S	<i>Prunus virginiana</i> var. <i>demissa</i>	40	7.0	6.0	24.0				
S	<i>Baccharis pilularis</i>	40	3.5	3.0	14.0				
S	<i>Amelanchier utahensis</i>	30	1.6	1.0	12.0				
S	<i>Symphoricarpos mollis</i>	30	0.3	0.2	3.0				
S	<i>Holodiscus discolor</i>	20	0.9	4.0	5.0				
S	Standing snag	20	0.4	1.0	3.0				
S	<i>Quercus berberidifolia</i>	20	0.0	0.1	0.2				
H	<i>Scrophularia californica</i>	70	0.3	0.2	1.0				Y
H	<i>Bromus diandrus</i>	40	2.8	0.2	27.0				
H	<i>Vulpia bromoides</i>	30	0.4	0.2	3.0				
H	<i>Bromus hordeaceus</i>	30	0.3	0.2	2.0				
H	<i>Aira caryophyllea</i>	30	0.3	0.2	2.0				
H	<i>Achillea millefolium</i>	30	0.1	0.2	1.0				
H	<i>Sanicula crassicaulis</i>	20	0.2	1.0	1.0				
H	<i>Lysimachia arvensis</i>	20	0.1	0.2	1.0				
H	<i>Claytonia perfoliata</i>	20	0.1	0.2	1.0				
H	<i>Lolium perenne</i>	20	0.0	0.2	0.2				
H	<i>Monardella villosa</i>	20	0.0	0.2	0.2				
H	<i>Sanicula laciniata</i>	20	0.0	0.2	0.2				
NV	Moss	50	0.4	0.2	2.0				Y
NV	Lichen	20	0.4	1.0	3.0				

***Frangula californica* – (*Prunus emarginata* – *Ribes menziesii*)
Provisional Association**

Common Name: California Coffeeberry – (Bitter Cherry – Canyon Gooseberry)
Shrubland

Alliance: *Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Local Vegetation Description

The California Coffeeberry – (Bitter Cherry – Canyon Gooseberry) Association forms an intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Frangula californica*, *Ribes menziesii*, and *Prunus emarginata*. *Sambucus nigra*, *Toxicodendron diversilobum*, and *Baccharis pilularis* are often present. The herbaceous layer typically includes *Aira caryophyllea*, and herbs that are often present include *Scrophularia californica*. Herbs that are sometimes present include *Asclepias fascicularis*, *Trifolium willdenovii*, *Urtica dioica*, and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.4	0.9	0 – 2
Shrub	34.3	33 – 37	3.5	2 – 5
Herb	2.5	1 – 5	0.4	0 – 1

Local Environmental Description

Elevation: Mean 1026 m, Range 957 – 1060 m

Aspect: NE (3), NW (1)

Slope: Mean 8 degrees, Range 2 – 20 degrees

Macro Topography: Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 32.0%, Range 4 – 60%

Fines Cover: Mean 32.3%, Range 6 – 68%

Litter Cover: Mean 34.3%, Range 10 – 64%

Soil Texture (field assessed): Moderately coarse, sandy loam (2), Coarse sand (1), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (3), Sandstone and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (4)

Contra Costa County Subsections: None

Frangula californica – (*Prunus emarginata* – *Ribes menziesii*) Provisional Association
Ribes quercetorum – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Site Impacts

This association has low non-native plant cover (average 2.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Polypogon monspeliensis*, and *Torilis arvensis*.

Classification Comments

This association is newly described here and remains provisional due to low sample size.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=4): ALCC132, ALCC133, ALCC139, ALCC140

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Pinus coulteri</i>	25	0.1	0.2	0.2				
R	<i>Quercus douglasii</i>	25	0.1	0.2	0.2				
S	<i>Frangula californica</i>	100	16.5	9.0	20.0	Y		Y	Y
S	<i>Toxicodendron diversilobum</i>	100	4.3	2.0	6.0	Y			Y
S	<i>Ribes menziesii</i>	100	1.8	0.2	3.0	Y			Y
S	<i>Sambucus nigra</i>	75	1.6	0.2	5.0	Y			Y
S	<i>Baccharis pilularis</i>	50	2.3	3.0	6.0				Y
S	<i>Prunus emarginata</i>	50	2.3	1.0	8.0				Y
S	<i>Oemleria cerasiformis</i>	25	2.5	10.0	10.0				
S	<i>Prunus virginiana</i> var. <i>demissa</i>	25	1.5	6.0	6.0				
S	<i>Symphoricarpos mollis</i>	25	0.8	3.0	3.0				
S	<i>Amelanchier utahensis</i>	25	0.8	3.0	3.0				
S	<i>Quercus berberidifolia</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	75	0.8	0.2	2.0	Y		Y	Y
H	<i>Scrophularia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Urtica dioica</i>	25	1.0	4.0	4.0				
H	<i>Solanum</i> sp.	25	0.3	1.0	1.0				
H	<i>Asclepias fascicularis</i>	25	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	25	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	25	0.1	0.2	0.2				
H	<i>Xanthium strumarium</i>	25	0.0	0.1	0.1				
NV	Moss	50	0.3	0.2	1.0				Y

Frangula californica – (*Prunus emarginata* – *Ribes menziesii*) Provisional Association
Ribes quercetorum – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

***Prunus emarginata* Foothills Provisional Association**

Common Name: Bitter Cherry Foothills Shrubland

Alliance: *Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Local Vegetation Description

The Bitter Cherry Foothills Association forms an intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Prunus emarginata* and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. The herbaceous layer typically includes *Scrophularia californica*, and herbs that are often present include *Bromus diandrus*, *Lysimachia arvensis*, and *Sanicula crassicaulis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 0.2	15.0	10 – 20
Regenerating or Shrubby Tree	0.7	0 – 2	2.1	0.5 – 5
Shrub	55.7	49 – 61	2.8	1 – 5
Herb	3.1	0.4 – 6	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 666 m, Range 499 – 994 m

Aspect: NE (1), NW (1), SE (1)

Slope: Mean 11 degrees, Range 3 – 22 degrees

Macro Topography: Middle 1/3 of slope (2), Ridge top (1)

Large Rock: Mean 0.7%, Range 0 – 2%

Small Rock: Mean 22.3%, Range 10 – 43%

Fines Cover: Mean 51.3%, Range 30 – 76%

Litter Cover: Mean 24.0%, Range 9 – 40%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): General volcanic extrusives (1), Mixed sedimentary (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has low non-native plant cover (average 1.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Galium parisiense*, and *Lolium perenne*.

Classification Comments

This association is newly described here and remains provisional due to low sample size.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; **Alameda County (n=2):** ALCC131, ALCC761

Contra Costa County (n=1): ALCC763

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	33	0.1	0.2	0.2				
T	<i>Quercus agrifolia</i>	33	0.1	0.2	0.2				
R	<i>Umbellularia californica</i> *	33	0.7	2.0	2.0				
S	<i>Prunus emarginata</i>	100	35.0	22.0	42.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	100	5.3	1.0	10.0	Y			Y
S	<i>Baccharis pilularis</i>	67	8.7	12.0	14.0				Y
S	<i>Prunus virginiana</i> var. <i>demissa</i>	33	6.7	20.0	20.0				
S	<i>Frangula californica</i>	33	1.7	5.0	5.0				
S	<i>Holodiscus discolor</i>	33	1.3	4.0	4.0				
S	<i>Corylus cornuta</i>	33	0.1	0.2	0.2				
S	<i>Symphoricarpos mollis</i>	33	0.1	0.2	0.2				
S	<i>Ribes menziesii</i>	33	0.1	0.2	0.2				
S	<i>Quercus berberidifolia</i>	33	0.0	0.1	0.1				
H	<i>Scrophularia californica</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Sanicula crassicaulis</i>	67	0.7	1.0	1.0				Y
H	<i>Lysimachia arvensis</i>	67	0.4	0.2	1.0				Y
H	<i>Bromus diandrus</i>	67	0.1	0.2	0.2				Y
H	<i>Dryopteris arguta</i>	33	0.7	2.0	2.0				

Prunus emarginata Foothills Provisional Association
Ribes quercetorum – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Maianthemum racemosum</i>	33	0.3	1.0	1.0				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Anaphalis margaritacea</i>	33	0.1	0.2	0.2				
H	<i>Artemisia douglasiana</i>	33	0.1	0.2	0.2				
H	<i>Briza minor</i>	33	0.1	0.2	0.2				
H	<i>Eurybia radulina</i>	33	0.1	0.2	0.2				
H	<i>Galium parisiense</i>	33	0.1	0.2	0.2				
H	<i>Heracleum maximum</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Brachypodium distachyon</i>	33	0.1	0.2	0.2				
H	<i>Phacelia</i> sp.	33	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	33	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
NV	Lichen	67	1.3	1.0	3.0				Y
NV	Moss	33	0.7	2.0	2.0				

***Prunus virginiana* Foothills Provisional Association**

Common Name: Choke Cherry Foothills Shrubland

Alliance: *Ribes quercetorum* – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Local Vegetation Description

The Choke Cherry Foothills Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to intermittent. Dominant and characteristic shrubs include *Prunus virginiana* var. *demissa*, and those that are often present include *Sambucus nigra*. Commonly associated emergent trees at sparse cover include *Quercus douglasii*. Herbs that are often present include *Bromus hordeaceus*, *Monardella villosa*, and *Vulpia bromoides*, and herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Carduus pycnocephalus*, *Marrubium vulgare*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 0.2	7.5	5 – 10
Regenerating or Shrubby Tree	0.1	0 – 0.2	3.5	2 – 5
Shrub	41.7	20 – 80	1.5	1 – 2
Herb	15.1	3 – 37	0.4	0 – 1

Local Environmental Description

Elevation: Mean 640 m, Range 287 – 1125 m

Aspect: NE (2), SW (1)

Slope: Mean 30 degrees, Range 23 – 38 degrees

Macro Topography: Middle to Upper 1/3 of slope (3)

Large Rock: Mean 1.4%, Range 0 – 3%

Small Rock: Mean 13.3%, Range 3 – 28%

Fines Cover: Mean 37.0%, Range 14 – 69%

Litter Cover: Mean 46.7%, Range 2 – 80%

Soil Texture (field assessed): Medium silt loam (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Eastern Hills (1)

Site Impacts

This association has moderate non-native plant cover (average 26.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Carduus tenuiflorus*, *Centaurea solstitialis*, *Hirschfeldia incana*, *Logfia gallica*, *Lolium perenne*, *Marrubium vulgare*, and *Vulpia bromoides*.

Classification Comments

The name of this association has been updated from “Coast Range” to “Foothills” in order to reflect its presence in the Sierra Nevada Foothills and other low elevation settings. It remains provisional due to low sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC070

Contra Costa County (n=1): ALCC236

San Joaquin Co. (n=1): LLNL076

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
R	<i>Pinus sabiniana</i>	33	0.1	0.2	0.2				
R	<i>Quercus chrysolepis</i>	33	0.1	0.2	0.2				
S	<i>Prunus virginiana</i> var. <i>demissa</i>	100	31.3	20.0	50.0	Y	Y		Y
S	<i>Sambucus nigra</i>	67	6.7	0.2	20.0				Y
S	<i>Ribes quercetorum</i>	33	2.7	8.0	8.0				
S	<i>Toxicodendron diversilobum</i>	33	0.7	2.0	2.0				
S	<i>Baccharis pilularis</i>	33	0.7	2.0	2.0				
S	<i>Amelanchier utahensis</i>	33	0.3	1.0	1.0				
S	<i>Ribes menziesii</i>	33	0.1	0.2	0.2				
S	<i>Frangula californica</i> ssp. <i>tomentella</i>	33	0.1	0.2	0.2				
S	<i>Symphoricarpos mollis</i>	33	0.1	0.2	0.2				
H	<i>Vulpia bromoides</i>	67	1.3	1.0	3.0				Y

Prunus virginiana Foothills Provisional Association
Ribes quercetorum – *Rhus trilobata* – *Frangula californica* Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	67	1.0	1.0	2.0				Y
H	<i>Monardella villosa</i>	67	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	33	9.0	27.0	27.0				
H	<i>Carduus pycnocephalus</i>	33	3.3	10.0	10.0				
H	<i>Urtica dioica</i>	33	0.7	2.0	2.0				
H	<i>Avena barbata</i>	33	0.7	2.0	2.0				
H	<i>Marrubium vulgare</i>	33	0.3	1.0	1.0				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Sanicula laciniata</i>	33	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	33	0.1	0.2	0.2				
H	<i>Grindelia camporum</i>	33	0.1	0.2	0.2				
H	<i>Claytonia perfoliata</i>	33	0.1	0.2	0.2				
H	<i>Lagophylla minor</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	33	0.1	0.2	0.2				
H	<i>Carduus tenuiflorus</i>	33	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	33	0.1	0.2	0.2				
H	<i>Galium andrewsii</i>	33	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	33	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				
NV	Moss	33	0.1	0.2	0.2				

***Rubus armeniacus* – *Sesbania punicea* – *Ficus carica* Shrubland
Semi-Natural Alliance**



Common Name: Himalayan blackberry – rattlebox – edible fig riparian scrub

NVC Alliance Code: A4160. *Rubus armeniacus* - *Sesbania punicea* - *Ficus carica*
Ruderal Riparian Scrub Alliance

Statewide Description

Ficus carica, *Rubus armeniacus*, *Sesbania punicea*, or other non-native is dominant or co-dominant in the shrub canopy in moist or riparian areas. Emergent trees may be present at low cover, including *Alnus rhombifolia*, *Populus fremontii*, *Quercus agrifolia*, *Quercus lobata*, *Quercus wislizeni* or *Salix laevigata*.

Rubus armeniacus has a Cal-IPC rating of High. The species is native of western Europe. Plants create sprawling, robust, spiny brambles to 3 m high with stems to 10 m long. Stems are biennial. Sterile first-year stems, called primocanes, develop from buds at or below the ground surface and can root when they hit the soil. During the second year, lateral branches, develop in the axils of the primocanes, and these flower and fruit and then die. Animals, especially birds and mammals, readily eat the fruit and seeds get spread over considerable distances (DiTomaso and Healy 2007, Francis 2002b, Global

Invasive Species Database 2006, Hoshovsky 2000a, Tirmenstein 1989e). Other botanical references use the names *R. discolor* and *R. procerus* for this species. *Rubus armeniacus* grows along riparian sites, mesic clearings, disturbed areas, and stock ponds throughout cismontane California. The native *R. ursinus* and non-native *R. armeniacus* have similar ecologies, and these species sometimes grow intermixed. Stands dominated by the aggressive *R. armeniacus* are extensive in many areas in northern California.

Local Vegetation Description

The Himalayan blackberry – rattlebox – edible fig riparian scrub Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Rubus armeniacus*, and those that are often present include *Baccharis pilularis*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. The herbaceous layer that are sometimes present include *Atriplex prostrata*, *Avena barbata*, *Carduus pycnocephalus*, *Conium maculatum*, *Foeniculum vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Lepidium latifolium*, *Schoenoplectus californicus*, and *Typha angustifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0.2	3.5	2 – 5
Shrub	63.1	29 – 98	2.2	0 – 5
Herb	6.9	1 – 18	0.4	0 – 1

Local Membership Rule

Rubus armeniacus, *Argyranthemum foeniculum*, *Rosa eglanteria*, or *Delairea odorata* > 60% relative cover in the shrub canopy.

Local Environmental Description

Elevation: Mean 19 m, Range 2 – 87 m

Aspect: NE (4), Flat (3)

Slope: Mean 4 degrees, Range 0 – 18 degrees

Macro Topography: Bottom (4), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.5%, Range 0 – 10%

Fines Cover: Mean 39.5%, Range 0 – 96%

Litter Cover: Mean 32.0%, Range 0 – 90%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine silty clay loam (1), Moderately fine clay loam (1), Loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Clayey alluvium (3), Sandstone and other sedimentary (2), Alluvium (1), Mixed alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Terraces and Alluvium (2), East Bay Hills - Mount Diablo (1), Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (3)

Site Impacts

This alliance has high non-native plant cover (average 71.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Carduus pycnocephalus*, *Conium maculatum*, *Foeniculum vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Lepidium latifolium*, and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Rubus armeniacus

Rubus armeniacus – *Sesbania punicea* – *Ficus carica* alliance

Classification Comments

A stand dominated by the exotic *Argyranthemum foeniculum* was provisionally placed in this alliance but requires more sampling. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=7; **Alameda County (n=0):**

Contra Costa County (n=4): ALCC243, ALCCREC604, ALCCREC605, EBRTA130

Solano Co. (n=3): SUMA12034, SUMA12044, SUMA9055

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	29	0.2	0.2	1.0				
S	<i>Rubus armeniacus</i>	86	52.7	35.0	93.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	57	2.0	0.2	10.0				Y
S	<i>Rosa californica</i>	29	0.7	0.1	5.0				
H	<i>Lepidium latifolium</i>	43	0.5	0.2	2.0				
H	<i>Conium maculatum</i>	43	0.3	0.2	2.0				
H	<i>Typha angustifolia</i>	29	1.3	0.2	9.0				
H	<i>Hirschfeldia incana</i>	29	0.2	0.2	1.0				
H	<i>Schoenoplectus californicus</i>	29	0.2	0.2	1.0				
H	<i>Carduus pycnocephalus</i>	29	0.2	0.2	1.0				
H	<i>Avena barbata</i>	29	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	29	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	29	0.0	0.1	0.2				
H	<i>Atriplex prostrata</i>	29	0.0	0.1	0.2				

***Rubus armeniacus* Semi-natural Association**

Common Name: Himalayan Blackberry Shrubland

Alliance: *Rubus armeniacus* – *Sesbania punicea* – *Ficus carica* Shrubland Semi-Natural Alliance

Local Vegetation Description

The Himalayan Blackberry Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Rubus armeniacus*, and those that are often present include *Baccharis pilularis*. Commonly associated emergent trees at low cover include *Quercus agrifolia*. Herbs that are often present include *Conium maculatum* and *Lepidium latifolium*, and herbs that are sometimes present include *Avena barbata*, *Carduus pycnocephalus*, *Foeniculum vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Schoenoplectus californicus*, and *Typha angustifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0.2	3.5	2 – 5
Shrub	68.8	35 – 98	2.5	1 – 5
Herb	7.9	1 – 18	0.5	0 – 1

Local Environmental Description

Elevation: Mean 22 m, Range 2 – 87 m

Aspect: NE (4), Flat (2)

Slope: Mean 5 degrees, Range 0 – 18 degrees

Macro Topography: Bottom (4), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.5%, Range 0 – 10%

Fines Cover: Mean 39.5%, Range 0 – 96%

Litter Cover: Mean 32.0%, Range 0 – 90%

Soil Texture (field assessed): Loam (1), Medium silt loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Clayey alluvium (3), Alluvium (1), Mixed alluvium (1), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1), Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (3)

Rubus armeniacus Semi-natural Association

Rubus armeniacus – *Sesbania punicea* – *Ficus carica* Shrubland Semi-Natural Alliance

Site Impacts

This association has high non-native plant cover (average 83.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Conium maculatum*, *Foeniculum vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Lepidium latifolium*, and *Rubus armeniacus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=3): ALCC243, ALCCREC604, EBRTA130

Solano Co. (n=3): SUMA12034, SUMA12044, SUMA9055

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	33	0.2	0.2	1.0				
S	<i>Rubus armeniacus</i>	100	61.5	35.0	93.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	50	2.2	0.2	10.0				Y
S	<i>Rosa californica</i>	33	0.9	0.1	5.0				
H	<i>Lepidium latifolium</i>	50	0.5	0.2	2.0				Y
H	<i>Conium maculatum</i>	50	0.4	0.2	2.0				Y
H	<i>Typha angustifolia</i>	33	1.5	0.2	9.0				
H	<i>Carduus pycnocephalus</i>	33	0.2	0.2	1.0				
H	<i>Schoenoplectus californicus</i>	33	0.2	0.2	1.0				
H	<i>Hirschfeldia incana</i>	33	0.2	0.2	1.0				
H	<i>Foeniculum vulgare</i>	33	0.1	0.2	0.2				
H	<i>Avena barbata</i>	33	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	33	0.1	0.1	0.2				

***Salix exigua* Shrubland Alliance**



Common Name: Sandbar willow thickets

NVC Alliance Code: A0947. *Salix exigua* Warm Desert Wet Shrubland Alliance

Statewide Description

Salix exigua is dominant or co-dominant in the shrub canopy with *Baccharis* spp., *Brickellia californica*, *Rosa californica*, *Rubus armeniacus*, *Rubus ursinus*, *Salix lasiolepis*, and *Salix melanopsis*. Emergent trees of many different species may be present at low cover.

The *Salix exigua* Alliance is widespread and common throughout California, especially along seasonally or temporarily flowing streams and at seeps. It often forms dense, clonal stands. Great regional variation exists in shrub and understory composition, ranging from Sierran mountain meadow species to those found in Colorado Desert oases. Along the Sacramento River and elsewhere in the Central Valley, *Salix exigua* are the first shrubs to colonize point bars and cut banks, followed in time by *Populus fremontii* and other tall, longer-lived species (Sands 1980). Rivers with flood-control dams in place may have reduced acreage of *Salix exigua* stands with increases in stands of longer-lived tree willows such as *S. gooddingii*, *S. laevigata*, and *S. lucida*.

Local Vegetation Description

The Sandbar willow thickets Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salix exigua*, and those that are often present include *Baccharis salicifolia*. Commonly associated emergent trees at low cover include *Salix laevigata*. Herbs that are often present include *Artemisia douglasiana*, and herbs that are sometimes present include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Lepidium latifolium*, *Melilotus indicus*, *Mentha pulegium*, *Schoenoplectus acutus*, *Scrophularia californica*, *Silybum marianum*, *Stachys pycnantha*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	1.8	0 – 7	8.5	5 – 15
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.5	0 – 1
Shrub	44.1	7 – 75	2.9	0 – 10
Herb	4.8	1 – 16	0.7	0 – 2

Local Membership Rule

Salix exigua > 50% relative cover in the shrub canopy, OR either *Salix exigua* and/or *Salix lasiolepis* is > 15% relative cover with *Rubus armeniacus* having the highest cover in the shrub layer.

Local Environmental Description

Elevation: Mean 98 m, Range 4 – 225 m

Aspect: Flat (3), NE (2), SE (2), SW (1)

Slope: Mean 2 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (8)

Large Rock: 0%

Small Rock: Mean 12.1%, Range 0 – 80%

Fines Cover: Mean 38.0%, Range 10 – 60%

Litter Cover: Mean 46.4%, Range 5 – 81%

Soil Texture (field assessed): Medium sand (3), Medium to very fine, loamy sand (1), Medium loam (1), Fine sand (1), Coarse, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Mixed alluvium (2), Sandstone, shale, and gravel deposits (2), Alluvium (1), Sandstone (1), Sandy alluvium (most alluvial fans and washes) (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4), Western Diablo Range (1), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Delta (1), Eastern Hills (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has low non-native plant cover (average 16.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Lepidium latifolium*, *Mentha pulegium*, *Rubus armeniacus*, and *Silybum marianum*.

Associations in Alameda & Contra Costa Counties

Salix exigua

Salix exigua – (*Salix lasiolepis*) – *Rubus armeniacus*

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens et al. 2014, Hickson and Keeler-Wolf 2007, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Vaghti 2003

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=9; Alameda County (n=6): ALCC101, ALCC231, SUNOL021, SUNOL022, SUNOL028, SUNOL029

Contra Costa County (n=3): ALCC214, ALCC824, ALCCREC601

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	44	0.7	0.2	5.0				
S	<i>Salix exigua</i>	89	32.0	5.0	74.0	Y	Y		Y
S	<i>Baccharis salicifolia</i>	56	0.6	0.2	4.0				Y
S	<i>Rubus armeniacus</i>	33	5.0	0.2	32.0				
S	<i>Toxicodendron diversilobum</i>	33	0.1	0.2	0.2				
S	<i>Salix lasiolepis</i>	22	5.7	22.0	29.0				
S	<i>Rubus ursinus</i>	22	0.0	0.2	0.2				
H	<i>Artemisia douglasiana</i>	56	0.4	0.2	2.0				Y
H	<i>Conium maculatum</i>	44	0.8	0.2	3.0				
H	<i>Brassica nigra</i>	33	0.2	0.2	1.0				
H	<i>Scrophularia californica</i>	33	0.1	0.2	0.2				
H	<i>Schoenoplectus acutus</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	22	0.4	0.2	3.0				
H	<i>Silybum marianum</i>	22	0.2	0.2	2.0				
H	<i>Urtica dioica</i>	22	0.1	0.2	1.0				
H	<i>Lepidium latifolium</i>	22	0.1	0.2	1.0				
H	<i>Bromus hordeaceus</i>	22	0.0	0.2	0.2				
H	<i>Stachys pycnantha</i>	22	0.0	0.2	0.2				
H	<i>Mentha pulegium</i>	22	0.0	0.2	0.2				
H	<i>Melilotus indicus</i>	22	0.0	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	22	0.0	0.2	0.2				

***Salix exigua* Association**

Common Name: Sandbar Willow Shrubland

Alliance: *Salix exigua* Shrubland Alliance

Local Vegetation Description

The Sandbar Willow Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salix exigua*, and those that are often present include *Baccharis salicifolia*. Commonly associated emergent trees at sparse cover include *Salix laevigata*. Herbs that are often present include *Artemisia douglasiana* and *Conium maculatum*, and herbs that are sometimes present include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Mentha pulegium*, *Schoenoplectus acutus*, *Scrophularia californica*, *Silybum marianum*, *Stachys pycnantha*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	2.2	0 – 7	8.5	5 – 15
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.5	0 – 1
Shrub	39.1	7 – 75	2.9	0 – 10
Herb	3.6	1 – 10	0.6	0 – 1

Local Environmental Description

Elevation: Mean 125 m, Range 68 – 225 m

Aspect: Flat (3), NE (2), SE (1), SW (1)

Slope: Mean 2 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (7)

Large Rock: 0%

Small Rock: Mean 13.8%, Range 0 – 80%

Fines Cover: Mean 38.4%, Range 10 – 60%

Litter Cover: Mean 44.0%, Range 5 – 81%

Soil Texture (field assessed): Medium sand (3), Coarse, loamy sand (1), Medium loam (1), Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Mixed alluvium (2), Sandstone, shale, and gravel deposits (2), Sandstone (1), Sandy alluvium (1), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4), East Bay Hills - Mount Diablo (1), Western Diablo Range (1)

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 10.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Mentha pulegium*, and *Silybum marianum*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens et al. 2014, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Vaghti 2003

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=7; Alameda County (n=6): ALCC101, ALCC231, SUNOL021, SUNOL022, SUNOL028, SUNOL029

Contra Costa County (n=1): ALCC214

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	57	0.9	0.2	5.0				Y
S	<i>Salix exigua</i>	100	38.0	5.0	74.0	Y	Y		Y
S	<i>Baccharis salicifolia</i>	71	0.8	0.2	4.0				Y
S	<i>Toxicodendron diversilobum</i>	43	0.1	0.2	0.2				
S	<i>Rubus ursinus</i>	29	0.1	0.2	0.2				
H	<i>Artemisia douglasiana</i>	71	0.5	0.2	2.0				Y
H	<i>Conium maculatum</i>	57	1.0	0.2	3.0				Y
H	<i>Brassica nigra</i>	43	0.2	0.2	1.0				
H	<i>Scrophularia californica</i>	43	0.1	0.2	0.2				
H	<i>Schoenoplectus acutus</i>	43	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	29	0.5	0.2	3.0				
H	<i>Silybum marianum</i>	29	0.3	0.2	2.0				
H	<i>Urtica dioica</i>	29	0.2	0.2	1.0				
H	<i>Stachys pycnantha</i>	29	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	29	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	29	0.1	0.2	0.2				
H	<i>Mentha pulegium</i>	29	0.1	0.2	0.2				

Salix exigua Association
Salix exigua Shrubland Alliance

***Salix exigua* – (*Salix lasiolepis*) – *Rubus armeniacus* Association**

Common Name: Sandbar Willow – (Arroyo Willow) – Himalayan Blackberry Shrubland

Alliance: *Salix exigua* Shrubland Alliance

Local Vegetation Description

The Sandbar Willow – (Arroyo Willow) – Himalayan Blackberry Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Rubus armeniacus*, *Salix exigua*, and *Salix lasiolepis*. Commonly associated emergent trees at sparse cover include *Alnus rhombifolia*, *Populus fremontii*, *Salix gooddingii*, and *Fraxinus latifolia*. Herbs that are sometimes present include *Calystegia sepium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	5.5	0 – 18	15.0	10 – 20
Regenerating or Shrubby Tree	0.1	0 – 1	6.5	2 – 10
Shrub	77.7	60 – 90	4.6	1 – 10
Herb	5.6	0.2 – 30	1.0	0 – 2

Local Environmental Description

Elevation: Mean 3 m, Range 1 – 6 m

Aspect: Flat (6), NW (1), SE (1), Variable (1)

Slope: Mean 1 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (9)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 54.8%, Range 5 – 90%

Litter Cover: Mean 43.5%, Range 9 – 92%

Soil Texture (field assessed): Fine sand (1), Medium sand (1)

Geology (field or map data): Alluvium (9)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1), Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (8)

Site Impacts

This association has moderate non-native plant cover (average 42.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Rubus armeniacus*.

Salix exigua – (*Salix lasiolepis*) – *Rubus armeniacus* Association
Salix exigua Shrubland Alliance

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=10; Alameda County (n=0):

Contra Costa County (n=2): ALCC824, ALCCREC601

Sacramento Co. (n=3): SSJD0248, SSJD0298, SSJD0305

San Joaquin Co. (n=5): SSJD0234, SSJD0283, SSJD0284, SSJD0285, SSJD0286

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Populus fremontii</i>	60	0.7	0.2	3.0				Y
T	<i>Salix gooddingii</i>	50	1.9	0.2	8.0				Y
T	<i>Alnus rhombifolia</i>	50	1.4	0.2	9.0				Y
T	<i>Fraxinus latifolia</i>	30	0.4	0.2	3.0				
S	<i>Rubus armeniacus</i>	100	42.2	13.0	80.0	Y		Y	Y
S	<i>Salix lasiolepis</i>	100	34.9	1.0	77.0	Y		Y	Y
S	<i>Salix exigua</i>	80	9.2	2.0	36.0	Y			Y
S	<i>Cephalanthus occidentalis</i>	40	0.5	0.2	2.0				
H	<i>Calystegia sepium</i>	30	0.1	0.2	0.2				

***Salix lasiolepis* Shrubland Alliance**



Common Name: Arroyo willow thickets

NVC Alliance Code: A3878. *Salix lasiolepis* Warm Desert Wet Shrubland Alliance

Statewide Description

Salix lasiolepis is dominant or co-dominant in the tall shrub or low tree canopy with *Acer macrophyllum*, *Baccharis pilularis*, *Baccharis salicifolia*, *Cephalanthus occidentalis*, *Cornus sericea*, *Morella californica*, *Platanus racemosa*, *Populus fremontii*, *Populus trichocarpa*, *Salix* spp., and *Sambucus nigra*. Emergent trees may be present at low cover.

Salix lasiolepis grows on seasonally or intermittently flooded riparian sites. Some plants in California stands are sufficiently tall to be considered trees. Plants are typically shrubby and multi-branched along coastal creeks, at lower and middle elevations, and in parts of the Sacramento–San Joaquin River delta. Some taxonomists recognize varieties: *Salix lasiolepis* var. *bigelovii* is a coastal plant, and *S. lasiolepis* var. *lasiolepis* grows throughout the state (Argus 1997). Disturbances during winter floods modify stands; timing of seed dispersal and spring flood patterns determine seedling success.

Local Vegetation Description

The Arroyo willow thickets Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salix lasiolepis*, and those that are often present include *Rubus ursinus* and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are sometimes present include *Artemisia douglasiana*, *Carduus pycnocephalus*, *Conium maculatum*, *Cyperus eragrostis*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 1	15.0	10 – 20
Hardwood	2.7	0 – 15	11.7	5 – 20
Regenerating or Shrubby Tree	0.5	0 – 5	4.7	0.5 – 10
Shrub	62.7	20 – 90	4.1	1 – 10
Herb	8.1	0 – 22	0.6	0 – 2

Local Membership Rule

Salix lasiolepis > 50% relative cover in the shrub canopy, or > 30% relative cover with *Rubus* spp. or *Baccharis pilularis*.

Local Environmental Description

Elevation: Mean 167 m, Range 1 – 379 m

Aspect: Flat (5), NW (5), NE (4), SW (2), SE (1)

Slope: Mean 4 degrees, Range 0 – 30 degrees

Macro Topography: Bottom (12), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.6%, Range 0 – 7%

Small Rock: Mean 6.2%, Range 0 – 45%

Fines Cover: Mean 36.3%, Range 0 – 93%

Litter Cover: Mean 52.8%, Range 5 – 95%

Soil Texture (field assessed): Fine silty clay (2), Medium to very fine, loamy sand (2), Clay (1), Fine clay (1), Medium sand (1), Medium silt loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (4), Mixed alluvium (2), Sandstone, shale, and gravel deposits (2), Silty alluvium (2), Alluvium (1), Clayey alluvium (1), Conglomerate (1), Sandstone (1), Sandy alluvium (most alluvial fans and washes) (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (2), East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (9), Delta (1)

Site Impacts

This alliance has low non-native plant cover (average 8.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Conium maculatum*, and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Salix lasiolepis

Salix lasiolepis – *Baccharis salicifolia*

Salix lasiolepis – *Rubus* spp.

Classification Comments

None.

References: AECOM 2013, Bendix 1994, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2005, HDR 2014b, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf et al. 1998b, Keeler-Wolf et al. 2003a, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2019, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, VegCAMP 2015a, Verdone and Evens 2010

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=17; Alameda County (n=7): ALCC079, ALCC168, ALCC501, ALCCREC220, AW027, SUNOL016, WRBL096

Contra Costa County (n=10): ALCC001, ALCC163, ALCCREC001, ALCCREC104, EBAY0019, EBRTA125, EBRTA204, EBRTA311, SPCCA-056, SSJD0281

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	35	0.6	0.2	3.0				
T	<i>Umbellularia californica</i>	24	1.2	1.0	12.0				
S	<i>Salix lasiolepis</i>	100	51.2	12.0	88.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	65	6.0	0.2	20.0				Y
S	<i>Rubus ursinus</i>	53	4.5	0.2	33.0				Y
S	<i>Baccharis pilularis</i>	41	0.8	0.2	4.0				
S	<i>Sambucus nigra</i>	29	0.4	0.2	2.0				
S	<i>Symphoricarpos albus</i>	24	0.5	1.0	5.0				
S	<i>Lonicera hispidula</i>	24	0.2	0.2	3.0				
H	<i>Artemisia douglasiana</i>	29	0.2	0.2	1.0				
H	<i>Carduus pycnocephalus</i>	29	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	24	0.7	0.2	8.0				
H	<i>Conium maculatum</i>	24	0.3	0.2	2.0				
H	<i>Cyperus eragrostis</i>	24	0.0	0.1	0.2				

***Salix lasiolepis* Association**

Common Name: Arroyo Willow Shrubland

Alliance: *Salix lasiolepis* Shrubland Alliance

Local Vegetation Description

The Arroyo Willow Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salix lasiolepis* and *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis* and *Rubus ursinus*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Salix laevis*. Herbs that are sometimes present include *Artemisia douglasiana*, *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Cyperus eragrostis*, *Helenium puberulum*, *Heracleum maximum*, *Juncus patens*, *Lolium perenne*, *Medicago polymorpha*, *Nasturtium officinale*, *Scrophularia californica*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.9	0 – 5	12.5	5 – 20
Regenerating or Shrubby Tree	0.2	0 – 1	3.3	0.5 – 10
Shrub	58.1	22 – 90	3.5	1 – 10
Herb	11.1	0.2 – 22	0.6	0 – 1

Local Environmental Description

Elevation: Mean 231 m, Range 70 – 379 m

Aspect: NW (5), Flat (2), SE (1)

Slope: Mean 7 degrees, Range 0 – 30 degrees

Macro Topography: Bottom (5), Bottom to Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.3%, Range 0 – 3%

Fines Cover: Mean 59.6%, Range 29 – 93%

Litter Cover: Mean 36.5%, Range 5 – 64%

Soil Texture (field assessed): Fine silty clay (2), Medium to very fine, loamy sand (2), Clay (1), Fine clay (1)

Geology (field or map data): Mixed alluvium (2), Sedimentary (2), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1), Sandy alluvium (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Salix lasiolepis Association
Salix lasiolepis Shrubland Alliance

Site Impacts

This association has low non-native plant cover (average 9.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Hedera helix*, and *Lolium perenne*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, HDR 2014b, Hickson and Keeler-Wolf 2007, Keeler-Wolf et al. 1998b, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, VegCAMP 2015a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=8; Alameda County (n=4): ALCCREC220, AW027, SUNOL016, WRBL096

Contra Costa County (n=4): ALCC001, ALCCREC104, EBAY0019, EBRTA204

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	25	0.5	1.0	3.0				
T	<i>Quercus agrifolia</i>	25	0.3	0.2	2.2				
R	<i>Quercus agrifolia</i>	38	0.2	0.1	1.0				
S	<i>Salix lasiolepis</i>	100	51.5	15.0	88.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	88	3.7	0.2	10.0	Y			Y
S	<i>Rubus ursinus</i>	50	2.2	0.2	10.0				Y
S	<i>Baccharis pilularis</i>	50	0.9	0.2	4.0				Y
S	<i>Lonicera hispidula</i>	38	0.4	0.2	3.0				
S	<i>Symphoricarpos albus</i>	25	0.4	1.0	2.0				
S	<i>Frangula californica</i>	25	0.2	0.2	1.0				
S	<i>Hedera helix</i>	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	38	1.3	0.2	8.0				
H	<i>Conium maculatum</i>	38	0.4	0.2	2.0				
H	<i>Cyperus eragrostis</i>	38	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	38	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	25	1.9	0.2	15.0				
H	<i>Bromus diandrus</i>	25	1.0	0.2	8.0				
H	<i>Cynosurus echinatus</i>	25	0.3	0.2	2.0				
H	<i>Medicago polymorpha</i>	25	0.3	0.2	2.0				
H	<i>Nasturtium officinale</i>	25	0.3	0.2	2.0				
H	<i>Heracleum maximum</i>	25	0.3	0.2	2.0				
H	<i>Scrophularia californica</i>	25	0.2	0.5	1.0				
H	<i>Artemisia douglasiana</i>	25	0.2	0.2	1.0				
H	<i>Juncus patens</i>	25	0.2	0.2	1.0				
H	<i>Helenium puberulum</i>	25	0.1	0.2	0.2				

***Salix lasiolepis* – *Baccharis salicifolia* Association**

Common Name: Arroyo Willow / Mulefat Shrubland

Alliance: *Salix lasiolepis* Shrubland Alliance

Local Vegetation Description

The Arroyo Willow / Mulefat Association forms an open shrub layer in the single survey available. The emergent tree layer is sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Baccharis salicifolia* and *Salix lasiolepis*. Regenerating or shrubby trees that are present include *Platanus racemosa* and *Quercus lobata*. Emergent trees at sparse cover include *Salix laevigata*. The herbaceous layer includes *Elymus triticoides* and *Polypogon monspeliensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	2.0	2 – 2	12.5	10 – 15
Regenerating or Shrubby Tree	0.3	0 – 0	1.5	1 – 2
Shrub	20.0	20 – 20	3.5	2 – 5
Herb	4.2	4 – 4	0.8	0.5 – 1

Local Environmental Description

Elevation: 147 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 45%

Fines Cover: 30%

Litter Cover: 24%

Soil Texture (field assessed): Medium sand (1)

Geology (field or map data): no data

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 7.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Centaurea melitensis*, *Dittrichia graveolens*, *Hirschfeldia incana*, *Lythrum hyssopifolium*, and *Polypogon monspeliensis*.

Classification Comments

None.

References: AECOM 2013, Bendix 1994, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Reyes et al. 2020a, Rodriguez et al. 2017, Verdone and Evens 2010

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC079

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Salix laevigata</i>	100	2.0	2.0	2.0	Y	Y		Y
R	<i>Platanus racemosa</i>	100	0.2	0.2	0.2	Y	Y		Y
R	<i>Quercus lobata</i>	100	0.1	0.1	0.1	Y		Y	Y
S	<i>Salix lasiolepis</i>	100	12.0	12.0	12.0	Y	Y		Y
S	<i>Baccharis salicifolia</i>	100	11.0	11.0	11.0	Y		Y	Y
H	<i>Polypogon monspeliensis</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Elymus triticoides</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Scrophularia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Centaurea melitensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melilotus indicus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus rubens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Artemisia douglasiana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Dittrichia graveolens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Erigeron canadensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Cyperus eragrostis</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Rumex salicifolius</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Rupertia physodes</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Lythrum hyssopifolium</i>	100	0.1	0.1	0.1	Y			Y

***Salix lasiolepis* – *Rubus* spp. Association**

Common Name: Arroyo Willow / Blackberry Shrubland

Alliance: *Salix lasiolepis* Shrubland Alliance

Local Vegetation Description

The Arroyo Willow / Blackberry Association forms an intermittent to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salix lasiolepis*, and those that are often present include *Rubus ursinus*, *Sambucus nigra*, and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are sometimes present include *Artemisia douglasiana* and *Foeniculum vulgare*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.2	0 – 1	15.0	10 – 20
Hardwood	4.6	1 – 15	11.1	5 – 20
Regenerating or Shrubby Tree	0.9	0 – 5	6.5	2 – 10
Shrub	72.8	50 – 85	4.8	1 – 10
Herb	5.5	0.2 – 20	0.6	0 – 2

Local Environmental Description

Elevation: Mean 106 m, Range 1 – 301 m

Aspect: Flat (3), NE (3), SW (2)

Slope: Mean 3 degrees, Range 0 – 15 degrees

Macro Topography: Bottom (6), Middle 1/3 of slope (1)

Large Rock: Mean 1.2%, Range 0 – 7%

Small Rock: Mean 3.8%, Range 0 – 17%

Fines Cover: Mean 17.9%, Range 0 – 61%

Litter Cover: Mean 74.0%, Range 35 – 95%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (2), Silty alluvium (2), Alluvium (1), Conglomerate (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Delta (1)

Site Impacts

This association has low non-native plant cover (average 8.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Foeniculum vulgare* and *Rubus armeniacus*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4 **State Rarity Rank:** S4? **State Rare:** N

Surveys Used for Description

Total: N=8; Alameda County (n=2): ALCC168, ALCC501

Contra Costa County (n=6): ALCC163, ALCCREC001, EBRTA125, EBRTA311, SPCCA-056, SSJD0281

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	50	0.9	1.0	3.0				Y
T	<i>Umbellularia californica</i>	38	2.3	1.0	12.0				
S	<i>Salix lasiolepis</i>	100	55.9	20.0	70.0	Y	Y		Y
S	<i>Rubus ursinus</i>	63	7.4	1.0	33.0				Y
S	<i>Toxicodendron diversilobum</i>	50	9.1	15.0	20.0				Y
S	<i>Sambucus nigra</i>	50	0.8	1.0	2.0				Y
S	<i>Rubus armeniacus</i>	38	5.6	10.0	25.0				
S	<i>Baccharis pilularis</i>	38	0.8	2.0	2.0				
S	<i>Symphoricarpos albus</i>	25	0.8	1.0	5.0				
H	<i>Foeniculum vulgare</i>	25	0.8	1.0	5.0				
H	<i>Artemisia douglasiana</i>	25	0.2	0.2	1.0				

***Salvia mellifera* – (*Artemisia californica*) Shrubland Alliance**



Common Name: Black sage – California sagebrush scrub

NVC Alliance Code: N/A.

Statewide Description

Salvia mellifera is dominant or co-dominant in the shrub canopy with *Adenostoma fasciculatum*, *Artemisia californica*, *Baccharis pilularis*, *Diplacus aurantiacus*, *Encelia californica*, *Eriogonum cinereum*, *Eriogonum fasciculatum*, *Hesperoyucca whipplei*, *Lotus scoparius*, *Malacothamnus fasciculatus*, *Malosma laurina*, *Opuntia littoralis*, *Rhus integrifolia* and *Salvia apiana*. Emergent trees may be present at low cover.

Salvia mellifera has the widest range of any of the *Salvia* shrubby sage species of the coastal sage scrub. In the northern portion of its range, stands usually appear on relatively xeric, well-drained exposures, whereas, in the south, stands tend to be on more mesic slopes with shallow soils. *S. mellifera* hybridizes with *S. apiana*. Where their ranges in southern California overlap, *S. mellifera* tends to occur in flatter and wetter microsites, while *S. apiana* occurs on drier slopes. Conversely, where *S. mellifera* overlaps in range with *S. leucophylla*, the latter tends to occupy more mesic sites. Hybrids between *S. mellifera* and *S. apiana* occur in recently disturbed areas and

elsewhere in the coastal sage scrub (Kirkpatrick and Hutchinson 1977, Malanson 1984, Mooney 1977.)

Local Vegetation Description

The Black sage – California sagebrush scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salvia mellifera* and *Artemisia californica*. Herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus rubens*, *Centaurea melitensis*, *Hirschfeldia incana*, and *Nassella pulchra*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	3.5	2 – 5
Hardwood	0.1	0 – 0.4	8.0	2 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	39.5	20 – 59	1.5	1 – 2
Herb	8.3	0 – 20	0.3	0 – 1

Local Membership Rule

Salvia mellifera > 50% relative cover in the shrub canopy, or > 30% relative cover with *Artemisia californica*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, or *Lotus scoparius*.

Local Environmental Description

Elevation: Mean 350 m, Range 236 – 512 m

Aspect: SW (5), Variable (2), NE (1)

Slope: Mean 28 degrees, Range 20 – 40 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (2)

Large Rock: Mean 17.0%, Range 0 – 57%

Small Rock: Mean 18.8%, Range 2 – 50%

Fines Cover: Mean 36.8%, Range 21 – 80%

Litter Cover: Mean 25.4%, Range 1 – 53%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine sandy clay loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Sandstone (2), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (3), Diablo Range (2), Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Site Impacts

This alliance has low non-native plant cover (average 12.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Centaurea melitensis*, and *Hirschfeldia incana*.

Associations in Alameda & Contra Costa Counties

Salvia mellifera

Salvia mellifera – *Artemisia californica*

Classification Comments

This is a recently merged alliance that includes the previously described *Salvia mellifera* and *Artemisia californica* – *Salvia mellifera* alliances.

References: AECOM 2013, Buck-Diaz et al. 2023, DeSimone and Burk 1992, Dixon 2019, Evens and San 2004, Evens and San 2005, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Malanson 1984, Reyes et al. 2019, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: G4

State Rarity Rank: S3S4

Surveys Used for Description

Total: N=8; Alameda County (n=6): ALCC228, ALCC276, ALCCREC217, LLNL049, SVRA_CA007, SVRA_CA009

Contra Costa County (n=2): ALCC212, SPCCA-013

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Salvia mellifera</i>	100	31.5	12.0	58.0	Y	Y		Y
S	<i>Artemisia californica</i>	75	5.2	0.2	12.0	Y			Y
S	<i>Eriodictyon californicum</i>	38	1.1	2.0	4.0				
S	<i>Toxicodendron diversilobum</i>	38	0.1	0.1	0.2				
S	<i>Malacothamnus fremontii</i>	25	2.3	3.0	15.0				
S	<i>Heteromeles arbutifolia</i>	25	0.4	0.1	3.0				
S	<i>Adenostoma fasciculatum</i>	25	0.3	1.0	1.0				
S	<i>Diplacus aurantiacus</i>	25	0.2	0.2	1.0				
S	<i>Lotus scoparius</i>	25	0.1	0.2	0.2				
S	<i>Gutierrezia californica</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	38	2.8	0.2	17.0				
H	<i>Centaurea melitensis</i>	38	1.7	0.2	12.0				
H	<i>Bromus rubens</i>	38	1.4	0.2	10.0				
H	<i>Avena barbata</i>	38	0.8	0.2	4.0				
H	<i>Hirschfeldia incana</i>	25	0.2	0.2	1.0				
H	<i>Nassella pulchra</i>	25	0.2	0.2	1.0				

***Salvia mellifera* Association**

Common Name: Black Sage Shrubland

Alliance: *Salvia mellifera* – (*Artemisia californica*) Shrubland Alliance

Local Vegetation Description

The Black Sage Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Salvia mellifera*, and those that are often present include *Artemisia californica*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia*. Herbs that are sometimes present include *Bromus rubens*, *Centaurea melitensis*, and *Nassella pulchra*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	3.5	2 – 5
Hardwood	0.6	0 – 5	8.0	2 – 15
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	49.7	20 – 80	1.5	1 – 2
Herb	3.3	0.2 – 20	0.3	0 – 1

Local Environmental Description

Elevation: Mean 367 m, Range 236 – 512 m

Aspect: SW (6), Variable (2), NW (1)

Slope: Mean 24 degrees, Range 15 – 40 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope (2)

Large Rock: Mean 1.0%, Range 0 – 3%

Small Rock: Mean 14.0%, Range 2 – 20%

Fines Cover: Mean 45.3%, Range 21 – 80%

Litter Cover: Mean 37.0%, Range 15 – 53%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine sandy clay loam (2), Moderately coarse, sandy loam (1)

Geology (field or map data): Diabase (2), Serpentine (2), , Sandstone (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Western Diablo Range (3), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (4)

Site Impacts

This association has low non-native plant cover (average 4.0%) relative to native cover.

Non-native species that occur with highest frequency and abundance include *Centaurea melitensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens and San 2004, Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Klein and Evens 2005, Malanson 1984, Reyes et al. 2019, Sikes et al. 2023, Verdone and Evens 2010

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=9; Alameda County (n=4): ALCC228, ALCC276, ALCCREC217, SVRA_CA007

Contra Costa County (n=1): SPCCA-013

Santa Clara Co. (n=4): SCLAR041, SCLAR067, SCLAR078, SCLAR096

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Quercus agrifolia</i>	22	0.6	0.2	5.0				
R	<i>Quercus agrifolia</i> *	22	0.0	0.2	0.2				
S	<i>Salvia mellifera</i>	100	44.9	12.0	73.0	Y	Y		Y
S	<i>Artemisia californica</i>	67	1.0	0.2	4.0				Y
S	<i>Adenostoma fasciculatum</i>	44	1.8	1.0	8.0				
S	<i>Diplacus aurantiacus</i>	33	0.2	0.2	1.0				
S	<i>Toxicodendron diversilobum</i>	33	0.1	0.1	0.2				
S	<i>Eriodictyon californicum</i>	22	0.7	2.0	4.0				
S	<i>Heteromeles arbutifolia</i>	22	0.3	0.1	3.0				
S	<i>Arctostaphylos glauca</i>	22	0.1	0.2	1.0				
S	<i>Lotus scoparius</i>	22	0.0	0.2	0.2				
S	<i>Sambucus nigra</i>	22	0.0	0.2	0.2				
H	<i>Centaurea melitensis</i>	44	1.5	0.2	12.0				
H	<i>Bromus rubens</i>	22	1.2	1.0	10.0				
H	<i>Nassella pulchra</i>	22	0.1	0.2	1.0				
NV	Lichen	33	0.3	0.2	2.0				

***Salvia mellifera* – *Artemisia californica* Association**

Common Name: Black Sage – California Sagebrush Shrubland

Alliance: *Salvia mellifera* – (*Artemisia californica*) Shrubland Alliance

Local Vegetation Description

The Black Sage – California Sagebrush Association forms an open to intermittent shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse to open. Dominant and characteristic shrubs include *Artemisia californica* and *Salvia mellifera*. Herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea melitensis*, *Hirschfeldia incana*, *Lolium perenne*, and *Marah fabaceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	39.6	30 – 50	1.5	1 – 2
Herb	9.1	1 – 20	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 299 m, Range 274 – 353 m

Aspect: SW (3), NE (1), NW (1), SE (1), Variable (1)

Slope: Mean 27 degrees, Range 19 – 38 degrees

Macro Topography: Middle 1/3 of slope (3), Lower to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 28.0%, Range 2 – 57%

Small Rock: Mean 20.0%, Range 2 – 50%

Fines Cover: Mean 33.0%, Range 23 – 51%

Litter Cover: Mean 17.0%, Range 1 – 35%

Soil Texture (field assessed): Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (3), Sandstone (1), Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: Diablo Range (1), Eastern Hills (1)

Contra Costa County Subsections: Eastern Hills (1)

Other Subsections: Fremont - Livermore Hills and Valleys (3), Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 10.3%) relative to native

Salvia mellifera – *Artemisia californica* Association
Salvia mellifera – (*Artemisia californica*) Shrubland Alliance

cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea melitensis*, *Hirschfeldia incana*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2023, DeSimone and Burk 1992, Dixon 2019, Evens and San 2004, Evens et al. 2006, Gordon and White 1994, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011, Verdane and Evens 2010

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=7; Alameda County (n=2): LLNL049, SVRA_CA009

Contra Costa County (n=1): ALCC212

San Joaquin Co. (n=1): SVRA_CA011

Santa Clara Co. (n=3): SCLAR094, SCLAR100, SCLAR141

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Salvia mellifera</i>	100	20.0	15.0	25.0	Y		Y	Y
S	<i>Artemisia californica</i>	100	16.1	11.0	25.0	Y		Y	Y
S	<i>Malacothamnus fremontii</i>	29	3.6	10.0	15.0				
S	<i>Baccharis pilularis</i>	29	0.5	0.2	3.0				
S	<i>Eriodictyon californicum</i>	29	0.5	0.2	3.0				
S	<i>Gutierrezia californica</i>	29	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	29	0.1	0.2	0.2				
H	<i>Avena barbata</i>	43	1.1	2.0	4.0				
H	<i>Hirschfeldia incana</i>	43	0.2	0.2	1.0				
H	<i>Bromus hordeaceus</i>	43	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	29	3.1	5.0	17.0				
H	<i>Bromus madritensis</i>	29	0.2	0.2	1.0				
H	<i>Marah fabaceus</i>	29	0.2	0.1	1.0				
H	<i>Lolium perenne</i>	29	0.1	0.2	0.2				
NV	Lichen	29	0.2	0.2	1.0				

***Suaeda moquinii* Shrubland Alliance**



Common Name: Bush seepweed scrub

NVC Alliance Code: A3880. *Suaeda moquinii* - *Salicornia rubra* - *Isocoma acradenia*
Alkaline Wet Scrub Alliance

Statewide Description

Isocoma acradenia or *Suaeda moquinii* is dominant or co-dominant in the shrub layer with *Allenrolfea occidentalis*, *Atriplex canescens*, *Atriplex polycarpa*, *Kochia californica* and *Sarcobatus vermiculatus*. Herbs may include *Frankenia salina*, *Schismus* spp. or *Sporobolus airoides*.

The alliance is restricted primarily to alkaline substrates in desert or semi-desert habitats. Stands are floristically and structurally simple; however, plant cover may vary substantially (2% to > 80%). We know little about disturbance effects, though *S. moquinii* appears opportunistic in occupying roadsides and other recently disturbed areas. This alliance has been updated to include associations dominated or codominated by *Isocoma acradenia*.

Local Vegetation Description

The Bush seepweed scrub Alliance forms an open shrub layer in the single sample available. The emergent tree layer is absent, and the herbaceous layer is open. Dominant and characteristic shrubs include *Suaeda moquinii* and *Allenrolfea occidentalis*. The herbaceous layer typically includes *Atriplex* sp., *Centromadia fitchii*, *Distichlis spicata*, *Frankenia salina*, *Hordeum depressum*, *Hypochaeris glabra*, *Juncus bufonius*, *Lasthenia californica*, *Lepidium dictyotum*, *Lepidium nitidum*, *Microseris acuminata*, *Parapholis incurva*, *Plantago elongata*, *Puccinellia simplex*, *Spergularia macrotheca*, *Spergularia marina*, and *Trifolium depauperatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	8.0	8 – 8	0.3	0 – 0.5
Herb	27.0	27 – 27	0.3	0 – 0.5

Local Membership Rule

Suaeda moquinii (= *S. nigra*) > 50% relative cover in the shrub layer.

Local Environmental Description

Elevation: 9 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 70%

Litter Cover: 25%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Chert (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has low non-native plant cover (average 19.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Hypochaeris glabra* and *Parapholis incurva*.

Associations in Alameda & Contra Costa Counties

Suaeda moquinii / *Lepidium dictyotum*

Classification Comments

The single survey included the rare *Puccinellia simplex* (CRPR 1B.2)..

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): SSJD0376

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Suaeda moquinii</i>	100	8.0	8.0	8.0	Y	Y		Y
S	<i>Allenrolfea occidentalis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Juncus bufonius</i>	100	9.0	9.0	9.0	Y			Y
H	<i>Parapholis incurva</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Lepidium dictyotum</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Spergularia marina</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Hordeum depressum</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Plantago elongata</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Puccinellia simplex</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Atriplex</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Frankenia salina</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Centromadia fitchii</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Distichlis spicata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hypochaeris glabra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lasthenia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium depauperatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Spergularia macrotheca</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Microseris acuminata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lepidium nitidum</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	5.0	5.0	5.0	Y	Y		Y

***Suaeda moquinii* / *Lepidium dictyotum* Association**

Common Name: Bush Seepweed / Alkali Pepperweed Shrubland

Alliance: *Suaeda moquinii* Shrubland Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Toxicodendron diversilobum* Shrubland Alliance**



Common Name: Poison oak scrub

NVC Alliance Code: A2610. *Toxicodendron diversilobum* Scrub Alliance

Statewide Description

Toxicodendron diversilobum is dominant in the shrub canopy with *Artemisia californica*, *Baccharis pilularis*, *Diplacus aurantiacus*, *Heteromeles arbutifolia*, *Keckiella cordifolia*, *Malosma laurina*, *Philadelphus lewisii*, *Rhamnus ilicifolia*, *Rubus parviflorus*, *Salvia leucophylla*, *Salvia mellifera*, and *Sambucus nigra*. Emergent trees may be present at low cover, including *Juglans californica* or *Quercus agrifolia*.

Sampling in this alliance requires care. Nonetheless, people have sampled it in a variety of settings in southern and central California, from the immediate coastline to dry inland foothills of the Sierra Nevada. Some coastal stands are nearly pure, persistent, and have relatively low diversity. However, some stands are likely to be a consequence of past and frequent fire disturbance, and these can have a high diversity of native herbs and emergent trees. *Toxicodendron diversilobum* grows throughout cismontane California and is found in many low-elevation alliances.

Local Vegetation Description

The Poison oak scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to continuous. Dominant and characteristic shrubs include *Toxicodendron diversilobum*, and those that are often present include *Baccharis pilularis*. Commonly associated emergent trees at sparse cover include *Quercus agrifolia* and *Umbellularia californica*. Herbs that are often present include *Bromus diandrus*, and herbs that are sometimes present include *Avena barbata*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Bromus rubens*, *Carduus pycnocephalus*, *Conium maculatum*, *Dryopteris arguta*, *Heracleum maximum*, *Lolium perenne*, *Marah fabaceus*, *Scrophularia californica*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	3.5	2 – 5
Hardwood	1.0	0 – 4	8.8	2 – 35
Regenerating or Shrubby Tree	0.3	0 – 2	1.2	0 – 5
Shrub	30.8	3 – 65	1.9	0 – 5
Herb	15.7	1 – 85	0.6	0 – 2

Local Membership Rule

Toxicodendron diversilobum > 50% relative cover in the shrub canopy, sometimes intermixing with sub-dominant *Baccharis pilularis* and *Rubus* spp.

Local Environmental Description

Elevation: Mean 303 m, Range 163 – 427 m

Aspect: NW (6), NE (5), SE (2), Variable (1)

Slope: Mean 20 degrees, Range 3 – 36 degrees

Macro Topography: Middle 1/3 of slope (4), Upper 1/3 of slope (4), Middle to Upper 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 7.6%, Range 0 – 50%

Fines Cover: Mean 50.3%, Range 14 – 90%

Litter Cover: Mean 40.2%, Range 5 – 79%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine silty clay loam (2), Loam (1), Medium loam (1), Medium to very fine, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Basalt (2), Franciscan melange (2), Sedimentary (2), Chert (1), Conglomerate (1), Metamorphic (1), Sandstone (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2), East Bay Hills - Mount Diablo (2), Eastern Hills (1), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (6), Suisun Hills and Valleys (3)

Site Impacts

This alliance has moderate non-native plant cover (average 25.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Lolium perenne*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Toxicodendron diversilobum – (*Baccharis pilularis*)

Toxicodendron diversilobum / herbaceous

Toxicodendron diversilobum alliance

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=15; Alameda County (n=6): ALCC036, ALCC105, ALCCREC116, EBRTA312, LLNL065, LLNL091

Contra Costa County (n=9): ALCC056, ALCC058, ALCC121, EBAY0012, EBRTA004, EBRTA124, EBRTA208, EBRTA303, SPCCB-070

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	27	0.3	0.2	2.0				
T	<i>Quercus agrifolia</i>	27	0.3	0.2	2.0				
R	<i>Quercus agrifolia</i> *	33	0.3	0.2	2.0				
R	<i>Umbellularia californica</i> *	27	0.1	0.2	1.2				
S	<i>Toxicodendron diversilobum</i>	100	26.5	2.0	60.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	60	2.3	0.2	15.0				Y
S	<i>Rubus ursinus</i>	40	1.6	0.2	10.0				
S	<i>Diplacus aurantiacus</i>	20	0.4	0.2	6.0				
S	<i>Artemisia californica</i>	20	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	53	0.7	0.2	6.0				Y
H	<i>Bromus rubens</i>	40	1.6	0.2	10.0				
H	<i>Bromus hordeaceus</i>	40	0.9	0.2	10.0				
H	<i>Scrophularia californica</i>	40	0.2	0.2	1.0				
H	<i>Conium maculatum</i>	33	3.8	0.2	50.0				
H	<i>Avena barbata</i>	33	1.5	2.0	8.0				
H	<i>Carduus pycnocephalus</i>	33	0.7	0.2	8.0				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	27	1.5	0.2	8.0				
H	<i>Brachypodium distachyon</i>	20	0.5	0.2	5.0				
H	<i>Dryopteris arguta</i>	20	0.4	0.2	6.0				
H	<i>Vulpia bromoides</i>	20	0.3	0.2	3.0				
H	<i>Heracleum maximum</i>	20	0.1	0.2	1.0				

***Toxicodendron diversilobum* – (*Baccharis pilularis*) Association**

Common Name: Poison Oak – (Coyote Brush) Shrubland

Alliance: *Toxicodendron diversilobum* Shrubland Alliance

Local Vegetation Description

The Poison Oak – (Coyote Brush) Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to continuous. Dominant and characteristic shrubs include *Baccharis pilularis* and *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana*, *Quercus agrifolia*, and *Umbellularia californica*. Herbs that are often present include *Bromus diandrus*, and herbs that are sometimes present include *Avena barbata*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Conium maculatum*, *Dryopteris arguta*, *Elymus triticoides*, *Galium porrigens*, *Lolium perenne*, *Marah fabaceus*, *Nassella pulchra*, *Scrophularia californica*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0.2	3.5	2 – 5
Hardwood	1.4	0 – 4	6.2	2 – 10
Regenerating or Shrubby Tree	0.3	0 – 2	0.9	0.5 – 2
Shrub	33.1	5 – 65	2.4	1 – 5
Herb	17.5	1 – 85	0.7	0 – 2

Local Environmental Description

Elevation: Mean 304 m, Range 163 – 427 m

Aspect: NE (3), NW (3), SE (1), Variable (1)

Slope: Mean 22 degrees, Range 7 – 36 degrees

Macro Topography: Upper 1/3 of slope (3), Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.3%, Range 0 – 1%

Small Rock: Mean 11.4%, Range 0 – 50%

Fines Cover: Mean 56.5%, Range 14 – 90%

Litter Cover: Mean 30.0%, Range 5 – 75%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine silty clay loam (2), Medium loam (1), Medium to very fine, loamy sand (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (2), Basalt (1), Chert (1), Metamorphic (1), Sandstone (1), Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2), Diablo Range (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 20.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Conium maculatum*, *Lolium perenne*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=9; Alameda County (n=4): ALCC036, ALCC105, EBRTA312, LLNL091

Contra Costa County (n=5): ALCC058, EBAY0012, EBRTA004, EBRTA303, SPCCB-070

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Umbellularia californica</i>	33	0.6	1.0	2.0				
T	<i>Quercus agrifolia</i>	33	0.4	0.2	2.0				
T	<i>Pinus sabiniana</i>	22	0.0	0.2	0.2				
R	<i>Quercus agrifolia</i> *	33	0.3	0.2	2.0				
R	<i>Umbellularia californica</i> *	33	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	26.8	3.0	60.0	Y	Y		Y
S	<i>Baccharis pilularis</i>	78	3.7	1.0	15.0	Y			Y
S	<i>Rubus ursinus</i>	44	2.0	0.2	10.0				
S	<i>Diplacus aurantiacus</i>	33	0.7	0.2	6.0				
S	<i>Artemisia californica</i>	33	0.1	0.2	0.2				
S	<i>Heteromeles arbutifolia</i>	22	0.9	0.2	8.0				
S	<i>Rosa californica</i>	22	0.2	1.0	1.0				

Toxicodendron diversilobum – (*Baccharis pilularis*) Association
Toxicodendron diversilobum Shrubland Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rhamnus ilicifolia</i>	22	0.0	0.1	0.2				
H	<i>Bromus diandrus</i>	56	1.0	0.2	6.0				Y
H	<i>Conium maculatum</i>	44	6.2	0.2	50.0				
H	<i>Bromus hordeaceus</i>	44	0.4	0.2	3.0				
H	<i>Scrophularia californica</i>	44	0.3	0.2	1.0				
H	<i>Lolium perenne</i>	33	1.6	0.2	8.0				
H	<i>Brachypodium distachyon</i>	33	0.8	0.2	5.0				
H	<i>Carduus pycnocephalus</i>	33	0.2	0.2	1.0				
H	<i>Marah fabaceus</i>	33	0.1	0.2	0.2				
H	<i>Avena barbata</i>	22	1.0	4.0	5.0				
H	<i>Elymus triticoides</i>	22	0.7	0.2	6.0				
H	<i>Vulpia bromoides</i>	22	0.4	0.2	3.0				
H	<i>Nassella pulchra</i>	22	0.4	0.2	3.0				
H	<i>Centaurea solstitialis</i>	22	0.2	1.0	1.0				
H	<i>Galium porrigens</i>	22	0.0	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	22	0.0	0.2	0.2				
H	<i>Bromus rubens</i>	22	0.0	0.2	0.2				
H	<i>Solanum umbelliferum</i>	22	0.0	0.2	0.2				
H	<i>Dryopteris arguta</i>	22	0.0	0.2	0.2				
H	<i>Lysimachia arvensis</i>	22	0.0	0.1	0.2				

***Toxicodendron diversilobum* / herbaceous Association**

Common Name: Poison Oak / herbaceous Shrubland

Alliance: *Toxicodendron diversilobum* Shrubland Alliance

Local Vegetation Description

The Poison Oak / herbaceous Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. Dominant and characteristic shrubs include *Toxicodendron diversilobum*. Commonly associated emergent trees at sparse cover include *Ailanthus altissima*. The herbaceous layer typically includes *Avena barbata*, *Bromus diandrus*, and *B. rubens*. Herbs often present include *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Grindelia camporum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	3.5	2 – 5
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.8	0.5 – 1
Shrub	23.8	15 – 40	1.5	1 – 2
Herb	17.8	5 – 25	0.5	0 – 1

Local Environmental Description

Elevation: Mean 326 m, Range 243 – 385 m

Aspect: NW (2), NE (1), SE (1)

Slope: Mean 23 degrees, Range 22 – 25 degrees

Macro Topography: Middle 1/3 of slope (2), Bottom to Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.3%, Range 0 – 7%

Fines Cover: Mean 49.3%, Range 20 – 90%

Litter Cover: Mean 47.0%, Range 8 – 79%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Site Impacts

This association has moderate non-native plant cover (average 43.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Ailanthus altissima, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Hirschfeldia incana*, *Lolium perenne*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Klein et al. 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=2): ALCCREC116, LLNL065

Contra Costa County (n=2): ALCC056, ALCC121

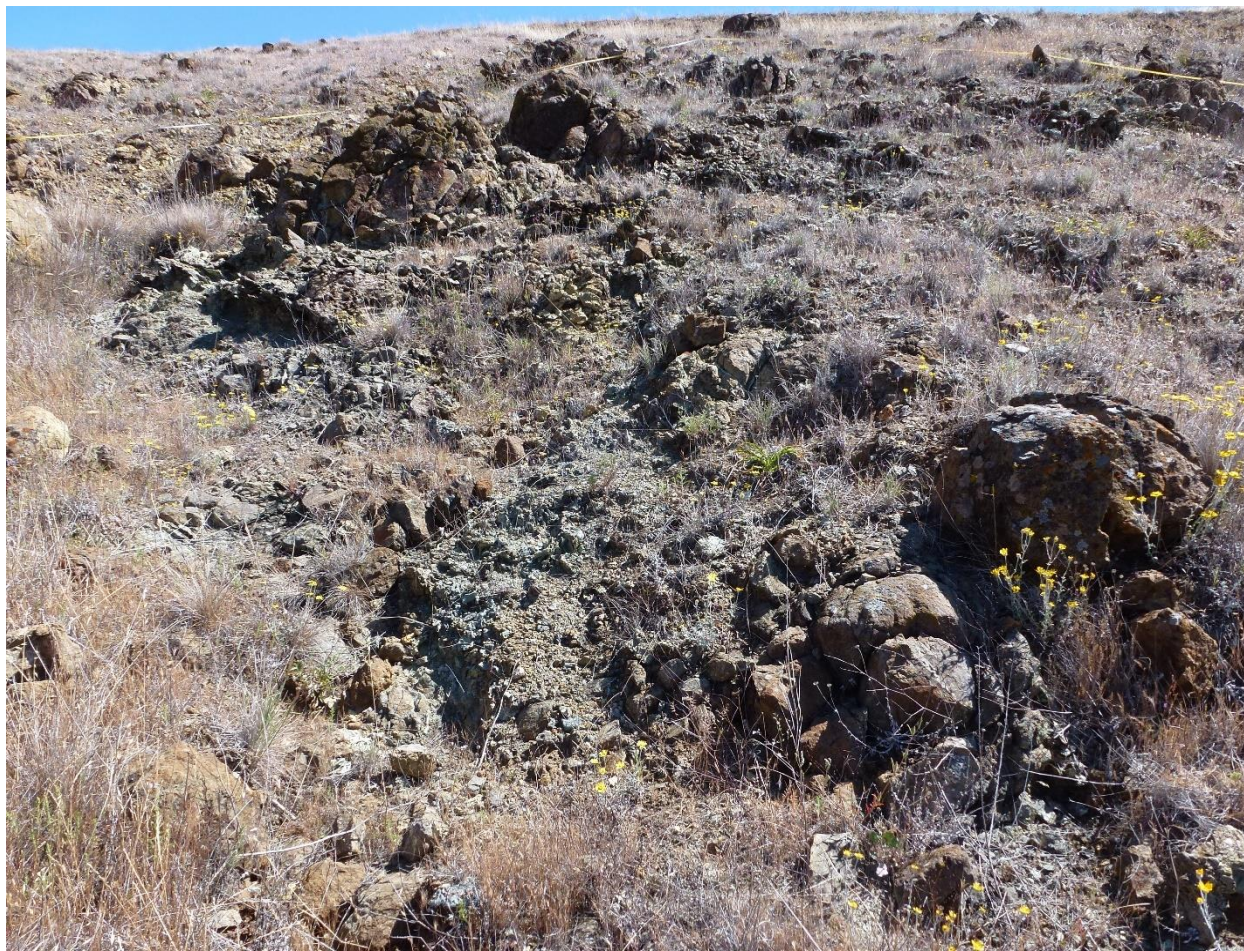
Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Ailanthus altissima</i>	25	0.3	1.0	1.0				
R	<i>Quercus douglasii</i>	25	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	100	23.8	15.0	40.0	Y	Y		Y
H	<i>Bromus rubens</i>	100	6.1	0.2	10.0	Y			Y
H	<i>Avena barbata</i>	75	3.3	2.0	8.0	Y			Y
H	<i>Bromus diandrus</i>	75	0.4	0.2	1.0	Y			Y
H	<i>Bromus hordeaceus</i>	50	2.6	0.2	10.0				Y
H	<i>Carduus pycnocephalus</i>	50	2.3	1.0	8.0				Y
H	<i>Grindelia camporum</i>	50	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	25	2.0	8.0	8.0				
H	<i>Brassica nigra</i>	25	0.8	3.0	3.0				
H	<i>Hirschfeldia incana</i>	25	0.3	1.0	1.0				
H	<i>Achillea millefolium</i>	25	0.3	1.0	1.0				
H	<i>Vulpia bromoides</i>	25	0.3	1.0	1.0				
H	<i>Cirsium cymosum</i>	25	0.3	1.0	1.0				
H	<i>Silene gallica</i>	25	0.1	0.2	0.2				
H	<i>Asclepias fascicularis</i>	25	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	25	0.1	0.2	0.2				
H	<i>Silybum marianum</i>	25	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	25	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	25	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	25	0.0	0.1	0.1				
NV	Lichen	25	0.1	0.2	0.2				

HERBACEOUS VEGETATION

***Allium* spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentinite Sparsely Vegetated Alliance**



Common Name: Onion – twistflower – dwarf-flax serpentinite rock outcrop

NVC Alliance Code: A3783. *Allium* spp. - *Streptanthus* spp. - *Hesperolinon* spp.
Serpentinite Sparse Rock Vegetation Alliance

Statewide Description

Allium spp., *Eriogonum luteolum*, *Hesperolinon* spp. and/or *Streptanthus* spp. are diagnostic herbs at sparse cover in the herbaceous layer, which is variable but commonly includes *Allium burlewii*, *A. cratericola*, *A. falcifolium*, *Asclepias cordifolia*, *Asclepias solanoana*, *Aspidotis densa*, *Chlorogalum pomeridianum*, *Claytonia exigua*, *Dudleya abramsii*, *Dudleya caespitosa*, *Eriogonum* spp., *Hesperolinon adenophyllum*, *H. bicarpellatum*, *H. breweri*, *H. californicum*, *H. clevelandii*, *H. congestum*, *H. didymocarpum*, *H. disjunctum*, *H. micranthum*, *H. spergulinum*, *H. tehamense*, *Lomatium* spp., *Nassella pulchra*, *Plantago erecta*, *Streptanthus batrachopus*, *S.*

Allium spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentinite Sparsely Vegetated
Alliance

breweri, *S. glandulosus* or *S. morrisonii*. Sparse shrubs may be present at low cover including *Adenostoma fasciculatum*, *Arctostaphylos* spp., *Ceanothus* spp., *Eriogonum* spp. and *Quercus durata*. Emergent conifers may be present such as *Hesperocyparis* spp., *Pinus attenuata*, *P. jeffreyi* or *P. sabiniana*. Non-vascular lichens may have high cover in some stands.

A host of distinctive annual and perennial plants are adapted to and/or thrive on harsh, infertile peridotite and serpentinite soils whereby the species composition of this alliance is variable. Often called 'serpentine barrens', they usually include one or more species of *Allium* (especially *A. falcifolium* or *A. cratericola*), *Streptanthus*, *Hesperolinon*, *Dudleya*, and annual or perennial *Eriogonum* spp. (Klein et al. 2015, Buck-Diaz et al. 2021) among many others.

Stands of this alliance typically have sparse cover characterized by annual and perennial herbs, with occasional low-growing subshrubs. Woody species such as *Quercus durata*, *Arctostaphylos* spp., and *Ceanothus* spp. (particularly *C. jepsonii* or *C. cuneatus*) may be widely scattered. Occasionally, emergent conifers can be present (NatureServe 2020).

Stands are restricted to serpentine, or other ultramafic substrates that are characteristically high in magnesium and low in calcium, and often include chemically harsh elements. The combination of a substrate toxic to most plants and a location on frequently unstable talus or scree slopes (often called barrens) makes these landscapes poorly vegetated, but rich in serpentine-tolerant endemic plants. All major serpentine regions within the state contain such barrens. However, there is insufficient vegetation data to characterize all of them (Klein et al. 2015). This alliance is known to occupy serpentinite outcrops of the central and southern Sierra Nevada, central and northern Coast Ranges, and Klamath Mountains (NatureServe 2020).

Local Vegetation Description

The Onion – twistflower – dwarf-flax serpentinite rock outcrop Alliance forms a sparse to open herbaceous layer in the single sample available. The shrub layer is typically absent, and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Boechera* sp., *Calochortus venustus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Elymus elymoides*, *Eriogonum nudum*, *Eriophyllum lanatum*, *Eschscholzia californica*, *Hesperolinon californicum*, *Holocarpha virgata*, *Melica californica*, *Nassella lepida*, *Plantago erecta*, *Sisyrinchium bellum*, *Stephanomeria* sp., *Streptanthus glandulosus*, and *Vulpia microstachys*. Commonly associated non-vascular plants include lichen.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	7.0	7 – 7	0.3	0 – 0.5

Allium spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentine Sparsely Vegetated Alliance

Local Membership Rule

Sparsely vegetated herbaceous stands (< 10% absolute cover though may be higher in cover depending on rainfall) characterized by *Allium falcifolium*, *Claytonia exigua*, *Eriogonum luteolum*, *E. nudum*, *Hesperolinon* spp., *Plantago erecta*, *Dudleya* spp. and/or other native herbs growing on serpentine barrens with exposed gravel and bedrock.

Local Environmental Description

Elevation: 464 m

Aspect: SW (1)

Slope: 19 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 52.0%

Small Rock: 35.0%

Fines Cover: 10.0%

Litter Cover: 2.0%

Soil Texture (field assessed): Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has low non-native plant cover (average 11.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus rubens*.

Associations in Alameda & Contra Costa Counties

Allium spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentinite alliance

Classification Comments

None.

References: Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2015

Global Rarity Rank: G2G3

State Rarity Rank: S2S3

Surveys Used for Description

Total: N=9; **Alameda County (n=0):**

Contra Costa County (n=1): SPCCB-066

Allium spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentinite Sparsely Vegetated Alliance

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Nassella lepida</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Eriophyllum lanatum</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Vulpia microstachys</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Elymus elymoides</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus rubens</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Hesperolinon californicum</i>	100	0.5	0.5	0.5	Y			Y
H	<i>Streptanthus glandulosus</i>	100	0.5	0.5	0.5	Y			Y
H	<i>Eschscholzia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Chlorogalum pomeridianum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Achillea millefolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Holocarpha virgata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Melica californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Plantago erecta</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eriogonum nudum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Calochortus venustus</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Stephanomeria</i> sp.	100	0.1	0.1	0.1	Y			Y
H	<i>Dichelostemma</i> sp.	100	0.1	0.1	0.1	Y			Y
H	<i>Clarkia purpurea</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Lolium perenne</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Eriogonum</i> sp.	100	0.1	0.1	0.1	Y			Y
H	<i>Sisyrinchium bellum</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Avena barbata</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Boechera</i> sp.	100	0.1	0.1	0.1	Y			Y
H	<i>Grindelia</i> sp.	100	0.1	0.1	0.1	Y			Y
NV	Lichen	100	10.0	10.0	10.0	Y	Y		Y

Allium spp. – *Streptanthus* spp. – *Hesperolinon* spp. Serpentine Sparsely Vegetated

Alliance

***Amsinckia (menziesii, tessellata) – Phacelia* spp. Herbaceous Alliance**



Common Name: Fiddleneck - Phacelia Fields

NVC Alliance Code: A4182. *Amsinckia menziesii* - *Amsinckia tessellata* - *Phacelia* spp. Meadow Alliance

Statewide Description

Amsinckia menziesii, *Amsinckia tessellata* and/or *Phacelia* spp. or other *Amsinckia* sp. is seasonally co-dominant or characteristic in the herbaceous layer with *Amblyopappus pusillus*, *Astragalus didymocarpus*, *Atriplex californica*, *Avena* spp., *Bromus diandrus*, *Bromus hordeaceus*, *Bromus rubens*, *Castilleja exserta*, *Centromadia pungens*, *Croton setigerus*, *Deinandra fasciculata*, *Dichelostemma capitatum*, *Erodium* spp., *Guillenia lasiophylla*, *Hordeum murinum*, *Lasthenia californica*, *Lasthenia gracilis*, *Lotus wrangelianus*, *Lupinus bicolor*, *Plagiobothrys canescens*, *Plagiobothrys collinus* and *Vulpia bromoides*. Emergent shrubs may be present at low cover, including *Adenostoma fasciculatum*, *Artemisia californica*, *Eastwoodia elegans*, *Encelia farinosa*, *Ericameria palmeri*, *Eriogonum fasciculatum*, *Isocoma menziesii* or *Lupinus albifrons*.

The alliance's cover and abundance of native taxa fluctuate depending on the amount and timing of precipitation. As with other annual vegetation, stand appearance and size

may vary from year to year. We need further sampling and analysis to understand the relationships of this alliance with non-native *Bromus* spp. and with other native herb alliances, including the *Plagiobothrys nothofulvus* alliance.

Local Vegetation Description

The Fiddleneck - Phacelia Fields Alliance forms an open to dense herbaceous layer. The shrub layer is absent and the tree layer is absent. Herbs that are often present include *Amsinckia menziesii* var. *intermedia*, *Avena barbata*, *Erodium cicutarium*, *Hordeum murinum*, and *Lolium perenne*, and herbs that are sometimes present include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus rubens*, *Carduus pycnocephalus*, *Castilleja exserta*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Erodium botrys*, *Hirschfeldia incana*, *Hordeum marinum*, *Lupinus succulentus*, *Medicago polymorpha*, *Rumex crispus*, *Trichostema lanceolatum*, and *Trifolium hirtum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.2	0.3	0 – 0.5
Herb	53.4	7 – 100	0.5	0 – 2

Local Membership Rule

Amsinckia spp., *Croton setigerus*, an annual *Eriogonum* spp., or *Phacelia* spp. > 15% relative cover as co-dominant or characteristic plants in the herbaceous layer; non-natives may be higher in cover yet the nominate native species are present and characteristic.

Local Environmental Description

Elevation: Mean 325 m, Range 76 – 662 m

Aspect: SW (3), NE (2), SE (2), Flat (1), Variable (1)

Slope: Mean 16 degrees, Range 0 – 30 degrees

Macro Topography: Bottom (2), Middle 1/3 of slope (2), Upper 1/3 of slope (2), Lower 1/3 of slope (1), Other (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: Mean 11.2%, Range 0 – 52%

Fines Cover: Mean 64.0%, Range 1 – 93%

Litter Cover: Mean 8.5%, Range 0 – 40%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately coarse, sandy loam (1), Fine silty clay (1), Coarse, loamy sand (1), Medium silt loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (4), Sandstone and other sedimentary (2), Alluvium (1), Sandstone, shale, and gravel deposits (1), Shale (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Eastern Hills (1)

Other Subsections: Eastern Hills (2), Diablo Range (1), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has high non-native plant cover (average 68.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, *Rumex crispus*, and *Trifolium hirtum*.

Associations in Alameda & Contra Costa Counties

Amsinckia (intermedia, menziesii)

Croton setigerus – (*Trichostema lanceolatum*)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=9; Alameda County (n=1): ALCC559

Contra Costa County (n=4): ALCC327, ALCC428, ALCC452, ALCC702

Santa Clara Co. (n=2): SCLAR802, SCRUZ996

Stanislaus Co. (n=2): SMNW0009, SMNW0027

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	67	9.2	4.0	30.0				Y
H	<i>Avena barbata</i>	56	8.3	1.0	47.0				Y
H	<i>Hordeum murinum</i>	56	4.2	0.2	20.0				Y
H	<i>Lolium perenne</i>	56	4.0	1.0	20.0				Y
H	<i>Erodium cicutarium</i>	56	2.2	0.2	10.0				Y
H	<i>Bromus hordeaceus</i>	44	3.2	0.2	20.0				
H	<i>Medicago polymorpha</i>	44	1.3	0.2	10.0				
H	<i>Bromus diandrus</i>	44	0.6	0.2	5.0				
H	<i>Erodium botrys</i>	33	3.4	0.2	22.0				
H	<i>Hirschfeldia incana</i>	22	1.1	2.0	8.0				
H	<i>Trichostema lanceolatum</i>	22	0.8	2.0	5.0				
H	<i>Bromus rubens</i>	22	0.5	0.2	4.0				
H	<i>Trifolium hirtum</i>	22	0.3	1.0	2.0				
H	<i>Lupinus succulentus</i>	22	0.2	0.2	2.0				
H	<i>Centaurea solstitialis</i>	22	0.2	0.2	2.0				
H	<i>Hordeum marinum</i>	22	0.2	1.0	1.0				
H	<i>Castilleja exserta</i>	22	0.0	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	22	0.0	0.2	0.2				
H	<i>Brassica nigra</i>	22	0.0	0.2	0.2				
H	<i>Rumex crispus</i>	22	0.0	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	22	0.0	0.1	0.2				

Amsinckia (intermedia, menziesii) Association

Common Name: Fiddleneck Patches

Alliance: *Amsinckia (menziesii, tessellata)* – *Phacelia* spp. Herbaceous Alliance

Local Vegetation Description

The Fiddleneck Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Amsinckia menziesii* var. *intermedia*. Herbs often present include *Avena barbata*, *Bromus diandrus*, *Erodium cicutarium*, *Hordeum murinum*, *Lolium perenne*, and *Medicago polymorpha*, and herbs that are sometimes present include *Brassica nigra*, *Bromus hordeaceus*, *Castilleja exserta*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Erodium botrys*, *Hirschfeldia incana*, and *Lupinus succulentus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.4	0.3	0 – 0.5
Herb	58.6	7 – 100	0.6	0 – 2

Local Environmental Description

Elevation: Mean 257 m, Range 76 – 662 m

Aspect: NE (2), SE (2), SW (2), Flat (1)

Slope: Mean 16 degrees, Range 0 – 30 degrees

Macro Topography: Bottom (2), Middle 1/3 of slope (2), Upper 1/3 of slope (2), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 10.4%, Range 0 – 52%

Fines Cover: Mean 57.7%, Range 1 – 93%

Litter Cover: Mean 10.7%, Range 0 – 40%

Soil Texture (field assessed): Coarse, loamy sand (1), Fine silty clay (1), Medium silt loam (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (3), Alluvium (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Shale (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), Eastern Hills (1)

Other Subsections: Eastern Hills (2), Diablo Range (1)

Site Impacts

This association has high non-native plant cover (average 66.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hordeum murinum*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: G4 **State Rarity Rank:** S4 **State Rare:** N

Surveys Used for Description

Total: N=7; **Alameda County (n=1):** ALCC559

Contra Costa County (n=3): ALCC327, ALCC428, ALCC702

Santa Clara Co. (n=1): SCLAR802

Stanislaus Co. (n=2): SMNW0009, SMNW0027

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	86	11.9	4.0	30.0	Y			Y
H	<i>Hordeum murinum</i>	71	5.3	0.2	20.0				Y
H	<i>Erodium cicutarium</i>	71	2.9	0.2	10.0				Y
H	<i>Avena barbata</i>	57	10.6	3.0	47.0				Y
H	<i>Lolium perenne</i>	57	5.0	1.0	20.0				Y
H	<i>Medicago polymorpha</i>	57	1.6	0.2	10.0				Y
H	<i>Bromus diandrus</i>	57	0.8	0.2	5.0				Y
H	<i>Bromus hordeaceus</i>	29	2.9	0.2	20.0				
H	<i>Hirschfeldia incana</i>	29	1.4	2.0	8.0				
H	<i>Erodium botrys</i>	29	1.2	0.2	8.0				
H	<i>Lupinus succulentus</i>	29	0.3	0.2	2.0				
H	<i>Centaurea solstitialis</i>	29	0.3	0.2	2.0				
H	<i>Brassica nigra</i>	29	0.1	0.2	0.2				
H	<i>Castilleja exserta</i>	29	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	29	0.0	0.1	0.2				

Amsinckia (*intermedia*, *menziesii*) Association
Amsinckia (*menziesii*, *tessellata*) – *Phacelia* spp. Herbaceous Alliance

***Croton setigerus* – (*Trichostema lanceolatum*) Provisional Association**

Common Name: Doveweed – (Vinegar Weed) Patches

Alliance: *Amsinckia (menziesii, tessellata)* – *Phacelia* spp. Herbaceous Alliance

Local Vegetation Description

The Doveweed – (Vinegar Weed) Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus* and *Trichostema lanceolatum*. Those herbs often present include *Aira caryophylllea*, *Avena barbata*, *Avena* sp., *Brachypodium distachyon*, *Bromus rubens*, *Carduus pycnocephalus*, *Croton setigerus*, *Cynosurus echinatus*, *Epilobium brachycarpum*, *Erodium botrys*, *Eschscholzia californica*, *Galium murale*, *Galium parisiense*, *Gastidium phleoides*, *Holocarpha virgata*, *Hordeum marinum*, *Juncus bufonius*, *Juncus mexicanus*, *Lagophylla ramosissima*, *Logfia gallica*, *Lolium perenne*, *Micropus californicus*, *Polypogon monspeliensis*, *Rumex crispus*, *Trifolium hirtum*, *Trifolium willdenovii*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	35.0	30 – 40	0.5	0 – 1

Local Environmental Description

Elevation: Mean 564 m, Range 500 – 628 m

Aspect: SW (1), Variable (1)

Slope: Mean 16 degrees, Range 10 – 22 degrees

Macro Topography: Other (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 1.6%, Range 0.2 – 3%

Small Rock: Mean 11.0%, Range 7 – 15%

Fines Cover: Mean 86.0%, Range 84 – 88%

Litter Cover: Mean 0.6%, Range 0 – 1%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 74.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophylla*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Erodium botrys*, *Galium murale*, *Galium parisiense*, *Gastridium phleoides*, *Hordeum marinum*, *Logfia gallica*, *Lolium perenne*, *Polypogon monspeliensis*, *Rumex crispus*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

This association remains provisional due to overall low sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): ALCC452

Santa Clara Co. (n=1): SCRUZ996

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	4.5	3.0	6.0	Y			Y
H	<i>Trichostema lanceolatum</i>	100	3.5	2.0	5.0	Y			Y
H	<i>Erodium botrys</i>	50	11.0	22.0	22.0				Y
H	<i>Gastidium phleoides</i>	50	3.0	6.0	6.0				Y
H	<i>Vulpia myuros</i>	50	3.0	6.0	6.0				Y
H	<i>Lagophylla ramosissima</i>	50	2.0	4.0	4.0				Y
H	<i>Bromus rubens</i>	50	2.0	4.0	4.0				Y
H	<i>Croton setigerus</i>	50	1.5	3.0	3.0				Y
H	<i>Juncus mexicanus</i>	50	1.0	2.0	2.0				Y
H	<i>Logfia gallica</i>	50	0.5	1.0	1.0				Y
H	<i>Avena barbata</i>	50	0.5	1.0	1.0				Y
H	<i>Vulpia bromoides</i>	50	0.5	1.0	1.0				Y
H	<i>Trifolium hirtum</i>	50	0.5	1.0	1.0				Y
H	<i>Lolium perenne</i>	50	0.5	1.0	1.0				Y
H	<i>Hordeum marinum</i>	50	0.5	1.0	1.0				Y
H	<i>Brachypodium distachyon</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Aira caryophyllea</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium willdenovii</i>	50	0.1	0.2	0.2				Y
H	<i>Micropus californicus</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex crispus</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus bufonius</i>	50	0.1	0.2	0.2				Y
H	<i>Avena</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Epilobium brachycarpum</i>	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Eschscholzia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Galium murale</i>	50	0.1	0.2	0.2				Y
H	<i>Galium parisiense</i>	50	0.1	0.2	0.2				Y
H	<i>Holocarpa virgata</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y

Croton setigerus – (*Trichostema lanceolatum*) Provisional Association
Amsinckia (menziesii, tessellata) – *Phacelia* spp. Herbaceous Alliance

***Anemopsis californica* – *Helianthus nuttallii* – *Solidago spectabilis*
Herbaceous Alliance**



Common Name: Yerba mansa – Nuttall's sunflower – Nevada goldenrod alkaline wet meadows

NVC Alliance Code: A4247. *Anemopsis californica* - *Helianthus nuttallii* - *Solidago spectabilis* Alkaline Wet Meadow Alliance

Statewide Description

Anemopsis californica, *Helianthus nuttallii*, *Solidago confinis* and/or *Solidago spectabilis* is dominant or co-dominant in the herbaceous layer with *Ambrosia psilostachya*, *Bromus hordeaceus*, *Carex praegracilis*, *Carpobrotus edulis*, *Cirsium occidentale*, *Distichlis spicata*, *Euthamia occidentalis*, *Holocarpha virgata*, *Hordeum murinum* ssp. *leporinum*, *Juncus arcticus*, *Juncus cooperi*, *Juncus rugulosus*, *Lactuca serriola*, *Leymus triticoides*, *Lolium perenne*, *Medicago polymorpha*, *Rumex crispus*, *Schoenoplectus americanus*, *Sisyrinchium bellum* and *Sporobolus airoides*.

Stands of *Anemopsis californica* are typically small and occur in isolated inland wetlands and riparian zones. In California, it associates with *Platanus racemosa*, *Populus fremontii*, *Salix* spp., and riparian herbs.

Anemopsis californica – *Helianthus nuttallii* – *Solidago spectabilis* Herbaceous Alliance

This alliance has been expanded to include additional species since the 2009 publication of *A Manual of California Vegetation*, second edition. In southeastern California stands of *Solidago spectabilis* and *Helianthus nuttallii* occur in a matrix with various herbs, sometimes including *Anemopsis californica*.

Local Vegetation Description

The Yerba mansa – Nuttall's sunflower – Nevada goldenrod alkaline wet meadows Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Anemopsis californica*, and characteristic herbs include *Anemopsis californica*. Those herbs often present include *Distichlis spicata* and *Juncus mexicanus*, and herbs that are sometimes present include *Asparagus officinalis*, *Berula erecta*, *Bromus diandrus*, *Centromadia pungens* ssp. *pungens*, *Cirsium vulgare*, *Elymus triticoides*, *Frankenia salina*, *Hirschfeldia incana*, *Hordeum brachyantherum*, *Juncus arcticus*, *Juncus xiphioides*, *Lactuca serriola*, *Lepidium latifolium*, *Lolium perenne*, *Mimulus guttatus*, *Polypogon monspeliensis*, *Rumex* sp., *Schoenoplectus americanus*, and *Sonchus asper*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.1	0.9	0 – 2
Herb	57.9	32 – 98	0.3	0 – 0.5

Local Membership Rule

Anemopsis californica >30% relative cover in meadows and seeps that often have a degree of alkalinity.

Local Environmental Description

Elevation: Mean 105 m, Range 1 – 217 m

Aspect: NE (2), Flat (1), SE (1), SW (1)

Slope: Mean 4 degrees, Range 0 – 10 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (2)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 28.0%, Range 0 – 92%

Litter Cover: Mean 67.8%, Range 1 – 97%

Soil Texture (field assessed): Clay, (class unknown) (1), Medium silt (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Alluvium (2), Sandstone, shale, and gravel deposits (2), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (2), East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has low non-native plant cover (average 5.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Asparagus officinalis*, *Bromus diandrus*, *Cirsium vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Lepidium latifolium*, *Lolium perenne*, *Polypogon monspeliensis*, *Rubus armeniacus*, and *Sonchus asper*.

Associations in Alameda & Contra Costa Counties

Anemopsis californica

Anemopsis californica – *Juncus arcticus* var. *mexicanus*

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Reyes et al. 2020a

Global Rarity Rank: G3

State Rarity Rank: S2

Surveys Used for Description

Total: N=5; Alameda County (n=2): ALCC263, ALCCREC114

Contra Costa County (n=3): ALCC336, ALCC605, ALCC906

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rubus armeniacus</i>	20	0.0	0.1	0.1				
H	<i>Anemopsis californica</i>	100	40.6	12.0	97.0	Y	Y		Y
H	<i>Distichlis spicata</i>	60	6.0	2.0	18.0				Y
H	<i>Juncus mexicanus</i>	60	2.8	0.2	12.0				Y
H	<i>Juncus xiphioides</i>	40	2.0	2.0	8.0				
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	40	1.2	2.0	4.0				
H	<i>Sonchus asper</i>	40	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	20	2.0	10.0	10.0				
H	<i>Juncus arcticus</i>	20	2.0	10.0	10.0				
H	<i>Berula erecta</i>	20	1.6	8.0	8.0				
H	<i>Frankenia salina</i>	20	1.6	8.0	8.0				
H	<i>Mimulus guttatus</i>	20	0.6	3.0	3.0				
H	<i>Lepidium latifolium</i>	20	0.4	2.0	2.0				
H	<i>Schoenoplectus americanus</i>	20	0.2	1.0	1.0				
H	<i>Polypogon monspeliensis</i>	20	0.2	1.0	1.0				
H	<i>Hordeum brachyantherum</i>	20	0.0	0.2	0.2				
H	<i>Hirschfeldia incana</i>	20	0.0	0.2	0.2				
H	<i>Elymus triticoides</i>	20	0.0	0.2	0.2				
H	<i>Cirsium vulgare</i>	20	0.0	0.2	0.2				
H	<i>Bromus diandrus</i>	20	0.0	0.2	0.2				
H	<i>Lactuca serriola</i>	20	0.0	0.2	0.2				
H	<i>Rumex</i> sp.	20	0.0	0.2	0.2				
H	<i>Asparagus officinalis</i>	20	0.0	0.1	0.1				

***Anemopsis californica* Provisional Association**

Common Name: Yerba Mansa Patches

Alliance: *Anemopsis californica* – *Helianthus nuttallii* – *Solidago spectabilis*
Herbaceous Alliance

Local Vegetation Description

The Yerba Mansa Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Anemopsis californica*. Those herbs often present include *Centromadia pungens* ssp. *pungens*, *Distichlis spicata*, *Juncus mexicanus*, and *Sonchus asper*, and herbs that are sometimes present include *Asparagus officinalis*, *Berula erecta*, *Bromus diandrus*, *Cirsium vulgare*, *Elymus triticoides*, *Frankenia salina*, *Hirschfeldia incana*, *Hordeum brachyantherum*, *Juncus arcticus*, *Juncus xiphioides*, *Lactuca serriola*, *Lepidium latifolium*, *Polypogon monspeliensis*, and *Schoenoplectus americanus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.1	0.9	0 – 2
Herb	60.9	32 – 98	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 107 m, Range 1 – 217 m

Aspect: Flat (1), NE (1), SE (1), SW (1)

Slope: Mean 2 degrees, Range 0 – 5 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 6.7%, Range 0 – 18%

Litter Cover: Mean 90.0%, Range 78 – 97%

Soil Texture (field assessed): Clay, (class unknown) (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Alluvium (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (2)

Site Impacts

This association has low non-native plant cover (average 1.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Asparagus officinalis*, *Bromus diandrus*, *Cirsium vulgare*, *Hirschfeldia incana*, *Lactuca serriola*, *Lepidium latifolium*, *Polypogon monspeliensis*, *Rubus armeniacus*, and *Sonchus asper*.

Classification Comments

This association remains provisional due to low overall sample size.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Ratchford et al. 2023a, Reyes et al. 2020a

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=4; Alameda County (n=2): ALCC263, ALCCREC114

Contra Costa County (n=2): ALCC336, ALCC605

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rubus armeniacus</i>	25	0.0	0.1	0.1				
H	<i>Anemopsis californica</i>	100	47.8	20.0	97.0	Y	Y		Y
H	<i>Distichlis spicata</i>	50	5.0	2.0	18.0				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	50	1.5	2.0	4.0				Y
H	<i>Juncus mexicanus</i>	50	0.6	0.2	2.0				Y
H	<i>Sonchus asper</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus arcticus</i>	25	2.5	10.0	10.0				
H	<i>Berula erecta</i>	25	2.0	8.0	8.0				
H	<i>Juncus xiphioides</i>	25	2.0	8.0	8.0				
H	<i>Frankenia salina</i>	25	2.0	8.0	8.0				
H	<i>Lepidium latifolium</i>	25	0.5	2.0	2.0				
H	<i>Schoenoplectus americanus</i>	25	0.3	1.0	1.0				
H	<i>Polypogon monspeliensis</i>	25	0.3	1.0	1.0				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				
H	<i>Elymus triticoides</i>	25	0.1	0.2	0.2				
H	<i>Cirsium vulgare</i>	25	0.1	0.2	0.2				
H	<i>Hordeum brachyantherum</i>	25	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	25	0.1	0.2	0.2				
H	<i>Asparagus officinalis</i>	25	0.0	0.1	0.1				

***Anemopsis californica* – *Juncus arcticus* var. *mexicanus* Association**

Common Name: Yerba Mansa – Mexican Rush Patches

Alliance: *Anemopsis californica* – *Helianthus nuttallii* – *Solidago spectabilis*
Herbaceous Alliance

Local Vegetation Description

The Yerba Mansa – Mexican Rush Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Anemopsis californica*, *Distichlis spicata*, *Juncus mexicanus*, *Juncus xiphioides*, *Lolium perenne*, *Mimulus guttatus*, and *Rumex* sp.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	46.0	46 – 46	0.3	0 – 0.5

Local Environmental Description

Elevation: 98 m

Aspect: NE (1)

Slope: 10 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: no data

Small Rock: no data

Fines Cover: 92%

Litter Cover: 1%

Soil Texture (field assessed): Medium silt (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 20.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lolium perenne*.

Classification Comments

None.

References: Evens and San 2005, Reyes et al. 2020a, Sproul et al. 2011, VegCAMP 2014b

Anemopsis californica – *Juncus arcticus* var. *mexicanus* Association
Anemopsis californica – *Helianthus nuttallii* – *Solidago spectabilis* Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC906

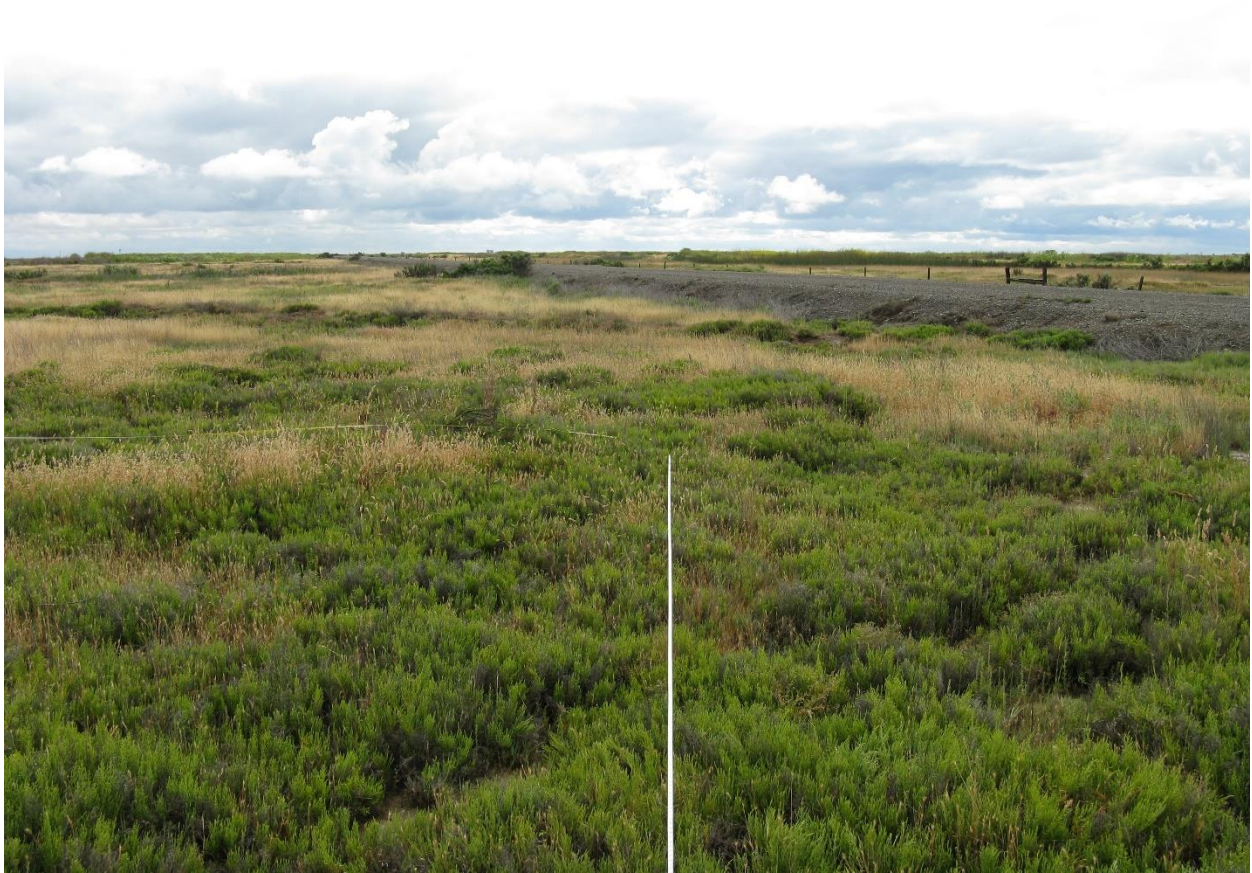
Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Juncus mexicanus</i>	100	12.0	12.0	12.0	Y			Y
H	<i>Anemopsis californica</i>	100	12.0	12.0	12.0	Y			Y
H	<i>Distichlis spicata</i>	100	10.0	10.0	10.0	Y			Y
H	<i>Lolium perenne</i>	100	10.0	10.0	10.0	Y			Y
H	<i>Mimulus guttatus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Juncus xiphioides</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Rumex</i> sp.	100	0.2	0.2	0.2	Y			Y

Anemopsis californica – *Juncus arcticus* var. *mexicanus* Association
Anemopsis californica – *Helianthus nuttallii* – *Solidago spectabilis* Herbaceous Alliance

***Arthrocnemum subterminale* Herbaceous Alliance**



Common Name: Parish's glasswort patches

NVC Alliance Code: N/A

Statewide Description

Arthrocnemum subterminale is dominant or co-dominant in the herbaceous and subshrub layers with *Atriplex patula*, *Atriplex prostrata*, *Batis maritima*, *Cotula coronopifolia*, *Cressa truxillensis*, *Cuscuta salina*, *Distichlis spicata*, *Frankenia salina*, *Grindelia stricta*, *Jaumea carnosa*, *Limonium californicum*, *Monanthochloe littoralis*, *Sarcocornia pacifica*, *Suaeda esteroa* and *Suaeda taxifolia*.

Arthrocnemum subterminale and *Sarcocornia pacifica* co-occur in southern California salt marshes, and they also range inland from coastal marshes. Pennings and Calloway (1992) and Zedler et al. (1999) described the ecological separation of these species in the Carpinteria Salt Marsh and in southern California, respectively. *Sarcocornia pacifica* grows at lower marsh elevations, and *A. subterminale* is a component of the high marsh, along with *Cuscuta salina* and *Monanthochloe littoralis* (Zedler 1999). Both *A. subterminale* and *S. pacifica* have their greatest growth immediately adjacent to their abrupt border, suggesting *Arthrocnemum subterminale* Herbaceous Alliance that

interspecific competition is most important in the relatively benign, middle-marsh zones. Each species excludes the other from a portion of its prime habitat. *S. pacifica* appears better able to tolerate more flooding and lower salinity, thus persisting in the lower marsh zone; *A. subterminale* is more tolerant of higher salinity, persisting in the transition and in the higher marsh zone.

Although *Arthrocnemum subterminale* occurs without *Sarcocornia pacifica*, few stands have been assessed in California. In Baja California, *A. subterminale* strictly dominates in salt marshes and alkaline depressions, where it has been sampled extensively (Peinado et al. 1994, 2007). We need more sampling and analysis of the different tidal marsh zones to determine the relationships of alliances; however, high tidal marshes have become regionally rare or infrequent in the tidal marsh system in California, and only small refugia for high tidal marsh plants exist for *A. subterminale* and other species (Baye et al. 2000).

Local Vegetation Description

The Parish's glasswort patches Alliance forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Cotula coronopifolia*, and characteristic herbs include *Arthrocnemum subterminale*, *Cotula coronopifolia*, *Frankenia salina*, *Hordeum marinum*, *Juncus bufonius*, *Lasthenia conjugens*, and *Polypogon monspeliensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean		Height (m) Range
Conifer	0.0	0 – 0	no data		no data
Hardwood	0.0	0 – 0	no data		no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data		no data
Shrub	0.0	0 – 0	no data		no data
Herb	85.0	85 – 85	0.3		0 – 0.5

Local Membership Rule

Arthrocnemum subterminale > 30% relative cover with other salt marsh plants.

Local Environmental Description

Elevation: 3 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: 10%

Litter Cover: 5%

Soil Texture (field assessed): no data

Geology (field or map data): Alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has high non-native plant cover (average 70.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cotula coronopifolia*, *Hordeum marinum*, and *Polypogon monspeliensis*.

Associations in Alameda & Contra Costa Counties

Arthrocnemum subterminale alliance

Classification Comments

None.

References: Evens and San 2005, Grewell et al. 2007, Keeler-Wolf and Evens 2006, Sproul et al. 2011, Buck-Diaz et al. 2012

Global Rarity Rank: G4

State Rarity Rank: S2

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** WAR008E

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Cotula coronopifolia</i>	100	60.0	60.0	60.0	Y	Y		Y
H	<i>Arthrocnemum subterminale</i>	100	20.0	20.0	20.0	Y			Y
H	<i>Frankenia salina</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Polypogon monspeliensis</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Lasthenia conjugens</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Hordeum marinum</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Juncus bufonius</i>	100	0.4	0.4	0.4	Y			Y

***Atriplex prostrata* – *Cotula coronopifolia* Herbaceous Semi-Natural Alliance**



Common Name: Fields of fat hen and brass buttons

NVC Alliance Code: A2285.

Statewide Description

Atriplex prostrata and/or *Cotula coronopifolia* is dominant or co-dominant in the herbaceous layer.

Both species are indicative of disturbed conditions in alkaline or saline wetlands. They readily colonize bare mud and sand and can produce copious seed. Both are early seral plants; they may be abundant to sparse from year to year depending on the disturbance regime of unpredictable flooding and salinity. Thus, we place them into this one vegetation type which constitutes an ephemeral, seasonally flooded marsh type at intermediate tidal elevations with relatively high salinities (Keeler-Wolf and Vaghti 2000, Pickart 2006). Stands occur usually in relatively narrow bands along the upper margins of brackish or salt marshes, and sometimes as extensive monocultures (Pickart 2006). Ecologically, the most closely related native types may be the *Distichlis spicata* and *Frankenia salina* alliances. As a result of flooding, stands of the *Typha (angustifolia)*,

domingensis, *latifolia*) alliance and other freshwater plants may occur adjacent to or replace them.

Local Vegetation Description

The Fields of fat hen and brass buttons Alliance forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Cotula coronopifolia*, and characteristic herbs include *Cotula coronopifolia*. Those herbs often present include *Atriplex prostrata*, *Distichlis spicata*, *Frankenia salina*, *Lolium perenne*, and *Sesuvium verrucosum*, and herbs that are sometimes present include *Arthrocnemum subterminale*, *Hordeum depressum*, *Hordeum marinum*, *Juncus bufonius*, *Lasthenia conjugens*, *Lythrum hyssopifolium*, *Plantago elongata*, *Polypogon monspeliensis*, *Sonchus oleraceus*, and *Symphyotrichum subulatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	96.2	90 – 100	0.3	0 – 0.5

Local Membership Rule

Cotula coronopifolia and/or *Atriplex prostrata* > 50% relative cover in the herbaceous layer; and overall non-native herbs > 90% relative cover.

Local Environmental Description

Elevation: Mean 1 m, Range 0 – 3 m

Aspect: Flat (3)

Slope: 0 degrees

Macro Topography: Bottom (3)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 2.8%, Range 0 – 6%

Litter Cover: Mean 50.0%, Range 0 – 100%

Soil Texture (field assessed): Peat (1), Muck (1), Moderately fine silty clay loam (1)

Geology (field or map data): Clayey alluvium (3), Alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Other Subsections: Delta (3)

Site Impacts

This alliance has high non-native plant cover (average 97.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex*

prostrata, *Cotula coronopifolia*, *Hordeum marinum*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Cotula coronopifolia

Classification Comments

Lasthenia conjugens, present in one of the surveys, is a rare plant (CRPR 1B.1). Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Keeler-Wolf and Vaghti 2000, Pickart 2006

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=4; Alameda County (n=1): WAR008F

Contra Costa County (n=0):

Solano Co. (n=3): SUMA9131, SUMA9132, SUMA9173

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Cotula coronopifolia</i>	100	92.3	75.0	100.0	Y	Y		Y
H	<i>Frankenia salina</i>	50	1.3	0.2	5.0				Y
H	<i>Lolium perenne</i>	50	0.2	0.2	0.4				Y
H	<i>Sesuvium verrucosum</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.2	0.2				Y
H	<i>Distichlis spicata</i>	50	0.1	0.2	0.2				Y
H	<i>Hordeum marinum</i>	25	1.3	5.0	5.0				
H	<i>Arthrocnemum subterminale</i>	25	0.3	1.0	1.0				
H	<i>Lasthenia conjugens</i>	25	0.3	1.0	1.0				
H	<i>Hordeum depressum</i>	25	0.1	0.4	0.4				
H	<i>Plantago elongata</i>	25	0.1	0.4	0.4				
H	<i>Juncus bufonius</i>	25	0.1	0.4	0.4				
H	<i>Symphyotrichum subulatum</i>	25	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	25	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	25	0.1	0.2	0.2				
H	<i>Lythrum hyssopifolium</i>	25	0.0	0.1	0.1				

***Cotula coronopifolia* Semi-natural Association**

Common Name: Brass Buttons Patches

Alliance: *Atriplex prostrata* – *Cotula coronopifolia* Herbaceous Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2021a, Keeler-Wolf and Vaghti 2000, Pickart 2006

Global Rarity Rank: GNA **State Rarity Rank:** SNA **State Rare:** N

Cotula coronopifolia Semi-natural Association
Atriplex prostrata – *Cotula coronopifolia* Herbaceous Semi-natural Alliance

***Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance**



Common Name: Wild oats and annual brome grasslands

NVC Alliance Code: A3870. *Avena fatua* - *Bromus* spp. Ruderal Annual Grassland Alliance

Statewide Description

Avena barbata, *Avena fatua*, *Brachypodium distachyon*, *Bromus diandrus*, and/or *Bromus hordeaceus* dominate or co-dominate in the herbaceous layer. Emergent trees and shrubs may be present at low cover.

Until recently, this type was recognized as two separate alliances. However, the yearly shift of species dominance and the overlap of many non-native *Bromus*, *Avena*, and related non-native grass species suggests a broader, more inclusive treatment. This alliance is identified by high, persistent cover of non-native grasses, but may have high cover of early spring non-native herbs such as *Erodium* spp. as well.

Local Vegetation Description

The Wild oats and annual brome grasslands Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is open. Characteristic

herbs include *Avena barbata*, *Bromus diandrus*, and *Bromus hordeaceus*. Those herbs often present include *Carduus pycnocephalus*, *Erodium botrys*, *Hordeum murinum*, *Lolium perenne*, and *Trifolium hirtum*, and herbs that are sometimes present include *Brassica* sp., *Bromus rubens*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Dichelostemma capitatum*, *Erodium cicutarium*, *Erodium* sp., *Geranium dissectum*, *Hordeum marinum*, *Hypochaeris glabra*, *Lupinus* sp., *Medicago polymorpha*, *Nassella pulchra*, *Plagiobothrys* sp., *Rumex crispus*, *Sherardia arvensis*, *Silene gallica*, *Trifolium dubium*, *Trifolium* sp., *Triteleia laxa*, *Vicia sativa*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.4	0 – 6	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.3	0 – 7	no data	no data
Herb	54.6	30 – 80	0.6	0 – 1

Local Membership Rule

Avena, *Brachypodium*, *Briza*, *Bromus*, *Erodium*, *Hypochaeris*, *Medicago* spp., and/or *Vulpia bromoides* > 30% relative cover individually, or share > 50% relative cover in the herbaceous layer; and overall non-native herbs > 90% relative cover.

Local Environmental Description

Elevation: Mean 368 m, Range 0 – 844 m

Aspect: SE (6), NW (3), SW (2), Flat (1), NE (1), Variable (1)

Slope: Mean 18 degrees, Range 0 – 48 degrees

Macro Topography: Upper 1/3 of slope (5), Lower 1/3 of slope (3), Middle 1/3 of slope (3), Bottom (1), Lower to Middle 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.2%, Range 0 – 2%

Small Rock: Mean 2.1%, Range 0 – 11%

Fines Cover: Mean 58.7%, Range 5 – 93%

Litter Cover: Mean 31.1%, Range 2 – 93%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (11), Franciscan melange (9), Sandstone, shale, and gravel deposits (6), Alluvium (1), Sandstone (1), Sandstone and other sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (11), Eastern Hills (5), Diablo Range (2), East Bay Hills - Mount Diablo (2), Western Diablo Range (1)

Contra Costa County Subsections: Suisun Hills and Valleys (5), East Bay Hills - Mount Diablo (3), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has high non-native plant cover (average 92.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hordeum marinum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex crispus*, *Sherardia arvensis*, *Trifolium hirtum*, *Vicia sativa*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Avena barbata – *Avena fatua*

Avena barbata – *Bromus hordeaceus*

Avena spp. – *Bromus* spp. alliance

Brachypodium distachyon

Bromus diandrus

Bromus diandrus – *Avena* spp.

Bromus hordeaceus – *Erodium botrys*

Bromus hordeaceus – *Hordeum* spp. – *Medicago polymorpha*

Classification Comments

None.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and San 2004, Jimerson et al. 2000, Keeler-Wolf and Evens 2006, Klein et al. 2007, Klein et al. 2015, Parsons and Stohlgren 1989, Rodriguez 2015, Rodriguez et al. 2017, Schlising and Sanders 1982, Sikes et al. 2021, Sikes et al. 2023, Solomeshch and Barbour 2006, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=30; Alameda County (n=21): ACWM-03, ACWM-04, ACWM-05, ACWM-06, ACWM-08, ALCC565, EBAY0048, GARA-01, GARA-03, GARA-05, GARA-08, GUMP-001, GUMP-009, GUMP-017, GUMP-020, GUMP-022, GUMP-025, LLNL090, MULL-04, PRRP005, PRRP008

Contra Costa County (n=9): ALCC437, ALCC701, ALCC706, EBAY0114, JOMU002, JOMU012, JOMU014

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	90	8.8	0.2	25.0	Y			Y
H	<i>Bromus diandrus</i>	83	7.3	0.1	20.0	Y			Y
H	<i>Avena barbata</i>	80	9.2	0.2	70.0	Y			Y
H	<i>Lolium perenne</i>	70	2.0	0.1	12.1				Y
H	<i>Trifolium hirtum</i>	67	2.6	0.1	13.0				Y
H	<i>Carduus pycnocephalus</i>	63	1.2	0.1	15.0				Y
H	<i>Hordeum murinum</i>	60	3.3	0.1	20.0				Y
H	<i>Erodium botrys</i>	57	3.0	0.1	23.0				Y
H	<i>Amsinckia</i> sp.	43	0.1	0.1	1.2				
H	<i>Bromus rubens</i>	40	1.2	0.1	15.0				
H	<i>Hypochaeris glabra</i>	40	0.2	0.1	2.6				
H	<i>Vulpia bromoides</i>	37	0.5	0.3	6.3				
H	<i>Erodium cicutarium</i>	37	0.5	0.1	6.6				
H	<i>Brassica</i> sp.	33	0.5	0.1	11.8				
H	<i>Avena fatua</i>	30	3.9	0.2	40.0				
H	<i>Hordeum marinum</i>	30	0.8	0.1	8.2				
H	<i>Medicago polymorpha</i>	30	0.4	0.2	4.8				
H	<i>Lupinus</i> sp.	30	0.1	0.1	0.6				
H	<i>Dichelostemma capitatum</i>	30	0.0	0.1	0.3				
H	<i>Erodium</i> sp.	27	0.9	0.3	6.9				
H	<i>Nassella pulchra</i>	27	0.4	0.1	5.0				
H	<i>Sherardia arvensis</i>	27	0.4	0.1	4.1				
H	<i>Triteleia laxa</i>	27	0.1	0.1	2.0				
H	<i>Silene gallica</i>	27	0.1	0.1	0.6				
H	<i>Vicia sativa</i>	27	0.1	0.1	1.0				
H	<i>Brachypodium distachyon</i>	23	1.4	0.2	14.8				
H	<i>Trifolium</i> sp.	23	0.1	0.1	2.1				
H	<i>Geranium dissectum</i>	23	0.1	0.1	1.4				
H	<i>Trifolium dubium</i>	23	0.1	0.1	0.9				
H	<i>Chlorogalum pomeridianum</i>	23	0.1	0.1	1.0				
H	<i>Clarkia</i> sp.	23	0.1	0.1	0.6				
H	<i>Plagiobothrys</i> sp.	23	0.0	0.1	0.3				
H	<i>Vulpia myuros</i>	20	0.2	0.3	2.3				

***Avena barbata* – *Avena fatua* Semi-natural Association**

Common Name: Wild Oats Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Wild Oats Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is usually absent. Dominant herbs include *Avena barbata*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, and *Erodium cicutarium*, and herbs that are sometimes present include *Avena fatua*, *Bromus rubens*, *Carduus pycnocephalus*, and *Hirschfeldia incana*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.6	0 – 6	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	59.5	19 – 91	0.4	0 – 1

Local Environmental Description

Elevation: Mean 244 m, Range 61 – 411 m

Aspect: SE (4), NE (2), Flat (1), NW (1), SW (1), Variable (1)

Slope: Mean 17 degrees, Range 3 – 25 degrees

Macro Topography: Middle 1/3 of slope (3), Lower 1/3 of slope (2), Upper 1/3 of slope (2), Lower 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 1.5%, Range 0 – 8%

Small Rock: Mean 2.2%, Range 0 – 9%

Fines Cover: Mean 38.9%, Range 1 – 98%

Litter Cover: Mean 30.0%, Range 0 – 90%

Soil Texture (field assessed): Loam, (class unknown) (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (5), Sedimentary (2), Franciscan melange (1), Sandstone and other sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Diablo Range (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2)

Other Subsections: Eastern Hills (5), Eastern Hills (2)

Site Impacts

This association has high non-native plant cover (average 95.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium cicutarium*, and *Hirschfeldia incana*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Evens and San 2004, Keeler-Wolf and Evens 2006, Klein et al. 2007, Klein et al. 2015, Parsons and Stohlgren 1989, Ratchford et al. 2023a, Rodriguez 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=10; Alameda County (n=1): LLNL090

Contra Costa County (n=2): JOMU012, JOMU014

San Joaquin Co. (n=5): LLNL007, LLNL024, LLNL028, LLNL029, LLNL078

Stanislaus Co. (n=2): SMNW0008, SMNW0023

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	70	2.7	0.2	10.0				Y
H	<i>Erodium cicutarium</i>	70	1.5	0.2	10.0				Y
H	<i>Avena barbata</i>	60	25.5	10.0	70.0				Y
H	<i>Bromus hordeaceus</i>	60	3.7	0.2	15.0				Y
H	<i>Avena fatua</i>	40	16.0	25.0	60.0				
H	<i>Carduus pycnocephalus</i>	40	1.1	0.2	5.0				
H	<i>Hirschfeldia incana</i>	40	0.2	0.2	1.0				
H	<i>Bromus rubens</i>	30	1.1	2.0	5.0				

***Avena barbata* – *Bromus hordeaceus* Semi-natural Association**

Common Name: Slender Oat – Soft Brome Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Slender Oat – Soft Brome Association forms an intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Avena barbata*, and characteristic herbs include *Amsinckia* sp., *Bromus diandrus*, *Bromus hordeaceus*, *Erodium cicutarium*, *Hordeum marinum*, *Hordeum murinum*, and *Trifolium hirtum*. Those herbs often present include *Brassica* sp., *Bromus rubens*, *Carduus pycnocephalus*, *Erodium botrys*, *Lolium perenne*, *Lupinus* sp., *Medicago polymorpha*, *Trifolium hirtum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0.2	0.3	0 – 0.5
Herb	50.7	35 – 63	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 452 m, Range 334 – 768 m

Aspect: NW (1)

Slope: 20 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0.2%

Fines Cover: Mean 67.5%, Range 57 – 93%

Litter Cover: Mean 28.9%, Range 1 – 43%

Soil Texture (field assessed): Not recorded (3), Clay, (class unknown) (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Eastern Hills (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 93.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Avena barbata – *Bromus hordeaceus* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

Bromus diandrus, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Erodium moschatum*, *Geranium dissectum*, *Geranium molle*, *Hordeum marinum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex crispus*, *Sherardia arvensis*, *Silene gallica*, *Silybum marianum*, *Trifolium dubium*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2007, Sikes et al. 2023

Global Rarity Rank: GNA **State Rarity Rank:** SNA **State Rare:** N

Surveys Used for Description

Total: N=4; Alameda County (n=3): ACWM-03, ACWM-04, GUMP-001

Contra Costa County (n=0):

San Joaquin Co. (n=1): LLNL030

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Lupinus albifrons</i>	25	0.1	0.2	0.2				
H	<i>Avena barbata</i>	100	16.7	14.2	19.1	Y		Y	Y
H	<i>Bromus hordeaceus</i>	100	14.4	10.0	20.3	Y			Y
H	<i>Bromus diandrus</i>	100	6.3	4.0	10.2	Y			Y
H	<i>Erodium cicutarium</i>	100	0.9	0.3	1.6	Y			Y
H	<i>Hordeum marinum</i>	75	2.5	1.6	5.9	Y			Y
H	<i>Erodium</i> sp.	75	1.6	0.3	3.6	Y			Y
H	<i>Hordeum murinum</i>	75	1.2	0.3	3.8	Y			Y
H	<i>Trifolium hirtum</i>	75	1.1	0.1	4.2	Y			Y
H	<i>Amsinckia</i> sp.	75	0.1	0.1	0.3	Y			Y
H	<i>Bromus rubens</i>	50	0.9	0.6	3.0				Y
H	<i>Erodium botrys</i>	50	0.9	0.3	3.2				Y
H	<i>Medicago polymorpha</i>	50	0.6	0.8	1.8				Y
H	<i>Vulpia bromoides</i>	50	0.5	0.3	1.6				Y
H	<i>Lupinus</i> sp.	50	0.2	0.1	0.6				Y
H	<i>Brassica</i> sp.	50	0.1	0.3	0.3				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.1	0.3				Y

Avena barbata – *Bromus hordeaceus* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	50	0.1	0.1	0.3				Y
H	<i>Vulpia myuros</i>	25	0.6	2.3	2.3				
H	<i>Elymus multisetus</i>	25	0.5	2.0	2.0				
H	<i>Lactuca</i> sp.	25	0.3	1.0	1.0				
H	<i>Chlorogalum pomeridianum</i>	25	0.2	1.0	1.0				
H	<i>Lotus</i> sp.	25	0.2	1.0	1.0				
H	<i>Silene gallica</i>	25	0.2	0.6	0.6				
H	<i>Madia</i> sp.	25	0.2	0.6	0.6				
H	<i>Convolvulus arvensis</i>	25	0.1	0.5	0.5				
H	<i>Nassella pulchra</i>	25	0.1	0.3	0.3				
H	<i>Elymus caput-medusae</i>	25	0.1	0.3	0.3				
H	<i>Trifolium</i> sp.	25	0.1	0.3	0.3				
H	<i>Erodium moschatum</i>	25	0.1	0.3	0.3				
H	<i>Claytonia perfoliata</i>	25	0.1	0.2	0.2				
H	<i>Castilleja densiflora</i>	25	0.1	0.2	0.2				
H	<i>Asclepias fascicularis</i>	25	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	25	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	25	0.1	0.2	0.2				
H	<i>Grindelia camporum</i>	25	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	25	0.0	0.1	0.1				
H	<i>Clarkia</i> sp.	25	0.0	0.1	0.1				
H	<i>Dichelostemma capitatum</i>	25	0.0	0.1	0.1				
H	<i>Plagiobothrys</i> sp.	25	0.0	0.1	0.1				
H	<i>Geranium molle</i>	25	0.0	0.1	0.1				
H	<i>Trifolium dubium</i>	25	0.0	0.1	0.1				
H	<i>Microseris campestris</i>	25	0.0	0.1	0.1				
H	<i>Viola pedunculata</i>	25	0.0	0.1	0.1				
H	<i>Hypochaeris glabra</i>	25	0.0	0.1	0.1				
H	<i>Phacelia</i> sp.	25	0.0	0.1	0.1				
H	<i>Sherardia arvensis</i>	25	0.0	0.1	0.1				
H	<i>Sidalcea</i> sp.	25	0.0	0.1	0.1				
H	<i>Geranium dissectum</i>	25	0.0	0.1	0.1				
H	<i>Silybum marianum</i>	25	0.0	0.1	0.1				

Avena barbata – *Bromus hordeaceus* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

***Brachypodium distachyon* Semi-natural Association**

Common Name: Purple False Brome Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Purple False Brome Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bellardia trixago*, *Brachypodium distachyon*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea solstitialis*, *Elymus glaucus*, *Erodium botrys*, *Grindelia camporum*, *Lolium perenne*, *Lupinus microcarpus*, *Medicago polymorpha*, *Rumex pulcher*, *Trifolium hirtum*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	50.0	50 – 50	0.3	0 – 0.5

Local Environmental Description

Elevation: 293 m

Aspect: SW (1)

Slope: 28 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: no data

Small Rock: no data

Fines Cover: 60%

Litter Cover: 39%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 97.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Brachypodium distachyon*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea solstitialis*, *Erodium botrys*, *Lolium perenne*, *Rumex pulcher*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Keeler-Wolf et al. 2003a, Klein et al. 2015, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC419

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Brachypodium distachyon</i>	100	14.0	14.0	14.0	Y			Y
H	<i>Avena barbata</i>	100	14.0	14.0	14.0	Y			Y
H	<i>Erodium botrys</i>	100	11.0	11.0	11.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Lolium perenne</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Grindelia camporum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus diandrus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bellardia trixago</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus madritensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Centaurea solstitialis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Elymus glaucus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Medicago polymorpha</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Rumex pulcher</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lupinus microcarpus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium hirtum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Brassica nigra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vicia sativa</i>	100	0.1	0.1	0.1	Y			Y

***Bromus diandrus* Semi-natural Association**

Common Name: Ripgut Brome Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Ripgut Brome Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Bromus diandrus*, and characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Erodium botrys*. Herbs that are sometimes present include *Capsella bursa-pastoris*, *Centaurea melitensis*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex crispus*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	52.1	35 – 91	0.5	0 – 1

Local Environmental Description

Elevation: Mean 543 m, Range 191 – 1506 m

Aspect: SE (2), Flat (1), NW (1)

Slope: Mean 6 degrees, Range 0 – 10 degrees

Macro Topography: Middle 1/3 of slope (2), Bottom (1), Lower to Middle 1/3 of slope (1)

Large Rock: Mean 0.0%, Range 0 – 0%

Small Rock: Mean 2.8%, Range 0 – 10%

Fines Cover: Mean 36.9%, Range 5 – 74%

Litter Cover: Mean 41.5%, Range 10 – 93%

Soil Texture (field assessed): Fine sand (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), Sandstone (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Diablo Range (1), Western Diablo Range (1)

Site Impacts

This association has high non-native plant cover (average 94.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Bromus diandrus Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

Bromus diandrus, *Bromus hordeaceus*, *Capsella bursa-pastoris*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Erodium botrys*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex crispus*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Keeler-Wolf and Evens 2006, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2023, Solomeshch and Barbour 2006, Sproul et al. 2011

Global Rarity Rank: GNA **State Rarity Rank:** SNA **State Rare:** N

Surveys Used for Description

Total: N=5; Alameda County (n=2): ACWM-06, PRRP008

Contra Costa County (n=1): EBAY0114

Santa Clara Co. (n=2): CDLO0023, ROMR0017

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	100	27.5	17.6	40.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	100	14.3	5.0	30.0	Y			Y
H	<i>Avena barbata</i>	80	3.2	0.2	10.0	Y			Y
H	<i>Carduus pycnocephalus</i>	80	3.1	0.1	15.0	Y			Y
H	<i>Erodium botrys</i>	80	0.3	0.2	1.0	Y			Y
H	<i>Lolium perenne</i>	40	5.2	6.2	20.0				
H	<i>Centaurea melitensis</i>	40	1.0	0.2	5.0				
H	<i>Hordeum murinum</i>	40	1.0	0.2	5.0				
H	<i>Vulpia myuros</i>	40	0.2	0.2	1.0				
H	<i>Hypochaeris glabra</i>	40	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	40	0.1	0.1	0.2				
H	<i>Capsella bursa-pastoris</i>	40	0.1	0.1	0.2				

***Bromus diandrus* – *Avena* spp. Semi-natural Association**

Common Name: Ripgut Brome – Wild Oats Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Ripgut Brome – Wild Oats Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Bromus diandrus*, and characteristic herbs include *Bromus hordeaceus*. Those herbs often present include *Avena barbata*, *Carduus pycnocephalus*, *Erodium cicutarium*, *Sanicula bipinnatifida*, and *Trifolium hirtum*, and herbs that are sometimes present include *Amsinckia menziesii* var. *intermedia*, *Avena fatua*, *Bromus madritensis*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Convolvulus arvensis*, *Crepis capillaris*, *Dichelostemma capitatum*, *Erodium botrys*, *Galium divaricatum*, *Geranium dissectum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Lupinus bicolor*, *Nassella pulchra*, *Plagiobothrys nothofulvus*, *Plantago erecta*, and *Trifolium gracilentum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	82.9	65 – 94	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 1873 m, Range 122 – 2818 m

Aspect: SE (2), SW (1)

Slope: Mean 19 degrees, Range 12 – 22 degrees

Macro Topography: Upper 1/3 of slope (3)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 11.7%, Range 5 – 20%

Litter Cover: Mean 55.0%, Range 50 – 60%

Soil Texture (field assessed): Not recorded (2), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone and other sedimentary (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Fremont - Livermore Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover (average 98.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Crepis capillaris*, *Erodium botrys*, *Erodium cicutarium*, *Galium divaricatum*, *Geranium dissectum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, and *Trifolium hirtum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Keeler-Wolf and Evens 2006, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=1): JOMU002

Santa Clara Co. (n=2): KAMR0010, KAMR0011

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	100	30.0	20.0	40.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	100	0.8	0.2	2.0	Y			Y
H	<i>Avena barbata</i>	67	23.3	30.0	40.0				Y
H	<i>Carduus pycnocephalus</i>	67	5.7	2.0	15.0				Y
H	<i>Erodium cicutarium</i>	67	1.3	2.0	2.0				Y
H	<i>Trifolium hirtum</i>	67	0.7	0.2	2.0				Y
H	<i>Sanicula bipinnatifida</i>	67	0.1	0.2	0.2				Y
H	<i>Crepis capillaris</i>	33	10.0	30.0	30.0				
H	<i>Avena fatua</i>	33	6.7	20.0	20.0				
H	<i>Lolium perenne</i>	33	0.7	2.0	2.0				
H	<i>Plagiobothrys nothofulvus</i>	33	0.7	2.0	2.0				
H	<i>Convolvulus arvensis</i>	33	0.3	1.0	1.0				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	33	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	33	0.1	0.2	0.2				
H	<i>Clarkia</i> sp.	33	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	33	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	33	0.1	0.2	0.2				
H	<i>Plantago erecta</i>	33	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	33	0.1	0.2	0.2				
H	<i>Geranium dissectum</i>	33	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	33	0.1	0.2	0.2				
H	<i>Galium divaricatum</i>	33	0.1	0.2	0.2				

***Bromus hordeaceus* – *Erodium botrys* Semi-natural Association**

Common Name: Soft Brome – Longbeak Stork's Bill Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Soft Brome – Longbeak Stork's Bill Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Erodium botrys*, and *Trifolium hirtum*. Those herbs often present include *Bromus diandrus*, *Hordeum murinum*, *Hypochaeris glabra*, *Nassella pulchra*, and *Vulpia bromoides*, and herbs that are sometimes present include *Anagallis arvensis*, *Brachypodium distachyon*, *Bromus rubens*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Chlorogalum pomeridianum*, *Crepis vesicaria*, *Dichelostemma capitatum*, *Erodium cicutarium*, *Lasthenia californica*, *Logfia gallica*, *Lolium perenne*, *Sherardia arvensis*, *Silene gallica*, *Trifolium dubium*, *Triteleia laxa*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	54.5	30 – 80	0.4	0 – 1

Local Environmental Description

Elevation: Mean 383 m, Range 179 – 844 m

Aspect: SE (1), SW (1), Variable (1)

Slope: Mean 13 degrees, Range 5 – 20 degrees

Macro Topography: Upper 1/3 of slope (2), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 5.3%, Range 0 – 11%

Fines Cover: Mean 57.4%, Range 10 – 85%

Litter Cover: Mean 29.9%, Range 2 – 89%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (3), Sandstone, shale, and gravel deposits (3), Sandstone and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (2), Diablo Range (1), Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 92.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Crepis vesicaria*, *Erodium botrys*, *Erodium cicutarium*, *Hordeum murinum*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Sherardia arvensis*, *Silene gallica*, *Trifolium dubium*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Jimerson et al. 2000, Klein et al. 2015, Ratchford et al. 2023a, Rodriguez et al. 2017, Schlising and Sanders 1982, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=7; Alameda County (n=7): ALCC565, EBAY0048, GARA-01, GARA-03, GUMP-025, MULL-04, PRRP005

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	14.1	1.0	25.0	Y			Y
H	<i>Avena barbata</i>	100	5.5	0.2	10.4	Y			Y
H	<i>Erodium botrys</i>	86	9.2	0.9	23.0	Y			Y
H	<i>Trifolium hirtum</i>	86	3.8	0.2	12.0	Y			Y
H	<i>Bromus diandrus</i>	71	4.6	0.1	12.1				Y
H	<i>Hypochaeris glabra</i>	71	0.3	0.1	0.9				Y
H	<i>Vulpia bromoides</i>	57	1.6	0.6	6.3				Y
H	<i>Nassella pulchra</i>	57	1.3	0.1	5.0				Y
H	<i>Hordeum murinum</i>	57	1.2	0.2	3.4				Y
H	<i>Bromus rubens</i>	43	0.5	0.1	3.0				
H	<i>Sherardia arvensis</i>	43	0.4	0.1	2.8				
H	<i>Lolium perenne</i>	43	0.2	0.2	0.8				
H	<i>Amsinckia</i> sp.	43	0.1	0.1	0.3				
H	<i>Vicia sativa</i>	43	0.1	0.1	0.4				
H	<i>Dichelostemma capitatum</i>	43	0.1	0.1	0.3				
H	<i>Chlorogalum pomeridianum</i>	43	0.1	0.1	0.2				
H	<i>Triteleia laxa</i>	43	0.0	0.1	0.1				
H	<i>Erodium cicutarium</i>	29	1.0	0.3	6.6				
H	<i>Trifolium dubium</i>	29	0.1	0.1	0.9				
H	<i>Trifolium</i> sp.	29	0.1	0.1	0.9				
H	<i>Brachypodium distachyon</i>	29	0.1	0.2	0.4				
H	<i>Clarkia</i> sp.	29	0.1	0.1	0.3				
H	<i>Crepis vesicaria</i>	29	0.0	0.1	0.2				
H	<i>Anagallis arvensis</i>	29	0.0	0.1	0.2				
H	<i>Carduus pycnocephalus</i>	29	0.0	0.1	0.2				
H	<i>Cerastium glomeratum</i>	29	0.0	0.1	0.1				
H	<i>Logfia gallica</i>	29	0.0	0.1	0.1				
H	<i>Lupinus</i> sp.	29	0.0	0.1	0.1				
H	<i>Plagiobothrys</i> sp.	29	0.0	0.1	0.1				
H	<i>Silene gallica</i>	29	0.0	0.1	0.1				
H	<i>Lasthenia californica</i>	29	0.0	0.1	0.1				

Bromus hordeaceus – *Erodium botrys* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

***Bromus hordeaceus* – *Hordeum* spp. – *Medicago polymorpha* Semi-natural Association**

Common Name: Soft Brome – Barley – Burclover Patches

Alliance: *Avena* spp. – *Bromus* spp. Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Soft Brome – Barley – Burclover Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus*, *Hordeum murinum*, and *Lolium perenne*. Those herbs often present include *Avena barbata*, *Centaurea solstitialis*, *Cerastium glomeratum*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Medicago polymorpha*, *Rumex crispus*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*, and herbs that are sometimes present include *Anagallis arvensis*, *Brassica nigra*, *Brodiaea elegans*, *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea calcitrapa*, *Helminthotheca echioides*, *Hypochaeris radicata*, *Juncus bufonius*, *Nassella pulchra*, *Senecio vulgaris*, *Sonchus asper*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	74.0	41 – 100	0.3	0 – 1

Local Environmental Description

Elevation: Mean 185 m, Range 7 – 594 m

Aspect: NW (3), Flat (1), SW (1)

Slope: Mean 8 degrees, Range 0 – 16 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: Mean 3.0%, Range 0 – 15%

Fines Cover: Mean 80.1%, Range 35 – 97%

Litter Cover: Mean 16.1%, Range 1 – 50%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine silty clay loam (1)

Geology (field or map data): Mixed sedimentary (3), Sedimentary (2), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Bromus hordeaceus – *Hordeum* spp. – *Medicago polymorpha* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Suisun Hills and Valleys (3), Western Diablo Range (1)

Site Impacts

This association has high non-native plant cover (average 95.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea calcitrapa*, *Centaurea solstitialis*, *Cerastium glomeratum*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum murinum*, *Hypochaeris radicata*, *Lolium perenne*, *Rumex crispus*, *Senecio vulgaris*, *Sonchus asper*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Ratchford et al. 2023a

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=1): GARA-05

Contra Costa County (n=1): ALCC366

Santa Clara Co. (n=1): CDLO0022

Solano Co. (n=3): RUSH0003, RUSH0021, RUSH0024

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum murinum</i>	100	15.5	0.2	30.0	Y			Y
H	<i>Lolium perenne</i>	100	7.4	1.0	20.0	Y			Y
H	<i>Bromus hordeaceus</i>	83	9.2	2.0	25.0	Y			Y
H	<i>Erodium botrys</i>	67	1.1	0.1	5.0				Y
H	<i>Erodium cicutarium</i>	67	0.6	0.1	2.0				Y
H	<i>Vicia sativa</i>	67	0.5	0.2	1.0				Y
H	<i>Geranium dissectum</i>	67	0.1	0.2	0.2				Y
H	<i>Trifolium subterraneum</i>	50	9.5	2.0	50.0				Y
H	<i>Trifolium dubium</i>	50	5.9	0.2	20.0				Y
H	<i>Avena barbata</i>	50	2.6	2.0	10.0				Y
H	<i>Vulpia bromoides</i>	50	0.9	0.2	3.0				Y
H	<i>Medicago polymorpha</i>	50	0.6	0.2	2.0				Y
H	<i>Centaurea solstitialis</i>	50	0.5	0.2	2.0				Y
H	<i>Trifolium hirtum</i>	50	0.5	0.1	2.0				Y
H	<i>Cerastium glomeratum</i>	50	0.2	0.2	1.0				Y
H	<i>Rumex crispus</i>	50	0.2	0.1	1.0				Y
H	<i>Medicago</i> sp.	33	5.0	15.0	15.0				
H	<i>Vulpia myuros</i>	33	2.6	0.6	15.0				
H	<i>Bromus diandrus</i>	33	2.2	3.0	10.0				
H	<i>Hypochaeris radicata</i>	33	0.2	0.2	1.0				
H	<i>Brassica nigra</i>	33	0.2	0.2	1.0				
H	<i>Senecio vulgaris</i>	33	0.1	0.2	0.2				
H	<i>Juncus bufonius</i>	33	0.1	0.2	0.2				
H	<i>Centaurea calcitrapa</i>	33	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	33	0.1	0.2	0.2				
H	<i>Pedicularis</i> sp.	33	0.1	0.2	0.2				
H	<i>Helminthotheca echioides</i>	33	0.1	0.2	0.2				
H	<i>Anagallis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	33	0.1	0.1	0.2				
H	<i>Brodiaea elegans</i>	33	0.1	0.1	0.2				
H	<i>Sonchus asper</i>	33	0.1	0.1	0.2				

Bromus hordeaceus – *Hordeum* spp. – *Medicago polymorpha* Semi-natural Association
Avena spp. – *Bromus* spp. Herbaceous Semi-natural Alliance

***Azolla (filiculoides, microphylla)* Herbaceous Alliance**



Common Name: Mosquito fern mats

NVC Alliance Code: A1741. *Azolla filiculoides* - *Azolla microphylla* Aquatic Vegetation Alliance

Statewide Description

Azolla filiculoides or *Azolla mexicana* is dominant floating on the water surface or characteristically present in the herbaceous layer with *Egeria densa*, *Lemna minor*, *Spirodela polyrrhiza*, *Wolffia borealis*, and *Wolffiella lingulata*. Emergent plants may be present at low to high cover, including *Myriophyllum aquaticum*.

Azolla mats occur throughout California where conditions are favorable. Mats of both *Azolla* and *Lemna* occur under the same conditions, and either can dominate in the same water body. In California, stands are generally simple with only one or two species comprising the majority of cover.

Local Vegetation Description

The Mosquito fern mats Alliance forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Azolla filiculoides*, and

characteristic herbs include *Typha latifolia*. Those herbs often present include *Schoenoplectus acutus*, *Schoenoplectus americanus*, and *Schoenoplectus californicus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	92.5	91 – 94	0.3	0 – 0.5

Local Membership Rule

Azolla filiculoides or *Azolla mexicana* (= *A. microphylla*) > 50% relative cover in the herbaceous layer as aquatic herbs.

Local Environmental Description

Elevation: Mean 181 m, Range 6 – 356 m

Aspect: Flat (2)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 0%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has very low non-native plant cover (average 0.0%) relative to native cover.

Associations in Alameda & Contra Costa Counties

Azolla (filiculoides, microphylla)

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: G5

State Rarity Rank: S5

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC765, ALCCREC602

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	Azolla filiculoides	100	85.0	78.0	92.0	Y	Y		Y
H	Typha latifolia	100	1.5	1.0	2.0	Y			Y
H	Schoenoplectus californicus	50	7.5	15.0	15.0				Y
H	Schoenoplectus acutus	50	0.1	0.2	0.2				Y
H	Schoenoplectus americanus	50	0.1	0.2	0.2				Y

***Azolla (filiculoides, microphylla)* Association**

Common Name: Mosquito Fern Patches

Alliance: *Azolla (filiculoides, microphylla)* Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description. **References:** Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Hickson and Keeler-Wolf 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: G5 **State Rarity Rank:** S5 **State Rare:** N

Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris
Herbaceous Alliance



Common Name: Nodding beggarticks – western goldentop – marsh seedbox mudflats
NVC Alliance Code: A3850.

Statewide Description

Artemisia douglasiana, *Bidens cernua*, *Euthamia occidentalis* and/or *Ludwigia palustris* is dominant or co-dominant in the herbaceous layer with *Amaranthus* spp., *Baccharis douglasii*, *Eleocharis* spp., *Epilobium* spp., *Euphorbia* spp., *Hirschfeldia incana*, *Persicaria hydropiperoides*, *Rumex* spp., *Sagittaria latifolia* or *Urtica dioica*. Emergent trees and shrubs may be present at low cover, including *Rubus ursinus* and *Sambucus nigra*.

This herbaceous alliance is found in the western U.S. and occurs in low-elevation marshes, meadows, and mudflats along low-gradient streams, shallow ponds, and depressional wetlands (NatureServe 2019). It is dominated by a mixture of low-growing herbs, prostrate forbs, drying aquatic plants, and taller perennial herbs. Specifically, these are species that can tolerate early-season flooding and summer drying that expose mudflats with subsurface moisture. Potentially dominant plants include

Amaranthus ssp., *Artemisia douglasiana*, *Bidens cernua*, *Eleocharis* spp., *Euphorbia* spp., *Euthamia occidentalis*, *Ludwigia palustris*, *Persicaria hydropiperoides*, and *Sagittaria latifolia*, though many more species have been recorded.

Local Vegetation Description

The Nodding beggarticks – western goldentop – marsh seedbox mudflats Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Euthamia occidentalis*, and *Grindelia camporum*. Herbs that are sometimes present include *Achillea millefolium*, *Apium graveolens*, *Argentina egedii*, *Asclepias fascicularis*, *Brassica nigra*, *Calystegia sepium*, *Croton setigerus*, *Cynodon dactylon*, *Distichlis spicata*, *Elymus caput-medusae*, *Elymus triticoides*, *Epilobium brachycarpum*, *Frankenia salina*, *Grindelia camporum*, *Grindelia stricta*, *Heliotropium curassavicum*, *Helminthotheca echioides*, *Hirschfeldia incana*, *Juncus mexicanus*, *Juncus xiphioides*, *Kickxia elatine*, *Lemna* sp., *Lepidium latifolium*, *Melilotus indica*, *Oenanthe sarmentosa*, *Polypogon monspeliensis*, *Rumex conglomeratus*, *Salicornia pacifica*, *Schoenoplectus acutus*, *Schoenoplectus americanus*, *Sonchus asper*, *Trichostema lanceolatum*, *Typha latifolia*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	1.4	0 – 7	1.1	0.5 – 2
Herb	62.6	24 – 94	1.1	0.5 – 2

Local Membership Rule

Ambrosia psilostachya, *Euthamia occidentalis*, *Hoita orbicularis*, *Baccharis douglasii* (= *B. glutinosa*), *Bidens* spp., *Grindelia camporum*, *Helenium puberulum*, and/or *Urtica dioica* > 50% relative cover, singly or in combination, in wetlands, riparian areas, and other mesic soils, with emergent shrubs such as *Baccharis* spp.

Local Environmental Description

Elevation: Mean 119 m, Range 2 – 293 m

Aspect: Flat (2), NE (1), SE (1), SW (1)

Slope: Mean 4 degrees, Range 0 – 10 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (2)

Large Rock: Mean 3.0%, Range 0 – 12%

Small Rock: Mean 1.8%, Range 0 – 4%

Fines Cover: Mean 51.8%, Range 1 – 92%

Litter Cover: Mean 37.3%, Range 6 – 83%

Soil Texture (field assessed): Muck (2), Moderately coarse, sandy loam (1)

Geology (field or map data): Sedimentary (2), Alluvium (1), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (1), Westside Alluvial Fans and Terraces (1)

Other Subsections: Eastern Hills (2), Delta (1)

Site Impacts

This alliance has low non-native plant cover (average 2.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Apium graveolens*, *Brassica nigra*, *Cynodon dactylon*, *Elymus caput-medusae*, *Helminthotheca echioides*, *Hirschfeldia incana*, *Kickxia elatine*, *Lepidium latifolium*, *Polypogon monspeliensis*, *Rumex conglomeratus*, and *Sonchus asper*.

Associations in Alameda & Contra Costa Counties

Euthamia occidentalis

Grindelia camporum

Classification Comments

The *Grindelia camporum* Association is newly placed in this broader wetland herbaceous alliance. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, Christy 2004, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: S4

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=2): ALCC156, ALCCREC603

San Joaquin Co. (n=2): LLNL045, LLNL047

Solano Co. (n=1): SUMA12048

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	40	0.1	0.2	0.2				
S	<i>Baccharis salicifolia</i>	20	1.4	7.0	7.0				
S	<i>Artemisia californica</i>	20	0.0	0.2	0.2				
H	<i>Euthamia occidentalis</i>	60	27.0	21.0	90.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Grindelia camporum</i>	40	15.6	18.0	60.0				
H	<i>Typha latifolia</i>	40	3.6	0.2	18.0				
H	<i>Schoenoplectus americanus</i>	40	3.0	1.0	14.0				
H	<i>Calystegia sepium</i>	20	5.8	29.0	29.0				
H	<i>Oenanthе sarmentosa</i>	20	3.4	17.0	17.0				
H	<i>Grindelia stricta</i>	20	1.6	8.0	8.0				
H	<i>Achillea millefolium</i>	20	0.8	4.0	4.0				
H	<i>Distichlis spicata</i>	20	0.6	3.0	3.0				
H	<i>Lepidium latifolium</i>	20	0.4	2.0	2.0				
H	<i>Elymus triticoides</i>	20	0.4	2.0	2.0				
H	<i>Elymus caput-medusae</i>	20	0.2	1.0	1.0				
H	<i>Schoenoplectus acutus</i>	20	0.2	1.0	1.0				
H	<i>Heliotropium curassavicum</i>	20	0.2	1.0	1.0				
H	<i>Argentina egedii</i>	20	0.0	0.2	0.2				
H	<i>Juncus mexicanus</i>	20	0.0	0.2	0.2				
H	<i>Hirschfeldia incana</i>	20	0.0	0.2	0.2				
H	<i>Frankenia salina</i>	20	0.0	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	20	0.0	0.2	0.2				
H	<i>Croton setigerus</i>	20	0.0	0.2	0.2				
H	<i>Urtica dioica</i>	20	0.0	0.2	0.2				
H	<i>Asclepias fascicularis</i>	20	0.0	0.2	0.2				
H	<i>Apium graveolens</i>	20	0.0	0.2	0.2				
H	<i>Juncus xiphioides</i>	20	0.0	0.2	0.2				
H	<i>Cynodon dactylon</i>	20	0.0	0.2	0.2				
H	<i>Lemna</i> sp.	20	0.0	0.2	0.2				
H	<i>Trichostema lanceolatum</i>	20	0.0	0.2	0.2				
H	<i>Sonchus asper</i>	20	0.0	0.2	0.2				
H	<i>Salicornia pacifica</i>	20	0.0	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	20	0.0	0.2	0.2				
H	<i>Melilotus indica</i>	20	0.0	0.2	0.2				
H	<i>Brassica nigra</i>	20	0.0	0.1	0.1				
H	<i>Rumex conglomeratus</i>	20	0.0	0.1	0.1				
H	<i>Helminthotheca echioides</i>	20	0.0	0.1	0.1				
H	<i>Kickxia elatine</i>	20	0.0	0.1	0.1				

***Euthamia occidentalis* Provisional Association**

Common Name: Western Goldentop Patches

Alliance: *Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Alliance

Local Vegetation Description

The Western Goldentop Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Euthamia occidentalis*. Those herbs often present include *Schoenoplectus americanus* and *Typha latifolia*, and herbs that are sometimes present include *Achillea millefolium*, *Apium graveolens*, *Argentina egedii*, *Calystegia sepium*, *Cynodon dactylon*, *Epilobium brachycarpum*, *Grindelia stricta*, *Helminthotheca echioides*, *Hirschfeldia incana*, *Juncus mexicanus*, *Lemna* sp., *Lepidium latifolium*, *Oenanthe sarmentosa*, *Salicornia pacifica*, *Schoenoplectus acutus*, and *Urtica dioica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0.2	0.8	0.5 – 1
Herb	76.3	45 – 94	1.5	1 – 2

Local Environmental Description

Elevation: Mean 100 m, Range 2 – 293 m

Aspect: Flat (1), NE (1), SE (1)

Slope: Mean 3 degrees, Range 0 – 5 degrees

Macro Topography: Bottom (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.0%, Range 0 – 2%

Fines Cover: Mean 23.5%, Range 1 – 46%

Litter Cover: Mean 66.5%, Range 50 – 83%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (1), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (1), Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 1.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Apium*

Euthamia occidentalis Provisional Association

Bidens cernua – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Alliance

graveolens, *Helminthotheca echioides*, *Hirschfeldia incana*, and *Lepidium latifolium*.

Classification Comments

This association remains provisional due to overall low sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2023, Christy 2004, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=3; **Alameda County (n=0):**

Contra Costa County (n=1): ALCCREC603

San Joaquin Co. (n=1): LLNL047

Solano Co. (n=1): SUMA12048

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	33	0.1	0.2	0.2				
H	<i>Euthamia occidentalis</i>	100	45.0	21.0	90.0	Y	Y		Y
H	<i>Typha latifolia</i>	67	6.1	0.2	18.0				Y
H	<i>Schoenoplectus americanus</i>	67	5.0	1.0	14.0				Y
H	<i>Calystegia sepium</i>	33	9.7	29.0	29.0				
H	<i>Oenanthе sarmentosa</i>	33	5.7	17.0	17.0				
H	<i>Grindelia stricta</i>	33	2.7	8.0	8.0				
H	<i>Achillea millefolium</i>	33	1.3	4.0	4.0				
H	<i>Lepidium latifolium</i>	33	0.7	2.0	2.0				
H	<i>Schoenoplectus acutus</i>	33	0.3	1.0	1.0				
H	<i>Apium graveolens</i>	33	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	33	0.1	0.2	0.2				
H	<i>Salicornia pacifica</i>	33	0.1	0.2	0.2				
H	<i>Lemna</i> sp.	33	0.1	0.2	0.2				
H	<i>Juncus mexicanus</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Cynodon dactylon</i>	33	0.1	0.2	0.2				
H	<i>Argentina egedii</i>	33	0.1	0.2	0.2				

Euthamia occidentalis Provisional Association
Bidens cernua – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Alliance

***Grindelia camporum* Association**

Common Name: Great Valley Gumweed Patches

Alliance: *Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Alliance

Local Vegetation Description

The Great Valley Gumweed Association forms an open to intermittent herbaceous layer. The shrub layer is open and the tree layer is absent. Dominant herbs include *Grindelia camporum*. Those herbs often present include *Asclepias fascicularis*, *Brassica nigra*, *Croton setigerus*, *Distichlis spicata*, *Elymus caput-medusae*, *Elymus triticoides*, *Frankenia salina*, *Heliotropium curassavicum*, *Juncus xiphioides*, *Kickxia elatine*, *Melilotus indica*, *Polypogon monspeliensis*, *Rumex conglomeratus*, *Sonchus asper*, and *Trichostema lanceolatum*. Commonly associated emergent shrubs at low cover include *Artemisia californica*, *Baccharis pilularis*, and *Baccharis salicifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	3.5	0 – 7	1.5	1 – 2
Herb	42.0	24 – 60	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 148 m, Range 23 – 273 m

Aspect: Flat (1), SW (1)

Slope: Mean 5 degrees, Range 0 – 10 degrees

Macro Topography: Bottom (1), Lower 1/3 of slope (1)

Large Rock: Mean 6.0%, Range 0 – 12%

Small Rock: Mean 2.5%, Range 1 – 4%

Fines Cover: Mean 80.0%, Range 68 – 92%

Litter Cover: Mean 8.0%, Range 6 – 10%

Soil Texture (field assessed): Moderately coarse, sandy loam (1), Muck (1)

Geology (field or map data): Sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (1)

Other Subsections: Eastern Hills (1)

Site Impacts

This association has low non-native plant cover (average 3.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Elymus*

Grindelia camporum Association

Bidens cernua – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Provisional Alliance

caput-medusae, *Polypogon monspeliensis*, *Rumex conglomeratus*, and *Sonchus asper*.

Classification Comments

This association was previously placed in its own *Grindelia* alliance, but that alliance has been split into separate alliances based on habitat. Wetland *Grindelia camporum* stands are now placed within this broader alliance. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC156

San Joaquin Co. (n=1): LLNL045

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis salicifolia</i>	50	3.5	7.0	7.0				Y
S	<i>Baccharis pilularis</i>	50	0.1	0.2	0.2				Y
S	<i>Artemisia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Grindelia camporum</i>	100	39.0	18.0	60.0	Y	Y		Y
H	<i>Distichlis spicata</i>	50	1.5	3.0	3.0				Y
H	<i>Elymus triticoides</i>	50	1.0	2.0	2.0				Y
H	<i>Heliotropium curassavicum</i>	50	0.5	1.0	1.0				Y
H	<i>Elymus caput-medusae</i>	50	0.5	1.0	1.0				Y
H	<i>Trichostema lanceolatum</i>	50	0.1	0.2	0.2				Y
H	<i>Frankenia salina</i>	50	0.1	0.2	0.2				Y
H	<i>Asclepias fascicularis</i>	50	0.1	0.2	0.2				Y
H	<i>Sonchus asper</i>	50	0.1	0.2	0.2				Y
H	<i>Croton setigerus</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Melilotus indica</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus xiphioides</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex conglomeratus</i>	50	0.1	0.1	0.1				Y
H	<i>Kickxia elatine</i>	50	0.1	0.1	0.1				Y

Grindelia camporum Association

Bidens cernua – *Euthamia occidentalis* – *Ludwigia palustris* Herbaceous Provisional Alliance

***Bolboschoenus maritimus* Herbaceous Alliance**



Common Name: Salt marsh bulrush marshes

NVC Alliance Code: A3903. *Bolboschoenus maritimus* - *Schoenoplectus californicus*
Salt Marsh Alliance

Statewide Description

Bolboschoenus maritimus is dominant or co-dominant in the herbaceous layer with *Agrostis stolonifera*, *Argentina egedii*, *Atriplex prostrata*, *Bolboschoenus robustus*, *Chenopodium foliosum*, *Cotula coronopifolia*, *Distichlis spicata*, *Eleocharis macrostachya*, *Lemna minuta*, *Sarcocornia pacifica*, *Sesuvium verrucosum*, *Spergularia salina*, and *Typha latifolia*.

This alliance occurs in tidal marshes with relatively high salinity, at intermediate tidal elevations with seasonal flooding (Keeler-Wolf and Vaghti 2000, Pickart 2006). Inland marshes in areas with alkali, brackish, or fresh water contain different associates than stands found in coastal marshes. *Bolboschoenus maritimus* usually dominates in the wetter, tidal, brackish to sub-saline marshes and ditches, including early successional sites of diked marshes within relict swales and depressions (Baye 2000).

Local Vegetation Description

The Salt marsh bulrush marshes Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Bolboschoenus maritimus*. Those herbs often present include *Atriplex prostrata*, and herbs that are sometimes present include *Salicornia pacifica* and *Typha angustifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	65.3	26 – 100	0.9	0.5 – 2

Local Membership Rule

Bolboschoenus maritimus or *B. robustus* > 50% relative cover in the herbaceous layer, or > 30% relative cover with *Sarcocornia* (= *Salicornia*) *pacifica*.

Local Environmental Description

Elevation: Mean 46 m, Range 0 – 348 m

Aspect: Flat (9), NE (1), SW (1)

Slope: Mean 0 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (7), Basin/wetland (2), Not recorded (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 40.3%, Range 0 – 94%

Litter Cover: Mean 27.6%, Range 0 – 65%

Soil Texture (field assessed): Muck (3), Clay, (class unknown) (2), Fine silty clay (2), Peat (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (5), Clayey alluvium (3), Mixed alluvium (2), Sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Delta (4), Bay Flats (3), Suisun Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 6.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*.

Associations in Alameda & Contra Costa Counties

Bolboschoenus maritimus

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Klein et al. 2015, Pickart 2006, Reyes et al. 2020a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=11; Alameda County (n=2): ALCC270, ALCCREC113

Contra Costa County (n=1): EBRTA134

Santa Clara Co. (n=3): DEDW0376, VAWA406, VAWA408

Solano Co. (n=5): SUMA12022, SUMA12031, SUMA9002, SUMA9020, SUMA9170

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bolboschoenus maritimus</i>	100	56.4	20.0	84.0	Y	Y		Y
H	<i>Atriplex prostrata</i>	64	4.0	0.1	37.5				Y
H	<i>Salicornia pacifica</i>	36	0.8	1.0	3.0				
H	<i>Typha angustifolia</i>	27	0.7	0.2	6.0				

***Bolboschoenus maritimus* Association**

Common Name: Salt Marsh Bulrush Patches

Alliance: *Bolboschoenus maritimus* Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Klein et al. 2015, Pickart 2006, Reyes et al. 2020a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: SNR

State Rare: Y

Bolboschoenus maritimus Association
Bolboschoenus maritimus Herbaceous Alliance

***Brassica nigra* – *Centaurea (solstitialis, melitensis)* Herbaceous Semi-Natural Alliance**



Common Name: Upland mustards or star-thistle fields

NVC Alliance Code: A4214. *Brassica nigra* - *Raphanus* spp. Ruderal Annual Forb
Meadow Alliance

Statewide Description

Brassica nigra, *Brassica rapa*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Centaurea solstitialis*, *Cynara cardunculus*, *Euphorbia terracina*, *Hirschfeldia incana*, *Isatis tinctoria* or *Raphanus sativus* or similar ruderal forb is dominant in the herbaceous layer. Emergent trees and shrubs may be present at low cover.

We have included five mustards within this alliance based on their ecological similarities, and we also have updated the alliance to include other non-native invasive forbs including *Cynara cardunculus*, *Euphorbia terracina*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *C. melitensis*, and *C. sulphurea*. As a whole, stands of this alliance form dense colonies that overtop other plants whether they are native or non-native. All respond positively to regular frequent disturbance, whether it be fire, disking, intermittent flooding, or heavy grazing.

Local Vegetation Description

The Upland mustards or star-thistle fields Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Those herbs often present include *Brassica nigra*, *Bromus diandrus*, and *Carduus pycnocephalus*, and herbs that are sometimes present include *Avena fatua*, *Hordeum murinum*, *Lolium perenne*, and *Silybum marianum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	45.2	13 – 67	1.6	0.5 – 5

Local Membership Rule

Brassica nigra, *Raphanus sativus*, *Carduus pycnocephalus*, *Carthamus lanatus*, *Centaurea solstitialis*, *Picris echioides*, *Silybum marianum*, and/or other non-native forb(s) > 50% relative cover in the herbaceous layer, often in old or active agriculture land; and overall non-native cover > 80% relative cover.

Local Environmental Description

Elevation: Mean 162 m, Range 1 – 400 m

Aspect: Flat (2), SE (2), NW (1), SW (1)

Slope: Mean 6 degrees, Range 0 – 20 degrees

Macro Topography: Lower 1/3 of slope (2), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 43.3%, Range 20 – 94%

Litter Cover: Mean 30.8%, Range 2 – 72%

Soil Texture (field assessed): Moderately fine clay loam (3), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (4), Alluvium (2), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Suisun Hills and Valleys (2)

Other Subsections: Bay Flats (2)

Site Impacts

This alliance has high non-native plant cover (average 97.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Carduus pycnocephalus*, *Hordeum murinum*, *Lolium perenne*, and *Silybum marianum*.

Associations in Alameda & Contra Costa Counties

Brassica nigra

Carduus pycnocephalus – *Silybum marianum*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Evens 2006, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=7; Alameda County (n=0):

Contra Costa County (n=5): ALCC376, ALCC805, JOMU001, JOMU015, SPCCB-065
San Mateo Co. (n=2): DEDW0285, DEDWM010

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Brassica nigra</i>	71	12.7	0.2	48.0				Y
H	<i>Carduus pycnocephalus</i>	57	13.4	1.0	50.0				Y
H	<i>Bromus diandrus</i>	57	7.3	2.0	40.0				Y
H	<i>Hordeum murinum</i>	43	2.3	2.0	12.0				
H	<i>Lolium perenne</i>	43	1.0	0.2	6.0				
H	<i>Silybum marianum</i>	29	2.1	2.0	13.0				
H	<i>Avena fatua</i>	29	1.6	1.0	10.0				

***Brassica nigra* Semi-natural Association**

Common Name: Black Mustard Patches

Alliance: *Brassica nigra* – *Centaurea (solstitialis, melitensis)* Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Black Mustard Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Brassica nigra*. Those herbs often present include *Bromus diandrus*, and herbs that are sometimes present include *Avena fatua*, *Avena* sp., *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Eriogonum nudum*, *Erodium cicutarium*, *Hordeum murinum*, and *Lolium perenne*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	40.0	13 – 67	2.5	1 – 5

Local Environmental Description

Elevation: Mean 242 m, Range 122 – 400 m

Aspect: NW (1), SE (1)

Slope: Mean 11 degrees, Range 1 – 20 degrees

Macro Topography: Lower 1/3 of slope (1), Ridge top (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 41.5%, Range 25 – 58%

Litter Cover: Mean 37.0%, Range 2 – 72%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (2), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 99.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus*

pycnocephalus, *Centaurea solstitialis*, *Erodium cicutarium*, *Hordeum murinum*, and *Lolium perenne*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Keeler-Wolf and Evens 2006, Klein et al. 2015, Ratchford et al. 2023a, Rodriguez et al. 2017, Sproul et al. 2011

Global Rarity Rank: GNA **State Rarity Rank:** SNA **State Rare:** N

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=3): ALCC805, JOMU015, SPCCB-065

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Brassica nigra</i>	100	28.7	3.0	48.0	Y	Y		Y
H	<i>Bromus diandrus</i>	67	2.3	2.0	5.0				Y
H	<i>Avena</i> sp.	33	4.0	12.0	12.0				
H	<i>Bromus madritensis</i>	33	3.7	11.0	11.0				
H	<i>Avena fatua</i>	33	3.3	10.0	10.0				
H	<i>Hordeum murinum</i>	33	0.7	2.0	2.0				
H	<i>Carduus pycnocephalus</i>	33	0.3	1.0	1.0				
H	<i>Erodium cicutarium</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	33	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	33	0.1	0.2	0.2				

***Carduus pycnocephalus* – *Silybum marianum* Provisional Semi-natural Association**

Common Name: Italian Thistle – Milk Thistle Patches

Alliance: *Brassica nigra* – *Centaurea (solstitialis, melitensis)* Herbaceous Semi-Natural Alliance

Local Vegetation Description

The Italian Thistle – Milk Thistle Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Carduus pycnocephalus*. Those herbs often present include *Brassica nigra*, *Bromus diandrus*, *Hordeum murinum*, *Lolium perenne*, and *Silybum marianum*, and herbs that are sometimes present include *Amsinckia menziesii* var. *intermedia*, *Avena barbata*, *Avena fatua*, *Convolvulus arvensis*, *Geranium dissectum*, *Hypochaeris glabra*, *Lactuca serriola*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	49.1	37 – 65	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 102 m, Range 1 – 312 m

Aspect: Flat (2), SE (1), SW (1)

Slope: Mean 4 degrees, Range 0 – 11 degrees

Macro Topography: Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: no data

Small Rock: no data

Fines Cover: Mean 44.1%, Range 20 – 94%

Litter Cover: Mean 26.7%, Range 5 – 50%

Soil Texture (field assessed): Moderately fine clay loam (2), Not recorded (2)

Geology (field or map data): Alluvium (2), Sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Other Subsections: Bay Flats (2)

Site Impacts

This association has high non-native plant cover (average 96.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Geranium dissectum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lactuca serriola*, *Lolium perenne*, and *Silybum marianum*.

Classification Comments

This association remains provisional due to low overall sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=2): ALCC376, JOMU001

San Mateo Co. (n=2): DEDW0285, DEDWM010

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Carduus pycnocephalus</i>	75	23.1	20.0	50.0	Y		Y	Y
H	<i>Bromus diandrus</i>	50	11.0	4.0	40.0				Y
H	<i>Silybum marianum</i>	50	3.8	2.0	13.0				Y
H	<i>Hordeum murinum</i>	50	3.5	2.0	12.0				Y
H	<i>Lolium perenne</i>	50	1.8	1.0	6.0				Y
H	<i>Brassica nigra</i>	50	0.7	0.2	2.5				Y
H	<i>Avena barbata</i>	25	2.5	10.0	10.0				
H	<i>Hypochaeris glabra</i>	25	1.3	5.0	5.0				
H	<i>Vulpia microstachys</i>	25	1.3	5.0	5.0				
H	<i>Geranium dissectum</i>	25	0.4	1.5	1.5				
H	<i>Convolvulus arvensis</i>	25	0.3	1.0	1.0				
H	<i>Avena fatua</i>	25	0.3	1.0	1.0				
H	<i>Lactuca serriola</i>	25	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	25	0.0	0.1	0.1				

Carduus pycnocephalus – *Silybum marianum* Provisional Semi-natural Association
Brassica nigra – *Centaurea (solstitialis, melitensis)* Herbaceous Semi-natural Alliance

***Bromus carinatus* – *Elymus glaucus* Herbaceous Alliance**



Common Name: California brome – blue wildrye prairie

NVC Alliance Code: A4244. *Bromus carinatus* - *Elymus glaucus* Mesic Meadow Alliance

Statewide Description

Elymus glaucus, *Bromus carinatus*, *Bromus maritimus*, *Pteridium aquilinum* and/or *Thermopsis californica* dominate or co-dominate in the herbaceous layer with *Agrostis scabra*, *Anagallis arvensis*, *Bromus diandrus*, *Calamagrostis canadensis*, *Carex feta*, *Carex pellita*, *Glyceria striata*, *Heracleum maximum*, *Juncus oxymersis*, *Phleum pratense*, *Poa pratensis*, *Senecio clarkianus*, *Senecio triangularis*, *Solidago canadensis*, *Stachys albens*, *Veratrum californicum*, and *Vulpia bromoides*.

This alliance is represented by four different taxa, *Elymus glaucus*, *Bromus carinatus*, *B. maritimus*, and *Pteridium aquilinum*, which because of their ecological relatedness, have been combined into a single alliance.

Sawyer et al. (2009) stands dominated by *E. glaucus*, *B. carinatus*, or *P. aquilinum* were assigned to the *Elymus glaucus*, *Bromus carinatus*, or *Pteridium aquilinum* Association respectively, each within its own provisional alliance. Based on recent county-wide analyses, we now recognize one alliance which contains elements of these three associations in lower elevations of California. Mixes of *Bromus carinatus* or *Elymus glaucus* with a high cover of *Pteridium* are placed in the *Pteridium aquilinum* Association.

Local Vegetation Description

The California brome – blue wildrye prairie Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Elymus glaucus*, and *Geranium dissectum*. Those herbs often present include *Avena barbata*, *Bromus carinatus*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Lolium perenne*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.5	0 – 2
Shrub	0.2	0 – 2	0.6	0 – 1
Herb	44.7	11 – 100	0.5	0 – 1

Local Membership Rule

Bromus carinatus, *Elymus glaucus*, and/or *Pteridium aquilinum* > 30% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: Mean 377 m, Range 116 – 1041 m

Aspect: NW (9), NE (7), SE (1)

Slope: Mean 23 degrees, Range 10 – 34 degrees

Macro Topography: Upper 1/3 of slope (7), Middle 1/3 of slope (5), Lower 1/3 of slope (3), Bottom to Upper 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: Mean 5.8%, Range 0 – 26%

Fines Cover: Mean 48.6%, Range 1 – 87%

Litter Cover: Mean 36.2%, Range 1 – 96%

Soil Texture (field assessed): Moderately fine silty clay loam (4), Moderately fine clay loam (3), Medium to very fine, sandy loam (3), Moderately fine sandy clay loam (2), Moderately coarse, sandy loam (1), Medium silt loam (1), Medium silt (1)

Geology (field or map data): Franciscan melange (4), Sedimentary (4), Sandstone, shale, and gravel deposits (3), Shale and other sedimentary (2), General volcanic extrusives (1), Sandstone (1), Sandstone and other sedimentary (1), Ultramafic (1), Volcanic flow rocks (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), Western Diablo Range (2), Alameda Creek (1), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (6), Suisun Hills and Valleys (4), Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 48.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, *Scandix pecten-veneris*, *Torilis arvensis*, *Torilis nodosa*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Bromus carinatus

Elymus glaucus

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=18; Alameda County (n=7): ALCC308, ALCC385, ALCC557, ALCC576, ALCC582, ALCC915, PRRP002

Contra Costa County (n=11): ALCC330, ALCC355, ALCC365, ALCC448, ALCC449, ALCC587, ALCC590, ALCC803, ALCC901, CORT163, MTDIAB2

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Geranium dissectum</i>	94	0.6	0.2	4.0	Y			Y
H	<i>Elymus glaucus</i>	83	3.7	0.2	21.0	Y			Y
H	<i>Achillea millefolium</i>	78	1.9	0.2	9.0	Y			Y
H	<i>Bromus diandrus</i>	72	2.3	0.2	16.0				Y
H	<i>Bromus carinatus</i>	67	7.6	1.0	28.0				Y
H	<i>Lolium perenne</i>	67	6.5	0.2	27.0				Y
H	<i>Bromus hordeaceus</i>	67	1.8	0.2	10.0				Y
H	<i>Avena barbata</i>	61	3.2	0.2	18.0				Y
H	<i>Carduus pycnocephalus</i>	61	1.6	0.1	10.0				Y
H	<i>Vicia sativa</i>	50	0.4	0.1	3.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Chlorogalum pomeridianum</i>	39	1.3	0.2	12.0				
H	<i>Erodium cicutarium</i>	39	0.4	0.2	3.0				
H	<i>Epilobium brachycarpum</i>	39	0.3	0.1	1.0				
H	<i>Torilis arvensis</i>	39	0.2	0.2	1.0				
H	<i>Dichelostemma capitatum</i>	39	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	39	0.1	0.1	0.3				
H	<i>Eschscholzia californica</i>	33	0.2	0.2	1.0				
H	<i>Trifolium hirtum</i>	33	0.2	0.1	1.0				
H	<i>Avena fatua</i>	28	1.0	0.3	12.0				
H	<i>Centaurea solstitialis</i>	28	0.4	0.2	2.0				
H	<i>Medicago polymorpha</i>	28	0.3	0.1	4.0				
H	<i>Brassica nigra</i>	28	0.2	0.2	2.0				
H	<i>Hordeum murinum</i>	28	0.1	0.2	1.0				
H	<i>Cynosurus echinatus</i>	28	0.1	0.2	0.3				
H	<i>Lactuca serriola</i>	28	0.1	0.1	0.3				
H	<i>Sanicula bipinnata</i>	28	0.0	0.1	0.2				
H	<i>Madia gracilis</i>	22	1.0	0.3	8.0				
H	<i>Vulpia bromoides</i>	22	0.8	0.2	13.0				
H	<i>Vulpia microstachys</i>	22	0.4	0.2	3.0				
H	<i>Bromus madritensis</i>	22	0.4	0.2	4.0				
H	<i>Melica californica</i>	22	0.4	0.2	4.0				
H	<i>Geranium molle</i>	22	0.2	0.2	2.0				
H	<i>Calystegia subacaulis</i>	22	0.2	0.2	2.0				
H	<i>Torilis nodosa</i>	22	0.1	0.2	2.0				
H	<i>Scandix pecten-veneris</i>	22	0.1	0.2	1.0				
H	<i>Ranunculus californicus</i>	22	0.1	0.2	1.0				
H	<i>Galium aparine</i>	22	0.0	0.2	0.2				

***Bromus carinatus* Association**

Common Name: California Brome Patches

Alliance: *Bromus carinatus* – *Elymus glaucus* Herbaceous Alliance

Local Vegetation Description

The California Brome Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Bromus carinatus*, *Bromus diandrus*, and *Geranium dissectum*. Those herbs often present include *Avena barbata*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Elymus glaucus*, and *Lolium perenne*, and herbs that are sometimes present include *Avena fatua*, *Brassica nigra*, *Bromus madritensis*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Cynosurus echinatus*, *Dichelostemma capitatum*, *Epilobium brachycarpum*, *Erodium cicutarium*, *Eschscholzia californica*, *Hordeum murinum*, *Lathyrus vestitus*, *Madia gracilis*, *Melica californica*, *Poa secunda*, *Ranunculus californicus*, *Rumex acetosella*, *Sanicula bipinnata*, *Scandix pecten-veneris*, *Sherardia arvensis*, *Torilis arvensis*, *Torilis nodosa*, *Trifolium hirtum*, *Triteleia laxa*, *Vicia sativa*, *Vulpia bromoides*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.3	0 – 2	0.8	0.5 – 1
Herb	52.8	28 – 100	0.6	0 – 1

Local Environmental Description

Elevation: Mean 449 m, Range 116 – 1041 m

Aspect: NW (6), NE (4)

Slope: Mean 22 degrees, Range 15 – 32 degrees

Macro Topography: Upper 1/3 of slope (6), Lower 1/3 of slope (2), Middle 1/3 of slope (2)

Large Rock: 0%

Small Rock: Mean 9.2%, Range 0 – 26%

Fines Cover: Mean 43.6%, Range 1 – 83%

Litter Cover: Mean 34.2%, Range 1 – 96%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Moderately fine silty clay loam (2), Medium silt (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (3), Sandstone, shale, and gravel deposits (2), Sedimentary (2), Sandstone and other sedimentary (1), Shale and other sedimentary (1), Ultramafic (1), Volcanic flow rocks (1)

Bromus carinatus Association

Bromus carinatus – *Elymus glaucus* Herbaceous Alliance

Alameda County Subsections: Western Diablo Range (2), Alameda Creek (1), East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (2)

Site Impacts

This association has moderate non-native plant cover (average 47.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Cynosurus echinatus*, *Erodium cicutarium*, *Geranium dissectum*, *Hordeum murinum*, *Lolium perenne*, *Rumex acetosella*, *Scandix pecten-veneris*, *Sherardia arvensis*, *Torilis arvensis*, *Torilis nodosa*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=11; Alameda County (n=5): ALCC308, ALCC385, ALCC582, ALCC915, PRRP002

Contra Costa County (n=6): ALCC365, ALCC448, ALCC590, ALCC901, CORT163, MTDIAB2

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus carinatus</i>	100	12.4	3.0	28.0	Y			Y
H	<i>Geranium dissectum</i>	100	0.7	0.2	4.0	Y			Y
H	<i>Achillea millefolium</i>	82	1.9	0.2	9.0	Y			Y
H	<i>Bromus diandrus</i>	82	1.8	0.2	9.0	Y			Y
H	<i>Elymus glaucus</i>	73	1.9	0.2	10.0				Y
H	<i>Lolium perenne</i>	64	8.3	0.2	27.0				Y
H	<i>Bromus hordeaceus</i>	64	2.3	1.0	10.0				Y
H	<i>Avena barbata</i>	55	3.1	0.2	16.0				Y
H	<i>Carduus pycnocephalus</i>	55	2.3	0.2	10.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Chlorogalum pomeridianum</i>	45	1.1	0.2	8.0				
H	<i>Vicia sativa</i>	45	0.5	0.2	3.0				
H	<i>Triteleia laxa</i>	45	0.1	0.2	0.3				
H	<i>Cynosurus echinatus</i>	45	0.1	0.2	0.3				
H	<i>Dichelostemma capitatum</i>	45	0.1	0.2	0.2				
H	<i>Torilis nodosa</i>	36	0.2	0.2	2.0				
H	<i>Epilobium brachycarpum</i>	36	0.2	0.2	1.0				
H	<i>Trifolium hirtum</i>	36	0.2	0.2	1.0				
H	<i>Brassica nigra</i>	36	0.1	0.2	1.0				
H	<i>Eschscholzia californica</i>	36	0.1	0.2	1.0				
H	<i>Hordeum murinum</i>	36	0.1	0.2	1.0				
H	<i>Avena fatua</i>	27	1.4	0.3	12.0				
H	<i>Vulpia bromoides</i>	27	1.4	1.0	13.0				
H	<i>Madia gracilis</i>	27	1.3	0.3	8.0				
H	<i>Bromus madritensis</i>	27	0.6	1.0	4.0				
H	<i>Vulpia microstachys</i>	27	0.6	1.0	3.0				
H	<i>Melica californica</i>	27	0.6	0.2	4.0				
H	<i>Centaurea solstitialis</i>	27	0.5	2.0	2.0				
H	<i>Rumex acetosella</i>	27	0.5	0.2	4.0				
H	<i>Lathyrus vestitus</i>	27	0.4	1.0	2.0				
H	<i>Poa secunda</i>	27	0.3	0.2	3.0				
H	<i>Scandix pecten-veneris</i>	27	0.1	0.2	1.0				
H	<i>Sherardia arvensis</i>	27	0.1	0.2	0.3				
H	<i>Ranunculus californicus</i>	27	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	27	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	27	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	27	0.0	0.1	0.2				

***Elymus glaucus* Association**

Common Name: Blue Wildrye Patches

Alliance: *Bromus carinatus* – *Elymus glaucus* Herbaceous Alliance

Local Vegetation Description

The Blue Wildrye Association forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Elymus glaucus* and *Geranium dissectum*. Those herbs often present include *Achillea millefolium*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium cicutarium*, *Lolium perenne*, *Torilis arvensis*, and *Vicia sativa*, and herbs that are sometimes present include *Achyrachaena mollis*, *Acmispon wrangelianus*, *Amsinckia menziesii* var. *intermedia*, *Avena fatua*, *Calystegia subacaulis*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Dichelostemma capitatum*, *Epilobium brachycarpum*, *Eschscholzia californica*, *Euphorbia spathulata*, *Galium aparine*, *Geranium molle*, *Hesperervax sparsiflora*, *Lactuca serriola*, *Lupinus microcarpus*, *Marah fabaceus*, *Medicago polymorpha*, *Nassella pulchra*, *Sanicula bipinnata*, *Sisyrinchium bellum*, *Stellaria media*, *Trifolium bifidum*, *Trifolium hirtum*, *Trifolium microdon*, *Triteleia laxa*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.7	0 – 2
Shrub	0.1	0 – 0.2	0.3	0 – 0.5
Herb	32.0	11 – 45	0.4	0 – 1

Local Environmental Description

Elevation: Mean 266 m, Range 167 – 471 m

Aspect: NE (3), NW (3), SE (1)

Slope: Mean 24 degrees, Range 10 – 34 degrees

Macro Topography: Middle 1/3 of slope (3), Bottom to Upper 1/3 of slope (1), Lower 1/3 of slope (1), Lower 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 3.0%, Range 0 – 15%

Fines Cover: Mean 55.9%, Range 6 – 87%

Litter Cover: Mean 39.4%, Range 10 – 92%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately fine clay loam (2), Moderately fine silty clay loam (2), Medium silt loam (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), General volcanic extrusives (1), Sandstone (1), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), Suisun Hills and Valleys (2), Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 50.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Lactuca serriola*, *Lolium perenne*, *Stellaria media*, *Torilis arvensis*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia myuros*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Klein et al. 2015, Ratchford et al. 2023a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=7; **Alameda County (n=2):** ALCC557, ALCC576

Contra Costa County (n=5): ALCC330, ALCC355, ALCC449, ALCC587, ALCC803

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus lobata</i>	29	0.0	0.1	0.2				
H	<i>Elymus glaucus</i>	100	6.4	1.0	21.0	Y			Y
H	<i>Geranium dissectum</i>	86	0.5	0.2	2.0	Y			Y
H	<i>Lolium perenne</i>	71	3.6	0.2	8.0				Y
H	<i>Avena barbata</i>	71	3.3	0.2	18.0				Y
H	<i>Achillea millefolium</i>	71	1.9	0.2	8.0				Y
H	<i>Bromus hordeaceus</i>	71	1.1	0.2	3.0				Y
H	<i>Carduus pycnocephalus</i>	71	0.6	0.1	2.0				Y
H	<i>Bromus diandrus</i>	57	3.0	0.2	16.0				Y
H	<i>Erodium cicutarium</i>	57	0.9	0.2	3.0				Y
H	<i>Torilis arvensis</i>	57	0.3	0.2	1.0				Y
H	<i>Vicia sativa</i>	57	0.1	0.1	0.2				Y
H	<i>Hesperis matronalis</i>	43	0.6	0.2	4.0				
H	<i>Epilobium brachycarpum</i>	43	0.3	0.1	1.0				

Elymus glaucus Association
Bromus carinatus – *Elymus glaucus* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lactuca serriola</i>	43	0.1	0.1	0.2				
H	<i>Medicago polymorpha</i>	43	0.1	0.1	0.2				
H	<i>Chlorogalum pomeridianum</i>	29	1.7	0.2	12.0				
H	<i>Vulpia myuros</i>	29	0.7	2.0	3.0				
H	<i>Geranium molle</i>	29	0.6	2.0	2.0				
H	<i>Calystegia subacaulis</i>	29	0.4	1.0	2.0				
H	<i>Avena fatua</i>	29	0.4	1.0	2.0				
H	<i>Eschscholzia californica</i>	29	0.2	0.2	1.0				
H	<i>Clarkia</i> sp.	29	0.2	0.2	1.0				
H	<i>Achyraea mollis</i>	29	0.2	0.2	1.0				
H	<i>Trifolium hirtum</i>	29	0.2	0.1	1.0				
H	<i>Lupinus microcarpus</i>	29	0.2	0.1	1.0				
H	<i>Trifolium microdon</i>	29	0.1	0.2	0.2				
H	<i>Sisyrinchium bellum</i>	29	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	29	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	29	0.1	0.2	0.2				
H	<i>Galium aparine</i>	29	0.1	0.2	0.2				
H	<i>Stellaria media</i>	29	0.1	0.2	0.2				
H	<i>Trifolium bifidum</i>	29	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	29	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	29	0.1	0.2	0.2				
H	<i>Marah fabaceus</i>	29	0.1	0.2	0.2				
H	<i>Euphorbia spathulata</i>	29	0.0	0.1	0.2				
H	<i>Sanicula bipinnata</i>	29	0.0	0.1	0.2				
H	<i>Triteleia laxa</i>	29	0.0	0.1	0.2				
H	<i>Acemisson wrangelianus</i>	29	0.0	0.1	0.1				
NV	Moss	29	0.3	0.2	2.0				

Carex barbarae Herbaceous Alliance



Common Name: White-root beds

NVC Alliance Code: A2289.

Statewide Description

Carex barbarae is dominant or co-dominant in the herbaceous layer with *Asclepias fascicularis*, *Carex praegracilis*, *Epilobium ciliatum*, *Euthamia occidentalis*, *Perideridia kelloggii*, *Senecio minimus*, *Solidago* spp., and *Urtica dioica*. Emergent trees and shrubs may be present at low cover, including trees: *Fraxinus latifolia*, *Platanus racemosa*, *Quercus agrifolia* or *Quercus lobata*, and shrubs: *Cephalanthus occidentalis* or *Rubus* spp.

Carex barbarae is tolerant of shade and occurs in winter-deciduous gallery woodlands (Holland 1986). In the Central Valley and central Coast Ranges, *Carex barbarae* occurs regularly as an understory in *Quercus lobata* stands, but it also forms stands without tree canopies. In many areas, *Carex barbarae* is replaced by aggressive non-native woody species, such as *Rubus armeniacus*. In settings where soil moisture is similar to that found in a woodland understory, *Carex barbarae* can be found away from trees. Stands of *C. barbarae* may also remain where trees have been cleared.

Local Vegetation Description

The White-root beds Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Carex barbarae*. Those herbs often present include *Avena barbata*, *Carduus pycnocephalus*, and *Conium maculatum*, and herbs that are sometimes present include *Asclepias* sp., *Bromus diandrus*, *Bromus madritensis*, *Helminthotheca echioides*, *Hirschfeldia incana*, *Lolium perenne*, *Madia sativa*, *Mentha pulegium*, *Silybum marianum*, *Sonchus asper*, *Sonchus oleraceus*, *Trifolium hirtum*, *Urtica dioica*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0	no data	no data
Herb	80.6	52 – 97	0.8	0.5 – 1

Local Membership Rule

Carex barbarae > 50% relative cover in seasonally or intermittently saturated wetlands.

Local Environmental Description

Elevation: Mean 178 m, Range 2 – 364 m

Aspect: SE (2), Flat (1), SW (1)

Slope: Mean 16 degrees, Range 0 – 31 degrees

Macro Topography: Middle 1/3 of slope (2), Bottom (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 46.5%, Range 3 – 88%

Litter Cover: Mean 35.7%, Range 10 – 87%

Soil Texture (field assessed): Medium silt loam (2), Fine silty clay (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3)

Other Subsections: Delta (1)

Site Impacts

This alliance has low non-native plant cover (average 6.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Conium maculatum*, *Helminthotheca echioides*, *Hirschfeldia incana*, *Lolium perenne*, *Mentha pulegium*, *Nicotiana glauca*, *Silybum marianum*, *Sonchus asper*, *Trifolium hirtum*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Carex barbarae

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and Kentner 2006, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: G2? **State Rarity Rank:** S2?

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=3): ALCC438, ALCC439, ALCC908

San Joaquin Co. (n=1): SSJD0014

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Nicotiana glauca</i>	25	0.1	0.2	0.2				
H	<i>Carex barbarae</i>	100	76.0	45.0	95.0	Y	Y		Y
H	<i>Avena barbata</i>	50	1.0	1.0	3.0				Y
H	<i>Conium maculatum</i>	50	0.6	0.2	2.0				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Asclepias</i> sp.	25	0.8	3.0	3.0				
H	<i>Bromus diandrus</i>	25	0.5	2.0	2.0				
H	<i>Lolium perenne</i>	25	0.3	1.0	1.0				
H	<i>Sonchus asper</i>	25	0.3	1.0	1.0				
H	<i>Bromus madritensis</i>	25	0.3	1.0	1.0				
H	<i>Helminthotheca echioides</i>	25	0.3	1.0	1.0				
H	<i>Silybum marianum</i>	25	0.3	1.0	1.0				
H	<i>Mentha pulegium</i>	25	0.3	1.0	1.0				
H	<i>Madia sativa</i>	25	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	25	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	25	0.1	0.2	0.2				
H	<i>Urtica dioica</i>	25	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	25	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				

***Carex barbarae* Association**

Common Name: Valley Sedge Patches

Alliance: *Carex barbarae* Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Evens and Kentner 2006, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Centromadia (pungens)* Herbaceous Alliance**



Common Name: Tar plant fields

NVC Alliance Code: A4170. *Centromadia pungens* - *Hemizonia* sp. Vernal Pool Alliance

Statewide Description

Centromadia pungens and/or another *Centromadia* species is conspicuous to dominant in the herbaceous layer with *Atriplex* spp., *Bromus* spp., *Deschampsia danthonioides*, *Downingia bella*, *Erodium cicutarium*, *Frankenia salina*, *Hirschfeldia incana*, *Hordeum murinum*, *Lasthenia californica*, *Lasthenia fremontii*, *Trifolium depauperatum*, and *Trifolium variegatum*. Emergent shrubs may be present at low cover, including *Suaeda moquinii*.

Centromadia pungens is indicative of fine-textured clay soils, which are usually associated with seasonal saturation or flooding and alkalinity. These conditions typically occur in alkali vernal pools or swales, but may also occur on broad flats underlain by fine alkaline soils. Barbour et al. (2007b) defined stands of *C. pungens* in a recent regional treatment of vernal pools as part of the *Lasthenia fremontii* - *Distichlis spicata* (*Frankenia salina*) alliance, restricted to alkaline or saline pools in the southern Sierra Nevada foothills. However, *C. pungens* stands on vernal flats of southern California (Klein and Evens 2005), stands in vernal pools of the southern foothills, and stands in high marshes of the San Francisco Bay (Baye et al. 2000) can lack the strong presence of *D. spicata* and *Frankenia salina*. We consider the *Centromadia (pungens)* alliance as appropriately distinct from the other vernal pool and salt marsh alliances.

Another tar plant, *C. fitchii*, occurs commonly throughout cismontane California. Barbour et al. (2007b) considered it a moderately present vernal pool plant indicator of the *Downingia bicornuta* - *Lasthenia fremontii* order, but not a strong indicator at the alliance or association levels. *C. fitchii* also occurs regularly in grasslands with clay soils, including serpentine areas.

Local Vegetation Description

The Tar plant fields Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus*, *Centromadia pungens* ssp. *pungens*, *Hordeum marinum*, *Juncus bufonius*, and *Lolium perenne*. Those herbs often present include *Bromus hordeaceus*, *Deschampsia danthonioides*, *Distichlis spicata*, *Downingia pulchella*, *Eryngium aristulatum*, *Hordeum depressum*, *Hordeum marinum*, *Juncus bufonius*, *Lolium perenne*, *Medicago polymorpha*, *Microseris campestris*, *Plantago elongata*, and *Polypogon monspeliensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	65.7	28 – 95	0.4	0 – 1

Local Membership Rule

Centromadia pungens is characteristically present (usually > 15% relative cover) with *Deschampsia danthonioides* or other herbs in the herbaceous layer.

Local Environmental Description

Elevation: Mean 79 m, Range 2 – 156 m

Aspect: Flat (1), SE (1)

Slope: Mean 2 degrees, Range 1 – 2 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 10%

Fines Cover: Mean 44.3%, Range 5 – 88%

Litter Cover: Mean 6.5%, Range 0 – 25%

Soil Texture (field assessed): Medium to very fine, sandy loam (2)

Geology (field or map data): Alluvium (2), Sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Eastern Hills (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has moderate non-native plant cover (average 43.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bromus diandrus*, *Bromus hordeaceus*, *Erodium cicutarium*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, *Parapholis incurva*, *Polygonum aviculare*, *Polypogon monspeliensis*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Centromadia (pungens) alliance

Centromadia pungens – *Lepidium dictyotum*

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013

Global Rarity Rank: G2

State Rarity Rank: S2

Surveys Used for Description

Total: N=4; Alameda County (n=2): SPR003E, SPR005C

Contra Costa County (n=2): ALCC390, ALCC553

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	100	22.0	4.0	70.0	Y			Y
H	<i>Lolium perenne</i>	75	8.1	0.4	31.0	Y			Y
H	<i>Juncus bufonius</i>	75	4.3	0.2	15.0	Y			Y
H	<i>Hordeum marinum</i>	75	3.8	1.0	11.0	Y			Y
H	<i>Bromus hordeaceus</i>	75	0.7	0.2	2.0	Y			Y
H	<i>Deschampsia danthonioides</i>	50	10.1	0.4	40.0				Y
H	<i>Eryngium aristulatum</i>	50	0.8	1.0	2.0				Y
H	<i>Hordeum depressum</i>	50	0.8	1.0	2.0				Y
H	<i>Plantago elongata</i>	50	0.5	1.0	1.0				Y
H	<i>Downingia pulchella</i>	50	0.4	0.4	1.0				Y
H	<i>Medicago polymorpha</i>	50	0.3	0.2	1.0				Y
H	<i>Distichlis spicata</i>	50	0.3	0.2	1.0				Y
H	<i>Polypogon monspeliensis</i>	50	0.2	0.4	0.4				Y
H	<i>Microseris campestris</i>	50	0.1	0.1	0.4				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Parapholis incurva</i>	25	10.0	40.0	40.0				
H	<i>Vulpia myuros</i>	25	1.5	6.0	6.0				
H	<i>Lepidium dictyotum</i>	25	1.0	4.0	4.0				
H	<i>Arthrocnemum subterminale</i>	25	0.5	2.0	2.0				
H	<i>Myosurus minimus</i>	25	0.3	1.0	1.0				
H	<i>Cressa truxillensis</i>	25	0.3	1.0	1.0				
H	<i>Bromus diandrus</i>	25	0.3	1.0	1.0				
H	<i>Frankenia salina</i>	25	0.3	1.0	1.0				
H	<i>Lepidium acutidens</i>	25	0.3	1.0	1.0				
H	<i>Lasthenia glabrata</i> ssp. <i>glabrata</i>	25	0.1	0.4	0.4				
H	<i>Plagiobothrys acanthocarpus</i>	25	0.1	0.2	0.2				
H	<i>Microseris acuminata</i>	25	0.1	0.2	0.2				
H	<i>Lepidium nitidum</i>	25	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	25	0.1	0.2	0.2				
H	<i>Crassula aquatica</i>	25	0.1	0.2	0.2				
H	<i>Atriplex prostrata</i>	25	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	25	0.1	0.2	0.2				
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	25	0.1	0.2	0.2				
H	<i>Spergularia marina</i>	25	0.1	0.2	0.2				
H	<i>Psilocarphus tenellus</i>	25	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	25	0.1	0.2	0.2				
H	<i>Plagiobothrys trachycarpus</i>	25	0.1	0.2	0.2				
H	<i>Polygonum aviculare</i>	25	0.0	0.1	0.1				
H	<i>Psilocarphus brevissimus</i>	25	0.0	0.1	0.1				

***Centromadia pungens* – *Lepidium dictyotum* Association**

Common Name: Tar Plant – Alkali Pepperweed Patches

Alliance: *Centromadia (pungens)* Herbaceous Alliance

Local Vegetation Description

The Tar Plant – Alkali Pepperweed Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Centromadia pungens* ssp. *pungens*, and characteristic herbs include *Juncus bufonius*. Those herbs often present include *Bromus hordeaceus*, *Deschampsia danthonioides*, *Downingia pulchella*, *Eryngium aristulatum*, *Hordeum depressum*, *Hordeum marinum*, *Lolium perenne*, *Microseris campestris*, *Plantago elongata*, and *Polypogon monspeliensis*, and herbs that are sometimes present include *Arthrocnemum subterminale*, *Crassula aquatica*, *Distichlis spicata*, *Erodium cicutarium*, *Hordeum murinum*, *Lasthenia glabrata* ssp. *glabrata*, *Lepidium acutidens*, *Lepidium dictyotum*, *Lepidium nitidum*, *Medicago polymorpha*, *Microseris acuminata*, *Myosurus minimus*, *Parapholis incurva*, *Plagiobothrys acanthocarpus*, *Plagiobothrys stipitatus* var. *micranthus*, *Plagiobothrys trachycarpus*, *Psilocarphus brevissimus*, *Psilocarphus tenellus*, *Spergularia marina*, *Vulpia microstachys*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	70.9	28 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 105 m, Range 2 – 156 m

Aspect: SE (1)

Slope: 1 degree

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: Mean 10.0%, Range 10 – 10%

Fines Cover: Mean 34.3%, Range 5 – 88%

Litter Cover: Mean 0.3%, Range 0 – 1%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (2), Alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This association has moderate non-native plant cover (average 29.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Erodium cicutarium*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, *Parapholis incurva*, *Polypogon monspeliensis*, and *Vulpia myuros*.

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=3; **Alameda County (n=2):** SPR003E, SPR005C

Contra Costa County (n=1): ALCC553

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	100	28.0	4.0	70.0	Y		Y	Y
H	<i>Juncus bufonius</i>	100	5.7	0.2	15.0	Y			Y
H	<i>Deschampsia danthonioides</i>	67	13.5	0.4	40.0				Y
H	<i>Hordeum marinum</i>	67	1.3	1.0	3.0				Y
H	<i>Eryngium aristulatum</i>	67	1.0	1.0	2.0				Y
H	<i>Hordeum depressum</i>	67	1.0	1.0	2.0				Y
H	<i>Bromus hordeaceus</i>	67	0.8	0.4	2.0				Y
H	<i>Plantago elongata</i>	67	0.7	1.0	1.0				Y
H	<i>Downingia pulchella</i>	67	0.5	0.4	1.0				Y
H	<i>Lolium perenne</i>	67	0.5	0.4	1.0				Y
H	<i>Polypogon monspeliensis</i>	67	0.3	0.4	0.4				Y
H	<i>Microseris campestris</i>	67	0.2	0.1	0.4				Y
H	<i>Parapholis incurva</i>	33	13.3	40.0	40.0				
H	<i>Vulpia myuros</i>	33	2.0	6.0	6.0				
H	<i>Lepidium dictyotum</i>	33	1.3	4.0	4.0				
H	<i>Arthrocnemum subterminale</i>	33	0.7	2.0	2.0				
H	<i>Myosurus minimus</i>	33	0.3	1.0	1.0				
H	<i>Distichlis spicata</i>	33	0.3	1.0	1.0				
H	<i>Lepidium acutidens</i>	33	0.3	1.0	1.0				

Centromadia pungens – *Lepidium dictyotum* Association
Centromadia (pungens) Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lasthenia glabrata</i> ssp. <i>glabrata</i>	33	0.1	0.4	0.4				
H	<i>Crassula aquatica</i>	33	0.1	0.2	0.2				
H	<i>Medicago polymorpha</i>	33	0.1	0.2	0.2				
H	<i>Microseris acuminata</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys trachycarpus</i>	33	0.1	0.2	0.2				
H	<i>Lepidium nitidum</i>	33	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys acanthocarpus</i>	33	0.1	0.2	0.2				
H	<i>Psilocarphus tenellus</i>	33	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	33	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	33	0.1	0.2	0.2				
H	<i>Spergularia marina</i>	33	0.1	0.2	0.2				
H	<i>Psilocarphus brevissimus</i>	33	0.0	0.1	0.1				

***Conium maculatum* – *Foeniculum vulgare* Herbaceous Semi-Natural Alliance**



Common Name: Poison hemlock or fennel patches

NVC Alliance Code: A3872. *Centaurea virgata* ssp. *squarrosa* - *Conium maculatum* - *Foeniculum vulgare* Ruderal Meadow Alliance

Statewide Description

Ageratina adenophora, *Conium maculatum*, *Dipsacus fullonum*, *Dipsacus sativus*, *Foeniculum vulgare* and/or another non-native invasive plant of the *Apiaceae* is dominant or co-dominant with other non-native plants in the herbaceous layer. Emergent trees and shrubs may be present at low cover, including trees *Quercus* spp. and shrubs: *Baccharis pilularis*.

DiTomaso and Healy (2007) considered many members of the *Umbelliferae* in California as weeds, and Cal-IPC lists *Conium maculatum* and *Foeniculum vulgare* as invasive in wildland settings in the state. This forb-dominated ruderal herbaceous alliance has been expanded since the 2009 edition of *The Manual of California Vegetation* to include other non-native perennial forbs that similarly occur in moist roadside verges, ditches, agricultural waysides, and other disturbed moist to wet areas.

Local Vegetation Description

The Poison hemlock or fennel patches Alliance forms an intermittent herbaceous layer. The shrub layer is open and the tree layer is absent. Dominant herbs include *Conium maculatum*, and characteristic herbs include *Artemisia douglasiana*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Crepis vesicaria*, *Hordeum vulgare*, *Scrophularia californica*, and *Urtica dioica*. Herbs that are sometimes present include Commonly associated emergent shrubs at open cover include *Toxicodendron diversilobum*. Commonly associated non-vascular plants include Moss.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	12.0	12 – 12	0.8	0.5 – 1
Herb	41.0	41 – 41	1.5	1 – 2

Local Membership Rule

Conium maculatum, *Ageratina adenophora*, *Dipsacus fullonum*, *D. sativus*, and/or *Foeniculum vulgare* > 50% relative cover in the herbaceous layer, with < 10% relative cover of native herbs.

Local Environmental Description

Elevation: 433 m

Aspect: SE (1)

Slope: 12 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 3%

Small Rock: 3%

Fines Cover: 42%

Litter Cover: 50%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (field or map data): Mixed sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has high non-native plant cover (average 77.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Crepis vesicaria*, and *Hordeum vulgare*.

Associations in Alameda & Contra Costa Counties

Conium maculatum

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Keeler-Wolf and Vaghti 2000, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC762

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Toxicodendron diversilobum</i>	100	12.0	12.0	12.0	Y	Y		Y
H	<i>Conium maculatum</i>	100	45.0	45.0	45.0	Y	Y		Y
H	<i>Urtica dioica</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Artemisia douglasiana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus diandrus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Crepis vesicaria</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Scrophularia californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hordeum vulgare</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y

***Conium maculatum* Semi-natural Association**

Common Name: Poison Hemlock Patches

Alliance: *Conium maculatum* – *Foeniculum vulgare* Herbaceous Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties.
See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Keeler-Wolf and Vaghti 2000, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)
Herbaceous Alliance



Common Name: Sand-aster and perennial buckwheat fields

NVC Alliance Code: A4238. *Corethrogyne filaginifolia* - *Eriogonum elongatum* - *Eriogonum nudum* Dry Meadow Alliance

Statewide Description

Corethrogyne filaginifolia, *Eriogonum elongatum* and/or *Eriogonum nudum* is a co-dominant or characteristic herb. Commonly associated herbs include *Bromus diandrus*, *Bromus rubens*, *Cardionema ramosissimum*, *Clarkia* spp., *Erodium* spp., *Eschscholzia californica*, *Lupinus bicolor*, and *Nassella* spp. Shrubs present at low cover may include *Baccharis pilularis*, *Eriodictyon* spp., and *Eriogonum fasciculatum*. Stands of the short lived perennial buckwheats and sand-aster herbs occupy an ecological niche that is successional between grasslands and shrublands in many parts of cismontane California. They are similar to other alliances such as *Gutierrezia californica* and are thought to be a member of a transitional group mid-way along a seral gradient between grasslands and shrublands.

Corethrogyne filaginifolia is found in the Coast Ranges and southern Sierra Foothills,

and *E. elongatum* is found in parts of the inner South Coast Ranges and the southern Sierra Foothills. *Eriogonum nudum* is widespread throughout much of the state.

Local Vegetation Description

The Sand-aster and perennial buckwheat fields Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Avena barbata*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, *Grindelia camporum*, and *Lolium perenne*, and herbs that are sometimes present include *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Dichelostemma capitatum*, *Elymus caput-medusae*, *Eriogonum nudum*, *Erodium botrys*, *Erodium cicutarium*, *Eschscholzia californica*, *Geranium dissectum*, *Geranium molle*, *Holocarpha virgata*, *Lupinus bicolor*, *Melica californica*, *Nassella pulchra*, *Poa secunda*, *Sanicula bipinnata*, *Trifolium hirtum*, *Triteleia laxa*, *Vicia sativa*, *Viola pedunculata*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.8	0.5 – 1
Shrub	0.1	0 – 4	0.6	0 – 2
Herb	39.6	17 – 65	0.5	0 – 2

Local Membership Rule

Corethrogyne filaginifolia, *Eriogonum nudum*, *Eriophyllum confertiflorum*, *Heterotheca sessiliflora*, *Grindelia camporum*, *Achillea millefolium*, *Viola pedunculata*, or other perennial forbs characterize the sub-shrub / herb layer at > 15% relative cover, with other herbs including annual forbs and non-native grasses. If perennial grasses are present they are usually < 10% relative cover.

Local Environmental Description

Elevation: Mean 375 m, Range 46 – 977 m

Aspect: NW (16), NE (14), SW (7), SE (2)

Slope: Mean 20 degrees, Range 4 – 40 degrees

Macro Topography: Upper 1/3 of slope (13), Lower 1/3 of slope (7), Middle 1/3 of slope (7), Middle to Upper 1/3 of slope (5), Upper 1/3 of slope to Ridgetop (2), Entire slope (1), Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Ridge top (1)

Large Rock: Mean 2.0%, Range 0 – 41%

Small Rock: Mean 6.2%, Range 0 – 59%

Fines Cover: Mean 54.9%, Range 5 – 96%

Litter Cover: Mean 34.3%, Range 0 – 93%

Soil Texture (field assessed): Medium to very fine, loamy sand (2)

Geology (field or map data): Sedimentary (18), Shale and other sedimentary (6), Franciscan melange (4), Sandstone, shale, and gravel deposits (4), Sandstone (2), General volcanic extrusives (1), Serpentine (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (6), Eastern Hills (3), Western Diablo Range (3), East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This alliance has high non-native plant cover (average 66.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Lolium perenne*, *Trifolium hirtum*, *Vicia sativa*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Chlorogalum pomeridianum – (*Triteleia laxa* – *Perideridia kelloggii*)

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* alliance

Eriogonum nudum

Grindelia camporum – Annual Grass – Forb

Heterotheca sessiliflora Upland

Viola pedunculata – (*Eschscholzia californica* – *Nassella pulchra*)

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Kittel et al. 2012, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2023, VegCAMP 2010

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=39; Alameda County (n=14): LLNL073, PRRP004, PRRP007

Contra Costa County (n=25): ALCC531, ALCC573, ALCC586, ALCC593, ALCC802, JOMU013

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Avena barbata</i>	79	6.7	0.2	45.0	Y			Y
H	<i>Bromus hordeaceus</i>	69	2.7	0.1	13.0				Y
H	<i>Bromus diandrus</i>	67	4.1	0.1	30.0				Y
H	<i>Lolium perenne</i>	62	3.1	0.1	25.0				Y
H	<i>Grindelia camporum</i>	51	2.5	0.2	18.0				Y
H	<i>Chlorogalum pomeridianum</i>	46	1.3	0.1	14.0				
H	<i>Triteleia laxa</i>	46	0.4	0.1	6.0				
H	<i>Achillea millefolium</i>	44	0.6	0.2	4.0				
H	<i>Nassella pulchra</i>	41	0.2	0.1	2.0				
H	<i>Carduus pycnocephalus</i>	38	0.4	0.2	7.0				
H	<i>Erodium botrys</i>	36	1.3	0.1	15.0				
H	<i>Trifolium hirtum</i>	36	0.4	0.1	6.0				
H	<i>Geranium dissectum</i>	33	0.3	0.1	6.0				
H	<i>Eriogonum nudum</i>	26	1.0	0.2	10.0				
H	<i>Bromus madritensis</i>	26	0.8	0.2	14.0				
H	<i>Poa secunda</i>	26	0.2	0.2	2.0				
H	<i>Holocarpha virgata</i>	26	0.1	0.1	2.0				
H	<i>Geranium molle</i>	26	0.1	0.1	1.0				
H	<i>Viola pedunculata</i>	23	2.3	0.2	26.0				
H	<i>Bromus rubens</i>	23	0.9	0.2	14.0				
H	<i>Vulpia bromoides</i>	23	0.7	0.2	12.0				
H	<i>Erodium cicutarium</i>	23	0.2	0.1	5.0				
H	<i>Vicia sativa</i>	23	0.1	0.1	1.0				
H	<i>Dichelostemma capitatum</i>	23	0.0	0.1	0.2				
H	<i>Brassica nigra</i>	21	0.3	0.2	8.0				
H	<i>Melica californica</i>	21	0.2	0.1	3.0				
H	<i>Lupinus bicolor</i>	21	0.1	0.1	2.0				
H	<i>Eschscholzia californica</i>	21	0.1	0.1	1.0				
H	<i>Sanicula bipinnata</i>	21	0.1	0.1	1.0				
H	<i>Elymus caput-medusae</i>	21	0.1	0.1	1.0				
NV	Moss	23	0.2	0.1	5.0				

***Chlorogalum pomeridianum* – (*Triteleia laxa* – *Perideridia kelloggii*) Provisional Association**

Common Name: Wavyleaf Soap Plant – (Ithuriel's Spear – Kellogg's Yampah) Patches

Alliance: *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Local Vegetation Description

The Wavyleaf Soap Plant – (Ithuriel's Spear – Kellogg's Yampah) Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Chlorogalum pomeridianum*, and *Triteleia laxa*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, *Grindelia camporum*, and *Lolium perenne*, and herbs that are sometimes present include *Achillea millefolium*, *Achyrrachaena mollis*, *Bellardia trixago*, *Bromus madritensis*, *Bromus rubens*, *Carduus pycnocephalus*, *Elymus caput-medusae*, *Epilobium brachycarpum*, *Geranium dissectum*, *Geranium molle*, *Hordeum marinum*, *Nassella pulchra*, *Perideridia kelloggii*, *Poa secunda*, *Ranunculus californicus*, *Torilis arvensis*, *Torilis nodosa*, *Vicia sativa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.8	0.5 – 1
Shrub	0.1	0 – 1	1.5	1 – 2
Herb	40.8	23 – 65	0.7	0 – 2

Local Environmental Description

Elevation: Mean 323 m, Range 61 – 490 m

Aspect: NE (5), NW (3), SE (1)

Slope: Mean 19 degrees, Range 12 – 29 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Lower 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.3%, Range 0 – 1%

Small Rock: Mean 1.0%, Range 0 – 4%

Fines Cover: Mean 45.2%, Range 5 – 82%

Litter Cover: Mean 46.2%, Range 5 – 93%

Soil Texture (field assessed): Moderately fine clay loam (5), Fine silty clay (1), Medium silt loam (1)

Geology (field or map data): Sedimentary (6), Shale and other sedimentary (2), General volcanic extrusives (1)

Alameda County Subsections: None

Chlorogalum pomeridianum – (*Triteleia laxa* – *Perideridia kelloggii*) Provisional Association

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Contra Costa County Subsections: Suisun Hills and Valleys (7), East Bay Hills - Mount Diablo (2)

Site Impacts

This association has high non-native plant cover (average 66.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Elymus caput-medusae*, *Geranium dissectum*, *Geranium molle*, *Hordeum marinum*, *Lolium perenne*, *Torilis arvensis*, *Torilis nodosa*, *Vicia sativa*, and *Vicia villosa*.

Classification Comments

This association is newly described here and remains provisional until additional samples are available.

References: None

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=9; Alameda County (n=0):

Contra Costa County (n=9): ALCC306, ALCC315, ALCC320, ALCC359, ALCC413, ALCC442, ALCC529, ALCC586, JOMU013

Chlorogalum pomeridianum – (*Triteleia laxa* – *Perideridia kelloggii*) Provisional Association

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Chlorogalum pomeridianum</i>	89	5.1	0.1	14.0	Y			Y
H	<i>Avena barbata</i>	78	5.7	0.2	18.0	Y			Y
H	<i>Triteleia laxa</i>	78	1.4	0.2	6.0	Y			Y
H	<i>Lolium perenne</i>	67	3.2	0.2	15.0				Y
H	<i>Bromus hordeaceus</i>	67	1.6	0.2	13.0				Y
H	<i>Bromus diandrus</i>	56	2.7	0.2	10.0				Y
H	<i>Grindelia camporum</i>	56	1.6	1.0	5.0				Y
H	<i>Perideridia kelloggii</i>	44	2.9	1.0	10.0				
H	<i>Carduus pycnocephalus</i>	44	1.1	0.2	7.0				
H	<i>Torilis arvensis</i>	44	0.6	0.2	3.0				
H	<i>Geranium dissectum</i>	44	0.5	0.2	2.0				
H	<i>Bromus madritensis</i>	33	2.8	1.0	14.0				
H	<i>Bromus rubens</i>	33	1.8	0.2	10.0				
H	<i>Achillea millefolium</i>	33	0.4	0.2	3.0				
H	<i>Poa secunda</i>	33	0.3	0.2	2.0				
H	<i>Achyrrachaena mollis</i>	33	0.2	0.2	1.0				
H	<i>Hordeum marinum</i>	33	0.1	0.2	0.2				
H	<i>Elymus caput-medusae</i>	33	0.1	0.2	0.2				
H	<i>Geranium molle</i>	33	0.1	0.1	0.2				
H	<i>Torilis nodosa</i>	22	0.0	0.2	0.2				
H	<i>Vicia sativa</i>	22	0.0	0.2	0.2				
H	<i>Bellardia trixago</i>	22	0.0	0.2	0.2				
H	<i>Vicia villosa</i>	22	0.0	0.2	0.2				
H	<i>Ranunculus californicus</i>	22	0.0	0.2	0.2				
H	<i>Nassella pulchra</i>	22	0.0	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	22	0.0	0.1	0.2				

Chlorogalum pomeridianum – (*Triteleia laxa* – *Perideridia kelloggii*) Provisional Association

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

***Eriogonum nudum* Association**

Common Name: Naked Buckwheat Patches

Alliance: *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Local Vegetation Description

The Naked Buckwheat Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus diandrus*, and *Eriogonum nudum*. Those herbs often present include *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Nassella pulchra*, and *Trifolium hirtum*, and herbs that are sometimes present include *Achillea millefolium*, *Brassica nigra*, *Bromus rubens*, *Chlorogalum pomeridianum*, *Erodium cicutarium*, *Eschscholzia californica*, *Geranium molle*, *Gilia tricolor*, *Holocarpha virgata*, *Logfia gallica*, *Melica californica*, *Trifolium willdenovii*, and *Triteleia laxa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.2	0.3	0 – 0.5
Herb	32.7	17 – 60	0.5	0 – 1

Local Environmental Description

Elevation: Mean 450 m, Range 81 – 977 m

Aspect: SW (3), NE (1), NW (1), SE (1)

Slope: Mean 31 degrees, Range 25 – 40 degrees

Macro Topography: Lower 1/3 of slope (2), Lower 1/3 of slope to Ridgetop (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.3%, Range 0 – 1%

Small Rock: Mean 20.1%, Range 0 – 59%

Fines Cover: Mean 48.3%, Range 7 – 95%

Litter Cover: Mean 25.2%, Range 1 – 89%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Fine sandy clay (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (2), Sandstone, shale, and gravel deposits (2), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (2), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: Suisun Hills and Valleys (2), East Bay Hills - Mount Diablo (1)

Site Impacts

This association has high non-native plant cover (average 69.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Geranium molle*, *Logfia gallica*, and *Trifolium hirtum*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Kittel et al. 2012, Klein et al. 2015, Ratchford et al. 2023a, Reyes et al. 2023, Sikes et al. 2023, VegCAMP 2010

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC522, ALCC914, PRRP007

Contra Costa County (n=3): ALCC303, ALCC378, ALCC573

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Avena barbata</i>	100	9.5	2.0	18.0	Y			Y
H	<i>Eriogonum nudum</i>	100	5.8	1.0	10.0	Y			Y
H	<i>Bromus diandrus</i>	83	5.9	0.2	30.0	Y			Y
H	<i>Bromus hordeaceus</i>	67	2.0	1.0	6.0				Y
H	<i>Trifolium hirtum</i>	67	0.9	0.2	3.0				Y
H	<i>Carduus pycnocephalus</i>	67	0.1	0.2	0.2				Y
H	<i>Erodium botrys</i>	50	2.7	4.0	7.0				Y
H	<i>Nassella pulchra</i>	50	0.4	0.2	1.0				Y
H	<i>Erodium cicutarium</i>	33	1.0	1.0	5.0				
H	<i>Logfia gallica</i>	33	0.5	1.0	2.0				
H	<i>Bromus rubens</i>	33	0.5	1.0	2.0				
H	<i>Gilia tricolor</i>	33	0.4	0.2	2.0				
H	<i>Achillea millefolium</i>	33	0.4	0.2	2.0				
H	<i>Holocarpha virgata</i>	33	0.4	0.2	2.0				
H	<i>Eschscholzia californica</i>	33	0.2	0.2	1.0				
H	<i>Melica californica</i>	33	0.2	0.2	1.0				
H	<i>Trifolium willdenovii</i>	33	0.2	0.1	1.0				
H	<i>Geranium molle</i>	33	0.1	0.2	0.2				
H	<i>Brassica nigra</i>	33	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	33	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	33	0.1	0.1	0.2				

***Grindelia camporum* – Annual Grass – Forb Provisional Association**

Common Name: Great Valley Gumweed – Annual Grass – Forb Patches

Alliance: *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Local Vegetation Description

The Great Valley Gumweed – Annual Grass – Forb Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata* and *Grindelia camporum*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, and *Lolium perenne*, and herbs that are sometimes present include *Achillea millefolium*, *Bellardia trixago*, *Brassica nigra*, *Bromus madritensis*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Hordeum murinum*, *Medicago polymorpha*, *Nassella pulchra*, *Trifolium hirtum*, *Triteleia laxa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	43.9	28 – 60	0.6	0 – 2

Local Environmental Description

Elevation: Mean 261 m, Range 109 – 466 m

Aspect: NW (6), NE (3), SW (1)

Slope: Mean 15 degrees, Range 5 – 28 degrees

Macro Topography: Lower 1/3 of slope (3), Upper 1/3 of slope (3), Middle 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 0.0%, Range 0 – 0.4%

Small Rock: Mean 0.2%, Range 0 – 2%

Fines Cover: Mean 52.9%, Range 5 – 96%

Litter Cover: Mean 44.9%, Range 3 – 93%

Soil Texture (field assessed): Moderately fine clay loam (6), Clay, (class unknown) (1), Medium loam (1), Medium silt (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (6), Shale and other sedimentary (3)

Alameda County Subsections: Eastern Hills (2)

Contra Costa County Subsections: Suisun Hills and Valleys (7), East Bay Hills - Mount Diablo (1)

Site Impacts

This association has high non-native plant cover (average 77.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Hordeum murinum*, *Lolium perenne*, *Trifolium hirtum*, and *Vicia villosa*.

Classification Comments

This association is newly described here and remains provisional until additional samples are available in other regions.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=10; Alameda County (n=2): ALCC558, ALCC597

Contra Costa County (n=8): ALCC305, ALCC316, ALCC317, ALCC363, ALCC528, ALCC530, ALCC593, ALCC802

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Grindelia camporum</i>	100	7.1	2.0	18.0	Y			Y
H	<i>Avena barbata</i>	80	8.1	0.2	45.0	Y			Y
H	<i>Lolium perenne</i>	70	5.2	0.2	25.0				Y
H	<i>Bromus hordeaceus</i>	70	3.4	0.2	13.0				Y
H	<i>Bromus diandrus</i>	60	5.3	0.2	29.0				Y
H	<i>Hordeum murinum</i>	40	0.6	0.2	5.0				
H	<i>Nassella pulchra</i>	40	0.4	0.2	2.0				
H	<i>Medicago polymorpha</i>	40	0.2	0.2	1.0				
H	<i>Brassica nigra</i>	30	0.9	0.2	8.0				
H	<i>Achillea millefolium</i>	30	0.5	0.2	4.0				
H	<i>Bromus madritensis</i>	30	0.4	0.2	3.0				
H	<i>Vicia villosa</i>	30	0.3	0.2	3.0				
H	<i>Carduus pycnocephalus</i>	30	0.2	0.2	2.0				
H	<i>Trifolium hirtum</i>	30	0.2	0.2	1.0				
H	<i>Chlorogalum pomeridianum</i>	30	0.1	0.2	1.0				
H	<i>Triteleia laxa</i>	30	0.1	0.2	0.2				
H	<i>Bellardia trixago</i>	30	0.1	0.2	0.2				

Grindelia camporum – Annual Grass – Forb Provisional Association
Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

***Heterotheca sessiliflora* Upland Provisional Association**

Common Name: Goldenaster Patches

Alliance: *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Local Vegetation Description

The Goldenaster Association forms an open to intermittent herbaceous layer. The shrub layer is open and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus diandrus*, *Eriogonum nudum*, and *Heterotheca sessiliflora*. Those herbs often present include *Brachypodium distachyon*, *Bromus hordeaceus*, *Erodium botrys*, *Eschscholzia californica*, *Grindelia camporum*, *Logfia gallica*, *Melica californica*, and *Trifolium hirtum*, and herbs that are sometimes present include *Achillea millefolium*, *Avena fatua*, *Brassica nigra*, *Bromus madritensis*, *Bromus rubens*, *Castilleja exserta*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Croton setigerus*, *Dichelostemma capitatum*, *Epilobium canum*, *Erodium cicutarium*, *Hirschfeldia incana*, *Lolium perenne*, *Lomatium dasycarpum*, *Monardella villosa*, *Nassella cernua*, *Nassella pulchra*, *Sanicula bipinnata*, *Sanicula bipinnatifida*, *Selaginella bigelovii*, *Silene gallica*, *Sonchus oleraceus*, *Trifolium gracilentum*, *Trifolium willdenovii*, *Triteleia laxa*, *Uropappus lindleyi*, *Vicia sativa*, and *Viola pedunculata*. Commonly associated emergent shrubs at sparse cover include *Gutierrezia californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	1.4	0 – 4	0.3	0 – 0.5
Herb	37.3	29 – 45	0.4	0 – 1

Local Environmental Description

Elevation: Mean 488 m, Range 477 – 498 m

Aspect: SW (2), NW (1)

Slope: Mean 24 degrees, Range 21 – 27 degrees

Macro Topography: Ridge top (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 20.5%, Range 0 – 41%

Small Rock: Mean 10.6%, Range 1 – 20%

Fines Cover: Mean 67.2%, Range 30 – 88%

Litter Cover: Mean 7.0%, Range 5 – 10%

Soil Texture (field assessed): Medium to very fine, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone (2), Sedimentary (1)

Heterotheca sessiliflora Upland Provisional Association
Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 64.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Logfia gallica*, *Lolium perenne*, *Silene gallica*, *Sonchus oleraceus*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

This association is newly described here and remains provisional until additional samples are available.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; **Alameda County (n=2):** ALCC075, LLNL073

Contra Costa County (n=1): ALCC374

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Gutierrezia californica</i>	67	0.4	0.2	1.0				Y
S	<i>Lotus scoparius</i>	33	1.0	3.0	3.0				
S	<i>Artemisia californica</i>	33	0.1	0.2	0.2				
S	<i>Lupinus albifrons</i> var. <i>collinus</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	10.3	1.0	20.0	Y			Y
H	<i>Heterotheca sessiliflora</i>	100	8.0	3.0	12.0	Y			Y
H	<i>Avena barbata</i>	100	5.7	4.0	8.0	Y			Y
H	<i>Eriogonum nudum</i>	100	0.7	0.2	1.0	Y			Y
H	<i>Erodium botrys</i>	67	6.0	3.0	15.0				Y
H	<i>Brachypodium distachyon</i>	67	3.3	3.0	7.0				Y
H	<i>Bromus hordeaceus</i>	67	1.7	2.0	3.0				Y
H	<i>Eschscholzia californica</i>	67	0.4	0.2	1.0				Y
H	<i>Grindelia camporum</i>	67	0.4	0.2	1.0				Y
H	<i>Logfia gallica</i>	67	0.1	0.2	0.2				Y

Heterotheca sessiliflora Upland Provisional Association
Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Melica californica</i>	67	0.1	0.1	0.2				Y
H	<i>Trifolium hirtum</i>	67	0.1	0.1	0.2				Y
H	<i>Selaginella bigelovii</i>	33	1.7	5.0	5.0				
H	<i>Achillea millefolium</i>	33	0.7	2.0	2.0				
H	<i>Clarkia purpurea</i>	33	0.3	1.0	1.0				
H	<i>Amsinckia</i> sp.	33	0.3	1.0	1.0				
H	<i>Monardella villosa</i>	33	0.1	0.2	0.2				
H	<i>Nassella cernua</i>	33	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	33	0.1	0.2	0.2				
H	<i>Silene gallica</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnatifida</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	33	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	33	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	33	0.1	0.2	0.2				
H	<i>Centaurea solstitialis</i>	33	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	33	0.1	0.2	0.2				
H	<i>Avena fatua</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	33	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	33	0.1	0.2	0.2				
H	<i>Navarretia</i> sp.	33	0.1	0.2	0.2				
H	<i>Phacelia</i> sp.	33	0.1	0.2	0.2				
H	<i>Brassica nigra</i>	33	0.1	0.2	0.2				
H	<i>Uropappus lindleyi</i>	33	0.1	0.2	0.2				
H	<i>Epilobium canum</i>	33	0.1	0.2	0.2				
H	<i>Viola pedunculata</i>	33	0.1	0.2	0.2				
H	<i>Castilleja exserta</i>	33	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Lomatium dasycarpum</i>	33	0.1	0.2	0.2				
H	<i>Calystegia</i> sp.	33	0.1	0.2	0.2				
H	<i>Gilia</i> sp.	33	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	33	0.1	0.2	0.2				
NV	Moss	33	0.7	2.0	2.0				
NV	Lichen	33	0.1	0.2	0.2				

Heterotheca sessiliflora Upland Provisional Association
Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

***Viola pedunculata* – (*Eschscholzia californica* – *Nassella pulchra*) Provisional Association**

Common Name: Johnny Jump-up – (California Poppy – Purple Needle Grass) Patches

Alliance: *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Local Vegetation Description

The Johnny Jump-up – (California Poppy – Purple Needle Grass) Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Lolium perenne*, *Sidalcea malviflora*, and *Viola pedunculata*. Those herbs often present include *Aphanes occidentalis*, *Avena barbata*, *Claytonia perfoliata*, *Dichelostemma capitatum*, *Elymus multisetus*, *Erodium cicutarium*, *Geranium dissectum*, *Holocarpha virgata*, *Nassella pulchra*, *Poa secunda*, *Ranunculus californicus*, *Sherardia arvensis*, *Trifolium willdenovii*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	39.6	30 – 50	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 525 m, Range 159 – 782 m

Aspect: NE (5), NW (2), SW (1)

Slope: Mean 17 degrees, Range 4 – 23 degrees

Macro Topography: Upper 1/3 of slope (5), Entire slope (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 3.4%, Range 0 – 12%

Fines Cover: Mean 65.7%, Range 34 – 92%

Litter Cover: Mean 27.9%, Range 3 – 65%

Soil Texture (field assessed): Moderately fine clay loam (4), Moderately fine sandy clay loam (2), Medium to very fine, loamy sand (1), Not recorded (1)

Geology (field or map data): Franciscan melange (2), Sandstone, shale, and gravel deposits (2), Sedimentary (2), Serpentine (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5), East Bay Hills - Mount Diablo (1), Western Diablo Range (1)

Viola pedunculata – (*Eschscholzia californica* – *Nassella pulchra*) Provisional Association

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 51.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Crepis vesicaria*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex acetosella*, *Sherardia arvensis*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

This association remains provisional due to limited sampling throughout its expected range.

References: Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=8; Alameda County (n=7): ALCC408, ALCC566, ALCC569, ALCC570, ALCC572, ALCC912, PRRP004

Contra Costa County (n=1): ALCC418

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Viola pedunculata</i>	100	11.3	4.0	26.0	Y			Y
H	<i>Bromus hordeaceus</i>	88	4.8	0.1	12.0	Y			Y
H	<i>Lolium perenne</i>	75	2.4	0.1	10.0	Y			Y
H	<i>Erodium botrys</i>	75	1.4	0.1	5.0	Y			Y
H	<i>Bromus diandrus</i>	75	0.8	0.1	4.0	Y			Y
H	<i>Achillea millefolium</i>	75	0.8	0.2	2.0	Y			Y
H	<i>Sidalcea malviflora</i>	75	0.5	0.1	2.0	Y			Y
H	<i>Avena barbata</i>	63	3.1	1.0	9.0				Y
H	<i>Vulpia bromoides</i>	63	3.0	1.0	12.0				Y
H	<i>Holocarpha virgata</i>	63	0.3	0.1	2.0				Y
H	<i>Nassella pulchra</i>	63	0.2	0.1	1.0				Y
H	<i>Geranium dissectum</i>	63	0.1	0.1	0.2				Y
H	<i>Dichelostemma capitatum</i>	63	0.1	0.1	0.2				Y

Viola pedunculata – (*Eschscholzia californica* – *Nassella pulchra*) Provisional Association

Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Trifolium willdenovii</i>	50	0.5	0.1	3.0				Y
H	<i>Sherardia arvensis</i>	50	0.3	0.2	2.0				Y
H	<i>Elymus multisetus</i>	50	0.3	0.1	2.0				Y
H	<i>Claytonia perfoliata</i>	50	0.2	0.2	1.0				Y
H	<i>Poa secunda</i>	50	0.2	0.2	1.0				Y
H	<i>Clarkia</i> sp.	50	0.2	0.1	1.0				Y
H	<i>Erodium cicutarium</i>	50	0.1	0.1	0.2				Y
H	<i>Aphanes occidentalis</i>	50	0.1	0.1	0.2				Y
H	<i>Ranunculus californicus</i>	50	0.1	0.1	0.2				Y
H	<i>Corethrogyne filaginifolia</i>	38	1.3	0.1	10.0				
H	<i>Trifolium hirtum</i>	38	0.8	0.2	6.0				
H	<i>Crepis vesicaria</i>	38	0.4	0.2	2.0				
H	<i>Sisyrinchium bellum</i>	38	0.2	0.2	1.0				
H	<i>Elymus caput-medusae</i>	38	0.2	0.1	1.0				
H	<i>Micropus californicus</i>	38	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	38	0.1	0.1	0.2				
H	<i>Chlorogalum pomeridianum</i>	38	0.1	0.1	0.2				
H	<i>Epilobium brachycarpum</i>	38	0.1	0.1	0.2				
H	<i>Lupinus bicolor</i>	38	0.1	0.1	0.2				
H	<i>Sanicula bipinnata</i>	38	0.1	0.1	0.2				
H	<i>Hypochaeris glabra</i>	38	0.1	0.1	0.2				
H	<i>Perideridia kelloggii</i>	25	0.4	0.2	3.0				
H	<i>Trifolium subterraneum</i>	25	0.4	1.0	2.0				
H	<i>Carduus pycnocephalus</i>	25	0.2	0.2	1.0				
H	<i>Trifolium dubium</i>	25	0.1	0.2	0.2				
H	<i>Achyraea mollis</i>	25	0.1	0.2	0.2				
H	<i>Geranium molle</i>	25	0.0	0.1	0.2				
H	<i>Rumex acetosella</i>	25	0.0	0.1	0.2				
H	<i>Clarkia purpurea</i>	25	0.0	0.1	0.2				
H	<i>Calystegia subacaulis</i>	25	0.0	0.1	0.2				
H	<i>Bromus carinatus</i>	25	0.0	0.1	0.2				
H	<i>Vicia sativa</i>	25	0.0	0.1	0.1				
H	<i>Vicia villosa</i>	25	0.0	0.1	0.1				
NV	Moss	50	0.7	0.2	5.0				Y

Viola pedunculata – (*Eschscholzia californica* – *Nassella pulchra*) Provisional Association
Corethrogyne filaginifolia – *Eriogonum (elongatum, nudum)* Herbaceous Alliance
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***Cortaderia (jubata, selloana)* Herbaceous Semi-Natural Alliance**



Common Name: Pampas grass patches

NVC Alliance Code: A1203. *Cortaderia jubata* - *Cortaderia selloana* Ruderal
Grassland Alliance

Statewide Description

Cortaderia jubata or *Cortaderia selloana* is dominant in the herbaceous and shrub canopies. Emergent trees and shrubs may be present at low cover. Stands of *Cortaderia* invade coastal bluff and coastal scrub stands of *Artemisia californica*, *Baccharis pilularis*, and *Eriogonum fasciculatum* alliances and in disturbed openings. They grow in moist, open forest stands and infest inland riparian stands in the Great Valley.

Local Vegetation Description

The Pampas grass patches Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is low and the tree layer is sparse. Dominant herbs include *Cortaderia jubata* and *Cortaderia selloana*. Those herbs often present include *Cortaderia selloana*, *Euthamia occidentalis*, and *Lepidium latifolium*, and herbs that are sometimes present include *Ambrosia psilostachya*, *Brassica nigra*, *Calystegia sepium*, *Carduus pycnocephalus*, *Conium maculatum*, *Conyza canadensis*, *Cortaderia jubata*, *Lotus corniculatus*, *Phragmites australis*, and *Schoenoplectus americanus*. Commonly associated emergent trees at sparse cover include *Aesculus californica*. Commonly associated emergent shrubs at open cover include *Rubus armeniacus*.

Lifeform	Cover (%)	Cover (%)	Height (m)	Height (m)
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	Mean	Range	Mean	Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 0.2	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	7.5	5 – 10
Shrub	5.0	0 – 10	1.1	0.5 – 2
Herb	68.7	43 – 100	2.1	0.5 – 5

Local Membership Rule

Cortaderia jubata or *Cortaderia selloana* > 50% relative cover in naturalized stands, or > 30% relative cover with other non-native plants. Overall non-native cover is > 90% relative cover.

Local Environmental Description

Elevation: Mean 43 m, Range 1 – 126 m

Aspect: Flat (2), SE (1)

Slope: Mean 13 degrees, Range 0 – 40 degrees

Macro Topography: Bottom (2), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.3%, Range 0 – 4%

Fines Cover: Mean 32.7%, Range 0 – 79%

Litter Cover: Mean 33.3%, Range 5 – 80%

Soil Texture (field assessed): Medium silt loam (1), Peat (1), Medium loam (1)

Geology (field or map data): Alluvium (1), Clayey alluvium (1), General igneous intrusives (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Other Subsections: Delta (1), Suisun Hills and Valleys (1)

Site Impacts

This alliance has high non-native plant cover (average 81.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Carduus pycnocephalus*, *Conium maculatum*, *Cortaderia jubata*, *Cortaderia selloana*, *Genista monspessulana*, *Lepidium latifolium*, *Lotus corniculatus*, and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Cortaderia (jubata, selloana)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC434

Contra Costa County (n=0):

Sacramento Co. (n=1): SSJD0352

Solano Co. (n=1): SUMA9133

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Aesculus californica</i>	33	0.1	0.2	0.2				
S	<i>Rubus armeniacus</i>	33	1.7	5.0	5.0				
S	<i>Artemisia californica</i>	33	1.7	5.0	5.0				
S	<i>Genista monspessulana</i>	33	0.7	2.0	2.0				
S	<i>Baccharis pilularis</i>	33	0.3	1.0	1.0				
S	<i>Salvia mellifera</i>	33	0.3	1.0	1.0				
S	<i>Diplacus aurantiacus</i>	33	0.1	0.2	0.2				
H	<i>Cortaderia selloana</i>	67	42.7	35.0	93.0				Y
H	<i>Euthamia occidentalis</i>	67	1.3	1.0	3.0				Y
H	<i>Lepidium latifolium</i>	67	0.7	0.2	2.0				Y
H	<i>Cortaderia jubata</i>	33	13.3	40.0	40.0				
H	<i>Phragmites australis</i>	33	6.7	20.0	20.0				
H	<i>Schoenoplectus americanus</i>	33	1.3	4.0	4.0				
H	<i>Carduus pycnocephalus</i>	33	0.7	2.0	2.0				
H	<i>Lotus corniculatus</i>	33	0.7	2.0	2.0				
H	<i>Ambrosia psilostachya</i>	33	0.4	1.2	1.2				
H	<i>Conium maculatum</i>	33	0.3	1.0	1.0				
H	<i>Brassica nigra</i>	33	0.1	0.2	0.2				
H	<i>Calystegia sepium</i>	33	0.1	0.2	0.2				
H	<i>Conyza canadensis</i>	33	0.1	0.2	0.2				

***Cortaderia (jubata, selloana)* Provisional Semi-Natural Association**

Common Name: Pampas Grass Patches

Alliance: *Cortaderia (jubata, selloana)* Herbaceous Semi-Natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. It remains a provisional association due to low overall sample size. See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

***Cressa truxillensis* – *Distichlis spicata* Herbaceous Alliance**



Common Name: Alkali weed – saltgrass playas and sinks

NVC Alliance Code: A4180. *Cressa truxillensis* - *Distichlis spicata* Vernal Pool Alliance

Statewide Description

Cressa truxillensis and *Distichlis spicata* are characteristically present and *Crypsis schoenoides* may be dominant or co-dominant in the herbaceous layer with *Atriplex persistens*, *Bolboschoenus maritimus*, *Chamaesyce hooveri*, *Downingia insignis*, *Eleocharis macrostachya*, *Eryngium aristulatum*, *Eryngium vaseyi*, *Frankenia salina*, *Malvella laprosa*, *Marsilea vestita*, *Navarretia leucocephala*, *Neostapfia colusana*, *Orcuttia pilosa*, *Phyla nodiflora*, *Plagiobothrys stipitatus*, *Polypogon maritimus*, *Psilocarphus brevissimus*, *Tuctoria greenei*, and *Tuctoria mucronata*.

Barbour et al. (2003, 2007b) recognized the *Downingia* - *Lasthenia* class that includes California vernal pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within the class, Barbour et al. (2007b) included this alliance of alkali playas and sinks with the *Lasthenia fremontii* - *Distichlis spicata* alliance of alkali vernal pools, as both contain halophytes. This alliance typically lacks diagnostic vernal pool taxa, such as *Lasthenia fremontii*, *Plagiobothrys stipitatus*,

and *Psilocarphus brevissimus*, but it often includes rare plants traditionally considered as vernal pool taxa, including *Chamaesyce hooveri*, *Neostapfia colusana*, *Orcuttia pilosa*, *Tuctoria greenei*, and *T. mucronata* (CNPS 2007, USFWS 2004).

Barbour et al. (2007b) recognized several community types that we provisionally place in this alliance. Surveys representing each type came from only one location, and diagnostic species were unique to each type; usually they were rare species. Most stands also contained a strong presence of the non-native *Crypsis schoenoides*, and some contain the non-natives *Amaranthus albus*, *Bassia hyssopifolia*, and/or *Polypogon monspeliensis*. Stands appear very similar to those of the *Lasthenia fremontii* - *Distichlis spicata* alliance, but we include these rare types in this alliance until more sampling and data analysis occurs.

Local Vegetation Description

The Alkali weed – saltgrass playas and sinks Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Cressa truxillensis*, *Distichlis spicata*, *Hordeum marinum*, *Lolium perenne*, and *Polypogon monspeliensis*. Those herbs often present include *Atriplex prostrata*, *Bromus hordeaceus*, *Grindelia camporum*, *Hypochaeris glabra*, *Lactuca serriola*, and *Rumex crispus*, and herbs that are sometimes present include *Amaranthus albus*, *Atriplex argentea* ssp. *expansa*, *Bromus diandrus*, *Centromadia pungens* ssp. *pungens*, *Cotula coronopifolia*, *Croton setigerus*, *Eleocharis macrostachya*, *Euthamia occidentalis*, *Frankenia salina*, *Heliotropium curassavicum*, *Hirschfeldia incana*, *Lepidium latifolium*, *Lythrum hyssopifolium*, *Malvella leprosa*, *Medicago polymorpha*, *Melilotus albus*, *Phalaris minor*, *Sesuvium verrucosum*, *Sonchus oleraceus*, *Vicia villosa*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	57.0	37 – 75	0.4	0 – 1

Local Membership Rule

Halophytes such as *Cressa truxillensis*, *Distichlis spicata*, *Hordeum depressum*, and *Malvella leprosa* characterize the herbaceous layer with a variety of other native and non-native herbs such as *Hordeum marinum* and *Frankenia salina*. Stands occur in alkaline-wet vernal pools / playa areas

Local Environmental Description

Elevation: Mean 24 m, Range 2 – 68 m

Aspect: Flat (2), NE (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (3), Middle to Upper 1/3 of slope (1)

Large Rock: 0%
Small Rock: 0%
Fines Cover: Mean 59.0%, Range 4 – 98%
Litter Cover: Mean 39.0%, Range 0 – 94%

Soil Texture (field assessed): Medium silt loam (2), Moderately fine clay loam (2)

Geology (field or map data): Alluvium (2), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (2)

Other Subsections: Delta (1)

Site Impacts

This alliance has high non-native plant cover (average 72.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Amaranthus albus*, *Atriplex prostrata*, *Bromus diandrus*, *Bromus hordeaceus*, *Cotula coronopifolia*, *Hirschfeldia incana*, *Hordeum marinum*, *Hypochaeris glabra*, *Lactuca serriola*, *Lepidium latifolium*, *Lolium perenne*, *Lythrum hyssopifolium*, *Phalaris minor*, *Polypogon monspeliensis*, *Rumex crispus*, *Sonchus oleraceus*, *Vicia villosa*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Cressa truxillensis

Cressa truxillensis – *Distichlis spicata*

Cressa truxillensis – *Distichlis spicata* alliance

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Rodriguez et al. 2017

Global Rarity Rank: G2

State Rarity Rank: S2

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=3): ALCC451, ALCC527, ALCC810

Sacramento Co. (n=1): SSJD0311

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	19.6	0.2	55.0	Y			Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum marinum</i>	75	15.0	3.0	35.0	Y			Y
H	<i>Cressa truxillensis</i>	75	7.8	6.0	14.0	Y			Y
H	<i>Distichlis spicata</i>	75	7.0	2.0	22.0	Y			Y
H	<i>Polypogon monspeliensis</i>	75	0.4	0.2	1.0	Y			Y
H	<i>Lactuca serriola</i>	50	1.1	0.2	4.0				Y
H	<i>Bromus hordeaceus</i>	50	0.8	1.0	2.0				Y
H	<i>Grindelia camporum</i>	50	0.3	0.1	1.0				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex crispus</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.1	0.2				Y
H	<i>Crypsis</i> sp.	25	6.3	25.0	25.0				
H	<i>Frankenia salina</i>	25	3.5	14.0	14.0				
H	<i>Medicago polymorpha</i>	25	1.3	5.0	5.0				
H	<i>Amaranthus albus</i>	25	1.0	4.0	4.0				
H	<i>Bromus diandrus</i>	25	0.5	2.0	2.0				
H	<i>Vulpia bromoides</i>	25	0.5	2.0	2.0				
H	<i>Atriplex argentea</i> ssp. <i>expansa</i>	25	0.3	1.0	1.0				
H	<i>Vulpia myuros</i>	25	0.3	1.0	1.0				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				
H	<i>Malvella leprosa</i>	25	0.1	0.2	0.2				
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	25	0.1	0.2	0.2				
H	<i>Cotula coronopifolia</i>	25	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	25	0.1	0.2	0.2				
H	<i>Heliotropium curassavicum</i>	25	0.1	0.2	0.2				
H	<i>Lepidium latifolium</i>	25	0.1	0.2	0.2				
H	<i>Melilotus albus</i>	25	0.1	0.2	0.2				
H	<i>Vicia villosa</i>	25	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	25	0.1	0.2	0.2				
H	<i>Phalaris minor</i>	25	0.1	0.2	0.2				
H	<i>Sesuvium verrucosum</i>	25	0.1	0.2	0.2				
H	<i>Euthamia occidentalis</i>	25	0.1	0.2	0.2				
H	<i>Eleocharis macrostachya</i>	25	0.0	0.1	0.1				
H	<i>Lythrum hyssopifolium</i>	25	0.0	0.1	0.1				

***Cressa truxillensis* Provisional Association**

Common Name: Alkali Weed Patches

Alliance: *Cressa truxillensis* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Alkali Weed Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Hordeum marinum*, and characteristic herbs include *Bromus hordeaceus*, *Cressa truxillensis*, *Frankenia salina*, *Hypochaeris glabra*, *Lolium perenne*, *Malvella leprosa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	46.0	46 – 46	0.3	0 – 0.5

Local Environmental Description

Elevation: 68 m

Aspect: SE (1)

Slope: 1 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 61%

Litter Cover: 37%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 53.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, *Hypochaeris glabra*, *Lolium perenne*, and *Vicia villosa*.

Classification Comments

This association remains provisional due to low overall sample size.

References: Rodriguez et al. 2017

Cressa truxillensis Provisional Association
Cressa truxillensis – *Distichlis spicata* Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC810

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum marinum</i>	100	22.0	22.0	22.0	Y		Y	Y
H	<i>Cressa truxillensis</i>	100	14.0	14.0	14.0	Y			Y
H	<i>Frankenia salina</i>	100	14.0	14.0	14.0	Y			Y
H	<i>Lolium perenne</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Hypochaeris glabra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vicia villosa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Malvella leprosa</i>	100	0.2	0.2	0.2	Y			Y

***Cressa truxillensis* – *Distichlis spicata* Provisional Association**

Common Name: Alkali Weed – Saltgrass Patches

Alliance: *Cressa truxillensis* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Alkali Weed – Saltgrass Association forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Atriplex prostrata*, *Cressa truxillensis*, *Distichlis spicata*, *Lactuca serriola*, and *Polypogon monspeliensis*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, *Centromadia pungens* ssp. *pungens*, *Cotula coronopifolia*, *Euthamia occidentalis*, *Grindelia camporum*, *Hordeum marinum*, *Hypochaeris glabra*, *Lepidium latifolium*, *Lythrum hyssopifolium*, *Medicago polymorpha*, *Melilotus albus*, *Phalaris minor*, *Rumex crispus*, *Sonchus oleraceus*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	72.5	70 – 75	0.5	0 – 1

Local Environmental Description

Elevation: 2 m

Aspect: Flat (1), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1), Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 38.5%, Range 4 – 73%

Litter Cover: Mean 59.5%, Range 25 – 94%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (1)

Site Impacts

This association has high non-native plant cover (average 75.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bromus diandrus*, *Bromus hordeaceus*, *Cotula coronopifolia*,

Cressa truxillensis – *Distichlis spicata* Provisional Association

Cressa truxillensis – *Distichlis spicata* Herbaceous Alliance

Hordeum marinum, *Hypochaeris glabra*, *Lactuca serriola*, *Lepidium latifolium*, *Lolium perenne*, *Lythrum hyssopifolium*, *Phalaris minor*, *Polypogon monspeliensis*, *Rumex crispus*, *Sonchus oleraceus*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

This association remains provisional due to low overall sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): ALCC527

Sacramento Co. (n=1): SSJD0311

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	35.0	15.0	55.0	Y		Y	Y
H	<i>Distichlis spicata</i>	100	13.0	4.0	22.0	Y			Y
H	<i>Cressa truxillensis</i>	100	8.5	6.0	11.0	Y			Y
H	<i>Lactuca serriola</i>	100	2.1	0.2	4.0	Y			Y
H	<i>Polypogon monspeliensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Atriplex prostrata</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Hordeum marinum</i>	50	17.5	35.0	35.0				Y
H	<i>Medicago polymorpha</i>	50	2.5	5.0	5.0				Y
H	<i>Vulpia bromoides</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus diandrus</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus hordeaceus</i>	50	0.5	1.0	1.0				Y
H	<i>Vulpia myuros</i>	50	0.5	1.0	1.0				Y
H	<i>Melilotus albus</i>	50	0.1	0.2	0.2				Y
H	<i>Phalaris minor</i>	50	0.1	0.2	0.2				Y
H	<i>Cotula coronopifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Euthamia occidentalis</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.2	0.2				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex crispus</i>	50	0.1	0.2	0.2				Y
H	<i>Sonchus oleraceus</i>	50	0.1	0.2	0.2				Y
H	<i>Lepidium latifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Lythrum hyssopifolium</i>	50	0.1	0.1	0.1				Y
H	<i>Grindelia camporum</i>	50	0.1	0.1	0.1				Y

***Cynodon dactylon* – *Crypsis* spp. – *Paspalum* spp. Herbaceous Semi-Natural Alliance**

Common Name: Bermudagrass – prickle grass – crowngrass turfs

NVC Alliance Code: A4081. *Cynodon dactylon* Ruderal Desert Grassland Alliance

Statewide Description

Bolboschoenus glaucus, *Cotula coronopifolia*, *Crypsis alopecuroides*, *Crypsis schoenoides*, *Crypsis vaginiflora*, *Cynodon dactylon*, *Cyperus eragrostis*, *Panicum miliaceum*, *Paspalum dilatatum*, *Paspalum vaginatum* and/or *Polypogon monspeliensis* and/or other ruderal, non-native graminoids are dominant or co-dominant together in the herbaceous.

Stands of these and other non-native invasives are common in managed wetlands, disturbed streambanks, irrigated pastures, and other disturbed sites. We need further sampling and analysis to differentiate stands of this alliance with the related *Cressa truxillensis* - *Distichlis spicata* which also can have high cover of *Crypsis schoenoides*, though this other native alliance typically has vernal pool plants as characteristic indicators (which may be lower in cover than the *Crypsis*) and at least 10% relative cover of species native to California.

Local Vegetation Description

The Bermudagrass – prickle grass – crowngrass turfs Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Echinochloa crus-galli* and *Polypogon monspeliensis*. Those herbs often present include *Atriplex prostrata*, and herbs that are sometimes present include *Cirsium vulgare*, *Cotula coronopifolia*, *Crypsis* sp., *Distichlis spicata*, *Erodium brachycarpum*, *Frankenia salina*, *Helminthotheca echioides*, *Hordeum marinum*, *Juncus arcticus*, *Lactuca serriola*, *Lotus corniculatus*, *Persicaria lapathifolia*, *Rumex conglomeratus*, *Salicornia pacifica*, *Solanum americanum*, *Sonchus oleraceus*, and *Xanthium strumarium*. Commonly associated emergent shrubs at sparse cover include *Baccharis pilularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0.2	3.5	2 – 5
Herb	80.5	50 – 100	0.3	0 – 0.5

Local Membership Rule

Crypsis spp., *Cynodon dactylon*, *Cyperus eragrostis*, *Mollugo verticillata*, *Panicum millaceum*, *Paspalum* spp., and/or other non-native plants > 90% relative cover individually or collectively in the herbaceous layer.

Local Environmental Description

Elevation: Mean 51 m, Range 1 – 152 m

Aspect: Flat (3)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (2), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 11.0%, Range 0 – 25%

Litter Cover: Mean 48.5%, Range 7 – 90%

Soil Texture (field assessed): Medium silt (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Clayey alluvium (2), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Delta (2)

Site Impacts

This alliance has high non-native plant cover (average 99.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Cirsium vulgare*, *Cotula coronopifolia*, *Echinochloa crus-galli*, *Erodium brachycarpum*, *Helminthotheca echioides*, *Hordeum marinum*, *Lactuca serriola*, *Lotus corniculatus*, *Polypogon monspeliensis*, *Rumex conglomeratus*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Cynodon dactylon – *Crypsis* spp. – *Paspalum* spp. alliance

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Boul et al. 2018, Buck-Diaz et al. 2012, Keeler-Wolf and Vaghti 2000, O'Neil and Egan 2004

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=1): JOMU027

Solano Co. (n=2): SUMA6194, SUMA9160

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	33	0.1	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	67	33.3	15.0	85.0				Y
H	<i>Atriplex prostrata</i>	67	0.4	0.2	1.0				Y
H	<i>Echinochloa crus-galli</i>	33	33.0	99.0	99.0				
H	<i>Hordeum marinum</i>	33	5.0	15.0	15.0				
H	<i>Cotula coronopifolia</i>	33	1.0	3.0	3.0				
H	<i>Rumex conglomeratus</i>	33	0.3	1.0	1.0				
H	<i>Xanthium strumarium</i>	33	0.3	1.0	1.0				
H	<i>Lotus corniculatus</i>	33	0.1	0.2	0.2				
H	<i>Cirsium vulgare</i>	33	0.1	0.2	0.2				
H	<i>Crypsis</i> sp.	33	0.1	0.2	0.2				
H	<i>Distichlis spicata</i>	33	0.1	0.2	0.2				
H	<i>Frankenia salina</i>	33	0.1	0.2	0.2				
H	<i>Helminthotheca echioides</i>	33	0.1	0.2	0.2				
H	<i>Juncus arcticus</i>	33	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	33	0.1	0.2	0.2				
H	<i>Erodium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Salicornia pacifica</i>	33	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	33	0.1	0.2	0.2				
H	<i>Solanum americanum</i>	33	0.1	0.2	0.2				
H	<i>Gnaphalium</i> sp.	33	0.1	0.2	0.2				
H	<i>Persicaria lapathifolia</i>	33	0.1	0.2	0.2				

***Deschampsia cespitosa* – *Hordeum brachyantherum* – *Danthonia californica* Herbaceous Alliance**



Common Name: Coastal tufted hair grass – Meadow barley – California oatgrass meadow

NVC Alliance Code: A4423. *Deschampsia cespitosa* - *Carex unilateralis* - *Danthonia californica* Wet Prairie Alliance

Statewide Description

Deschampsia cespitosa or *Hordeum brachyantherum* is dominant or co-dominant in the herbaceous layer with *Achillea millefolium*, *Agrostis stolonifera*, *Aira caryophyllea*, *Anthoxanthum odoratum*, *Argentina egedii*, *Carex* spp., *Cirsium vulgare*, *Danthonia californica*, *Deschampsia danthonioides*, *Distichlis spicata*, *Eleocharis acicularis*, *Eleocharis macrostachya*, *Epilobium ciliatum*, *Eryngium armatum*, *Holcus lanatus*, *Horkelia marinensis*, *Hypochaeris radicata*, *Iris douglasiana*, *Juncus arcticus*, *Juncus phaeocephalus*, *Lilaeopsis masonii*, *Lolium perenne*, *Lotus* spp., *Lupinus versicolor*, *Medicago polymorpha*, *Plantago lanceolata*, *Potentilla gracilis*, *Ranunculus californicus*, *Ranunculus flammula*, *Rumex acetosella*, *Senecio hydrophiloides*, *Sisyrinchium bellum*,

Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

Trifolium spp. and *Triglochin striata*. Emergent shrubs may be present at low cover, including *Baccharis pilularis*, *Rosa nutkana*, *Rubus* spp. and *Rubus ursinus*.

We now accept the treatment of two alliances for *D. cespitosa*, separating the coastal and lowland stands from those in higher-elevation mountain meadows. Stands along the coast and at lower elevations occur in moist, maritime climates on soils with high moisture-holding capacity or on perched water tables, whereby the associations included in this alliance have a lush growth of *Deschampsia cespitosa*, *Danthonia californica*, *Hordeum brachyantherum*, and other perennial herbs (NatureServe 2020).

Similar to *D. cespitosa*, *H. brachyantherum* has a broad temperature tolerance, enabling stands to exist adjacent to a divergent array of wetland alliances. Directly along the coast, associations of this alliance interdigitate on a fine scale with herbaceous stands of the *Calamagrostis nutkaensis*, *Festuca idahoensis* - *Danthonia californica*, *Carex obnupta*, and *Juncus* spp. alliances; and woody stands of *Baccharis pilularis*, *Pinus muricata* and *Pseudotsuga menziesii* alliances; and non-native types. Typical associated herbs include *Eleocharis macrostachya*, *Juncus balticus*, and *J. nevadensis*.

Stands of *Deschampsia cespitosa*, *Danthonia californica*, *Hordeum brachyantherum*, in montane meadows fall under the *Danthonia californica* - *Deschampsia cespitosa* - *Camassia quamash* Alliance.

Local Vegetation Description

The Coastal tufted hair grass – Meadow barley – California oatgrass meadow Alliance forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Deschampsia caespitosa*. Those herbs often present include *Cotula coronopifolia*, *Cyperus eragrostis*, *Distichlis spicata*, *Hordeum brachyantherum*, *Isolepis cernua*, *Juncus mexicanus*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, and *Rumex crispus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	40.0	18 – 62	0.8	0.5 – 1

Local Membership Rule

Deschampsia cespitosa, *Danthonia californica*, *Hordeum brachyantherum*, *Iris douglasiana*, and/or *Eryngium armatum* > 30% relative cover individually or share > 50% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 4 m

Aspect: NE (1), NW (1)

Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

Slope: 0 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Other (1)

Large Rock: Mean 1.0%, Range 0 – 2%

Small Rock: Mean 0.5%, Range 0 – 1%

Fines Cover: Mean 43.5%, Range 2 – 85%

Litter Cover: Mean 48.5%, Range 1 – 96%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1), East Bay Terraces and Alluvium (1)

Site Impacts

This alliance has moderate non-native plant cover (average 24.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cotula coronopifolia*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, and *Rumex crispus*.

Associations in Alameda & Contra Costa Counties

Deschampsia (cespitosa, holciformis)

Hordeum brachyantherum Lowland

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Kittel et al. 2012, Klein et al. 2015, Reyes et al. 2023, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: S3

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC410, ALCC436

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Deschampsia caespitosa</i>	50	27.5	55.0	55.0				Y
H	<i>Hordeum brachyantherum</i>	50	4.0	8.0	8.0				Y
H	<i>Rumex crispus</i>	50	2.5	5.0	5.0				Y
H	<i>Lolium perenne</i>	50	2.0	4.0	4.0				Y
H	<i>Juncus mexicanus</i>	50	2.0	4.0	4.0				Y
H	<i>Distichlis spicata</i>	50	1.0	2.0	2.0				Y
H	<i>Isolepis cernua</i>	50	1.0	2.0	2.0				Y
H	<i>Cotula coronopifolia</i>	50	0.5	1.0	1.0				Y
H	<i>Lythrum hyssopifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Cyperus eragrostis</i>	50	0.1	0.2	0.2				Y
H	<i>Lactuca serriola</i>	50	0.1	0.1	0.1				Y

Deschampsia (cespitosa, holciformis) Association

Common Name: Tufted Hairgrass Patches

Alliance: *Deschampsia cespitosa* – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

Local Vegetation Description

The Tufted Hairgrass Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Deschampsia cespitosa*, and characteristic herbs include *Cotula coronopifolia*, *Isolepis cernua*, and *Juncus mexicanus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	62.0	62 – 62	0.8	0.5 – 1

Local Environmental Description

Elevation: 0 m

Aspect: NW (1)

Slope: 0 degrees

Macro Topography: Other (1)

Large Rock: 2%

Small Rock: 0%

Fines Cover: 85%

Litter Cover: 1%

Soil Texture (field assessed): Medium silt loam (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1)

Site Impacts

This association has low non-native plant cover (average 1.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cotula coronopifolia*.

Classification Comments

None.

References: Buck-Diaz et al. 2020

Deschampsia (cespitosa, holciformis) Association
Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC436

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Deschampsia caespitosa</i>	100	55.0	55.0	55.0	Y	Y		Y
H	<i>Juncus mexicanus</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Isolepis cernua</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Cotula coronopifolia</i>	100	1.0	1.0	1.0	Y			Y

Deschampsia (caespitosa, holciformis) Association
Deschampsia caespitosa – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

***Hordeum brachyantherum* Lowland Association**

Common Name: Meadow Barley lowland Patches

Alliance: *Deschampsia cespitosa* – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

Local Vegetation Description

The Meadow Barley lowland Association forms an open herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Hordeum brachyantherum*, and characteristic herbs include *Cyperus eragrostis*, *Distichlis spicata*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, and *Rumex crispus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	18.0	18 – 18	0.8	0.5 – 1

Local Environmental Description

Elevation: 4 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: 2%

Litter Cover: 96%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (field or map data): no data

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Site Impacts

This association has moderate non-native plant cover (average 47.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, and *Rumex crispus*.

Classification Comments

None.

Hordeum brachyantherum Lowland Association
Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica*
Herbaceous Alliance

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Kittel et al. 2012, Klein et al. 2015, Reyes et al. 2023, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC410

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum brachyantherum</i>	100	8.0	8.0	8.0	Y		Y	Y
H	<i>Rumex crispus</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Lolium perenne</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Distichlis spicata</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Lythrum hyssopifolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Cyperus eragrostis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lactuca serriola</i>	100	0.1	0.1	0.1	Y			Y

Hordeum brachyantherum Lowland Association
Deschampsia cespitosa – *Hordeum brachyantherum* – *Danthonia californica*
 Herbaceous Alliance

***Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance**



Common Name: Saltgrass – Alkali heath Coastal

NVC Alliance Code: A2279.

Statewide Description

Distichlis spicata is dominant or co-dominant in the herbaceous layer with *Agrostis viridis*, *Ambrosia chamissonis*, *Anemopsis californica*, *Atriplex prostrata*, *Batis maritima*, *Bromus diandrus*, *Cotula coronopifolia*, *Frankenia salina*, *Hordeum brachyantherum*, *Hordeum murinum*, *Jaumea carnosa*, *Juncus arcticus*, *Leymus triticoides*, *Limonium californicum*, *Parapholis strigosa*, *Sarcocornia pacifica*, and *Triglochin maritima*.

The alliance is commonly found in saline environments with direct ocean influence along the coast of California. Zedler et al. (1999) stated that elevation profiles and vegetation patterns do not always correlate with discrete zonation in coastal marshes, but they recognize three habitats: high marsh, marsh plain, cord grass. *Distichlis spicata* vegetation types are part of the marsh plain habitat.

Local Vegetation Description

The Saltgrass – Alkali heath Coastal Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Distichlis spicata*. Those herbs often present include *Bromus diandrus* and *Salicornia pacifica*, and herbs that are sometimes present include *Bromus hordeaceus*, *Carpobrotus edulis*, *Centromadia pungens* ssp. *pungens*, *Frankenia salina*, *Grindelia*

stricta, *Hordeum murinum*, *Jaumea carnosa*, *Lepidium latifolium*, and *Limonium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.4	0 – 3	0.8	0.5 – 1
Herb	38.0	4 – 63	0.4	0 – 1

Local Membership Rule

Distichlis spicata, *Frankenia salina*, *Hordeum depressum*, and/or *Grindelia stricta* > 50% relative cover or > 30% relative cover with *Jaumea carnosa* and other saline wetland herbs. Non-native grasses including *Avena* spp. and *Bromus hordeaceus* may have high cover and *Sarcocornia pacifica* may be present at < 30% relative cover.

Local Environmental Description

Elevation: Mean 2 m, Range -1 – 7 m

Aspect: Flat (4), NE (3), SW (2), SE (1)

Slope: Mean 2 degrees, Range 0 – 10 degrees

Macro Topography: Bottom (4), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 66.3%, Range 10 – 96%

Litter Cover: Mean 27.8%, Range 1 – 89%

Soil Texture (field assessed): Fine silty clay (1), Medium loam (1), Medium silt loam (1), Medium to very fine, loamy sand (1), Muck (1), Sand, (class unknown) (1)

Geology (field or map data): Alluvium (5), Sandstone, shale, and gravel deposits (2), Sandstone and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: Bay Flats (2), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (3), East Bay Terraces and Alluvium (2), East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This alliance has moderate non-native plant cover (average 22.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum murinum*, and *Lepidium latifolium*.

Associations in Alameda & Contra Costa Counties

Distichlis spicata – (*Bromus diandrus* – *Avena* spp.)

Distichlis spicata – *Frankenia salina* – *Jaumea carnosa*

Distichlis spicata – *Frankenia salina* Coastal alliance

Distichlis spicata Coastal

Frankenia salina – *Limonium californicum* – *Monanthochloe littoralis* – *Sarcocornia pacifica*

Grindelia stricta

Classification Comments

None.

References: Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Junak et al. 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Klein et al. 2015, Pickart 2006, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNR

State Rarity Rank: S3

Surveys Used for Description

Total: N=10; Alameda County (n=3): ALCC504, ALCC709, ALCC820

Contra Costa County (n=7): ALCC415, ALCC431, ALCC601, ALCCREC223, ALCCREC226, ALCCREC606, ALCCREC617

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Distichlis spicata</i>	90	14.2	0.2	52.0	Y		Y	Y
H	<i>Bromus diandrus</i>	60	2.7	0.2	15.0				Y
H	<i>Salicornia pacifica</i>	50	3.1	0.2	19.0				Y
H	<i>Frankenia salina</i>	40	7.6	0.2	60.0				
H	<i>Grindelia stricta</i>	30	4.5	1.0	23.0				
H	<i>Jaumea carnosa</i>	30	1.3	1.0	8.0				
H	<i>Bromus hordeaceus</i>	30	1.1	0.2	10.0				
H	<i>Lepidium latifolium</i>	30	0.6	0.2	6.0				
H	<i>Hordeum murinum</i>	30	0.1	0.2	0.2				
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	20	0.8	0.2	8.0				
H	<i>Limonium californicum</i>	20	0.0	0.2	0.2				
H	<i>Carpobrotus edulis</i>	20	0.0	0.2	0.2				

***Distichlis spicata* – (*Bromus diandrus* – *Avena* spp.) Association**

Common Name: Saltgrass – (Ripgut Brome – Wild Oats) Patches

Alliance: *Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance

Local Vegetation Description

The Saltgrass – (Ripgut Brome – Wild Oats) Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Distichlis spicata*, and characteristic herbs include *Bromus diandrus*. Those herbs often present include *Bromus hordeaceus*, and herbs that are sometimes present include *Atriplex prostrata*, *Centaurea solstitialis*, *Cirsium vulgare*, *Conium maculatum*, *Cressa truxillensis*, *Frankenia salina*, *Helminthotheca echioides*, *Hordeum murinum*, *Juncus* sp., *Lactuca serriola*, *Lepidium latifolium*, *Lotus corniculatus*, *Polypogon monspeliensis*, *Raphanus sativus*, *Rumex crispus*, *Sonchus oleraceus*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.2	no data	no data
Herb	57.6	32 – 100	0.4	0 – 1

Local Environmental Description

Elevation: Mean 4 m, Range 0 – 20 m

Aspect: Flat (3), NE (1), NW (1), SW (1), W (1)

Slope: Mean 2 degrees, Range 0 – 10 degrees

Macro Topography: Lower 1/3 of slope (4), Bottom (2), Not recorded (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 35.0%, Range 0 – 95%

Litter Cover: Mean 63.0%, Range 2 – 98%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Medium loam (1), Moderately fine silty clay loam (1), Peat (1), Sand, (class unknown) (1)

Geology (field or map data): Alluvium (2), Clayey alluvium (2), Mixed alluvium (1), Mixed sedimentary (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (4), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 61.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bromus diandrus*, *Bromus hordeaceus*, *Centaurea solstitialis*, *Cirsium vulgare*, *Conium maculatum*, *Helminthotheca echioides*, *Hordeum murinum*, *Lactuca serriola*, *Lepidium latifolium*, *Lotus corniculatus*, *Polypogon monspeliensis*, *Raphanus sativus*, *Rumex crispus*, *Sonchus oleraceus*, and *Vulpia myuros*.

Classification Comments

This association has been renamed and was previously cited as *Distichlis spicata* – *Bromus diandrus* or *Distichlis spicata* – annual grasses, both in the *Distichlis spicata* Alliance. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Hickson and Keeler-Wolf 2007, Junak et al. 2007, Keeler-Wolf and Vaghti 2000, Rodriguez et al. 2017, Sproul et al. 2011

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=7; Alameda County (n=0):

Contra Costa County (n=2): ALCC431, ALCC601

Sacramento Co. (n=1): SSJD0312

Solano Co. (n=4): RUSH0037, SUMA12058, SUMA12176, SUMA9140

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Distichlis spicata</i>	100	22.7	7.0	63.0	Y		Y	Y
H	<i>Bromus diandrus</i>	86	7.5	0.2	19.0	Y			Y
H	<i>Bromus hordeaceus</i>	71	8.1	0.2	40.0				Y
H	<i>Lactuca serriola</i>	43	7.5	0.2	51.0				
H	<i>Centaurea solstitialis</i>	43	3.9	6.0	15.0				
H	<i>Lepidium latifolium</i>	43	1.2	0.2	7.0				
H	<i>Lotus corniculatus</i>	43	1.0	0.2	4.0				
H	<i>Atriplex prostrata</i>	43	0.2	0.2	1.0				
H	<i>Hordeum murinum</i>	43	0.2	0.2	1.0				
H	<i>Cirsium vulgare</i>	43	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	29	2.9	0.2	20.0				
H	<i>Polypogon monspeliensis</i>	29	1.6	1.0	10.0				
H	<i>Cressa truxillensis</i>	29	1.5	0.2	10.0				
H	<i>Sonchus oleraceus</i>	29	0.9	2.0	4.0				
H	<i>Raphanus sativus</i>	29	0.4	1.0	2.0				
H	<i>Conium maculatum</i>	29	0.3	0.2	2.0				
H	<i>Juncus</i> sp.	29	0.3	1.0	1.0				
H	<i>Helminthotheca echioides</i>	29	0.2	0.2	1.0				
H	<i>Frankenia salina</i>	29	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	29	0.0	0.1	0.2				

***Distichlis spicata* – *Frankenia salina* – *Jaumea carnosa* Association**

Common Name: Saltgrass – Alkali Heath – Marsh Jaumea Patches

Alliance: *Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance

Local Vegetation Description

The Saltgrass – Alkali Heath – Marsh Jaumea Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Distichlis spicata* and *Jaumea carnosa*, and characteristic herbs include *Salicornia pacifica*. Herbs that are sometimes present include *Frankenia salina* and *Spartina foliosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.4	0 – 3	no data	no data
Herb	79.6	18 – 100	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 1 m, Range 0 – 4 m

Aspect: Flat (6), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: Mean 26.0%, Range 10 – 96%

Litter Cover: Mean 4.3%, Range 1 – 5%

Soil Texture (field assessed): Fine silty clay (1)

Geology (field or map data): Alluvium (6), Sandstone and other sedimentary (1)

Alameda County Subsections: Bay Flats (1)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Other Subsections: Bay Flats (5)

Site Impacts

This association has very low non-native plant cover (average 0.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cotula coronopifolia*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S2.2 **State Rare:** Y

Surveys Used for Description

Total: N=7; **Alameda County (n=1):** ALCC709

Contra Costa County (n=1): ALCCREC606

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Jaumea carnosa</i>	100	37.4	1.0	85.0	Y		Y	Y
H	<i>Distichlis spicata</i>	100	36.4	0.2	90.0	Y		Y	Y
H	<i>Salicornia pacifica</i>	86	7.9	0.2	15.0	Y			Y
H	<i>Spartina foliosa</i>	43	3.9	5.0	15.0				
H	<i>Frankenia salina</i>	29	2.3	6.0	10.0				

***Distichlis spicata* Coastal Association**

Common Name: Saltgrass Coastal Patches

Alliance: *Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance

Local Vegetation Description

The Saltgrass Coastal Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Distichlis spicata*. Those herbs often present include *Bromus diandrus* and *Lepidium latifolium*, and herbs that are sometimes present include *Atriplex prostrata*, *Centromadia pungens* ssp. *pungens*, *Frankenia salina*, *Lactuca serriola*, *Salicornia pacifica*, and *Sonchus asper*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.5	0.3	0 – 0.5
Herb	73.5	40 – 95	0.6	0 – 2

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 3 m

Aspect: Flat (4), NE (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (2), Basin/wetland (1), Lower 1/3 of slope (1), Not recorded (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 1%

Fines Cover: Mean 46.8%, Range 2 – 92%

Litter Cover: Mean 34.0%, Range 5 – 95%

Soil Texture (field assessed): Loam, (class unknown) (1), Medium silt loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Alluvium (5)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (2)

Other Subsections: Delta (2), Bay Flats (1), Bay Flats (1)

Site Impacts

This association has low non-native plant cover (average 6.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bromus diandrus*, *Lactuca serriola*, *Lepidium latifolium*, and *Sonchus asper*.

Classification Comments

This association has been renamed to reflect the split into coastal and interior associations and alliances. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf and Vaghti 2000, Pickart 2006, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=2): ALCC415, ALCCREC226

Sacramento Co. (n=2): SSJD0317, SSJD0350

Santa Clara Co. (n=1): VAWA388

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Distichlis spicata</i>	100	62.1	35.0	78.0	Y	Y		Y
H	<i>Bromus diandrus</i>	50	2.2	2.0	8.0				Y
H	<i>Lepidium latifolium</i>	50	0.4	0.2	2.0				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	33	1.4	0.2	8.0				
H	<i>Frankenia salina</i>	33	0.7	1.0	3.0				
H	<i>Atriplex prostrata</i>	33	0.7	1.0	3.0				
H	<i>Salicornia pacifica</i>	33	0.2	0.2	1.0				
H	<i>Lactuca serriola</i>	33	0.1	0.2	0.2				
H	<i>Sonchus asper</i>	33	0.1	0.2	0.2				

***Frankenia salina* – *Limonium californicum* – *Monanthochloe littoralis* –
Sarcocornia pacifica Association**

Common Name: Alkali Heath – Marsh-Rosemary – Shore Grass – Pickleweed Patches

Alliance: *Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance

Local Vegetation Description

The Alkali Heath – Marsh-Rosemary – Shore Grass – Pickleweed Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Frankenia salina*. Those herbs often present include *Salicornia pacifica*, and herbs that are sometimes present include *Bromus diandrus* and *Distichlis spicata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	72.8	20 – 100	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 1 m, Range -1 – 3 m

Aspect: Flat (10), SW (1)

Slope: Mean 0 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (3), Basin/wetland (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 19.0%, Range 0 – 73%

Litter Cover: Mean 45.2%, Range 5 – 100%

Soil Texture (field assessed): Fine clay (1), Fine silty clay (1), Loam, (class unknown) (1), Medium silt loam (1)

Geology (field or map data): Alluvium (8), Clayey alluvium (2), Silty alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Other Subsections: Bay Flats (5), Bay Flats (2), Delta (2), Delta (1)

Site Impacts

This association has low non-native plant cover (average 6.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Frankenia salina – *Limonium californicum* – *Monanthochloe littoralis* – *Sarcocornia pacifica* Association

Distichlis spicata – *Frankenia salina* Coastal Herbaceous Alliance

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf and Evens 2006, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S2? **State Rare:** Y

Surveys Used for Description

Total: N=11; Alameda County (n=1): ALCC504

Contra Costa County (n=0):

Sacramento Co. (n=1): SSJD0318

Santa Clara Co. (n=2): DEDW0412, VAWA392

Solano Co. (n=2): SUMA12171, SUMA12192

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Frankenia salina</i>	100	45.6	10.0	95.0	Y	Y		Y
H	<i>Salicornia pacifica</i>	64	3.8	0.2	30.0				Y
H	<i>Distichlis spicata</i>	45	2.5	0.2	15.0				
H	<i>Bromus diandrus</i>	27	0.8	0.2	5.0				

Frankenia salina – *Limonium californicum* – *Monanthochloe littoralis* – *Sarcocornia pacifica* Association

Distichlis spicata – *Frankenia salina* Coastal Herbaceous Alliance

***Grindelia stricta* Association**

Common Name: Gumweed Patches

Alliance: *Distichlis spicata* – *Frankenia salina* Coastal Herbaceous Alliance

Local Vegetation Description

The Gumweed Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Grindelia stricta*, characteristic herbs include *Salicornia pacifica*. Those herbs often present include *Distichlis spicata* and *Jaumea carnosa*, and herbs that are sometimes present include *Atriplex prostrata*, *Juncus arcticus*, *Lepidium latifolium*, *Rumex crispus*, *Schoenoplectus americanus*, and *Spartina foliosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	72.0	40 – 100	0.6	0 – 1

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 7 m

Aspect: Flat (7), NE (1), NW (1)

Slope: Mean 1 degrees, Range 0 – 4 degrees

Macro Topography: Bottom (6), Not recorded (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 59.5%, Range 20 – 98%

Litter Cover: Mean 19.8%, Range 2 – 47%

Soil Texture (field assessed): Muck (4), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (5), Clayey alluvium (4)

Alameda County Subsections: Bay Flats (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Bay Flats (4), Delta (2), Delta (1)

Site Impacts

This association has low non-native plant cover (average 11.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Lepidium latifolium*, and *Rumex crispus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=9; Alameda County (n=1): ALCC820

Contra Costa County (n=1): ALCCREC223

Sacramento Co. (n=1): SSJD0320

San Mateo Co. (n=4): DEDW0154, DEDW0672, SMAT0311, SMATREL0191

Solano Co. (n=2): SUMA12043, SUMA6078

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Grindelia stricta</i>	100	33.1	21.0	50.0	Y		Y	Y
H	<i>Salicornia pacifica</i>	78	17.1	10.0	35.0	Y			Y
H	<i>Distichlis spicata</i>	67	5.1	1.0	25.0				Y
H	<i>Jaumea carnosa</i>	56	1.4	1.0	4.0				Y
H	<i>Lepidium latifolium</i>	44	9.2	1.0	70.0				
H	<i>Juncus arcticus</i>	33	1.6	1.0	12.0				
H	<i>Spartina foliosa</i>	22	2.8	0.2	25.0				
H	<i>Atriplex prostrata</i>	22	0.2	0.2	2.0				
H	<i>Rumex crispus</i>	22	0.1	0.2	1.0				
H	<i>Schoenoplectus americanus</i>	22	0.0	0.2	0.2				

***Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance**



Common Name: Saltgrass – (Cooper's Rush – Alkali Heath) Interior

NVC Alliance Code: A1332. *Distichlis spicata* Alkaline Wet Meadow Alliance

Statewide Description

Distichlis spicata, *Frankenia salina*, and/or *Juncus cooperi* are dominant or co-dominant in the herbaceous layer with *Anemopsis californica*, *Bromus diandrus*, *Bromus hordeaceus*, *Croton californicus*, *Eleocharis palustris*, *Frankenia salina*, *Hordeum* spp., *Juncus arcticus*, *Juncus mexicanus*, *Leymus triticoides*, *Lolium perenne*, *Muhlenbergia asperifolia*, *Pascopyrum smithii*, *Poa secunda*, *Puccinellia nuttalliana*, *Phragmites australis*, *Schoenoplectus americanus*, *Schoenoplectus pungens*, *Scirpus nevadensis*, or *Sporobolus airoides*. Emergent shrubs may be present at low cover, including *Allenrolfea occidentalis*, *Atriplex* spp., *Ericameria albida*, *Ericameria nauseosa*, *Isocoma acradenia*, *Sarcobatus vermiculatus* or *Suaeda moquinii*.

The alliance is found commonly in alkaline- or saline-wet environments in the interior of California away from the immediate coast, including alkali-flats. The salinity tends to concentrate in the upper soil horizons because of capillary action from intermittent

flooding by salty or brackish waters and long periods of drying in hot sun. Stands may be monospecific or co-dominant with various graminoids and forbs. Stands dominated by *Distichlis* and *Frankenia* in coastal settings are placed in the *Distichlis spicata* – *Frankenia salina* Coastal Alliance.

Local Vegetation Description

The Saltgrass – (Cooper's Rush – Alkali Heath) Interior Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Distichlis spicata*. Those herbs often present include *Lolium perenne*, and herbs that are sometimes present include *Bromus diandrus*, *Bromus hordeaceus*, *Frankenia salina*, and *Hordeum marinum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	57.4	26 – 95	0.3	0 – 0.5

Local Membership Rule

Distichlis spicata and/or *Frankenia salina* > 30% relative cover in areas that have alkaline or saline soils, are wet for most of the year, and are away from the immediate coast.

Local Environmental Description

Elevation: Mean 110 m, Range 5 – 269 m

Aspect: NE (4), SE (3), NW (1), SW (1)

Slope: Mean 3 degrees, Range 0 – 12 degrees

Macro Topography: Bottom (6), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.2%, Range 0 – 4%

Fines Cover: Mean 37.4%, Range 5 – 94%

Litter Cover: Mean 58.5%, Range 1 – 90%

Soil Texture (field assessed): Fine clay (2), Moderately fine sandy clay loam (2), Sand, (class unknown) (1), Medium silt loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Alluvium (3), Sedimentary (3), Sandstone, shale, and gravel deposits (2), Sand dunes (1), Sandy alluvium (most alluvial fans and washes) (1), Shale and other sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), Eastern Hills (2)

Contra Costa County Subsections: Suisun Hills and Valleys (3), Westside Alluvial Fans and Terraces (2), Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 24.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Hordeum marinum*, and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Croton californicus – *Distichlis spicata* Provisional Association

Distichlis spicata Interior

Frankenia salina – *Distichlis spicata* Interior

Classification Comments

This alliance is the product of a split of the original generic *Distichlis spicata* Alliance (Sawyer et al. 2009). In Buck-Diaz et al. 2023, it was cited as the *Distichlis spicata* Interior Alliance, but it has been renamed to reflect the other associations that are placed in this alliance.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens et al. 2014, Kittel et al. 2012, Reyes et al. 2020a, Reyes et al. 2023a, Solomeshch and Barbour 2006

Global Rarity Rank: GNR

State Rarity Rank: S4

Surveys Used for Description

Total: N=11; Alameda County (n=5): ALCC264, ALCC267, ALCC268, LLNL019, M1007291740

Contra Costa County (n=6): ALCC279, ALCC323, ALCC433, ALCC809, ALCCREC227, M1007291440

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Distichlis spicata</i>	100	39.1	0.2	92.0	Y	Y		Y
H	<i>Lolium perenne</i>	64	2.6	0.2	15.0				Y
H	<i>Bromus diandrus</i>	45	2.9	0.2	16.0				
H	<i>Hordeum marinum</i>	45	0.8	0.2	6.0				
H	<i>Frankenia salina</i>	36	4.7	0.2	35.0				
H	<i>Bromus hordeaceus</i>	27	1.2	0.2	9.0				

Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

***Croton californicus* – *Distichlis spicata* Provisional Association**

Common Name: California croton – Saltgrass Patches

Alliance: *Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

Local Vegetation Description

The California croton – Saltgrass Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Bromus diandrus* and *Erodium* sp., and characteristic herbs include *Croton californicus* and *Distichlis spicata*. Those herbs often present include *Amsinckia menziesii* var. *intermedia*, *Centromadia pungens* ssp. *pungens*, and *Lessingia glandulifera*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	35.5	26 – 45	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 6 m, Range 5 – 6 m

Aspect: NE (1), SE (1)

Slope: Mean 2 degrees, Range 1 – 3 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 30%

Litter Cover: 69%

Soil Texture (field assessed): Sand, (class unknown) (1)

Geology (field or map data): Alluvium (1), Sand dunes (1)

Alameda County Subsections: None

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 65.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Erodium* spp.

Classification Comments

This association is newly described here and is provisional until additional samples are available.

Croton californicus – *Distichlis spicata* Provisional Association
Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC279, ALCCREC227

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium</i> sp.	100	11.0	10.0	12.0	Y		Y	Y
H	<i>Bromus diandrus</i>	100	10.5	5.0	16.0	Y		Y	Y
H	<i>Croton californicus</i>	100	7.0	6.0	8.0	Y			Y
H	<i>Distichlis spicata</i>	100	1.1	0.2	2.0	Y			Y
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	50	2.0	4.0	4.0				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	50	1.0	2.0	2.0				Y
H	<i>Lessingia glandulifera</i>	50	0.1	0.2	0.2				Y

***Distichlis spicata* Interior Association**

Common Name: Saltgrass Interior Patches

Alliance: *Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

Local Vegetation Description

The Saltgrass Interior Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Distichlis spicata*, and characteristic herbs include *Lolium perenne*. Those herbs often present include *Hordeum marinum*, and herbs that are sometimes present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Frankenia salina*, *Hirschfeldia incana*, *Malvella leprosa*, and *Polypogon monspeliensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	62.5	35 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 130 m, Range 24 – 269 m

Aspect: NE (2), SE (2), NW (1), SW (1)

Slope: Mean 4 degrees, Range 0 – 12 degrees

Macro Topography: Bottom (4), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.4%, Range 0 – 4%

Fines Cover: Mean 44.0%, Range 11 – 94%

Litter Cover: Mean 51.5%, Range 1 – 84%

Soil Texture (field assessed): Fine clay (2), Medium silt loam (1), Medium to very fine, loamy sand (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (3), Sandstone, shale, and gravel deposits (2), Alluvium (1), Sandy alluvium (most alluvial fans and washes) (1), Shale and other sedimentary (1)

Alameda County Subsections: Eastern Hills (2), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: Suisun Hills and Valleys (3), Eastern Hills (1)

Distichlis spicata Interior Association

Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

Site Impacts

This association has low non-native plant cover (average 16.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Hirschfeldia incana*, *Hordeum marinum*, *Lolium perenne*, and *Polypogon monspeliensis*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens et al. 2014, Kittel et al. 2012, Ratchford et al. 2023a, Reyes et al. 2020a, Reyes et al. 2023a, Solomeshch and Barbour 2006

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=8; Alameda County (n=4): ALCC264, ALCC268, LLNL019, M1007291740

Contra Costa County (n=4): ALCC323, ALCC433, ALCC809, M1007291440

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Distichlis spicata</i>	100	51.4	18.0	92.0	Y	Y		Y
H	<i>Lolium perenne</i>	88	3.5	0.2	15.0	Y			Y
H	<i>Hordeum marinum</i>	50	0.3	0.2	1.0				Y
H	<i>Frankenia salina</i>	38	2.1	0.2	16.0				
H	<i>Bromus diandrus</i>	38	1.3	0.2	10.0				
H	<i>Bromus hordeaceus</i>	25	1.6	4.0	9.0				
H	<i>Polypogon</i> sp.	25	0.6	2.0	3.0				
H	<i>Polypogon monspeliensis</i>	25	0.5	1.0	3.0				
H	<i>Malvella leprosa</i>	25	0.2	0.2	1.0				
H	<i>Avena barbata</i>	25	0.2	0.2	1.0				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				

Distichlis spicata Interior Association

Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

***Frankenia salina* – *Distichlis spicata* Interior Association**

Common Name: Alkali Heath – Saltgrass Interior Patches

Alliance: *Distichlis spicata* – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

Local Vegetation Description

The Alkali Heath – Saltgrass Interior Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Frankenia salina*, and characteristic herbs include *Bromus hordeaceus*, *Deinandra lobbiai*, *Distichlis spicata*, *Elymus triticoides*, *Hordeum marinum*, and *Sonchus asper*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	60.0	60 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: 155 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: 5%

Litter Cover: 90%

Soil Texture (field assessed): Moderately fine sandy clay loam (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 10.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, and *Sonchus asper*.

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013

Frankenia salina – *Distichlis spicata* Interior Association
Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): ALCC267

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Frankenia salina</i>	100	35.0	35.0	35.0	Y	Y		Y
H	<i>Distichlis spicata</i>	100	17.0	17.0	17.0	Y			Y
H	<i>Hordeum marinum</i>	100	6.0	6.0	6.0	Y			Y
H	<i>Elymus triticoides</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Sonchus asper</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Deinandra lobbii</i>	100	0.2	0.2	0.2	Y			Y

Frankenia salina – *Distichlis spicata* Interior Association
Distichlis spicata – (*Juncus cooperi* – *Frankenia salina*) Interior Herbaceous Alliance

***Dudleya cymosa* – *Dudleya lanceolata* / Lichen – Moss Sparsely Vegetated Alliance**



Common Name: Live-forever – lichen/moss sparse herbaceous rock outcrop

NVC Alliance Code: A4073. *Dudleya cymosa* - *Dudleya lanceolata* - Lichen/Moss Sparse Rock Vegetation Alliance

Statewide Description

Dudleya cymosa or *Dudleya lanceolata* are some of the characteristic herbs for this alliance. Other herbs include *Bromus* spp., *Clarkia* spp., *Cryptantha* spp., *Erigeron glaucus*, *Festuca* spp., *Lewisia rediviva* and *Phacelia* spp. Shrubs may be present at sparse cover, including *Cercocarpus montanus* var. *glaber*, *Diplacus aurantiacus*, *Eriogonum* spp., and *Heteromeles arbutifolia*. Moss and lichen are often well-developed.

This alliance contains sparse herbaceous vegetation which is variable in species composition from the coast to inland. The rocky nature of the substrate defines the alliance, and non-vascular cover may be present and high in cover. While it occurs California's Coast Ranges, southern California mountains and valleys, off-shore islands,

and Sierra Nevada foothills to mountains, it has not been well-documented across its range.

Live-forevers are not always present in this alliance while lichen and moss typically are, but *Dudleya* are well adapted to the harsh rocky environment where it occurs. The fleshy basal rosette of leaves in this perennial genus help the plant survive during long periods of dessication. While other *Dudleya* spp. may be found in this alliance, there are two species that are widespread and characteristic. Both are generally evergreen rather than drought deciduous. *D. cymosa* has several subspecies defined. Five subspecies are considered rare, and are limited to small ranges and rock types (Dorsey and Wilson 2011).

Ssp. *cymosa* is the most common subspecies, found as far south as the Santa Monica Mountains but ranging up to Humboldt and Tehama Counties. *D. lanceolata* is found in the southern half of the state and extends into northern Baja California. It does not occur in the Sierra Nevada or its foothills.

Local Vegetation Description

The Live-forever – lichen/moss sparse herbaceous rock outcrop Alliance forms a sparse to open herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Arabis breweri*, *Bromus rubens*, *Dudleya cymosa*, *Epilobium canum*, and *Eriophyllum lanatum*. Those herbs often present include *Avena barbata*, *Bromus diandrus*, *Chorizanthe membranacea*, *Cirsium occidentale*, *Clarkia unguiculata*, *Claytonia perfoliata*, *Dichelostemma capitatum*, *Eriogonum nudum*, *Eschscholzia lobbii*, *Festuca idahoensis*, *Grindelia camporum*, *Lomatium* sp., *Madia elegans*, *Melica californica*, *Microsteris gracilis*, *Nassella cernua*, *Phacelia distans*, *Phacelia imbricata*, *Poa secunda*, *Silene verecunda*, *Thysanocarpus curvipes*, and *Vulpia microstachys*. Commonly associated emergent shrubs at sparse cover include *Keckiella corymbosa*, *Ericameria linearifolia*, *Keckiella corymbosa*, *Diplacus aurantiacus*, and *Holodiscus discolor*. Commonly associated non-vascular plants include Lichen and Moss.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	2.0	2 – 2	0.3	0 – 0.5
Herb	4.0	2 – 6	0.3	0 – 0.5

Local Membership Rule

The native *Dudleya cymosa* or other *Dudleya* spp. is characteristic or > 30% relative cover with herbs such as *Eriogonum* spp., *Epilobium canum*, and others at sparse cover. Lichen is characteristic and often > 50% relative cover in the stand, with *Dudleya* sometimes lacking.

Local Environmental Description

Elevation: Mean 952 m, Range 945 – 958 m

Aspect: NW (1), SW (1)

Slope: Mean 37 degrees, Range 25 – 48 degrees

Macro Topography: Ridge top (1), Upper 1/3 of slope (1)

Large Rock: Mean 77.5%, Range 60 – 95%

Small Rock: Mean 14.0%, Range 2 – 26%

Fines Cover: Mean 6.0%, Range 1 – 11%

Litter Cover: Mean 2.0%, Range 1 – 3%

Soil Texture (field assessed): Medium to very fine, loamy sand (1)

Geology (field or map data): Sandstone and other sedimentary (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This alliance has moderate non-native plant cover (average 22.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*.

Associations in Alameda & Contra Costa Counties

Dudleya cymosa – *Dudleya lanceolata* / Lichen – Moss alliance

Classification Comments

None.

References: Buck-Diaz et al. 2020

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): SPCCB-020, SPCCB-033

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Keckiella corymbosa</i>	100	2.0	2.0	2.0	Y	Y		Y
S	<i>Ericameria linearifolia</i>	100	0.2	0.2	0.2	Y			Y
S	<i>Diplacus aurantiacus</i>	50	0.1	0.2	0.2				Y
S	<i>Holodiscus discolor</i>	50	0.1	0.1	0.1				Y

Dudleya cymosa – *Dudleya lanceolata* / Lichen – Moss Sparsely Vegetated Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Epilobium canum</i>	100	1.1	0.2	2.0	Y			Y
H	<i>Bromus rubens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eriophyllum lanatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Arabis breweri</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Dudleya cymosa</i>	100	0.2	0.1	0.2	Y			Y
H	<i>Avena barbata</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus diandrus</i>	50	0.5	1.0	1.0				Y
H	<i>Clarkia unguiculata</i>	50	0.1	0.2	0.2				Y
H	<i>Chorizanthe membranacea</i>	50	0.1	0.2	0.2				Y
H	<i>Eriogonum</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Eriogonum nudum</i>	50	0.1	0.2	0.2				Y
H	<i>Eschscholzia lobbi</i>	50	0.1	0.2	0.2				Y
H	<i>Festuca idahoensis</i>	50	0.1	0.2	0.2				Y
H	<i>Phacelia distans</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	50	0.1	0.2	0.2				Y
H	<i>Phacelia imbricata</i>	50	0.1	0.2	0.2				Y
H	<i>Nassella cernua</i>	50	0.1	0.2	0.2				Y
H	<i>Melica californica</i>	50	0.1	0.2	0.2				Y
H	<i>Grindelia camporum</i>	50	0.1	0.2	0.2				Y
H	<i>Microsteris gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Cirsium occidentale</i>	50	0.1	0.2	0.2				Y
H	<i>Thysanocarpus curvipes</i>	50	0.1	0.1	0.1				Y
H	<i>Silene verecunda</i>	50	0.1	0.1	0.1				Y
H	<i>Poa secunda</i>	50	0.1	0.1	0.1				Y
H	<i>Lomatium</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Claytonia perfoliata</i>	50	0.1	0.1	0.1				Y
H	<i>Madia elegans</i>	50	0.1	0.1	0.1				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.1	0.1				Y
NV	Moss	50	30.0	60.0	60.0				Y
NV	Lichen	50	12.5	25.0	25.0				Y

***Eriophyllum staechadifolium* – *Erigeron glaucus* – *Eriogonum latifolium* Herbaceous Alliance**



Common Name: Seaside woolly-sunflower - seaside daisy - buckwheat patches

NVC Alliance Code: A1614. *Abronia latifolia* - *Ambrosia chamissonis* Dune Grassland Alliance

Statewide Description

Artemisia pycnocephala, *Erigeron glaucus*, *Eriogonum latifolium*, *Eriogonum parvifolium*, *Eriophyllum staechadifolium* and/or *Fragaria chiloensis* mix with herbaceous species such as *Achillea millefolium*, *Angelica hendersonii*, *Armeria maritima*, *Bromus carinatus*, *Bromus maritimus*, *Camissonia cheiranthifolia*, *Cardionema ramosissimum*, *Carpobrotus edulis*, *Daucus pusillus*, *Dudleya farinosa*, *Dudleya* spp., *Grindelia stricta*, or *Poa douglasii*. Emergent shrubs may be present including *Baccharis pilularis*, *Lupinus arboreus*, *Lupinus versicolor*, or *Rubus ursinus*.

This alliance occupies a narrow band along the immediate coast of California. It typically occurs on rocky or sandy soils of coastal strand along the North Coast and Central Coast, although occurrences of the diagnostic taxa are known along the Pacific Coast

Eriophyllum staechadifolium – *Erigeron glaucus* – *Eriogonum latifolium* Herbaceous Alliance

from San Diego County to central Oregon. Stands occur on inner dunes to steep slopes above dunes inland from the leading edge of the beach; they are distinct from those of the *Abronia latifolia* - *Ambrosia chamissonis* Alliance, which is found on more active dune surfaces. Stands of this alliance are rarely impacted by saltwater overwash from storm events. However, reflective dune sand and steep coastal bluffs can have high temperatures in full sunlight. Dry sand is mobile so plants can be damaged by sand blast, root exposure, and foliage burial under the shifting sands. Additionally, beach sand has low water storage capacity and is nutrient poor and lacking in organic matter. Summer fog ameliorates surface conditions to some degree (Pickart and Barbour 2007).

Species composition of this alliance is richer on the inner dunes and coastal bluffs than the related *Abronia latifolia* - *Ambrosia chamissonis* Alliance because of somewhat decreased salt spray yet wind intensity may vary depending on setting. Vegetation is generally short or mounded in stature due to environmental factors such as intense winds, fluctuation in and/or high temperatures, salt spray, and sand/sandstone movement. Stands are primarily composed of perennial herbs and subshrubs.

Species dominance shifts spatially and temporally in coastal environments and dune ecosystems because environmental conditions create fine-scale vegetation patterning, in which stands of this alliance are often adjacent to stands of the *Abronia latifolia* - *Ambrosia chamissonis*, *Lupinus arboreus*, or *Lupinus chamissonis* - *Ericameria ericoides* alliances. The *Eriophyllum staechadifolium* - *Erigeron glaucus* - *Eriogonum latifolium* alliance is defined following surveys of coastal stands from Mendocino to Santa Barbara County. Stands dominated by *Artemisia pycnocephala* were previously considered as various associations of the *Abronia latifolia* - *Ambrosia chamissonis* dune mat alliance, depending on the codominant species, but have now been included in this more recently defined dune mat alliance.

Local Vegetation Description

The Seaside woolly-sunflower - seaside daisy - buckwheat patches Alliance forms an open to continuous herbaceous layer. *Artemisia pycnocephala* is the dominant herb and *Cammissoniopsis cheiranthifolia* may be present.

Local Membership Rule

Armeria maritima, *Artemisia pycnocephala*, *Erigeron glaucus*, *Eriophyllum staechadifolium*, *Eriogonum latifolium*, and/or *Fragaria chiloensis* combined are > 50% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: no data

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Eriophyllum staechadifolium – *Erigeron glaucus* – *Eriogonum latifolium* Herbaceous Alliance

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): no data

Alameda County Subsections: East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: none

Site Impacts

Non-native grasses were recorded in one of the field observations.

Associations in Alameda & Contra Costa Counties

*Artemisia pycnocephala**

Classification Comments

No survey data was available in the region, but 2 field observations were recorded.

References: Biondi and Casavecchia 2001, Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, McBride and Stone 1976, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=0; **Alameda County (n=0):**

Contra Costa County (n=0):

***Artemisia pycnocephala* Association**

Common Name: Beach Wormwood Patches

Alliance: *Eriophyllum staechadifolium* – *Erigeron glaucus* – *Eriogonum latifolium*
Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for more detailed description.

References: Biondi and Casavecchia 2001, Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, McBride and Stone 1976, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Artemisia pycnocephala Association
Eriophyllum staechadifolium – *Erigeron glaucus* – *Eriogonum latifolium* Herbaceous
Alliance

***Eryngium aristulatum* Herbaceous Alliance**



Common Name: California button-celery patches

NVC Alliance Code: A4169. *Eryngium aristulatum* Vernal Pool Alliance

Statewide Description

Eryngium aristulatum is co-dominant or characteristically present in the herbaceous layer with *Blennosperma nanum*, *Centromadia fitchii*, *Cicendia quadrangularis*, *Downingia cuspidata*, *Erodium* spp., *Hemizonia congesta* ssp. *luzulifolia*, *Lasthenia glabrata* ssp. *glabrata*, *Lepidium latipes* var. *latipes*, *Lepidium nitidum*, *Limnanthes douglasii* ssp. *rosea*, *Lolium perenne*, *Lupinus bicolor*, *Medicago polymorpha*, *Plagiobothrys greenii*, *Psilocarphus oregonus*, *Trifolium depauperatum* and *Trifolium willdenovii*.

Barbour et al. (2003, 2007b) recognized the *Downingia-Lasthenia* class that includes California pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within that class, they recognized this alliance for the vegetation of shallow vernal pools and pool edges on vertisols. Rare taxa (CNPS 1B.2 plants) include *Astragalus tener* var. *tener* and *Lepidium latipes* var. *heckardii*.

We denote the alliance using only *Eryngium aristulatum* in this treatment; Barbour et al. (2007b) originally named the alliance *Eryngium aristulatum-Lupinus bicolor*. They restricted their alliance definition to vertisols of the Central Valley; however, we are reinterpreting the alliance more broadly to allow for other stands with *E. aristulatum* as the primary diagnostic species without *L. bicolor*.

Klein and Evens (2005) identified similar stands with *E. aristulatum* ssp. *parishii* as a characteristic species within the *Eleocharis macrostachya* alliance in vernal pools on the Santa Rosa Plateau in southern California. Furthermore, some associations classified by Barbour et al. (2007b) in the *Cressa truxillensis-Distichlis spicata* alliance appear similar to this alliance. We need further sampling and data analysis to understand relationships of these and other types.

Local Vegetation Description

The California button-celery patches Alliance forms an open herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Eryngium aristulatum*. Herbs often present include *Anagallis arvensis*, *Avena fatua*, *Brassica nigra*, *Bromus hordeaceus*, *Bromus madritensis*, *Callitriche marginata*, *Centaurea melitensis*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Cotula coronopifolia*, *Crypsis* sp., *Eleocharis macrostachya*, *Erodium cicutarium*, *Juncus bufonius*, *Lythrum hyssopifolium*, *Myosurus minimus*, *Navarretia gowenii*, *Phalaris paradoxa*, *Plantago erecta*, and *Sonchus oleraceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	19.5	17 – 22	0.3	0 – 0.5

Local Membership Rule

Eryngium aristulatum or *Hemizonia congesta* > 30% relative cover or characteristically present in the herbaceous layer on clay soils often with other swale and vernal pool indicator species.

Local Environmental Description

Elevation: Mean 510 m, Range 68 – 952 m

Aspect: SW (2)

Slope: Mean 7 degrees, Range 1 – 12 degrees

Macro Topography: Bottom (1), Ridge top (1)

Large Rock: 0%

Small Rock: Mean 0.5%, Range 0 – 1%

Fines Cover: Mean 88.0%, Range 85 – 91%

Litter Cover: Mean 9.0%, Range 4 – 14%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Clay, (class unknown) (1)

Geology (field or map data): Sandstone (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Site Impacts

This alliance has moderate non-native plant cover (average 38.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis*, *Brassica nigra*, *Bromus hordeaceus*, *Bromus madritensis*, *Centaurea melitensis*, *Centaurea solstitialis*, *Cotula coronopifolia*, *Erodium cicutarium*, *Lythrum hyssopifolium*, *Phalaris paradoxa*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Eryngium aristulatum var. *aristulatum* – (*Lupinus bicolor*)

Classification Comments

This alliance excludes *Eryngium jepsonii*, a closely related species that predominantly occurs on clay barrens. *Navarretia gowenii* is a rare plant (CRPR 1B.1) found in one of the surveys.

References: Barbour et al. 2007b

Global Rarity Rank: G2 **State Rarity Rank:** S2

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC811, EBAY0116

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eryngium aristulatum</i>	100	11.5	8.0	15.0	Y	Y		Y
H	<i>Avena fatua</i>	50	2.5	5.0	5.0				Y
H	<i>Lythrum hyssopifolium</i>	50	2.5	5.0	5.0				Y
H	<i>Centaurea melitensis</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus madritensis</i>	50	0.5	1.0	1.0				Y
H	<i>Cotula coronopifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Anagallis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Brassica nigra</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Callitriche marginata</i>	50	0.1	0.2	0.2				Y
H	<i>Centaurea solstitialis</i>	50	0.1	0.2	0.2				Y
H	<i>Erodium cicutarium</i>	50	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.1	0.2	0.2				Y
H	<i>Navarretia gowenii</i>	50	0.1	0.2	0.2				Y
H	<i>Myosurus minimus</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus bufonius</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Sonchus oleraceus</i>	50	0.1	0.2	0.2				Y
H	<i>Plantago erecta</i>	50	0.1	0.2	0.2				Y
H	<i>Phalaris paradoxa</i>	50	0.1	0.2	0.2				Y
H	<i>Eleocharis macrostachya</i>	50	0.1	0.2	0.2				Y
H	<i>Crypsis</i> sp.	50	0.1	0.2	0.2				Y

Eryngium aristulatum var. *aristulatum* – (*Lupinus bicolor*) Association

Common Name: California button-celery – Miniature Lupine Patches

Alliance: *Eryngium aristulatum* Herbaceous Alliance

Classification Comments

The association name has been changed to include parentheses since lupine has a low constancy in the association. The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Barbour et al. 2007b, Buck-Diaz et al. 2021a

Global Rarity Rank: GNR

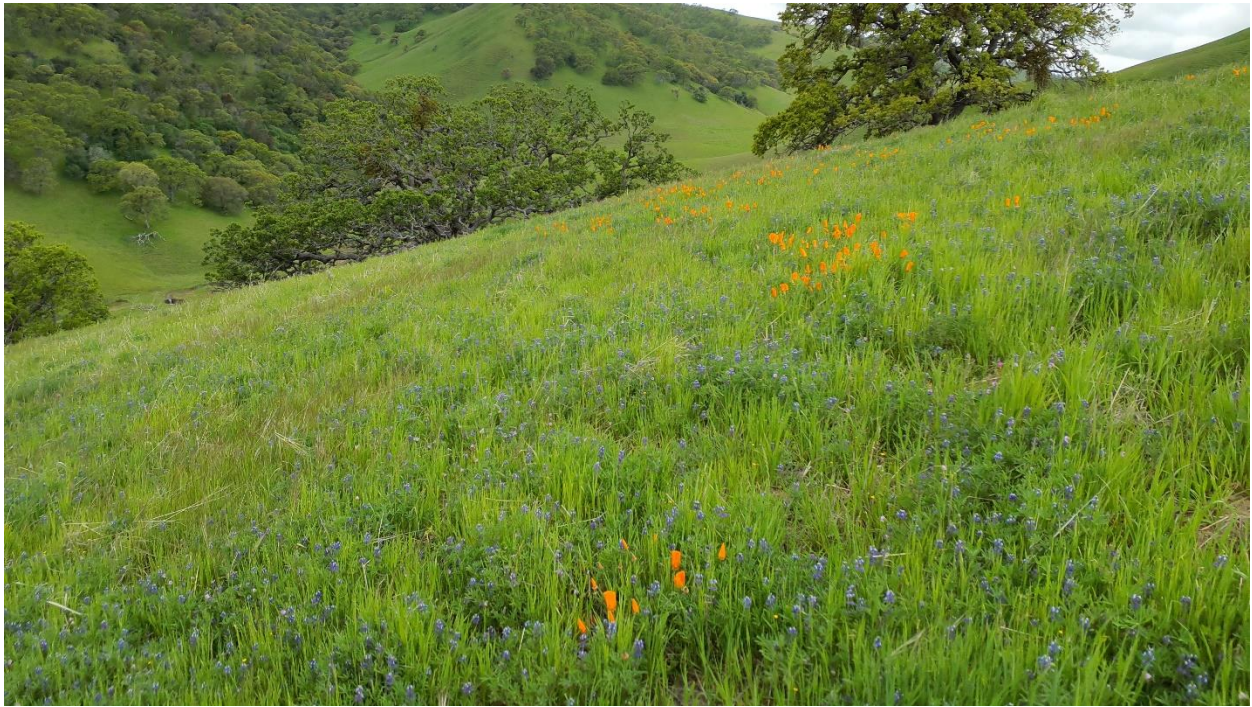
State Rarity Rank: SNR

State Rare: Y

Eryngium aristulatum var. *aristulatum* – (*Lupinus bicolor*) Association

Eryngium aristulatum Herbaceous Alliance

Eschscholzia (californica) – Lupinus (nanus) Herbaceous Alliance



Common Name: California poppy – lupine fields

NVC Alliance Code: A4240. *Eschscholzia californica* - *Lupinus nanus* Dry Meadow Alliance

Statewide Description

Eschscholzia californica, other *Eschscholzia* species, *Lupinus nanus* and/or *Lupinus bicolor* are characteristically present and/or abundant in the herbaceous layer with *Amsinckia* spp., *Avena barbata*, *Bromus* spp., *Chaenactis glabriuscula*, *Clarkia* spp., *Eriogonum* spp., *Erodium cicutarium*, *Hirschfeldia incana*, *Hypochaeris radicata*, *Lotus purshianus*, *Lupinus bicolor*, *Rumex salicifolius*, and *Vulpia myuros*. Emergent trees and shrubs may be present at low cover, including *Pinus sabiniana* or *Eriogonum fasciculatum*.

This alliance represents one of several annual herbaceous types that are widespread in the southern and central portion of cismontane California, where disturbances such as grazing, fire, occasional flooding, and slope movement are moderately frequent. The species composition of these stands appears to shift radically from year to year, depending primarily on the amount and timing of precipitation.

Stands of this alliance may include *Eschscholzia californica*, *E. lemmonii*, and *E. caespitosa*, and commonly include *Lupinus nanus*, *L. bicolor* and related taxa. Other species, especially the non-natives, may mask *Eschscholzia* and *Lupinus* abundance in some years, and competition with non-native plants is common. Robinson et al. (1995) showed that *Eschscholzia californica* competes closely with non-native *Bromus diandrus* for resources. A study by Cook (1965) suggested *E. californica* grows

principally where *Avena fatua* cannot exist, as on rocky, steep sites with porous, sterile, or serpentine soils. *E. californica* is adapted to these conditions through its deep taproot and physiological tolerance to different soil conditions.

Local Vegetation Description

The California poppy – lupine fields Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is sparse to open. Characteristic herbs include *Avena barbata* and *Bromus diandrus*. Those herbs often present include *Bromus hordeaceus*, *Lolium perenne*, and *Trifolium hirtum*, and herbs that are sometimes present include *Acmispon wrangelianus*, *Brassica nigra*, *Bromus madritensis*, *Carduus pycnocephalus*, *Castilleja exserta*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Croton setigerus*, *Dichelostemma capitatum*, *Erodium botrys*, *Erodium cicutarium*, *Eschscholzia californica*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Lupinus bicolor*, *Lupinus microcarpus*, and *Medicago polymorpha*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.2	0 – 8	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 2	0.3	0 – 0.5
Herb	40.5	8 – 95	0.5	0 – 2

Local Membership Rule

Eschscholzia californica, *Lupinus bicolor*, and/or *Lupinus* spp. > 15% relative cover seasonally in the herbaceous layer with a variety of native and non-native forbs and grasses.

Local Environmental Description

Elevation: Mean 383 m, Range 74 – 1106 m

Aspect: SW (15), SE (11), NE (6), NW (4), Variable (2)

Slope: Mean 21 degrees, Range 2 – 50 degrees

Macro Topography: Upper 1/3 of slope (9), Middle 1/3 of slope (7), Lower 1/3 of slope (6), Middle to Upper 1/3 of slope (5), Ridge top (3), Upper 1/3 of slope to Ridgetop (2), Bottom to Lower 1/3 of slope (1), Bottom to Upper 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1)

Large Rock: Mean 3.5%, Range 0 – 32%

Small Rock: Mean 12.5%, Range 0 – 92%

Fines Cover: Mean 63.6%, Range 5 – 98%

Litter Cover: Mean 19.2%, Range 0 – 93%

Soil Texture (field assessed): Moderately fine clay loam (5), Medium silt loam (4), Medium to very fine, sandy loam (4), Moderately coarse, sandy loam (4), Moderately fine silty clay loam (3), Medium loam (3), Fine clay (3), Medium to very fine, loamy sand (3), Moderately fine sandy clay loam (2), Medium sand (1), Fine silty clay (1), Coarse, loamy sand (1), Loam, (class unknown) (1), Medium silt (1)

Geology (field or map data): Sedimentary (13), Shale and other sedimentary (8), Franciscan melange (5), Sandstone (4), Sandstone and other sedimentary (4), Sandstone, shale, and gravel deposits (2), Serpentine (1)

Alameda County Subsections: Western Diablo Range (5), Fremont - Livermore Hills and Valleys (3), East Bay Hills - Mount Diablo (2), Alameda Creek (1), Eastern Hills (1)

Contra Costa County Subsections: Suisun Hills and Valleys (16), East Bay Hills - Mount Diablo (8), Eastern Hills (2)

Site Impacts

This alliance has high non-native plant cover (average 68.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, and *Trifolium hirtum*.

Associations in Alameda & Contra Costa Counties

Bromus hordeaceus – *Lupinus nanus* – *Trifolium* spp.

Eschscholzia (californica) – *Lupinus (nanus)* alliance

Eschscholzia californica

Lupinus (microcarpus, succulentus)

Lupinus bicolor

Lupinus formosus Provisional Association

Classification Comments

None.

References: Boul et al. 2011, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens et al. 2004, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=38; Alameda County (n=12): ALCC328, ALCC349, ALCC350, ALCC387, ALCC422, ALCC511, ALCC518, ALCC555, ALCC564, ALCC578, EBAY0051, PRRP003

Contra Costa County (n=26): ALCC302, ALCC304, ALCC314, ALCC331, ALCC332, ALCC333, ALCC352, ALCC354, ALCC360, ALCC364, ALCC369, ALCC375, ALCC406, ALCC407, ALCC412, ALCC441, ALCC443, ALCC591, ALCC592, ALCC806, ALCC812, ALCC813, ALCC856, ALCCREC008, SPCCA-016, SPCCA-020

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	89	3.1	0.2	18.0	Y			Y
H	<i>Avena barbata</i>	76	7.1	0.2	40.0	Y			Y
H	<i>Bromus hordeaceus</i>	71	3.4	0.1	50.0				Y
H	<i>Lolium perenne</i>	63	3.6	0.2	20.0				Y
H	<i>Trifolium hirtum</i>	61	1.6	0.1	10.0				Y
H	<i>Erodium botrys</i>	47	3.0	0.2	23.0				
H	<i>Eschscholzia californica</i>	45	2.1	0.2	12.0				
H	<i>Erodium cicutarium</i>	45	1.0	0.1	10.0				
H	<i>Carduus pycnocephalus</i>	45	0.4	0.1	9.0				
H	<i>Lupinus bicolor</i>	32	1.5	0.2	18.0				
H	<i>Chlorogalum pomeridianum</i>	32	0.2	0.1	5.0				
H	<i>Hypochaeris glabra</i>	32	0.2	0.1	2.0				
H	<i>Lupinus microcarpus</i>	29	4.4	2.0	65.0				
H	<i>Medicago polymorpha</i>	29	0.1	0.1	1.0				
H	<i>Dichelostemma capitatum</i>	29	0.1	0.1	0.2				
H	<i>Brassica nigra</i>	26	0.2	0.2	3.0				
H	<i>Centaurea solstitialis</i>	26	0.1	0.1	1.0				
H	<i>Acmispon wrangelianus</i>	24	0.8	0.1	23.0				
H	<i>Hordeum murinum</i>	24	0.1	0.2	2.0				
H	<i>Geranium dissectum</i>	24	0.1	0.2	1.0				
H	<i>Croton setigerus</i>	24	0.1	0.1	1.0				
H	<i>Bromus madritensis</i>	21	0.7	0.2	10.0				
H	<i>Castilleja exserta</i>	21	0.3	0.2	5.0				
H	<i>Hirschfeldia incana</i>	21	0.3	0.1	6.0				
H	<i>Clarkia purpurea</i>	21	0.2	0.1	2.0				

***Bromus hordeaceus* – *Lupinus nanus* – *Trifolium* spp. Association**

Common Name: Soft Brome - Sky Lupine - Clover Patches

Alliance: *Eschscholzia (californica)* – *Lupinus (nanus)* Herbaceous Alliance

Local Vegetation Description

The Soft Brome - Sky Lupine - Clover Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Those herbs often present include *Acmispon wrangelianus*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Erodium cicutarium*, *Trifolium gracilentum*, *Trifolium hirtum*, and *Trifolium microdon*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	50.0	24 – 80	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 602 m, Range 351 – 1066 m

Aspect: NE (1), SE (1), SW (1)

Slope: Mean 9 degrees, Range 7 – 10 degrees

Macro Topography: Bottom (1), Not recorded (1), Ridge top (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 56.5%, Range 20 – 93%

Litter Cover: Mean 17.0%, Range 4 – 30%

Soil Texture (field assessed): Medium loam (1), Moderately coarse, sandy loam (1),

Geology (field or map data): Franciscan melange (1), Sedimentary (1), Serpentine (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: Suisun Hills and Valleys (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 73.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Erodium cicutarium*, *Hordeum murinum*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, and *Trifolium hirtum*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Evens et al. 2004, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; **Alameda County (n=1):** ALCC350

Contra Costa County (n=1): ALCCREC008

Santa Clara Co. (n=1): COYO029

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	67	14.3	3.0	40.0				Y
H	<i>Bromus diandrus</i>	67	6.0	8.0	10.0				Y
H	<i>Avena barbata</i>	67	5.0	5.0	10.0				Y
H	<i>Trifolium gracilentum</i>	67	3.0	3.0	6.0				Y
H	<i>Erodium cicutarium</i>	67	2.4	0.1	7.0				Y
H	<i>Trifolium hirtum</i>	67	1.0	1.0	2.0				Y
H	<i>Acmispon wrangelianus</i>	67	0.7	0.1	2.0				Y
H	<i>Trifolium microdon</i>	67	0.1	0.1	0.2				Y
H	<i>Hordeum murinum</i>	33	6.7	20.0	20.0				
H	<i>Lolium perenne</i>	33	5.0	15.0	15.0				
H	<i>Trifolium willdenovii</i>	33	2.7	8.0	8.0				
H	<i>Calystegia collina</i>	33	2.0	6.0	6.0				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	33	1.7	5.0	5.0				
H	<i>Lupinus nanus</i>	33	1.3	4.0	4.0				
H	<i>Holocarpha virgata</i>	33	0.7	2.0	2.0				
H	<i>Clarkia purpurea</i>	33	0.7	2.0	2.0				
H	<i>Eschscholzia californica</i>	33	0.5	1.5	1.5				
H	<i>Trifolium microcephalum</i>	33	0.3	1.0	1.0				
H	<i>Brassica nigra</i>	33	0.3	1.0	1.0				
H	<i>Trichostema lanceolatum</i>	33	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	33	0.1	0.2	0.2				

Bromus hordeaceus – *Lupinus nanus* – *Trifolium* spp. Association
Eschscholzia (californica) – *Lupinus (nanus)* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Trifolium albopurpureum</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys nothofulvus</i>	33	0.1	0.2	0.2				
H	<i>Castilleja exserta</i>	33	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				
H	<i>Madia gracilis</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.2	0.2				
H	<i>Micropus californicus</i>	33	0.0	0.1	0.1				
H	<i>Vulpia microstachys</i>	33	0.0	0.1	0.1				
H	<i>Triteleia laxa</i>	33	0.0	0.1	0.1				
H	<i>Hypochaeris glabra</i>	33	0.0	0.1	0.1				
H	<i>Calandrinia ciliata</i>	33	0.0	0.1	0.1				
H	<i>Trifolium wormskioldii</i>	33	0.0	0.1	0.1				
H	<i>Cryptantha flaccida</i>	33	0.0	0.1	0.1				
H	<i>Sisyrinchium bellum</i>	33	0.0	0.1	0.1				
H	<i>Platystemon californicus</i>	33	0.0	0.1	0.1				
H	<i>Achillea millefolium</i>	33	0.0	0.1	0.1				
H	<i>Hordeum brachyantherum</i>	33	0.0	0.1	0.1				
H	<i>Castilleja densiflora</i>	33	0.0	0.1	0.1				
H	<i>Agoseris heterophylla</i>	33	0.0	0.1	0.1				

Bromus hordeaceus – *Lupinus nanus* – *Trifolium* spp. Association
Eschscholzia (californica) – *Lupinus (nanus)* Herbaceous Alliance

***Eschscholzia californica* Association**

Common Name: California Poppy Patches

Alliance: *Eschscholzia (californica)* – *Lupinus (nanus)* Herbaceous Alliance

Local Vegetation Description

The California Poppy Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus diandrus*, *Eschscholzia californica*, and *Trifolium hirtum*. Those herbs often present include *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Lolium perenne*, and herbs that are sometimes present include *Acmispon wrangelianus*, *Avena fatua*, *Brassica nigra*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Dichelostemma capitatum*, *Eriogonum nudum*, *Erodium cicutarium*, *Lupinus bicolor*, *Nassella pulchra*, *Plagiobothrys nothofulvus*, and *Sonchus asper*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	36.5	19 – 46	0.5	0 – 2

Local Environmental Description

Elevation: Mean 474 m, Range 74 – 1083 m

Aspect: SW (10), SE (2)

Slope: Mean 22 degrees, Range 2 – 41 degrees

Macro Topography: Upper 1/3 of slope (4), Lower 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (2), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: Mean 10.8%, Range 0 – 32%

Small Rock: Mean 26.6%, Range 0 – 80%

Fines Cover: Mean 56.3%, Range 5 – 93%

Litter Cover: Mean 13.4%, Range 0 – 63%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Moderately fine clay loam (2), Coarse, loamy sand (1), Loam, (class unknown) (1), Medium silt loam (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (3), Sedimentary (3), Franciscan melange (2), Sandstone (1), Serpentine (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (2), Alameda Creek (1), East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover (average 65.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Lolium perenne*, *Sonchus asper*, and *Trifolium hirtum*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Kittel et al. 2012, Klein et al. 2015, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=12; Alameda County (n=5): ALCC349, ALCC422, ALCC511, ALCC578, PRRP003

Contra Costa County (n=7): ALCC354, ALCC360, ALCC443, ALCC806, ALCC813, SPCCA-016, SPCCA-020

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eschscholzia californica</i>	100	6.4	3.0	12.0	Y			Y
H	<i>Trifolium hirtum</i>	92	2.4	0.1	6.0	Y			Y
H	<i>Bromus diandrus</i>	83	4.0	0.2	18.0	Y			Y
H	<i>Avena barbata</i>	75	7.5	2.0	18.0	Y			Y
H	<i>Bromus hordeaceus</i>	67	1.1	0.1	4.0				Y
H	<i>Erodium botrys</i>	58	3.0	0.2	20.0				Y
H	<i>Lolium perenne</i>	58	1.7	0.2	10.0				Y
H	<i>Carduus pycnocephalus</i>	58	0.3	0.1	2.0				Y
H	<i>Acmispon wrangelianus</i>	42	2.0	0.1	23.0				
H	<i>Centaurea solstitialis</i>	42	0.2	0.1	1.0				
H	<i>Chlorogalum pomeridianum</i>	42	0.1	0.1	1.0				
H	<i>Erodium cicutarium</i>	33	0.9	0.2	7.0				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.1	0.2				
H	<i>Avena fatua</i>	25	0.7	0.2	6.0				
H	<i>Lupinus bicolor</i>	25	0.4	0.2	4.0				
H	<i>Clarkia purpurea</i>	25	0.3	0.2	2.0				
H	<i>Brassica nigra</i>	25	0.2	0.2	1.0				
H	<i>Eriogonum nudum</i>	25	0.1	0.2	1.0				
H	<i>Sonchus asper</i>	25	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	25	0.1	0.2	0.2				
H	<i>Plagiobothrys nothofulvus</i>	25	0.1	0.2	0.2				
NV	Lichen	42	1.1	0.2	10.0				

***Lupinus (microcarpus, succulentus)* Provisional Association**

Common Name: Chick or Arroyo Lupine Patches

Alliance: *Eschscholzia (californica)* – *Lupinus (nanus)* Herbaceous Alliance

Local Vegetation Description

The Chick or Arroyo Lupine Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is sparse. Characteristic herbs include *Bromus diandrus*, *Bromus hordeaceus*, *Lolium perenne*. Those herbs often present include *Avena barbata*, *Carduus pycnocephalus*, *Geranium dissectum*, and *Lupinus microcarpus*, and herbs that are sometimes present include *Brassica nigra*, *Bromus madritensis*, *Bromus rubens*, *Chlorogalum pomeridianum*, *Croton setigerus*, *Dichelostemma capitatum*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hordeum murinum*, *Lactuca serriola*, *Lupinus succulentus*, *Medicago polymorpha*, *Trifolium hirtum*, *Triteleia laxa*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.5	0 – 8	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 2	0.3	0 – 0.5
Herb	46.3	24 – 95	0.5	0 – 2

Local Environmental Description

Elevation: Mean 237 m, Range 74 – 475 m

Aspect: NE (5), NW (4), SE (4), SW (2)

Slope: Mean 18 degrees, Range 3 – 38 degrees

Macro Topography: Lower 1/3 of slope (4), Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (2), Bottom to Upper 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Ridge top (1)

Large Rock: Mean 0.2%, Range 0 – 2%

Small Rock: Mean 1.0%, Range 0 – 10%

Fines Cover: Mean 67.1%, Range 5 – 98%

Litter Cover: Mean 24.0%, Range 1 – 93%

Soil Texture (field assessed): Medium silt loam (3), Moderately fine clay loam (3), Medium to very fine, loamy sand (2), Fine clay (1), Fine silty clay (1), Medium loam (1), Medium silt (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (6), Shale and other sedimentary (5), Sandstone (2), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Suisun Hills and Valleys (10), East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 70.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

This association remains provisional due to limited sampling through its expected range.

References: Buck-Diaz et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=15; Alameda County (n=3): ALCC328, ALCC555, EBAY0051

Contra Costa County (n=12): ALCC302, ALCC304, ALCC331, ALCC332, ALCC364, ALCC369, ALCC375, ALCC412, ALCC441, ALCC592, ALCC812, ALCC856

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	87	1.9	0.2	12.0	Y			Y
H	<i>Lolium perenne</i>	80	6.5	0.2	20.0	Y			Y
H	<i>Bromus hordeaceus</i>	80	5.5	0.2	50.0	Y			Y
H	<i>Lupinus microcarpus</i>	73	11.2	2.0	65.0				Y
H	<i>Avena barbata</i>	67	8.7	0.2	40.0				Y
H	<i>Carduus pycnocephalus</i>	53	0.7	0.1	9.0				Y
H	<i>Geranium dissectum</i>	53	0.2	0.2	1.0				Y
H	<i>Erodium cicutarium</i>	47	1.0	0.1	10.0				
H	<i>Hordeum murinum</i>	47	0.3	0.2	2.0				
H	<i>Medicago polymorpha</i>	47	0.2	0.1	1.0				
H	<i>Chlorogalum pomeridianum</i>	40	0.4	0.2	5.0				
H	<i>Croton setigerus</i>	40	0.1	0.1	0.2				
H	<i>Lupinus succulentus</i>	33	2.3	1.0	19.0				
H	<i>Bromus madritensis</i>	33	1.7	1.0	10.0				
H	<i>Trifolium hirtum</i>	33	0.7	0.1	10.0				
H	<i>Brassica nigra</i>	33	0.3	0.2	3.0				
H	<i>Lactuca serriola</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	27	0.8	0.2	10.0				
H	<i>Erodium botrys</i>	27	0.5	1.0	3.0				
H	<i>Hirschfeldia incana</i>	27	0.3	0.2	2.0				
H	<i>Triteleia laxa</i>	27	0.1	0.2	1.0				
H	<i>Dichelostemma capitatum</i>	27	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	27	0.0	0.1	0.2				

***Lupinus bicolor* Association**

Common Name: Miniature Lupine Patches

Alliance: *Eschscholzia (californica)* – *Lupinus (nanus)* Herbaceous Alliance

Local Vegetation Description

The Miniature Lupine Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus diandrus*, *Hypochaeris glabra*, and *Lupinus bicolor*. Those herbs often present include *Bromus hordeaceus*, *Castilleja exserta*, *Dichelostemma capitatum*, *Erodium botrys*, and *Erodium cicutarium*, and herbs that are sometimes present include *Acmispon wrangelianus*, *Amsinckia menziesii* var. *intermedia*, *Calandrinia ciliata*, *Centaurea melitensis*, *Croton setigerus*, *Eschscholzia californica*, *Hirschfeldia incana*, *Lolium perenne*, *Silene gallica*, and *Trifolium hirtum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	33.3	8 – 55	0.4	0 – 1

Local Environmental Description

Elevation: Mean 377 m, Range 133 – 1106 m

Aspect: SE (4), SW (1), Variable (1)

Slope: Mean 29 degrees, Range 16 – 50 degrees

Macro Topography: Upper 1/3 of slope (3), Middle 1/3 of slope (2), Lower to Upper 1/3 of slope (1)

Large Rock: Mean 0.5%, Range 0 – 3%

Small Rock: Mean 16.2%, Range 0 – 92%

Fines Cover: Mean 70.3%, Range 5 – 96%

Litter Cover: Mean 11.9%, Range 0 – 35%

Soil Texture (field assessed): Medium loam (2), Fine clay (1), Medium sand (1), Medium to very fine, loamy sand (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (2), Shale and other sedimentary (2), Franciscan melange (1), Sandstone (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: Suisun Hills and Valleys (3), Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 64.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Centaurea melitensis*, *Erodium botrys*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Lolium perenne*, *Silene gallica*, and *Trifolium hirtum*.

Classification Comments

None.

References: Boul et al. 2011, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC518, ALCC564

Contra Costa County (n=4): ALCC333, ALCC352, ALCC406, ALCC407

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lupinus bicolor</i>	100	8.3	1.0	18.0	Y			Y
H	<i>Bromus diandrus</i>	100	3.6	0.2	10.0	Y			Y
H	<i>Avena barbata</i>	100	3.3	1.0	8.0	Y			Y
H	<i>Hypochaeris glabra</i>	83	0.6	0.1	2.0	Y			Y
H	<i>Erodium botrys</i>	67	9.0	1.0	23.0				Y
H	<i>Bromus hordeaceus</i>	67	3.0	1.0	13.0				Y
H	<i>Erodium cicutarium</i>	67	0.8	0.2	4.0				Y
H	<i>Castilleja exserta</i>	50	1.0	0.2	5.0				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium hirtum</i>	33	1.0	1.0	5.0				
H	<i>Lolium perenne</i>	33	0.5	0.2	3.0				
H	<i>Eschscholzia californica</i>	33	0.5	0.2	3.0				
H	<i>Acemispom wrangelianus</i>	33	0.4	0.2	2.0				
H	<i>Croton setigerus</i>	33	0.2	0.2	1.0				
H	<i>Calandrinia ciliata</i>	33	0.2	0.2	1.0				
H	<i>Silene gallica</i>	33	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	33	0.1	0.1	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.1	0.2				
H	<i>Centaurea melitensis</i>	33	0.1	0.1	0.2				
NV	Moss	33	0.1	0.2	0.2				

***Lupinus formosus* Provisional Association**

Common Name: Western Lupine Patches

Alliance: *Eschscholzia (californica)* – *Lupinus (nanus)* Herbaceous Alliance

Local Vegetation Description

The Western Lupine Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Bromus diandrus*, *Bromus hordeaceus*, *Centaurea solstitialis*, *Erodium botrys*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Lupinus formosus*, *Trifolium hirtum*, *Trifolium subterraneum*, and *Vulpia bromoides*. Those herbs often present include *Avena fatua*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Eschscholzia californica*, *Rumex pulcher*, *Trifolium dubium*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	47.4	35 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 194 m, Range 51 – 400 m

Aspect: SW (2), Variable (2), NW (1)

Slope: Mean 22 degrees, Range 10 – 30 degrees

Macro Topography: Ridge top (3), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 3.0%, Range 0 – 12%

Fines Cover: Mean 73.0%, Range 32 – 96%

Litter Cover: Mean 21.4%, Range 1 – 54%

Soil Texture (field assessed): Medium loam (2), Medium to very fine, sandy loam (2), Fine clay (1)

Geology (field or map data): Mixed sedimentary (3), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Suisun Hills and Valleys (3)

Site Impacts

This association has high non-native plant cover (average 72.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Lupinus formosus Provisional Association
Eschscholzia (californica) – *Lupinus (nanus)* Herbaceous Alliance

Bromus diandrus, *Bromus hordeaceus*, *Erodium botrys*, *Hordeum murinum*,
Hypochaeris glabra, *Lolium perenne*, *Trifolium hirtum*, and *Vulpia bromoides*.

Classification Comments

This provisional association is newly described here. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=2): ALCC314, ALCC591

Solano Co. (n=3): RUSH0018, RUSH0020, RUSH0023

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium botrys</i>	100	13.2	0.2	30.0	Y			Y
H	<i>Lupinus formosus</i>	100	10.8	3.0	20.0	Y			Y
H	<i>Lolium perenne</i>	100	3.2	0.2	10.0	Y			Y
H	<i>Trifolium hirtum</i>	100	2.2	1.0	5.0	Y			Y
H	<i>Bromus diandrus</i>	100	0.9	0.2	2.0	Y			Y
H	<i>Centaurea solstitialis</i>	100	0.7	0.2	2.0	Y			Y
H	<i>Vulpia bromoides</i>	80	3.2	0.2	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	80	2.0	0.2	8.0	Y			Y
H	<i>Hordeum murinum</i>	80	1.4	0.2	5.0	Y			Y
H	<i>Hypochaeris glabra</i>	80	1.3	0.2	4.0	Y			Y
H	<i>Trifolium subterraneum</i>	80	0.5	0.2	2.0	Y			Y
H	<i>Avena fatua</i>	60	1.2	0.2	4.0				Y
H	<i>Eschscholzia californica</i>	60	1.1	0.2	5.0				Y
H	<i>Convolvulus arvensis</i>	60	0.5	0.2	2.0				Y
H	<i>Vicia sativa</i>	60	0.3	0.2	1.0				Y
H	<i>Rumex pulcher</i>	60	0.1	0.2	0.2				Y
H	<i>Trifolium dubium</i>	60	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	60	0.1	0.2	0.2				Y
H	<i>Viola pedunculata</i>	40	0.4	0.2	2.0				
H	<i>Sanicula bipinnatifida</i>	40	0.1	0.2	0.2				
H	<i>Raphanus sativus</i>	40	0.1	0.2	0.2				
H	<i>Sidalcea malviflora</i>	40	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	40	0.1	0.2	0.2				
H	<i>Helminthotheca echioides</i>	40	0.1	0.2	0.2				
H	<i>Rumex acetosella</i>	40	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	40	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	40	0.1	0.2	0.2				

***Festuca idahoensis* – *Danthonia californica* Herbaceous Alliance**



Common Name: Idaho fescue - California oatgrass grassland

NVC Alliance Code: A4210. *Festuca idahoensis* ssp. *roemerii* - *Danthonia californica*
Interior Prairie, Bald & Bluff Grassland Alliance

Statewide Description

Danthonia californica, *Festuca idahoensis*, *Festuca californica*, and/or *Festuca rubra* is dominant or co-dominant in the herbaceous layer with *Achillea millefolium*, *Aira caryophylla*, *Anagallis arvensis*, *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Cynosurus echinatus*, *Hypochaeris radicata*, *Koeleria macrantha*, *Lolium perenne* ssp. *multiflorum*, *Nassella pulchra*, *Plantago lanceolata*, *Rumex acetosella*, *Sisyrinchium bellum* and *Vulpia bromoides*. Emergent trees or shrubs may be present at low cover, including *Baccharis pilularis*, *Elymus glaucus*, *Pseudotsuga menziesii*, *Rubus ursinus*, or *Toxicodendron diversilobum*.

Although these three character species exist in a variety of habitats across California, this alliance describes coastal prairie grasslands along the central coast and in northwestern California. On the North Coast (north of Marin County), this coastal prairie occurs in two settings: terrace prairie along the coastline at low and maritime elevations, and bald hills prairie on inland ridges and hilltops. In either phase, shrubs and trees are generally absent. Native perennial bunchgrasses mix with annual and perennial forbs creating a colorful display in late spring (Ornduff et al. 2003).

Local Vegetation Description

The Idaho fescue - California oatgrass grassland Alliance forms an open to continuous herbaceous layer. The shrub layer is usually sparse and the tree layer is sparse. Characteristic herbs include *Danthonia californica*, *Nassella pulchra*, and *Plantago lanceolata*. Those herbs often present include *Avena barbata*, *Bromus hordeaceus*, *Lolium perenne*, *Rumex acetosella*, and *Vulpia bromoides*, and herbs that are sometimes present include *Achillea millefolium*, *Aira caryophyllea*, *Avena fatua*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Chlorogalum pomeridianum*, *Convolvulus arvensis*, *Erodium botrys*, *Festuca idahoensis*, *Geranium dissectum*, *Hypochaeris radicata*, *Juncus occidentalis*, *Koeleria macrantha*, *Lysimachia arvensis*, *Sisyrinchium bellum*, *Trifolium dubium*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 1	no data	no data
Regenerating or Shrubby Tree	0.3	0 – 5	1.5	0 – 5
Shrub	1.1	0 – 10	0.8	0 – 2
Herb	63.3	30 – 100	0.3	0 – 1

Local Membership Rule

Festuca idahoensis, *F. californica*, *F. rubra*, and/or *Danthonia californica* > 50% relative cover in the herbaceous layer. *Nassella pulchra* > 30% relative cover. *Bromus carinatus*, *Elymus glaucus*, *Nassella pulchra*, *Plantago erecta*, and a variety of native and non-native forbs and grasses < 30% relative cover. *Festuca*, *Danthonia*, or *Perideridia kelloggii* and other native species share at least 10% relative cover in the herb layer, with other non-native grasses and forbs sometimes having higher cover.

Local Environmental Description

Elevation: Mean 94 m, Range 3 – 400 m

Aspect: NE (4), NW (4), SE (3), Variable (3), Flat (2), Not recorded (2)

Slope: Mean 7 degrees, Range 0 – 20 degrees

Macro Topography: Lower 1/3 of slope (6), Middle 1/3 of slope (4), Bottom (2), Middle to Upper 1/3 of slope (2), Not recorded (2), Upper 1/3 of slope (2)

Large Rock: 0%

Small Rock: Mean 1.5%, Range 0 – 10%

Fines Cover: Mean 34.2%, Range 0 – 85%

Litter Cover: Mean 31.7%, Range 1 – 78%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine silty clay loam (1), Medium loam (1), Fine silty clay (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (12), Alluvium (1), General igneous intrusives (1), General volcanic extrusives (1), Sandstone and other sedimentary (1), Sedimentary (1), Serpentine (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (14), East Bay Terraces and Alluvium (1)

Site Impacts

This alliance has moderate non-native plant cover (average 44.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Convolvulus arvensis*, *Erodium botrys*, *Geranium dissectum*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, *Trifolium dubium*, *Vicia sativa*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Danthonia californica – *Nassella pulchra*

Danthonia californica Coastal

Festuca idahoensis – *Nassella pulchra*

Perideridia kelloggii – *Danthonia californica*

Classification Comments

None.

References: Buck-Diaz et al. 2021, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: S3

Surveys Used for Description

Total: N=18; Alameda County (n=3): ALCC589, EBAY0050, PRRP001

Contra Costa County (n=15): ALCC588, ALCC902, ALCC910, CORT160, PPRA004, PPRA005, PPRA006, PPRA007, PPRA009, PPRA010, PPRA011, PPRA016, PPRA018, PPRA026, PPRA033

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	28	0.4	0.2	4.0				
H	<i>Plantago lanceolata</i>	89	5.1	0.2	25.0	Y			Y
H	<i>Danthonia californica</i>	78	13.9	2.0	40.0	Y			Y
H	<i>Nassella pulchra</i>	78	9.9	1.0	38.0	Y			Y
H	<i>Lolium perenne</i>	72	4.1	0.2	15.0				Y
H	<i>Bromus hordeaceus</i>	67	4.3	0.2	25.0				Y
H	<i>Vulpia bromoides</i>	67	3.0	0.2	25.0				Y
H	<i>Rumex acetosella</i>	67	0.3	0.2	2.0				Y
H	<i>Avena barbata</i>	50	0.9	0.2	5.0				Y
H	<i>Bromus diandrus</i>	39	2.7	0.2	20.0				
H	<i>Convolvulus arvensis</i>	39	1.5	0.2	10.0				
H	<i>Erodium botrys</i>	39	0.6	0.2	10.0				
H	<i>Hypochaeris radicata</i>	39	0.5	0.2	4.0				
H	<i>Vicia sativa</i>	39	0.4	0.2	3.0				
H	<i>Geranium dissectum</i>	39	0.2	0.2	3.0				
H	<i>Achillea millefolium</i>	33	0.5	0.2	4.0				
H	<i>Lysimachia arvensis</i>	33	0.1	0.2	0.2				
H	<i>Festuca idahoensis</i>	28	2.8	0.2	36.0				
H	<i>Brachypodium distachyon</i>	28	1.4	1.0	16.0				
H	<i>Chlorogalum pomeridianum</i>	28	0.9	0.2	10.0				
H	<i>Juncus occidentalis</i>	28	0.5	0.2	8.0				
H	<i>Avena fatua</i>	28	0.5	0.2	5.0				
H	<i>Trifolium dubium</i>	28	0.4	0.2	6.0				
H	<i>Sisyrinchium bellum</i>	28	0.4	0.2	4.0				
H	<i>Aira caryophyllea</i>	28	0.3	0.2	3.0				
H	<i>Briza minor</i>	22	1.9	0.2	33.0				
H	<i>Koeleria macrantha</i>	22	0.5	1.0	4.0				

***Danthonia californica* – *Nassella pulchra* Association**

Common Name: California Oatgrass – Purple Needlegrass Patches

Alliance: *Festuca idahoensis* – *Danthonia californica* Herbaceous Alliance

Local Vegetation Description

The California Oatgrass – Purple Needlegrass Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is usually absent. Characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Danthonia californica*, *Nassella pulchra*, *Plantago lanceolata*. Those herbs often present include *Convolvulus arvensis*, *Erodium botrys*, *Hypochaeris radicata*, *Lolium perenne*, *Lysimachia arvensis*, *Rumex acetosella*, and *Vulpia bromoides*, and herbs that are sometimes present include *Avena fatua*, *Brachypodium distachyon*, *Bromus diandrus*, *Geranium dissectum*, *Juncus occidentalis*, *Vicia sativa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.6	0 – 5	3.5	2 – 5
Shrub	0.3	0 – 2	0.8	0.5 – 1
Herb	75.1	60 – 90	0.4	0 – 1

Local Environmental Description

Elevation: Mean 30 m, Range 4 – 178 m

Aspect: Not recorded (2), SE (2), Variable (2), Flat (1), NE (1)

Slope: Mean 4 degrees, Range 0 – 15 degrees

Macro Topography: Lower 1/3 of slope (5), Not recorded (2), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.2%, Range 0 – 1%

Fines Cover: Mean 4.2%, Range 0 – 13%

Litter Cover: Mean 30.4%, Range 1 – 75%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (6), Alluvium (1), General igneous intrusives (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7)

Site Impacts

This association has moderate non-native plant cover (average 43.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Convolvulus arvensis*, *Erodium botrys*, *Geranium dissectum*, *Hypochaeris radicata*, *Lolium perenne*,

Danthonia californica – *Nassella pulchra* Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

Plantago lanceolata, *Rumex acetosella*, *Vicia sativa*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=8; **Alameda County (n=1):** EBAY0050

Contra Costa County (n=7): PPRA005, PPRA006, PPRA010, PPRA016, PPRA018, PPRA026, PPRA033

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Danthonia californica</i>	100	18.4	5.0	30.0	Y			Y
H	<i>Nassella pulchra</i>	100	15.6	3.0	30.0	Y			Y
H	<i>Plantago lanceolata</i>	100	3.9	1.0	15.0	Y			Y
H	<i>Bromus hordeaceus</i>	75	6.3	0.2	25.0	Y			Y
H	<i>Avena barbata</i>	75	1.9	1.0	5.0	Y			Y
H	<i>Vulpia bromoides</i>	63	4.1	0.2	25.0				Y
H	<i>Lolium perenne</i>	63	3.0	0.2	15.0				Y
H	<i>Convolvulus arvensis</i>	63	2.9	0.2	10.0				Y
H	<i>Rumex acetosella</i>	63	0.2	0.2	1.0				Y
H	<i>Hypochaeris radicata</i>	50	0.2	0.2	1.0				Y
H	<i>Erodium botrys</i>	50	0.1	0.2	0.2				Y
H	<i>Lysimachia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	38	4.0	2.0	20.0				
H	<i>Juncus occidentalis</i>	38	1.2	0.2	8.0				
H	<i>Brachypodium distachyon</i>	25	2.6	5.0	16.0				
H	<i>Avena fatua</i>	25	0.8	1.2	5.0				
H	<i>Vicia villosa</i>	25	0.7	0.2	5.0				
H	<i>Vicia sativa</i>	25	0.3	0.2	2.0				
H	<i>Geranium dissectum</i>	25	0.1	0.2	0.2				

***Danthonia californica* Coastal Association**

Common Name: California Oatgrass Coastal Patches

Alliance: *Festuca idahoensis* – *Danthonia californica* Herbaceous Alliance

Local Vegetation Description

The California Oatgrass Coastal Association forms an intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Danthonia californica*, and characteristic herbs include *Bromus hordeaceus*, *Holcus lanatus*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, *Vicia sativa*, *Vulpia bromoides*. Those herbs often present include *Avena barbata*, *Avena fatua*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Convolvulus arvensis*, *Geranium dissectum*, *Holcus lanatus*, *Juncus occidentalis*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0.2	no data	no data
Herb	58.8	50 – 65	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 7 m, Range 3 – 12 m

Aspect: NE (2), Flat (1), Variable (1)

Slope: Mean 1 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (2), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 40.5%, Range 2 – 85%

Litter Cover: Mean 28.8%, Range 2 – 78%

Soil Texture (field assessed): Not recorded (4)

Geology (field or map data): Sandstone, shale, and gravel deposits (4)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4)

Site Impacts

This association has high non-native plant cover (average 57.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Bromus racemosus*, *Convolvulus arvensis*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Holcus lanatus*, *Hypochaeris*

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Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

radicata, *Lolium perenne*, *Lotus corniculatus*, *Plantago lanceolata*, *Rumex acetosella*, *Torilis arvensis*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Keeler-Wolf et al. 2003a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=4): PPRA004, PPRA007, PPRA009, PPRA011

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	25	0.1	0.2	0.2				
H	<i>Danthonia californica</i>	100	25.0	15.0	40.0	Y		Y	Y
H	<i>Plantago lanceolata</i>	100	10.8	0.2	25.0	Y			Y
H	<i>Lolium perenne</i>	100	7.0	1.0	15.0	Y			Y
H	<i>Vulpia bromoides</i>	100	4.3	1.0	10.0	Y			Y
H	<i>Rumex acetosella</i>	100	0.9	0.2	2.0	Y			Y
H	<i>Bromus hordeaceus</i>	75	4.0	1.0	10.0	Y			Y
H	<i>Holcus lanatus</i>	75	1.9	0.2	7.0	Y			Y
H	<i>Vicia sativa</i>	75	0.9	0.2	3.0	Y			Y
H	<i>Bromus diandrus</i>	50	2.0	4.0	4.0				Y
H	<i>Geranium dissectum</i>	50	0.8	0.2	3.0				Y
H	<i>Avena fatua</i>	50	0.8	1.0	2.0				Y
H	<i>Convolvulus arvensis</i>	50	0.8	1.0	2.0				Y
H	<i>Brachypodium distachyon</i>	50	0.8	1.0	2.0				Y
H	<i>Avena barbata</i>	50	0.3	0.2	1.0				Y
H	<i>Briza minor</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus occidentalis</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris radicata</i>	25	1.0	4.0	4.0				
H	<i>Nassella pulchra</i>	25	0.5	2.0	2.0				
H	<i>Juncus phaeocephalus</i>	25	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	25	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	25	0.1	0.2	0.2				
H	<i>Bromus racemosus</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	25	0.1	0.2	0.2				
H	<i>Nassella cernua</i>	25	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	25	0.1	0.2	0.2				
H	<i>Lotus corniculatus</i>	25	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	25	0.1	0.2	0.2				

***Festuca idahoensis* – *Nassella pulchra* Provisional Association**

Common Name: Idaho Fescue – Purple Needlegrass Patches

Alliance: *Festuca idahoensis* – *Danthonia californica* Herbaceous Alliance

Local Vegetation Description

The Idaho Fescue – Purple Needlegrass Association forms an open to continuous herbaceous layer. The shrub layer is open and the tree layer is sparse. Characteristic herbs include *Achillea millefolium*, *Chlorogalum pomeridianum*, *Festuca idahoensis*, *Koeleria macrantha*, *Nassella pulchra*, *Sisyrinchium bellum*, *Trifolium dubium*, and *Vulpia bromoides*. Those herbs often present include *Bromus carinatus*, *Dichelostemma capitatum*, *Erodium botrys*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago lanceolata*, *Ranunculus californicus*, *Rumex acetosella*, *Sherardia arvensis*, *Sidalcea malviflora*, and *Wyethia angustifolia*. Commonly associated emergent trees at sparse cover include *Eucalyptus* sp. Commonly associated emergent shrubs at low cover include *Baccharis pilularis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 1	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.8	0.5 – 1
Shrub	2.5	0 – 10	1.5	1 – 2
Herb	51.9	30 – 100	0.4	0 – 1

Local Environmental Description

Elevation: Mean 265 m, Range 23 – 400 m

Aspect: NW (3), SE (1)

Slope: Mean 15 degrees, Range 3 – 20 degrees

Macro Topography: Middle to Upper 1/3 of slope (2), Upper 1/3 of slope (2)

Large Rock: Mean 0.1%, Range 0 – 0.2%

Small Rock: Mean 5.8%, Range 1 – 10%

Fines Cover: Mean 62.7%, Range 57 – 72%

Litter Cover: Mean 29.3%, Range 20 – 38%

Soil Texture (field assessed): Medium loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): General volcanic extrusives (1), Sandstone and other sedimentary (1), Sedimentary (1), Serpentine (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1)

Site Impacts

This association has moderate non-native plant cover (average 29.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Anagallis arvensis*, *Briza maxima*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cotoneaster pannosus*, *Cynosurus echinatus*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Helminthotheca echioides*, *Hypochaeris radicata*, *Logfia gallica*, *Lolium perenne*, *Plantago lanceolata*, *Prunus cerasifera*, *Rumex acetosella*, *Sherardia arvensis*, *Soliva sessilis*, *Sonchus oleraceus*, *Stellaria media*, *Torilis arvensis*, *Torilis nodosa*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

A rare plant was identified in one of the surveys, *Eriogonum luteolum* var. *caninum* (CRPR 1B.2). This association remains provisional due to limited sampling across its expected range.

References: Buck-Diaz et al. 2021a, Sikes et al. 2021

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=2): ALCC589, PRRP001

Contra Costa County (n=2): ALCC588, CORT160

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Eucalyptus</i> sp.	25	0.3	1.0	1.0				
R	<i>Prunus cerasifera</i>	25	0.1	0.2	0.2				
S	<i>Baccharis pilularis</i>	50	0.8	0.2	3.0				Y
S	<i>Symphoricarpos mollis</i>	25	0.8	3.0	3.0				
S	<i>Toxicodendron diversilobum</i>	25	0.5	2.0	2.0				
S	<i>Rubus ursinus</i>	25	0.3	1.0	1.0				
S	<i>Cotoneaster pannosus</i>	25	0.3	1.0	1.0				
H	<i>Festuca idahoensis</i>	100	12.8	4.0	36.0	Y			Y
H	<i>Nassella pulchra</i>	100	12.5	3.0	38.0	Y			Y
H	<i>Achillea millefolium</i>	100	1.3	0.2	2.0	Y			Y
H	<i>Chlorogalum pomeridianum</i>	75	3.6	0.2	10.0	Y			Y
H	<i>Koeleria macrantha</i>	75	2.0	1.0	4.0	Y			Y
H	<i>Vulpia bromoides</i>	75	1.4	0.2	5.0	Y			Y
H	<i>Sisyrinchium bellum</i>	75	0.8	0.2	2.0	Y			Y

Festuca idahoensis – *Nassella pulchra* Provisional Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Trifolium dubium</i>	75	0.4	0.2	1.0	Y			Y
H	<i>Plantago lanceolata</i>	50	2.8	1.0	10.0				Y
H	<i>Erodium botrys</i>	50	2.6	0.2	10.0				Y
H	<i>Lolium perenne</i>	50	1.8	1.0	6.0				Y
H	<i>Bromus carinatus</i>	50	1.5	3.0	3.0				Y
H	<i>Hypochaeris radicata</i>	50	0.8	0.2	3.0				Y
H	<i>Wyethia angustifolia</i>	50	0.3	0.2	1.0				Y
H	<i>Sidalcea malviflora</i>	50	0.1	0.2	0.2				Y
H	<i>Ranunculus californicus</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex acetosella</i>	50	0.1	0.2	0.2				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.2	0.2				Y
H	<i>Sherardia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Briza minor</i>	25	8.3	33.0	33.0				
H	<i>Plantago sp.</i>	25	4.3	17.0	17.0				
H	<i>Bromus diandrus</i>	25	2.0	8.0	8.0				
H	<i>Bromus hordeaceus</i>	25	1.3	5.0	5.0				
H	<i>Nassella lepida</i>	25	1.3	5.0	5.0				
H	<i>Briza maxima</i>	25	1.3	5.0	5.0				
H	<i>Elymus glaucus</i>	25	1.0	4.0	4.0				
H	<i>Pteridium aquilinum</i>	25	0.8	3.0	3.0				
H	<i>Elymus multisetus</i>	25	0.8	3.0	3.0				
H	<i>Anagallis arvensis</i>	25	0.8	3.0	3.0				
H	<i>Eschscholzia californica</i>	25	0.5	2.0	2.0				
H	<i>Madia sativa</i>	25	0.5	2.0	2.0				
H	<i>Plantago erecta</i>	25	0.5	2.0	2.0				
H	<i>Vulpia microstachys</i>	25	0.5	2.0	2.0				
H	<i>Corethrogyne filaginifolia</i>	25	0.3	1.0	1.0				
H	<i>Zigadenus fremontii</i>	25	0.3	1.0	1.0				
H	<i>Grindelia hirsutula</i>	25	0.3	1.0	1.0				
H	<i>Foeniculum vulgare</i>	25	0.3	1.0	1.0				
H	<i>Marah fabaceus</i>	25	0.3	1.0	1.0				
H	<i>Trifolium subterraneum</i>	25	0.3	1.0	1.0				
H	<i>Carduus pycnocephalus</i>	25	0.3	1.0	1.0				
H	<i>Madia gracilis</i>	25	0.3	1.0	1.0				
H	<i>Hordeum brachyantherum</i>	25	0.3	1.0	1.0				
H	<i>Calochortus luteus</i>	25	0.1	0.2	0.2				
H	<i>Drymocallis glandulosa</i>	25	0.1	0.2	0.2				

Festuca idahoensis – *Nassella pulchra* Provisional Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Monardella villosa</i>	25	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	25	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	25	0.1	0.2	0.2				
H	<i>Luzula comosa</i>	25	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	25	0.1	0.2	0.2				
H	<i>Helminthotheca echioides</i>	25	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	25	0.1	0.2	0.2				
H	<i>Sanicula bipinnatifida</i>	25	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	25	0.1	0.2	0.2				
H	<i>Aphanes occidentalis</i>	25	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	25	0.1	0.2	0.2				
H	<i>Eriogonum luteolum</i> var. <i>caninum</i>	25	0.1	0.2	0.2				
H	<i>Clarkia franciscana</i>	25	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	25	0.1	0.2	0.2				
H	<i>Erodium</i> sp.	25	0.1	0.2	0.2				
H	<i>Geranium dissectum</i>	25	0.1	0.2	0.2				
H	<i>Trifolium microdon</i>	25	0.1	0.2	0.2				
H	<i>Astragalus gambelianus</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Calystegia</i> sp.	25	0.1	0.2	0.2				
H	<i>Calystegia subacaulis</i>	25	0.1	0.2	0.2				
H	<i>Camissonia ovata</i>	25	0.1	0.2	0.2				
H	<i>Acmispon wrangelianus</i>	25	0.1	0.2	0.2				
H	<i>Viola pedunculata</i>	25	0.1	0.2	0.2				
H	<i>Perideridia kelloggii</i>	25	0.1	0.2	0.2				
H	<i>Triphysaria pusilla</i>	25	0.1	0.2	0.2				
H	<i>Acaena californica</i>	25	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	25	0.1	0.2	0.2				
H	<i>Bromus</i> sp.	25	0.1	0.2	0.2				
H	<i>Torilis nodosa</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Stellaria media</i>	25	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	25	0.1	0.2	0.2				
H	<i>Soliva sessilis</i>	25	0.1	0.2	0.2				
H	<i>Avena barbata</i>	25	0.1	0.2	0.2				
NV	Moss	25	0.1	0.2	0.2				

Festuca idahoensis – *Nassella pulchra* Provisional Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

***Perideridia kelloggii* – *Danthonia californica* Provisional Association**

Common Name: Yampah – Creeping Ryegrass Patches

Alliance: *Festuca idahoensis* – *Danthonia californica* Herbaceous Alliance

Local Vegetation Description

The Yampah – Creeping Ryegrass Association forms an intermittent herbaceous layer. The shrub layer is open and the tree layer is absent. Characteristic herbs include *Aira caryophylla*, *Anagallis arvensis*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Danthonia californica*, *Geranium dissectum*, *Helminthotheca echioides*, *Linum bienne*, *Lolium perenne*, *Madia elegans*, *Nassella lepida*, *Perideridia kelloggii*, *Plantago lanceolata*, *Sisyrinchium bellum*, *Sonchus asper*, and *Trifolium dubium*. Commonly associated regenerating or shrubby trees at sparse cover include *Umbellularia californica*. Commonly associated emergent shrubs at sparse cover include *Baccharis pilularis* and *Toxicodendron diversilobum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	3.5	3 – 4	0.5	0 – 1
Herb	47.5	40 – 55	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 176 m, Range 146 – 207 m

Aspect: NE (1), NW (1)

Slope: Mean 11 degrees, Range 10 – 12 degrees

Macro Topography: Middle 1/3 of slope (2)

Large Rock: No data

Small Rock: No data

Fines Cover: Mean 53.5%, Range 30 – 77%

Litter Cover: Mean 44.5%, Range 20 – 69%

Soil Texture (field assessed): Fine silty clay (1), Moderately fine clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Site Impacts

This association has high non-native plant cover (average 55.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophylla*, *Anagallis arvensis*, *Brachypodium distachyon*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Cirsium*

Perideridia kelloggii – *Danthonia californica* Provisional Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

vulgare, *Cynosurus echinatus*, *Geranium dissectum*, *Helminthotheca echioides*, *Hypochaeris glabra*, *Linum bienne*, *Logfia gallica*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, *Sherardia arvensis*, *Soliva sessilis*, *Sonchus asper*, *Torilis arvensis*, *Trifolium dubium*, *Trifolium glomeratum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vicia villosa*.

Classification Comments

This association remains provisional due to low sample size.

References: Buck-Diaz et al. 2021a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): ALCC902, ALCC910

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Umbellularia californica</i>	50	0.1	0.2	0.2				Y
S	<i>Baccharis pilularis</i>	100	2.1	0.2	4.0	Y	Y		Y
S	<i>Toxicodendron diversilobum</i>	50	1.5	3.0	3.0				Y
H	<i>Lolium perenne</i>	100	7.0	4.0	10.0	Y			Y
H	<i>Helminthotheca echioides</i>	100	5.0	4.0	6.0	Y			Y
H	<i>Perideridia kelloggii</i>	100	4.0	2.0	6.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	3.5	1.0	6.0	Y			Y
H	<i>Plantago lanceolata</i>	100	3.5	3.0	4.0	Y			Y
H	<i>Trifolium dubium</i>	100	3.1	0.2	6.0	Y			Y
H	<i>Sisyrinchium bellum</i>	100	2.1	0.2	4.0	Y			Y
H	<i>Danthonia californica</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Nassella lepida</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Chlorogalum pomeridianum</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Aira caryophyllea</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Bromus madritensis</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Madia elegans</i>	100	0.6	0.2	1.0	Y			Y
H	<i>Anagallis arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Sonchus asper</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Geranium dissectum</i>	100	0.2	0.2	0.2	Y			Y

Perideridia kelloggii – *Danthonia californica* Provisional Association
Festuca idahoensis – *Danthonia californica* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Linum bienne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hemizonia congesta</i>	50	5.0	10.0	10.0				Y
H	<i>Achillea millefolium</i>	50	2.0	4.0	4.0				Y
H	<i>Brachypodium distachyon</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus carinatus</i>	50	1.0	2.0	2.0				Y
H	<i>Trifolium subterraneum</i>	50	0.5	1.0	1.0				Y
H	<i>Vicia sativa</i>	50	0.5	1.0	1.0				Y
H	<i>Elymus glaucus</i>	50	0.5	1.0	1.0				Y
H	<i>Koeleria macrantha</i>	50	0.5	1.0	1.0				Y
H	<i>Cynosurus echinatus</i>	50	0.5	1.0	1.0				Y
H	<i>Nassella pulchra</i>	50	0.5	1.0	1.0				Y
H	<i>Madia gracilis</i>	50	0.5	1.0	1.0				Y
H	<i>Torilis</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Vulpia microstachys</i>	50	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	50	0.1	0.2	0.2				Y
H	<i>Vicia villosa</i>	50	0.1	0.2	0.2				Y
H	<i>Briza minor</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y
H	<i>Logfia gallica</i>	50	0.1	0.2	0.2				Y
H	<i>Cirsium vulgare</i>	50	0.1	0.2	0.2				Y
H	<i>Festuca idahoensis</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus patens</i>	50	0.1	0.2	0.2				Y
H	<i>Pogogyne serpylloides</i>	50	0.1	0.2	0.2				Y
H	<i>Ranunculus californicus</i>	50	0.1	0.2	0.2				Y
H	<i>Triteleia laxa</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium glomeratum</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.2	0.2				Y
H	<i>Sherardia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Soliva sessilis</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex acetosella</i>	50	0.1	0.2	0.2				Y

***Holocarpha (heermannii, virgata)* Herbaceous Alliance**



Common Name: Tarweed fields

NVC Alliance Code: N/A.

Statewide Description

Holocarpha heermannii, *Holocarpha obconica*, or *Holocarpha virgata* is characteristically present to co-dominant in the herbaceous layer with *Aegilops triuncialis*, *Avena barbata*, *Avena fatua*, *Briza minor*, *Brodiaea elegans*, *Bromus diandrus*, *Bromus hordeaceus*, *Castilleja attenuata*, *Centaurium muehlenbergii*, *Clarkia purpurea*, *Croton setigerus*, *Daucus pusillus*, *Erodium botrys*, *Galium parisiense*, *Hypochaeris glabra*, *Juncus bufonius*, *Leontodon saxatilis*, *Lolium perenne*, *Navarretia intertexta*, *Navarretia pubescens*, *Taeniatherum caput-medusae*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium microcephalum*, *Triteleia hyacinthina*, *Vicia sativa* ssp. *nigra*, *Vicia villosa*, and *Vulpia bromoides*.

Holocarpha virgata includes two subspecies; ssp. *virgata* occurs generally in Great Valley and the foothills of the Sierra Nevada and Coast Ranges surrounding the Valley, and ssp. *elongata* is in the Peninsular Ranges and South Coast regions. In the central to southern Sierra Nevada foothills, *Holocarpha obconica* and *H. heermannii* replace

Holocarpha virgata. *Holocarpha* spp. are aromatic native annuals that are most abundant in late spring to late summer; the stem leaves of this genus have distinctive sessile pit glands with sticky resin.

Holocarpha spp. usually occur with *Bromus hordeaceus*, *Erodium* spp., other non-natives, and/or native herbs. Stands may key to different alliances early in the season. Further sampling and analysis with full species composition, over a period of several seasons and years, are needed to understand the relationships between the component vegetation associations of this *Holocarpha* spp. alliance, and similar natural and semi-natural herbaceous types.

Local Vegetation Description

The Tarweed fields Alliance forms an open herbaceous layer. Both the shrub and tree layer are typically absent. Characteristic herbs include *Avena barbata* and *Bromus hordeaceus*. Those herbs often present include *Holocarpha virgata*, *Lolium perenne*, and *Trifolium hirtum*, and herbs that are sometimes present include *Bromus diandrus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Croton setigerus*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Lactuca serriola*, *Medicago polymorpha*, *Nassella pulchra*, *Trifolium willdenovii*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	37.5	18 – 65	0.6	0 – 1

Local Membership Rule

Holocarpha heermannii, *Holocarpha virgata*, *Holocarpha obconica*, or other *Holocarpha* spp., *Deinandra lobbiai*, *Blepharizonia laxa*, and/or *Blepharizonia plumosa* characteristically present or > 30% relative cover in the herbaceous layer; native herbs typically > 10% relative cover.

Local Environmental Description

Elevation: Mean 353 m, Range 56 – 1059 m

Aspect: NE (6), SW (4), NW (3), SE (3), Variable (1)

Slope: Mean 10 degrees, Range 1 – 24 degrees

Macro Topography: Lower 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Bottom (1), Bottom to Lower 1/3 of slope (1), Bottom to Mid 1/3 of slope (1), Middle 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.5%, Range 0 – 5%

Small Rock: Mean 4.5%, Range 0 – 20%

Fines Cover: Mean 65.2%, Range 12 – 95%

Litter Cover: Mean 28.1%, Range 3 – 81%

Soil Texture (field assessed): Fine silty clay (4), Moderately fine sandy clay loam (2), Fine clay (2), Moderately coarse, sandy loam (2), Moderately fine clay loam (1), Moderately fine silty clay loam (1), Fine sandy clay (1), Clay, (class unknown) (1), Medium loam (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (5), Sedimentary (5), Shale and other sedimentary (4), Franciscan melange (3)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5), Western Diablo Range (4)

Contra Costa County Subsections: Suisun Hills and Valleys (5), East Bay Hills - Mount Diablo (2), Eastern Hills (1)

Site Impacts

This alliance has high non-native plant cover (average 58.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Lactuca serriola*, *Lolium perenne*, *Trifolium hirtum*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Blepharizonia (laxa, plumosa)

Deinandra lobbii

Holocarpha (heermannii, virgata) alliance

Holocarpha virgata

Classification Comments

Two new provisional associations have been added to this alliance that are dominated by other genera that are also annual tarweeds.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens et al. 2004, Klein et al. 2007, Sikes et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=17; Alameda County (n=9): ALCC142, ALCC272, ALCC346, ALCC520, ALCC567, ALCC568, ALCC577, ALCC585, ALCCREC225

Contra Costa County (n=8): ALCC207, ALCC311, ALCC312, ALCC339, ALCC371, ALCC372, ALCC373, ALCC817

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	94	6.2	0.1	20.0	Y			Y
H	<i>Avena barbata</i>	88	3.8	0.2	16.0	Y			Y
H	<i>Holocarpha virgata</i>	71	6.0	0.2	27.0				Y
H	<i>Lolium perenne</i>	71	3.7	0.2	16.0				Y
H	<i>Trifolium hirtum</i>	53	1.3	0.2	10.0				Y
H	<i>Bromus diandrus</i>	35	1.7	0.1	16.0				
H	<i>Erodium botrys</i>	35	1.0	0.1	6.0				
H	<i>Elymus caput-medusae</i>	35	0.7	0.1	10.0				
H	<i>Erodium cicutarium</i>	29	0.7	0.2	7.0				
H	<i>Vulpia bromoides</i>	29	0.5	0.2	3.0				
H	<i>Croton setigerus</i>	29	0.3	0.2	3.0				
H	<i>Carduus pycnocephalus</i>	29	0.1	0.1	0.2				
H	<i>Geranium dissectum</i>	29	0.0	0.1	0.2				
H	<i>Hirschfeldia incana</i>	24	0.4	0.2	4.0				
H	<i>Medicago polymorpha</i>	24	0.3	0.2	4.0				
H	<i>Centaurea solstitialis</i>	24	0.2	0.2	2.0				
H	<i>Trifolium willdenovii</i>	24	0.2	0.1	2.0				
H	<i>Nassella pulchra</i>	24	0.1	0.1	2.0				
H	<i>Lactuca serriola</i>	24	0.1	0.2	1.0				

***Blepharizonia (laxa, plumosa)* Provisional Association**

Common Name: Big Tarweed Patches

Alliance: *Holocarpha (heermannii, virgata)* Herbaceous Alliance

Local Vegetation Description

The Big Tarweed Association forms an open herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Blepharizonia plumosa*, *Croton setigerus*, *Lactuca serriola*, *Lolium perenne*, and *Medicago polymorpha*. Those herbs often present include *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Geranium dissectum*, *Grindelia camporum*, and *Trifolium hirtum*, and herbs that are sometimes present include *Bellardia trixago*, *Brachypodium distachyon*, *Brassica nigra*, *Brassica rapa*, *Centaurea melitensis*, *Epilobium brachycarpum*, *Erodium cicutarium*, *Helminthotheca echioides*, *Holocarpha virgata*, *Hordeum marinum*, *Hypochaeris radicata*, *Lupinus* sp., *Microseris douglasii*, *Torilis arvensis*, and *Trifolium angustifolium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	28.3	25 – 35	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 207 m, Range 122 – 265 m

Aspect: NW (1), SE (1), SW (1)

Slope: Mean 17 degrees, Range 9 – 24 degrees

Macro Topography: Middle to Upper 1/3 of slope (1), Not recorded (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 81.0%, Range 60 – 94%

Litter Cover: Mean 17.7%, Range 5 – 38%

Soil Texture (field assessed): Fine silty clay (3)

Geology (field or map data): Shale and other sedimentary (2), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Suisun Hills and Valleys (2), East Bay Hills - Mount Diablo (1)

Site Impacts

This association has high non-native plant cover (average 65.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Brachypodium distachyon*, *Brassica nigra*, *Brassica rapa*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum marinum*, *Hypochaeris radicata*, *Lactuca serriola*, *Lolium perenne*, *Torilis arvensis*, *Trifolium angustifolium*, and *Trifolium hirtum*.

Classification Comments

This association is newly described here and remains provisional until additional data is available. *Blepharizonia plumosa* is a rare 1B.1 plant (CRPR) found in both counties.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=3): ALCC311, ALCC372, ALCC373

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Blepharizonia plumosa</i>	100	7.3	4.0	13.0	Y			Y
H	<i>Lolium perenne</i>	100	5.7	3.0	9.0	Y			Y
H	<i>Avena barbata</i>	100	2.4	0.2	4.0	Y			Y
H	<i>Croton setigerus</i>	100	1.7	0.2	3.0	Y			Y
H	<i>Lactuca serriola</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Medicago polymorpha</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Erodium botrys</i>	67	2.1	0.2	6.0				Y
H	<i>Bromus hordeaceus</i>	67	0.7	0.2	2.0				Y
H	<i>Trifolium hirtum</i>	67	0.7	0.2	2.0				Y
H	<i>Centaurea solstitialis</i>	67	0.4	0.2	1.0				Y
H	<i>Grindelia camporum</i>	67	0.4	0.2	1.0				Y
H	<i>Geranium dissectum</i>	67	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	67	0.1	0.2	0.2				Y
H	<i>Bromus madritensis</i>	67	0.1	0.2	0.2				Y
H	<i>Brassica rapa</i>	33	1.3	4.0	4.0				
H	<i>Brachypodium distachyon</i>	33	1.0	3.0	3.0				
H	<i>Erodium cicutarium</i>	33	0.7	2.0	2.0				
H	<i>Centaurea melitensis</i>	33	0.7	2.0	2.0				
H	<i>Brassica sp.</i>	33	0.3	1.0	1.0				
H	<i>Brassica nigra</i>	33	0.1	0.2	0.2				
H	<i>Bellardia trixago</i>	33	0.1	0.2	0.2				
H	<i>Holocarpa virgata</i>	33	0.1	0.2	0.2				
H	<i>Trifolium angustifolium</i>	33	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	33	0.1	0.2	0.2				
H	<i>Lupinus sp.</i>	33	0.1	0.2	0.2				
H	<i>Hordeum marinum</i>	33	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Helminthotheca echioides</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Hypochaeris radicata</i>	33	0.1	0.2	0.2				
NV	Lichen	33	0.1	0.2	0.2				

Blepharizonia (laxa, plumosa) Provisional Association
Holocarpa (heermannii, virgata) Herbaceous Alliance

***Deinandra lobbii* Provisional Association**

Common Name: Threeray Tarweed Patches

Alliance: *Holocarpha (heermannii, virgata)* Herbaceous Alliance

Local Vegetation Description

The Threeray Tarweed Association forms an intermittent herbaceous layer in the single survey available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Deinandra lobbii*, and characteristic herbs include *Bromus hordeaceus*, *Centromadia pungens* ssp. *pungens*, *Epilobium brachycarpum*, *Frankenia salina*, *Hirschfeldia incana*, *Hordeum marinum*, *Juncus mexicanus*, *Lactuca saligna*, and *Malvella leprosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	56.0	56 – 56	0.8	0.5 – 1

Local Environmental Description

Elevation: 141 m

Aspect: NW (1)

Slope: 1 degrees

Macro Topography: Not recorded (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 18%

Litter Cover: 80%

Soil Texture (field assessed): Clay, (class unknown) (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 25.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hirschfeldia incana*, *Hordeum marinum*, and *Lactuca saligna*.

Classification Comments

This association is newly described here and remains provisional until additional data is available. *Deinandra lobbii* is cited in some references as *Hemizonia lobbii*.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): ALCC520

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Deinandra lobbii</i>	100	37.0	37.0	37.0	Y	Y		Y
H	<i>Bromus hordeaceus</i>	100	10.0	10.0	10.0	Y			Y
H	<i>Hirschfeldia incana</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Frankenia salina</i>	100	4.0	4.0	4.0	Y			Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Hordeum marinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Juncus mexicanus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lactuca saligna</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Malvella leprosa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Epilobium brachycarpum</i>	100	0.2	0.2	0.2	Y			Y

***Holocarpha virgata* Association**

Common Name: Yellowflower Tarweed Patches

Alliance: *Holocarpha (heermannii, virgata)* Herbaceous Alliance

Local Vegetation Description

The Yellowflower Tarweed Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is sparse. Characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, and *Holocarpha virgata*. Those herbs often present include *Bromus diandrus*, *Elymus caput-medusae*, *Lolium perenne*, and *Trifolium hirtum*, and herbs that are sometimes present include *Acmispon wrangelianus*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Hypochaeris glabra*, *Logfia gallica*, *Lupinus bicolor*, *Nassella pulchra*, *Ranunculus californicus*, *Sherardia arvensis*, *Sidalcea malviflora*, *Sisyrinchium bellum*, *Trifolium willdenovii*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	38.8	18 – 65	0.5	0 – 1

Local Environmental Description

Elevation: Mean 459 m, Range 153 – 1059 m

Aspect: NE (6), SW (3), SE (1), Variable (1)

Slope: Mean 10 degrees, Range 1 – 20 degrees

Macro Topography: Lower 1/3 of slope (3), Middle to Upper 1/3 of slope (2), Not recorded (2), Bottom (1), Bottom to Mid 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.9%, Range 0 – 5%

Small Rock: Mean 6.9%, Range 0 – 20%

Fines Cover: Mean 67.5%, Range 17 – 93%

Litter Cover: Mean 23.3%, Range 3 – 75%

Soil Texture (field assessed): Moderately coarse, sandy loam (2), Moderately fine sandy clay loam (2), Fine sandy clay (1), Fine silty clay (1), Medium loam (1), Medium to very fine, sandy loam (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (4), Franciscan melange (3), Sedimentary (2), Shale and other sedimentary (2)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4), Western Diablo Range (4)

Contra Costa County Subsections: Suisun Hills and Valleys (3)

Site Impacts

This association has high non-native plant cover (average 58.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Geranium molle*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Sherardia arvensis*, *Trifolium hirtum*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens et al. 2004, Klein et al. 2007, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=11; Alameda County (n=8): ALCC142, ALCC272, ALCC346, ALCC567, ALCC568, ALCC577, ALCC585, ALCCREC225

Contra Costa County (n=3): ALCC312, ALCC339, ALCC371

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Holocarpha virgata</i>	100	9.3	1.0	27.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	6.2	0.1	20.0	Y			Y
H	<i>Avena barbata</i>	100	4.4	0.2	16.0	Y			Y
H	<i>Lolium perenne</i>	64	2.6	0.2	7.0				Y
H	<i>Trifolium hirtum</i>	64	1.9	0.2	10.0				Y
H	<i>Bromus diandrus</i>	55	2.6	0.1	16.0				Y
H	<i>Elymus caput-medusae</i>	55	1.2	0.1	10.0				Y
H	<i>Vulpia bromoides</i>	45	0.7	0.2	3.0				
H	<i>Erodium cicutarium</i>	36	0.9	0.2	7.0				
H	<i>Erodium botrys</i>	36	0.9	0.1	6.0				
H	<i>Trifolium willdenovii</i>	36	0.3	0.1	2.0				
H	<i>Nassella pulchra</i>	36	0.2	0.1	2.0				
H	<i>Sisyrinchium bellum</i>	27	0.3	0.2	2.0				
H	<i>Sidalcea malviflora</i>	27	0.3	0.2	2.0				
H	<i>Hypochaeris glabra</i>	27	0.2	0.2	2.0				
H	<i>Lupinus bicolor</i>	27	0.2	0.1	2.0				
H	<i>Acmispon wrangelianus</i>	27	0.1	0.1	1.0				
H	<i>Clarkia</i> sp.	27	0.1	0.1	1.0				
H	<i>Chlorogalum pomeridianum</i>	27	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	27	0.0	0.1	0.2				
H	<i>Ranunculus californicus</i>	27	0.0	0.1	0.2				
H	<i>Sherardia arvensis</i>	27	0.0	0.1	0.2				
H	<i>Logfia gallica</i>	27	0.0	0.1	0.2				
H	<i>Geranium dissectum</i>	27	0.0	0.1	0.2				
H	<i>Geranium molle</i>	27	0.0	0.1	0.2				
NV	Moss	27	0.6	0.2	5.0				

Juncus (effusus, patens) – Carex (pansa, praegracilis) Herbaceous Alliance



Common Name: Soft and western rush – Sedge marshes

NVC Alliance Code: A2290.

Statewide Description

Juncus effusus, *J. patens*, *J. phaeocephalus*, *Carex densa*, *C. pansa*, *C. praegracilis*, *C. serratodens* or other rushes and sedges co-dominate or dominate in the herbaceous layer with *Achillea millefolium*, *Argentina egedii*, *Artemisia pycnocephala*, *Briza maxima*, *Bromus tectorum*, *Camissonia cheiranthifolia*, *Cardionema ramosissimum*, *Carex* spp., *Carpobrotus chilensis*, *Cirsium vulgare*, *Epilobium ciliatum*, *Erigeron glaucus*, *Helminthotheca echioides*, *Holcus lanatus*, *Juncus arcticus*, *Juncus bufonius*, *Juncus lescurii*, *Juncus phaeocephalus*, *Lactuca serriola*, *Lolium perenne*, *Lotus* spp., *Luzula comosa*, *Plantago* spp., *Poa douglasii*, *Pteridium aquilinum*, *Senecio minimus*, *Trifolium* spp., *Typha latifolia*, and *Urtica dioica*. Emergent shrubs may be present at low cover, including *Baccharis pilularis*, *Lotus scoparius*, or *Rubus armeniacus*.

Several *Juncus* species overlap ecologically in moist coastal terraces, seeps, swales, drainages, and pond edges along the northern and central coast of California. *Juncus effusus* and *J. patens* overlap geographically and tend to be the most common stand

formers, perhaps due to their tolerance of relatively heavy grazing. However, *Juncus phaeocephalus*, *J. occidentalis*, and other *Juncus* or *Carex* species may also occur in similar settings.

Stands of various *Juncus* spp. and *Carex* spp. occur scattered across California in seasonally or temporarily wet flats and depressions. Ecological relationships with other caespitose to somewhat rhizomatous rushes and sedges along the coast appear close, therefore the species which were previously treated in separate alliances have been combined along with other rushes and sedges. These settings are typically only seasonally wet, and they are often invaded by non-native plants such as *Holcus lanatus*, *Lolium perenne*, etc., though they have a mosaic of various native sedge and rush species.

Local Vegetation Description

The Soft and western rush – Sedge marshes Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Lolium perenne*. Those herbs often present include *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Helminthotheca echioides*, and *Juncus bufonius*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	57.4	19 – 100	0.4	0 – 2

Local Membership Rule

Carex densa, *C. gynodynamis*, *C. praegracilis*, *C. serratodens*, *C. tumulicola*, *Eleocharis macrostachya*, *Juncus bufonius*, *J. effusus*, *J. patens*, *J. hesperius*, *J. occidentalis*, *J. phaeocephalus*, *J. subbracteata* and/or *Juncus xiphioides* > 50% relative cover or > 30% relative cover with other herbs such as *Holcus lanatus*, *Hypochaeris radicata*, *Juncus balticus*, *Paspalum distichum*, *Helminthotheca echioides*, and *Vulpia bromoides*.

Local Environmental Description

Elevation: Mean 336 m, Range 3 – 652 m

Aspect: NW (4), NE (3), SE (1), SW (1), Variable (1)

Slope: Mean 3 degrees, Range 0 – 8 degrees

Macro Topography: Bottom (4), Lower 1/3 of slope (2), Middle 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 1.3%, Range 0 – 5%

Fines Cover: Mean 72.7%, Range 11 – 96%

Litter Cover: Mean 17.4%, Range 0 – 86%

Juncus (effusus, patens) – Carex (pansa, praegracilis) Herbaceous Alliance

Soil Texture (field assessed): Medium silt (2), Moderately fine clay loam (2), Fine clay (2), Muck (2)

Geology (field or map data): Franciscan melange (2), Sandstone and other sedimentary (2), Sandstone, shale, and gravel deposits (2), Sedimentary (2), General igneous intrusives (1), Ultramafic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2), East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), East Bay Terraces and Alluvium (1), Suisun Hills and Valleys (1)

Other Subsections:

Site Impacts

This alliance has moderate non-native plant cover (average 35.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Geranium dissectum*, *Helminthotheca echinoides*, *Lolium perenne*, *Lotus corniculatus*, *Lythrum hyssopifolium*, *Mentha pulegium*, *Rumex pulcher*, *Sonchus asper*, *Trifolium dubium*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, *Vicia villosa*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Carex densa

Carex tumulicola

Juncus (effusus, patens) – *Carex (pansa, praegracilis)* alliance

Juncus bufonius Provisional Association

Juncus effusus

Juncus phaeocephalus

Juncus xiphioides

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Moran 2004a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4?

State Rarity Rank: S3S4

Surveys Used for Description

Total: N=10; Alameda County (n=3): ALCC307, ALCC579, ALCC904

Contra Costa County (n=7): ALCC357, ALCC464, ALCC705, ALCC816, CORT162, PPRA001, SPCCB-069

Alliance Stand Table

Juncus (effusus, patens) – *Carex (pansa, praegracilis)* Herbaceous Alliance

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	90	6.1	0.2	22.0	Y			Y
H	<i>Bromus hordeaceus</i>	60	1.2	0.2	8.0				Y
H	<i>Carduus pycnocephalus</i>	60	0.2	0.2	1.0				Y
H	<i>Juncus bufonius</i>	50	3.5	0.2	30.0				Y
H	<i>Helminthotheca echioides</i>	50	3.1	3.0	14.0				Y
H	<i>Geranium dissectum</i>	50	0.2	0.2	1.0				Y
H	<i>Juncus xiphioides</i>	40	4.8	9.0	19.0				
H	<i>Eleocharis macrostachya</i>	40	0.3	0.2	2.0				
H	<i>Lotus corniculatus</i>	30	3.2	1.0	20.0				
H	<i>Juncus phaeocephalus</i>	30	3.0	0.2	20.0				
H	<i>Mimulus guttatus</i>	30	1.2	0.2	7.0				
H	<i>Hordeum brachyantherum</i>	30	1.0	0.2	9.0				
H	<i>Rumex pulcher</i>	30	0.2	0.2	2.0				
H	<i>Sonchus asper</i>	30	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	30	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	20	0.8	0.2	8.0				
H	<i>Conium maculatum</i>	20	0.7	0.2	7.0				
H	<i>Mentha pulegium</i>	20	0.6	0.2	6.0				
H	<i>Juncus mexicanus</i>	20	0.4	1.0	3.0				
H	<i>Trifolium variegatum</i>	20	0.3	0.2	3.0				
H	<i>Vulpia bromoides</i>	20	0.3	0.2	3.0				
H	<i>Briza minor</i>	20	0.3	0.2	3.0				
H	<i>Trifolium subterraneum</i>	20	0.1	0.2	1.0				
H	<i>Trifolium hirtum</i>	20	0.1	0.2	1.0				
H	<i>Vicia villosa</i>	20	0.1	0.2	1.0				
H	<i>Medicago polymorpha</i>	20	0.1	0.2	1.0				
H	<i>Epilobium brachycarpum</i>	20	0.0	0.2	0.2				
H	<i>Rumex</i> sp.	20	0.0	0.2	0.2				
H	<i>Vicia sativa</i>	20	0.0	0.2	0.2				
H	<i>Lythrum hyssopifolium</i>	20	0.0	0.2	0.2				
H	<i>Trifolium dubium</i>	20	0.0	0.2	0.2				
H	<i>Barbarea orthoceras</i>	20	0.0	0.2	0.2				
H	<i>Cyperus</i> sp.	20	0.0	0.2	0.2				

***Carex densa* Provisional Association**

Common Name: Dense Sedge Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Herbaceous Alliance

Local Vegetation Description

The Dense Sedge Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Carex densa*, and characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, and *Lolium perenne*. Those herbs often present include *Briza minor*, *Cerastium glomeratum*, *Cirsium vulgare*, *Claytonia perfoliata*, *Conium maculatum*, *Eleocharis macrostachya*, *Elymus caput-medusae*, *Epilobium brachycarpum*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum brachyantherum*, *Hordeum murinum*, *Juncus phaeocephalus*, *Juncus xiphioides*, *Linum bienne*, *Mentha pulegium*, *Mimulus guttatus*, *Plectritis macrocera*, *Poa howellii*, *Sonchus asper*, *Trifolium* sp., *Trifolium willdenovii*, *Veronica anagallis-aquatica*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	77.0	64 – 90	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 454 m, Range 390 – 517 m

Aspect: NW (1), SE (1)

Slope: Mean 5 degrees, Range 3 – 7 degrees

Macro Topography: Draw (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: Mean 47.5%, Range 11 – 84%

Litter Cover: Mean 47.9%, Range 10 – 86%

Soil Texture (field assessed): Clay (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Western Diablo Range (1)

Carex densa Provisional Association

Juncus (effusus, patens) – *Carex (pansa, praegracilis)* Herbaceous Alliance

Site Impacts

This association has low non-native plant cover (average 15.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Briza minor*, *Bromus hordeaceus*, *Cerastium glomeratum*, *Cirsium vulgare*, *Conium maculatum*, *Elymus caput-medusae*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum murinum*, *Linum bienne*, *Lolium perenne*, *Mentha pulegium*, *Sonchus asper*, *Veronica anagallis-aquatica*, and *Vulpia myuros*.

Classification Comments

This association remains provisional due to low sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Evens and Kentner 2006, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=1): ALCC464

Santa Clara Co. (n=1): VAWA278

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Carex densa</i>	100	50.5	20.0	81.0	Y	Y		Y
H	<i>Lolium perenne</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	2.0	1.0	3.0	Y			Y
H	<i>Avena barbata</i>	100	0.4	0.2	0.5	Y			Y
H	<i>Trifolium willdenovii</i>	50	5.0	10.0	10.0				Y
H	<i>Eleocharis macrostachya</i>	50	5.0	10.0	10.0				Y
H	<i>Hordeum murinum</i>	50	1.5	3.0	3.0				Y
H	<i>Cerastium glomeratum</i>	50	1.5	3.0	3.0				Y
H	<i>Helminthotheca echioides</i>	50	1.5	3.0	3.0				Y
H	<i>Juncus xiphioides</i>	50	1.5	3.0	3.0				Y
H	<i>Mimulus guttatus</i>	50	1.5	3.0	3.0				Y
H	<i>Trifolium</i> sp.	50	1.5	3.0	3.0				Y
H	<i>Hordeum brachyantherum</i>	50	0.3	0.5	0.5				Y
H	<i>Claytonia perfoliata</i>	50	0.3	0.5	0.5				Y
H	<i>Geranium dissectum</i>	50	0.3	0.5	0.5				Y
H	<i>Veronica anagallis-aquatica</i>	50	0.3	0.5	0.5				Y
H	<i>Plectritis macrocera</i>	50	0.3	0.5	0.5				Y
H	<i>Juncus phaeocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Mentha pulegium</i>	50	0.1	0.2	0.2				Y
H	<i>Sonchus asper</i>	50	0.1	0.2	0.2				Y
H	<i>Briza minor</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus caput-medusae</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	50	0.1	0.2	0.2				Y
H	<i>Cirsium vulgare</i>	50	0.1	0.2	0.2				Y
H	<i>Epilobium brachycarpum</i>	50	0.1	0.2	0.2				Y
H	<i>Conium maculatum</i>	50	0.1	0.2	0.2				Y
H	<i>Linum bienne</i>	50	0.1	0.1	0.1				Y
H	<i>Poa howellii</i>	50	0.1	0.1	0.1				Y

***Carex tumulicola* Provisional Association**

Common Name: Splitawn Sedge Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Herbaceous Alliance

Local Vegetation Description

The Splitawn Sedge Association forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Carex tumulicola*, and characteristic herbs include *Avena fatua*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Lolium perenne*, *Nassella pulchra*, *Vicia villosa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	85.0	85 – 85	0.3	0 – 0.5

Local Environmental Description

Elevation: 3 m

Aspect: Variable (1)

Slope: 1 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 80%

Litter Cover: 10%

Soil Texture (field assessed): Not recorded (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has moderate non-native plant cover (average 41.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Lolium perenne*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

This association remains provisional due to low sample size.

References: Buck-Diaz et al. 2021a

Carex tumulicola Provisional Association
Juncus (effusus, patens) – *Carex (pansa, praegracilis)* Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): PPRA001

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Carex tumulicola</i>	100	50.0	50.0	50.0	Y	Y		Y
H	<i>Avena fatua</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Lolium perenne</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Bromus diandrus</i>	100	8.0	8.0	8.0	Y			Y
H	<i>Vulpia bromoides</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Vicia villosa</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Nassella pulchra</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Brachypodium distachyon</i>	100	0.2	0.2	0.2	Y			Y

***Juncus bufonius* Provisional Association**

Common Name: Toad Rush Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Herbaceous Alliance

Local Vegetation Description

The Toad Rush Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Juncus bufonius*. Those herbs often present include *Agrostis elliotiana*, *Distichlis spicata*, *Frankenia salina*, *Hordeum murinum*, *Hypochaeris glabra*, *Juncus arcticus*, *Lolium perenne*, *Persicaria* sp., *Ranunculus repens*, *Spergula arvensis*, *Spergularia* sp., *Vulpia myuros*, and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	40.0	35 – 45	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 271 m, Range 0 – 542 m

Aspect: Flat (1), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.5%, Range 0 – 5%

Fines Cover: Mean 76.5%, Range 60 – 93%

Litter Cover: Mean 19.5%, Range 1 – 38%

Soil Texture (field assessed): Moderately fine clay loam (1), Muck (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Delta (1)

Site Impacts

This association has moderate non-native plant cover (average 24.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Vulpia myuros*, *Lolium perenne*, *Hordeum murinum*, and *Ranunculus repens*.

Classification Comments

This provisional association is newly described here. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: None.

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC705

Sacramento Co. (n=1): SSJD0310

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Juncus bufonius</i>	100	35.0	30.0	40.0	Y	Y		Y
H	<i>Vulpia myuros</i>	50	7.5	15.0	15.0				Y
H	<i>Lolium perenne</i>	50	3.0	6.0	6.0				Y
H	<i>Distichlis spicata</i>	50	1.0	2.0	2.0				Y
H	<i>Hordeum murinum</i>	50	1.0	2.0	2.0				Y
H	<i>Xanthium strumarium</i>	50	0.5	1.0	1.0				Y
H	<i>Spergula arvensis</i>	50	0.5	1.0	1.0				Y
H	<i>Ranunculus repens</i>	50	0.5	1.0	1.0				Y
H	<i>Spergularia</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Juncus arcticus</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.2	0.2				Y
H	<i>Frankenia salina</i>	50	0.1	0.2	0.2				Y
H	<i>Persicaria</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Agrostis elliotiana</i>	50	0.1	0.2	0.2				Y

***Juncus effusus* Association**

Common Name: Soft rush Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praeegracilis)* Herbaceous Alliance

Local Vegetation Description

The Soft rush Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Juncus effusus*, and characteristic herbs include *Carduus pycnocephalus*, *Geranium dissectum*, and *Rumex* sp. Those herbs often present include *Anthriscus caucalis*, *Avena* sp., *Barbarea orthoceras*, *Bromus diandrus*, *Bromus hordeaceus*, *Carex serratodens*, *Conium maculatum*, *Cynosurus echinatus*, *Cyperus* sp., *Elymus* sp., *Epilobium brachycarpum*, *Galium* sp., *Helenium puberulum*, *Heliotropium* sp., *Juncus mexicanus*, *Juncus patens*, *Lactuca serriola*, *Lolium perenne*, *Lysimachia arvensis*, *Lythrum hyssopifolium*, *Melilotus indica*, *Mimulus guttatus*, *Polypogon monspeliensis*, *Silybum marianum*, *Sonchus asper*, *Stachys pycnantha*, *Stellaria media*, *Trifolium dubium*, *Urtica dioica*, *Verbena lasiostachys*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	72.5	55 – 90	1.5	1 – 2

Local Environmental Description

Elevation: Mean 586 m, Range 545 – 626 m

Aspect: NW (2)

Slope: Mean 4 degrees, Range 2 – 6 degrees

Macro Topography: Not recorded (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.5%, Range 0 – 3%

Fines Cover: Mean 18.5%, Range 0 – 37%

Litter Cover: Mean 25.0%, Range 0 – 50%

Soil Texture (field assessed): Fine clay (1), Not recorded (1)

Geology (field or map data): Franciscan melange (1), Ultramafic (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Diablo Range (1)

***Juncus effusus* Association**

Juncus (effusus, patens) – *Carex (pansa, praeegracilis)* Herbaceous Alliance

Site Impacts

This association has low non-native plant cover (average 11.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anthriscus caucalis*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Conium maculatum*, *Cynosurus echinatus*, *Geranium dissectum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, *Silybum marianum*, *Sonchus asper*, *Stellaria media*, *Trifolium dubium*, and *Vicia villosa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021a, Evens and Kentner 2006, Evens and San 2005, Keeler-Wolf et al. 2003a, Klein et al. 2007, Klein et al. 2015, Moran 2004a, Ratchford et al. 2023a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4 **State Rarity Rank:** S4?

State Rare: N

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=1): SPCCB-069

Santa Clara Co. (n=1): R0513211125

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Juncus effusus</i>	100	60.0	40.0	80.0	Y	Y		Y
H	<i>Carduus pycnocephalus</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Rumex</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Geranium dissectum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Stachys pycnantha</i>	50	3.5	7.0	7.0				Y
H	<i>Conium maculatum</i>	50	3.5	7.0	7.0				Y
H	<i>Mimulus guttatus</i>	50	2.5	5.0	5.0				Y
H	<i>Juncus patens</i>	50	1.5	3.0	3.0				Y
H	<i>Vicia villosa</i>	50	1.0	2.0	2.0				Y
H	<i>Melilotus indica</i>	50	0.5	1.0	1.0				Y
H	<i>Galium</i> sp.	50	0.5	1.0	1.0				Y
H	<i>Juncus mexicanus</i>	50	0.5	1.0	1.0				Y
H	<i>Bromus hordeaceus</i>	50	0.1	0.2	0.2				Y

Juncus effusus Association

Juncus (effusus, patens) – Carex (pansa, praeegracilis) Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sonchus asper</i>	50	0.1	0.2	0.2				Y
H	<i>Anthriscus caucalis</i>	50	0.1	0.2	0.2				Y
H	<i>Helenium puberulum</i>	50	0.1	0.2	0.2				Y
H	<i>Heliotropium</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Barbarea orthoceras</i>	50	0.1	0.2	0.2				Y
H	<i>Cyperus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Avena</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	50	0.1	0.2	0.2				Y
H	<i>Lactuca serriola</i>	50	0.1	0.2	0.2				Y
H	<i>Lolium perenne</i>	50	0.1	0.2	0.2				Y
H	<i>Verbena lasiostachys</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium dubium</i>	50	0.1	0.2	0.2				Y
H	<i>Urtica dioica</i>	50	0.1	0.2	0.2				Y
H	<i>Carex serratodens</i>	50	0.1	0.2	0.2				Y
H	<i>Epilobium brachycarpum</i>	50	0.1	0.2	0.2				Y
H	<i>Polypogon monspeliensis</i>	50	0.1	0.2	0.2				Y
H	<i>Lythrum hyssopifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Silybum marianum</i>	50	0.1	0.2	0.2				Y
H	<i>Elymus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Lysimachia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Bromus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Stellaria media</i>	50	0.1	0.2	0.2				Y

***Juncus phaeocephalus* Association**

Common Name: Brownhead Rush Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Herbaceous Alliance

Local Vegetation Description

The Brownhead Rush Association forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Bromus hordeaceus*, *Carduus pycnocephalus*, *Eleocharis macrostachya*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum brachyantherum*, *Hordeum marinum*, *Juncus bufonius*, *Juncus phaeocephalus*, *Lotus corniculatus*, *Medicago polymorpha*, *Plantago lanceolata*, *Rumex pulcher*, *Stachys albens*, *Trifolium angustifolium*, *Trifolium repens*, *Trifolium subterraneum*, *Vicia sativa*, *Vicia villosa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	74.0	74 – 74	0.3	0 – 0.5

Local Environmental Description

Elevation: 196 m

Aspect: SW (1)

Slope: 8 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 89%

Litter Cover: 5%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): General igneous intrusives (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 69.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum marinum*, *Lolium perenne*, *Lotus corniculatus*, *Plantago lanceolata*,

Rumex pulcher, *Trifolium angustifolium*, *Trifolium repens*, *Trifolium subterraneum*, *Vicia sativa*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2020, Buck-Diaz et al. 2021a, Klein et al. 2015, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC307

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	22.0	22.0	22.0	Y		Y	Y
H	<i>Lotus corniculatus</i>	100	20.0	20.0	20.0	Y			Y
H	<i>Juncus phaeocephalus</i>	100	20.0	20.0	20.0	Y			Y
H	<i>Helminthotheca echinoides</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Hordeum brachyantherum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Plantago lanceolata</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Trifolium repens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Carduus pycnocephalus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vulpia bromoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium subterraneum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vicia villosa</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Trifolium angustifolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Rumex pulcher</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Medicago polymorpha</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Juncus bufonius</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hordeum marinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Geranium dissectum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Stachys albens</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eleocharis macrostachya</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vicia sativa</i>	100	0.2	0.2	0.2	Y			Y

Juncus phaeocephalus Association

Juncus (effusus, patens) – Carex (pansa, praegracilis) Herbaceous Alliance

***Juncus xiphioides* Provisional Association**

Common Name: Irisleaf Rush Patches

Alliance: *Juncus (effusus, patens)* – *Carex (pansa, praegracilis)* Herbaceous Alliance

Local Vegetation Description

The Irisleaf Rush Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Juncus xiphioides* and *Lolium perenne*. Those herbs often present include *Carduus pycnocephalus* and *Eleocharis macrostachya*, and herbs that are sometimes present include *Geranium dissectum*, *Helminthotheca echioides*, *Juncus bufonius*, *Lysimachia arvensis*, *Mimulus guttatus*, *Rumex pulcher*, *Trifolium hirtum*, and *Trifolium variegatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	33.9	19 – 51	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 385 m, Range 162 – 652 m

Aspect: NW (3), NE (2)

Slope: Mean 3 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (4), Bottom to Lower 1/3 of slope (1)

Large Rock: Mean 0.4%, Range 0 – 1%

Small Rock: Mean 0.5%, Range 0 – 1%

Fines Cover: Mean 86.0%, Range 62 – 96%

Litter Cover: Mean 1.3%, Range 0 – 2%

Soil Texture (field assessed): Medium silt (2), Fine clay (1), Muck (1)

Geology (field or map data): Franciscan melange (2), Sandstone and other sedimentary (1), Sedimentary (1), Serpentine (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 42.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Carduus pycnocephalus, *Geranium dissectum*, *Helminthotheca echioides*, *Lolium perenne*, *Rumex pulcher*, and *Trifolium hirtum*.

Classification Comments

This association is currently placed in a *Juncus (oxmyeris, xiphoides)* Alliance in the Online MCV (CNPS 2024). The species is widespread throughout California, and therefore may not be permanently included in this primarily coastal mixed rush and sedge alliance. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Evens and San 2004, Klein et al. 2007, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=5; Alameda County (n=2): ALCC579, ALCC904

Contra Costa County (n=2): ALCC357, ALCC816

Santa Clara Co. (n=1): SCLAR061

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Juncus xiphoides</i>	80	9.6	9.0	19.0	Y			Y
H	<i>Lolium perenne</i>	80	5.2	0.2	15.0	Y			Y
H	<i>Eleocharis macrostachya</i>	60	0.6	0.2	2.0				Y
H	<i>Carduus pycnocephalus</i>	60	0.1	0.2	0.2				Y
H	<i>Helminthotheca echioides</i>	40	3.4	3.0	14.0				
H	<i>Mimulus guttatus</i>	40	1.4	0.2	7.0				
H	<i>Juncus bufonius</i>	40	0.8	2.0	2.0				
H	<i>Trifolium variegatum</i>	40	0.6	0.2	3.0				
H	<i>Rumex pulcher</i>	40	0.4	0.2	2.0				
H	<i>Trifolium hirtum</i>	40	0.2	0.2	1.0				
H	<i>Geranium dissectum</i>	40	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	40	0.1	0.2	0.2				

***Juncus arcticus* (var. *balticus*, *mexicanus*) Herbaceous Alliance**



Common Name: Baltic and Mexican rush marshes

NVC Alliance Code: A1374.

Statewide Description

Juncus arcticus var. *balticus* or *Juncus arcticus* var. *mexicanus* is dominant or co-dominant in the herbaceous layer with *Achillea millefolium*, *Argentina egedii*, *Bolboschoenus robus*, *Bromus diandrus*, *Carex* spp., *Conium maculatum*, *Deschampsia cespitosa*, *Distichlis spicata*, *Eleocharis acicularis*, *Geum macrophyllum*, *Iris missouriensis*, *Juncus effusus*, *Juncus phaeocephalus*, *Lepidium latifolium*, *Leymus cinereus*, *Poa pratensis*, *Ranunculus alismifolius*, *Schoenoplectus pungens*, *Sporobolus airoides*, *Taraxacum officinale*, and *Trifolium longipes*. Emergent trees and shrubs may be present at low cover.

Juncus arcticus is a member of many alliances throughout its wide range, and the alliance exists throughout the state in seasonally flooded sites from the coast to high montane altitudes. Stands occur in many types of wet meadows and associated species vary greatly depending on location.

Local Vegetation Description

Juncus arcticus (var. *balticus*, *mexicanus*) Herbaceous Alliance

The Baltic and Mexican rush marshes Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Juncus arcticus*. Herbs that are sometimes present include *Carduus pycnocephalus*, *Distichlis spicata*, *Elymus glaucus*, *Galium aparine*, *Geranium dissectum*, *Lactuca serriola*, *Lolium perenne*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.9	0 – 3	1.1	0.5 – 2
Herb	59.1	24 – 100	0.7	0 – 1

Local Membership Rule

Juncus arcticus (var. *balticus* or var. *mexicanus*) > 50% relative cover in freshwater, brackish, or alkaline settings. *Argentina egedii*, *Carex* spp., *Mentha pulegium* and other hydrophytes < 30% relative cover in the herb layer.

Local Environmental Description

Elevation: Mean 167 m, Range 0 – 478 m

Aspect: NE (4), Flat (3)

Slope: Mean 1 degrees, Range 0 – 8 degrees

Macro Topography: Bottom (4), Bottom/plain (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.3%, Range 0 – 2%

Fines Cover: Mean 32.6%, Range 0 – 78%

Litter Cover: Mean 59.0%, Range 1 – 95%

Soil Texture (field assessed): Loam, (class unknown) (2), Fine clay (1), Moderately fine clay loam (1), Peat (1), Moderately fine silty clay loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Clayey alluvium (1), Franciscan melange (1), Sandstone (1), Sandstone and other sedimentary (1), Sedimentary (1), Shale and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Eastern Hills (1)

Other Subsections: Delta (2), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This alliance has moderate non-native plant cover (average 20.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Carduus pycnocephalus*, *Geranium dissectum*, *Lactuca serriola*, *Lolium perenne*, and *Vicia sativa*.

Associations in Alameda & Contra Costa Counties

Juncus arcticus var. *balticus* – (var. *mexicanus*)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Boul et al. 2021b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, Evens and San 2005, Evens et al. 2006, Evens et al. 2014, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003b, Klein et al. 2007, Klein et al. 2015, Manning and Padgett 1995, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2023, Smith 1998b, Taylor 1984, Weixelman et al. 1999

Global Rarity Rank: G5

State Rarity Rank: S4

Surveys Used for Description

Total: N=7; Alameda County (n=1): ALCC753

Contra Costa County (n=2): ALCC414, ALCC804

Santa Clara Co. (n=2): VAWA276, VAWA304

Solano Co. (n=2): SUMA12177, SUMA9194

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Juncus arcticus</i>	86	44.6	8.0	92.0	Y	Y		Y
H	<i>Carduus pycnocephalus</i>	43	1.6	0.2	8.0				
H	<i>Distichlis spicata</i>	43	1.1	0.2	7.0				
H	<i>Geranium dissectum</i>	43	0.4	0.2	2.0				
H	<i>Lactuca serriola</i>	29	1.4	0.5	9.0				
H	<i>Elymus glaucus</i>	29	0.5	0.5	3.0				
H	<i>Galium aparine</i>	29	0.2	0.5	1.0				
H	<i>Vicia sativa</i>	29	0.1	0.2	0.5				
H	<i>Lolium perenne</i>	29	0.1	0.2	0.5				

***Juncus arcticus* var. *balticus* – (var. *mexicanus*) Association**

Common Name: Baltic Rush – (Mexican Rush) Patches

Alliance: *Juncus arcticus* (var. *balticus*, *mexicanus*) Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Boul et al. 2021b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023, Evens and San 2005, Evens et al. 2006, Evens et al. 2014, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003b, Klein et al. 2007, Klein et al. 2015, Manning and Padgett 1995, Ratchford et al. 2022b (in progress), Ratchford et al. 2023a, Reyes et al. 2020a, Rodriguez et al. 2017, Sikes et al. 2023, Smith 1998b, Taylor 1984, Weixelman et al. 1999

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

***Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys*
Herbaceous Alliance**



Common Name: California goldfields – dwarf plantain – small fescue flower fields

NVC Alliance Code: A4153. *Lasthenia californica* - *Plantago erecta* - *Vulpia microstachys* Meadow Alliance

Statewide Description

Lasthenia californica, *L. gracilis*, *Plantago erecta*, *Vulpia microstachys* and/or other native annuals are seasonally dominant individually, co-dominant, or are characteristic in the herbaceous layer with *Achillea millefolium*, *Achnatherum lemmonii*, *Agrostis elliotiana*, *Avena barbata*, *Bromus hordeaceus*, *Calycadenia multiglandulosa*, *Calycadenia truncata*, *Castilleja exserta*, *Chlorogalum pomeridianum*, *Cryptantha flaccida*, *Eriogonum nudum*, *Eschscholzia californica*, *Hemizonia congesta*, *Hesperis matronalis*, *Lasthenia* spp., *Lepidium nitidum*, *Lessingia* spp., *Lolium perenne*, *Lomatium utriculatum*, *Lotus wrangelianus*, *Lupinus nanus*, *Lupinus spectabilis*, *Microseris douglasii*, *Mimulus guttatus*, *Minuartia douglasii*, *Mulla maritima*, *Nassella pulchra*, *Navarretia tagetina*, *Pentagramma triangularis*, *Platystemon californicus*, *Sanicula bipinnatifida*, *Sedella pumila*, *Selaginella hansenii*, *Sidalcea diploscypha*, *Sisyrinchium bellum*, and *Trifolium* spp.

Stands of the *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Alliance occur throughout much of cismontane California (Bartolome et al. 2007a, Evens and San 2004, Hobbs and Mooney 1991, Klein et al. 2007, McCarten 1991, Rodriguez-Rojo et al. 2001a, 2001b, Weiss 1999). This alliance represents a triad of native species that have a broad adaptation to the area's Mediterranean climate, yet many other native annual species can also be representative. Bartolome et al. (2007a) suggested that

native annual grassland types replace steppe types wherever annual rainfall is less than 21 cm. *Vulpia microstachys* var. *pauciflora* is the most frequent annual grass of these semi-desert grasslands.

This alliance appears to be seasonally abundant on infertile soils of less frequent disturbance, whereas other herbaceous stands with more disturbance-related taxa appear more regularly on deeper and disturbed soils (cf. Hobbs and Mooney 1991, Seabloom et al. 2003, Howard 2006). Adaptation to local site/soil conditions allows these native species to dominate on serpentine soils (Espeland and Rice 2007, Howard 2006, Rajakaruna and Bohm 1999). The three species commonly co-occur, though in some areas only one or two may predominate, and/or a variety of other native annuals may also be diagnostic.

Local Vegetation Description

The California goldfields – dwarf plantain – small fescue flower fields Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus*. Those herbs often present include *Avena barbata* and *Erodium cicutarium*, and herbs that are sometimes present include *Aphanes occidentalis*, *Bromus diandrus*, *Bromus madritensis*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Geranium dissectum*, *Hesperevax sparsiflora*, *Holocarpha virgata*, *Hypochaeris glabra*, *Lepidium nitidum*, *Lolium perenne*, *Lupinus bicolor*, *Medicago polymorpha*, *Micropus californicus*, *Microseris douglasii*, *Plantago erecta*, *Poa secunda*, *Trifolium hirtum*, *Trifolium willdenovii*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.1	0 – 3	0.5	0 – 1
Herb	32.9	3 – 98	0.4	0 – 1

Local Membership Rule

Lasthenia californica, *L. gracilis*, *Calycadenia* spp., *Hemizonia congesta*, *Hesperevax sparsiflora*, *Leptosiphon bicolor*, *Lomatium*, *Lotus humistratus*, *Micropus californicus*, *Plantago erecta*, and/or *Vulpia microstachys* > 30% relative cover individually or > 50% relative cover in combination in the herb layer.

Local Environmental Description

Elevation: Mean 481 m, Range 6 – 1139 m

Aspect: NE (11), SW (8), NW (7), flat (2), SE (2), Variable (1)

Slope: Mean 12 degrees, Range 0 – 31 degrees

Macro Topography: Middle 1/3 of slope (8), Upper 1/3 of slope (7), Lower 1/3 of slope (5), bottom (3), Bottom to Lower 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Ridge top (2)

Large Rock: Mean 0.2%, Range 0 – 2%
Small Rock: Mean 12.3%, Range 0 – 75%
Fines Cover: Mean 69.2%, Range 10 – 99%
Litter Cover: Mean 12.7%, Range 0 – 84%

Soil Texture (field assessed): Moderately fine clay loam (7), Moderately coarse, sandy loam (7), Moderately fine silty clay loam (4), Fine silty clay (3), Fine sandy clay (2), Medium to very fine, sandy loam (2), Fine sand (1), Fine clay (1), Medium silt (1), Medium to very fine, loamy sand (1), Moderately fine sandy clay loam (1), Coarse, loamy sand (1)

Geology (field or map data): Franciscan melange (9), Sedimentary (7), Clayey alluvium (3), Sandstone, shale, and gravel deposits (3), Serpentine (3), Sandstone and other sedimentary (2), Shale and other sedimentary (2), Sandstone (1), Ultramafic (1)

Alameda County Subsections: Western Diablo Range (11), East Bay Hills - Mount Diablo (2), Diablo Range (1), East Bay Terraces and Alluvium (1), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (5), Eastern Hills (2), Westside Alluvial Fans and Terraces (2), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has moderate non-native plant cover (average 45.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Erodium cicutarium*, *Geranium dissectum*, *Hypochaeris glabra*, *Lolium perenne*, and *Trifolium hirtum*.

Associations in Alameda & Contra Costa Counties

Lasthenia californica – *Plantago erecta* – *Hesperis matronalis*

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* alliance

Leptosiphon ambiguus

Micropus californicus

Vulpia microstachys

Vulpia microstachys – *Plantago erecta*

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2004, Evens et al. 2006, Klein et al. 2007, Klein et al. 2015, McCarten 1991, Reyes et al. 2023, Rodriguez 2015, Rodriguez-Rojo et al. 2001a, Sikes et al. 2021, Sikes et al. 2023, Taylor et al. 1992, VegCAMP 2015b

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=31; Alameda County (n=16): ALCC310, ALCC343, ALCC347, ALCC384, ALCC389, ALCC425, ALCC447, ALCC462, ALCC526, ALCC580, ALCC583, ALCC584, ALCC754, ALCC903, ALCC905, EBAY0110

Contra Costa County (n=15): ALCC166, ALCC210, ALCC334, ALCC351, ALCC368, ALCC377, ALCC379, ALCC403, ALCC427, ALCC466, ALCC556, ALCC854, EBAY0113, SSJD0379, SSJD0380

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	81	3.8	0.1	16.0	Y			Y
H	<i>Avena barbata</i>	68	1.6	0.1	12.0				Y
H	<i>Erodium cicutarium</i>	65	1.2	0.1	10.0				Y
H	<i>Vulpia microstachys</i>	48	1.8	0.2	25.0				
H	<i>Lolium perenne</i>	42	6.1	0.2	75.0				
H	<i>Trifolium willdenovii</i>	42	0.4	0.2	5.0				
H	<i>Hypochaeris glabra</i>	39	0.6	0.2	17.0				
H	<i>Plantago erecta</i>	35	0.3	0.1	3.0				
H	<i>Micropus californicus</i>	32	0.8	0.2	7.0				
H	<i>Clarkia purpurea</i>	32	0.5	0.2	10.0				
H	<i>Bromus diandrus</i>	32	0.3	0.1	3.0				
H	<i>Holocarpha virgata</i>	32	0.3	0.1	2.0				
H	<i>Lupinus bicolor</i>	29	0.1	0.1	2.0				
H	<i>Hesperis sparsiflora</i>	26	1.3	0.1	10.0				
H	<i>Trifolium hirtum</i>	26	0.2	0.1	3.0				
H	<i>Bromus madritensis</i>	26	0.2	0.2	2.0				
H	<i>Poa secunda</i>	26	0.1	0.2	0.2				
H	<i>Lepidium nitidum</i>	23	0.6	0.1	12.0				
H	<i>Microseris douglasii</i>	23	0.5	0.2	7.0				
H	<i>Aphanes occidentalis</i>	23	0.3	0.1	8.0				
H	<i>Medicago polymorpha</i>	23	0.3	0.1	6.0				
H	<i>Chlorogalum pomeridianum</i>	23	0.1	0.2	1.0				
H	<i>Geranium dissectum</i>	23	0.1	0.1	1.0				

***Hemizonia congesta* – *Lolium perenne* Association**

Common Name: Hayfield Tarweed – Italian Ryegrass Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Hayfield Tarweed – Italian Ryegrass Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Hemizonia congesta* and *Lolium perenne*, and characteristic herbs include *Avena barbata*, *Bellardia trixago*, *Bromus hordeaceus*, and *Helminthotheca echioides*. Those herbs often present include *Centaurea solstitialis*, *Convolvulus arvensis*, and *Vicia sativa*, and herbs that are sometimes present include *Brachypodium distachyon*, *Carduus pycnocephalus*, *Erodium cicutarium*, *Hordeum marinum*, *Plantago lanceolata*, *Rumex pulcher*, and *Trifolium angustifolium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	56.8	18 – 98	0.5	0 – 1

Local Environmental Description

Elevation: Mean 169 m, Range 117 – 223 m

Aspect: NW (2), NE (1), SE (1), SW (1)

Slope: Mean 8 degrees, Range 3 – 14 degrees

Macro Topography: Lower 1/3 of slope (2), Middle 1/3 of slope (2), Not recorded (1)

Large Rock: 0%

Small Rock: Mean 1.3%, Range 0 – 3%

Fines Cover: Mean 61.2%, Range 10 – 94%

Litter Cover: Mean 35.8%, Range 5 – 84%

Soil Texture (field assessed): Moderately fine clay loam (4), Medium silt (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Sedimentary (2), Sandstone and other sedimentary (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), Suisun Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover (average 60.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Convolvulus arvensis*, *Erodium cicutarium*, *Helminthotheca echioides*, *Hordeum marinum*, *Lolium perenne*, *Plantago lanceolata*, *Rumex pulcher*, *Trifolium angustifolium*, and *Vicia sativa*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Evens and San 2004, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=5; Alameda County (n=1): ALCC310

Contra Costa County (n=4): ALCC166, ALCC210, ALCC368, ALCC466

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hemizonia congesta</i>	100	17.4	11.0	26.0	Y		Y	Y
H	<i>Avena barbata</i>	100	0.3	0.1	1.0	Y			Y
H	<i>Lolium perenne</i>	80	29.0	6.0	75.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	80	3.6	0.2	10.0	Y			Y
H	<i>Bellardia trixago</i>	80	0.5	0.2	1.0	Y			Y
H	<i>Helminthotheca echioides</i>	80	0.3	0.2	1.0	Y			Y
H	<i>Centaurea solstitialis</i>	60	0.7	0.2	3.0				Y
H	<i>Convolvulus arvensis</i>	60	0.7	0.2	3.0				Y
H	<i>Vicia sativa</i>	60	0.1	0.2	0.2				Y
H	<i>Brachypodium distachyon</i>	40	3.4	5.0	12.0				
H	<i>Carduus pycnocephalus</i>	40	1.2	1.0	5.0				
H	<i>Trifolium angustifolium</i>	40	0.8	1.0	3.0				
H	<i>Hordeum marinum</i>	40	0.4	1.0	1.0				
H	<i>Erodium cicutarium</i>	40	0.1	0.2	0.2				
H	<i>Plantago lanceolata</i>	40	0.1	0.2	0.2				
H	<i>Rumex pulcher</i>	40	0.1	0.1	0.2				

Hemizonia congesta – *Lolium perenne* Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

***Hesperevax sparsiflora* – (*Microseris douglasii* – *Plagiobothrys* spp.) Provisional Association**

Common Name: Erect Evax – (Douglas' microseris – Popcornflower) Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Erect Evax – (Douglas' microseris – Popcornflower) Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Erodium cicutarium*, *Hesperevax sparsiflora*, *Lolium perenne*, and *Medicago polymorpha*. Those herbs often present include *Aphanes occidentalis*, *Bromus hordeaceus*, *Calandrinia ciliata*, *Croton setigerus*, *Geranium dissectum*, *Hypochaeris glabra*, *Lepidium nitidum*, *Microseris douglasii*, and *Senecio vulgaris*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	30.3	20 – 40	0.3	0 – 1

Local Environmental Description

Elevation: Mean 138 m, Range 68 – 191 m

Aspect: NE (3), NW (1), SE (1), SW (1)

Slope: Mean 11 degrees, Range 3 – 19 degrees

Macro Topography: Bottom to Lower 1/3 of slope (2), Lower 1/3 of slope (2), Bottom (1), Middle 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 0.6%, Range 0 – 2%

Fines Cover: Mean 95.6%, Range 85 – 99%

Litter Cover: Mean 2.7%, Range 1 – 10%

Soil Texture (field assessed): Fine silty clay (3), Moderately fine silty clay loam (2), Fine clay (1)

Geology (field or map data): Sedimentary (3), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1), Shale and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (2), Suisun Hills and Valleys (2) East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1)

Hesperevax sparsiflora – (*Microseris douglasii* – *Plagiobothrys* spp.) Provisional Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Site Impacts

This association has high non-native plant cover (average 50.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Erodium cicutarium*, *Lolium perenne*, and *Medicago polymorpha*.

Classification Comments

This provisional association is newly described here and remains provisional until additional samples are available.

References: None.

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=5; **Alameda County (n=0):**

Contra Costa County (n=6): ALCC351, ALCC379, ALCC403, ALCC427, ALCC556, ALCC854

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	7.2	0.2	12.0	Y			Y
H	<i>Hesperevax sparsiflora</i>	100	5.6	1.0	10.0	Y			Y
H	<i>Erodium cicutarium</i>	100	2.5	0.2	9.0	Y			Y
H	<i>Medicago polymorpha</i>	100	1.5	0.1	6.0	Y			Y
H	<i>Microseris douglasii</i>	60	2.8	0.2	7.0				Y
H	<i>Lepidium nitidum</i>	60	2.5	0.1	12.0				Y
H	<i>Calandrinia ciliata</i>	60	0.3	0.2	1.0				Y
H	<i>Geranium dissectum</i>	60	0.3	0.1	1.0				Y
H	<i>Hypochaeris glabra</i>	60	0.1	0.2	0.2				Y
H	<i>Senecio vulgaris</i>	60	0.1	0.1	0.2				Y
H	<i>Bromus hordeaceus</i>	40	0.2	0.2	1.0				
H	<i>Croton setigerus</i>	40	0.1	0.2	0.2				
H	<i>Aphanes occidentalis</i>	40	0.1	0.1	0.2				

Hesperevax sparsiflora – (*Microseris douglasii* – *Plagiobothrys* spp.) Provisional Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

***Lasthenia (californica, gracilis)* Association**

Common Name: Goldfields Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Goldfields Association forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Lasthenia californica*. Herbs often present include *Allium serra*, *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Lolium perenne*, *Plantago erecta*, and *Vulpia microstachys*, and herbs that are sometimes present include *Achillea millefolium*, *Calystegia collina*, *Castilleja exserta*, *Centromadia fitchii*, *Clarkia purpurea*, *Corethrogyne filaginifolia*, *Cryptantha flaccida*, *Elymus multisetus*, *Erysimum franciscanum*, *Eschscholzia californica*, *Fritillaria liliacea*, *Hemizonia congesta*, *Hordeum murinum*, *Juncus bufonius*, *Layia platyglossa*, *Lepidium nitidum*, *Linanthus ambiguus*, *Lomatium utriculatum*, *Muilla maritima*, *Parapholis incurva*, *Poa secunda*, *Ranunculus californicus*, *Sanicula bipinnatifida*, *Spergularia macrotheca*, *Trifolium depauperatum*, *Triphysaria eriantha*, and *Triteleia hyacinthina*. Commonly associated emergent shrubs at sparse cover include *Eriophyllum confertiflorum* and *Suaeda moquinii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	1.7	0 – 3	no data	no data
Herb	31.3	12 – 42	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 249 m, Range 6 – 376 m

Aspect: NE (2), Flat (1)

Slope: Mean 11 degrees, Range 0 – 30 degrees

Macro Topography: Bottom (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 5.3%, Range 0 – 13%

Small Rock: Mean 32.7%, Range 0 – 82%

Fines Cover: Mean 36.3%, Range 7 – 90%

Litter Cover: Mean 4.3%, Range 1 – 7%

Soil Texture (field assessed): Fine clay (1), Fine sandy clay (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (2), Clayey alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Lasthenia (californica, gracilis) Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Other Subsections: Fremont - Livermore Hills and Valleys (2)

Site Impacts

This association has low non-native plant cover (average 10.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum murinum*, *Lolium perenne*, and *Parapholis incurva*.

Classification Comments

Fritillaria liliacea is a rare plant (CRPR 1B,2) that was identified in one of the surveys. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Ratchford et al. 2023a, Rodriguez 2015, Sikes et al. 2021, Sikes et al. 2023, Taylor et al. 1992, VegCAMP 2015b

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=1): SSJD0379

Santa Clara Co. (n=2): COYO023, SCLAR129

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Suaeda moquinii</i>	33	1.0	3.0	3.0				
S	<i>Eriophyllum confertiflorum</i>	33	0.7	2.0	2.0				
H	<i>Lasthenia californica</i>	100	24.3	8.0	40.0	Y	Y		Y
H	<i>Lolium perenne</i>	67	2.7	0.1	8.0				Y
H	<i>Vulpia microstachys</i>	67	2.0	1.0	5.0				Y
H	<i>Bromus hordeaceus</i>	67	1.3	1.0	3.0				Y
H	<i>Chlorogalum pomeridianum</i>	67	0.4	0.1	1.0				Y
H	<i>Plantago erecta</i>	67	0.1	0.1	0.2				Y
H	<i>Allium serra</i>	67	0.1	0.1	0.2				Y
H	<i>Spergularia macrotheca</i>	33	2.0	6.0	6.0				
H	<i>Trifolium depauperatum</i>	33	1.7	5.2	5.2				
H	<i>Lepidium nitidum</i>	33	1.7	5.0	5.0				
H	<i>Calystegia collina</i>	33	1.3	4.0	4.0				
H	<i>Sanicula bipinnatifida</i>	33	1.0	3.0	3.0				

Lasthenia (californica, gracilis) Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Layia platyglossa</i>	33	0.7	2.0	2.0				
H	<i>Linanthus ambiguus</i>	33	0.3	1.0	1.0				
H	<i>Hordeum murinum</i>	33	0.3	1.0	1.0				
H	<i>Parapholis incurva</i>	33	0.3	1.0	1.0				
H	<i>Lepidium</i> sp.	33	0.3	1.0	1.0				
H	<i>Juncus bufonius</i>	33	0.3	1.0	1.0				
H	<i>Hemizonia congesta</i>	33	0.3	1.0	1.0				
H	<i>Ranunculus californicus</i>	33	0.1	0.2	0.2				
H	<i>Lomatium utriculatum</i>	33	0.1	0.2	0.2				
H	<i>Muilla maritima</i>	33	0.1	0.2	0.2				
H	<i>Centromadia fitchii</i>	33	0.1	0.2	0.2				
H	<i>Triphysaria eriantha</i>	33	0.1	0.2	0.2				
H	<i>Triteleia hyacinthina</i>	33	0.1	0.2	0.2				
H	<i>Erodium</i> sp.	33	0.1	0.2	0.2				
H	<i>Fritillaria liliacea</i>	33	0.1	0.2	0.2				
H	<i>Hordeum</i> sp.	33	0.1	0.2	0.2				
H	<i>Sisyrinchium</i> sp.	33	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	33	0.0	0.1	0.1				
H	<i>Castilleja exserta</i>	33	0.0	0.1	0.1				
H	<i>Erysimum franciscanum</i>	33	0.0	0.1	0.1				
H	<i>Eschscholzia californica</i>	33	0.0	0.1	0.1				
H	<i>Poa secunda</i>	33	0.0	0.1	0.1				
H	<i>Corethrogyne filaginifolia</i>	33	0.0	0.1	0.1				
H	<i>Cryptantha flaccida</i>	33	0.0	0.1	0.1				
H	<i>Elymus multisetus</i>	33	0.0	0.1	0.1				
H	<i>Clarkia purpurea</i>	33	0.0	0.1	0.1				
NV	Algae	33	6.7	20.0	20.0				
NV	Lichen	33	0.7	2.0	2.0				
NV	Moss	33	0.0	0.1	0.1				

***Lasthenia californica* – *Plantago erecta* – *Hesperevax sparsiflora* Association**

Common Name: California goldfields – dwarf plantain – erect evax Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The California goldfields – dwarf plantain – erect evax Association forms an open herbaceous layer in the single survey available. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Acmispon wrangelianus*, *Aphanes occidentalis*, *Astragalus gambelianus*, *Calandrinia ciliata*, *Calystegia subacaulis*, *Castilleja densiflora*, *Caulanthus californicus*, *Chlorogalum pomeridianum*, *Eriogonum luteolum* var. *caninum*, *Eschscholzia californica*, *Hesperevax sparsiflora*, *Koeleria macrantha*, *Plantago erecta*, *Platystemon californicus*, *Plectritis macrocera*, *Ranunculus californicus*, *Trifolium microdon*, and *Trifolium willdenovii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	28.0	28 – 28	no data	no data

Local Environmental Description

Elevation: 256 m

Aspect: NE (1)

Slope: 18 degrees

Macro Topography: no data

Large Rock: 0%

Small Rock: 0%

Fines Cover: 50%

Litter Cover: 10%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (field or map data): Serpentine (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 7.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lolium perenne* and *Vulpia myuros*.

Classification Comments

Two rare plants were identified in this survey, *Caulanthus californicus* (CRPR 1B.1) and *Eriogonum luteolum* var. *caninum* (CRPR 1B.2).

References: Buck and Evens 2010, Buck-Diaz et al. 2020, Buck-Diaz et al. 2021a, Evens and San 2004, McCarten 1991, Rodriguez-Rojo et al. 2001a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): EBAY0110

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Plantago erecta</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Plectritis macrocera</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Trifolium microdon</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Microseris</i> sp.	100	3.0	3.0	3.0	Y			Y
H	<i>Acmispon wrangelianus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Hesperevax sparsiflora</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Vulpia myuros</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Astragalus gambelianus</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Eschscholzia californica</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Aphanes occidentalis</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Trifolium willdenovii</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Koeleria macrantha</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Ranunculus californicus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Caulanthus californicus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Calandrinia ciliata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Eriogonum luteolum</i> var. <i>caninum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Chlorogalum pomeridianum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Castilleja densiflora</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Calystegia subacaulis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Achillea millefolium</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Platystemon californicus</i>	100	0.2	0.2	0.2	Y			Y

***Leptosiphon ambiguus* Provisional Association**

Common Name: Serpentine leptosiphon Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Serpentine leptosiphon Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is sparse. Dominant herbs include *Leptosiphon ambiguus*, and characteristic herbs include *Bromus hordeaceus*, *Erodium cicutarium*, and *Trifolium willdenovii*. Those herbs often present include *Acemisson wrangelianus*, *Astragalus gambelianus*, *Avena barbata*, *Bromus diandrus*, *Bromus tectorum*, *Gilia tricolor*, *Lupinus bicolor*, *Poa secunda*, and *Vulpia microstachys*, and herbs that are sometimes present include *Agoseris heterophylla*, *Bromus madritensis*, *Camissonia graciliflora*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Cynosurus echinatus*, *Dichelostemma capitatum*, *Elymus multisetus*, *Holocarpha virgata*, *Hypochaeris glabra*, *Koeleria macrantha*, *Lasthenia californica*, *Leptosiphon bicolor*, *Logfia gallica*, *Lomatium caruifolium*, *Micropus californicus*, *Mimulus douglasii*, *Plagiobothrys nothofulvus*, *Plantago erecta*, *Plectritis congesta* ssp. *brachystemon*, *Poa bulbosa*, *Ranunculus californicus*, *Trichostema lanceolatum*, *Trifolium albopurpureum*, *Trifolium dichotomum*, *Trifolium gracilentum*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	28.3	12 – 45	0.4	0 – 1

Local Environmental Description

Elevation: Mean 1095 m, Range 1036 – 1139 m

Aspect: SW (2), NE (1)

Slope: Mean 23 degrees, Range 17 – 31 degrees

Macro Topography: Upper 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 60%

Fines Cover: Mean 47.0%, Range 10 – 95%

Litter Cover: Mean 1.3%, Range 1 – 2%

Soil Texture (field assessed): Coarse, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (2), Serpentine (1)

Alameda County Subsections: Western Diablo Range (3)

Leptosiphon ambiguus Provisional Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 28.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Bromus tectorum*, *Cynosurus echinatus*, *Erodium cicutarium*, *Hypochaeris glabra*, *Logfia gallica*, *Poa bulbosa*, and *Vulpia myuros*.

Classification Comments

This association is newly described here and remains provisional until more samples are available. The dominant species *Leptosiphon ambiguus* has a CRPR rank of 4.2.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC447, ALCC584, ALCC905

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus douglasii</i>	33	0.1	0.2	0.2				
H	<i>Leptosiphon ambiguus</i>	100	12.7	3.0	30.0	Y		Y	Y
H	<i>Erodium cicutarium</i>	100	6.1	0.2	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	1.4	0.2	2.0	Y			Y
H	<i>Trifolium willdenovii</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Gilia tricolor</i>	67	2.7	0.2	8.0				Y
H	<i>Bromus tectorum</i>	67	0.7	1.0	1.0				Y
H	<i>Avena barbata</i>	67	0.4	0.2	1.0				Y
H	<i>Bromus diandrus</i>	67	0.4	0.2	1.0				Y
H	<i>Clarkia</i> sp.	67	0.4	0.2	1.0				Y
H	<i>Astragalus gambelianus</i>	67	0.1	0.2	0.2				Y
H	<i>Acmispon wrangelianus</i>	67	0.1	0.2	0.2				Y
H	<i>Lupinus bicolor</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	67	0.1	0.2	0.2				Y
H	<i>Poa secunda</i>	67	0.1	0.2	0.2				Y
H	<i>Lasthenia californica</i>	33	1.7	5.0	5.0				

Leptosiphon ambiguus Provisional Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Logfia gallica</i>	33	0.3	1.0	1.0				
H	<i>Elymus multisetus</i>	33	0.3	1.0	1.0				
H	<i>Trichostema lanceolatum</i>	33	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	33	0.1	0.2	0.2				
H	<i>Leptosiphon bicolor</i>	33	0.1	0.2	0.2				
H	<i>Koeleria macrantha</i>	33	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	33	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Camissonia graciliflora</i>	33	0.1	0.2	0.2				
H	<i>Clarkia purpurea</i>	33	0.1	0.2	0.2				
H	<i>Lomatium caruifolium</i>	33	0.1	0.2	0.2				
H	<i>Agoseris heterophylla</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Trifolium dichotomum</i>	33	0.1	0.2	0.2				
H	<i>Poa bulbosa</i>	33	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	33	0.1	0.2	0.2				
H	<i>Micropus californicus</i>	33	0.1	0.2	0.2				
H	<i>Trifolium albopurpureum</i>	33	0.1	0.2	0.2				
H	<i>Holocarpha virgata</i>	33	0.1	0.2	0.2				
H	<i>Ranunculus californicus</i>	33	0.1	0.2	0.2				
H	<i>Plectritis congesta</i> ssp. <i>brachystemon</i>	33	0.1	0.2	0.2				
H	<i>Plantago erecta</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys nothofulvus</i>	33	0.1	0.2	0.2				
H	<i>Mimulus douglasii</i>	33	0.1	0.2	0.2				
H	<i>Vulpia myuros</i>	33	0.1	0.2	0.2				
H	<i>Cynosurus echinatus</i>	33	0.0	0.1	0.1				

***Micropus californicus* Provisional Association**

Common Name: Q-tips Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Q-tips Association forms an open herbaceous layer. The shrub layer is absent and the tree layer is sparse. Dominant herbs include *Micropus californicus*, and characteristic herbs include *Bromus hordeaceus*. Those herbs often present include *Achillea millefolium*, *Achyrachaena mollis*, *Aphanes occidentalis*, *Avena barbata*, *Bromus diandrus*, *Carduus pycnocephalus*, *Clarkia* sp., *Erodium cicutarium*, *Holocarpha virgata*, *Plectritis ciliosa*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.1	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	16.0	13 – 22	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 546 m, Range 163 – 1108 m

Aspect: NE (2), NW (1)

Slope: Mean 17 degrees, Range 3 – 26 degrees

Macro Topography: Middle 1/3 of slope (2), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 15.1%, Range 0 – 30%

Fines Cover: Mean 84.9%, Range 63 – 98%

Litter Cover: Mean 3.7%, Range 1 – 5%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 33.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Micropus californicus Provisional Association
Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Bromus diandrus, *Bromus hordeaceus*, *Bromus madritensis*, *Bromus tectorum*, *Carduus pycnocephalus*, *Cerastium glomeratum*, *Elymus caput-medusae*, *Erodium botrys*, *Erodium cicutarium*, *Galium murale*, *Geranium dissectum*, *Geranium molle*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Poa bulbosa*, *Sherardia arvensis*, *Trifolium hirtum*, and *Vulpia bromoides*.

Classification Comments

This association remains provisional due to low sample size.

References: Klein et al. 2015, Reyes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC583

Contra Costa County (n=2): ALCC334, ALCC377

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus agrifolia</i>	33	0.0	0.1	0.1				
H	<i>Micropus californicus</i>	100	6.3	6.0	7.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	100	2.0	0.1	4.0	Y			Y
H	<i>Bromus diandrus</i>	67	1.0	1.0	2.0				Y
H	<i>Avena barbata</i>	67	0.7	0.2	2.0				Y
H	<i>Clarkia</i> sp.	67	0.7	1.0	1.0				Y
H	<i>Achillea millefolium</i>	67	0.4	0.2	1.0				Y
H	<i>Plectritis ciliosa</i>	67	0.4	0.2	1.0				Y
H	<i>Aphanes occidentalis</i>	67	0.4	0.2	1.0				Y
H	<i>Achyrachaena mollis</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	67	0.1	0.2	0.2				Y
H	<i>Erodium cicutarium</i>	67	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	67	0.1	0.2	0.2				Y
H	<i>Holocarpha virgata</i>	67	0.1	0.1	0.2				Y
H	<i>Vulpia bromoides</i>	33	0.7	2.0	2.0				
H	<i>Leptosiphon bicolor</i>	33	0.3	1.0	1.0				
H	<i>Madia</i> sp.	33	0.3	1.0	1.0				
H	<i>Microseris douglasii</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.2	0.2				
H	<i>Camissonia contorta</i>	33	0.1	0.2	0.2				
H	<i>Medicago polymorpha</i>	33	0.1	0.2	0.2				
H	<i>Delphinium</i> sp.	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Dodecatheon</i> sp.	33	0.1	0.2	0.2				
H	<i>Delphinium variegatum</i>	33	0.1	0.2	0.2				
H	<i>Elymus caput-medusae</i>	33	0.1	0.2	0.2				
H	<i>Castilleja exserta</i>	33	0.1	0.2	0.2				
H	<i>Camissonia graciliflora</i>	33	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	33	0.1	0.2	0.2				
H	<i>Clarkia purpurea</i>	33	0.1	0.2	0.2				
H	<i>Clarkia affinis</i>	33	0.1	0.2	0.2				
H	<i>Chlorogalum pomeridianum</i>	33	0.1	0.2	0.2				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Madia exigua</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				
H	<i>Lepidium nitidum</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Melica californica</i>	33	0.1	0.2	0.2				
H	<i>Leptosiphon ambiguus</i>	33	0.1	0.2	0.2				
H	<i>Geranium dissectum</i>	33	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	33	0.1	0.2	0.2				
H	<i>Elymus glaucus</i>	33	0.1	0.2	0.2				
H	<i>Geranium molle</i>	33	0.1	0.2	0.2				
H	<i>Galium murale</i>	33	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	33	0.1	0.2	0.2				
H	<i>Daucus pusillus</i>	33	0.1	0.2	0.2				
H	<i>Rigiopappus leptocladus</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnatifida</i>	33	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	33	0.1	0.2	0.2				
H	<i>Poa bulbosa</i>	33	0.1	0.2	0.2				
H	<i>Sherardia arvensis</i>	33	0.1	0.2	0.2				
H	<i>Poa secunda</i>	33	0.1	0.2	0.2				
H	<i>Torilis</i> sp.	33	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	33	0.1	0.2	0.2				
H	<i>Ranunculus californicus</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Cerastium glomeratum</i>	33	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Agoseris</i> sp.	33	0.1	0.2	0.2				
H	<i>Bromus tectorum</i>	33	0.1	0.2	0.2				
NV	Moss	67	1.3	1.0	3.0				Y

***Vulpia microstachys* Association**

Common Name: Small Fescue Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Small Fescue Association forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is usually absent. Characteristic herbs include *Avena barbata*, *Erodium cicutarium* and *Vulpia microstachys*. Those herbs often present include *Aira caryophyllea*, *Bromus hordeaceus*, *Bromus rubens*, *Clarkia purpurea*, *Cynosurus echinatus*, *Elymus multisetus*, *Galium parisiense*, *Holocarpha virgata*, *Hypochaeris glabra*, *Lagophylla ramosissima*, *Lathyrus vestitus*, *Lupinus bicolor*, *Micropus californicus*, *Plectritis ciliosa*, and *Trifolium hirtum*. Commonly associated regenerating or shrubby trees at sparse cover include *Quercus douglasii*. Commonly associated emergent shrubs at sparse cover include *Frangula californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	0.1	0 – 0.2	0.3	0 – 0.5
Herb	36.0	26 – 50	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 699 m, Range 44 – 1111 m

Aspect: NE (1), NW (1), Variable (1)

Slope: Mean 13 degrees, Range 8 – 24 degrees

Macro Topography: Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 30%

Fines Cover: Mean 42.0%, Range 20 – 58%

Litter Cover: Mean 32.7%, Range 10 – 48%

Soil Texture (field assessed): Fine sandy clay (1), Medium to very fine, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Franciscan melange (3)

Alameda County Subsections: Western Diablo Range (2), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 51.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Brassica nigra*, *Bromus hordeaceus*, *Cynosurus echinatus*, *Erodium* spp., *Foeniculum vulgare*, *Galium parisiense*, *Geranium dissectum*, *Hordeum murinum*, *Hypochaeris glabra*, *Phalaris aquatica*, *Torilis* spp., *Trifolium hirtum*, and *Vicia sativa*.

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Ratchford et al. 2023a

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC389, ALCC425, ALCC754

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus douglasii</i>	67	0.1	0.2	0.2				Y
S	<i>Frangula californica</i>	33	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	100	11.7	2.0	25.0	Y			Y
H	<i>Avena barbata</i>	100	3.0	1.0	6.0	Y			Y
H	<i>Erodium cicutarium</i>	100	1.4	0.2	2.0	Y			Y
H	<i>Bromus hordeaceus</i>	67	5.7	7.0	10.0				Y
H	<i>Bromus rubens</i>	67	1.7	0.2	5.0				Y
H	<i>Trifolium hirtum</i>	67	1.0	0.1	3.0				Y
H	<i>Clarkia purpurea</i>	67	1.0	1.0	2.0				Y
H	<i>Aira caryophyllea</i>	67	0.7	0.2	2.0				Y
H	<i>Holocarpha virgata</i>	67	0.7	0.2	2.0				Y
H	<i>Micropus californicus</i>	67	0.7	1.0	1.0				Y
H	<i>Elymus multisetus</i>	67	0.7	1.0	1.0				Y
H	<i>Lupinus bicolor</i>	67	0.1	0.2	0.2				Y
H	<i>Cynosurus echinatus</i>	67	0.1	0.2	0.2				Y
H	<i>Plectritis ciliosa</i>	67	0.1	0.2	0.2				Y
H	<i>Hypochaeris glabra</i>	67	0.1	0.2	0.2				Y
H	<i>Lagophylla ramosissima</i>	67	0.1	0.2	0.2				Y
H	<i>Galium parisiense</i>	67	0.1	0.1	0.2				Y

Vulpia microstachys Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lathyrus vestitus</i>	67	0.1	0.1	0.2				Y
H	<i>Erodium botrys</i>	33	4.0	12.0	12.0				
H	<i>Nassella pulchra</i>	33	0.7	2.0	2.0				
H	<i>Castilleja attenuata</i>	33	0.7	2.0	2.0				
H	<i>Trifolium willdenovii</i>	33	0.3	1.0	1.0				
H	<i>Trifolium microdon</i>	33	0.3	1.0	1.0				
H	<i>Chlorogalum pomeridianum</i>	33	0.3	1.0	1.0				
H	<i>Bromus carinatus</i>	33	0.3	1.0	1.0				
H	<i>Melica californica</i>	33	0.3	1.0	1.0				
H	<i>Rigipappus leptocladus</i>	33	0.1	0.2	0.2				
H	<i>Acmispon wrangelianus</i>	33	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	33	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	33	0.1	0.2	0.2				
H	<i>Clarkia gracilis</i>	33	0.1	0.2	0.2				
H	<i>Centaurea melitensis</i>	33	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.2	0.2				
H	<i>Trifolium albopurpureum</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	33	0.1	0.2	0.2				
H	<i>Trifolium microcephalum</i>	33	0.1	0.2	0.2				
H	<i>Erodium moschatum</i>	33	0.1	0.2	0.2				
H	<i>Trifolium ciliolatum</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Acmispon</i> sp.	33	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	33	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	33	0.1	0.2	0.2				
H	<i>Daucus pusillus</i>	33	0.1	0.2	0.2				
H	<i>Agoseris heterophylla</i>	33	0.1	0.2	0.2				
H	<i>Madia exigua</i>	33	0.1	0.2	0.2				
H	<i>Medicago praecox</i>	33	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	33	0.1	0.2	0.2				
H	<i>Ranunculus</i> sp.	33	0.1	0.2	0.2				
H	<i>Phalaris aquatica</i>	33	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	33	0.1	0.2	0.2				
H	<i>Poa secunda</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				

Vulpia microstachys Association

Lasthenia californica – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

***Vulpia microstachys* – *Plantago erecta* Association**

Common Name: Small Fescue – Dwarf Plantain Patches

Alliance: *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Herbaceous Alliance

Local Vegetation Description

The Small Fescue – Dwarf Plantain Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Vulpia microstachys*, and characteristic herbs include *Plantago erecta*. Those herbs often present include *Avena barbata*, *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, and *Nassella pulchra*, and herbs that are sometimes present include *Allium serra*, *Bromus rubens*, *Elymus multisetus*, *Erodium cicutarium*, *Holocarpha virgata*, *Lasthenia gracilis*, *Lolium perenne*, *Lomatium utriculatum*, *Lupinus bicolor*, *Micropus californicus*, *Poa secunda*, *Sanicula bipinnata*, *Sanicula bipinnatifida*, and *Trifolium willdenovii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	24.2	10 – 38	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 542 m, Range 352 – 1016 m

Aspect: NW (3), N (1), NE (1), SW (1)

Slope: Mean 8 degrees, Range 3 – 22 degrees

Macro Topography: Middle 1/3 of slope (2), Ridge top (2), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.5%, Range 0 – 1%

Small Rock: Mean 45.5%, Range 16 – 75%

Fines Cover: Mean 61.8%, Range 23 – 97%

Litter Cover: Mean 6.0%, Range 1 – 15%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Not recorded (2), Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (3), Franciscan melange (1), Sedimentary (1), Ultramafic (1)

Alameda County Subsections: Western Diablo Range (2), Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has moderate non-native plant cover (average 31.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Erodium cicutarium*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Evens and San 2004, Evens et al. 2006, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC343, ALCC347, ALCC580

Contra Costa County (n=0):

Santa Clara Co. (n=3): COYO047, SCLAR063, SCLAR065

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Vulpia microstachys</i>	100	10.9	0.2	30.0	Y		Y	Y
H	<i>Plantago erecta</i>	83	2.3	0.2	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	67	2.7	1.0	10.0				Y
H	<i>Nassella pulchra</i>	67	0.7	0.1	3.0				Y
H	<i>Clarkia purpurea</i>	67	0.3	0.1	1.0				Y
H	<i>Avena barbata</i>	50	0.9	0.2	5.0				Y
H	<i>Chlorogalum pomeridianum</i>	50	0.2	0.1	1.0				Y
H	<i>Lolium perenne</i>	33	3.2	4.0	15.0				
H	<i>Micropus californicus</i>	33	0.7	1.0	3.0				
H	<i>Holocarpha virgata</i>	33	0.5	1.0	2.0				
H	<i>Elymus multisetus</i>	33	0.5	1.0	2.0				
H	<i>Erodium cicutarium</i>	33	0.4	0.2	2.0				
H	<i>Lasthenia gracilis</i>	33	0.2	0.2	1.0				
H	<i>Sanicula bipinnata</i>	33	0.1	0.2	0.2				
H	<i>Poa secunda</i>	33	0.1	0.2	0.2				
H	<i>Bromus rubens</i>	33	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.1	0.2				
H	<i>Allium serra</i>	33	0.1	0.1	0.2				
H	<i>Sanicula bipinnatifida</i>	33	0.1	0.1	0.2				
H	<i>Lomatium utriculatum</i>	33	0.0	0.1	0.1				
NV	Lichen	33	1.7	0.2	10.0				
NV	Moss	33	0.2	0.2	1.0				

***Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance**



Common Name: Fremont's goldfields – saltgrass alkaline vernal pools

NVC Alliance Code: A4181. *Lasthenia fremontii* - *Distichlis spicata* Vernal Pool Alliance

Statewide Description

Cressa truxillensis, *Distichlis spicata*, and/or *Lasthenia fremontii* are characteristically present and may be dominant in the herbaceous layer with other indicator species including *Atriplex persistens*, *Centromadia pungens*, *Crypsis schoenoides*, *Downingia bella*, *Downingia insignis*, *Grindelia camporum*, *Hordeum depressum*, *Lasthenia glaberrima*, *Lasthenia platycarpa*, *Lepidium dictyotum*, *Lilaea scilloides*, *Limnanthes douglasii* ssp. *rosea*, *Myosurus minimus*, *Navarretia leucocephala*, *Plagiobothrys stipitatus*, *Pleuropogon californicus*, *Psilocarphus brevissimus* and *Spergularia macrotheca*. Other plants may include *Achyrachaena mollis*, *Arthrocnemum subterminale*, *Brodiaea coronaria*, *Centromadia* spp., *Cicendia quadrangularis*, *Cotula coronopifolia*, *Crassula connata*, *Croton setigerus*, *Cynodon dactylon*, *Deinandra* spp., *Eleocharis acicularis*, *Epilobium* spp., *Eryngium aristulatum*, *Gnaphalium palustre*, *Hemizonia congesta*, *Hordeum* spp., *Juncus arcticus*, *Lactuca serriola*, *Lepidium* spp., *Marsilea vestita*, *Medicago polymorpha*, *Phalaris lemmonii*, *Plantago* spp., *Poa secunda*, *Polygonum* spp., *Senecio vulgaris*, *Spergularia platensis* or *Trifolium* spp.

Barbour et al. (2003, 2007b) recognized the *Downingia*-*Lasthenia* class of California vernal pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within that class, they recognized the *Frankenia salina* – *Lasthenia fremontii* alliance for the vegetation of shallow, alkaline, or saline vernal pools and playas. We have renamed this alliance as *Lasthenia fremontii* –

Distichlis spicata in concert with Barbour et al. (2008). Most pools are typically large, flooded for long periods, and have shallow groundwater tables. Unlike other vernal pools with similar species composition, they also have perennial halophytes. They are inundated until the late spring with growth taking place later in the season (Barbour et al. 2007b). Rare taxa in this alliance include low constancy of *Astragalus tener* var. *tener*, *Atriplex persistens*, *Downingia pusilla*, *Gratiola heterosepala*, *Legenere limosa*, and *Orcuttia pilosa* (all CRPR 1B or 2 list plants).

Local Vegetation Description

The Fremont's goldfields – saltgrass alkaline vernal pools Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Frankenia salina*, *Hordeum marinum*, and *Lolium perenne*. Those herbs often present include *Bromus hordeaceus*, *Eryngium aristulatum*, *Juncus bufonius*, and *Spergularia marina*, and herbs that are sometimes present include *Atriplex coronata* var. *coronata*, *Atriplex fruticulosa*, *Centromadia pungens* ssp. *pungens*, *Distichlis spicata*, *Downingia pulchella*, *Hordeum depressum*, *Lasthenia conjugens*, *Lasthenia gracilis*, *Lepidium acutidens*, *Lepidium dictyotum*, *Myosurus minimus*, *Parapholis incurva*, *Pilularia americana*, *Plantago elongata*, *Psilocarphus brevissimus*, and *Trifolium depauperatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.2	0 – 3	no data	no data
Herb	64.0	25 – 95	0.3	0 – 0.5

Local Membership Rule

Halophytes, such as *Distichlis spicata*, *Frankenia salina*, *Hordeum depressum*, and *Myosurus minimus*, present along with other diagnostic species, such as *Downingia pulchella*, *Eryngium aristulatum*, *Lasthenia conjugens*, *Lasthenia fremontii*, and *Psilocarphus brevissimus*, found in saline or alkaline vernal pools that have a salt crust or salty soil.

Local Environmental Description

Elevation: Mean 74 m, Range 0 – 160 m

Aspect: NE (4), Flat (1), SW (1), Variable (1)

Slope: Mean 1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (5), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 7.7%, Range 0 – 40%

Fines Cover: Mean 47.0%, Range 0 – 97%

Litter Cover: Mean 3.7%, Range 0 – 20%

Soil Texture (field assessed): Fine clay (3), Medium to very fine, sandy loam (2), Moderately fine silty clay loam (1), Medium silt loam (1)

Geology (field or map data): Alluvium (6), Sedimentary (5), Sandy alluvium (most alluvial fans and washes) (2), Clayey alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (5), East Bay Terraces and Alluvium (3)

Contra Costa County Subsections: Eastern Hills (6)

Site Impacts

This alliance has moderate non-native plant cover (average 26.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, *Lolium perenne*, and *Parapholis incurva*.

Associations in Alameda & Contra Costa Counties

Downingia pulchella – *Distichlis spicata*

Hordeum depressum – *Spergularia (marina)*

Frankenia salina – *Psilocarphus brevissimus*

Lasthenia ferrisiae – *Lasthenia conjugens*

Lasthenia fremontii – *Distichlis spicata*

Lasthenia fremontii – *Distichlis spicata* alliance

Classification Comments

Lasthenia conjugens is a rare plant (CRPR 1B.1) that sometimes occurs in this alliance..

References: Barbour et al. 2007b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Taylor et al. 1992

Global Rarity Rank: G2

State Rarity Rank: S2

Surveys Used for Description

Total: N=14; Alameda County (n=8): ALCC851, SPR001B, SPR004C, SPR005A, SPR006A, WAR003A, WAR004B, WAR007A

Contra Costa County (n=6): ALCC551, ALCC560, ALCC574, ALCC594, ALCC808, ALCC855

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Frankenia salina</i>	93	3.6	0.1	15.0	Y			Y
H	<i>Hordeum marinum</i>	79	7.5	0.2	60.0	Y			Y
H	<i>Lolium perenne</i>	79	3.3	0.2	10.0	Y			Y
H	<i>Eryngium aristulatum</i>	50	7.4	3.0	45.0				Y
H	<i>Bromus hordeaceus</i>	50	2.1	0.2	25.0				Y
H	<i>Spergularia marina</i>	50	1.2	0.2	10.0				Y
H	<i>Juncus bufonius</i>	50	0.4	0.2	3.0				Y
H	<i>Distichlis spicata</i>	43	5.2	0.4	40.0				
H	<i>Hordeum depressum</i>	43	2.9	0.2	25.0				
H	<i>Downingia pulchella</i>	36	9.1	0.1	80.0				
H	<i>Atriplex coronata</i> var. <i>coronata</i>	29	0.4	0.2	4.0				
H	<i>Lepidium acutidens</i>	29	0.1	0.2	1.0				
H	<i>Lasthenia conjugens</i>	21	14.3	55.0	80.0				
H	<i>Lasthenia gracilis</i>	21	1.1	1.0	10.0				
H	<i>Parapholis incurva</i>	21	0.7	0.2	7.0				
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	21	0.4	0.2	5.0				
H	<i>Lepidium dictyotum</i>	21	0.4	0.2	4.0				
H	<i>Pilularia americana</i>	21	0.4	0.1	5.0				
H	<i>Atriplex fruticulosa</i>	21	0.2	0.2	2.0				
H	<i>Psilocarphus brevissimus</i>	21	0.1	0.4	1.0				
H	<i>Trifolium depauperatum</i>	21	0.1	0.2	0.8				
H	<i>Myosurus minimus</i>	21	0.1	0.1	1.0				
H	<i>Plantago elongata</i>	21	0.0	0.2	0.2				

***Downingia pulchella* – *Distichlis spicata* Association**

Common Name: Flatface Calicoflower – Saltgrass Patches

Alliance: *Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Flatface Calicoflower – Saltgrass Association forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Downingia pulchella*, and characteristic herbs include *Downingia pulchella* and *Eryngium aristulatum*. Those herbs often present include *Distichlis spicata*, *Frankenia salina*, *Lilaea scilloides*, and *Pilularia americana*, and herbs that are sometimes present include *Bromus hordeaceus*, *Callitriche marginata*, *Elatine californica*, *Epilobium cleistogamum*, *Hordeum marinum*, *Juncus bufonius*, *Lasthenia glaberrima*, *Lepidium latifolium*, *Lolium perenne*, *Lythrum hyssopifolium*, *Plagiobothrys leptocladus*, *Polypogon monspeliensis*, *Psilocarphus brevissimus*, *Spergularia macrotheca*, *Trifolium barbigerrum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	91.7	90 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 156 m, Range 155 – 156 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 6.7%, Range 0 – 10%

Litter Cover: Mean 0.7%, Range 0 – 2%

Soil Texture (field assessed): Not recorded (3)

Geology (field or map data): Alluvium (2), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 22.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include

Bromus hordeaceus, *Hordeum marinum*, *Lepidium latifolium*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, and *Vulpia bromoides*.

Classification Comments

None.

References: Barbour et al. 2007b

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): SPR001B, SPR004C, SPR005A

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Downingia pulchella</i>	100	42.0	1.0	80.0	Y		Y	Y
H	<i>Eryngium aristulatum</i>	100	25.0	5.0	45.0	Y			Y
H	<i>Pilularia americana</i>	67	1.8	0.4	5.0				Y
H	<i>Distichlis spicata</i>	67	0.8	0.4	2.0				Y
H	<i>Lilaea scilloides</i>	67	0.8	0.4	2.0				Y
H	<i>Frankenia salina</i>	67	0.7	0.1	2.0				Y
H	<i>Hordeum marinum</i>	33	20.0	60.0	60.0				
H	<i>Elatine californica</i>	33	1.7	5.0	5.0				
H	<i>Lepidium latifolium</i>	33	0.3	1.0	1.0				
H	<i>Lolium perenne</i>	33	0.3	1.0	1.0				
H	<i>Epilobium cleistogamum</i>	33	0.3	1.0	1.0				
H	<i>Polypogon monspeliensis</i>	33	0.1	0.4	0.4				
H	<i>Callitriche marginata</i>	33	0.1	0.4	0.4				
H	<i>Lasthenia glaberrima</i>	33	0.1	0.4	0.4				
H	<i>Plagiobothrys leptocladus</i>	33	0.1	0.4	0.4				
H	<i>Juncus bufonius</i>	33	0.1	0.4	0.4				
H	<i>Psilocarphus brevissimus</i>	33	0.1	0.4	0.4				
H	<i>Spergularia macrotheca</i>	33	0.1	0.4	0.4				
H	<i>Trifolium barbigerum</i>	33	0.1	0.4	0.4				
H	<i>Vulpia bromoides</i>	33	0.1	0.4	0.4				
H	<i>Bromus hordeaceus</i>	33	0.1	0.4	0.4				
H	<i>Lythrum hyssopifolium</i>	33	0.0	0.1	0.1				

Downingia pulchella – *Distichlis spicata* Association
Lasthenia fremontii – *Distichlis spicata* Herbaceous Alliance

***Frankenia salina* – *Psilocarphus brevissimus* Provisional Association**

Common Name: Alkali Heath – Woolly Marbles Patches

Alliance: *Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Alkali Heath – Woolly Marbles Association forms a continuous herbaceous layer. The shrub and tree layers are absent. Dominant herbs include *Psilocarphus brevissimus*, and characteristic herbs include *Frankenia salina* and *Lolium perenne*. Those herbs often present include *Bromus hordeaceus*, *Cotula coronopifolia*, *Distichlis spicata*, *Eryngium aristulatum*, *Lasthenia conjugens*, *Plagiobothrys stipitatus* var. *micranthus*, *Rumex crispus*, and *Trifolium depauperatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	85.0	80 – 95	0.25	0-0.5

Local Environmental Description

Elevation: Mean 3 m, Range 3 – 3 m

Aspect: Flat (3)

Slope: 0 degrees, Range 0 – 0 degrees

Macro Topography: not recorded

Large Rock: no data

Small Rock: no data

Fines Cover: Mean 10.7%, Range 2 – 25%

Litter Cover: Mean 5.3%, Range 1 – 10%

Soil Texture (field assessed): Not Recorded

Geology (field or map data): Alluvium (3)

Alameda County Subsections: East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: none

Other Subsections: Suisun Hills and Valleys (1)

Site Impacts

This association has moderate non-native plant cover (average 25.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Cotula coronopifolia*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=2): WAR004A, WAR007C

Contra Costa County (n=0):

Solano Co. (n=1): VPOOL099

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	0.4	45.0	15.8	Y			
H	<i>Frankenia salina</i>	100	2.0	10.0	5.7	Y			
H	<i>Psilocarphus brevissimus</i>	67	20.0	70.0	45.0			Y	Y
H	<i>Trifolium depauperatum</i>	67	0.4	20.0	10.2				Y
H	<i>Lasthenia conjugens</i>	67	1.0	10.0	5.5				Y
H	<i>Bromus hordeaceus</i>	67	0.4	10.0	5.2				Y
H	<i>Eryngium aristulatum</i>	67	2.0	3.0	2.5				Y
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	67	1.0	2.0	1.5				Y
H	<i>Cotula coronopifolia</i>	67	0.4	0.4	0.4				Y
H	<i>Distichlis spicata</i>	67	0.4	0.4	0.4				Y
H	<i>Rumex crispus</i>	67	0.4	0.4	0.4				Y
H	<i>Eleocharis macrostachya</i>	33	15.0	15.0	15.0				
H	<i>Myosurus minimus</i>	33	15.0	15.0	15.0				
H	<i>Lotus corniculatus</i>	33	5.0	5.0	5.0				
H	<i>Trifolium variegatum</i>	33	5.0	5.0	5.0				
H	<i>Vulpia bromoides</i>	33	5.0	5.0	5.0				
H	<i>Trifolium dubium</i>	33	3.0	3.0	3.0				
H	<i>Centaurea calcitrapa</i>	33	1.0	1.0	1.0				
H	<i>Alopecurus saccatus</i>	33	0.4	0.4	0.4				
H	<i>Cerastium glomeratum</i>	33	0.4	0.4	0.4				
H	<i>Crassula aquatica</i>	33	0.4	0.4	0.4				
H	<i>Downingia pulchella</i>	33	0.4	0.4	0.4				
H	<i>Lasthenia californica</i>	33	0.4	0.4	0.4				
H	<i>Malvella leprosa</i>	33	0.4	0.4	0.4				
H	<i>Medicago polymorpha</i>	33	0.4	0.4	0.4				
H	<i>Plagiobothrys humistratus</i>	33	0.4	0.4	0.4				
H	<i>Poa annua</i>	33	0.4	0.4	0.4				
H	<i>Ranunculus muricatus</i>	33	0.4	0.4	0.4				
H	<i>Trifolium barbigerum</i>	33	0.4	0.4	0.4				
H	<i>Triphysaria eriantha</i>	33	0.4	0.4	0.4				
H	<i>Triphysaria versicolor</i> ssp. <i>faucibarbat</i>	33	0.4	0.4	0.4				

Frankenia salina – *Psilocarphus brevissimus* Provisional Association
Lasthenia fremontii – *Distichlis spicata* Herbaceous Alliance

***Hordeum depressum* – *Spergularia (marina)* Association**

Common Name: Dwarf Barley – Salt Marsh Sandspurry Patches

Alliance: *Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Dwarf Barley – Salt Marsh Sandspurry Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus*, *Frankenia salina*, *Hordeum depressum*, *Hordeum marinum*, *Lolium perenne*, and *Spergularia marina*. Those herbs often present include *Atriplex coronata* var. *coronata*, *Distichlis spicata*, *Juncus bufonius*, *Lepidium acutidens*, and *Lepidium dictyotum*, and herbs that are sometimes present include *Atriplex fruticulosa*, *Centromadia pungens* ssp. *pungens*, *Crypsis* sp., *Hordeum murinum*, *Lasthenia gracilis*, *Lepidium latipes*, *Lepidium nitidum*, *Medicago polymorpha*, *Melilotus indicus*, *Microseris douglasii*, *Parapholis incurva*, and *Plantago elongata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.5	0 – 3	no data	no data
Herb	38.5	25 – 72	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 40 m, Range 0 – 84 m

Aspect: NE (4), Flat (1), SW (1)

Slope: Mean 1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (4), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 10.2%, Range 0 – 40%

Fines Cover: Mean 79.8%, Range 55 – 97%

Litter Cover: Mean 8.0%, Range 1 – 20%

Soil Texture (field assessed): Fine clay (2), Medium to very fine, sandy loam (2), Medium silt loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sedimentary (3), Sandy alluvium (most alluvial fans and washes) (2), Clayey alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (6)

Site Impacts

This association has moderate non-native plant cover (average 38.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, *Hordeum murinum*, *Lolium perenne*, and *Parapholis incurva*.

Classification Comments

This association has been renamed from *Hordeum (depressum, murinum ssp. leporinum)* to better indicate its composition and vernal pool habitat.

References: Barbour et al. 2007b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=6): ALCC551, ALCC560, ALCC574, ALCC594, ALCC808, ALCC855

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum depressum</i>	100	6.7	0.2	25.0	Y			Y
H	<i>Hordeum marinum</i>	100	4.9	0.2	12.0	Y			Y
H	<i>Lolium perenne</i>	100	4.7	0.2	10.0	Y			Y
H	<i>Spergularia marina</i>	100	2.8	0.2	10.0	Y			Y
H	<i>Frankenia salina</i>	100	2.3	0.2	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	83	0.8	0.2	3.0	Y			Y
H	<i>Atriplex coronata</i> var. <i>coronata</i>	67	0.9	0.2	4.0				Y
H	<i>Lepidium acutidens</i>	67	0.3	0.2	1.0				Y
H	<i>Juncus bufonius</i>	67	0.1	0.2	0.2				Y
H	<i>Distichlis spicata</i>	50	9.2	7.0	40.0				Y
H	<i>Lepidium dictyotum</i>	50	1.0	0.2	4.0				Y
H	<i>Parapholis incurva</i>	33	1.7	3.0	7.0				
H	<i>Lasthenia gracilis</i>	33	0.8	1.0	4.0				
H	<i>Lepidium nitidum</i>	33	0.7	0.2	4.0				
H	<i>Microseris douglasii</i>	33	0.4	0.2	2.0				
H	<i>Hordeum murinum</i>	33	0.4	0.2	2.0				
H	<i>Crypsis</i> sp.	33	0.2	0.2	1.0				
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	33	0.2	0.2	1.0				
H	<i>Melilotus indicus</i>	33	0.1	0.2	0.2				
H	<i>Plantago elongata</i>	33	0.1	0.2	0.2				
H	<i>Lepidium latipes</i>	33	0.1	0.2	0.2				
H	<i>Atriplex fruticulosa</i>	33	0.1	0.2	0.2				
H	<i>Medicago polymorpha</i>	33	0.1	0.2	0.2				

***Lasthenia ferrisiae* – *Lasthenia conjugens* Association**

Common Name: Ferris' Goldfields – Contra Costa Goldfields Patches

Alliance: *Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Ferris' Goldfields – Contra Costa Goldfields Association forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Lasthenia conjugens*, and characteristic herbs include *Eryngium aristulatum*, *Frankenia salina*, *Hordeum marinum*, *Lolium perenne*. Those herbs often present include *Psilocarphus brevissimus*, *Trifolium depauperatum*, and herbs that are sometimes present include *Downingia pulchella*, *Eleocharis macrostachya*, *Myosurus minimus*, *Pilularia americana*, *Plagiobothrys stipitatus* var. *micranthus*, *Rumex crispus*, *Trifolium barbigerum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	90.0	85 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 3 m, Range 3 – 4 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: No data

Small Rock: No data

Fines Cover: Mean 2.7%, Range 0 – 5%

Litter Cover: Mean 0.3%, Range 0 – 1%

Soil Texture (field assessed): Not recorded (3)

Geology (field or map data): Alluvium (3)

Alameda County Subsections: East Bay Terraces and Alluvium (3)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 12.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Hordeum marinum*, *Lolium perenne*, *Rumex crispus*, and *Vulpia bromoides*.

Classification Comments

Lasthenia conjugens is a rare plant (CRPR 1B.1) that dominates this association..

References: Barbour et al. 2007b

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): WAR003A, WAR004B, WAR007A

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lasthenia conjugens</i>	100	66.7	55.0	80.0	Y	Y		Y
H	<i>Frankenia salina</i>	100	6.7	5.0	8.0	Y			Y
H	<i>Lolium perenne</i>	100	5.7	1.0	10.0	Y			Y
H	<i>Hordeum marinum</i>	100	4.8	0.4	12.0	Y			Y
H	<i>Eryngium aristulatum</i>	100	4.3	3.0	5.0	Y			Y
H	<i>Psilocarphus brevissimus</i>	67	0.5	0.4	1.0				Y
H	<i>Trifolium depauperatum</i>	67	0.4	0.4	0.8				Y
H	<i>Eleocharis macrostachya</i>	33	0.3	1.0	1.0				
H	<i>Vulpia bromoides</i>	33	0.3	1.0	1.0				
H	<i>Trifolium barbigerum</i>	33	0.1	0.4	0.4				
H	<i>Rumex crispus</i>	33	0.1	0.4	0.4				
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	33	0.1	0.4	0.4				
H	<i>Pilularia americana</i>	33	0.0	0.1	0.1				
H	<i>Myosurus minimus</i>	33	0.0	0.1	0.1				
H	<i>Downingia pulchella</i>	33	0.0	0.1	0.1				

***Lasthenia fremontii* – *Distichlis spicata* Provisional Association**

Common Name: Fremont's Goldfields – Saltgrass Patches

Alliance: *Lasthenia fremontii* – *Distichlis spicata* Herbaceous Alliance

Local Vegetation Description

The Fremont's Goldfields – Saltgrass Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Eryngium aristulatum* and *Lasthenia fremontii*, and characteristic herbs include *Centromadia fitchii*, *Deschampsia danthonioides*, *Downingia pulchella*, *Eryngium aristulatum*, *Frankenia salina*, *Juncus bufonius*, *Lasthenia fremontii*, and *Myosurus minimus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	45.0	45 – 45	0.3	0 – 0.5

Local Environmental Description

Elevation: 156 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: No data

Small Rock: No data

Fines Cover: 55%

Litter Cover: 0%

Soil Texture (field assessed): Not recorded (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyor.

Classification Comments

This association remains provisional due to low sample size.

References: Taylor et al. 1992

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): SPR006A

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lasthenia fremontii</i>	100	22.0	22.0	22.0	Y		Y	Y
H	<i>Eryngium aristulatum</i>	100	15.0	15.0	15.0	Y		Y	Y
H	<i>Centromadia fitchii</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Juncus bufonius</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Deschampsia danthonioides</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Downingia pulchella</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Frankenia salina</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Myosurus minimus</i>	100	0.1	0.1	0.1	Y			Y

***Lasthenia fremontii* – *Downingia (bicornuta)* Herbaceous Alliance**



Common Name: Fremont's goldfields – *Downingia* vernal pools

NVC Alliance Code: A4168. *Lasthenia fremontii* - *Downingia bicornuta* - *Downingia* spp. Vernal Pool Alliance

Statewide Description

Downingia spp. and/or *Lasthenia fremontii* are characteristically present in the herbaceous layer with *Castilleja campestris*, *Cuscuta howelliana*, *Eryngium castrense*, *Eryngium vaseyi*, *Gratiola ebracteata*, *Lilaea scilloides*, *Limnanthes douglasii*, *Plagiobothrys stipitatus* var. *micranthus*, *Plagiobothrys undulatus*, *Psilocarphus brevissimus* var. *brevissimus*, and *Ranunculus bonariensis* var. *trisepalus*. Other common species include *Briza minor*, *Bromus hordeaceus*, *Centromadia fitchii*, *Croton setigerus*, *Erodium* spp., *Hordeum* spp., *Hypochaeris glabra*, *Leontodon saxatilis*, *Lolium perenne*, or *Lythrum hyssopifolia*.

Barbour et al. (2003, 2007b) recognized the *Downingia*-*Lasthenia* class for California vernal pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within that class, they recognized the *Lasthenia fremontii*-*Downingia bicornuta* alliance for vegetation of shallow vernal pools and pool

edges. Rare taxa (CRPR 1B and 2 list plants) in this alliance include *Castilleja campestris* ssp. *succulenta*, *Downingia pusilla*, *Gratiola heterosepala*, *Legenere limosa*, *Limnanthes floccosa* ssp. *californica*, *Navarretia myersii*, *Orcuttia pilosa*, and *O. tenuis*.

Nomenclature for this alliance, as described by Barbour et al. (2007b), includes some associations without the nominate alliance species in their names. Their philosophy for vegetation classification in vernal pools reflects the fact that many related vernal pools have similar species composition (e.g., similar presence of *Eryngium* spp., *Lasthenia fremontii*, *Plagiobothrys stipitatus*, and *Psilocarphus brevissimus*), and that certain species are significant indicators of certain pool types. Furthermore, the local distribution of certain ecologically equivalent species of *Downingia* is taken into account in the naming of some associations.

According to Barbour et al. (2007b), two associations have high constancy of species and better define the alliance, the *Ranunculus bonariensis* – *Holocarpha virgata* association that occurs in the southeastern Sacramento Valley and the *Lasthenia fremontii* – *Downingia bicornuta* association that occurs in the southern Sierra Nevada foothills (Keeler-Wolf et al. 1998a).

Local Vegetation Description

The Fremont's goldfields – *Downingia* vernal pools Alliance forms an open herbaceous layer. The shrub layer is absent and the tree layer is absent. Those herbs often present include *Lolium perenne* and *Plagiobothrys stipitatus* var. *micranthus*, and herbs that are sometimes present include *Alopecurus saccatus*, *Calandrinia ciliata*, *Capsella bursa-pastoris*, *Crassula aquatica*, *Deschampsia danthonioides*, *Epilobium densiflorum*, *Erodium cicutarium*, *Eryngium castrense*, *Eryngium spinosepalum*, *Hirschfeldia incana*, *Hordeum marinum*, *Hordeum murinum*, *Lactuca serriola*, *Lasthenia gracilis*, *Lepidium latipes*, *Lepidium nitidum*, *Lupinus succulentus*, *Lysimachia arvensis*, *Lythrum hyssopifolium*, *Medicago polymorpha*, *Myosurus minimus*, *Plagiobothrys bracteatus*, *Plagiobothrys stipitatus*, *Poa annua*, *Pogogyne ziziphoroides*, *Psilocarphus brevissimus*, *Senecio vulgaris*, and *Stellaria media*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	42.7	30 – 60	0.3	0 – 0.5

Local Membership Rule

Eryngium castrense and/or *Plagiobothrys stipitatus* var. *micranthus* present and abundant with a mix of native and non-native herbs in the herbaceous layer in vernal pools or seasonal wetlands.

Local Environmental Description

Elevation: Mean 306 m, Range 5 – 893 m

Aspect: NE (2), NW (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (1), Bottom to Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 6.5%, Range 1 – 12%

Fines Cover: Mean 69.7%, Range 15 – 98%

Litter Cover: Mean 24.3%, Range 1 – 71%

Soil Texture (field assessed): Moderately fine silty clay loam (2), Fine clay (1)

Geology (field or map data): Alluvium (1), Franciscan melange (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: Eastern Hills (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has moderate non-native plant cover (average 23.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Capsella bursa-pastoris*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hordeum marinum*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Poa annua*, *Senecio vulgaris*, and *Stellaria media*.

Associations in Alameda & Contra Costa Counties

Eryngium (*vaseyi*, *castrense*)

Plagiobothrys stipitatus – *Psilocarphus brevissimus*

Classification Comments

Eryngium spinosepalum is a rare plant (CRPR 1B.2) that was identified in one of the surveys.

References: Barbour et al. 2007b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Klein et al. 2007

Global Rarity Rank: G2

State Rarity Rank: S2

Surveys Used for Description

Total: N=3; Alameda County (n=1): ALCC828

Contra Costa County (n=2): ALCC417, ALCC552

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	67	14.3	12.0	31.0				Y
H	<i>Lolium perenne</i>	67	5.3	5.0	11.0				Y
H	<i>Eryngium castrense</i>	33	10.0	30.0	30.0				
H	<i>Plagiobothrys stipitatus</i>	33	6.7	20.0	20.0				
H	<i>Alopecurus saccatus</i>	33	3.3	10.0	10.0				
H	<i>Deschampsia danthonioides</i>	33	1.0	3.0	3.0				
H	<i>Erodium cicutarium</i>	33	1.0	3.0	3.0				
H	<i>Medicago polymorpha</i>	33	0.7	2.0	2.0				
H	<i>Stellaria media</i>	33	0.3	1.0	1.0				
H	<i>Calandrinia ciliata</i>	33	0.3	1.0	1.0				
H	<i>Pogogyne ziziphoroides</i>	33	0.3	1.0	1.0				
H	<i>Lepidium nitidum</i>	33	0.3	1.0	1.0				
H	<i>Epilobium densiflorum</i>	33	0.3	1.0	1.0				
H	<i>Capsella bursa-pastoris</i>	33	0.1	0.2	0.2				
H	<i>Hordeum marinum</i>	33	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	33	0.1	0.2	0.2				
H	<i>Crassula aquatica</i>	33	0.1	0.2	0.2				
H	<i>Eryngium spinosepalum</i>	33	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	33	0.1	0.2	0.2				
H	<i>Lasthenia gracilis</i>	33	0.1	0.2	0.2				
H	<i>Lepidium latipes</i>	33	0.1	0.2	0.2				
H	<i>Poa annua</i>	33	0.1	0.2	0.2				
H	<i>Lysimachia arvensis</i>	33	0.1	0.2	0.2				
H	<i>Lythrum hyssopifolium</i>	33	0.1	0.2	0.2				
H	<i>Plagiobothrys bracteatus</i>	33	0.1	0.2	0.2				
H	<i>Hordeum murinum</i>	33	0.1	0.2	0.2				
H	<i>Psilocarphus brevissimus</i>	33	0.0	0.1	0.1				
H	<i>Senecio vulgaris</i>	33	0.0	0.1	0.1				
H	<i>Lupinus succulentus</i>	33	0.0	0.1	0.1				
H	<i>Myosurus minimus</i>	33	0.0	0.1	0.1				

Eryngium (vaseyi, castrense) Association

Common Name: Coyotethistle or Great Valley Eryngo Patches

Alliance: *Lasthenia fremontii* – *Downingia (bicornuta)* Herbaceous Alliance

Local Vegetation Description

The Coyotethistle or Great Valley Eryngo Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Eryngium castrense* and *Plagiobothrys stipitatus* var. *micranthus*, and characteristic herbs include *Epilobium densiflorum* and *Hordeum marinum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	60.0	60 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: 893 m

Aspect: NW (1)

Slope: 0 degrees

Macro Topography: Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 12%

Fines Cover: 15%

Litter Cover: 71%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has very low non-native plant cover (average 0.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Hordeum marinum*.

Classification Comments

None.

References: Barbour et al. 2007b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Klein et al. 2007, Ratchford et al. 2023a

Eryngium (vaseyi, castrense) Association
Lasthenia fremontii – *Downingia (bicornuta)* Herbaceous Alliance

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): ALCC828

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	100	31.0	31.0	31.0	Y		Y	Y
H	<i>Eryngium castrense</i>	100	30.0	30.0	30.0	Y		Y	Y
H	<i>Epilobium densiflorum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Hordeum marinum</i>	100	0.2	0.2	0.2	Y			Y

***Plagiobothrys stipitatus* – *Psilocarphus brevissimus* Provisional Association**

Common Name: Stalked Popcorn Flower – Woolly Marbles Patches

Alliance: *Lasthenia fremontii* – *Downingia (bicornuta)* Herbaceous Alliance

Local Vegetation Description

The Stalked Popcorn Flower – Woolly Marbles Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Lolium perenne*. Those herbs often present include *Alopecurus saccatus*, *Calandrinia ciliata*, *Capsella bursa-pastoris*, *Crassula aquatica*, *Deschampsia danthonioides*, *Erodium cicutarium*, *Eryngium spinosepalum*, *Hirschfeldia incana*, *Hordeum murinum*, *Lactuca serriola*, *Lasthenia gracilis*, *Lepidium latipes*, *Lepidium nitidum*, *Lupinus succulentus*, *Lysimachia arvensis*, *Lythrum hyssopifolium*, *Medicago polymorpha*, *Myosurus minimus*, *Plagiobothrys bracteatus*, *Plagiobothrys stipitatus*, *Plagiobothrys stipitatus* var. *micranthus*, *Poa annua*, *Pogogyne ziziphoroides*, *Psilocarphus brevissimus*, *Senecio vulgaris*, and *Stellaria media*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	34.0	30 – 38	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 13 m, Range 5 – 21 m

Aspect: NE (2)

Slope: Mean 2 degrees, Range 1 – 2 degrees

Macro Topography: Bottom (1), Bottom to Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: Mean 97.0%, Range 96 – 98%

Litter Cover: 1%

Soil Texture (field assessed): Fine clay (1), Moderately fine silty clay loam (1)

Geology (field or map data): Alluvium (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This association has moderate non-native plant cover (average 34.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Capsella bursa-pastoris*, *Erodium cicutarium*, *Hirschfeldia incana*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Poa annua*, *Senecio vulgaris*, and *Stellaria media*.

Classification Comments

Eryngium spinosepalum is a rare plant (CRPR 1B.2) that was identified in one of the surveys. This association remains provisional due to low overall sample size.

References: Buck-Diaz et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC417, ALCC552

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	8.0	5.0	11.0	Y			Y
H	<i>Plagiobothrys stipitatus</i>	50	10.0	20.0	20.0				Y
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	50	6.0	12.0	12.0				Y
H	<i>Alopecurus saccatus</i>	50	5.0	10.0	10.0				Y
H	<i>Deschampsia danthonioides</i>	50	1.5	3.0	3.0				Y
H	<i>Erodium cicutarium</i>	50	1.5	3.0	3.0				Y
H	<i>Medicago polymorpha</i>	50	1.0	2.0	2.0				Y
H	<i>Stellaria media</i>	50	0.5	1.0	1.0				Y
H	<i>Pogogyne ziziphoroides</i>	50	0.5	1.0	1.0				Y
H	<i>Lepidium nitidum</i>	50	0.5	1.0	1.0				Y
H	<i>Calandrinia ciliata</i>	50	0.5	1.0	1.0				Y
H	<i>Lactuca serriola</i>	50	0.1	0.2	0.2				Y
H	<i>Lysimachia arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Lythrum hyssopifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Hordeum murinum</i>	50	0.1	0.2	0.2				Y
H	<i>Poa annua</i>	50	0.1	0.2	0.2				Y
H	<i>Plagiobothrys bracteatus</i>	50	0.1	0.2	0.2				Y
H	<i>Eryngium spinosepalum</i>	50	0.1	0.2	0.2				Y
H	<i>Capsella bursa-pastoris</i>	50	0.1	0.2	0.2				Y
H	<i>Hirschfeldia incana</i>	50	0.1	0.2	0.2				Y
H	<i>Lepidium latipes</i>	50	0.1	0.2	0.2				Y
H	<i>Lasthenia gracilis</i>	50	0.1	0.2	0.2				Y
H	<i>Crassula aquatica</i>	50	0.1	0.2	0.2				Y
H	<i>Psilocarphus brevissimus</i>	50	0.1	0.1	0.1				Y
H	<i>Senecio vulgaris</i>	50	0.1	0.1	0.1				Y
H	<i>Lupinus succulentus</i>	50	0.1	0.1	0.1				Y
H	<i>Myosurus minimus</i>	50	0.1	0.1	0.1				Y

***Lasthenia glaberrima* – *Eleocharis macrostachya* Herbaceous Alliance**



Common Name: Smooth goldfields – pale spike rush vernal pool bottoms

NVC Alliance Code: A4172. *Lasthenia glaberrima* Vernal Pool Alliance

Statewide Description

Lasthenia glaberrima is typically co-dominant or characteristically present in the herbaceous layer with *Alopecurus saccatus*, *Callitriche marginata*, *Castilleja campestris*, *Centromadia fitchii*, *Crassula aquatica*, *Distichlis spicata*, *Downingia bicornuta*, *Downingia cuspidata*, *Downingia insignis*, *Eleocharis macrostachya*, *Eryngium* spp., *Glyceria occidentalis*, *Gratiola ebracteata*, *Holocarpha virgata*, *Isoetes howellii*, *Lasthenia fremontii*, *Lilaea scilloides*, *Lupinus bicolor*, *Lythrum hyssopifolia*, *Lythrum portula*, *Myosurus minimus*, *Plagiobothrys stipitatus* var. *micranthus*, *Pleuropogon californicus*, *Pogogyne douglasii*, *Psilocarphus brevissimus* var. *brevissimus*, *Ranunculus bonariensis* var. *trisepalus*, and *Trifolium variegatum*. Other common species include *Hordeum marinum*, *Leontodon saxatilis*, *Lolium perenne*, or *Polypogon monspeliensis*.

Barbour et al. (2003, 2007b) recognized the *Downingia* – *Lasthenia* Class for California vernal pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within that class, Barbour et al. recognized this *Lasthenia glaberrima* Alliance for vegetation of deeper pools bottoms. The alliance has a high constancy and abundance of *Lasthenia glaberrima* and/or *Eleocharis macrostachya*, which are extremely flood tolerant. Associations in this alliance differ from other freshwater vernal pool alliances in their absence or much lower constancy of species adapted to short inundation periods such as *Blennosperma nanum* var. *nanum*, *Centromadia fitchii*, *Cicendia quadrangularis*, *Downingia cuspidata*, *Lepidium nitidum*, *Limnanthes douglasii* ssp. *rosea*, *Plagiobothrys greenei*, and *Trifolium depauperatum*. Lengthy inundation also leads to a lower degree of invasion by non-natives. However, stands do have *Downingia bicornuta* and *Eryngium castrense*, which grow across pools of varying degrees of inundation.

The alliance occurs on a variety of geomorphic surfaces, landforms, and soil series. Stands occur primarily in freshwater pools but sometimes occur in slightly saline/alkaline pools. Within the alliance some associations are characteristic of hardpan and volcanic rock pools and some of claypan pools (Barbour et al. 2007b). Stands are normally at lower elevations in cismontane California, though can be found somewhat higher in elevation in the Modoc Plateau ecoregion.

The name of the alliance has been updated to include *Eleocharis macrostachya*, which is an important associated species. Likewise, vernal pool associations which had previously been placed in a generic *Eleocharis macrostachya* or *Eleocharis acicularis* Alliances have been moved to this alliance.

Local Vegetation Description

The Smooth goldfields – pale spike rush vernal pool bottoms Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Eleocharis macrostachya*, and characteristic herbs include *Downingia pulchella*, *Eryngium aristulatum*, *Frankenia salina*, *Lythrum hyssopifolium*, *Psilocarphus brevissimus*, and *Rumex crispus*. Those herbs often present include *Crassula aquatica*, *Distichlis spicata*, *Hordeum marinum*, *Lasthenia glaberrima*, and *Pleuropogon californicus*, and herbs that are sometimes present include *Bromus hordeaceus*, *Callitriche marginata*, *Cotula coronopifolia*, *Downingia cuspidata*, *Elatine californica*, *Juncus bufonius*, *Lactuca serriola*, *Lasthenia californica*, *Lasthenia conjugens*, *Lilaea scilloides*, *Lolium perenne*, *Myosurus minimus*, *Pilularia americana*, *Plagiobothrys leptocladus*, *Plagiobothrys stipitatus* var. *micranthus*, *Plagiobothrys undulatus*, *Plantago elongata*, *Polypogon monspeliensis*, *Trifolium barbigerum*, *Trifolium depauperatum*, *Triglochin scilloides*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	52.0	25 – 80	0.3	0 – 0.5

Local Membership Rule

Eleocharis macrostachya or *E. palustris* is present and > 30% relative cover in the herbaceous layer in a vernal pool setting; OR *Pleuropogon californicus* and/or *Lasthenia glaberrima* are present, sometimes with high cover, in the herbaceous layer along with *Limnanthes douglasii*, *Navarretia leucocephala*, *Eryngium aristulatum*, and/or *Isoetes howellii*.

Local Environmental Description

Elevation: Mean 95 m, Range 3 – 156 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 34.6%, Range 0 – 98%

Litter Cover: Mean 30.2%, Range 0 – 75%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Alluvium (4), Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (3), East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: None

Site Impacts

This alliance has moderate non-native plant cover (average 35.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Cotula coronopifolia*, *Hordeum marinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, *Rumex crispus*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Eleocharis macrostachya – *Lasthenia glaberrima*

Eleocharis macrostachya Vernal Pool

Lasthenia glaberrima – *Pleuropogon californicus*

Classification Comments

This alliance has been renamed to include *Eleocharis macrostachya* and vernal pool associations that were previously placed in an *Eleocharis* alliance have been moved into it.

References: Barbour et al. 2003, Barbour et al. 2007b, Boul et al. 2021b, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Klein et al. 2007, Klein et al. 2015, Sikes et al. 2021, Smith 1998b

Global Rarity Rank: G2

State Rarity Rank: S2

Surveys Used for Description

Total: N=5; Alameda County (n=5): ALCC853, SPR001C, SPR002C, WAR002A, WAR006B

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eryngium aristulatum</i>	100	3.9	0.4	7.0	Y			Y
H	<i>Downingia pulchella</i>	100	0.4	0.1	1.0	Y			Y
H	<i>Eleocharis macrostachya</i>	80	11.4	7.0	20.0	Y			Y
H	<i>Frankenia salina</i>	80	2.3	0.4	5.0	Y			Y
H	<i>Lythrum hyssopifolium</i>	80	1.6	0.1	7.0	Y			Y
H	<i>Rumex crispus</i>	80	1.3	0.1	4.0	Y			Y
H	<i>Psilocarphus brevissimus</i>	80	0.3	0.2	0.4	Y			Y
H	<i>Hordeum marinum</i>	60	8.5	0.4	40.0				Y
H	<i>Lasthenia glaberrima</i>	60	4.5	0.4	20.0				Y
H	<i>Pleuropogon californicus</i>	60	1.5	0.2	7.0				Y
H	<i>Distichlis spicata</i>	60	0.3	0.2	1.0				Y
H	<i>Crassula aquatica</i>	60	0.3	0.1	1.0				Y
H	<i>Lolium perenne</i>	40	8.6	8.0	35.0				
H	<i>Polypogon monspeliensis</i>	40	1.6	1.0	7.0				
H	<i>Myosurus minimus</i>	40	1.4	0.2	7.0				
H	<i>Cotula coronopifolia</i>	40	1.2	2.0	4.0				
H	<i>Lilaea scilloides</i>	40	0.3	0.4	1.0				
H	<i>Bromus hordeaceus</i>	40	0.2	0.4	0.4				
H	<i>Juncus bufonius</i>	40	0.2	0.4	0.4				
H	<i>Lactuca serriola</i>	40	0.2	0.4	0.4				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Plagiobothrys leptocladus</i>	40	0.2	0.4	0.4				
H	<i>Callitriche marginata</i>	40	0.1	0.2	0.4				
H	<i>Elatine californica</i>	40	0.1	0.1	0.2				
H	<i>Downingia cuspidata</i>	20	1.4	7.0	7.0				
H	<i>Lasthenia conjugens</i>	20	0.8	4.0	4.0				
H	<i>Plagiobothrys undulatus</i>	20	0.6	3.0	3.0				
H	<i>Trifolium depauperatum</i>	20	0.2	1.2	1.2				
H	<i>Vulpia bromoides</i>	20	0.1	0.4	0.4				
H	<i>Pilularia americana</i>	20	0.1	0.4	0.4				
H	<i>Trifolium barbigerum</i>	20	0.1	0.4	0.4				
H	<i>Epilobium</i> sp.	20	0.1	0.4	0.4				
H	<i>Lasthenia californica</i>	20	0.1	0.4	0.4				
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	20	0.1	0.4	0.4				
H	<i>Vulpia myuros</i>	20	0.1	0.4	0.4				
H	<i>Triglochin scilloides</i>	20	0.0	0.2	0.2				
H	<i>Plantago elongata</i>	20	0.0	0.1	0.1				

***Eleocharis macrostachya* – *Lasthenia glaberrima* Association**

Common Name: Pale Spike Rush – Smooth Goldfields Patches

Alliance: *Lasthenia glaberrima* – *Eleocharis macrostachya* Herbaceous Alliance

Local Vegetation Description

The Pale Spike Rush – Smooth Goldfields Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Callitriche marginata*, *Crassula aquatica*, *Distichlis spicata*, *Downingia cuspidata*, *Downingia pulchella*, *Elatine californica*, *Eleocharis macrostachya*, *Eryngium aristulatum*, *Lasthenia glaberrima*, *Lythrum hyssopifolium*, *Myosurus minimus*, *Plagiobothrys undulatus*, *Pleuropogon californicus*, *Psilocarphus brevissimus*, and *Triglochin scilloides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	35.0	35 – 35	0.3	0 – 0.5

Local Environmental Description

Elevation: 156 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 98%

Litter Cover: 1%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has low non-native plant cover (average 19.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lythrum hyssopifolium*.

Classification Comments

This association has been moved into this alliance from the *Eleocharis macrostachya* Alliance, due to its vernal pool character.

References: Barbour et al. 2003, Klein et al. 2007

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC853

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eryngium aristulatum</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Eleocharis macrostachya</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Downingia cuspidata</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Lythrum hyssopifolium</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Plagiobothrys undulatus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Lasthenia glaberrima</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Crassula aquatica</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Psilocarphus brevissimus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Callitriche marginata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Distichlis spicata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Downingia pulchella</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Elatine californica</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Myosurus minimus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Pleuropogon californicus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Triglochin scilloides</i>	100	0.2	0.2	0.2	Y			Y

***Eleocharis macrostachya* Vernal Pool Association**

Common Name: Pale Spike Rush Vernal Pool Patches

Alliance: *Lasthenia glaberrima* – *Eleocharis macrostachya* Herbaceous Alliance

Local Vegetation Description

The Pale Spike Rush Vernal Pool Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Eleocharis macrostachya*, and characteristic herbs include *Downingia pulchella*, *Eryngium aristulatum*, *Frankenia salina*, and *Rumex crispus*. Those herbs often present include *Cotula coronopifolia*, *Distichlis spicata*, *Hordeum marinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, and *Psilocarphus brevissimus*, and herbs that are sometimes present include *Bromus hordeaceus*, *Callitriche marginata*, *Crassula aquatica*, *Juncus bufonius*, *Lasthenia conjugens*, *Lasthenia glaberrima*, *Lilaea scilloides*, *Myosurus minimus*, *Plagiobothrys leptocladus*, *Plagiobothrys stipitatus* var. *micranthus*, *Pleuropogon californicus*, *Polypogon monspeliensis*, *Trifolium barbigerum*, *Trifolium depauperatum*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	48.3	25 – 75	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 54 m, Range 3 – 155 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 20.0%, Range 0 – 55%

Litter Cover: Mean 40.0%, Range 0 – 75%

Soil Texture (field assessed): Not recorded (3)

Geology (field or map data): Alluvium (3)

Alameda County Subsections: East Bay Terraces and Alluvium (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 33.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Cotula coronopifolia*, *Hordeum marinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, *Rumex crispus*, and *Vulpia bromoides*.

Classification Comments

Lasthenia conjugens is a rare plant (CRPR 1B.1) that was identified in one of the surveys. This association has been split from the generic *Eleocharis macrostachya* Association and moved into this alliance from the *Eleocharis macrostachya* Alliance, due to its vernal pool character.

References: Boul et al. 2021b, Buck-Diaz et al. 2012, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a, Smith 1998b

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): SPR002C, WAR002A, WAR006B

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Eleocharis macrostachya</i>	100	16.7	10.0	20.0	Y		Y	Y
H	<i>Frankenia salina</i>	100	3.5	0.4	5.0	Y			Y
H	<i>Eryngium aristulatum</i>	100	3.1	0.4	5.0	Y			Y
H	<i>Rumex crispus</i>	100	2.1	0.4	4.0	Y			Y
H	<i>Downingia pulchella</i>	100	0.5	0.1	1.0	Y			Y
H	<i>Lolium perenne</i>	67	14.3	8.0	35.0				Y
H	<i>Cotula coronopifolia</i>	67	2.0	2.0	4.0				Y
H	<i>Hordeum marinum</i>	67	0.8	0.4	2.0				Y
H	<i>Distichlis spicata</i>	67	0.5	0.4	1.0				Y
H	<i>Lythrum hyssopifolium</i>	67	0.3	0.4	0.4				Y
H	<i>Lactuca serriola</i>	67	0.3	0.4	0.4				Y
H	<i>Psilocarphus brevissimus</i>	67	0.3	0.4	0.4				Y
H	<i>Myosurus minimus</i>	33	2.3	7.0	7.0				
H	<i>Lasthenia conjugens</i>	33	1.3	4.0	4.0				
H	<i>Trifolium depauperatum</i>	33	0.4	1.2	1.2				
H	<i>Polypogon monspeliensis</i>	33	0.3	1.0	1.0				
H	<i>Lilaea scilloides</i>	33	0.1	0.4	0.4				
H	<i>Plagiobothrys leptocladus</i>	33	0.1	0.4	0.4				
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	33	0.1	0.4	0.4				
H	<i>Callitriche marginata</i>	33	0.1	0.4	0.4				
H	<i>Vulpia bromoides</i>	33	0.1	0.4	0.4				
H	<i>Bromus hordeaceus</i>	33	0.1	0.4	0.4				
H	<i>Crassula aquatica</i>	33	0.1	0.4	0.4				
H	<i>Trifolium barbigerum</i>	33	0.1	0.4	0.4				
H	<i>Juncus bufonius</i>	33	0.1	0.4	0.4				
H	<i>Lasthenia glaberrima</i>	33	0.1	0.4	0.4				
H	<i>Pleuropogon californicus</i>	33	0.1	0.4	0.4				

***Lasthenia glaberrima* – *Pleuropogon californicus* Association**

Common Name: Smooth Goldfields – Annual Semaphoregrass Patches

Alliance: *Lasthenia glaberrima* – *Eleocharis macrostachya* Herbaceous Alliance

Local Vegetation Description

The Smooth Goldfields – Annual Semaphoregrass Association forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Hordeum marinum*, and characteristic herbs include *Bromus hordeaceus*, *Crassula aquatica*, *Downingia pulchella*, *Elatine californica*, *Epilobium* sp., *Eryngium aristulatum*, *Frankenia salina*, *Juncus bufonius*, *Lasthenia californica*, *Lasthenia glaberrima*, *Lilaea scilloides*, *Lythrum hyssopifolium*, *Pilularia americana*, *Plagiobothrys leptocladus*, *Plantago elongata*, *Pleuropogon californicus*, *Polypogon monspeliensis*, *Psilocarphus brevissimus*, *Rumex crispus*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	80.0	80 – 80	0.3	0 – 0.5

Local Environmental Description

Elevation: 155 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: No data

Small Rock: No data

Fines Cover: 15%

Litter Cover: 30%

Soil Texture (field assessed): Not recorded (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 57.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, *Lythrum hyssopifolium*, *Polypogon monspeliensis*, *Rumex crispus*, and *Vulpia myuros*.

Lasthenia glaberrima – *Pleuropogon californicus* Association
Lasthenia glaberrima – *Eleocharis macrostachya* Herbaceous Alliance

Classification Comments

None.

References: Barbour et al. 2003, Barbour et al. 2007b, Buck-Diaz et al. 2021a, Klein et al. 2015, Sikes et al. 2021

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** SPR001C

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum marinum</i>	100	40.0	40.0	40.0	Y		Y	Y
H	<i>Lasthenia glaberrima</i>	100	20.0	20.0	20.0	Y			Y
H	<i>Pleuropogon californicus</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Polypogon monspeliensis</i>	100	7.0	7.0	7.0	Y			Y
H	<i>Eryngium aristulatum</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Frankenia salina</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Lilaea scilloides</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Downingia pulchella</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Epilobium</i> sp.	100	0.4	0.4	0.4	Y			Y
H	<i>Vulpia myuros</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Psilocarphus brevissimus</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Plagiobothrys leptocladus</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Lasthenia californica</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Pilularia americana</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Juncus bufonius</i>	100	0.4	0.4	0.4	Y			Y
H	<i>Plantago elongata</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Lythrum hyssopifolium</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Crassula aquatica</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Elatine californica</i>	100	0.1	0.1	0.1	Y			Y
H	<i>Rumex crispus</i>	100	0.1	0.1	0.1	Y			Y

***Layia fremontii* – *Achyrachaena mollis* Herbaceous Alliance**



Common Name: Fremont's tidy-tips – blow wives vernal pools

NVC Alliance Code: A4173. *Layia fremontii* - *Achyrachaena mollis* Vernal Pool Alliance

Statewide Description

Achyrachaena mollis and/or *Layia fremontii* are characteristically present in the herbaceous layer with *Blennosperma nanum*, *Brodiaea minor*, *Centromadia fitchii*, *Chlorogalum angustifolium*, *Cicendia quadrangularis*, *Clarkia purpurea*, *Dodecatheon clevelandii* ssp. *patulum*, *Downingia cuspidata*, *Downingia ornatissima*, *Lasthenia californica*, *Lasthenia fremontii*, *Lepidium nitidum*, *Leptosiphon parviflorus*, *Limnanthes douglasii* ssp. *rosea*, *Microseris acuminata*, *Navarretia tagetina*, *Plagiobothrys austiniae*, *Plagiobothrys greenei*, *Plantago erecta*, *Taeniatherum caput-medusae*, *Trifolium depauperatum*, *Triphysaria eriantha* ssp. *eriantha*, *Vulpia microstachys* and *Zigadenus fremontii*.

Barbour et al. (2003, 2007b) recognized the *Downingia-Lasthenia* class for California vernal pool vegetation on all geomorphic surfaces, landscapes, and soil types in the Central Valley and adjacent foothills. Within that class, they recognized this alliance for vegetation of comparative shallow vernal pools and of pool edges.

This alliance has a similar inundation pattern to the *Montia fontana* – *Sidalcea calycosa* and *Trifolium variegatum* alliances and commonly occurs on substrates derived from metamorphic or volcanic material. However, it is not found on basalt flows of table mountains. Some of these stands are just slightly moister than the surrounding uplands and occupy the transition between vernal pools or swales and uplands.

Local Vegetation Description

The Fremont's tidy-tips – blow wives vernal pools Alliance forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Trifolium hirtum*. Those herbs often present include *Achyrrachaena mollis*, *Brassica nigra*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Crassula aquatica*, *Erodium botrys*, *Eryngium spinosepalum*, *Eschscholzia californica*, *Geranium molle*, *Hordeum murinum*, *Hypochaeris glabra*, *Juncus bufonius*, *Lasthenia gracilis*, *Lepidium nitidum*, *Lolium perenne*, *Medicago lupulina*, *Medicago polymorpha*, *Microseris douglasii*, *Trifolium depauperatum*, *Triphysaria eriantha*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	34.5	34 – 35	0.3	0 – 0.5

Local Membership Rule

Achyrrachaena mollis, *Lasthenia californica*, or *Lasthenia gracilis* is an indicator (may be > 15% relative cover), forming early spring displays along edges of vernal pools and in vernal moist flats and swales along with native and non-native herbs including *Microseris douglasii*.

Local Environmental Description

Elevation: Mean 152 m, Range 19 – 286 m

Aspect: NW (1), Variable (1)

Slope: Mean 3 degrees, Range 1 – 5 degrees

Macro Topography: Bottom (1), Ridge top (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 92.5%, Range 88 – 97%

Litter Cover: Mean 5.5%, Range 1 – 10%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Alluvium (1), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has high non-native plant cover (average 71.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium botrys*, *Geranium molle*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Layia fremontii – *Achyrrachaena mollis* alliance

Classification Comments

The two surveys included here were classified to the alliance level. *Eryngium spinosepalum* is a rare plant (CRPR 1B.2) that was identified in one of the surveys.

References:

Global Rarity Rank: G3

State Rarity Rank: S3?

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC440, ALCC814

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	7.5	5.0	10.0	Y			Y
H	<i>Avena barbata</i>	100	5.5	1.0	10.0	Y			Y
H	<i>Trifolium hirtum</i>	100	1.1	0.2	2.0	Y			Y
H	<i>Lasthenia gracilis</i>	50	5.0	10.0	10.0				Y
H	<i>Achyrrachaena mollis</i>	50	3.5	7.0	7.0				Y
H	<i>Hordeum murinum</i>	50	3.0	6.0	6.0				Y
H	<i>Vulpia bromoides</i>	50	2.5	5.0	5.0				Y
H	<i>Lolium perenne</i>	50	1.5	3.0	3.0				Y
H	<i>Medicago polymorpha</i>	50	1.5	3.0	3.0				Y
H	<i>Centaurea solstitialis</i>	50	1.0	2.0	2.0				Y
H	<i>Microseris douglasii</i>	50	1.0	2.0	2.0				Y
H	<i>Medicago lupulina</i>	50	1.0	2.0	2.0				Y
H	<i>Juncus bufonius</i>	50	0.1	0.2	0.2				Y
H	<i>Hypochaeris glabra</i>	50	0.1	0.2	0.2				Y
H	<i>Geranium molle</i>	50	0.1	0.2	0.2				Y
H	<i>Eschscholzia californica</i>	50	0.1	0.2	0.2				Y
H	<i>Eryngium spinosepalum</i>	50	0.1	0.2	0.2				Y
H	<i>Erodium botrys</i>	50	0.1	0.2	0.2				Y
H	<i>Brassica nigra</i>	50	0.1	0.2	0.2				Y
H	<i>Carduus pycnocephalus</i>	50	0.1	0.2	0.2				Y
H	<i>Lepidium nitidum</i>	50	0.1	0.2	0.2				Y
H	<i>Triphysaria eriantha</i>	50	0.1	0.2	0.2				Y
H	<i>Vulpia myuros</i>	50	0.1	0.2	0.2				Y
H	<i>Crassula aquatica</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium depauperatum</i>	50	0.1	0.1	0.1				Y

***Lepidium latifolium* – *Lactuca serriola* Herbaceous Semi-Natural Alliance**



Common Name: Perennial pepper weed – Prickly lettuce patches

NVC Alliance Code: A3849. *Conyza canadensis* - *Cirsium arvense* - *Lactuca serriola*
Ruderal Wet Meadow Alliance

Statewide Description

Lepidium latifolium, *Lactuca serriola*, or another non-native forb is dominant in the herbaceous layer in mesic environments. Emergent trees and shrubs may be present at low cover.

Lepidium latifolium is invading riparian and wetland settings in California. Plants expand rapidly and form extensive, dense patches in both freshwater and brackish water sites in the state. This invasion is magnified in disturbed brackish marshes of the San Francisco Bay estuary, where *L. latifolium* invades first after disturbance along levees and then spreads into diked and tidal wetlands.

Other non-native wetland or facultative forb species such as *Chenopodium album*, *Cirsium arvense*, *Conyza canadensis*, *Lactuca serriola*, *Rumex crispus*, and

Sisymbrium altissimum are common across the state and throughout western North America in similar settings as *Lepidium latifolium* and can form stands.

Local Vegetation Description

The Perennial pepper weed – Prickly lettuce patches Alliance forms an open herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Rumex dentatus*, and characteristic herbs include *Scirpus* sp.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	18.2	18 – 18	no data	no data

Local Membership Rule

Lepidium latifolium, *Dittrichia graveolens*, *Lythrum hyssopifolia*, *Pseudognaphalium luteoalbum*, *Xanthium spinosum*, or similar non-native forb > 50% relative cover in the herbaceous layer along intermittently flooded areas. Overall native species have < 10% relative cover when combined.

Local Environmental Description

Elevation: 27 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has high non-native plant cover (average 98.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Rumex dentatus*.

Associations in Alameda & Contra Costa Counties

Chenopodium album – *Rumex* spp.

Classification Comments

None.

References: Reyes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): POA1007291602

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Rumex dentatus</i>	100	18.0	18.0	18.0	Y	Y		Y
H	<i>Scirpus</i> sp.	100	0.2	0.2	0.2	Y			Y

***Chenopodium album* – *Rumex* spp. Provisional Semi-Natural Association**

Common Name: Lamb's quarters – Dock Patches

Alliance: *Lepidium latifolium* – *Lactuca serriola* Herbaceous Semi-natural Alliance

Classification Comments

This association remains provisional due to low overall sample size. The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Reyes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

***Leymus cinereus* – *Leymus triticoides* Herbaceous Alliance**



Common Name: Ashy ryegrass – Creeping wildrye turfs

NVC Alliance Code: A1329. *Leymus cinereus* - *Leymus triticoides* Alkaline Wet Meadow Alliance

Statewide Description

Leymus cinereus and/or *Leymus triticoides* is dominant or co-dominant in the herbaceous layer with *Ambrosia psilostachya*, *Anemopsis californica*, *Aristida purpurea*, *Avena fatua*, *Bromus* spp., *Danthonia unispicata*, *Distichlis spicata*, *Elymus elymoides*, *Hordeum* spp., *Juncus arcticus*, *Lolium perenne*, *Poa secunda* or *Triglochin maritima*. Emergent trees and shrubs may be present at low cover.

Many regional descriptions include the alliance in an alkali meadow category. Stands often occur in a fine mosaic with upland shrublands, including *Artemisia tridentata* and *Sarcobatus vermiculatus* alliances. Soils are influenced by accumulations of coarse to fine volcanic tephra (Young et al. 2007).

The two primary species in this alliance were treated separately in the 2009 book, *A Manual of California Vegetation*, second edition. *Leymus cinereus* and *L. triticoides* may

hybridize when they co-occur. *Leymus triticoides* also hybridizes with another large California species, *L. condensatus* in the western Mojave and in the southern Sierra Nevada Foothills. The resulting species complexes are often difficult to identify and may be ecologically overlapping.

Local Vegetation Description

The Ashy ryegrass – Creeping wildrye turfs Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is open. Dominant herbs include *Elymus triticoides*. Those herbs often present include *Bromus diandrus*, *Carduus pycnocephalus*, and *Lolium perenne*, and herbs that are sometimes present include *Avena barbata*, *Bromus hordeaceus*, *Geranium dissectum*, and *Lactuca serriola*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.1	0 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.3	0 – 3	1.1	0.5 – 2
Herb	66.5	23 – 100	0.7	0 – 2

Local Membership Rule

Leymus triticoides or *Leymus x gouldii* > 50% relative cover in the herbaceous layer, or > 30% relative cover with *Avena*, *Bromus*, *Carduus pycnocephalus*, *Lolium perenne* or other grasses or forbs.

Local Environmental Description

Elevation: Mean 183 m, Range 3 – 552 m

Aspect: NE (7), NW (5), SE (3), SW (3), Flat (1), Variable (1), W (1)

Slope: Mean 11 degrees, Range 0 – 29 degrees

Macro Topography: Bottom (7), Upper 1/3 of slope (4), Lower 1/3 of slope (3), Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (2), Not recorded (1), Upper 1/3 of slope to Ridgeline (1)

Large Rock: Mean 0.1%, Range 0 – 1%

Small Rock: Mean 1.9%, Range 0 – 12%

Fines Cover: Mean 25.0%, Range 0 – 87%

Litter Cover: Mean 60.4%, Range 2 – 100%

Soil Texture (field assessed): Moderately fine clay loam (5), Moderately fine silty clay loam (3), Fine clay (2), Medium silt loam (2), Moderately fine sandy clay loam (1), Moderately coarse, sandy loam (1), Medium silt (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (9), Sandstone, shale, and gravel deposits (4), Alluvium (2), Franciscan melange (2), Sandstone and other sedimentary (2), Shale and other sedimentary (2), Mixed alluvium (1)

Alameda County Subsections: Diablo Range (1), East Bay Terraces and Alluvium (1), Eastern Hills (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7), Suisun Hills and Valleys (6), Eastern Hills (2), Alameda Creek (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has moderate non-native plant cover (average 39.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Lactuca serriola*, and *Lolium perenne*.

Associations in Alameda & Contra Costa Counties

Leymus triticoides

Leymus triticoides – *Bromus* spp. – *Avena* spp.

Leymus triticoides – *Lolium perenne*

Classification Comments

Leymus triticoides and *Elymus triticoides* are synonyms.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and San 2004, Holstein 2001, Junak et al. 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Kittel et al. 2012, Klein et al. 2015, NatureServe 2007, O'Neil and Egan 2004, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Solomeshch and Barbour 2006, Sproul et al. 2011, VegCAMP 2015a

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=22; Alameda County (n=5): ALCC233, ALCC581, ALCC852, LLNL003, WAR005U

Contra Costa County (n=17): ALCC321, ALCC337, ALCC356, ALCC450, ALCC453, ALCC561, ALCC801, ALCC911, ALCCREC206, CORT165, EBAY0017, EBAY0028, JOMU036, JOMU043, PPRA013, SPCCA-034, SPCCB-086

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Elymus triticoides</i>	91	36.0	0.2	86.0	Y		Y	Y
H	<i>Carduus pycnocephalus</i>	55	1.8	0.2	20.0				Y
H	<i>Lolium perenne</i>	50	6.5	0.2	65.0				Y
H	<i>Bromus diandrus</i>	50	5.3	0.2	33.0				Y
H	<i>Bromus hordeaceus</i>	41	1.7	0.2	15.0				
H	<i>Geranium dissectum</i>	41	1.4	0.2	20.0				
H	<i>Avena barbata</i>	32	1.1	0.2	15.0				
H	<i>Lactuca serriola</i>	27	0.1	0.2	1.0				

***Leymus triticoides* Association**

Common Name: Creeping Wildrye Patches

Alliance: *Leymus cinereus* – *Leymus triticoides* Herbaceous Alliance

Local Vegetation Description

The Creeping Wildrye Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is open. Dominant herbs include *Elymus triticoides*. Herbs that are sometimes present include *Avena barbata*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Distichlis spicata*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum marinum*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, and *Sonchus asper*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.2	0 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.4	0 – 3	1.3	0.5 – 2
Herb	68.3	23 – 100	0.7	0 – 2

Local Environmental Description

Elevation: Mean 142 m, Range 7 – 268 m

Aspect: NE (4), SE (3), NW (2), Flat (1), SW (1), Variable (1), W (1)

Slope: Mean 7 degrees, Range 0 – 20 degrees

Macro Topography: Bottom (7), Middle 1/3 of slope (2), Lower 1/3 of slope (1), Not recorded (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 2.1%, Range 0 – 12%

Fines Cover: Mean 23.4%, Range 0 – 77%

Litter Cover: Mean 64.6%, Range 2 – 97%

Soil Texture (field assessed): Moderately fine clay loam (2), Fine clay (1), Medium silt (1), Medium silt loam (1), Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (4), Sedimentary (4), Shale and other sedimentary (2), Alluvium (1), Franciscan melange (1), Mixed alluvium (1)

Alameda County Subsections: Eastern Hills (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (6), Eastern Hills (2), Suisun Hills and Valleys (1), Westside Alluvial Fans and Terraces (1)

Leymus triticoides Association

Leymus cinereus – *Leymus triticoides* Herbaceous Alliance

Site Impacts

This association has moderate non-native plant cover (average 20.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Helminthotheca echioides*, *Hordeum marinum*, *Hordeum murinum*, *Lactuca serriola*, *Lolium perenne*, and *Sonchus asper*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Holstein 2001, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Kittel et al. 2012, Klein et al. 2015, NatureServe 2007, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Solomeshch and Barbour 2006, Sproul et al. 2011, VegCAMP 2015a

Global Rarity Rank: G4? **State Rarity Rank:** SNR

State Rare: Y

Surveys Used for Description

Total: N=13; Alameda County (n=3): ALCC233, ALCC852, LLNL003

Contra Costa County (n=10): ALCC337, ALCC450, ALCC561, ALCC801, ALCC911, ALCCREC206, CORT165, EBAY0017, PPRA013, SPCCB-086

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Leymus triticoides</i>	85	45.5	17.0	86.0	Y	Y		Y
H	<i>Bromus diandrus</i>	46	3.0	0.2	20.0				
H	<i>Carduus pycnocephalus</i>	46	1.0	0.2	5.0				
H	<i>Geranium dissectum</i>	46	0.2	0.2	1.0				
H	<i>Lolium perenne</i>	38	1.0	0.2	10.0				
H	<i>Distichlis spicata</i>	31	1.0	0.2	7.0				
H	<i>Brassica nigra</i>	31	0.7	0.1	9.0				
H	<i>Bromus hordeaceus</i>	31	0.5	0.2	6.0				
H	<i>Hordeum marinum</i>	23	0.8	0.1	10.0				
H	<i>Helminthotheca echioides</i>	23	0.4	0.2	4.0				
H	<i>Sonchus asper</i>	23	0.3	0.2	4.0				
H	<i>Avena barbata</i>	23	0.2	0.2	2.0				
H	<i>Lactuca serriola</i>	23	0.1	0.2	1.0				
H	<i>Hordeum marinum</i>	23	0.0	0.2	0.2				

Leymus triticoides Association

Leymus cinereus – *Leymus triticoides* Herbaceous Alliance

***Leymus triticoides* – *Bromus* spp. – *Avena* spp. Association**

Common Name: Creeping Wildrye – Annual Brome – Wild Oats Patches

Alliance: *Leymus cinereus* – *Leymus triticoides* Herbaceous Alliance

Local Vegetation Description

The Creeping Wildrye – Annual Brome – Wild Oats Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Elymus triticoides*. Those herbs often present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, and *Lolium perenne*, and herbs that are sometimes present include *Bromus madritensis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Lactuca serriola*, *Triteleia laxa*, *Vicia villosa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.2	0.8	0.5 – 1
Herb	58.4	32 – 75	0.8	0 – 2

Local Environmental Description

Elevation: Mean 281 m, Range 3 – 552 m

Aspect: NW (3), NE (2), SW (1)

Slope: Mean 18 degrees, Range 8 – 29 degrees

Macro Topography: Lower 1/3 of slope (2), Upper 1/3 of slope (2), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.0%, Range 0 – 8%

Fines Cover: Mean 29.0%, Range 0 – 87%

Litter Cover: Mean 57.4%, Range 5 – 100%

Soil Texture (field assessed): Moderately fine clay loam (2), Moderately fine silty clay loam (2), Fine clay (1)

Geology (field or map data): Sedimentary (4), Sandstone and other sedimentary (2), Alluvium (1)

Alameda County Subsections: Diablo Range (1), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: Suisun Hills and Valleys (4), Alameda Creek (1)

Site Impacts

This association has high non-native plant cover (average 68.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Lactuca serriola*, *Lolium perenne*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Junak et al. 2007, O'Neil and Egan 2004, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): ALCC581, WAR005U

Contra Costa County (n=5): ALCC321, ALCC356, ALCC453, JOMU036, SPCCA-034

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	Elymus triticoides	100	20.0	0.2	50.0	Y			Y
H	Bromus diandrus	71	11.0	0.2	33.0				Y
H	Bromus hordeaceus	71	4.3	0.2	15.0				Y
H	<i>Lolium perenne</i>	57	4.1	1.0	21.0				Y
H	<i>Carduus pycnocephalus</i>	57	3.2	0.2	20.0				Y
H	Avena barbata	57	3.1	1.0	15.0				Y
H	Bromus madritensis	43	4.9	0.2	22.0				
H	<i>Erodium cicutarium</i>	43	0.3	0.2	2.0				
H	<i>Lactuca serriola</i>	43	0.2	0.2	1.0				
H	<i>Vulpia bromoides</i>	29	3.1	2.0	20.0				
H	<i>Geranium dissectum</i>	29	3.1	2.0	20.0				
H	<i>Erodium botrys</i>	29	0.7	1.0	4.0				
H	<i>Vicia villosa</i>	29	0.1	0.2	0.2				
H	<i>Triteleia laxa</i>	29	0.1	0.2	0.2				

***Leymus triticoides* – *Lolium perenne* Association**

Common Name: Creeping Wildrye – Italian Ryegrass Patches

Alliance: *Leymus cinereus* – *Leymus triticoides* Herbaceous Alliance

Local Vegetation Description

The Creeping Wildrye – Italian Ryegrass Association forms a continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Carduus pycnocephalus* and *Elymus triticoides*. Those herbs often present include *Achillea millefolium*, *Amsinckia menziesii*, *Artemisia douglasiana*, *Avena fatua*, *Briza minor*, *Bromus carinatus*, *Centaurea solstitialis*, *Clarkia* sp., *Claytonia perfoliata*, *Geranium dissectum*, *Geranium molle*, *Lathyrus vestitus*, *Lupinus* sp., *Lythrum tribracteatum*, *Marah fabaceus*, *Medicago arabica*, *Pentagramma triangularis*, *Perideridia kelloggii*, *Polypogon monspeliensis*, *Rumex acetosella*, *Sanicula crassicaulis*, *Silybum marianum*, *Stellaria media*, *Torilis arvensis*, *Vicia* sp., and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	82.5	75 – 90	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 112 m, Range 61 – 164 m

Aspect: NE (1), SW (1)

Slope: Mean 16 degrees, Range 10 – 22 degrees

Macro Topography: Middle to Upper 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 20.0%, Range 10 – 30%

Litter Cover: Mean 46.0%, Range 25 – 67%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (1), Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 64.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Briza minor*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Geranium dissectum*, *Geranium molle*, *Lolium perenne*, *Lythrum tribracteatum*, *Polypogon monspeliensis*, *Rumex acetosella*, *Silybum marianum*, *Stellaria media*, and *Torilis arvensis*.

Classification Comments

None.

References: Evens and San 2004, Klein et al. 2015

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=2; **Alameda County (n=0):**

Contra Costa County (n=2): EBAY0028, JOMU043

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	50.0	35.0	65.0	Y		Y	Y
H	<i>Elymus triticoides</i>	100	30.0	20.0	40.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	1.5	1.0	2.0	Y			Y
H	<i>Centaurea solstitialis</i>	50	3.5	7.0	7.0				Y
H	<i>Avena fatua</i>	50	3.0	6.0	6.0				Y
H	<i>Geranium dissectum</i>	50	2.5	5.0	5.0				Y
H	<i>Polypogon monspeliensis</i>	50	2.5	5.0	5.0				Y
H	<i>Achillea millefolium</i>	50	1.5	3.0	3.0				Y
H	<i>Claytonia perfoliata</i>	50	1.0	2.0	2.0				Y
H	<i>Geranium molle</i>	50	1.0	2.0	2.0				Y
H	<i>Bromus carinatus</i>	50	1.0	2.0	2.0				Y
H	<i>Medicago arabica</i>	50	0.5	1.0	1.0				Y
H	<i>Silybum marianum</i>	50	0.5	1.0	1.0				Y
H	<i>Briza minor</i>	50	0.5	1.0	1.0				Y
H	<i>Lythrum tribracteatum</i>	50	0.5	1.0	1.0				Y
H	<i>Sanicula crassicaulis</i>	50	0.5	1.0	1.0				Y
H	<i>Xanthium strumarium</i>	50	0.5	1.0	1.0				Y
H	<i>Clarkia</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Amsinckia menziesii</i>	50	0.1	0.2	0.2				Y
H	<i>Artemisia douglasiana</i>	50	0.1	0.2	0.2				Y
H	<i>Marah fabaceus</i>	50	0.1	0.2	0.2				Y
H	<i>Torilis arvensis</i>	50	0.1	0.2	0.2				Y
H	<i>Lathyrus vestitus</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex acetosella</i>	50	0.1	0.2	0.2				Y
H	<i>Perideridia kelloggii</i>	50	0.1	0.2	0.2				Y
H	<i>Pentagramma triangularis</i>	50	0.1	0.2	0.2				Y
H	<i>Lupinus</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Stellaria media</i>	50	0.1	0.2	0.2				Y
H	<i>Vicia</i> sp.	50	0.1	0.2	0.2				Y
NV	Moss	50	0.5	1.0	1.0				Y

***Lolium perenne* Herbaceous Semi-Natural Alliance**



Common Name: Perennial rye grass fields

NVC Alliance Code: A3871. *Lolium perenne* Ruderal Grassland Alliance

Statewide Description

Lolium perenne is dominant or co-dominant with other non-natives in the herbaceous layer with *Agrostis stolonifera*, *Alopecurus aequalis*, *Asclepias fascicularis*, *Avena fatua*, *Brassica nigra*, *Bromus diandrus*, *Bromus hordeaceus*, *Centaureum muehlenbergii*, *Cirsium vulgare*, *Cryptantha flaccida*, *Euphorbia spathulata*, *Festuca arundinacea*, *Holcus lanatus*, *Hordeum brachyantherum*, *Hordeum marinum*, *Leontodon saxatilis*, *Leymus triticoides*, *Lotus corniculatus*, *Microseris douglasii*, *Nassella pulchra*, *Nasturtium officinale*, *Phalaris aquatica*, *Plantago erecta*, *Poa pratensis*, *Rumex crispus*, and *Trifolium* spp. Emergent trees and shrubs may be present at low cover.

Lolium perenne is a widespread and adaptable grass in cismontane California, and the plants grow in a wide range of soil types, except for those excessively drained. Many herbaceous alliances have significant cover of *L. perenne*, including stands of the *Eleocharis macrostachya*, *Juncus arcticus* (var. *balticus*, *mexicanus*), *Leymus triticoides*, *Muhlenbergia rigens*, *Plagiobothrys nothofulvus*, and *Trifolium variegatum*

Alliances. While membership rules vary among studies, Sawyer et al. (2009) consider stands to be included in this type if *Lolium perenne* is a strong dominant, either alone or with other non-natives, largely to the exclusion of native plants. Generally, this type occurs in seasonally moist to wet environments that are regularly disturbed through grazing, fire, flooding, or mechanical means.

Local Vegetation Description

The Perennial rye grass fields Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is open. Dominant herbs include *Lolium perenne*. Those herbs often present include *Avena barbata*, *Bromus hordeaceus*, *Hordeum marinum*, *Hordeum murinum*, and *Trifolium hirtum*, and herbs that are sometimes present include *Amsinckia* sp., *Avena fatua*, *Brassica* sp., *Bromus diandrus*, *Bromus rubens*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hypochaeris glabra*, *Lupinus* sp., *Medicago polymorpha*, *Vulpia bromoides*, and *Vulpia myuros*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 5	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	57.6	32 – 90	0.4	0 – 1

Local Membership Rule

Lolium perenne > 50% relative cover, or > 30% relative cover with *Avena* spp., *Bromus* spp., *Hordeum marinum*, *H. murinum*, *Medicago*, *Trifolium subterraneum*, *Elymus caput-medusae*, and other non-natives in the herbaceous layer. Native species < 10% relative cover.

Local Environmental Description

Elevation: Mean 249 m, Range 3 – 558 m

Aspect: SW (4), NE (3), NW (2), Variable (1)

Slope: Mean 11 degrees, Range 1 – 32 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (3), Lower 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.6%, Range 0 – 9%

Fines Cover: Mean 64.0%, Range 0 – 97%

Litter Cover: Mean 27.7%, Range 1 – 100%

Soil Texture (field assessed): Moderately fine clay loam (3), Fine clay (2), Medium loam (2), Fine silty clay (1), Loam, (class unknown) (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (9), Sandstone, shale, and gravel deposits (4), Alluvium (2), Sandstone and other sedimentary (2), Metamorphic (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (4), Eastern Hills (3), East Bay Terraces and Alluvium (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (5), Suisun Hills and Valleys (3), Eastern Hills (1)

Site Impacts

This alliance has high non-native plant cover (average 93.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea melitensis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hordeum marinum*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Lolium perenne

Lolium perenne – *Hordeum marinum* – *Ranunculus californicus*

Lolium perenne alliance

Classification Comments

None.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Evens et al. 2004, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Klein et al. 2015, Pickart 2006, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=18; Alameda County (n=9): ACWM-01, ACWM-02, ACWM-07, ALCC759, GARA-07, GARA-09, GARA-10, WAR001B, WAR005B

Contra Costa County (n=9): ALCC209, ALCC367, ALCC370, ALCC703, ALCC704, ALCC707, ALCC822, JOMU026, JOMU042

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	28.6	7.0	85.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	72	7.2	0.4	26.0				Y
H	<i>Avena barbata</i>	61	1.9	0.2	13.8				Y
H	<i>Hordeum marinum</i>	56	5.0	0.1	30.0				Y
H	<i>Hordeum murinum</i>	56	2.1	0.1	13.0				Y
H	<i>Trifolium hirtum</i>	50	1.4	0.1	12.0				Y
H	<i>Avena fatua</i>	44	1.6	0.2	12.7				
H	<i>Bromus diandrus</i>	44	1.0	0.2	8.7				
H	<i>Medicago polymorpha</i>	44	1.0	0.1	11.4				
H	<i>Bromus rubens</i>	39	1.4	0.1	10.2				
H	<i>Carduus pycnocephalus</i>	39	0.6	0.1	5.0				
H	<i>Erodium</i> sp.	33	0.9	0.1	6.5				
H	<i>Brassica</i> sp.	28	0.2	0.1	2.5				
H	<i>Amsinckia</i> sp.	28	0.2	0.1	1.3				
H	<i>Erodium botrys</i>	28	0.1	0.1	0.8				
H	<i>Lupinus</i> sp.	28	0.0	0.1	0.1				
H	<i>Erodium cicutarium</i>	22	1.2	0.1	16.0				
H	<i>Vulpia bromoides</i>	22	0.3	0.2	2.0				
H	<i>Hypochaeris glabra</i>	22	0.1	0.1	1.0				
H	<i>Vulpia myuros</i>	22	0.1	0.2	0.6				
H	<i>Centaurea melitensis</i>	22	0.1	0.1	0.6				
H	<i>Geranium dissectum</i>	22	0.0	0.1	0.2				

***Lolium perenne* Semi-natural Association**

Common Name: Italian Ryegrass Patches

Alliance: *Lolium perenne* Herbaceous Semi-natural Alliance

Local Vegetation Description

The Italian Ryegrass Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is open. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Bromus hordeaceus*. Those herbs often present include *Avena barbata*, *Avena fatua*, *Bromus rubens*, *Hordeum murinum*, *Medicago polymorpha*, and *Trifolium hirtum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.4	0 – 5	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.3	no data	no data
Herb	59.3	40 – 90	0.4	0 – 1

Local Environmental Description

Elevation: Mean 279 m, Range 61 – 558 m

Aspect: NE (2), NW (2), SW (2), Variable (1)

Slope: Mean 12 degrees, Range 1 – 32 degrees

Macro Topography: Upper 1/3 of slope (3), Lower 1/3 of slope (2), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 0.8%, Range 0 – 2%

Fines Cover: Mean 79.2%, Range 25 – 97%

Litter Cover: Mean 14.8%, Range 1 – 37%

Soil Texture (field assessed): Fine clay (2), Moderately fine clay loam (2), Fine silty clay (1), Medium loam (1), Medium to very fine, sandy loam (1)

Geology (field or map data): Sedimentary (8), Sandstone, shale, and gravel deposits (3), Sandstone and other sedimentary (2)

Alameda County Subsections: Eastern Hills (3), Fremont - Livermore Hills and Valleys (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (2), Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 93.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Convolvulus arvensis*, *Hordeum murinum*, *Lolium perenne*, and *Trifolium hirtum*.

Classification Comments

None.

References:

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=13; **Alameda County** (n=6):

Contra Costa County (n=7):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	30.6	10.6	85.0	Y		Y	Y
H	<i>Bromus hordeaceus</i>	85	9.8	0.4	26.0	Y			Y
H	<i>Avena barbata</i>	69	2.6	0.2	13.8				Y
H	<i>Trifolium hirtum</i>	69	1.9	0.1	12.0				Y
H	<i>Hordeum murinum</i>	69	1.8	0.1	6.9				Y
H	<i>Avena fatua</i>	62	2.2	0.2	12.7				Y
H	<i>Bromus rubens</i>	54	2.0	0.1	10.2				Y
H	<i>Medicago polymorpha</i>	54	1.4	0.1	11.4				Y
H	<i>Bromus diandrus</i>	46	1.4	0.2	8.7				
H	<i>Erodium</i> sp.	46	1.3	0.1	6.5				
H	<i>Hordeum marinum</i>	46	0.5	0.1	3.1				
H	<i>Carduus pycnocephalus</i>	46	0.4	0.1	2.2				
H	<i>Brassica</i> sp.	38	0.3	0.1	2.5				
H	<i>Amsinckia</i> sp.	38	0.2	0.1	1.3				
H	<i>Lupinus</i> sp.	38	0.0	0.1	0.1				
H	<i>Hypochaeris glabra</i>	31	0.1	0.1	1.0				
H	<i>Vulpia myuros</i>	31	0.1	0.2	0.6				
H	<i>Erodium botrys</i>	31	0.1	0.1	0.8				
H	<i>Centaurea melitensis</i>	31	0.1	0.1	0.6				
H	<i>Convolvulus arvensis</i>	23	2.2	0.2	20.0				
H	<i>Erodium cicutarium</i>	23	0.4	0.1	4.0				
H	<i>Medicago</i> sp.	23	0.2	0.3	1.3				
H	<i>Vulpia microstachys</i>	23	0.1	0.1	0.8				
H	<i>Geranium molle</i>	23	0.0	0.1	0.2				
H	<i>Achyraea mollis</i>	23	0.0	0.1	0.2				
H	<i>Eschscholzia californica</i>	23	0.0	0.1	0.2				
H	<i>Croton setigerus</i>	23	0.0	0.1	0.1				
H	<i>Geranium dissectum</i>	23	0.0	0.1	0.1				
H	<i>Silybum marianum</i>	23	0.0	0.1	0.1				
H	<i>Nassella pulchra</i>	23	0.0	0.1	0.1				

***Lolium perenne* – *Hordeum marinum* – *Ranunculus californicus* Semi-natural Association**

Common Name: Italian Ryegrass – Mediterranean Barley – California Buttercup Patches

Alliance: *Lolium perenne* Herbaceous Semi-natural Alliance

Local Vegetation Description

The Italian Ryegrass – Mediterranean Barley – California Buttercup Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Hordeum marinum* and *Lolium perenne*. Those herbs often present include *Frankenia salina*, and herbs that are sometimes present include *Distichlis spicata*, *Salicornia pacifica*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	66.8	39 – 100	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 137 m, Range 1 – 456 m

Aspect: SW (2), Flat (1)

Slope: Mean 5 degrees, Range 0 – 12 degrees

Macro Topography: Middle 1/3 of slope (2), Bottom (1)

Large Rock: 0%

Small Rock: Mean 2.5%, Range 0 – 9%

Fines Cover: Mean 11.6%, Range 0 – 48%

Litter Cover: Mean 74.6%, Range 36 – 100%

Soil Texture (field assessed): Loam, (class unknown) (1), Moderately fine clay loam (1), Peat (1)

Geology (field or map data): Alluvium (2), Clayey alluvium (1), Metamorphic (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: East Bay Terraces and Alluvium (2), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Delta (1)

Site Impacts

This association has high non-native plant cover (average 93.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Hordeum marinum*, *Lolium perenne*, and *Vulpia bromoides*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Buck-Diaz et al. 2021a, Evens et al. 2004, Ratchford et al. 2023a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=5; Alameda County (n=3): ALCC759, WAR001B, WAR005B

Contra Costa County (n=1): ALCC209

Solano Co. (n=1): SUMA9077

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	30.8	10.0	45.0	Y		Y	Y
H	<i>Hordeum marinum</i>	100	25.8	6.0	45.0	Y		Y	Y
H	<i>Frankenia salina</i>	60	3.0	1.0	12.0				Y
H	<i>Vulpia bromoides</i>	40	0.6	1.0	2.0				
H	<i>Distichlis spicata</i>	40	0.2	0.2	1.0				
H	<i>Salicornia pacifica</i>	40	0.1	0.2	0.4				

Lolium perenne – *Hordeum marinum* – *Ranunculus californicus* Semi-natural Association

Lolium perenne Herbaceous Semi-natural Alliance

***Ludwigia (hexapetala, peploides) – Eichhornia crassipes* Herbaceous
Semi-Natural Alliance**



Common Name: Water primrose – Water hyacinth wetlands

NVC Alliance Code: A4219.

Statewide Description

Eichhornia crassipes, *Ludwigia hexapetala*, *Ludwigia peploides* ssp. *montevidensis* or other *Ludwigia* species are dominant as emergent or floating plants on the water surface.

The genus is especially diverse in the southeastern United States, and many have widespread ranges. *The Jepson Manual* (Hickman 1993) recognized both native and non-native taxa for California. The two nonnatives, *L. hexapetala* and *L. peploides* ssp. *montevidensis*, are serious wetland weeds at low elevations in coastal and Central Valley wetlands. To complicate the situation, the state has *L. palustris*—a variable and weedy native, *L. peploides* ssp. *peploides*—a native widespread in the state, and *L. repens*—a native of southern parts of the state. In addition, it is often difficult to identify taxa in the field; more than one may occur at the same location, and plants hybridize (Sears et al. 2006).

Plants create dense mats in shallow water and over wet soil, occurring alone or with natives such as *Azolla filiculoides*, *Hydrocotyle ranunculoides*, and *Schoenoplectus acutus*. Plants clog river waterways, lakes, irrigation canals, and agricultural wetland areas; and the mats threaten agriculture and federal water delivery projects. They

Ludwigia (hexapetala, peploides) – Eichhornia crassipes Herbaceous Semi-Natural
Alliance

compete with natives, eliminate openwater habitat, and reduce oxygen levels critical for fish survival. The mats also pose a public health threat as a habitat for mosquitoes that carry West Nile virus (Sears et al. 2005). Efforts to remove dense, spreading stands of *L. hexapetala* are underway, especially in the Russian River watershed through a *Ludwigia* Task Force (Sears et al. 2005, 2006).

This alliance name and concept has been expanded from *Ludwigia (hexapetala, peploides)* since the publication of the 2009 book, *A Manual of California Vegetation*, to include other invasive aquatic plants.

Local Vegetation Description

The Water primrose – Water hyacinth wetlands Alliance forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Ludwigia peploides*, and characteristic herbs include *Schoenoplectus acutus* and *Typha latifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	97.0	97 – 97	0.3	0 – 0.5

Local Membership Rule

Ludwigia hexapetala or *L. peploides* > 50% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: 2 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 4%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1)

Ludwigia (hexapetala, peploides) – *Eichhornia crassipes* Herbaceous Semi-Natural Alliance

Site Impacts

This alliance has high non-native plant cover (average 99.6%) relative to native cover. The non-native species with the highest frequency and abundance is *Ludwigia peploides*.

Associations in Alameda & Contra Costa Counties

Ludwigia (hexapetala, peploides)

Classification Comments

None.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCC823

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Ludwigia peploides</i>	100	97.0	97.0	97.0	Y	Y		Y
H	<i>Typha latifolia</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Schoenoplectus acutus</i>	100	0.2	0.2	0.2	Y			Y

Ludwigia (hexapetala, peploides) Semi-natural Association

Common Name: Water Primrose Patches

Alliance: *Ludwigia (hexapetala, peploides)* – *Eichhornia crassipes* Herbaceous Semi-natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Hickson and Keeler-Wolf 2007, Klein et al. 2015, Ratchford et al. 2023a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Ludwigia (hexapetala, peploides) Semi-natural Association
Ludwigia (hexapetala, peploides) – *Eichhornia crassipes* Herbaceous Semi-natural Alliance

Mesembryanthemum spp. – Carpobrotus spp. Herbaceous Semi-Natural Alliance



Common Name: Ice plant mats

NVC Alliance Code: A1620. *Mesembryanthemum* spp. - *Carpobrotus* spp. Ruderal Grassland Alliance

Statewide Description

Carpobrotus chilensis, *C. edulis*, *Mesembryanthemum*, or other ice plant taxa are dominant in the herbaceous layer. At least eight invasive ice plant taxa grow in California: *Aptenia cordifolia*, *Carpobrotus edulis*, *C. chilensis*, *Conicosia pugioniformis*, *Drosanthemum floribundum*, *Malephora crocea*, *Mesembryanthemum crystallinum*, and *M. nodiflorum*.

Carpobrotus edulis is a ground-hugging succulent perennial that forms impenetrable mats covering large areas. This ice plant has been widely planted for soil stabilization and landscaping. The success of *C. edulis* is due particularly to its tolerance of a wide range of soil moisture and nutrient conditions, and to its dispersal by mammals (D'Antonio 1993). This species is often confused with *C. chilensis*, a smaller, less aggressive ice plant with magenta flowers. The two species hybridize, and the hybrids are invasive as well.

Mesembryanthemum crystallinum and *M. nodiflorum* invade coastal bluffs and interior alkaline wetlands in southern California (Randall 2000).

Local Vegetation Description

The Ice plant mats Alliance was confirmed to occur in the study area from a single reconnaissance survey. No cover data was collected. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Carpobrotus edulis*, and herbs that are sometimes present include *Distichlis spicata*, *Grindelia stricta*, *Iva axillaris*, and *Nassella pulchra*. Commonly associated emergent shrubs at sparse cover include *Baccharis pilularis*.

Local Membership Rule

Carpobrotus and/or *Mesembryanthemum* > 80% relative cover on bluffs, dunes, or disturbed lands.

Local Environmental Description

Elevation: 5 m

Aspect: no data

Slope: no data

Macro Topography: no data

Large Rock: no data

Small Rock: no data

Fines Cover: no data

Litter Cover: no data

Soil Texture (field assessed): no data

Geology (field or map data): Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Site Impacts

This alliance has high non-native plant cover relative to native cover. The non-native species that occurs with highest frequency and abundance is *Carpobrotus edulis*.

Associations in Alameda & Contra Costa Counties

Carpobrotus (edulis)

Classification Comments

Data comes from a single reconnaissance survey with no cover estimates.

References: Buck-Diaz et al. 2021, HDR 2014b, Keeler-Wolf and Evens 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; **Alameda County (n=0):**

Contra Costa County (n=1): ALCCREC608

***Carpobrotus (edulis)* Semi-natural Association**

Common Name: Iceplant Patches

Alliance: *Mesembryanthemum* spp. – *Carpobrotus* spp. Herbaceous Semi-natural Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2021a, HDR 2014b, Keeler-Wolf and Evens 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023, Verdone and Evens 2010

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Monolopia (lanceolata) – Coreopsis (calliopsidea) Herbaceous Alliance

Common Name: Monolopia – leafy-stemmed tickseed fields

NVC Alliance Code: N/A

Statewide Description

Camissonia boothii, *Coreopsis calliopsidea*, *Mentzelia pectinate*, and/or *Monolopia lanceolata* or other *Monolopia* species, or other semi-desert, annual forbs are dominant, co-dominant, or characteristically present in the herbaceous layer with *Amsinckia tessellata*, *Astragalus didymocarpus*, *Bromus rubens*, *Caulanthus inflatus*, *Chaenactis stevioides*, *Eriogonum* spp., *Erodium cicutarium*, *Guillenia lasiophylla*, *Layia munzii*, *Lepidium nitidum*, *Malacothrix coulteri*, *Mentzelia* spp., *Phacelia* spp., *Phacelia tanacetifolia*, and *Poa secunda*.

This annual herbaceous alliance occurs along steep hillslopes, tops of small rises and mounds, roadcuts, and in openings in chaparral and woodlands along hills and valleys. It can tolerate alkaline soils. Stands occur prominently in the inner Central Coastal Ranges, southern Sierra Nevada foothills, and the western Mojave Desert. In good rain years, hillsides can be alight in bright yellow and orange during spring. Differences in rainfall and natural disturbances across years confer variation in species composition and abundance, though *Monolopia lanceolata* appears persistent in the seedbank (Buck and Evens 2013). More sampling and analysis is needed in various areas of the Coast Ranges and western Mojave Desert to determine the suite of associations in this alliance and to determine if post-fire stands of *Monolopia* and related forbs warrant a different alliance designation.

Local Vegetation Description

The Monolopia – leafy-stemmed tickseed fields Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata* and *Monolopia major*. Those herbs often present include *Amsinckia menziesii*, *Bromus hordeaceus*, *Bromus rubens*, *Erodium cicutarium*, *Erodium moschatum*, *Medicago polymorpha*, *Plantago erecta*, *Sonchus oleraceus*, and herbs that are sometimes present include *Acmispon brachycarpus*, *Bromus diandrus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Erodium botrys*, *Geranium molle*, *Guillenia lasiophylla*, *Phacelia tanacetifolia*, and *Senecio vulgaris*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	50.0	30 – 85	0.3	0 – 0.5

Local Membership Rule

Monolopia spp. seasonally dominant to co-dominant in the herbaceous layer.

Local Environmental Description

Elevation: Mean 302 m, Range 228 – 388 m

Aspect: SW (2), NW (1)

Slope: Mean 18 degrees, Range 12 – 28 degrees

Macro Topography: Lower 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 1.3%, Range 0 – 2%

Fines Cover: Mean 65.7%, Range 15 – 92%

Litter Cover: Mean 31.3%, Range 5 – 82%

Soil Texture (field assessed): Clay, (class unknown) (3)

Geology (field or map data): Sandstone (2), Sedimentary (1)

Alameda County Subsections: Eastern Hills (3)

Contra Costa County Subsections: None

Site Impacts

This alliance has high non-native plant cover (average 74.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Erodium cicutarium*, *Erodium moschatum*, *Geranium molle*, *Senecio vulgaris*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Monolopia major

Classification Comments

None.

References: Buck-Diaz et al. 2023

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=3; Alameda County (n=3): EBAY0120, VNLC001, VNLC002

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Avena barbata</i>	100	23.0	3.0	62.0	Y			Y
H	<i>Monolopia major</i>	100	9.0	7.0	10.0	Y			Y
H	<i>Bromus rubens</i>	67	7.7	8.0	15.0				Y
H	<i>Bromus hordeaceus</i>	67	4.3	3.0	10.0				Y
H	<i>Erodium cicutarium</i>	67	1.0	1.0	2.0				Y
H	<i>Erodium moschatum</i>	67	0.7	0.2	2.0				Y
H	<i>Amsinckia menziesii</i>	67	0.4	0.2	1.0				Y
H	<i>Medicago polymorpha</i>	67	0.1	0.2	0.2				Y
H	<i>Sonchus oleraceus</i>	67	0.1	0.2	0.2				Y
H	<i>Plantago erecta</i>	67	0.1	0.2	0.2				Y
H	<i>Bromus diandrus</i>	33	20.7	62.0	62.0				
H	<i>Chlorogalum pomeridianum</i>	33	6.7	20.0	20.0				
H	<i>Clarkia purpurea</i>	33	0.1	0.2	0.2				
H	<i>Acmispon brachycarpus</i>	33	0.1	0.2	0.2				
H	<i>Guillenia lasiophylla</i>	33	0.1	0.2	0.2				
H	<i>Phacelia tanacetifolia</i>	33	0.1	0.2	0.2				
H	<i>Geranium molle</i>	33	0.0	0.1	0.1				
H	<i>Senecio vulgaris</i>	33	0.0	0.1	0.1				
H	<i>Erodium botrys</i>	33	0.0	0.1	0.1				

Monolopia major Provisional Association

Common Name: Cupped Monolopia Patches

Alliance: *Monolopia (lanceolata)* – *Coreopsis (calliopsidea)* Herbaceous Alliance

Classification Comments

This association remains provisional due to low overall sample size. The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Monolopia major Provisional Association
Monolopia (lanceolata) – *Coreopsis (calliopsidea)* Herbaceous Alliance

***Nassella* spp. – *Melica* spp. Herbaceous Alliance**



Common Name: Needle grass - Melic grass grassland

NVC Alliance Code: A1248. *Nassella lepida* - *Melica torreyana* Grassland Alliance

Statewide Description

Melica californica, *M. torreyana*, *Nassella cernua*, *N. lepida*, and/or *N. pulchra* dominate in the herbaceous layer with *Aristida ternipes*, *Avena* spp. *Bromus* spp. *Calochortus* spp., *Calamagrostis koelerioides*, *Calystegia* spp. *Chlorogalum pomeridianum*, *Clarkia* spp., *Croton setigerus*, *Cryptantha* spp., *Daucus pusillus*, *Dichelostemma capitatum*, *Elymus* spp., *Eriogonum* spp., *Erodium* spp., *Eschscholzia californica*, *Festuca californica*, *Hirschfeldia incana*, *Holocarpha virgata*, *Hordeum brachyantherum*, *Koeleria macrantha*, *Lasthenia* spp., *Lepidium nitidum*, *Leymus triticoides*, *Lolium perenne*, *Lupinus* spp., *Plantago* spp., *Poa secunda*, *Sanicula* spp., *Sisyrinchium bellum*, *Trifolium* spp., and *Vulpia* spp. Emergent trees and shrubs may be present at low cover.

Nassella pulchra stands commonly exist in deep and clay-rich soils, but they also occur in sterile serpentine soils (Evens and San 2004, Gelbard and Harrison 2003, Hamilton 1997, Harrison and Viers 2007, McNaughton 1968) or in shallow soils of coastal hills in central and southern California (Keeler-Wolf et al. 2003a). Coastal stands currently

occur from Baja California, and San Diego Co., northward across the Coast Ranges to Sonoma Co. (Bartolome et al. 2007a), and coastal stands tend to have more emergent shrubs, suggesting seral and/or dynamic relationships with woody vegetation types (Tyler et al. 2007). *Nassella cernua* stands commonly appear in the transition between coastal/valley grasslands and inland/desert steppes. For example, *N. cernua* and *Achnatherum speciosum* replace *N. pulchra* and *Leymus triticoides* in the transition between the eastern desert slopes of southern California mountains and the valley grasslands (Bartolome et al. 2007a).

In southern California, *Nassella lepida* is a common understory herb on dry, fine-textured soils in stands of the *Artemisia californica* and *Salvia leucophylla* Alliances. In some areas, such as the Santa Monica Mountains, small (< 1 ha) glades dominated by this species occur with a diverse mixture of native plants.

Melica californica has a broad elevation range from near sea level on the North and Central Coast to over 1500 m elevation in the Coast Ranges, Klamath Mountains, and the Sierra Nevada. Stands are best described from Sonoma and Napa Cos. where they tend to occur on more mesic slopes than stands dominated by *Nassella pulchra*. *M. californica* often forms small stands in openings in woodlands of *Quercus agrifolia*, *douglasii*, *garryana*, *lobata*, and *wislizeni*. It is tolerant of serpentine soils and may grow in relatively deep or shallow soils.

Melica torreyana is endemic to California, typically occurring under a canopy of chaparral and forests. At times, it dominates in open habitats where the plants form loose tufts of culms forming localized stands in grasslands or meadows. *Melica torreyana* stands appear to occur both on and off serpentine substrates.

Local Vegetation Description

The Needle grass - Melic grass grassland Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is sparse to open. Characteristic herbs include *Avena barbata* and *Bromus hordeaceus*. Those herbs often present include *Bromus diandrus*, *Lolium perenne*, and *Nassella pulchra*, and herbs that are sometimes present include *Achillea millefolium*, *Bromus rubens*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Dichelostemma capitatum*, *Epilobium brachycarpum*, *Erodium botrys*, *Erodium cicutarium*, *Eschscholzia californica*, *Geranium dissectum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Lupinus bicolor*, *Melica californica*, *Micropus californicus*, *Plantago erecta*, *Poa secunda*, *Trifolium willdenovii*, *Triteleia laxa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 2	3.5	2 – 5
Hardwood	0.1	0 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.1	0 – 1	0.3	0 – 0.5
Shrub	0.2	0 – 4	0.6	0 – 2
Herb	43.2	9 – 100	0.4	0 – 1

Local Membership Rule

Elymus elymoides, *E. multisetus*, *Melica* spp., *Nassella* spp. and/or *Poa secunda* are characteristic of the stand, typically > 15% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: Mean 393 m, Range 2 – 1110 m

Aspect: NE (23), NW (22), SW (11), SE (7), Not recorded (3), Variable (2), Flat (1)

Slope: Mean 19 degrees, Range 0 – 34 degrees

Macro Topography: Upper 1/3 of slope (24), Middle 1/3 of slope (20), Lower 1/3 of slope (10), Middle to Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Lower to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (2), Ridge top (1)

Large Rock: Mean 0.5%, Range 0 – 10%

Small Rock: Mean 5.6%, Range 0 – 37%

Fines Cover: Mean 54.8%, Range 1 – 94%

Litter Cover: Mean 31.1%, Range 0 – 94%

Soil Texture (field assessed): Moderately coarse, sandy loam (11), Moderately fine clay loam (10), Medium to very fine, sandy loam (6), Fine silty clay (5), Moderately fine silty clay loam (4), Medium loam (4), Moderately fine sandy clay loam (4), Medium silt loam (3), Medium to very fine, loamy sand (2), Fine clay (1), Coarse, loamy sand (1), Clay, (class unknown) (1)

Geology (field or map data): Sedimentary (19), Franciscan melange (15), Sandstone, shale, and gravel deposits (15), Sandstone and other sedimentary (6), Ultramafic (4), Serpentine (3), Alluvium (2), General igneous intrusives (2), Sandstone (2), Shale (2), Shale and other sedimentary (2), Igneous (1)

Alameda County Subsections: Western Diablo Range (14), East Bay Hills - Mount Diablo (8), Eastern Hills (5), Fremont - Livermore Hills and Valleys (5), Diablo Range (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (24), Suisun Hills and Valleys (7), Eastern Hills (5), East Bay Terraces and Alluvium (2)

Site Impacts

This alliance has high non-native plant cover (average 57.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Lolium perenne*, and *Vicia villosa*.

Associations in Alameda & Contra Costa Counties

Elymus multisetus – (*Eschscholzia californica* – *Plantago erecta*)

Melica californica

Melica torreyana

Nassella cernua

Nassella lepida

Nassella pulchra

Nassella pulchra – *Avena* spp. – *Bromus* spp.

Nassella pulchra – *Erodium* spp. – *Avena barbata*

Nassella pulchra – *Hemizonia congesta*

Nassella pulchra – *Lolium perenne* – (*Trifolium* spp.)

Nassella pulchra – *Lolium perenne* – *Plantago erecta* Serpentine

Nassella pulchra – *Melica californica* – annual grass

Nassella spp. – *Melica* spp. alliance

Poa secunda – (*Trifolium gracilentum*, *willdenovii*)

Classification Comments

None.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2004, Evens and San 2005, Evens et al. 2006, Fiedler and Leidy 1987, Junak et al. 2007, Keeler-Wolf and Evens 2006, Klein and Evens 2005, Klein et al. 2007, Klein et al. 2015, Parker 1990b, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, VegCAMP 2014c, Verdone and Evens 2010

Global Rarity Rank: G3G4

State Rarity Rank: S3S4

Surveys Used for Description

Total: N=73; Alameda County (n=35): ALCC326, ALCC338, ALCC344, ALCC345, ALCC348, ALCC380, ALCC381, ALCC382, ALCC383, ALCC386, ALCC404, ALCC445, ALCC461, ALCC512, ALCC524, ALCC563, ALCC571, ALCC752, ALCC757, ALCC758, ALCC913, ALCCREC111, EBAY0049, EBAY0055, EBAY0112, EBRTA318, EBRTA320, GARI001, GUMP-003, GUMP-006, LLNL010, LLNL033, LLNL035, LLNL060, PRRP006

Contra Costa County (n=38): ALCC208, ALCC313, ALCC318, ALCC319, ALCC329, ALCC340, ALCC341, ALCC353, ALCC362, ALCC401, ALCC402, ALCC405, ALCC411, ALCC421, ALCC426, ALCC429, ALCC430, ALCC444, ALCC554, ALCC562, ALCC575, ALCC807, ALCC815, ALCC900, ALCC909, CORT161, EBAY0015, MTDIAB1, PPRA017, PPRA019, PPRA020, PPRA022, PPRA023, PPRA027, PPRA028, PPRA030, SPCCA-042, SPCCB-067

Nassella spp. – *Melica* spp. Herbaceous Alliance

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	84	3.3	0.1	25.0	Y			Y
H	<i>Avena barbata</i>	77	4.4	0.1	34.0	Y			Y
H	<i>Nassella pulchra</i>	63	6.2	0.2	45.0				Y
H	<i>Bromus diandrus</i>	59	2.9	0.1	18.0				Y
H	<i>Lolium perenne</i>	52	3.5	0.1	50.0				Y
H	<i>Achillea millefolium</i>	44	0.6	0.2	5.0				
H	<i>Dichelostemma capitatum</i>	40	0.1	0.1	2.0				
H	<i>Erodium botrys</i>	37	1.7	0.1	32.0				
H	<i>Chlorogalum pomeridianum</i>	36	0.2	0.1	5.0				
H	<i>Geranium dissectum</i>	34	0.3	0.1	10.0				
H	<i>Poa secunda</i>	30	1.0	0.2	32.0				
H	<i>Melica californica</i>	27	1.2	0.1	24.0				
H	<i>Erodium cicutarium</i>	27	0.4	0.1	15.0				
H	<i>Triteleia laxa</i>	27	0.2	0.1	4.0				
H	<i>Eschscholzia californica</i>	26	0.3	0.2	8.0				
H	<i>Bromus rubens</i>	25	0.4	0.2	7.0				
H	<i>Lupinus bicolor</i>	23	0.2	0.1	7.0				
H	<i>Hypochaeris glabra</i>	23	0.1	0.1	2.0				
H	<i>Carduus pycnocephalus</i>	22	0.6	0.2	14.0				
H	<i>Trifolium willdenovii</i>	22	0.1	0.1	3.0				
H	<i>Epilobium brachycarpum</i>	22	0.1	0.1	2.0				
H	<i>Vicia villosa</i>	21	0.4	0.2	11.0				
H	<i>Micropus californicus</i>	21	0.2	0.1	3.0				
H	<i>Clarkia purpurea</i>	21	0.1	0.2	3.0				
H	<i>Plantago erecta</i>	21	0.1	0.1	3.0				
H	<i>Hirschfeldia incana</i>	21	0.1	0.1	1.0				
NV	Moss	29	0.5	0.1	26.0				

***Elymus multisetus* – (*Eschscholzia californica* – *Plantago erecta*) Association**

Common Name: Big squirreltail grass – (California poppy – dwarf plantain) Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Big squirreltail grass – (California poppy – dwarf plantain) Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Bromus hordeaceus*, *Elymus multisetus*, *Epilobium brachycarpum*, *Holocarpha virgata*, *Plantago erecta*, and *Poa secunda*. Those herbs often present include *Achyrachaena mollis*, *Aira caryophyllea*, *Avena barbata*, *Bromus rubens*, *Clarkia purpurea*, *Dichelostemma capitatum*, *Elymus caput-medusae*, *Koeleria macrantha*, *Lupinus bicolor*, *Micropus californicus*, *Trifolium willdenovii*, and *Vulpia microstachys*, and herbs that are sometimes present include *Aphanes occidentalis*, *Clarkia* sp., *Claytonia parviflora*, *Galium parisiense*, *Geranium dissectum*, *Lagophylla ramosissima*, *Lolium perenne*, *Microsteris gracilis*, *Ranunculus californicus*, and *Sanicula bipinnata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 1	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	24.7	18 – 34	0.5	0 – 1

Local Environmental Description

Elevation: Mean 827 m, Range 475 – 1079 m

Aspect: NE (4), NW (1)

Slope: Mean 19 degrees, Range 7 – 31 degrees

Macro Topography: Lower 1/3 of slope (2), Lower to Upper 1/3 of slope (1), Middle 1/3 of slope (1), Upper 1/3 of slope (1)

Large Rock: Mean 0.5%, Range 0 – 1%

Small Rock: Mean 22.7%, Range 8 – 37%

Fines Cover: Mean 69.8%, Range 56 – 88%

Litter Cover: Mean 7.6%, Range 3 – 10%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (4), Ultramafic (2)

Alameda County Subsections: Western Diablo Range (4), Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Elymus multisetus – (*Eschscholzia californica* – *Plantago erecta*) Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

Site Impacts

This association has moderate non-native plant cover (average 40.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus hordeaceus*, *Elymus caput-medusae*, *Galium parisiense*, *Geranium dissectum*, and *Lolium perenne*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Evens and San 2004, Evens et al. 2006, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=5): ALCC338, ALCC345, ALCC383, ALCC571, ALCC913

Contra Costa County (n=1): SPCCB-067

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	4.7	1.0	9.0	Y			Y
H	<i>Elymus multisetus</i>	83	4.8	3.0	11.0	Y			Y
H	<i>Holocarpha virgata</i>	83	0.7	0.2	2.0	Y			Y
H	<i>Plantago erecta</i>	83	0.6	0.2	3.0	Y			Y
H	<i>Epilobium brachycarpum</i>	83	0.6	0.2	2.0	Y			Y
H	<i>Poa secunda</i>	83	0.4	0.2	1.0	Y			Y
H	<i>Achillea millefolium</i>	83	0.3	0.2	1.0	Y			Y
H	<i>Avena barbata</i>	67	2.7	0.2	9.0				Y
H	<i>Vulpia microstachys</i>	67	1.5	1.0	6.0				Y
H	<i>Bromus rubens</i>	67	0.4	0.2	1.0				Y
H	<i>Micropus californicus</i>	67	0.4	0.2	1.0				Y
H	<i>Trifolium willdenovii</i>	67	0.4	0.1	1.0				Y
H	<i>Clarkia purpurea</i>	67	0.3	0.2	1.0				Y
H	<i>Achyraea mollis</i>	50	1.2	0.2	7.0				Y
H	<i>Elymus caput-medusae</i>	50	1.2	0.2	6.0				Y
H	<i>Aira caryophyllea</i>	50	0.2	0.2	1.0				Y
H	<i>Koeleria macrantha</i>	50	0.1	0.2	0.2				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.1	0.2				Y
H	<i>Lupinus bicolor</i>	50	0.1	0.1	0.2				Y
H	<i>Lolium perenne</i>	33	0.4	0.2	2.0				
H	<i>Claytonia parviflora</i>	33	0.2	0.2	1.0				
H	<i>Lagophylla ramosissima</i>	33	0.2	0.2	1.0				
H	<i>Geranium dissectum</i>	33	0.1	0.2	0.2				
H	<i>Clarkia</i> sp.	33	0.1	0.2	0.2				
H	<i>Galium parisiense</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	33	0.1	0.2	0.2				
H	<i>Aphanes occidentalis</i>	33	0.1	0.2	0.2				
H	<i>Ranunculus californicus</i>	33	0.1	0.2	0.2				
H	<i>Microsteris gracilis</i>	33	0.1	0.2	0.2				
NV	Moss	67	0.1	0.1	0.2				Y

Elymus multisetus – (*Eschscholzia californica* – *Plantago erecta*) Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Melica californica* Association**

Common Name: California Melicgrass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The California Melicgrass Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, and *Melica californica*. Those herbs often present include *Dichelostemma capitatum*, *Lupinus bicolor*, and *Triteleia laxa*, and herbs that are sometimes present include *Aira caryophyllaea*, *Amsinckia menziesii* var. *intermedia*, *Bromus rubens*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Cynosurus echinatus*, *Elymus triticoides*, *Epilobium brachycarpum*, *Eriogonum nudum*, *Erodium botrys*, *Erodium cicutarium*, *Erodium moschatum*, *Eschscholzia californica*, *Galium parisiense*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Lagophylla ramosissima*, *Micropus californicus*, *Nassella pulchra*, *Poa secunda*, *Sanicula bipinnata*, *Sanicula bipinnatifida*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	35.3	27 – 51	0.5	0 – 1

Local Environmental Description

Elevation: Mean 532 m, Range 241 – 1024 m

Aspect: NW (5), NE (3)

Slope: Mean 21 degrees, Range 3 – 32 degrees

Macro Topography: Middle 1/3 of slope (4), Upper 1/3 of slope (3)

Large Rock: Mean 0.5%, Range 0 – 2%

Small Rock: Mean 6.1%, Range 0 – 20%

Fines Cover: Mean 54.4%, Range 15 – 82%

Litter Cover: Mean 33.4%, Range 2 – 62%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Coarse, loamy sand (1), Medium to very fine, loamy sand (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (4), Franciscan melange (2), Sandstone and other sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (2), Diablo Range (1), Eastern Hills (1)

Contra Costa County Subsections: Eastern Hills (2), East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 55.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Cynosurus echinatus*, *Erodium botrys*, *Erodium cicutarium*, *Erodium moschatum*, *Galium parisiense*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, and *Torilis arvensis*.

Classification Comments

None.

References: Buck-Diaz et al. 2021a, Klein et al. 2015, Ratchford et al. 2023a, Sikes et al. 2021, Sikes et al. 2023, VegCAMP 2014c

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** Y

Surveys Used for Description

Total: N=8; Alameda County (n=4): ALCC445, ALCC461, ALCC758, LLNL060

Contra Costa County (n=4): ALCC329, ALCC341, ALCC401, SPCCA-042

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus diandrus</i>	100	9.5	2.0	16.0	Y			Y
H	<i>Melica californica</i>	100	9.4	2.0	24.0	Y			Y
H	<i>Avena barbata</i>	100	5.1	0.2	15.0	Y			Y
H	<i>Bromus hordeaceus</i>	88	3.1	0.2	20.0	Y			Y
H	<i>Achillea millefolium</i>	75	1.4	0.2	5.0	Y			Y
H	<i>Dichelostemma capitatum</i>	50	0.2	0.2	1.0				Y
H	<i>Lupinus bicolor</i>	50	0.2	0.2	1.0				Y
H	<i>Triteleia laxa</i>	50	0.2	0.1	1.0				Y
H	<i>Bromus rubens</i>	38	0.5	1.0	2.0				
H	<i>Nassella pulchra</i>	38	0.4	0.2	2.0				
H	<i>Torilis arvensis</i>	38	0.2	0.2	1.0				
H	<i>Chlorogalum pomeridianum</i>	38	0.1	0.2	0.2				
H	<i>Erodium cicutarium</i>	38	0.1	0.1	0.2				
H	<i>Cynosurus echinatus</i>	38	0.1	0.1	0.2				
H	<i>Eschscholzia californica</i>	25	1.0	0.2	8.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Hordeum murinum</i>	25	0.4	0.2	3.0				
H	<i>Clarkia purpurea</i>	25	0.4	0.2	3.0				
H	<i>Sanicula bipinnatifida</i>	25	0.2	0.2	1.0				
H	<i>Aira caryophyllea</i>	25	0.2	0.2	1.0				
H	<i>Epilobium brachycarpum</i>	25	0.2	0.2	1.0				
H	<i>Galium parisiense</i>	25	0.2	0.2	1.0				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	25	0.2	0.2	1.0				
H	<i>Geranium dissectum</i>	25	0.1	0.1	1.0				
H	<i>Erodium botrys</i>	25	0.1	0.1	1.0				
H	<i>Elymus triticoides</i>	25	0.1	0.1	1.0				
H	<i>Carduus pycnocephalus</i>	25	0.1	0.2	0.2				
H	<i>Poa secunda</i>	25	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	25	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	25	0.0	0.1	0.2				
H	<i>Micropus californicus</i>	25	0.0	0.1	0.2				
H	<i>Lagophylla ramosissima</i>	25	0.0	0.1	0.2				
H	<i>Hirschfeldia incana</i>	25	0.0	0.1	0.2				
H	<i>Erodium moschatum</i>	25	0.0	0.1	0.2				
NV	Lichen	25	0.1	0.2	0.2				

***Melica torreyana* Association**

Common Name: Torrey's melicgrass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Torrey's melicgrass Association forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Melica torreyana*, and characteristic herbs include *Achillea millefolium*, *Bromus hordeaceus*, *Clarkia purpurea*, *Eschscholzia californica*, *Lolium perenne*, *Pentagramma triangularis*, *Plantago erecta*, *Poa secunda*, and *Trifolium willdenovii*. Those herbs often present include *Achillea millefolium*, *Acmispon wrangelianus*, *Allium serra*, *Aphanes occidentalis*, *Avena barbata*, *Bromus hordeaceus*, *Bromus madritensis*, *Calystegia collina*, *Castilleja exserta*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Claytonia perfoliata*, *Crassula connata*, *Cryptantha flaccida*, *Dichelostemma capitatum*, *Dodecatheon* sp., *Dudleya setchellii*, *Eriogonum nudum*, *Galium aparine*, *Lasthenia californica*, *Lessingia* sp., *Lolium perenne*, *Nassella pulchra*, *Pentagramma triangularis*, *Poa secunda*, *Sisyrinchium bellum*, and *Vulpia microstachys*. Commonly associated emergent trees at sparse cover include *Pinus sabiniana* are characteristic or often present.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.1	0 – 0.2	3.5	2 – 5
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.1	0 – 0.2	0.3	0 – 0.5
Herb	35.0	20 – 45	0.8	0.5 – 1

Local Environmental Description

Elevation: Mean 342 m, Range 128 – 665 m

Aspect: NE (4)

Slope: Mean 31 degrees, Range 19 – 58 degrees

Macro Topography: Middle 1/3 of slope (2), Upper 1/3 of slope (2)

Large Rock: Mean 12.3%, Range 5 – 21%

Small Rock: Mean 54.0%, Range 14 – 79%

Fines Cover: Mean 26.5%, Range 4 – 49%

Litter Cover: Mean 7.5%, Range 3 – 15%

Soil Texture (field assessed): Coarse, loamy sand (1), Fine silty clay (1), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (4)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has moderate non-native plant cover (average 35.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Lactuca serriola*, and *Lolium perenne*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Buck-Diaz et al. 2021a, Evens and San 2004, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=1): ALCC381

Contra Costa County (n=0):

Santa Clara Co. (n=3): COYO012, COYO038, COYO068

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus sabiniana</i>	25	0.1	0.2	0.2				
S	<i>Toxicodendron diversilobum</i>	25	0.1	0.2	0.2				
S	<i>Eriophyllum confertiflorum</i>	25	0.0	0.1	0.1				
S	<i>Artemisia californica</i>	25	0.0	0.1	0.1				
H	<i>Melica torreyana</i>	100	16.8	5.0	42.0	Y		Y	Y
H	<i>Plantago erecta</i>	100	0.8	0.1	2.0	Y			Y
H	<i>Eschscholzia californica</i>	100	0.4	0.1	1.0	Y			Y
H	<i>Trifolium willdenovii</i>	100	0.1	0.1	0.2	Y			Y
H	<i>Lolium perenne</i>	75	8.8	0.1	25.0	Y			Y
H	<i>Bromus hordeaceus</i>	75	3.5	1.0	10.0	Y			Y
H	<i>Poa secunda</i>	75	0.3	0.1	1.0	Y			Y
H	<i>Achillea millefolium</i>	75	0.3	0.1	1.0	Y			Y
H	<i>Clarkia purpurea</i>	75	0.3	0.1	1.0	Y			Y
H	<i>Pentagramma triangularis</i>	75	0.1	0.1	0.2	Y			Y
H	<i>Vulpia microstachys</i>	50	2.0	1.0	7.0				Y
H	<i>Chlorogalum pomeridianum</i>	50	1.0	1.0	3.0				Y
H	<i>Calystegia collina</i>	50	0.5	0.1	2.0				Y
H	<i>Eriogonum nudum</i>	50	0.3	0.1	1.0				Y
H	<i>Dodecatheon</i> sp.	50	0.3	0.1	1.0				Y
H	<i>Claytonia perfoliata</i>	50	0.1	0.1	0.2				Y
H	<i>Avena barbata</i>	50	0.1	0.1	0.2				Y
H	<i>Acmispon wrangelianus</i>	50	0.1	0.1	0.2				Y
H	<i>Galium aparine</i>	50	0.1	0.1	0.2				Y
H	<i>Allium serra</i>	50	0.1	0.1	0.1				Y
H	<i>Nassella pulchra</i>	50	0.1	0.1	0.1				Y
H	<i>Lessingia</i> sp.	50	0.1	0.1	0.1				Y
H	<i>Castilleja exserta</i>	50	0.1	0.1	0.1				Y
H	<i>Cryptantha flaccida</i>	50	0.1	0.1	0.1				Y
H	<i>Lasthenia californica</i>	50	0.1	0.1	0.1				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.1	0.1				Y
H	<i>Crassula connata</i>	50	0.1	0.1	0.1				Y
H	<i>Bromus madritensis</i>	50	0.1	0.1	0.1				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sisyrinchium bellum</i>	50	0.1	0.1	0.1				Y
H	<i>Dudleya setchellii</i>	50	0.1	0.1	0.1				Y
H	<i>Aphanes occidentalis</i>	50	0.1	0.1	0.1				Y
H	<i>Bromus rubens</i>	25	1.0	4.0	4.0				
H	<i>Phacelia imbricata</i>	25	0.3	1.0	1.0				
H	<i>Lessingia nemaclada</i>	25	0.3	1.0	1.0				
H	<i>Bromus diandrus</i>	25	0.1	0.2	0.2				
H	<i>Melica californica</i>	25	0.1	0.2	0.2				
H	<i>Madia exigua</i>	25	0.1	0.2	0.2				
H	<i>Scrophularia californica</i>	25	0.1	0.2	0.2				
H	<i>Calystegia subacaulis</i>	25	0.1	0.2	0.2				
H	<i>Thysanocarpus curvipes</i>	25	0.1	0.2	0.2				
H	<i>Eriogonum gracile</i>	25	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	25	0.1	0.2	0.2				
H	<i>Calochortus venustus</i>	25	0.1	0.2	0.2				
H	<i>Gilia tricolor</i>	25	0.1	0.2	0.2				
H	<i>Holocarpha virgata</i>	25	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	25	0.1	0.2	0.2				
H	<i>Clarkia gracilis</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Lomatium utriculatum</i>	25	0.0	0.1	0.1				
H	<i>Trifolium microdon</i>	25	0.0	0.1	0.1				
H	<i>Hesperervax sparsiflora</i>	25	0.0	0.1	0.1				
H	<i>Clarkia</i> sp.	25	0.0	0.1	0.1				
H	<i>Trifolium albopurpureum</i>	25	0.0	0.1	0.1				
H	<i>Ranunculus californicus</i>	25	0.0	0.1	0.1				
H	<i>Calochortus</i> sp.	25	0.0	0.1	0.1				
H	<i>Elymus glaucus</i>	25	0.0	0.1	0.1				
H	<i>Elymus multisetus</i>	25	0.0	0.1	0.1				
H	<i>Microsteris gracilis</i>	25	0.0	0.1	0.1				
H	<i>Corethrogyne filaginifolia</i>	25	0.0	0.1	0.1				
H	<i>Micropus californicus</i>	25	0.0	0.1	0.1				
NV	Lichen	100	8.0	0.1	30.0	Y	Y		Y
NV	Moss	100	0.8	0.1	1.0	Y		Y	Y

***Nassella cernua* Association**

Common Name: Nodding Needlegrass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Nodding Needlegrass Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Bromus hordeaceus*, *Bromus rubens*, *Erodium botrys*, *Hirschfeldia incana*, and *Nassella cernua*. Those herbs often present include *Achillea millefolium*, *Acmispon wrangelianus*, *Amsinckia* sp., *Avena barbata*, *Chlorogalum pomeridianum*, *Erodium cicutarium*, *Eschscholzia californica*, *Grindelia camporum*, and *Koeleria gerardii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.2	no data	no data
Herb	42.3	26 – 51	0.4	0 – 1

Local Environmental Description

Elevation: Mean 521 m, Range 453 – 599 m

Aspect: SW (3)

Slope: Mean 18 degrees, Range 10 – 28 degrees

Macro Topography: Upper 1/3 of slope (2), Ridge top (1)

Large Rock: Mean 0.4%, Range 0 – 1%

Small Rock: Mean 10.7%, Range 6 – 15%

Fines Cover: Mean 51.3%, Range 16 – 83%

Litter Cover: Mean 34.7%, Range 2 – 66%

Soil Texture (field assessed): Moderately fine sandy clay loam (1)

Geology (field or map data): Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1)

Alameda County Subsections: Eastern Hills (2), Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 64.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus rubens*, *Erodium botrys*, *Hirschfeldia incana*, *Torilis nodosa*, and *Vicia villosa*.

Classification Comments

None.

References: Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Ratchford et al. 2023a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC757, LLNL010, LLNL033

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Gutierrezia californica</i>	33	0.1	0.2	0.2				
H	<i>Nassella cernua</i>	100	8.7	7.0	12.0	Y			Y
H	<i>Erodium botrys</i>	100	8.7	3.0	18.0	Y			Y
H	<i>Bromus rubens</i>	100	2.1	0.2	5.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	1.4	0.2	3.0	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Avena barbata</i>	67	4.7	4.0	10.0				Y
H	<i>Grindelia camporum</i>	67	1.3	2.0	2.0				Y
H	<i>Acmispon wrangelianus</i>	67	0.7	0.2	2.0				Y
H	<i>Erodium cicutarium</i>	67	0.7	0.2	2.0				Y
H	<i>Eschscholzia californica</i>	67	0.4	0.2	1.0				Y
H	<i>Koeleria gerardii</i>	67	0.4	0.2	1.0				Y
H	<i>Achillea millefolium</i>	67	0.4	0.2	1.0				Y
H	<i>Amsinckia</i> sp.	67	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	67	0.1	0.2	0.2				Y
H	<i>Avena fatua</i>	33	10.0	30.0	30.0				
H	<i>Logfia californica</i>	33	1.3	4.0	4.0				
H	<i>Medicago polymorpha</i>	33	1.0	3.0	3.0				
H	<i>Trichostema lanceolatum</i>	33	0.1	0.2	0.2				
H	<i>Astragalus gambelianus</i>	33	0.1	0.2	0.2				
H	<i>Castilleja densiflora</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnatifida</i>	33	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	33	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	33	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum nudum</i>	33	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	33	0.1	0.2	0.2				

***Nassella lepida* Association**

Common Name: Foothill Needlegrass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Foothill Needlegrass Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Nassella lepida*, and characteristic herbs include *Nassella lepida*. Those herbs often present include *Bromus diandrus*, *Carduus pycnocephalus*, *Lolium perenne*, and *Vicia villosa*, and herbs that are sometimes present include *Achillea millefolium*, *Avena barbata*, *Avena fatua*, *Bromus carinatus*, *Bromus hordeaceus*, *Calystegia subacaulis*, *Centaurea solstitialis*, *Chlorogalum pomeridianum*, *Dichelostemma capitatum*, *Erodium cicutarium*, *Geranium dissectum*, *Hemizonia congesta*, *Hirschfeldia incana*, *Medicago polymorpha*, *Sonchus asper*, and *Vicia sativa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.1	0 – 0.5	0.4	0 – 1
Herb	55.9	40 – 80	0.3	0 – 1

Local Environmental Description

Elevation: Mean 353 m, Range 191 – 990 m

Aspect: NE (5), SE (1), SW (1)

Slope: Mean 25 degrees, Range 15 – 45 degrees

Macro Topography: Middle 1/3 of slope (2), Lower 1/3 of slope (1), Ridge top (1), Upper 1/3 of slope (1)

Large Rock: Mean 1.8%, Range 0 – 7%

Small Rock: Mean 4.8%, Range 0 – 10%

Fines Cover: Mean 35.6%, Range 0 – 58%

Litter Cover: Mean 36.0%, Range 0 – 57%

Soil Texture (field assessed): Clay, (class unknown) (1), Fine clay (1), Moderately fine clay loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Franciscan melange (1), General igneous intrusives (1), Large landslide (1), Serpentine (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2)

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has moderate non-native plant cover (average 29.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Centaurea solstitialis*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Lolium perenne*, *Sonchus asper*, *Vicia sativa*, and *Vicia villosa*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf and Evens 2006, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Verdone and Evens 2010

Global Rarity Rank: G2? **State Rarity Rank:** S2 **State Rare:** Y

Surveys Used for Description

Total: N=7; Alameda County (n=2): ALCC326, ALCCREC111

Contra Costa County (n=2): ALCC554, ALCC900

Santa Clara Co. (n=3): SCLAR030, SCLAV005, VAWA266

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Toxicodendron diversilobum</i>	29	0.1	0.2	0.5				
H	<i>Nassella lepida</i>	100	29.1	6.0	60.0	Y		Y	Y
H	<i>Lolium perenne</i>	71	5.5	0.2	20.0				Y
H	<i>Carduus pycnocephalus</i>	57	1.6	0.5	8.0				Y
H	<i>Bromus diandrus</i>	57	0.8	0.2	3.0				Y
H	<i>Vicia villosa</i>	57	0.6	0.2	3.0				Y
H	<i>Bromus hordeaceus</i>	43	2.6	0.2	10.0				
H	<i>Dichelostemma capitatum</i>	43	0.5	0.1	3.0				
H	<i>Achillea millefolium</i>	43	0.5	0.2	2.0				
H	<i>Avena fatua</i>	43	0.5	0.2	2.0				
H	<i>Calystegia subacaulis</i>	43	0.2	0.2	1.0				
H	<i>Geranium dissectum</i>	43	0.2	0.2	1.0				
H	<i>Avena barbata</i>	29	2.6	8.0	10.0				
H	<i>Chlorogalum pomeridianum</i>	29	0.6	1.0	3.0				
H	<i>Centaurea solstitialis</i>	29	0.5	0.2	3.0				
H	<i>Bromus carinatus</i>	29	0.2	0.2	1.0				
H	<i>Erodium cicutarium</i>	29	0.1	0.2	0.5				
H	<i>Medicago polymorpha</i>	29	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	29	0.1	0.2	0.2				
H	<i>Hemizonia congesta</i>	29	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	29	0.1	0.2	0.2				
H	<i>Sonchus asper</i>	29	0.0	0.1	0.2				

***Nassella pulchra* Association**

Common Name: Purple Needlegrass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is sparse. Dominant herbs include *Nassella pulchra*. Those herbs often present include *Avena barbata*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, and *Vulpia bromoides*, and herbs that are sometimes present include *Avena fatua*, *Convolvulus arvensis*, *Danthonia californica*, *Eschscholzia californica*, *Foeniculum vulgare*, *Geranium dissectum*, *Hypochaeris glabra*, *Lysimachia arvensis*, and *Sisyrinchium bellum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.2	0 – 2	no data	no data
Regenerating or Shrubby Tree	0.2	0 – 1	0.3	0 – 0.5
Shrub	0.4	0 – 2	0.3	0 – 0.5
Herb	57.7	32 – 100	0.4	0 – 1

Local Environmental Description

Elevation: Mean 88 m, Range 2 – 325 m

Aspect: NE (2), NW (2), SE (2), Flat (1), SW (1), Variable (1)

Slope: Mean 9 degrees, Range 0 – 20 degrees

Macro Topography: Lower 1/3 of slope (4), Middle 1/3 of slope (2), Not recorded (2), Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (1)

Large Rock: 0%

Small Rock: Mean 2.6%, Range 0 – 15%

Fines Cover: Mean 41.6%, Range 1 – 94%

Litter Cover: Mean 36.5%, Range 1 – 74%

Soil Texture (field assessed): Moderately fine clay loam (2), Clay, (class unknown) (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (5), Alluvium (2), General igneous intrusives (1), Sandstone and other sedimentary (1), Sedimentary (1), Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (7), East Bay Terraces and Alluvium (1)

Site Impacts

This association has high non-native plant cover (average 54.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Convolvulus arvensis*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Hypochaeris glabra*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, and *Vulpia bromoides*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Evens and Kentner 2006, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3? **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=11; Alameda County (n=3): ALCC512, EBRTA318, GARI001

Contra Costa County (n=8): ALCC562, CORT161, PPRA017, PPRA019, PPRA022, PPRA023, PPRA027, PPRA030

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Baccharis pilularis</i>	36	0.2	0.2	1.0				
H	<i>Nassella pulchra</i>	100	23.6	6.0	45.0	Y		Y	Y
H	<i>Plantago lanceolata</i>	73	2.8	0.2	10.0				Y
H	<i>Erodium botrys</i>	73	2.3	0.2	10.0				Y
H	<i>Brachypodium distachyon</i>	64	5.6	0.2	20.0				Y
H	<i>Bromus diandrus</i>	64	2.5	1.0	11.0				Y
H	<i>Bromus hordeaceus</i>	64	1.3	0.2	5.0				Y
H	<i>Hypochaeris radicata</i>	55	4.4	0.2	37.0				Y
H	<i>Vulpia bromoides</i>	55	3.9	0.2	19.0				Y
H	<i>Avena barbata</i>	55	2.7	2.0	10.0				Y
H	<i>Lolium perenne</i>	55	1.6	0.2	10.0				Y
H	<i>Rumex acetosella</i>	55	0.8	0.2	5.0				Y
H	<i>Sisyrinchium bellum</i>	45	0.6	0.2	4.0				
H	<i>Avena fatua</i>	36	1.4	0.2	9.0				
H	<i>Foeniculum vulgare</i>	36	0.7	0.2	7.0				
H	<i>Geranium dissectum</i>	36	0.1	0.2	1.0				
H	<i>Lysimachia arvensis</i>	36	0.1	0.2	0.2				
H	<i>Convolvulus arvensis</i>	27	0.7	1.0	5.0				
H	<i>Hypochaeris glabra</i>	27	0.4	0.2	2.0				
H	<i>Danthonia californica</i>	27	0.2	0.2	2.0				
H	<i>Eschscholzia californica</i>	27	0.2	0.2	2.0				

***Nassella pulchra* – *Avena* spp. – *Bromus* spp. Association**

Common Name: Purple Needlegrass – Wild Oat – Annual Brome Grassland Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – Wild Oat – Annual Brome Grassland Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is open. Characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Lolium perenne*, and *Nassella pulchra*. Those herbs often present include *Bromus diandrus*, *Convolvulus arvensis*, *Erodium botrys*, *Trifolium hirtum*, and *Vicia villosa*, and herbs that are sometimes present include *Achillea millefolium*, *Avena fatua*, *Brachypodium distachyon*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Eschscholzia californica*, *Geranium dissectum*, *Grindelia camporum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Lupinus bicolor*, *Melica californica*, *Plantago lanceolata*, *Rumex acetosella*, *Sherardia arvensis*, *Silene gallica*, *Sisyrinchium bellum*, *Triteleia laxa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.3	0 – 2	7.5	5 – 10
Regenerating or Shrubby Tree	0.1	0 – 1	0.3	0 – 0.5
Shrub	0.6	0 – 4	0.8	0 – 2
Herb	52.3	31 – 90	0.4	0 – 1

Local Environmental Description

Elevation: Mean 199 m, Range 5 – 553 m

Aspect: NW (4), SW (2), NE (1), Not recorded (1), SE (1), Variable (1)

Slope: Mean 19 degrees, Range 1 – 31 degrees

Macro Topography: Middle 1/3 of slope (4), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope (2), Lower 1/3 of slope (1)

Large Rock: Mean 0.7%, Range 0 – 5%

Small Rock: Mean 5.7%, Range 0 – 35%

Fines Cover: Mean 54.3%, Range 5 – 94%

Litter Cover: Mean 31.1%, Range 0 – 93%

Soil Texture (field assessed): Medium loam (3), Moderately fine clay loam (2), Fine silty clay (1), Moderately coarse, sandy loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (3), Sedimentary (3), Franciscan melange (2), Sandstone and other sedimentary (2), Sandstone (1), Shale (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (3), Fremont - Livermore Hills and Valleys (2)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Eastern Hills (2), East Bay Terraces and Alluvium (1), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 76.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Erodium botrys*, *Geranium dissectum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Lolium perenne*, *Plantago lanceolata*, *Rumex acetosella*, *Sherardia arvensis*, *Silene gallica*, *Trifolium hirtum*, *Vicia villosa*, and *Vulpia bromoides*.

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2021a, Evens and Kentner 2006, Junak et al. 2007, Klein et al. 2015, Parker 1990b, Ratchford et al. 2023a, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3? **State Rare:** Y

Surveys Used for Description

Total: N=12; Alameda County (n=5): EBAY0049, EBRTA320, GUMP-003, GUMP-006, PRRP006

Contra Costa County (n=7): ALCC362, ALCC405, ALCC430, ALCC575, ALCC815, PPRA020, PPRA028

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Nassella pulchra</i>	100	8.4	2.0	20.0	Y			Y
H	<i>Avena barbata</i>	92	8.9	0.2	34.0	Y			Y
H	<i>Bromus hordeaceus</i>	92	6.5	0.2	25.0	Y			Y
H	<i>Lolium perenne</i>	92	3.3	0.2	10.0	Y			Y
H	<i>Bromus diandrus</i>	67	4.1	0.2	18.0				Y
H	<i>Erodium botrys</i>	58	1.7	0.2	10.0				Y
H	<i>Trifolium hirtum</i>	50	1.3	0.2	10.0				Y
H	<i>Vicia villosa</i>	50	1.0	0.2	5.4				Y
H	<i>Convolvulus arvensis</i>	50	0.6	0.2	3.0				Y
H	<i>Brachypodium distachyon</i>	42	6.2	10.0	20.0				
H	<i>Plantago lanceolata</i>	42	2.8	1.0	25.0				
H	<i>Hypochaeris glabra</i>	42	0.3	0.1	2.0				
H	<i>Triteleia laxa</i>	33	0.4	0.1	4.0				
H	<i>Achillea millefolium</i>	33	0.2	0.2	1.0				
H	<i>Vulpia bromoides</i>	25	1.9	6.0	10.0				
H	<i>Avena fatua</i>	25	0.5	1.0	2.9				
H	<i>Sisyrinchium bellum</i>	25	0.5	0.2	5.0				
H	<i>Eschscholzia californica</i>	25	0.4	1.0	2.0				
H	<i>Carduus pycnocephalus</i>	25	0.4	0.2	4.0				
H	<i>Geranium dissectum</i>	25	0.4	1.0	2.3				
H	<i>Lupinus bicolor</i>	25	0.3	0.2	3.0				
H	<i>Melica californica</i>	25	0.2	0.2	2.6				
H	<i>Grindelia camporum</i>	25	0.2	0.1	2.0				
H	<i>Rumex acetosella</i>	25	0.1	0.2	1.0				
H	<i>Sherardia arvensis</i>	25	0.1	0.2	0.8				
H	<i>Chlorogalum pomeridianum</i>	25	0.1	0.2	0.3				
H	<i>Hirschfeldia incana</i>	25	0.1	0.2	0.2				
H	<i>Silene gallica</i>	25	0.0	0.1	0.3				

Nassella pulchra – *Avena* spp. – *Bromus* spp. Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Nassella pulchra* – *Erodium* spp. – *Avena barbata* Association**

Common Name: Purple Needlegrass – Stork's Bill – Slender Oat Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – Stork's Bill – Slender Oat Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Erodium botrys*, and characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Erodium botrys*, *Hirschfeldia incana*, *Koeleria gerardii*, *Logfia californica*, *Nassella cernua*, and *Nassella pulchra*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	40.0	40 – 40	0.3	0 – 0.5

Local Environmental Description

Elevation: 431 m

Aspect: SE (1)

Slope: 20 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 87%

Litter Cover: 10%

Soil Texture (field assessed): Not recorded (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 80.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Erodium botrys*, *Hirschfeldia incana*, and *Koeleria gerardii*.

Classification Comments

None.

References: Evens and San 2005, Klein and Evens 2005

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): LLNL035

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium botrys</i>	100	32.0	32.0	32.0	Y	Y		Y
H	<i>Nassella pulchra</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Nassella cernua</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Avena barbata</i>	100	2.0	2.0	2.0	Y			Y
H	<i>Chlorogalum pomeridianum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Koeleria gerardii</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus hordeaceus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Logfia californica</i>	100	0.2	0.2	0.2	Y			Y

Nassella pulchra – *Erodium* spp. – *Avena barbata* Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Nassella pulchra* – *Hemizonia congesta* Association**

Common Name: Purple Needlegrass – Hayfield Tarweed Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – Hayfield Tarweed Association forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Acmispon wrangelianus*, *Bromus hordeaceus*, *Cryptantha flaccida*, *Hemizonia congesta*, *Microseris douglasii*, *Nassella pulchra*, and *Plantago erecta*. Those herbs often present include *Acmispon wrangelianus*, *Agoseris heterophylla*, *Calystegia collina*, *Dichelostemma capitatum*, *Euphorbia spathulata*, *Lasthenia californica*, *Layia gaillardoides*, *Plantago erecta*, *Ranunculus californicus*, *Sanicula bipinnatifida*, *Sisyrinchium bellum*, and *Trifolium albobpurpureum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.3	0 – 1	0.3	0 – 0.5
Herb	40.0	10 – 60	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 316 m, Range 152 – 388 m

Aspect: SE (2), SW (1), W (1)

Slope: Mean 17 degrees, Range 6 – 25 degrees

Macro Topography: Middle 1/3 of slope (2), Upper 1/3 of slope (2)

Large Rock: Mean 1.3%, Range 1 – 2%

Small Rock: Mean 9.7%, Range 8 – 11%

Fines Cover: Mean 71.3%, Range 55 – 84%

Litter Cover: Mean 11.0%, Range 2 – 30%

Soil Texture (field assessed): Moderately fine silty clay loam (2), Coarse, loamy sand (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Serpentine (3), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (3)

Site Impacts

This association has high non-native plant cover (average 60.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Anagallis arvensis*, *Bellardia trixago*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Geranium dissectum*, *Helminthotheca echioides*, *Lolium perenne*, *Sonchus asper*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=0):

Contra Costa County (n=1): ALCC909

Santa Clara Co. (n=3): COYO020, COYO028, COYO040

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Toxicodendron diversilobum</i>	25	0.3	1.0	1.0				
H	<i>Lolium perenne</i>	100	14.0	6.0	26.0	Y		Y	Y
H	<i>Nassella pulchra</i>	100	6.0	2.0	12.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	3.3	0.1	6.0	Y			Y
H	<i>Hemizonia congesta</i>	100	2.6	0.2	5.0	Y			Y
H	<i>Plantago erecta</i>	75	1.5	0.1	5.0	Y			Y
H	<i>Microseris douglasii</i>	75	0.3	0.1	1.0	Y			Y
H	<i>Acmispon wrangelianus</i>	75	0.3	0.1	1.0	Y			Y
H	<i>Cryptantha flaccida</i>	75	0.1	0.1	0.1	Y			Y
H	<i>Sanicula bipinnatifida</i>	50	0.3	0.1	1.0				Y
H	<i>Lasthenia californica</i>	50	0.1	0.1	0.1				Y
H	<i>Dichelostemma capitatum</i>	50	0.1	0.1	0.1				Y
H	<i>Layia gaillardoides</i>	50	0.1	0.1	0.1				Y
H	<i>Calystegia collina</i>	50	0.1	0.1	0.1				Y
H	<i>Trifolium albopurpureum</i>	50	0.1	0.1	0.1				Y
H	<i>Sisyrinchium bellum</i>	50	0.1	0.1	0.1				Y

Nassella pulchra – *Hemizonia congesta* Association

Nassella spp. – *Melica* spp. Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Ranunculus californicus</i>	50	0.1	0.1	0.1				Y
H	<i>Agoseris heterophylla</i>	50	0.1	0.1	0.1				Y
H	<i>Euphorbia spathulata</i>	50	0.1	0.1	0.1				Y
H	<i>Carduus pycnocephalus</i>	25	3.5	14.0	14.0				
H	<i>Elymus x gouldii</i>	25	3.0	12.0	12.0				
H	<i>Avena fatua</i>	25	0.5	2.0	2.0				
H	<i>Helminthotheca echioides</i>	25	0.3	1.0	1.0				
H	<i>Sonchus asper</i>	25	0.3	1.0	1.0				
H	<i>Bellardia trixago</i>	25	0.3	1.0	1.0				
H	<i>Solidago velutina</i>	25	0.1	0.2	0.2				
H	<i>Anagallis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	25	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	25	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	25	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	25	0.0	0.1	0.1				
H	<i>Corethrogyne filaginifolia</i>	25	0.0	0.1	0.1				
H	<i>Elymus multisetus</i>	25	0.0	0.1	0.1				
H	<i>Chlorogalum pomeridianum</i>	25	0.0	0.1	0.1				
H	<i>Castilleja densiflora</i>	25	0.0	0.1	0.1				
H	<i>Achyrachaena mollis</i>	25	0.0	0.1	0.1				
H	<i>Astragalus gambelianus</i>	25	0.0	0.1	0.1				
H	<i>Castilleja exserta</i>	25	0.0	0.1	0.1				
H	<i>Trifolium willdenovii</i>	25	0.0	0.1	0.1				
H	<i>Eschscholzia californica</i>	25	0.0	0.1	0.1				
H	<i>Geranium dissectum</i>	25	0.0	0.1	0.1				
H	<i>Lepidium nitidum</i>	25	0.0	0.1	0.1				
H	<i>Calandrinia ciliata</i>	25	0.0	0.1	0.1				
H	<i>Trifolium gracilentum</i>	25	0.0	0.1	0.1				
H	<i>Lessingia</i> sp.	25	0.0	0.1	0.1				
H	<i>Linanthus dichotomus</i>	25	0.0	0.1	0.1				
H	<i>Muilla maritima</i>	25	0.0	0.1	0.1				
H	<i>Microsteris gracilis</i>	25	0.0	0.1	0.1				
H	<i>Hesperivax sparsiflora</i>	25	0.0	0.1	0.1				
H	<i>Eriogonum nudum</i>	25	0.0	0.1	0.1				
NV	Lichen	25	0.0	0.1	0.1				

***Nassella pulchra* – *Lolium perenne* – (*Trifolium* spp.) Association**

Common Name: Purple Needlegrass – Italian Ryegrass – Clover Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – Italian Ryegrass – Clover Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Lolium perenne*, and characteristic herbs include *Avena barbata*, *Bromus hordeaceus*, and *Nassella pulchra*. Those herbs often present include *Geranium dissectum*, and herbs that are sometimes present include *Bellardia trixago*, *Bromus diandrus*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Clarkia purpurea*, *Convolvulus arvensis*, *Dichelostemma capitatum*, *Erodium botrys*, *Erodium cicutarium*, *Eschscholzia californica*, *Grindelia camporum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Medicago polymorpha*, *Rumex crispus*, *Triteleia laxa*, *Vicia sativa*, and *Vicia villosa*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	45.7	26 – 70	0.4	0 – 1

Local Environmental Description

Elevation: Mean 209 m, Range 99 – 385 m

Aspect: NE (2), NW (2), SW (2), SE (1)

Slope: Mean 22 degrees, Range 15 – 34 degrees

Macro Topography: Middle 1/3 of slope (4), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Lower to Upper 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 1%

Small Rock: Mean 2.5%, Range 0 – 12%

Fines Cover: Mean 36.4%, Range 15 – 58%

Litter Cover: Mean 59.1%, Range 40 – 82%

Soil Texture (field assessed): Fine silty clay (2), Moderately fine silty clay loam (2), Medium loam (1), Medium silt loam (1)

Geology (field or map data): Sandstone, shale, and gravel deposits (2), Sedimentary (2), Franciscan melange (1), Igneous (1), Shale and other sedimentary (1)

Alameda County Subsections: Eastern Hills (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (4), Suisun Hills and Valleys (2)

Site Impacts

This association has high non-native plant cover (average 75.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bellardia trixago*, *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Convolvulus arvensis*, *Erodium botrys*, *Erodium cicutarium*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Rumex crispus*, *Vicia sativa*, and *Vicia villosa*.

Classification Comments

None.

References: Buck and Evens 2010, Buck-Diaz et al. 2021a, Evens and Kentner 2006, Fiedler and Leidy 1987, Rodriguez et al. 2017, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3? **State Rare:** Y

Surveys Used for Description

Total: N=7; Alameda County (n=1): ALCC404

Contra Costa County (n=6): ALCC208, ALCC318, ALCC411, ALCC426, ALCC807, EBAY0015

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lolium perenne</i>	100	18.0	10.0	50.0	Y		Y	Y
H	<i>Nassella pulchra</i>	100	7.0	4.0	18.0	Y			Y
H	<i>Avena barbata</i>	86	3.2	0.1	10.0	Y			Y
H	<i>Bromus hordeaceus</i>	86	1.9	0.2	8.0	Y			Y
H	<i>Geranium dissectum</i>	57	0.2	0.2	1.0				Y
H	<i>Erodium cicutarium</i>	43	2.6	0.1	15.0				
H	<i>Bromus diandrus</i>	43	2.6	5.0	7.0				
H	<i>Carduus pycnocephalus</i>	43	1.5	0.2	8.0				
H	<i>Chlorogalum pomeridianum</i>	43	0.6	0.1	4.0				
H	<i>Grindelia camporum</i>	43	0.5	0.2	2.0				
H	<i>Hordeum murinum</i>	43	0.2	0.2	1.0				
H	<i>Hirschfeldia incana</i>	43	0.2	0.1	1.0				
H	<i>Convolvulus arvensis</i>	43	0.1	0.2	0.2				
H	<i>Vicia villosa</i>	29	1.6	0.2	11.0				
H	<i>Eschscholzia californica</i>	29	0.2	0.2	1.0				
H	<i>Vicia sativa</i>	29	0.2	0.1	1.0				
H	<i>Clarkia purpurea</i>	29	0.1	0.2	0.2				
H	<i>Bellardia trixago</i>	29	0.1	0.2	0.2				
H	<i>Rumex crispus</i>	29	0.1	0.2	0.2				
H	<i>Medicago polymorpha</i>	29	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	29	0.1	0.2	0.2				
H	<i>Erodium botrys</i>	29	0.0	0.1	0.2				
H	<i>Triteleia laxa</i>	29	0.0	0.1	0.2				
H	<i>Hypochaeris glabra</i>	29	0.0	0.1	0.2				
NV	Moss	29	0.2	0.2	1.0				

***Nassella pulchra* – *Lolium perenne* – *Plantago erecta* Serpentine Association**

Common Name: Purple Needlegrass – Italian Ryegrass – California Plantain
Serpentine Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – Italian Ryegrass – California Plantain Serpentine Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is open. Characteristic herbs include *Bromus hordeaceus*, *Eschscholzia californica*, *Nassella pulchra*, *Plantago erecta*, and *Trifolium willdenovii*. Those herbs often present include *Achillea millefolium*, *Acmispon wrangelianus*, *Aphanes occidentalis*, *Avena barbata*, *Bromus diandrus*, *Calandrinia ciliata*, *Calycadenia truncata*, *Chlorogalum pomeridianum*, *Clarkia* sp., *Dichelostemma capitatum*, *Lolium perenne*, *Silene gallica*, and *Vulpia microstachys*. Commonly associated emergent trees at sparse cover include *Pinus radiata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.7	0 – 2	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	25.6	9 – 36	0.5	0 – 1

Local Environmental Description

Elevation: Mean 378 m, Range 187 – 697 m

Aspect: NE (1), SE (1), SW (1)

Slope: Mean 18 degrees, Range 15 – 20 degrees

Macro Topography: Upper 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: Mean 5.1%, Range 0 – 10%

Small Rock: Mean 13.6%, Range 7 – 20%

Fines Cover: Mean 76.3%, Range 73 – 78%

Litter Cover: Mean 4.3%, Range 3 – 5%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Ultramafic (2), Serpentine (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 44.5%) relative to native
Nassella pulchra – *Lolium perenne* – *Plantago erecta* Serpentine Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bromus diandrus*, *Bromus hordeaceus*, *Lactuca serriola*, *Lolium perenne*, and *Silene gallica*.

Classification Comments

A rare plant was identified in one of the surveys, *Eriogonum luteolum* var. *caninum* (CRPR 1B.2).

References: Buck-Diaz et al. 2021a, Klein et al. 2015, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC344, ALCC563, EBAY0112

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
T	<i>Pinus radiata</i>	33	0.7	2.0	2.0				
R	<i>Pinus radiata</i>	33	0.1	0.2	0.2				
H	<i>Nassella pulchra</i>	100	3.0	1.0	6.0	Y			Y
H	<i>Bromus hordeaceus</i>	100	2.7	0.2	7.0	Y			Y
H	<i>Eschscholzia californica</i>	100	0.7	0.2	1.0	Y			Y
H	<i>Plantago erecta</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Trifolium willdenovii</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	67	6.3	4.0	15.0				Y
H	<i>Lolium perenne</i>	67	2.3	1.0	6.0				Y
H	<i>Clarkia</i> sp.	67	1.4	0.2	4.0				Y
H	<i>Achillea millefolium</i>	67	0.7	0.2	2.0				Y
H	<i>Vulpia microstachys</i>	67	0.4	0.2	1.0				Y
H	<i>Bromus diandrus</i>	67	0.1	0.2	0.2				Y
H	<i>Aphanes occidentalis</i>	67	0.1	0.2	0.2				Y
H	<i>Acemispom wrangelianus</i>	67	0.1	0.2	0.2				Y
H	<i>Dichelostemma capitatum</i>	67	0.1	0.2	0.2				Y
H	<i>Calandrinia ciliata</i>	67	0.1	0.2	0.2				Y
H	<i>Calycadenia truncata</i>	67	0.1	0.2	0.2				Y
H	<i>Silene gallica</i>	67	0.1	0.2	0.2				Y
H	<i>Chlorogalum pomeridianum</i>	67	0.1	0.2	0.2				Y

Nassella pulchra – *Lolium perenne* – *Plantago erecta* Serpentine Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus rubens</i>	33	2.3	7.0	7.0				
H	<i>Holocarpha virgata</i>	33	0.3	1.0	1.0				
H	<i>Eriogonum nudum</i>	33	0.3	1.0	1.0				
H	<i>Melica imperfecta</i>	33	0.3	1.0	1.0				
H	<i>Plectritis ciliosa</i>	33	0.3	1.0	1.0				
H	<i>Clarkia purpurea</i>	33	0.3	1.0	1.0				
H	<i>Hesperis sparsiflora</i>	33	0.1	0.2	0.2				
H	<i>Microseris</i> sp.	33	0.1	0.2	0.2				
H	<i>Sisyrinchium bellum</i>	33	0.1	0.2	0.2				
H	<i>Trichostema lanceolatum</i>	33	0.1	0.2	0.2				
H	<i>Thysanocarpus laciniatus</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum luteolum</i> var. <i>caninum</i>	33	0.1	0.2	0.2				
H	<i>Astragalus gambelianus</i>	33	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	33	0.1	0.2	0.2				
H	<i>Claytonia perfoliata</i>	33	0.1	0.2	0.2				
H	<i>Calochortus venustus</i>	33	0.1	0.2	0.2				
H	<i>Guillenia lasiophylla</i>	33	0.1	0.2	0.2				
H	<i>Gilia achilleifolia</i>	33	0.1	0.2	0.2				
H	<i>Eriogonum gracile</i>	33	0.1	0.2	0.2				
H	<i>Sanicula bipinnatifida</i>	33	0.1	0.2	0.2				
H	<i>Crassula connata</i>	33	0.1	0.2	0.2				
H	<i>Microsteris gracilis</i>	33	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	33	0.1	0.2	0.2				
H	<i>Logfia californica</i>	33	0.1	0.2	0.2				
H	<i>Pentagramma triangularis</i>	33	0.1	0.2	0.2				
H	<i>Uropappus lindleyi</i>	33	0.1	0.2	0.2				
H	<i>Micropus californicus</i>	33	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	33	0.1	0.2	0.2				
H	<i>Lepidium nitidum</i>	33	0.1	0.2	0.2				
H	<i>Bromus carinatus</i>	33	0.1	0.2	0.2				
H	<i>Koeleria macrantha</i>	33	0.1	0.2	0.2				
H	<i>Trifolium microdon</i>	33	0.1	0.2	0.2				
H	<i>Lasthenia gracilis</i>	33	0.1	0.2	0.2				
NV	Lichen	33	1.0	3.0	3.0				
NV	Moss	33	0.1	0.2	0.2				

Nassella pulchra – *Lolium perenne* – *Plantago erecta* Serpentine Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Nassella pulchra* – *Melica californica* – annual grass Association**

Common Name: Purple Needlegrass – California Melicgrass – annual grass Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Purple Needlegrass – California Melicgrass – annual grass Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Achillea millefolium*, *Bromus diandrus*, *Bromus hordeaceus*, *Melica californica*, *Nassella pulchra*, and *Triteleia laxa*. Those herbs often present include *Avena barbata*, *Chlorogalum pomeridianum*, *Geranium dissectum*, and *Lolium perenne*, and herbs that are sometimes present include *Achyraea mollis*, *Avena fatua*, *Carduus pycnocephalus*, *Delphinium hesperium*, *Dichelostemma capitatum*, *Erodium cicutarium*, *Eschscholzia californica*, *Galium parisiense*, *Hypochaeris glabra*, *Lupinus* sp., *Micropus californicus*, *Sanicula bipinnata*, *Sanicula bipinnatifida*, *Sherardia arvensis*, and *Torilis arvensis*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	36.1	14 – 48	0.5	0 – 1

Local Environmental Description

Elevation: Mean 429 m, Range 211 – 542 m

Aspect: NW (3), NE (1)

Slope: Mean 20 degrees, Range 15 – 32 degrees

Macro Topography: Upper 1/3 of slope (3), Lower 1/3 of slope (1)

Large Rock: Mean 0.4%, Range 0 – 1%

Small Rock: Mean 2.3%, Range 1 – 4%

Fines Cover: Mean 62.0%, Range 2 – 89%

Litter Cover: Mean 25.2%, Range 4 – 49%

Soil Texture (field assessed): Moderately fine clay loam (2), Medium silt loam (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Sedimentary (3), Franciscan melange (1), Sandstone and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), Eastern Hills (1), Suisun Hills and Valleys (1)

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has high non-native plant cover (average 65.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium cicutarium*, *Galium parisiense*, *Geranium dissectum*, *Hypochaeris glabra*, *Lolium perenne*, *Sherardia arvensis*, and *Torilis arvensis*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Evens and Kentner 2006, Klein et al. 2015, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=5; Alameda County (n=0):

Contra Costa County (n=4): ALCC340, ALCC402, ALCC444, MTDIAB1

Santa Clara Co. (n=1): SPCCA-029

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus lobata</i>	40	0.1	0.2	0.2				
H	<i>Bromus diandrus</i>	100	4.1	0.1	13.0	Y			Y
H	<i>Melica californica</i>	100	2.0	1.0	3.0	Y			Y
H	<i>Nassella pulchra</i>	100	1.6	1.0	3.0	Y			Y
H	<i>Triteleia laxa</i>	100	0.5	0.1	2.0	Y			Y
H	<i>Achillea millefolium</i>	80	1.6	1.0	3.0	Y			Y
H	<i>Bromus hordeaceus</i>	80	0.5	0.1	1.0	Y			Y
H	<i>Avena barbata</i>	60	6.6	10.0	13.0				Y
H	<i>Lolium perenne</i>	60	1.8	0.1	6.0				Y
H	<i>Geranium dissectum</i>	60	0.8	0.1	3.0				Y
H	<i>Chlorogalum pomeridianum</i>	60	0.1	0.1	0.2				Y
H	<i>Avena fatua</i>	40	7.9	0.2	39.2				
H	<i>Eschscholzia californica</i>	40	0.8	1.0	3.0				
H	<i>Achyraea mollis</i>	40	0.2	0.2	1.0				
H	<i>Sherardia arvensis</i>	40	0.2	0.1	1.0				
H	<i>Sanicula bipinnata</i>	40	0.1	0.2	0.2				
H	<i>Delphinium hesperium</i>	40	0.1	0.2	0.2				
H	<i>Torilis arvensis</i>	40	0.1	0.2	0.2				
H	<i>Micropus californicus</i>	40	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	40	0.1	0.2	0.2				
H	<i>Lupinus</i> sp.	40	0.1	0.1	0.2				
H	<i>Galium parisiense</i>	40	0.1	0.1	0.2				
H	<i>Dichelostemma capitatum</i>	40	0.1	0.1	0.2				
H	<i>Sanicula bipinnatifida</i>	40	0.1	0.1	0.2				
H	<i>Hypochaeris glabra</i>	40	0.0	0.1	0.1				
H	<i>Erodium cicutarium</i>	40	0.0	0.1	0.1				
NV	Moss	40	0.1	0.1	0.2				
NV	Lichen	40	0.1	0.1	0.2				

Nassella pulchra – *Melica californica* – annual grass Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Poa secunda* – (*Trifolium gracilentum*, *willdenovii*) Provisional Association**

Common Name: Pine Bluegrass – Pinpoint or Tomcat Clover Patches

Alliance: *Nassella* spp. – *Melica* spp. Herbaceous Alliance

Local Vegetation Description

The Pine Bluegrass – Pinpoint or Tomcat Clover Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata* and *Poa secunda*. Those herbs often present include *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Dichelostemma capitatum*, *Erodium cicutarium*, *Leptosiphon bicolor*, *Lupinus bicolor*, *Micropus californicus*, and *Trifolium willdenovii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	37.1	24 – 90	0.4	0 – 1

Local Environmental Description

Elevation: Mean 575 m, Range 247 – 1082 m

Aspect: NE (3), NW (3), SE (1)

Slope: Mean 19 degrees, Range 14 – 23 degrees

Macro Topography: Upper 1/3 of slope (5), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 3.7%, Range 0 – 10%

Fines Cover: Mean 76.1%, Range 54 – 91%

Litter Cover: Mean 14.4%, Range 0 – 29%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Fine silty clay (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (field or map data): Sedimentary (4), Franciscan melange (3)

Alameda County Subsections: Western Diablo Range (2), Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), Suisun Hills and Valleys (1)

Site Impacts

This association has high non-native plant cover (average 50.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Erodium cicutarium*, *Geranium dissectum*, and *Lolium perenne*.

Classification Comments

This association is newly described here and remains provisional until more samples are available.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=7; Alameda County (n=3): ALCC348, ALCC382, EBAY0055

Contra Costa County (n=4): ALCC313, ALCC353, ALCC421, ALCC429

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus douglasii</i>	29	0.1	0.2	0.2				
H	<i>Poa secunda</i>	100	6.4	1.0	32.0	Y			Y
H	<i>Avena barbata</i>	86	3.2	0.1	13.0	Y			Y
H	<i>Bromus hordeaceus</i>	71	4.6	2.0	15.0				Y
H	<i>Dichelostemma capitatum</i>	71	0.4	0.2	2.0				Y
H	<i>Lupinus bicolor</i>	57	1.2	0.2	7.0				Y
H	<i>Micropus californicus</i>	57	1.1	1.0	3.0				Y
H	<i>Erodium cicutarium</i>	57	1.0	0.2	4.0				Y
H	<i>Bromus diandrus</i>	57	0.9	0.2	4.0				Y
H	<i>Leptosiphon bicolor</i>	57	0.8	0.2	5.0				Y
H	<i>Trifolium willdenovii</i>	57	0.5	0.1	2.0				Y
H	<i>Chlorogalum pomeridianum</i>	57	0.2	0.1	1.0				Y
H	<i>Plectritis ciliosa</i>	43	1.6	2.0	6.0				
H	<i>Geranium dissectum</i>	43	1.5	0.2	10.0				
H	<i>Triteleia laxa</i>	43	0.3	0.2	2.0				
H	<i>Geranium molle</i>	43	0.1	0.2	0.2				
H	<i>Dodecatheon</i> sp.	43	0.1	0.1	0.2				
H	<i>Trifolium oliganthum</i>	43	0.1	0.1	0.2				
H	<i>Dodecatheon hendersonii</i>	29	2.3	1.0	15.0				

Poa secunda – (*Trifolium gracilentum*, *willdenovii*) Provisional Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Madia exigua</i>	29	0.9	0.2	6.0				
H	<i>Achillea millefolium</i>	29	0.3	1.0	1.0				
H	<i>Elymus multisetus</i>	29	0.2	0.2	1.0				
H	<i>Galium parisiense</i>	29	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	29	0.1	0.2	0.2				
H	<i>Clarkia purpurea</i>	29	0.1	0.2	0.2				
H	<i>Sanicula bipinnata</i>	29	0.1	0.2	0.2				
H	<i>Elymus caput-medusae</i>	29	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	29	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	29	0.1	0.2	0.2				
H	<i>Aphanes occidentalis</i>	29	0.1	0.2	0.2				
H	<i>Trifolium microcephalum</i>	29	0.0	0.1	0.2				
H	<i>Claytonia perfoliata</i>	29	0.0	0.1	0.2				
H	<i>Ranunculus canus</i>	29	0.0	0.1	0.2				
NV	Moss	71	4.6	0.2	26.0				Y

Poa secunda – (*Trifolium gracilentum*, *willdenovii*) Provisional Association
Nassella spp. – *Melica* spp. Herbaceous Alliance

***Phalaris aquatica* – *Phalaris arundinacea* Herbaceous Semi-Natural Alliance**



Common Name: Harding grass – Reed Canary grass swards

NVC Alliance Code: A3846. *Phalaris arundinacea* Western Ruderal Marsh Alliance

Statewide Description

Phalaris aquatica or *Phalaris arundinacea* is dominant in the herbaceous layer. Scattered emergent shrubs may be present at low cover, including *Baccharis pilularis*, *Baccharis salicifolia*, *Ceanothus cuneatus* or *Salix* spp.

Stands of *Phalaris aquatica* have invaded many inland settings, especially grasslands with past disturbance (such as clearing) or from nearby intentional plantings. *P. aquatica* forms dense patches that prevent the germination of other species (Silveira 2000). Native species richness drops because of a thick surface litter and thatch build-up. In wetlands, land managers plant *Phalaris aquatica* for waterfowl food (Silveira 2000). Other *Phalaris* species are less invasive, but locally found in wildlands: *P. arundinacea*, *P. brachystachys*, *P. canariensis*, *P. caroliniana*, *P. minor*, and *P. paradoxa*. See DiTomaso and Healy (2007) for details.

Although *P. arundinacea* is considered to be native to California, it tends to form stands in cultivated and disturbed settings as some biotypes are of non-native origin (from Europe). Stands of *Phalaris arundinacea* are established in irrigated pastures, wet meadows, pond and lake margins, intermittent drainages and other riparian areas, where *P. arundinacea* often has displaced the local flora upon being cultivated and/or escaped (Buck-Diaz et al. 2012). Because of this invasive behavior, associations of this species have been placed in this expanded alliance.

This alliance was cited as *Phalaris aquatica* Herbaceous Semi-Natural Alliance in the 2009 book, A Manual of California Vegetation, second edition, and has been expanded to include ruderal stands of *P. arundinacea*.

Local Vegetation Description

The Harding grass – Reed Canary grass swards Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Phalaris aquatica*. Those herbs often present include *Bromus diandrus*, *Bromus hordeaceus*, and *Lolium perenne*, and herbs that are sometimes present include *Avena barbata*, *Carduus pycnocephalus*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Hypochaeris radicata*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	10.0	0 – 60	no data	no data
Herb	74.2	25 – 100	0.7	0 – 2

Local Membership Rule

Phalaris aquatica, *Phalaris arundinacea*, or *Thinopyrum* spp. (= *Elymus hispidus*) > 30% relative cover in the herbaceous layer with other non-native species in naturalized or planted stands.

Local Environmental Description

Elevation: Mean 144 m, Range 1 – 401 m

Aspect: SW (3), NE (2), Flat (1), NW (1)

Slope: Mean 8 degrees, Range 0 – 24 degrees

Macro Topography: Lower 1/3 of slope (2), Middle 1/3 of slope (2), Upper 1/3 of slope (2), Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 36.6%, Range 3 – 95%

Litter Cover: Mean 36.4%, Range 2 – 88%

Soil Texture (field assessed): Moderately fine silty clay loam (2)

Geology (field or map data): Mixed sedimentary (2), Serpentine (2), Clayey alluvium (1), Franciscan melange (1), Shale and other sedimentary (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (2), Suisun Hills and Valleys (2), Delta (1)

Site Impacts

This alliance has high non-native plant cover (average 90.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Carduus pycnocephalus*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Hirschfeldia incana*, *Hypochaeris glabra*, *Hypochaeris radicata*, *Lolium perenne*, *Phalaris aquatica*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Phalaris aquatica

Phalaris arundinacea

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Boul et al. 2021b, Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Evens and San 2004, Jimerson et al. 2000, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=7; Alameda County (n=1): ALCC755

Contra Costa County (n=1): SPCCB-084

Santa Clara Co. (n=2): COYO063, COYO086

Solano Co. (n=3): RUSH0009, RUSH0011, SUMA9095

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Phalaris aquatica</i>	86	25.1	4.0	95.0	Y		Y	Y
H	<i>Bromus diandrus</i>	71	3.9	1.0	18.0				Y
H	<i>Bromus hordeaceus</i>	57	2.0	0.2	8.0				Y
H	<i>Lolium perenne</i>	57	1.9	0.2	10.0				Y
H	<i>Avena barbata</i>	43	5.5	0.2	35.0				
H	<i>Erodium botrys</i>	43	0.5	0.2	2.0				
H	<i>Vulpia bromoides</i>	43	0.5	0.2	2.0				
H	<i>Vicia sativa</i>	43	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	29	2.1	5.0	10.0				
H	<i>Hypochaeris radicata</i>	29	1.0	0.2	7.0				
H	<i>Vicia</i> sp.	29	0.7	0.2	5.0				
H	<i>Geranium dissectum</i>	29	0.2	0.2	1.0				
H	<i>Trifolium subterraneum</i>	29	0.2	0.2	1.0				
H	<i>Trifolium hirtum</i>	29	0.1	0.2	0.2				
H	<i>Foeniculum vulgare</i>	29	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	29	0.1	0.2	0.2				
H	<i>Hirschfeldia incana</i>	29	0.0	0.1	0.2				
H	<i>Erodium</i> sp.	29	0.0	0.1	0.1				

***Phalaris aquatica* Semi-natural Association**

Common Name: Harding grass Patches

Alliance: *Phalaris aquatica* – *Phalaris arundinacea* Herbaceous Semi-natural Alliance

Local Vegetation Description

The Harding grass Association forms an open to continuous herbaceous layer. The shrub layer is open and the tree layer is absent. Dominant herbs include *Phalaris aquatica*. Those herbs often present include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, and *Lolium perenne*, and herbs that are sometimes present include *Erodium botrys*, *Hypochaeris radicata*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	61.2	15 – 100	0.4	0 – 1

Local Environmental Description

Elevation: Mean 163 m, Range 1 – 401 m

Aspect: SW (3), Flat (1), NE (1), NW (1)

Slope: Mean 8 degrees, Range 0 – 24 degrees

Macro Topography: Lower 1/3 of slope (2), Upper 1/3 of slope (2), Bottom (1), Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 39.3%, Range 3 – 95%

Litter Cover: Mean 29.8%, Range 2 – 88%

Soil Texture (field assessed): Fine silty clay (2), Moderately fine clay loam (2), Medium silt loam (1), Moderately fine silty clay loam (1)

Geology (field or map data): Mixed sedimentary (2), Serpentine (2), Clayey alluvium (1), Shale and other sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Fremont - Livermore Hills and Valleys (2), Suisun Hills and Valleys (2), Delta (1)

Site Impacts

This association has high non-native plant cover (average 97.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Bromus hordeaceus*, *Erodium botrys*, *Hypochaeris radicata*, *Lolium perenne*, *Phalaris aquatica*, *Trifolium hirtum*, *Trifolium subterraneum*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Evens and San 2004, Jimerson et al. 2000, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=6; Alameda County (n=0):

Contra Costa County (n=1): SPCCB-084

Santa Clara Co. (n=2): COYO063, COYO086

Solano Co. (n=3): RUSH0009, RUSH0011, SUMA9095

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Phalaris aquatica</i>	100	29.3	4.0	95.0	Y	Y		Y
H	<i>Bromus hordeaceus</i>	67	2.4	0.2	8.0				Y
H	<i>Bromus diandrus</i>	67	1.5	1.0	3.0				Y
H	<i>Avena barbata</i>	50	6.4	0.2	35.0				Y
H	<i>Lolium perenne</i>	50	2.2	0.2	10.0				Y
H	<i>Hypochaeris radicata</i>	33	1.2	0.2	7.0				
H	<i>Vicia</i> sp.	33	0.9	0.2	5.0				
H	<i>Vulpia bromoides</i>	33	0.5	1.0	2.0				
H	<i>Erodium botrys</i>	33	0.5	1.0	2.0				
H	<i>Trifolium subterraneum</i>	33	0.2	0.2	1.0				
H	<i>Trifolium hirtum</i>	33	0.1	0.2	0.2				
H	<i>Vicia sativa</i>	33	0.1	0.2	0.2				
H	<i>Erodium</i> sp.	33	0.0	0.1	0.1				

Phalaris aquatica Semi-natural Association

Phalaris aquatica – *Phalaris arundinacea* Herbaceous Semi-natural Alliance

***Phalaris arundinacea* Provisional Semi-natural Association**

Common Name: Reed canary grass Patches

Alliance: *Phalaris aquatica* – *Phalaris arundinacea* Herbaceous Semi-natural Alliance

Local Vegetation Description

The Reed canary grass Association forms an intermittent herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Phalaris arundinacea*, and characteristic herbs include *Bromus diandrus*, *Carduus pycnocephalus*, *Erodium botrys*, *Foeniculum vulgare*, *Galium aparine*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Lysimachia arvensis*, *Medicago praecox*, *Thinopyrum ponticum*, *Vicia sativa*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	56.0	56 – 56	1.5	1 – 2

Local Environmental Description

Elevation: 29 m

Aspect: NE (1)

Slope: 8 degrees

Macro Topography: Middle 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 20%

Litter Cover: 76%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (field or map data): Franciscan melange (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Site Impacts

This association has moderate non-native plant cover (average 46.6%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus diandrus*, *Carduus pycnocephalus*, *Erodium botrys*, *Foeniculum vulgare*, *Geranium dissectum*, *Hirschfeldia incana*, *Hordeum murinum*, *Hypochaeris glabra*, *Lolium perenne*, *Thinopyrum ponticum*, *Vicia sativa*, and *Vulpia bromoides*.

Classification Comments

This association remains provisional due to low overall sample size.

References: Boul et al. 2021b, Buck-Diaz et al. 2012

Global Rarity Rank: GNA

State Rarity Rank: SNA

State Rare: N

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC755

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Phalaris arundinacea</i>	100	33.0	33.0	33.0	Y	Y		Y
H	<i>Bromus diandrus</i>	100	18.0	18.0	18.0	Y			Y
H	<i>Carduus pycnocephalus</i>	100	5.0	5.0	5.0	Y			Y
H	<i>Thinopyrum ponticum</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Geranium dissectum</i>	100	1.0	1.0	1.0	Y			Y
H	<i>Hirschfeldia incana</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lysimachia arvensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Foeniculum vulgare</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Erodium botrys</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Medicago praecox</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hypochaeris glabra</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hordeum murinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Galium aparine</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vulpia bromoides</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Vicia sativa</i>	100	0.2	0.2	0.2	Y			Y
NV	Moss	100	0.2	0.2	0.2	Y	Y		Y

***Phragmites australis* – *Arundo donax* Herbaceous Semi-Natural Alliance**



Common Name: Common and giant reed marshes

NVC Alliance Code: A3847. *Phragmites australis* ssp. *australis* - *Arundo donax* - *Typha angustifolia* Ruderal Marsh Alliance

Statewide Description

Arundo donax or *Phragmites australis* is dominant in the herbaceous layer with *Ambrosia psilostachya*, *Anemopsis californica*, *Distichlis spicata*, *Juncus arcticus*, *Juncus cooperi*, *Lepidium latifolium*, *Schoenoplectus acutus*, *Schoenoplectus americanus*, *Schoenoplectus californicus*, *Typha* spp. and *Xanthium strumarium*. Emergent trees may be present at low cover, including *Populus fremontii* or *Salix* spp. Emergent shrubs may be present, including *Baccharis douglasii*, *Baccharis salicifolia* or *Cephalanthus occidentalis*.

Though the species is considered native to the state, stands of *Phragmites australis* act differently in various regions of California. In the Great Valley and North Coast, *P. australis* is invasive and invading managed wetlands that have frequent disturbance. In

the Mojave Desert and southeastern Great Basin, stands of *P. australis* are native and limited to naturally occurring, unmanaged alkaline and freshwater sites (Thomas et al. 2004). Its occurrence in some parts of California could be related to Native American use and tending; archeological records of the plant occur as early as in pre-Columbian times, such as in the San Joaquin River delta (Atwater et al. 1979). At least 46 Native North American tribes were reported to use *P. australis* historically (Kiviat and Hamilton 2001). Stands dominated by the native *P. australis* ssp. *americanus* are treated as an association in the *Typha* (*angustifolia*, *domingensis*, *latifolia*) alliance.

Stands of *Arundo donax* choke riverbanks and stream channels, crowds out native plants, interferes with flood control, increases fire potential, and reduces wildlife habitat. It is replacing the native *Phragmites australis* in many parts of the Southwest (DiTomaso and Healy 2007).

Local Vegetation Description

The Common and giant reed marshes Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Phragmites australis*. Those herbs often present include *Atriplex prostrata*, and herbs that are sometimes present include *Cotula coronopifolia*, *Distichlis spicata*, *Lepidium latifolium*, *Polypogon monspeliensis*, *Salicornia pacifica*, and *Sonchus oleraceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.2	0 – 2	0.3	0 – 0.5
Herb	73.6	15 – 99	2.5	1 – 5

Local Membership Rule

Arundo donax or *Phragmites australis* > 60% relative cover in the herbaceous layer.

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 3 m

Aspect: Flat (7), NE (1), SE (1)

Slope: Mean 0 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (9)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 3.6%, Range 0 – 10%

Litter Cover: Mean 61.1%, Range 0 – 95%

Soil Texture (field assessed): Muck (7), Fine silty clay (1), Medium sand (1)

Geology (field or map data): Clayey alluvium (4), Alluvium (3), Silty alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1), Suisun Hills and Valleys (1)

Other Subsections: Delta (6), Suisun Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 3.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Cotula coronopifolia*, *Lepidium latifolium*, *Polypogon monspeliensis*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Phragmites australis Western Ruderal

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens et al. 2014, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000

Global Rarity Rank: GNR

State Rarity Rank: SNR

Surveys Used for Description

Total: N=9; Alameda County (n=0):

Contra Costa County (n=2): ALCC262, ALCC825

Solano Co. (n=7): SUMA12010, SUMA12015, SUMA12023, SUMA12037, SUMA12159, SUMA9011, SUMA9085

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Phragmites australis</i>	100	69.9	8.0	99.0	Y	Y		Y
H	<i>Atriplex prostrata</i>	56	1.3	0.2	7.0				Y
H	<i>Salicornia pacifica</i>	33	1.1	2.0	6.0				
H	<i>Distichlis spicata</i>	22	0.5	0.2	4.0				
H	<i>Sonchus oleraceus</i>	22	0.2	0.2	2.0				
H	<i>Lepidium latifolium</i>	22	0.1	0.2	1.0				
H	<i>Cotula coronopifolia</i>	22	0.0	0.2	0.2				
H	<i>Polypogon monspeliensis</i>	22	0.0	0.2	0.2				

***Phragmites australis* Western Ruderal Association**

Common Name: Common Reed Western Ruderal Patches

Alliance: *Phalaris aquatica* – *Phalaris arundinacea* Herbaceous Semi-natural Alliance

Local Vegetation Description

The Common Reed Western Ruderal Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Phragmites australis*. Those herbs often present include *Atriplex prostrata*, *Bolboschoenus maritimus*, *Calystegia sepium*, *Grindelia stricta*, *Juncus effusus*, *Lepidium latifolium*, *Ludwigia peploides*, *Mimulus guttatus*, *Rumex pulcher*, *Schoenoplectus acutus*, and *Spartina alterniflora*. Commonly associated emergent shrubs at sparse cover include *Rubus armeniacus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	1.0	0 – 2	0.3	0 – 0.5
Herb	69.0	62 – 76	2.5	1 – 5

Local Environmental Description

Elevation: Mean 2 m, Range 2 – 3 m

Aspect: NE (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 5.0%, Range 2 – 8%

Litter Cover: Mean 91.0%, Range 87 – 95%

Soil Texture (field assessed): Medium sand (1), Muck (1)

Geology (field or map data): Silty alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Delta (1), Suisun Hills and Valleys (1)

Site Impacts

This association has low non-native plant cover (average 2.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Lepidium latifolium*, *Ludwigia peploides*, *Rubus armeniacus*, *Rumex pulcher*, and *Spartina alterniflora*.

Classification Comments

None.

References: Evens et al. 2014, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=2; Alameda County (n=0):

Contra Costa County (n=2): ALCC262, ALCC825

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rubus armeniacus</i>	50	1.0	2.0	2.0				Y
H	<i>Phragmites australis</i>	100	69.0	62.0	76.0	Y	Y		Y
H	<i>Spartina alterniflora</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus effusus</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.2	0.2				Y
H	<i>Bolboschoenus maritimus</i>	50	0.1	0.2	0.2				Y
H	<i>Grindelia stricta</i>	50	0.1	0.2	0.2				Y
H	<i>Lepidium latifolium</i>	50	0.1	0.2	0.2				Y
H	<i>Ludwigia peploides</i>	50	0.1	0.2	0.2				Y
H	<i>Mimulus guttatus</i>	50	0.1	0.2	0.2				Y
H	<i>Rumex pulcher</i>	50	0.1	0.2	0.2				Y
H	<i>Schoenoplectus acutus</i>	50	0.1	0.2	0.2				Y
H	<i>Calystegia sepium</i>	50	0.1	0.1	0.1				Y

***Plagiobothrys nothofulvus* Herbaceous Alliance**



Common Name: Popcorn flower fields

NVC Alliance Code: A4182. *Amsinckia menziesii* - *Amsinckia tessellata* - *Phacelia* spp. Meadow Alliance

Statewide Description

Plagiobothrys nothofulvus is characteristically present or dominant in the herbaceous layer with *Amsinckia menziesii*, *Avena* spp., *Bromus* spp., *Calochortus luteus*, *Castilleja attenuate*, *Castilleja exserta*, *Clarkia* spp., *Daucus pusillus*, *Dichelostemma capitatum*, *Erodium* spp., *Eschscholzia californica*, *Eschscholzia lobbii*, *Holocarpha virgata*, *Hordeum murinum*, *Lasthenia californica*, *Lotus* spp., *Lupinus* spp., *Phacelia ramosissima*, *Plagiobothrys collinus*, *Plagiobothrys fulvus*, and *Trifolium* spp. Emergent shrubs may be present at low cover.

Stands are widespread and seasonally abundant in upland annual grasslands on the Central Coast, in the Sierra Nevada foothills, and elsewhere where grazing, fire, and other disturbances are moderately frequent. Stands radically shift in appearance and size, depending primarily on the amount and timing of precipitation from year to year. Annual grasses such as *Bromus hordeaceus* mask native plants such as *P. nothofulvus*

in some years (Bartolome et al. 2007a).

Local Vegetation Description

The Popcorn flower fields Alliance forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is usually absent. Characteristic herbs include *Avena barbata*. Those herbs often present include *Acmispon wrangelianus*, *Aira caryophyllea*, *Bromus diandrus*, *Clarkia purpurea*, *Croton setigerus*, *Erodium botrys*, *Galium parisiense*, *Lagophylla ramosissima*, *Plagiobothrys nothofulvus*, *Trichostema lanceolatum*, *Trifolium ciliolatum*, *Trifolium microcephalum*, and *Vulpia myuros*, and herbs that are sometimes present include *Agoseris heterophylla*, *Bromus tectorum*, *Carduus pycnocephalus*, *Castilleja attenuata*, *Castilleja exserta*, *Elymus multisetus*, *Epilobium brachycarpum*, *Logfia gallica*, *Lolium perenne*, *Lupinus bicolor*, *Medicago polymorpha*, *Micropus californicus*, *Trifolium albopurpureum*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	37.4	33 – 40	0.4	0 – 1

Local Membership Rule

Castilleja exserta and/or *Plagiobothrys nothofulvus* characterizes the stand with variable cover and is typically > 15% relative cover in the herbaceous layer with *Bromus* spp., *Erodium* spp., *Trifolium* spp., and a variety of native and non-native forbs and grasses.

Local Environmental Description

Elevation: Mean 830 m, Range 167 – 1146 m

Aspect: SE (4), SW (2)

Slope: Mean 17 degrees, Range 6 – 28 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Middle 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.5%, Range 0 – 5%

Fines Cover: Mean 78.7%, Range 61 – 94%

Litter Cover: Mean 6.7%, Range 2 – 20%

Soil Texture (field assessed): Moderately coarse, sandy loam (4), Fine silty clay (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (4), Sedimentary (1), Shale and other sedimentary (1)

Alameda County Subsections: Western Diablo Range (4)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Site Impacts

This alliance has high non-native plant cover (average 65.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus tectorum*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Galium parisiense*, *Logfia gallica*, *Lolium perenne*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Associations in Alameda & Contra Costa Counties

Plagiobothrys nothofulvus – *Castilleja exserta* – (*Lupinus nanus*)

Plagiobothrys nothofulvus – *Daucus pusillus* – *Trifolium microcephalum*

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S4

Surveys Used for Description

Total: N=6; Alameda County (n=4): ALCC388, ALCC423, ALCC446, ALCC523

Contra Costa County (n=2): ALCC301, ALCC432

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	7.4	0.2	15.0	Y			Y
H	<i>Avena barbata</i>	100	3.6	0.2	17.0	Y			Y
H	<i>Erodium cicutarium</i>	100	3.1	0.2	10.0	Y			Y
H	<i>Clarkia purpurea</i>	67	2.4	0.2	6.0				Y
H	<i>Galium parisiense</i>	67	1.5	0.2	4.0				Y
H	<i>Vulpia myuros</i>	67	0.7	0.2	3.0				Y
H	<i>Bromus diandrus</i>	67	0.6	0.2	3.0				Y
H	<i>Plagiobothrys nothofulvus</i>	67	0.4	0.2	2.0				Y
H	<i>Acmispon wrangelianus</i>	67	0.3	0.2	1.0				Y
H	<i>Aira caryophyllea</i>	67	0.3	0.1	1.0				Y
H	<i>Trifolium microcephalum</i>	50	0.8	1.0	2.0				Y
H	<i>Lagophylla ramosissima</i>	50	0.7	0.2	4.0				Y
H	<i>Erodium botrys</i>	50	0.6	0.2	3.0				Y
H	<i>Trichostema lanceolatum</i>	50	0.2	0.2	1.0				Y
H	<i>Trifolium ciliolatum</i>	50	0.1	0.2	0.2				Y
H	<i>Croton setigerus</i>	50	0.1	0.1	0.2				Y
H	<i>Castilleja exserta</i>	33	4.8	14.0	15.0				
H	<i>Trifolium hirtum</i>	33	3.0	0.2	18.0				
H	<i>Bromus tectorum</i>	33	1.3	3.0	5.0				
H	<i>Micropus californicus</i>	33	0.4	1.0	1.2				
H	<i>Vulpia bromoides</i>	33	0.2	0.2	1.0				
H	<i>Castilleja attenuata</i>	33	0.1	0.2	0.2				
H	<i>Medicago polymorpha</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	33	0.1	0.2	0.2				
H	<i>Agoseris heterophylla</i>	33	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	33	0.1	0.2	0.2				
H	<i>Trifolium albopurpureum</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.1	0.1	0.2				
H	<i>Carduus pycnocephalus</i>	33	0.0	0.1	0.1				

***Plagiobothrys nothofulvus* – *Castilleja exserta* – (*Lupinus nanus*) Provisional Association**

Common Name: Rusty Popcornflower – Owl's Clover – (Sky Lupine) Patches

Alliance: *Plagiobothrys nothofulvus* Herbaceous Alliance

Local Vegetation Description

The Rusty Popcornflower – Owl's Clover – (Sky Lupine) Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Avena barbata*, *Bromus diandrus*, *Bromus hordeaceus*, *Castilleja exserta*, *Erodium cicutarium*, and *Medicago polymorpha*. Those herbs often present include *Acmispon wrangelianus*, *Bromus madritensis*, *Centaurea melitensis*, *Erodium botrys*, *Hordeum murinum*, and *Vulpia myuros*, and herbs that are sometimes present include *Amsinckia menziesii* var. *intermedia*, *Clarkia purpurea*, *Crassula connata*, *Croton setigerus*, *Dichelostemma capitatum*, *Elymus multisetus*, *Epilobium brachycarpum*, *Eschscholzia californica*, *Grindelia camporum*, *Holocarpha heermannii*, *Lagophylla ramosissima*, *Lupinus bicolor*, *Lupinus succulentus*, *Plagiobothrys nothofulvus*, *Thysanocarpus curvipes*, *Trichostema lanceolatum*, *Trifolium gracilentum*, *Trifolium hirtum*, and *Trifolium willdenovii*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	47.0	36 – 72	0.4	0 – 1

Local Environmental Description

Elevation: Mean 422 m, Range 123 – 1135 m

Aspect: SE (3), SW (1)

Slope: Mean 20 degrees, Range 9 – 28 degrees

Macro Topography: Lower 1/3 of slope (1), Middle 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1)

Large Rock: 0%

Small Rock: Mean 2.0%, Range 0 – 5%

Fines Cover: Mean 74.5%, Range 40 – 94%

Litter Cover: Mean 22.0%, Range 4 – 60%

Soil Texture (field assessed): Fine silty clay (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1)

Geology (field or map data): Sedimentary (2), Franciscan melange (1), Shale and other sedimentary (1)

Plagiobothrys nothofulvus – *Castilleja exserta* – (*Lupinus nanus*) Provisional Association

Plagiobothrys nothofulvus Herbaceous Alliance

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1), Suisun Hills and Valleys (1)

Other Subsections: Eastern Hills (1)

Site Impacts

This association has high non-native plant cover (average 70.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllaea*, *Bellardia trixago*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Bromus tectorum*, *Centaurea melitensis*, *Centaurea solstitialis*, *Erodium botrys*, *Erodium cicutarium*, *Erodium moschatum*, *Galium parisiense*, *Hordeum murinum*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Trifolium hirtum*, and *Vulpia myuros*.

Classification Comments

This association remains provisional due to low overall sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=1): ALCC446

Contra Costa County (n=2): ALCC301, ALCC432

Stanislaus Co. (n=1): SMNW0007

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Bromus hordeaceus</i>	100	6.6	0.2	15.0	Y			Y
H	<i>Avena barbata</i>	100	6.1	0.2	20.0	Y			Y
H	<i>Erodium cicutarium</i>	100	2.7	0.2	10.0	Y			Y
H	<i>Castilleja exserta</i>	75	7.3	0.2	15.0	Y			Y
H	<i>Medicago polymorpha</i>	75	1.6	0.2	6.0	Y			Y
H	<i>Bromus diandrus</i>	75	0.6	0.2	2.0	Y			Y
H	<i>Bromus madritensis</i>	50	5.1	0.2	20.0				Y
H	<i>Hordeum murinum</i>	50	1.3	0.2	5.0				Y

Plagiobothrys nothofulvus – *Castilleja exserta* – (*Lupinus nanus*) Provisional Association

Plagiobothrys nothofulvus Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Vulpia myuros</i>	50	0.8	0.2	3.0				Y
H	<i>Acemispom wrangelianus</i>	50	0.6	0.2	2.0				Y
H	<i>Centaurea melitensis</i>	50	0.3	0.2	1.0				Y
H	<i>Erodium botrys</i>	50	0.1	0.2	0.2				Y
H	<i>Trifolium hirtum</i>	25	4.5	18.0	18.0				
H	<i>Centaurea solstitialis</i>	25	2.3	9.0	9.0				
H	<i>Plagiobothrys</i> sp.	25	1.3	5.0	5.0				
H	<i>Bromus tectorum</i>	25	1.3	5.0	5.0				
H	<i>Galium parisiense</i>	25	1.0	4.0	4.0				
H	<i>Lagophylla ramosissima</i>	25	1.0	4.0	4.0				
H	<i>Brachypodium distachyon</i>	25	0.8	3.0	3.0				
H	<i>Clarkia purpurea</i>	25	0.8	3.0	3.0				
H	<i>Lupinus succulentus</i>	25	0.5	2.0	2.0				
H	<i>Plagiobothrys nothofulvus</i>	25	0.5	2.0	2.0				
H	<i>Grindelia camporum</i>	25	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	25	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	25	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	25	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	25	0.1	0.2	0.2				
H	<i>Erodium moschatum</i>	25	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	25	0.1	0.2	0.2				
H	<i>Aira caryophyllea</i>	25	0.1	0.2	0.2				
H	<i>Trichostema lanceolatum</i>	25	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	25	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	25	0.1	0.2	0.2				
H	<i>Trifolium gracilentum</i>	25	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	25	0.1	0.2	0.2				
H	<i>Thysanocarpus curvipes</i>	25	0.1	0.2	0.2				
H	<i>Crassula connata</i>	25	0.1	0.2	0.2				
H	<i>Holocarpa heermannii</i>	25	0.1	0.2	0.2				
H	<i>Amsinckia menziesii</i> var. <i>intermedia</i>	25	0.1	0.2	0.2				
H	<i>Bellardia trixago</i>	25	0.1	0.2	0.2				
H	<i>Dichelostemma capitatum</i>	25	0.1	0.2	0.2				
H	<i>Croton setigerus</i>	25	0.1	0.2	0.2				

Plagiobothrys nothofulvus – *Castilleja exserta* – (*Lupinus nanus*) Provisional
Association

Plagiobothrys nothofulvus Herbaceous Alliance

***Plagiobothrys nothofulvus* – *Daucus pusillus* – *Trifolium microcephalum*
Association**

Common Name: Rusty Popcornflower – Wild Carrot – Small Head Clover Patches

Alliance: *Plagiobothrys nothofulvus* Herbaceous Alliance

Local Vegetation Description

The Rusty Popcornflower – Wild Carrot – Small Head Clover Association forms an intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Acmispon wrangelianus*, *Aira caryophyllea*, *Avena barbata*, *Bromus hordeaceus*, *Clarkia purpurea*, *Erodium cicutarium*, *Galium parisiense*, *Plagiobothrys nothofulvus*, *Trifolium ciliolatum*, *Trifolium microcephalum*, and *Vulpia myuros*. Those herbs often present include *Agoseris heterophylla*, *Bromus diandrus*, *Carduus pycnocephalus*, *Castilleja attenuata*, *Croton setigerus*, *Lagophylla ramosissima*, *Micropus californicus*, *Trichostema lanceolatum*, *Trifolium albopurpureum*, *Vulpia bromoides*, and *Vulpia microstachys*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.3	0 – 0.5
Shrub	0.0	0 – 0	no data	no data
Herb	36.0	33 – 40	0.4	0 – 1

Local Environmental Description

Elevation: Mean 1137 m, Range 1120 – 1146 m

Aspect: SE (2), SW (1)

Slope: Mean 13 degrees, Range 6 – 20 degrees

Macro Topography: Middle to Upper 1/3 of slope (2), Middle 1/3 of slope (1)

Large Rock: No data

Small Rock: No data

Fines Cover: Mean 71.3%, Range 61 – 79%

Litter Cover: Mean 4.0%, Range 2 – 5%

Soil Texture (field assessed): Moderately coarse, sandy loam (3)

Geology (field or map data): Franciscan melange (3)

Alameda County Subsections: Western Diablo Range (3)

Contra Costa County Subsections: None

Site Impacts

This association has high non-native plant cover (average 66.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Aira caryophyllea*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus tectorum*, *Carduus*

Plagiobothrys nothofulvus – *Daucus pusillus* – *Trifolium microcephalum* Association
Plagiobothrys nothofulvus Herbaceous Alliance

pycnocephalus, *Crepis vesicaria*, *Erodium botrys*, *Erodium cicutarium*, *Galium parisiense*, *Hypochaeris glabra*, *Logfia gallica*, *Lolium perenne*, *Trifolium hirtum*, *Vulpia bromoides*, and *Vulpia myuros*.

Classification Comments

None.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Evens et al. 2004, Klein et al. 2007, Klein et al. 2015, Ratchford et al. 2023a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: N

Surveys Used for Description

Total: N=3; Alameda County (n=3): ALCC388, ALCC423, ALCC523

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
R	<i>Quercus lobata</i>	33	0.0	0.1	0.1				
R	<i>Pinus sabiniana</i>	33	0.0	0.1	0.1				
H	<i>Bromus hordeaceus</i>	100	9.3	5.0	13.0	Y			Y
H	<i>Avena barbata</i>	100	5.8	0.2	17.0	Y			Y
H	<i>Clarkia purpurea</i>	100	3.7	0.2	6.0	Y			Y
H	<i>Erodium cicutarium</i>	100	2.7	1.0	4.0	Y			Y
H	<i>Galium parisiense</i>	100	1.7	0.2	3.0	Y			Y
H	<i>Trifolium microcephalum</i>	100	1.7	1.0	2.0	Y			Y
H	<i>Acmispon wrangelianus</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Vulpia myuros</i>	100	0.5	0.2	1.0	Y			Y
H	<i>Aira caryophyllea</i>	100	0.4	0.1	1.0	Y			Y
H	<i>Trifolium ciliolatum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Plagiobothrys nothofulvus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Bromus diandrus</i>	67	1.1	0.2	3.0				Y
H	<i>Micropus californicus</i>	67	0.7	1.0	1.2				Y
H	<i>Vulpia bromoides</i>	67	0.4	0.2	1.0				Y
H	<i>Trichostema lanceolatum</i>	67	0.4	0.2	1.0				Y
H	<i>Lagophylla ramosissima</i>	67	0.1	0.2	0.2				Y
H	<i>Trifolium albopurpureum</i>	67	0.1	0.2	0.2				Y
H	<i>Agoseris heterophylla</i>	67	0.1	0.2	0.2				Y

Plagiobothrys nothofulvus – *Daucus pusillus* – *Trifolium microcephalum* Association
Plagiobothrys nothofulvus Herbaceous Alliance

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Castilleja attenuata</i>	67	0.1	0.2	0.2				Y
H	<i>Vulpia microstachys</i>	67	0.1	0.2	0.2				Y
H	<i>Croton setigerus</i>	67	0.1	0.1	0.2				Y
H	<i>Carduus pycnocephalus</i>	67	0.1	0.1	0.1				Y
H	<i>Trifolium microdon</i>	33	2.7	8.0	8.0				
H	<i>Erodium botrys</i>	33	1.0	3.0	3.0				
H	<i>Bromus tectorum</i>	33	1.0	3.0	3.0				
H	<i>Gilia tricolor</i>	33	0.7	2.0	2.0				
H	<i>Rigiopappus leptocladus</i>	33	0.3	1.0	1.0				
H	<i>Bromus rubens</i>	33	0.3	1.0	1.0				
H	<i>Camissonia strigulosa</i>	33	0.1	0.2	0.2				
H	<i>Crepis vesicaria</i>	33	0.1	0.2	0.2				
H	<i>Epilobium brachycarpum</i>	33	0.1	0.2	0.2				
H	<i>Eschscholzia californica</i>	33	0.1	0.2	0.2				
H	<i>Lupinus bicolor</i>	33	0.1	0.2	0.2				
H	<i>Viola pedunculata</i>	33	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	33	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	33	0.1	0.2	0.2				
H	<i>Elymus multisetus</i>	33	0.1	0.2	0.2				
H	<i>Holocarpha virgata</i>	33	0.1	0.2	0.2				
H	<i>Trifolium hirtum</i>	33	0.1	0.2	0.2				
H	<i>Lolium perenne</i>	33	0.0	0.1	0.1				
H	<i>Allophylum gilioides</i>	33	0.0	0.1	0.1				

***Ruppia (cirrhosa, maritima)* Herbaceous Alliance**



Common Name: Ditch-grass or widgeon-grass mats

NVC Alliance Code: A3893. *Hippuris vulgaris* - *Ruppia* spp. - *Sparganium* spp.
Aquatic Vegetation Alliance

Statewide Description

Ruppia cirrhosa or *Ruppia maritima* is the dominant herb forming submerged beds in water with *Najas guadalupensis*, *Potamogeton foliosus*, *Utricularia macrorhiza*, and *Zannichellia palustris*. Emergent plants may be present at low cover, including *Myriophyllum* spp.

Stands occur scattered across California in wetlands that are seasonally or permanently flooded. Seasonal flooding and drying appear to drive stand distribution and abundance, many occurring in coastal lagoons whose shores dry and desiccate by late summer evaporation.

Local Vegetation Description

The Ditch-grass or widgeon-grass mats Alliance forms an open herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Ruppia cirrhosa*, and characteristic herbs include *Avena barbata*, *Bolboschoenus maritimus*, *Crypsis* sp., *Distichlis spicata*, *Hordeum marinum*, *Juncus mexicanus*, *Lactuca serriola*, *Lolium perenne*, *Lotus corniculatus*, *Polypogon*

monspeliensis, *Raphanus sativus*, and *Ruppia cirrhosa*. Commonly associated non-vascular plants include *Algae*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	25.0	25 – 25	0.8	0.5 – 1

Local Membership Rule

Ruppia spp. > 50% relative cover submersed in brackish to fresh water.

Local Environmental Description

Elevation: 41 m

Aspect: NW (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: 8%

Litter Cover: 0%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Sedimentary (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (1)

Site Impacts

This alliance has low non-native plant cover (average 6.2%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Hordeum marinum*, *Lactuca serriola*, *Lolium perenne*, *Lotus corniculatus*, *Polypogon monspeliensis*, and *Raphanus sativus*.

Associations in Alameda & Contra Costa Counties

Ruppia cirrhosa – algae

Classification Comments

None.

References: Odion et al. 1992a

Global Rarity Rank: G4?

State Rarity Rank: S2

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=1): ALCC335

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Ruppia cirrhosa</i>	100	18.0	18.0	18.0	Y	Y		Y
H	<i>Juncus mexicanus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Bolboschoenus maritimus</i>	100	3.0	3.0	3.0	Y			Y
H	<i>Crypsis</i> sp.	100	0.2	0.2	0.2	Y			Y
H	<i>Lolium perenne</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lactuca serriola</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Avena barbata</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Polypogon monspeliensis</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Lotus corniculatus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Hordeum marinum</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Raphanus sativus</i>	100	0.2	0.2	0.2	Y			Y
H	<i>Distichlis spicata</i>	100	0.2	0.2	0.2	Y			Y
NV	Algae	100	25.0	25.0	25.0	Y	Y		Y

Ruppia cirrhosa – algae Association

Common Name: Ditch-grass – algae Patches

Alliance: *Ruppia (cirrhosa, maritima)* Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Odion et al. 1992a

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Ruppia cirrhosa – algae Association
Ruppia (cirrhosa, maritima) Herbaceous Alliance

***Salsola tragus* – *Isatis tinctoria* – *Bassia* spp. Herbaceous Semi-Natural Alliance**



Common Name: Russianthistle – dyers woad – fivehood bassia fields

NVC Alliance Code: A3257.

Statewide Description

This cool, semi-arid interior western U.S. ruderal annual herbaceous alliance is strongly dominated (>90% relative canopy cover) by invasive, exotic annual forb species such as *Brassica nigra*, *Centaurea melitensis*, *Centaurea solstitialis*, *Crupina vulgaris*, *Cynoglossum officinale*, *Hyoscyamus niger*, *Isatis tinctoria*, or *Salsola tragus* and occurs in disturbed dry to mesic basins, alluvial fans, and foothills at elevations up to 2200 m (NatureServe 2025).

Local Vegetation Description

The Russianthistle – dyers woad – fivehood bassia fields Alliance forms an open herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Salsola soda*, and characteristic herbs include *Atriplex prostrata*, *Bromus diandrus*, *Bromus hordeaceus*, *Frankenia salina*, *Hordeum*

marinum, *Lactuca serriola*, *Lolium perenne*, *Polypogon monspeliensis*, *Rumex crispus*, and *Sonchus oleraceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0		–
Hardwood	0.0	0 – 0		–
Regenerating or Shrubby Tree	0.0	0 – 0		–
Shrub	0.0	0 – 0		–
Herb	21.4	21 – 21		–

Local Membership Rule

Strongly dominated by non-native annual herbaceous species of *Salsola* or *Sisymbrium irio*. Native plants, if present, are low in cover.

Local Environmental Description

Elevation: 1 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Lower 1/3 of slope (1)

Large Rock: 0.0%

Small Rock: 0.0%

Fines Cover: 22.0%

Litter Cover: 75.0%

Soil Texture (field assessed): Fine clay (1)

Geology (field or map data): Clayey alluvium (1)

Alameda County Subsections: none

Contra Costa County Subsections: none

Other Subsections: Delta

Site Impacts

This alliance has high non-native plant cover (average 99.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Hordeum marinum*, *Lolium perenne*, and *Salsola soda*.

Associations in Alameda & Contra Costa Counties

Salsola spp.*

Classification Comments

Since there were no surveys of this alliance in Alameda and Contra Costa Counties, data from nearby counties were included.

References: Buck-Diaz et al. 2023

Global Rarity Rank: GNA

State Rarity Rank: SNA

Surveys Used for Description

Total: N=1; Alameda County (n=0):

Contra Costa County (n=0):

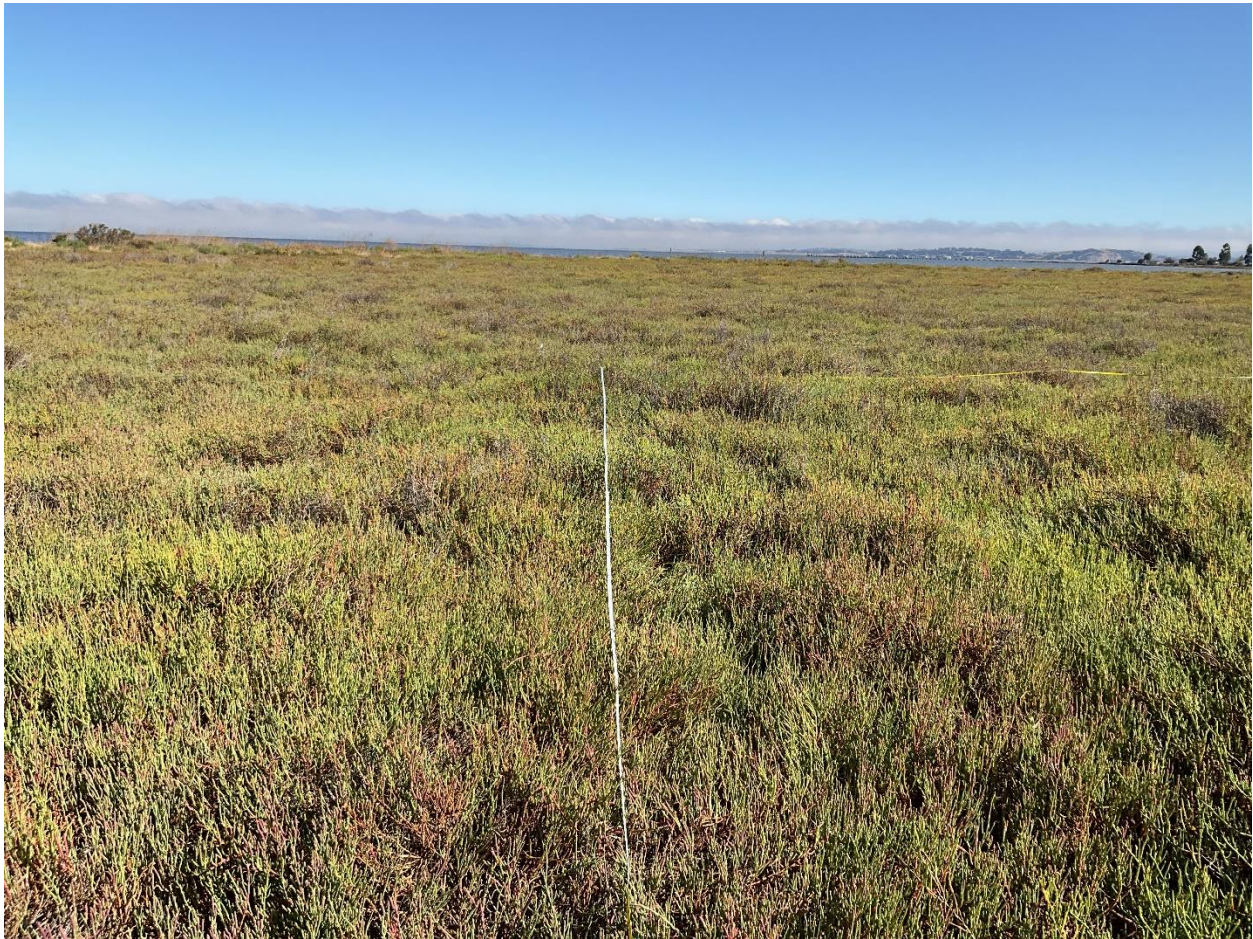
Solano Co. (n=1): SUMA12070

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Salsola soda</i>	100	11.0	11.0	11.0	Y	Y	Y	
H	<i>Lolium perenne</i>	100	5.0	5.0	5.0	Y			
H	<i>Bromus hordeaceus</i>	100	2.0	2.0	2.0	Y			
H	<i>Hordeum marinum</i>	100	2.0	2.0	2.0	Y			
H	<i>Atriplex prostrata</i>	100	0.2	0.2	0.2	Y			
H	<i>Bromus diandrus</i>	100	0.2	0.2	0.2	Y			
H	<i>Frankenia salina</i>	100	0.2	0.2	0.2	Y			
H	<i>Lactuca serriola</i>	100	0.2	0.2	0.2	Y			
H	<i>Polypogon monspeliensis</i>	100	0.2	0.2	0.2	Y			
H	<i>Rumex crispus</i>	100	0.2	0.2	0.2	Y			
H	<i>Sonchus oleraceus</i>	100	0.2	0.2	0.2	Y			

***Sarcocornia pacifica* (*Salicornia depressa*) Herbaceous Alliance**



Common Name: Pickleweed mats

NVC Alliance Code: A3902. *Sarcocornia pacifica* - *Spartina foliosa* - *Glaux maritima*
Salt Marsh Alliance

Statewide Description

Salicornia depressa and/or *Sarcocornia pacifica* is dominant or co-dominant in the subshrub and herbaceous layers with algae and *Atriplex patula*, *Atriplex prostrata*, *Batis maritima*, *Bolboschoenus maritimus*, *Cotula coronopifolia*, *Crypsis schoenoides*, *Cuscuta salina*, *Distichlis spicata*, *Echinochloa crus-galli*, *Frankenia salina*, *Grindelia stricta*, *Jaumea carnosa*, *Juncus* spp., *Lepidium latifolium*, *Limonium californicum*, *Monanthochloe littoralis*, *Persicaria lapathifolia*, *Sesuvium verrucosum*, *Spartina foliosa*, *Suaeda esteroa*, *Suaeda taxifolia*, *Triglochin maritima*, and *Xanthium strumarium*.

In northern California, *Sarcocornia pacifica* co-dominates with *Cuscuta salina* in the high marsh zone, slightly above the zones dominated by the non-native grass *Spartina densiflora*. In central California, *Sarcocornia pacifica* dominates in high- and mid-marsh zones above the zones dominated by the native grass *Spartina foliosa*. In southern California, Zedler et al. (1999) stated that elevation profiles and vegetation patterns do

not have discrete zonation, but they recognize three habitats: high marsh, marsh plain, and cordgrass habitat. In the high marsh, *Sarcocornia pacifica* is associated with *Arthrocnemum subterminale* and *Cuscuta salina*; the marsh plain is dominated by *Batis maritima*, *Distichlis spicata*, *Monanthochloe littoralis*, and *Sarcocornia pacifica*. General descriptions are found in Grewell et al. (2007).

Local Vegetation Description

The Pickleweed mats Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Salicornia pacifica*. Those herbs often present include *Frankenia salina*, and herbs that are sometimes present include *Grindelia stricta*, *Jaumea carnosa*, *Limonium californicum*, *Lolium perenne*, *Mesembryanthemum nodiflorum*, *Polypogon monspeliensis*, and *Spergularia marina*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	57.8	24 – 95	0.3	0 – 0.5

Local Membership Rule

Sarcocornia pacifica or *Jaumea carnosa* > 50% relative cover in the herbaceous layer, or > 30% relative cover with *Atriplex prostrata*, *Cotula coronopifolia*, *Distichlis spicata*, *Frankenia salina*, *Lepidium latifolium*, and/or *Triglochin maritima*.

Local Environmental Description

Elevation: Mean 3 m, Range 1 – 6 m

Aspect: NE (7), Flat (3), NW (2)

Slope: Mean 0 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (10), Lower 1/3 of slope (1)

Large Rock: Mean 0.2%, Range 0 – 2%

Small Rock: Mean 0.7%, Range 0 – 8%

Fines Cover: Mean 51.1%, Range 1 – 97%

Litter Cover: Mean 29.4%, Range 1 – 93%

Soil Texture (field assessed): Muck (3), Fine sand (2), Medium to very fine, sandy loam (2), Fine silty clay (1), Medium loam (1), Medium silt (1), Medium to very fine, loamy sand (1)

Geology (field or map data): Alluvium (6), Silty alluvium (3), Mixed alluvium (1), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Bay Flats (5), East Bay Terraces and Alluvium (3)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (3), East Bay Terraces and Alluvium (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This alliance has low non-native plant cover (average 13.9%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lolium perenne*, *Mesembryanthemum nodiflorum*, and *Polypogon monspeliensis*.

Associations in Alameda & Contra Costa Counties

Sarcocornia pacifica – *Cotula coronopifolia*

Sarcocornia pacifica – *Jaumea carnosa* – *Distichlis spicata*

Sarcocornia pacifica (*Salicornia depressa*) alliance

Sarcocornia pacifica Tidal

Triglochin maritima

Classification Comments

None.

References: Atwater et al. 1979, Buck and Evens 2010, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Duke et al. 1999, Eicher 1987, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Evens 2006, Keeler-Wolf and Vaghti 2000, Klein et al. 2015, Newton 1989, Peinado et al. 1994, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, Tukman Geospatial et al. 2021

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=13; Alameda County (n=8): ALCC502, ALCC708, ALCC711, ALCC712, ALCC713, ALCC819, ALCC821, WAR008D

Contra Costa County (n=5): ALCC258, ALCC602, ALCC608, ALCCREC609, EBRTA131

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Salicornia pacifica</i>	100	35.0	2.0	78.0	Y	Y		Y
H	<i>Frankenia salina</i>	54	2.7	0.2	10.0				Y
H	<i>Jaumea carnosa</i>	38	5.5	0.1	58.0				
H	<i>Limonium californicum</i>	31	0.4	0.2	3.0				
H	<i>Grindelia stricta</i>	23	0.6	0.2	4.0				
H	<i>Polypogon monspeliensis</i>	23	0.2	0.2	2.0				
H	<i>Mesembryanthemum nodiflorum</i>	23	0.2	0.2	1.0				
H	<i>Spergularia marina</i>	23	0.2	0.2	1.0				
H	<i>Lolium perenne</i>	23	0.1	0.1	0.4				

***Sarcocornia pacifica* – *Cotula coronopifolia* Association**

Common Name: Pacific Glasswort – Brass Buttons Patches

Alliance: *Sarcocornia pacifica* (*Salicornia depressa*) Herbaceous Alliance

Local Vegetation Description

The Pacific Glasswort – Brass Buttons Association forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Cotula coronopifolia* and *Salicornia pacifica* (= *Sarcocornia pacifica*), and characteristic herbs include *Atriplex prostrata*, *Bolboschoenus maritimus*, and *Polypogon monspeliensis*. Those herbs often present include *Atriplex prostrata*, *Frankenia salina*, *Lolium perenne*, *Polypogon monspeliensis*, and *Sesuvium verrucosum*, and herbs that are sometimes present include *Bassia hyssopifolia*, *Crypsis* sp., *Hordeum marinum*, *Juncus arcticus*, *Juncus bufonius*, *Lactuca serriola*, *Lasthenia conjugens*, *Lythrum hyssopifolium*, *Phragmites australis*, *Polygonum argyrocoleon*, *Salsola australis*, *Sonchus oleraceus*, *Spergularia marina*, and *Xanthium strumarium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	59.7	31 – 95	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 1 m, Range 0 – 3 m

Aspect: Flat (3)

Slope: 0 degrees

Macro Topography: Bottom (3)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 42.8%, Range 5 – 89%

Litter Cover: Mean 31.5%, Range 1 – 90%

Soil Texture (field assessed): Fine silty clay (2), Moderately fine sandy clay loam (1),
Not recorded (1)

Geology (field or map data): Clayey alluvium (2), Alluvium (1), Mixed alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Other Subsections: Delta (3)

Site Impacts

This association has high non-native plant cover (average 51.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bassia hyssopifolia*, *Cotula coronopifolia*, *Hordeum marinum*, *Lactuca serriola*, *Lolium perenne*, *Lythrum hyssopifolium*, *Polygonum argyrocoleon*, *Polypogon monspeliensis*, and *Sonchus oleraceus*.

Classification Comments

Lasthenia conjugens is a rare plant (CRPR 1B.1) that occurs in one of the surveys. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=1): WAR008D

Contra Costa County (n=0):

Solano Co. (n=3): SUMA12132, SUMA12166, SUMA12172

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Cotula coronopifolia</i>	100	27.8	7.0	75.0	Y		Y	Y
H	<i>Salicornia pacifica</i>	100	16.0	5.0	27.0	Y		Y	Y
H	<i>Bolboschoenus maritimus</i>	75	2.1	0.1	8.0	Y			Y
H	<i>Polypogon monspeliensis</i>	75	2.0	0.1	6.0	Y			Y
H	<i>Atriplex prostrata</i>	75	1.1	0.2	4.0	Y			Y
H	<i>Sesuvium verrucosum</i>	50	2.6	0.2	10.0				Y
H	<i>Frankenia salina</i>	50	2.5	0.1	10.0				Y
H	<i>Lolium perenne</i>	50	0.2	0.2	0.4				Y
H	<i>Phragmites australis</i>	25	3.0	12.0	12.0				
H	<i>Spergularia marina</i>	25	1.3	5.0	5.0				
H	<i>Crypsis</i> sp.	25	0.3	1.0	1.0				
H	<i>Lasthenia conjugens</i>	25	0.3	1.0	1.0				
H	<i>Juncus bufonius</i>	25	0.3	1.0	1.0				
H	<i>Hordeum marinum</i>	25	0.3	1.0	1.0				
H	<i>Lythrum hyssopifolium</i>	25	0.1	0.4	0.4				
H	<i>Xanthium strumarium</i>	25	0.1	0.2	0.2				
H	<i>Lactuca serriola</i>	25	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	25	0.1	0.2	0.2				
H	<i>Spergularia</i> sp.	25	0.1	0.2	0.2				
H	<i>Juncus arcticus</i>	25	0.1	0.2	0.2				
H	<i>Bassia hyssopifolia</i>	25	0.0	0.1	0.1				
H	<i>Polygonum argyrocoleon</i>	25	0.0	0.1	0.1				
H	<i>Salsola australis</i>	25	0.0	0.1	0.1				

***Sarcocornia pacifica* – *Jaumea carnosa* – *Distichlis spicata* Association**

Common Name: Pacific Glasswort – Saltgrass – Marsh Jaumea Tidal Salt Marsh Patches

Alliance: *Sarcocornia pacifica* (*Salicornia depressa*) Herbaceous Alliance

Local Vegetation Description

The Pacific Glasswort – Saltgrass – Marsh Jaumea Tidal Salt Marsh Association forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Salicornia pacifica* (= *Sarcocornia pacifica*), and characteristic herbs include *Distichlis spicata*, and *Grindelia stricta*. Those herbs often present include *Jaumea carnosa*, and herbs that are sometimes present include *Atriplex prostrata*, *Frankenia salina*, *Limonium californicum*, *Polypogon monspeliensis*, and *Sonchus oleraceus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	78.3	38 – 100	0.3	0 – 1

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 5 m

Aspect: Flat (6), NE (1)

Slope: 0 degrees

Macro Topography: Basin/wetland (3), Bottom (3), Lower 1/3 of slope (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 39.2%, Range 3 – 94%

Litter Cover: Mean 36.0%, Range 4 – 95%

Soil Texture (field assessed): Medium silt (2), Muck (2), Not recorded (2), Fine clay (1), Medium loam (1), Medium silt loam (1)

Geology (field or map data): Alluvium (6), Sandstone and other sedimentary (1), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Bay Flats (5), Delta (2)

Site Impacts

This association has low non-native plant cover (average 2.3%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Polypogon monspeliensis*, and *Sonchus oleraceus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck and Evens 2010, Buck-Diaz et al. 2021a, Eicher 1987, Keeler-Wolf and Evens 2006, Klein et al. 2015, Newton 1989, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G3 **State Rarity Rank:** S3 **State Rare:** Y

Surveys Used for Description

Total: N=9; Alameda County (n=1): ALCC821

Contra Costa County (n=1): ALCC602

Sacramento Co. (n=2): SSJD0308, SSJD0349

Santa Clara Co. (n=5): DEDW0569, DEDWM028, VAWA097, VAWA100, VAWA420

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Salicornia pacifica</i>	89	46.8	16.0	87.5	Y		Y	Y
H	<i>Distichlis spicata</i>	78	17.9	2.5	50.0	Y			Y
H	<i>Grindelia stricta</i>	78	5.4	0.2	37.5	Y			Y
H	<i>Jaumea carnosa</i>	67	17.6	3.0	70.0				Y
H	<i>Frankenia salina</i>	44	2.8	0.2	10.0				
H	<i>Limonium californicum</i>	33	0.4	0.2	3.0				
H	<i>Atriplex prostrata</i>	22	1.3	5.0	7.0				
H	<i>Polypogon monspeliensis</i>	22	0.2	0.2	2.0				
H	<i>Sonchus oleraceus</i>	22	0.1	0.2	1.0				

***Sarcocornia pacifica* Tidal Association**

Common Name: Pacific Glasswort Tidal Patches

Alliance: *Sarcocornia pacifica* (*Salicornia depressa*) Herbaceous Alliance

Local Vegetation Description

The Pacific Glasswort Tidal Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Salicornia pacifica* (= *Sarcocornia pacifica*). Those herbs often present include *Frankenia salina* and *Jaumea carnosa*, and herbs that are sometimes present include *Cuscuta pacifica* var. *pacifica* and *Lepidium latifolium*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	60.9	35 – 78	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 3 m, Range 1 – 6 m

Aspect: NE (3), NW (2), Flat (1)

Slope: Mean 1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (5)

Large Rock: Mean 0.4%, Range 0 – 2%

Small Rock: 0%

Fines Cover: Mean 54.2%, Range 1 – 97%

Litter Cover: Mean 41.4%, Range 1 – 91%

Soil Texture (field assessed): Fine sand (1), Fine silty clay (1), Medium silt (1), Medium to very fine, sandy loam (1), Muck (1), Not recorded (1)

Geology (field or map data): Alluvium (2), Silty alluvium (2), Mixed alluvium (1)

Alameda County Subsections: Bay Flats (2), East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (2), East Bay Terraces and Alluvium (1)

Site Impacts

This association has low non-native plant cover (average 1.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Lepidium latifolium*.

Classification Comments

None.

References: Atwater et al. 1979, Buck-Diaz et al. 2021a, Duke et al. 1999, Keeler-Wolf and Vaghti 2000, Klein et al. 2015, Peinado et al. 1994, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC502, ALCC708, ALCC712

Contra Costa County (n=3): ALCC258, ALCCREC609, EBRTA131

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Salicornia pacifica</i>	100	58.0	35.0	78.0	Y	Y		Y
H	<i>Frankenia salina</i>	50	3.2	0.2	10.0				Y
H	<i>Jaumea carnosa</i>	50	0.4	0.1	2.0				Y
H	<i>Cuscuta pacifica</i> var. <i>pacifica</i>	33	1.0	2.0	4.0				
H	<i>Lepidium latifolium</i>	33	0.7	1.0	3.0				

***Triglochin maritima* Provisional Association**

Common Name: Seaside Arrowgrass Patches

Alliance: *Sarcocornia pacifica* (*Salicornia depressa*) Herbaceous Alliance

Local Vegetation Description

The Seaside Arrowgrass Association forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Salicornia pacifica* (= *Sarcocornia pacifica*) and *Triglochin maritima*, and characteristic herbs include *Limonium californicum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	70.0	70 – 70	0.3	0 – 0.5

Local Environmental Description

Elevation: 5 m

Aspect: NE (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 2%

Litter Cover: 2%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: Bay Flats (1)

Contra Costa County Subsections: None

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyor.

Classification Comments

This association remains provisional due to low overall sample size.

References: Tukman Geospatial et al. 2021

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=1; Alameda County (n=1): ALCC819

Contra Costa County (n=0):

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Triglochin maritima</i>	100	40.0	40.0	40.0	Y	Y		Y
H	<i>Salicornia pacifica</i>	100	30.0	30.0	30.0	Y		Y	Y
H	<i>Limonium californicum</i>	100	3.0	3.0	3.0	Y			Y

***Schoenoplectus (acutus, californicus)* Herbaceous Alliance**



Common Name: Hardstem and California bulrush marshes

NVC Alliance Code: A3895. *Schoenoplectus americanus* - *Schoenoplectus acutus* - *Schoenoplectus californicus* Marsh Alliance

Statewide Description

Schoenoplectus acutus and/or *S. californicus* is dominant or co-dominant in the herbaceous layer with *Apocynum cannabinum*, *Azolla filiculoides*, *Bolboschoenus maritimus*, *Calystegia sepium*, *Eichhornia crassipes*, *Euthamia occidentalis*, *Hibiscus lasiocarpus*, *Hoita macrostachya*, *Hydrocotyle ranunculoides*, *Leersia oryzoides*, *Ludwigia peploides*, *Lycopus americanus*, *Persicaria punctata*, *Phragmites australis*, *Sparganium eurycarpum*, *Triglochin* spp., *Typha* spp., and *Urtica dioica*. Emergent trees and shrubs may be present at low cover, including trees: *Alnus rhombifolia*, *Populus fremontii*, or *Salix gooddingii*, and shrubs: *Cephalanthus occidentalis*, *Rubus armeniacus*, *Salix exigua*, or *Salix lasiolepis*.

The alliance is a widespread, freshwater to slightly brackish marsh type, typical of marshes throughout much of North America (NatureServe 2007a). Although *Schoenoplectus acutus* and *S. californicus* commonly occur in the same area, *S. acutus*

is less tolerant of brackish conditions than is *S. californicus*, and associations dominated by *S. acutus* are not found regularly on the edges of large stretches of open water (Grewell et al. 2007). *S. californicus* tends to dominate on the outer, more-exposed edges of marshes adjacent to open water. However, both species also can co-dominate in stands.

Local Vegetation Description

The Hardstem and California bulrush marshes Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is sparse and the tree layer is open. Dominant herbs include *Schoenoplectus acutus*. Those herbs often present include *Typha latifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.5	0 – 4	4.5	1 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0.4	1.5	1 – 2
Herb	62.4	35 – 90	2.3	1 – 5

Local Membership Rule

Schoenoplectus acutus or *Schoenoplectus californicus* > 50% relative cover, or > 30% relative cover with other herbs including *Typha* spp.

Local Environmental Description

Elevation: Mean 91 m, Range 0 – 353 m

Aspect: NE (4), Flat (2), NW (1)

Slope: Mean 0 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (6)

Large Rock: 0%

Small Rock: Mean 0.2%, Range 0 – 1%

Fines Cover: Mean 2.0%, Range 0 – 7%

Litter Cover: Mean 31.7%, Range 0 – 84%

Soil Texture (field assessed): Muck (4), Fine silty clay (1), Moderately fine clay loam (1)

Geology (field or map data): Alluvium (2), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1), Sandy alluvium (1), Sedimentary (1), Shale and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (2), Suisun Hills and Valleys (2), Westside Alluvial Fans and Terraces (2), Delta (1), East Bay Hills - Mount Diablo (1)

Site Impacts

This alliance has very low non-native plant cover (average 0.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Ludwigia hexapetala* and *Rubus armeniacus*.

Associations in Alameda & Contra Costa Counties

Schoenoplectus (acutus, californicus) – Wetland herbs

Schoenoplectus acutus

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Klein and Evens 2005, Klein et al. 2015, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, VegCAMP 2015a

Global Rarity Rank: GNR

State Rarity Rank: S3S4

Surveys Used for Description

Total: N=8; Alameda County (n=0):

Contra Costa County (n=8): ALCC261, ALCC416, ALCC764, ALCC818, ALCC826, ALCCREC208, CVRP0053, M1007291607

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Schoenoplectus acutus</i>	100	50.3	4.0	79.0	Y	Y		Y
H	<i>Typha latifolia</i>	50	2.9	1.0	17.0				Y
NV	Algae	25	0.3	0.2	2.0				

Schoenoplectus (acutus, californicus) – Wetland herbs Provisional Association

Common Name: Common Tule or California Bulrush – Wetland herbs Patches

Alliance: *Schoenoplectus (acutus, californicus)* Herbaceous Alliance

Local Vegetation Description

The Common Tule or California Bulrush – Wetland herbs Association forms an intermittent to continuous herbaceous layer. The shrub layer is open and the tree layer is absent. Those herbs often present include *Rumex crispus*, *Schoenoplectus acutus*, *Schoenoplectus californicus*, and *Typha angustifolia*, and herbs that are sometimes present include *Agrostis capillaris*, *Ambrosia psilostachya*, *Apium graveolens*, *Apocynum cannabinum*, *Calystegia sepium*, *Convolvulus arvensis*, *Distichlis spicata*, *Eichhornia crassipes*, *Euthamia occidentalis*, *Foeniculum vulgare*, *Iris pseudacorus*, *Lotus corniculatus*, *Ludwigia hexapetala*, *Ludwigia peploides*, *Mentha arvensis*, *Persicaria lapathifolia*, *Schoenoplectus americanus*, *Solidago* sp., and *Sonchus oleraceus*. Commonly associated emergent shrubs at sparse cover include *Rosa californica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	6.1	0 – 18	1.5	1 – 2
Herb	82.7	50 – 100	1.5	1 – 2

Local Environmental Description

Elevation: Mean 1 m, Range 0 – 3 m

Aspect: Flat (3)

Slope: 0 degrees

Macro Topography: Bottom (3)

Large Rock: 0%

Small Rock: Mean 0.5%, Range 0 – 1%

Fines Cover: Mean 4.0%, Range 1 – 7%

Litter Cover: Mean 45.5%, Range 1 – 90%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine silty clay loam (1), Not recorded (1)

Geology (field or map data): Alluvium (1), Clayey alluvium (1), Sandy alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (1), Delta (1)

Site Impacts

This association has low non-native plant cover (average 13.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Agrostis capillaris*, *Apium graveolens*, *Convolvulus arvensis*, *Eichhornia crassipes*, *Foeniculum vulgare*, *Iris pseudacorus*, *Lotus corniculatus*, *Ludwigia hexapetala*, *Ludwigia peploides*, *Mentha arvensis*, *Rubus armeniacus*, *Rumex crispus*, and *Sonchus oleraceus*.

Classification Comments

This association remains provisional due to low overall sample size. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Keeler-Wolf and Vaghti 2000

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=3; Alameda County (n=0):

Contra Costa County (n=1): ALCC416

San Joaquin Co. (n=1): SSJD0022

Solano Co. (n=1): SUMA9087

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Rosa californica</i>	33	6.0	18.0	18.0				
S	<i>Salix lasiolepis</i>	33	0.1	0.2	0.2				
S	<i>Rubus armeniacus</i>	33	0.1	0.2	0.2				
H	<i>Schoenoplectus californicus</i>	67	18.3	12.0	43.0				Y
H	<i>Schoenoplectus acutus</i>	67	8.0	4.0	20.0				Y
H	<i>Typha angustifolia</i>	67	5.4	0.2	16.0				Y
H	<i>Rumex crispus</i>	67	0.1	0.2	0.2				Y
H	<i>Ludwigia hexapetala</i>	33	14.3	43.0	43.0				
H	<i>Eichhornia crassipes</i>	33	11.7	35.0	35.0				
H	<i>Apocynum cannabinum</i>	33	11.7	35.0	35.0				
H	<i>Persicaria lapathifolia</i>	33	6.7	20.0	20.0				
H	<i>Euthamia occidentalis</i>	33	2.7	8.0	8.0				
H	<i>Calystegia sepium</i>	33	2.0	6.0	6.0				
H	<i>Schoenoplectus americanus</i>	33	1.3	4.0	4.0				
H	<i>Foeniculum vulgare</i>	33	0.7	2.0	2.0				
H	<i>Distichlis spicata</i>	33	0.3	1.0	1.0				
H	<i>Ambrosia psilostachya</i>	33	0.1	0.2	0.2				
H	<i>Lotus corniculatus</i>	33	0.1	0.2	0.2				
H	<i>Ludwigia peploides</i>	33	0.1	0.2	0.2				
H	<i>Mentha arvensis</i>	33	0.1	0.2	0.2				
H	<i>Solidago</i> sp.	33	0.1	0.2	0.2				
H	<i>Sonchus oleraceus</i>	33	0.1	0.2	0.2				
H	<i>Convolvulus arvensis</i>	33	0.1	0.2	0.2				
H	<i>Agrostis capillaris</i>	33	0.1	0.2	0.2				
H	<i>Iris pseudacorus</i>	33	0.1	0.2	0.2				
H	<i>Apium graveolens</i>	33	0.1	0.2	0.2				

***Schoenoplectus acutus* Association**

Common Name: Common Tule Patches

Alliance: *Schoenoplectus (acutus, californicus)* Herbaceous Alliance

Local Vegetation Description

The Common Tule Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is open. Dominant herbs include *Schoenoplectus acutus*. Those herbs often present include *Typha latifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.6	0 – 4	7.5	5 – 10
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	64.2	35 – 90	2.4	1 – 5

Local Environmental Description

Elevation: Mean 104 m, Range 2 – 353 m

Aspect: NE (3), Flat (2), NW (1)

Slope: Mean 1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (5)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 1.0%, Range 0 – 5%

Litter Cover: Mean 37.8%, Range 0 – 84%

Soil Texture (field assessed): Muck (4), Fine silty clay (1)

Geology (field or map data): Alluvium (2), Clayey alluvium (1), Sandstone, shale, and gravel deposits (1), Sedimentary (1), Shale and other sedimentary (1), Silty alluvium (1)

Alameda County Subsections: None

Contra Costa County Subsections: Eastern Hills (2), Suisun Hills and Valleys (2), Delta (1), East Bay Hills - Mount Diablo (1), Westside Alluvial Fans and Terraces (1)

Site Impacts

This association has very low non-native plant cover (average 0.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Cirsium vulgare* and *Ludwigia peploides*.

Classification Comments

None.

References: AECOM 2013, Buck-Diaz et al. 2012, Buck-Diaz et al. 2021a, Hickson and Keeler-Wolf 2007, Klein and Evens 2005, Klein et al. 2015, Ratchford et al. 2022b (in progress), Ratchford et al. 2023a, Reyes et al. 2020a, Reyes et al. 2023, Sikes et al. 2021, Sikes et al. 2023, Sproul et al. 2011, VegCAMP 2015a

Global Rarity Rank: G5 **State Rarity Rank:** S3? **State Rare:** Y

Surveys Used for Description

Total: N=7; Alameda County (n=0):

Contra Costa County (n=7): ALCC261, ALCC764, ALCC818, ALCC826, ALCCREC208, CVRP0053, M1007291607

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Schoenoplectus acutus</i>	100	56.9	35.0	79.0	Y	Y		Y
H	<i>Typha latifolia</i>	57	3.3	1.0	17.0				Y
NV	Algae	29	0.3	0.2	2.0				

***Schoenoplectus americanus* Herbaceous Alliance**



Common Name: Common Three-square marsh

NVC Alliance Code: A3895. *Schoenoplectus americanus* - *Schoenoplectus acutus* - *Schoenoplectus californicus* Marsh Alliance

Statewide Description

Schoenoplectus americanus is dominant or co-dominant in the herbaceous layer with *Anemopsis californica*, *Argentina egedii*, *Distichlis spicata*, *Juncus arcticus*, *Juncus cooperi*, *Phragmites australis*, *Schoenoplectus acutus*, *Schoenoplectus californicus*, *Schoenoplectus pungens*, and *Typha* spp.

The *Schoenoplectus americanus* alliance occurs in many wetlands throughout the western United States and the southern Great Plains (NatureServe 2007a). Stands have a high organic-matter accumulation from extensive root/rhizome systems (Shupe et al. 1986, Ungar 1965). Most stands in California are associated with inland wetlands adjacent to alkali playas and seeps, but they also occur in coastal brackish marshes (Grewell et al. 2007).

Local Vegetation Description

The Common Three-square marsh Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Schoenoplectus americanus*. Those herbs often present include *Atriplex prostrata* and *Distichlis spicata*, and herbs that are sometimes present include *Juncus arcticus*, *Polypogon monspeliensis*, *Rumex crispus*, *Salicornia pacifica*, *Sonchus oleraceus*, and *Typha angustifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	81.3	30 – 100	1.5	1 – 2

Local Membership Rule

Schoenoplectus americanus or *Schoenoplectus pungens* > 50% relative cover, or > 30% relative cover with other herbs.

Local Environmental Description

Elevation: Mean 15 m, Range 0 – 214 m

Aspect: Flat (14), NE (1), Variable (1)

Slope: 0 degrees

Macro Topography: Bottom (13)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 19.5%, Range 0 – 82%

Litter Cover: Mean 52.0%, Range 8 – 100%

Soil Texture (field assessed): Muck (5), Moderately fine silty clay loam (2), Fine sandy clay (2), Medium silt loam (1), Fine sand (1), Fine clay (1), Peat (1)

Geology (field or map data): Clayey alluvium (9), Alluvium (3), Mixed alluvium (1), Sandstone, shale, and gravel deposits (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: Westside Alluvial Fans and Terraces (1)

Other Subsections: Delta (10), Bay Flats (3), Suisun Hills and Valleys (1)

Site Impacts

This alliance has low non-native plant cover (average 7.7%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Polypogon monspeliensis*, *Rumex crispus*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Schoenoplectus americanus

Schoenoplectus americanus alliance

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Bradley 1970, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2014, Keeler-Wolf and Vaghti 2000, Reyes et al. 2020a, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G5

State Rarity Rank: S3

Surveys Used for Description

Total: N=16; Alameda County (n=1): ALCC265

Contra Costa County (n=1): ALCC607

Sacramento Co. (n=1): SSJD0351

Santa Clara Co. (n=3): DEDW0421, DEDW0447, DEDW0582

Solano Co. (n=10): SUMA12049, SUMA12063, SUMA6023, SUMA6048, SUMA6072, SUMA6073, SUMA9057, SUMA9083, SUMA9088, SUMA9183

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Schoenoplectus americanus</i>	100	56.8	21.0	95.0	Y	Y		Y
H	<i>Distichlis spicata</i>	56	6.6	0.2	50.0				Y
H	<i>Atriplex prostrata</i>	56	5.7	0.2	65.0				Y
H	<i>Salicornia pacifica</i>	44	0.4	0.2	2.0				
H	<i>Typha angustifolia</i>	38	3.9	0.1	35.0				
H	<i>Juncus arcticus</i>	38	2.5	0.2	15.0				
H	<i>Sonchus oleraceus</i>	31	0.2	0.1	2.0				
H	<i>Rumex crispus</i>	31	0.1	0.1	0.2				
H	<i>Polypogon monspeliensis</i>	25	1.0	0.2	8.0				

***Schoenoplectus americanus* Association**

Common Name: Common Three-square Patches

Alliance: *Schoenoplectus americanus* Herbaceous Alliance

Local Vegetation Description

The Common Three-square Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Schoenoplectus americanus*. Herbs that are sometimes present include *Atriplex prostrata* and *Distichlis spicata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	75.6	59 – 100	1.5	1 – 2

Local Environmental Description

Elevation: Mean 44 m, Range 0 – 214 m

Aspect: Flat (4), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 42.0%, Range 20 – 80%

Litter Cover: Mean 30.2%, Range 15 – 61%

Soil Texture (field assessed): Fine clay (1), Muck (1)

Geology (field or map data): Alluvium (3), Sandstone, shale, and gravel deposits (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Bay Flats (3), Delta (1)

Site Impacts

This association has low non-native plant cover (average 10.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Bradley 1970, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2023, CNPS Vegetation Program 2015, Evens et al. 2014, Keeler-Wolf and Vaghti 2000, Ratchford et al. 2023a, Reyes et al. 2020a, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3? **State Rarity Rank:** S3

State Rare: Y

Surveys Used for Description

Total: N=5; Alameda County (n=1): ALCC265

Contra Costa County (n=0):

Sacramento Co. (n=1): SSJD0351

Santa Clara Co. (n=3): DEDW0421, DEDW0447, DEDW0582

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Schoenoplectus americanus</i>	100	65.4	55.0	77.0	Y	Y		Y
H	<i>Atriplex prostrata</i>	40	14.0	5.0	65.0				
H	<i>Distichlis spicata</i>	40	4.6	3.0	20.0				

***Selaginella (bigelovii, wallacei)* Herbaceous Alliance**



Common Name: Bushy spikemoss mats

NVC Alliance Code: A3785. *Selaginella bigelovii* Rock Alliance

Statewide Description

Selaginella bigelovii or *Selaginella wallacei* is dominant or conspicuous as rhizomatous mats in the herbaceous layer with *Aira caryophyllea*, *Avena barbata*, *Bromus diandrus*, *Bromus rubens*, *Corethrogyne filaginifolia*, *Logfia filaginoides*, *Melica imperfecta*, *Mirabilis laevis* var. *crassifolia*, *Plantago erecta*, and *Vulpia microstachys*. Emergent shrubs may be present at low cover, including *Adenostoma fasciculatum*, *Artemisia californica*, *Ceanothus crassifolius*, *Diplacus aurantiacus*, *Eriogonum fasciculatum*, *Eriogonum wrightii*, or *Hesperoyucca whipplei*.

The alliance is characteristic of outcrops in much of cismontane California. It typically occurs on gently to moderately sloping slabs of rock and, over time, may form thick mats of intertwined roots and rhizomes. The alliance is widespread in southern California, including the Channel Islands and Baja California. Surveys come from inland San Diego County north to San Benito County. In the northern Sierra Nevada foothills, Klein et al. (2007) placed stands with high cover of *Selaginella hansenii* in the *Lasthenia californica* – *Plantago erecta* – *Vulpia microstachys* Alliance. The relationships between *Selaginella*-dominated and annual herb-dominated vegetation can be better understood with further sampling in the southern foothills and other parts of California. The *Selaginella (tortipila, rupestris)* Alliance exists in the southeastern United States (NatureServe 2007a).

Local Vegetation Description

Selaginella (bigelovii, wallacei) Herbaceous Alliance

The Bushy spikemoss mats Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse to open and the tree layer is usually absent. Dominant herbs include *Selaginella bigelovii*. Those herbs often present include *Avena barbata*, *Bromus rubens*, *Epilobium canum*, and *Melica californica*, and herbs that are sometimes present include *Achillea millefolium*, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Calycadenia truncata*, *Carduus pycnocephalus*, *Chlorogalum pomeridianum*, *Chorizanthe membranacea*, *Elymus elymoides*, *Elymus multisetus*, *Erodium botrys*, *Erodium cicutarium*, *Gilia achilleifolia*, *Hypochaeris glabra*, *Logfia gallica*, *Monardella villosa*, *Phacelia* sp., *Poa secunda*, *Trifolium willdenovii*, *Uropappus lindleyi*, and *Vulpia microstachys*. Commonly associated emergent shrubs at sparse cover include *Ericameria nauseosa*. Commonly associated non-vascular plants include Lichen.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.1	0 – 0.2	0.5	0 – 1
Shrub	2.0	0 – 4	0.3	0 – 1
Herb	23.4	8 – 45	0.3	0 – 0.5

Local Membership Rule

Selaginella bigelovii > 50% relative cover or characterizes the herbaceous layer in small stands.

Local Environmental Description

Elevation: Mean 868 m, Range 357 – 1311 m

Aspect: SW (3), SE (2), NE (1), Variable (1)

Slope: Mean 31 degrees, Range 20 – 47 degrees

Macro Topography: Upper 1/3 of slope (4), Ridge top (2), Middle to Upper 1/3 of slope (1)

Large Rock: Mean 21.4%, Range 0 – 75%

Small Rock: Mean 48.0%, Range 0 – 95%

Fines Cover: Mean 13.3%, Range 0 – 51%

Litter Cover: Mean 1.2%, Range 0 – 5%

Soil Texture (field assessed): Moderately fine clay loam (1), Sand, (class unknown) (1), Moderately coarse, sandy loam (1), Coarse, loamy sand (1)

Geology (field or map data): Sandstone and other sedimentary (3), Franciscan melange (2), Serpentine (1), Ultramafic (1)

Alameda County Subsections: Western Diablo Range (3)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (3), Western Diablo Range (1)

Site Impacts

This alliance has low non-native plant cover (average 18.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Brachypodium distachyon*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis*, *Carduus pycnocephalus*, *Erodium botrys*, *Erodium cicutarium*, *Hypochaeris glabra*, and *Logfia gallica*.

Associations in Alameda & Contra Costa Counties

Selaginella bigelovii – (*Epilobium canum* – *Melica californica*)

Classification Comments

This association is newly described here as the northern expression of associations dominated by *Selaginella bigelovii*. Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Evens and San 2005, Keeler-Wolf and Evens 2006, Kittel et al. 2012, Reyes et al. 2019

Global Rarity Rank: G4

State Rarity Rank: S3

Surveys Used for Description

Total: N=7; Alameda County (n=3): ALCC071, ALCC424, ALCC516

Contra Costa County (n=0):

Santa Clara Co. (n=4): ALCC598, SCLAV011, SCRUZ550, SCRUZ994

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
S	<i>Ericameria nauseosa</i>	57	0.6	0.2	3.0				Y
S	<i>Lupinus albifrons</i> var. <i>collinus</i>	29	0.7	2.0	3.0				
S	<i>Toxicodendron diversilobum</i>	29	0.1	0.2	0.2				
H	<i>Selaginella bigelovii</i>	100	16.0	4.0	40.0	Y	Y		Y
H	<i>Epilobium canum</i>	71	1.9	0.2	4.0				Y
H	<i>Avena barbata</i>	71	1.6	1.0	4.0				Y
H	<i>Melica californica</i>	71	0.3	0.2	1.0				Y
H	<i>Bromus rubens</i>	57	0.5	0.2	1.0				Y
H	<i>Bromus diandrus</i>	43	0.7	0.2	4.0				
H	<i>Gilia achilleifolia</i>	43	0.3	0.2	1.0				

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Erodium cicutarium</i>	43	0.3	0.2	1.0				
H	<i>Elymus multisetus</i>	43	0.1	0.2	0.2				
H	<i>Uropappus lindleyi</i>	43	0.1	0.2	0.2				
H	<i>Trifolium willdenovii</i>	43	0.1	0.2	0.2				
H	<i>Avena</i> sp.	29	0.4	1.0	2.0				
H	<i>Elymus elymoides</i>	29	0.3	0.2	2.0				
H	<i>Chlorogalum pomeridianum</i>	29	0.2	0.2	1.0				
H	<i>Monardella villosa</i>	29	0.2	0.2	1.0				
H	<i>Brachypodium distachyon</i>	29	0.2	0.2	1.0				
H	<i>Erodium botrys</i>	29	0.2	0.2	1.0				
H	<i>Bromus hordeaceus</i>	29	0.1	0.2	0.2				
H	<i>Achillea millefolium</i>	29	0.1	0.2	0.2				
H	<i>Poa secunda</i>	29	0.1	0.2	0.2				
H	<i>Phacelia</i> sp.	29	0.1	0.2	0.2				
H	<i>Logfia gallica</i>	29	0.1	0.2	0.2				
H	<i>Chorizanthe membranacea</i>	29	0.1	0.2	0.2				
H	<i>Calycadenia truncata</i>	29	0.1	0.2	0.2				
H	<i>Bromus madritensis</i>	29	0.1	0.2	0.2				
H	<i>Vulpia microstachys</i>	29	0.1	0.2	0.2				
H	<i>Carduus pycnocephalus</i>	29	0.1	0.2	0.2				
H	<i>Hypochaeris glabra</i>	29	0.0	0.1	0.2				
NV	Lichen	57	7.4	2.0	30.0				Y
NV	Moss	43	0.5	0.2	2.0				

***Selaginella bigelovii* – (*Epilobium canum* – *Melica californica*) Provisional Association**

Common Name: Bushy Spikemoss – (California Fuchsia – California Melicgrass) Patches

Alliance: *Selaginella (bigelovii, wallacei)* Herbaceous Alliance

Classification Comments

This provisional association is newly described here, but the association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: None

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Selaginella bigelovii – (*Epilobium canum* – *Melica californica*) Provisional Association
Selaginella (bigelovii, wallacei) Herbaceous Alliance

Sesuvium verrucosum Herbaceous Alliance



Common Name: Western sea-purslane marshes

NVC Alliance Code: A3879. *Sesuvium verrucosum* Desert Salt Mudflat Scrub Alliance

Statewide Description

Sesuvium verrucosum is dominant or co-dominant in the herbaceous layer with *Chenopodium chenopodioides*, *Cotula coronopifolia*, *Distichlis spicata*, *Heliotropium curassavicum*, *Lolium perenne*, *Rumex crispus*, *Rumex pulcher*, *Salicornia bigelovii*, *Sarcocornia pacifica*, and *Spergularia marina*.

Sesuvium verrucosum is a native, perennial, succulent plant that forms extensive mats in saline or brackish, seasonal wetlands. Plants sprout from roots, or they may be effectively annuals, depending upon whether they experience periods of long-term inundation. The alliance occurs from central and southern California east to Missouri and south to Mexico (NatureServe 2007a).

Local Vegetation Description

The Western sea-purslane marshes Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Sesuvium verrucosum*, and characteristic herbs include *Distichlis spicata* and *Frankenia salina*. Those herbs often present include *Amaranthus blitoides*, *Atriplex prostrata*, *Bassia hyssopifolia*, *Centromadia pungens* ssp. *pungens*, *Cressa truxillensis*, *Crypsis* sp., *Cuscuta* sp., *Heliotropium curassavicum*, *Juncus mexicanus*, *Malvella leprosa*, *Salicornia pacifica*, *Sonchus oleraceus*, *Spergularia marina*, and *Symphyotrichum subulatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	73.1	47 – 99	0.3	0 – 0.5

Local Membership Rule

Sesuvium verrucosum > 50% relative cover in the herbaceous layer on saline or alkali flats.

Local Environmental Description

Elevation: Mean 69 m, Range 0 – 138 m

Aspect: Flat (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (1), Not recorded (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 49.5%, Range 1 – 98%

Litter Cover: Mean 7.5%, Range 1 – 14%

Soil Texture (field assessed): Moderately fine silty clay loam (2)

Geology (field or map data): Clayey alluvium (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Delta (1)

Site Impacts

This alliance has very low non-native plant cover (average 0.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bassia hyssopifolia*, and *Sonchus oleraceus*.

Associations in Alameda & Contra Costa Counties

Sesuvium verrucosum – *Distichlis spicata*

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Keeler-Wolf and Vaghti 2000

Global Rarity Rank: G3?

State Rarity Rank: S2

Surveys Used for Description

Total: N=2; Alameda County (n=1): ALCC521

Contra Costa County (n=0):

Solano Co. (n=1): SUMA9105

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sesuvium verrucosum</i>	100	49.0	24.0	74.0	Y	Y		Y
H	<i>Distichlis spicata</i>	100	13.5	7.0	20.0	Y			Y
H	<i>Frankenia salina</i>	100	7.0	4.0	10.0	Y			Y
H	<i>Malvella leprosa</i>	50	4.0	8.0	8.0				Y
H	<i>Cressa truxillensis</i>	50	0.5	1.0	1.0				Y
H	<i>Sonchus oleraceus</i>	50	0.1	0.2	0.2				Y
H	<i>Crypsis</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Amaranthus blitoides</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.2	0.2				Y
H	<i>Bassia hyssopifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	50	0.1	0.2	0.2				Y
H	<i>Cuscuta</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Salicornia pacifica</i>	50	0.1	0.2	0.2				Y
H	<i>Spergularia marina</i>	50	0.1	0.2	0.2				Y
H	<i>Symphyotrichum subulatum</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus mexicanus</i>	50	0.1	0.2	0.2				Y
H	<i>Heliotropium curassavicum</i>	50	0.1	0.2	0.2				Y

***Sesuvium verrucosum* – *Distichlis spicata* Association**

Common Name: Western Sea-purslane – Saltgrass Patches

Alliance: *Sesuvium verrucosum* Herbaceous Alliance

Local Vegetation Description

The Western Sea-purslane – Saltgrass Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Sesuvium verrucosum*, and characteristic herbs include *Distichlis spicata* and *Frankenia salina*. Those herbs often present include *Amaranthus blitoides*, *Atriplex prostrata*, *Bassia hyssopifolia*, *Centromadia pungens* ssp. *pungens*, *Cressa truxillensis*, *Crypsis* sp., *Cuscuta* sp., *Heliotropium curassavicum*, *Juncus mexicanus*, *Malvella leprosa*, *Salicornia pacifica*, *Sonchus oleraceus*, *Spergularia marina*, and *Symphyotrichum subulatum*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	73.1	47 – 99	0.3	0 – 0.5

Local Environmental Description

Elevation: Mean 69 m, Range 0 – 138 m

Aspect: Flat (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 49.5%, Range 1 – 98%

Litter Cover: Mean 7.5%, Range 1 – 14%

Soil Texture (field assessed): Moderately fine silty clay loam (2)

Geology (field or map data): Clayey alluvium (1), Silty alluvium (1)

Alameda County Subsections: Fremont - Livermore Hills and Valleys (1)

Contra Costa County Subsections: None

Other Subsections: Delta (1)

Site Impacts

This association has very low non-native plant cover (average 0.5%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*, *Bassia hyssopifolia*, and *Sonchus oleraceus*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2012, Keeler-Wolf and Vaghti 2000

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; **Alameda County (n=1):** ALCC521

Contra Costa County (n=0):

Solano Co. (n=1): SUMA9105

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sesuvium verrucosum</i>	100	49.0	24.0	74.0	Y	Y		Y
H	<i>Distichlis spicata</i>	100	13.5	7.0	20.0	Y			Y
H	<i>Frankenia salina</i>	100	7.0	4.0	10.0	Y			Y
H	<i>Malvella leprosa</i>	50	4.0	8.0	8.0				Y
H	<i>Cressa truxillensis</i>	50	0.5	1.0	1.0				Y
H	<i>Salicornia pacifica</i>	50	0.1	0.2	0.2				Y
H	<i>Amaranthus blitoides</i>	50	0.1	0.2	0.2				Y
H	<i>Cuscuta</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Symphyotrichum subulatum</i>	50	0.1	0.2	0.2				Y
H	<i>Juncus mexicanus</i>	50	0.1	0.2	0.2				Y
H	<i>Crypsis</i> sp.	50	0.1	0.2	0.2				Y
H	<i>Sonchus oleraceus</i>	50	0.1	0.2	0.2				Y
H	<i>Atriplex prostrata</i>	50	0.1	0.2	0.2				Y
H	<i>Bassia hyssopifolia</i>	50	0.1	0.2	0.2				Y
H	<i>Centromadia pungens</i> ssp. <i>pungens</i>	50	0.1	0.2	0.2				Y
H	<i>Heliotropium curassavicum</i>	50	0.1	0.2	0.2				Y
H	<i>Spergularia marina</i>	50	0.1	0.2	0.2				Y

***Sparganium (angustifolium)* Herbaceous Alliance**



Common Name: Mats of bur-reed leaves

NVC Alliance Code: A3893. *Hippuris vulgaris* - *Ruppia* spp. - *Sparganium* spp.
Aquatic Vegetation Alliance

Statewide Description

Sparganium angustifolium or another *Sparganium* species is dominant on the water surface with *Brasenia schreberi*, *Callitriche* spp., *Carex utriculata*, *Carex vesicaria*, *Nuphar lutea*, *Potamogeton* spp., *Stuckenia* spp., *Typha* spp. and *Utricularia macrorhiza*.

Sparganium. eurycarpum grows along the coast and inland in California, but not in salt marshes. *S. natans* grows in cool, quiet, slightly acidic to somewhat basic waters of bays, pools, ditches, and fens (Kaul 2000). The vegetational relationships among the bur-reeds need clarification.

Sparganium angustifolium is common in California's mountain lakes, regularly forming stands in the middle of small ponds and near lake shorelines. The habitat setting is similar to that of *Nuphar lutea*, but *S. angustifolium* typically occupies shallower water that may fluctuate more widely during the growing season.

Local Vegetation Description

The Mats of bur-reed leaves Alliance forms a continuous herbaceous layer in the single sample available. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Sparganium eurycarpum*, and characteristic herbs include *Lemna minor*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	70.1	70 – 70	3.5	2 – 5

Local Membership Rule

Sparganium eurycarpum is > 50% relative cover in wetlands with other forbs including *Lemna*.

Local Environmental Description

Elevation: 0 m

Aspect: NE (1)

Slope: 1 degrees

Macro Topography: Bottom (1)

Large Rock: 0%

Small Rock: 1%

Fines Cover: 0%

Litter Cover: 25%

Soil Texture (field assessed): Medium silt (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: East Bay Terraces and Alluvium (1)

Contra Costa County Subsections: None

Site Impacts

This alliance has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species was recorded by the surveyor.

Associations in Alameda & Contra Costa Counties

Sparganium eurycarpum

Classification Comments

None.

References: Buck-Diaz et al. 2021, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G4

State Rarity Rank: S3?

Surveys Used for Description

Total: N=1; **Alameda County (n=1):** ALCC435

Contra Costa County (n=0):

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Sparganium eurycarpum</i>	100	70.0	70.0	70.0	Y	Y		Y
H	<i>Lemna minor</i>	100	0.1	0.1	0.1	Y			Y

***Sparganium eurycarpum* Provisional Association**

Common Name: Broadfruit Bur-reed Patches

Alliance: *Sparganium (angustifolium)* Herbaceous Alliance

Classification Comments

This association remains provisional due to low overall sample size. The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2021a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

***Spartina foliosa* Herbaceous Alliance**



Common Name: California cordgrass marsh

NVC Alliance Code: A3902. *Sarcocornia pacifica* - *Spartina foliosa* - *Glaux maritima*
Salt Marsh Alliance

Statewide Description

Spartina foliosa is dominant in the herbaceous layer with algae and *Batis maritima*, *Sarcocornia pacifica*, and *Schoenoplectus californicus*.

The alliance often dominates lower-marsh settings in central and southern California; stands of *Sarcocornia pacifica* or *Salicornia depressa* typically occupy the landward edges of the alliance in mid- to high-marsh settings. For an overview of the state's coastal salt marshes, see Grewell et al. (2007) and MacDonald (1977); for regional descriptions of San Francisco and San Pablo bays, see Josselyn (1983) and Spicher and Josselyn (1985); and for southern California estuaries see J. Zedler (1982) and Zedler et al. (1999).

Spartina alterniflora, a highly invasive species, was introduced into San Francisco Bay in the 1970s (Callaway and Josselyn 1992). Early workers assumed that the

subsequently invading grass was *Spartina alterniflora* but later work found that the plants invading new sites were hybrids with *S. foliosa* (Ainouche et al. 2004, Ayres et al. 2007). In contrast to the native *Spartina foliosa*, the hybrids grow in upper salt marshes and in deeper water, changing marsh species composition by invading mud flats. These hybrids may eventually eliminate *S. foliosa* (Ayres et al. 2007).

Local Vegetation Description

The California cordgrass marsh Alliance forms an open to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Spartina foliosa*. Those herbs often present include *Salicornia pacifica*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	56.1	22 – 80	0.5	0 – 1

Local Membership Rule

Spartina foliosa is > 50% relative cover in the herb layer, or > 30% relative cover with other forbs including *Grindelia stricta* or *Sarcocornia pacifica*.

Local Environmental Description

Elevation: Mean 2 m, Range 0 – 15 m

Aspect: Flat (7), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 40.9%, Range 10 – 92%

Litter Cover: Mean 18.9%, Range 2 – 35%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (7)

Alameda County Subsections: Bay Flats (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Other Subsections: Bay Flats (6)

Site Impacts

This alliance has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyors.

Associations in Alameda & Contra Costa Counties

Spartina foliosa

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: AECOM 2013, Atwater et al. 1979, Buck-Diaz et al. 2021, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Klein et al. 2015, Peinado et al. 1994, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3

State Rarity Rank: S3

Surveys Used for Description

Total: N=8; Alameda County (n=1): ALCC710

Contra Costa County (n=1): ALCC603

San Mateo Co. (n=6): DEDWM144, DEDWM145, DEDWM146, DEDWM148, DEDWM149, DEDWM150

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Spartina foliosa</i>	100	48.5	21.0	67.5	Y	Y		Y
H	<i>Salicornia pacifica</i>	63	7.9	3.0	27.5				Y

***Spartina foliosa* Association**

Common Name: California Cordgrass Patches

Alliance: *Spartina foliosa* Herbaceous Alliance

Local Vegetation Description

The California Cordgrass Association forms an open to intermittent herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Spartina foliosa*. Those herbs often present include *Salicornia pacifica* (= *Sarcocornia pacifica*).

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	43.5	22 – 65	0.5	0 – 1

Local Environmental Description

Elevation: Mean 8 m, Range 1 – 15 m

Aspect: Flat (1), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 65.0%, Range 38 – 92%

Litter Cover: Mean 18.5%, Range 2 – 35%

Soil Texture (field assessed): Muck (1)

Geology (field or map data): Alluvium (1)

Alameda County Subsections: Bay Flats (1)

Contra Costa County Subsections: East Bay Hills - Mount Diablo (1)

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyors.

Classification Comments

None.

References: AECOM 2013, Atwater et al. 1979, Buck-Diaz et al. 2021a, Keeler-Wolf and Vaghti 2000, Keeler-Wolf et al. 2003a, Klein et al. 2015, Peinado et al. 1994, Sikes et al. 2023, Sproul et al. 2011

Global Rarity Rank: G3 **State Rarity Rank:** S3

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=1): ALCC710

Contra Costa County (n=1): ALCC603

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Spartina foliosa</i>	100	43.0	21.0	65.0	Y	Y		Y
H	<i>Salicornia pacifica</i>	50	1.5	3.0	3.0				Y

***Stuckenia (pectinata)* – *Potamogeton* spp. Herbaceous Alliance**



Common Name: Pondweed mats

NVC Alliance Code: A4067. *Stuckenia pectinata* - *Potamogeton* spp. - *Ceratophyllum demersum* Aquatic Vegetation Alliance

Statewide Description

Potamogeton spp., *Stuckenia pectinata* or other *Stuckenia* species is dominant or co-dominant at or below the water surface or as emergent with *Agrostis stolonifera*, *Bolboschoenus maritmus*, *Ceratophyllum demersum*, *Cotula coronopifolia*, *Eleocharis macrostachya*, *Elodea* spp., and *Lemna* spp.

Permanent flooding with either fresh or brackish water is necessary for the alliance's persistence. Stands from Humboldt Bay National Refuge (Pickart 2006), in the Sacramento-San Joaquin River delta, (Hickson and Keeler-Wolf 2007), and at Suisun Marsh (Keeler-Wolf and Vaghti 2000) include *S. pectinata* stands in seasonal or semipermanently flooded settings. Emergent plants occupy the pond edges. Other *Stuckenia* and *Potamogeton* species are included tentatively in this alliance until further data collection and analysis substantiate ecological differences.

Local Vegetation Description

Stuckenia (pectinata) – *Potamogeton* spp. Herbaceous Alliance

The Pondweed mats Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Stuckenia pectinata*. Commonly associated non-vascular plants include *Algae*

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	70.8	50 – 80	0.5	0 – 1

Local Membership Rule

Potamogeton or *Stuckenia* > 50% relative cover, or > 30% relative cover with other herbs including algae or *Lemna* spp.

Local Environmental Description

Elevation: Mean 432 m, Range 0 – 1030 m

Aspect: Flat (4), NE (1), SE (1)

Slope: 0 degrees

Macro Topography: Bottom (6)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 0%

Soil Texture (field assessed): Muck (6)

Geology (field or map data): Franciscan melange (2), Sedimentary (2), Clayey alluvium (1), Mixed alluvium (1)

Alameda County Subsections: Western Diablo Range (2)

Contra Costa County Subsections: None

Other Subsections: Delta (2), Fremont - Livermore Hills and Valleys (1), Western Diablo Range (1)

Site Impacts

This alliance has low non-native plant cover (average 2.1%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Nymphaea odorata*.

Associations in Alameda & Contra Costa Counties

Potamogeton spp.

Stuckenia pectinata

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included. While the data in our classification are from ponds, Boyer and Sutula (2015) show that *Stuckenia* stands are common in Suisun Bay and west Delta where the water is brackish and subject to fast-moving tidal flows.

References: Buck-Diaz et al. 2012, Buck-Diaz et al. 2020, Hickson and Keeler-Wolf 2007, Holstein 2000, Keeler-Wolf and Vaghti 2000, Pickart 2006, Sikes et al. 2023

Global Rarity Rank: G3G5

State Rarity Rank: S3?

Surveys Used for Description

Total: N=6; Alameda County (n=2): ALCC513, ALCC514

Contra Costa County (n=0):

Santa Clara Co. (n=2): SCRUZ946, SCRUZ991

Solano Co. (n=2): SUMA12158, SUMA9082

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Stuckenia pectinata</i>	83	48.5	10.0	80.0	Y	Y		Y
NV	Algae	50	1.5	0.2	8.0				Y

***Potamogeton* spp. Association**

Common Name: Pondweed Patches

Alliance: *Stuckenia (pectinata)* – *Potamogeton* spp. Herbaceous Alliance

Local Vegetation Description

The Pondweed Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Potamogeton foliosus*. Those herbs often present include *Ceratophyllum demersum*, *Lemna* sp., *Nymphaea odorata*, *Potamogeton nodosus*, and *Stuckenia pectinata*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	71.0	65 – 77	0.5	0 – 1

Local Environmental Description

Elevation: Mean 654 m, Range 298 – 1009 m

Aspect: Flat (1), SE (1)

Slope: 0 degrees

Macro Topography: Bottom (2)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 0%

Soil Texture (field assessed): Muck (2)

Geology (field or map data): Franciscan melange (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Western Diablo Range (1)

Site Impacts

This association has low non-native plant cover (average 6.4%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Nymphaea odorata*.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2020, Holstein 2000, Ratchford et al. 2022b (in progress), Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=2; Alameda County (n=1): ALCC514

Contra Costa County (n=0):

Santa Clara Co. (n=1): SCRUZ991

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Potamogeton foliosus</i>	50	31.0	62.0	62.0				Y
H	<i>Potamogeton</i> sp.	50	27.5	55.0	55.0				Y
H	<i>Ceratophyllum demersum</i>	50	15.0	30.0	30.0				Y
H	<i>Stuckenia pectinata</i>	50	5.0	10.0	10.0				Y
H	<i>Nymphaea odorata</i>	50	5.0	10.0	10.0				Y
H	<i>Potamogeton nodosus</i>	50	3.0	6.0	6.0				Y
H	<i>Lemna</i> sp.	50	0.1	0.2	0.2				Y
NV	Algae	50	4.0	8.0	8.0				Y

***Stuckenia pectinata* Association**

Common Name: Sago Pondweed Patches

Alliance: *Stuckenia (pectinata)* – *Potamogeton* spp. Herbaceous Alliance

Local Vegetation Description

The Sago Pondweed Association forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Dominant herbs include *Stuckenia pectinata*. Herbs that are sometimes present include *Bolboschoenus maritimus*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	70.8	50 – 80	0.5	0 – 1

Local Environmental Description

Elevation: Mean 321 m, Range 0 – 1030 m

Aspect: Flat (3), NE (1)

Slope: 0 degrees

Macro Topography: Bottom (4)

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 0%

Soil Texture (field assessed): Muck (4)

Geology (field or map data): Clayey alluvium (1), Franciscan melange (1), Mixed alluvium (1), Sedimentary (1)

Alameda County Subsections: Western Diablo Range (1)

Contra Costa County Subsections: None

Other Subsections: Delta (2), Fremont - Livermore Hills and Valleys (1)

Site Impacts

This association has very low non-native plant cover (average 0.0%) relative to native cover. No non-native species were recorded by the surveyors.

Classification Comments

Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included. While the data in our classification are from ponds, Boyer and Sutula (2015) show that *Stuckenia* stands are common in

Suisun Bay and west Delta where the water is brackish and subject to fast-moving tidal flows.

References: Buck-Diaz et al. 2012, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Pickart 2006, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Surveys Used for Description

Total: N=4; Alameda County (n=1): ALCC513

Contra Costa County (n=0):

Santa Clara Co. (n=1): SCRUZ946

Solano Co. (n=2): SUMA12158, SUMA9082

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Stuckenia pectinata</i>	100	70.3	50.0	80.0	Y	Y		Y
H	<i>Bolboschoenus maritimus</i>	25	0.5	2.0	2.0				
NV	Algae	50	0.3	0.2	1.0				Y

***Trifolium variegatum* Herbaceous Alliance**



Common Name: White-tip clover swales

NVC Alliance Code: A4175. *Trifolium variegatum* Vernal Pool Alliance

Statewide Description

Trifolium variegatum is dominant or characteristically present in the herbaceous layer with *Aira caryophyllea*, *Avena barbata*, *Briza minor*, *Bromus diandrus*, *Bromus hordeaceus*, *Castilleja attenuata*, *Deschampsia danthonioides*, *Erodium botrys*, *Erodium cicutarium*, *Hedypnois cretica*, *Hesperis matronalis*, *Hypochaeris glabra*, *Juncus bufonius*, *Leontodon saxatilis*, *Lolium perenne*, *Microseris elegans*, *Mimulus guttatus*, *Montia fontana*, *Silene sessilis*, *Trifolium gracilentum*, *Trifolium microcephalum*, *Triphysaria eriantha*, and *Vulpia bromoides*.

Stands form in swales, seeps, moist grassy flats, and intermittent stream channels as a conspicuous mix of native and non-native plants (Klein et al. 2007). Barbour et al. (2005, 2007b) noted that *T. variegatum* occurred within a group of vernal pool vegetation types of short inundation periods distinguished by species such as *Blennosperma nanum*, *Cicendia quadrangularis*, *Lasthenia californica*, *Trifolium variegatum*, and *Triphysaria eriantha*. Their research focused on vernal pools, but stands of *Trifolium variegatum* are also in seasonally moist or saturated upland settings. The relationships between this and other alliances need investigation because this alliance extends beyond vernal pools to these other settings.

We have defined this alliance by using *T. variegatum* as the native indicator species that occurs regularly but varies in dominance both spatially and temporally. In some years or in certain locations, non-native annuals surpass its abundance and cover. In-

depth studies (Bartolome et al. 2007a, Buck 2006, Stromberg et al. 2007) describe the value of identifying persistent native species, even at low cover, as a means to understanding restoration potentials and the natural ranges and ecological variability of these vegetation types.

Pitt and Heady (1978) identified a negative relationship between *Trifolium* cover and annual grass cover. More recently, D'Antonio et al. (2007) discussed seasonal variation and ecological interactions between native and non-native herbs, and Corbin et al. (2007) discussed negative interactions among native *Trifolium* and non-native *Erodium* and annual grasses. Climatic variation in some years favors the dominance of *Erodium* and *Trifolium* species; in some years *Avena* species or *Bromus hordeaceus* dominate. Annual grasses tend to be favored in years when rain starts early, temperatures are relatively warm during germination, and rainfall is regular throughout the wet season. Conversely, *Erodium* and *Trifolium* species appear to be favored during years with a late rain onset or an extended winter or spring drought.

Local Vegetation Description

The White-tip clover swales Alliance forms an intermittent to continuous herbaceous layer. The shrub layer is absent and the tree layer is absent. Characteristic herbs include *Trifolium variegatum*. Those herbs often present include *Deschampsia danthonioides*, *Eleocharis macrostachya*, *Holocarpha virgata*, *Hordeum marinum*, *Juncus bufonius*, *Lasthenia gracilis*, *Lythrum hyssopifolium*, *Plagiobothrys stipitatus* var. *micranthus*, and *Poa annua*, and herbs that are sometimes present include *Bromus hordeaceus*, *Callitriche marginata*, *Epilobium densiflorum*, *Epilobium* sp., *Epilobium torreyi*, *Geranium dissectum*, *Juncus patens*, *Lolium perenne*, *Microseris douglasii*, *Plagiobothrys* sp., *Pogogyne douglasii*, *Rumex pulcher*, *Trifolium barbigerum*, *Trifolium dubium*, *Veronica peregrina* ssp. *xalapensis*, and *Vulpia bromoides*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.0	0 – 0	no data	no data
Herb	63.0	49 – 80	0.3	0 – 0.5

Local Membership Rule

Trifolium variegatum > 50% relative cover, or characterizes the stand, typically > 15% relative cover in the herbaceous layer with a variety of other native and non-native herbs such as *Deschampsia danthonioides*, *Hordeum marinum*, *Lythrum hyssopifolium*, *Plagiobothrys* spp., and others.

Local Environmental Description

Elevation: Mean 928 m, Range 721 – 1057 m

Aspect: SE (2), NE (1)

Slope: 3 degrees

Macro Topography: Bottom (1), Lower 1/3 of slope (1)

Large Rock: Mean 0.1%, Range 0 – 0.2%

Small Rock: Mean 0.2%, Range 0 – 0.4%

Fines Cover: Mean 47.0%, Range 0 – 95%

Litter Cover: Mean 17.7%, Range 0 – 50%

Soil Texture (field assessed): Medium silt loam (1), Moderately fine clay loam (1)

Geology (field or map data): Franciscan melange (2), Ultramafic (type unknown) (1)

Alameda County Subsections: Western Diablo Range (2)

Contra Costa County Subsections: None

Other Subsections: Fremont - Livermore Hills and Valleys (1)

Site Impacts

This alliance has moderate non-native plant cover (average 37.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Bromus hordeaceus*, *Geranium dissectum*, *Hordeum marinum*, *Lolium perenne*, *Lythrum hyssopifolium*, *Poa annua*, *Rumex pulcher*, *Trifolium dubium*, and *Vulpia bromoides*.

Associations in Alameda & Contra Costa Counties

Trifolium variegatum

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021, Klein et al. 2007, Sikes et al. 2023

Global Rarity Rank: G3? **State Rarity Rank:** S3?

Surveys Used for Description

Total: N=3; Alameda County (n=2): ALCC515, ALCC907

Contra Costa County (n=0):

Santa Clara Co. (n=1): R051021624

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Trifolium variegatum</i>	100	19.3	8.0	30.0	Y			Y
H	<i>Hordeum marinum</i>	67	16.7	20.0	30.0				Y
H	<i>Deschampsia danthonioides</i>	67	10.0	12.0	18.0				Y

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Lythrum hyssopifolium</i>	67	3.4	0.2	10.0				Y
H	<i>Juncus bufonius</i>	67	1.7	0.2	5.0				Y
H	<i>Lasthenia gracilis</i>	67	1.7	2.0	3.0				Y
H	<i>Poa annua</i>	67	0.4	0.2	1.0				Y
H	<i>Plagiobothrys stipitatus</i> var. <i>micranthus</i>	67	0.1	0.2	0.2				Y
H	<i>Eleocharis macrostachya</i>	67	0.1	0.2	0.2				Y
H	<i>Holocarpha virgata</i>	67	0.1	0.2	0.2				Y
H	<i>Plagiobothrys</i> sp.	33	8.3	25.0	25.0				
H	<i>Lolium perenne</i>	33	1.7	5.0	5.0				
H	<i>Trifolium dubium</i>	33	0.7	2.0	2.0				
H	<i>Callitriche marginata</i>	33	0.1	0.2	0.2				
H	<i>Geranium dissectum</i>	33	0.1	0.2	0.2				
H	<i>Epilobium torreyi</i>	33	0.1	0.2	0.2				
H	<i>Microseris douglasii</i>	33	0.1	0.2	0.2				
H	<i>Epilobium</i> sp.	33	0.1	0.2	0.2				
H	<i>Trifolium barbigerum</i>	33	0.1	0.2	0.2				
H	<i>Epilobium densiflorum</i>	33	0.1	0.2	0.2				
H	<i>Pogogyne douglasii</i>	33	0.1	0.2	0.2				
H	<i>Rumex pulcher</i>	33	0.1	0.2	0.2				
H	<i>Veronica peregrina</i> ssp. <i>xalapensis</i>	33	0.1	0.2	0.2				
H	<i>Vulpia bromoides</i>	33	0.1	0.2	0.2				
H	<i>Juncus patens</i>	33	0.1	0.2	0.2				
H	<i>Bromus hordeaceus</i>	33	0.1	0.2	0.2				

***Trifolium variegatum* Association**

Common Name: Whitetip Clover Patches

Alliance: *Trifolium variegatum* Herbaceous Alliance

Classification Comments

The association circumscription is the same as that of the alliance for these counties. See above for detailed description.

References: Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Buck-Diaz et al. 2021a, Klein et al. 2007, Ratchford et al. 2023a, Sikes et al. 2023

Global Rarity Rank: GNR

State Rarity Rank: SNR

State Rare: Y

Trifolium variegatum Association
Trifolium variegatum Herbaceous Alliance

***Typha (angustifolia, domingensis, latifolia)* Herbaceous Alliance**



Common Name: Cattail marshes

NVC Alliance Code: A3896. *Typha domingensis* - *Typha latifolia* - *Phragmites australis* ssp. *americanus* Western Marsh Alliance

Statewide Description

Typha angustifolia, *Typha domingensis* or *Typha latifolia* is dominant or co-dominant in the herbaceous layer with *Agrostis stolonifera*, *Argentina egedii*, *Cyperus* spp., *Distichlis spicata*, *Echinochloa crus-galli*, *Eleocharis macrostachya*, *Equisetum telmateia*, *Juncus* spp., *Lemna minuta*, *Lepidium latifolium*, *Oenanthe sarmentosa*, *Persicaria lapathifolia*, *Persicaria punctata*, *Phragmites australis*, *Schoenoplectus americanus*, *Schoenoplectus*

californicus, *Typha ×glauca*, and *Xanthium strumarium*. Emergent trees may be present at low cover, including *Salix* spp.

These species require special considerations for correct identification (see Smith 2000), and they commonly hybridize when they grow in mixed stands. Hybrids between *Typha latifolia* and *T. angustifolia* (*T. ×glauca*) are infertile, but plants are vigorous, and rhizome growth creates large clones, especially in eutrophic, disturbed habitats with unstable water levels. Hybrids between *Typha angustifolia* and *T. domingensis* are highly fertile, and colonies are locally common in the state. *T. angustifolia* was probably introduced from Europe. Its range expansion and hybridization with *T. domingensis* make the use of plot database information difficult because of many misidentified herbarium specimens (Smith 2000).

Most studies in California report mixed stands, so this alliance includes both mixed stands and those with a single dominant. This treatment emphasizes the ecological similarities of the three species, with stand differentiation at the association level. Ecological similarities also exist with stands of larger bulrushes (*Schoenoplectus acutus*, *S. californicus*). Stands where *Typha* and *Schoenoplectus* species share dominance are placed in the *Schoenoplectus* Alliances.

Local Vegetation Description

The Cattail marshes Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Typha angustifolia*. Herbs that are sometimes present include *Atriplex prostrata*, *Bolboschoenus maritimus*, *Distichlis spicata*, *Salicornia pacifica*, *Schoenoplectus acutus*, *Schoenoplectus americanus*, and *Typha latifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.3	0 – 5	3.5	2 – 5
Herb	61.3	14 – 100	1.3	0.5 – 2

Local Membership Rule

Typha latifolia, *T. angustifolia*, and/or *T. domingensis* > 50% relative cover in semi-permanently flooded freshwater or brackish marshes.

Local Environmental Description

Elevation: Mean 9 m, Range -1 – 124 m

Aspect: Flat (17)

Slope: 0 degrees

Macro Topography: Bottom (16), Not recorded (1)

Large Rock: 0%

Small Rock: 0%
Fines Cover: Mean 25.0%, Range 0 – 95%
Litter Cover: Mean 44.9%, Range 0 – 96%

Soil Texture (field assessed): Muck (4), Medium silt loam (3), Peat (2), Fine silty clay (2), Fine sandy clay (2), Moderately fine silty clay loam (2)

Geology (field or map data): Clayey alluvium (9), Alluvium (6), Mixed alluvium (1), Sandstone and other sedimentary (1), Sedimentary (1), Silty alluvium (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1), Eastern Hills (1)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Other Subsections: Delta (13), Suisun Hills and Valleys (2)

Site Impacts

This alliance has low non-native plant cover (average 3.0%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Atriplex prostrata*.

Associations in Alameda & Contra Costa Counties

Typha (latifolia, angustifolia)

Classification Comments

Since the number of surveys of this alliance in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2005, Evens et al. 2014, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Pickart 2006, Reyes et al. 2023a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: G5 **State Rarity Rank:** S5

Surveys Used for Description

Total: N=19; Alameda County (n=3): ALCC505, ALCCREC203, POA1007291741

Contra Costa County (n=1): ALCCREC615

Sacramento Co. (n=1): SSJD0347

San Joaquin Co. (n=1): SSJD0266

Solano Co. (n=13): SUMA12002, SUMA12014, SUMA12020, SUMA12045, SUMA12082, SUMA12161, SUMA12174, SUMA6049, SUMA6067, SUMA6088, SUMA6168, SUMA9066, SUMA9144

Alliance Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Typha angustifolia</i>	63	21.7	7.0	78.0				Y
H	<i>Typha latifolia</i>	42	18.2	7.0	85.0				
H	<i>Bolboschoenus maritimus</i>	37	0.7	0.2	7.0				
H	<i>Atriplex prostrata</i>	37	0.2	0.2	2.0				
H	<i>Schoenoplectus acutus</i>	32	2.0	0.2	10.0				
H	<i>Schoenoplectus americanus</i>	26	3.5	0.2	40.0				
H	<i>Distichlis spicata</i>	26	1.7	0.2	25.0				
H	<i>Salicornia pacifica</i>	21	0.3	0.2	5.0				

Typha (latifolia, angustifolia) Association

Common Name: Broadleaf or Narrowleaf Cattail Marsh Patches

Alliance: *Typha (angustifolia, domingensis, latifolia)* Herbaceous Alliance

Local Vegetation Description

The Broadleaf or Narrowleaf Cattail Marsh Association forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. Dominant herbs include *Typha angustifolia*. Herbs that are sometimes present include *Typha latifolia*.

Lifeform	Cover (%) Mean	Cover (%) Range	Height (m) Mean	Height (m) Range
Conifer	0.0	0 – 0	no data	no data
Hardwood	0.0	0 – 0	no data	no data
Regenerating or Shrubby Tree	0.0	0 – 0	no data	no data
Shrub	0.8	0 – 5	3.5	2 – 5
Herb	47.7	26 – 80	1.3	0.5 – 2

Local Environmental Description

Elevation: Mean 26 m, Range -1 – 124 m

Aspect: Flat (4)

Slope: 0 degrees

Macro Topography: Bottom (3)

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 60.3%, Range 1 – 95%

Litter Cover: Mean 34.0%, Range 4 – 91%

Soil Texture (field assessed): Medium silt loam (2)

Geology (field or map data): Alluvium (3), Sandstone and other sedimentary (1), Sedimentary (1), Silty alluvium (1)

Alameda County Subsections: East Bay Hills - Mount Diablo (1), East Bay Terraces and Alluvium (1), Eastern Hills (1)

Contra Costa County Subsections: East Bay Terraces and Alluvium (1)

Other Subsections: Delta (2)

Site Impacts

This association has low non-native plant cover (average 2.8%) relative to native cover. Non-native species that occur with highest frequency and abundance include *Eichhornia crassipes* and *Rumex pulcher*.

Classification Comments

One survey did not identify the *Typha* to species level, but *Typha* spp. are 100% constant in this association. Since the number of surveys of this association in Alameda and Contra Costa Counties are low, data from nearby counties were included.

References: Buck-Diaz et al. 2021a, Buck-Diaz et al. 2023, Evens and Kentner 2006, Evens and San 2005, Evens et al. 2014, Hickson and Keeler-Wolf 2007, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Pickart 2006, Ratchford et al. 2022b (in progress), Ratchford et al. 2023a, Reyes et al. 2023a, Sikes et al. 2021, Sikes et al. 2023

Global Rarity Rank: GNR **State Rarity Rank:** SNR **State Rare:** N

Surveys Used for Description

Total: N=6; Alameda County (n=3): ALCC505, ALCCREC203, POA1007291741

Contra Costa County (n=1): ALCCREC615

Sacramento Co. (n=1): SSJD0347

San Joaquin Co. (n=1): SSJD0266

Association Stand Table

Column headings: Con = Constancy, Avg = Average Absolute Cover, Min = Minimum Absolute Cover, Max = Maximum Absolute Cover, Ch = Characteristic, D = Dominant, cD = Co-dominant, Oft = Often; **Content abbreviations:** T = Tree, R = Regenerating or Shrubby Tree, S = Shrub, H = Herb, NV = Non-vascular, Y = Yes, N = No

Layer	Taxon	Con	Avg	Min	Max	Ch	D	cD	Oft
H	<i>Typha angustifolia</i>	50	14.7	20.0	40.0				Y
H	<i>Typha latifolia</i>	33	20.8	60.0	65.0				