

# **Classification of the Vegetation of Modoc and Lassen Counties, California**



**California Department of Fish and Wildlife Vegetation Classification and Mapping  
Program  
California Native Plant Society Vegetation Program**

**Authors:**

**Rachelle Boul, Todd Keeler-Wolf, Jaime Ratchford, Torrance Haynes, Diana  
Hickson, Betsy Harbert, Rosie Yacoub, Julie Evens**



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## **ABSTRACT**

This report describes 61 alliances and 83 associations found throughout the Modoc Plateau and NW Ecoregions (USDA) within Modoc and eastern Lassen counties, California, following a 4-year data collection and analysis process, the most complete to date for northeastern California. 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 is the basis for an integrated vegetation map of the same area expected to be completed in 2021 by CSU Chico's Geographical Information Center (GIC). Ecologists with the California Department of Fish and Wildlife's (CDFW) Vegetation Classification and Mapping Program (VegCAMP) and the California Native Plant Society (CNPS) analyzed species data from 857 field surveys collected in the study area between 2016 and 2020. The data include 627 surveys collected from 2016 to 2019 with funding provided by CDFW Region 1 specifically for this classification effort. An additional 230 surveys collected immediately adjacent to the study area by CNPS through funding from the Bureau of Land Management (BLM) are included in the analysis, providing a broader, regional understanding. Nearly 1200 samples from the US Forest Service, recent Assessment Inventory and Monitoring (AIM) BLM-NRCS field samples, surveys from the US National Parks Service for Lava beds National Monument, and VegCAMP surveys from past vegetation projects that were collected within the Modoc Plateau and NW Ecoregions (USDA) were also included in the analysis. A total of 8 tree-overstory, 25 shrub, and 28 herbaceous alliances are described, with 14 tree-overstory, 41 shrub, and 29 herbaceous associations. Included within this report is a project introduction, methods, and results. It includes a floristic key to all vegetation types, descriptions and stand tables for all alliances and associations included in the study area, a table showing the full local classification nested within the USNVC hierarchy, and a crosswalk showing the relationship between this and other classification systems. The descriptions summarize distributional, structural, environmental, and plant species data for each type.

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## **CONTRIBUTORS**

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### **Field/Office Staff and Data Analysts:**

Adam Hoeft	Kendra Sikes
Aicha Ougzin	Laura Askim
Amy Henderson	Lorin Groshon
Anne Klein	Mary Jo Colletti
Betsy Harbert	Melanie Gogol-Prokurat
Brett Hall	Mike Dolan
Brian Kreb	Nora Bales
Catherine Curley	Pete Figura
Dana Keeler-Wolf	Rachelle Boul
Dennis Odion	Raphaella Floreani
Diana Hickson	Rosalie Yacoub
Groff Long	Sean Smith
Ioana Anghel	Sophia Winitzky
Jaime Ratchford	Teresa LeBlanc
Josie Crawford	Thomas Hender
Julie Evens	Todd Keeler-Wolf
Kari Lewis	Virginia Danes
Katie Heard	

This report was assembled by Torrance Haynes and edited by Betsy Harbert and Diana Hickson.





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## INTRODUCTION

### Project Design and Funding

This project was initiated with funding managed within Region 1 of the California Department of Fish and Wildlife (CDFW) to mitigate impacts resulting from the construction of the Tuscarora Pipeline in the late 1990's for transport of natural gas (<https://www.tcenergy.com/operations/-natural-gas/tuscarora-transmission-system/>) across a north-south trending portion of the Modoc Plateau and adjacent NW Basin and Range ecoregions (Figure 1). The vegetation sampling and subsequent mapping of the pipeline footprint and surrounding areas was completed to determine threats and changes to sensitive plant and animal species and vegetation within the ecosystems affected by the pipeline project. The Wildlife Conservation Board also provided partial funding for this project under the grant WC-1411TR, Statewide Digital Classification and Mapping System for Multiple Users.

Under the guidance of the Vegetation Classification and Mapping Program (VegCAMP), this project followed an ecoregional-wide sampling and classification perspective as much as possible in order to optimize economies of scale while also sampling ecologically related communities in an effort to better differentiate the nuances of the vegetation of the region. To define Phase 1 and 2 study areas, VegCAMP relied upon the map of USDA Ecological Subsections (Miles and Goudey 1997). The Phase 1 sampling area encompasses a 1.1-million-acre area, including all or portions of the following sections of the Modoc Plateau and NW Basin and Range ecoregions

### Greater sage-grouse

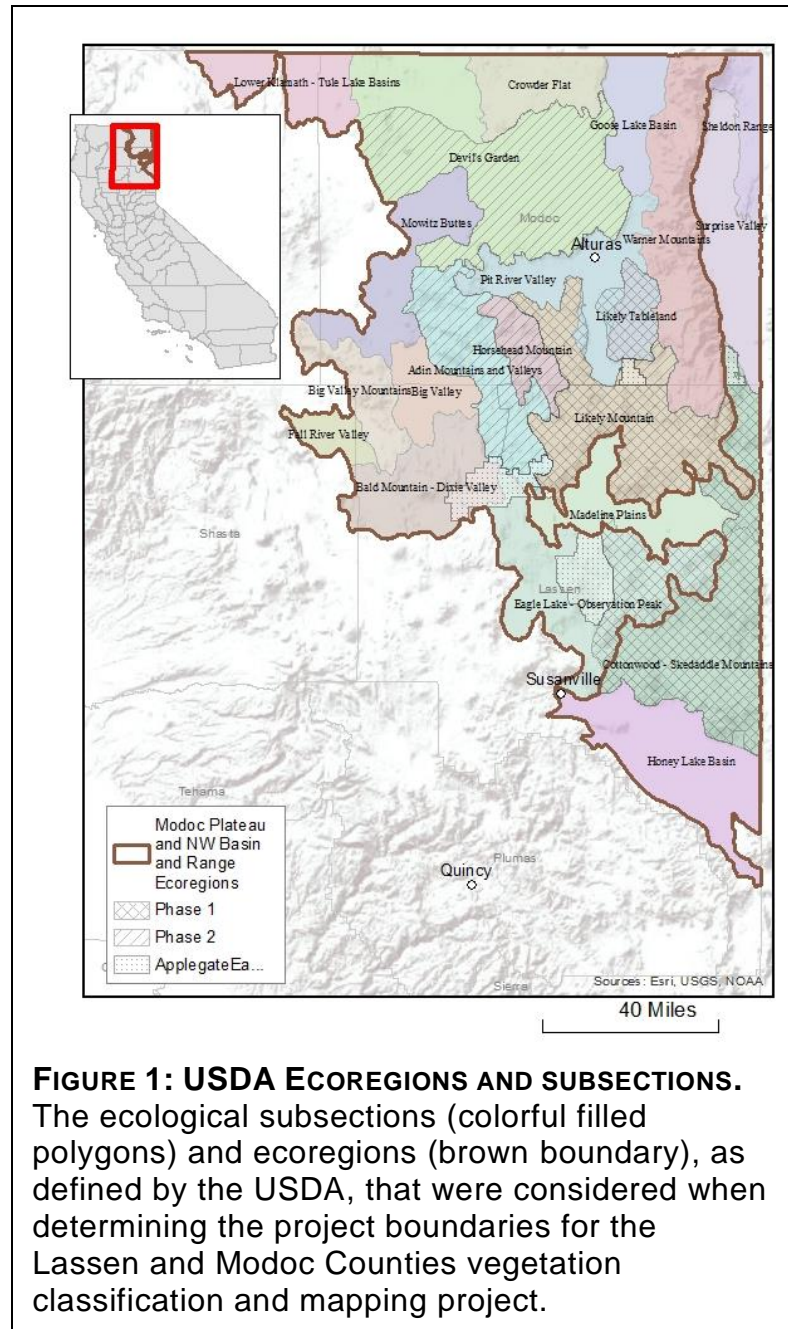


The Greater Sage-Grouse (GSG) is an emblematic game bird of the Intermontane Desert of North America. It is dependent upon large stretches of sagebrush (*Artemisia* spp.) for its primary food source through much of the year. Since the 1800's when they were abundant and easy prey for settlers of the North American West, GSG have been in sharp decline throughout much of their range. This has been especially noticeable in the extremities of the bird's range, including the landscapes of Modoc and Lassen counties. Since 2012, an inter-state and federal partnership of biologists and land managers have been working to understand causes of the decline and determine best management practices to address the decline in GSG populations. The vegetation map from this project is a critical piece to inform better management of the habitat for the Greater Sage-Grouse.

(Figure 1): Likely Tableland (M261Gh), Likely Mountain (M261Gi), Eagle Lake-Observation Peak (M261Gm), Cottonwood – Skedaddle Mountains (342Bd), Pit River Valley (M262Gg). The boundary of the Phase 1 study area excluded large areas of private land (Figure 1) on the Madeline Plains (subsection 342 Be) and the Pit River Valley (M261Gg).

Field staff from VegCAMP and the Geographical Information Center (GIC) at California State University Chico sampled the Phase 1 study area (Figure 2) in 2016 and 2017. In 2017, through funding from the Bureau of Land Management (BLM), the California Native Plant Society (CNPS) sampled the Applegate and Eagle Lake study area, an additional 50,000 acres immediately adjacent to the Phase 1 footprint in the Eagle Lake-Observation Peak and Bald Mountain-Dixie Valley ecological subsections (Figure 1).

In 2018 and 2019, sampling was completed in the Phase 2 study area by GIC and VegCAMP (Figure 2). The Phase 2 study area is approximately 1 million acres and covers most of the Devil's Garden Ecological Subsection, along with all of Horsehead Mountain and the southern portion of Adin Mountains and Valleys (Figure 1). Overall, the cumulative study area is approximately 2.2 million acres.



## Landscape of the Study Area

The project area covers approximately 47% (1.95 million acres) of the Modoc Plateau Ecological Section and 37% (145,000 acres) of the Northwestern Basin and Range Section (Figure 1). The two ecoregions are geomorphically similar, containing primarily Pliocene to Miocene volcanic mountains and Quaternary lakebed deposits. However, the Modoc Plateau is characterized by relatively large areas of flood basalts subsequently uplifted into small fault-block mountains and ridges, while the adjacent NW Basin and Range has a larger proportion of Quaternary alluvium and lake bed deposits named for the overall flat topography. Land areas of gentle slopes include the lava plains that were formed by extensive basalt outflows; the alluvial plains consisting of nearly level intermittent lake basins, sloping alluvial fans, and high alluvial terraces. The steeper areas include the dissected mountain ranges and the fault- or erosion-formed escarpments, such as those that drop from the Devil's Garden to the Pit River Valley level, and from the Likely Tableland to the area around Likely in the alluvial valley floor below. Tremendous volcanic activity has occurred here during the past 60 million years. Though, the bulk of the Modoc Plateau is composed of ancient lava flows and volcanic tuff dating back between 10 and 2 million years ago during the Tertiary period. Vast quantities of basaltic lava and associated pyroclastic materials flowed, or were deposited, over the landscape in almost continuous interbedded masses.

The Modoc Plateau exhibits an elevation range of over 4000 ft, including many steep canyons, escarpments, and mountain slopes. Its diverse geography includes closed basins such as Goose Lake and Surprise Valley, and most of the remainder draining into the Pitt River, a tributary of the Sacramento River. The study area's lowest elevation is along its southern portion near the shores of Honey Lake at the base of the Skedaddle Mountains (4,100 ft). Its highest elevations are on the southern edge of the Warner Mountains Subsection overlooking Surprise Valley (8,100 ft.). Most of the land is between 5,000 ft and 6,000 ft elevation.

Several important ecological gradients operate to influence the distribution of plants and vegetation in the study area including precipitation, temperature, soil texture, and soil chemistry. For example, the White fir (*Abies concolor* Alliance) is the forest community found at the highest elevations within the study area, where precipitation is the highest and winter temperatures are the lowest. Communities characterized by Low sagebrush (*Artemisia arbuscula* Alliance) and subshrub by Buckwheat species (*Eriogonum* spp. / *Poa secunda* Alliance) are often found on smectitic clay soils that crack and swell throughout the year with the ebb and flow of precipitation.

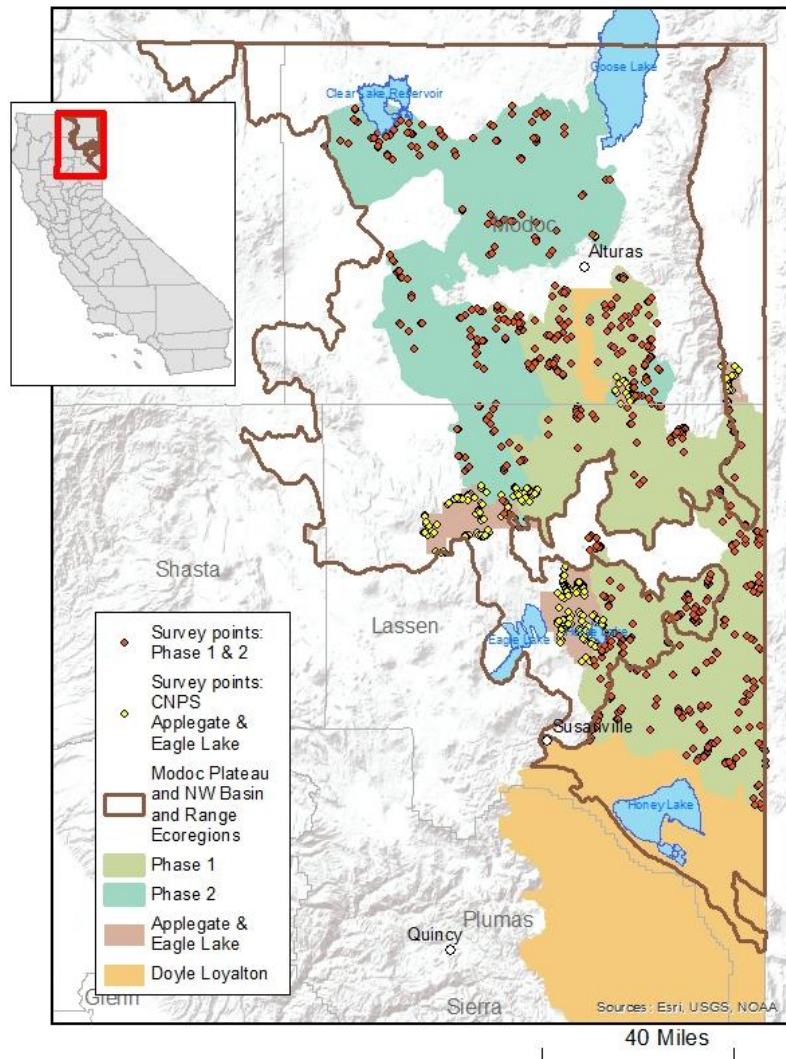
Much of the area is a cool semi-desert. There is a downward trend in mean annual precipitation from the northwestern to the southeastern portions of the study area (USGS 2014). The lowest average annual precipitation (around 6-7 inches) is seen near the southeastern edge of the study area adjacent to Honey Lake. The highest average precipitation (around 18-22 inches) is seen in the higher mountains to the north and west, such as the southern Warner Mountains and Horsehead Mountain. However, local topography and rain-shadow effects also influence local precipitation. The lowest elevation in the northern part of the area is near the town of Likely (4500 ft elevation),



where mean annual precipitation averages 8-9 inches. Although almost 1000 ft higher in elevation, the Madeline Plains in the center of the area, also average 7-9 inches of rain per year. Conversely, the Skedaddle Mountains at > 7500 ft elevation near the southeastern edge of the area average 11-15 inches per year.

The study area has some of the broadest annual seasonal temperature variability in California. Winters are chilly, with average December and January temperatures for Alturas and Susanville being 18- and 23-degrees F, respectively. The growing season is short; only 80 to 110 days throughout most of the lower elevation Modoc Plateau tablelands and adjoining foothills. In the higher elevation mountains, little data is available to accurately determine the length of the frost-free growing seasons. Daytime July-August high temperatures are 88 and 89 degrees F in Susanville and Alturas respectively, but drop to nighttime lows of 42 and 44 in the same months (US Climate data 2020).

Some of the most significant environmental differences across the study area are in soil texture and soil chemistry. Soils are highly clay-rich on old Pliocene basalt flows such as on the Likely Tablelands, where saturated Karcak-Ninkar Clays make car travel virtually impossible during the winter- to mid-spring. The extremely coarse and well drained substrates in Ash Valley are harsh and fast drying with a shallow duripan only a few inches below the surface, while the deep lacustrine deposits at Horse Lake and Painter Flat are deep alkaline silty clays. These variations in substrate have supported



**FIGURE 2:** The 627 field samples collected for the Modoc and Lassen counties vegetation mapping project collected by GIC and VegCAMP in 2016, 2017, and 2018 (orange points). The yellow points are an additional 230 points collected by CNPS for a separate project in 2018 and 2019.

relatively high plant endemism, including argylophiles (clay-loving species), vernal pool species, pumice and pyroclastic flow species, and saline and alkaline species. Despite the fact that both the Modoc and adjacent NW Basin and Range Ecoregions contain similar ranges in soil texture and chemistry, precipitation, and temperature, there are several discrete patterns of vegetation that largely adhere to these ecoregional boundaries. The Dwarf black sagebrush scrub (*Artemisia nova* Alliance) has only been sampled and mapped in the Cottonwood-Skedaddle Mountains subsection of the Basin and Range Section. This is also true of the few stands of Shadscale scrub (*Atriplex confertifolia* Alliance) and most of the Greasewood scrub (*Sarcobatus vermiculatus* Alliance). Conversely, the large majority of the Western juniper woodland (*Juniperus occidentalis* Alliance) stands are on the Modoc Plateau and very rarely in the adjacent Basin and Range Section. This is also true with the White fir forest (*Abies concolor* Alliance) and the Jeffrey pine forest (*Pinus jeffreyi* Alliance).

## METHODS

### Sample Allocation

Prior to field sampling in Phase 1, a Generalized Random Tessellation Stratified (GRTS) survey design was used to generate a target sample point allocation using GIS and R software. The allocation approach attempted to balance three goals: 1) generating a target number of samples based on workload predictions for staff conducting the field surveys; 2) distributing samples among the vegetation types so that both rare and common types are represented; and, 3) facilitating access to sites based on land ownership and proximity to roads or trails. This approach, in combination with manual photo-interpreted sample allocation and subjective identification of stands across a landscape through reconnaissance, maximized efficiencies that enabled more samples to be collected while also increasing the diversity of vegetation types sampled. The target sample points were used to direct exploration at the point and surrounding area for homogeneous stands of vegetation to sample, rather than a fixed sampling location. More than one vegetation type could be sampled in the area surrounding the target sample point if the sampling locations were greater than 500m apart to control for autocorrelation. In addition, field crews carried a list of vegetation types that potentially occur within the study area and kept a running tally of the number of samples collected for each type. This ensured that samples were distributed proportionally across all types and that all types were sampled.

The GRTS survey design used the Calveg vegetation dataset (Calveg 2002) and the National Wetlands Inventory (NWI) (<https://www.fws.gov/wetlands/Data/Mapper.html>, 2016) dataset to stratify the allocation of sample target points. Footprints of fires since the year 2000 from the CalFire dataset were used to further constrain the allocation so that proportionally fewer points were allocated in recently burned areas. The allocation area was bounded within 2 km of roads (some digitized) that occurred within parcels found in the 2015 California Protected Areas Database (CPAD) and augmented by CDFW lands acquired as mitigation in the project area. Stratification was based on unique cover type combinations between CalVeg, NWI, and CalFire layers across the

study area. The GRTS module in the R statistical package (R Core Team 2013) was employed to assign 206 target points with 29 additional locations as backup. Additionally, imagery was used by VegCAMP ecologists to identify unique signatures as potential targets for sampling. For sampling efforts conducted in the Phase 2 and Applegate - Eagle Lake study areas, all allocation targets were allocated visually, based on what was known about the classification of the area after the first round of classification.

## Field Sampling

Sampling of Phase 1, 2, and Eagle Lake and Applegate study areas was conducted in 2016-2019 by field crews from the Geographical Information Center (GIC), VegCAMP, and CNPS using the “Combined Vegetation Rapid Assessment and Relevé Field Form” and “Protocol for Combined Vegetation Rapid Assessment and Relevé Sampling Field Form” (Appendix A). A total of 857 stands were sampled, 627 from the Phase 1 and 2 study areas and 230 from the Applegate and Eagle Lake study area. Sample locations were placed in homogeneous stands of vegetation and 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. Complete species lists were recorded for plot-based Relevé surveys, while the most dominant and/or characteristic species were recorded for Rapid Assessments. Percent cover estimates to the nearest 1% were recorded for all recorded species.

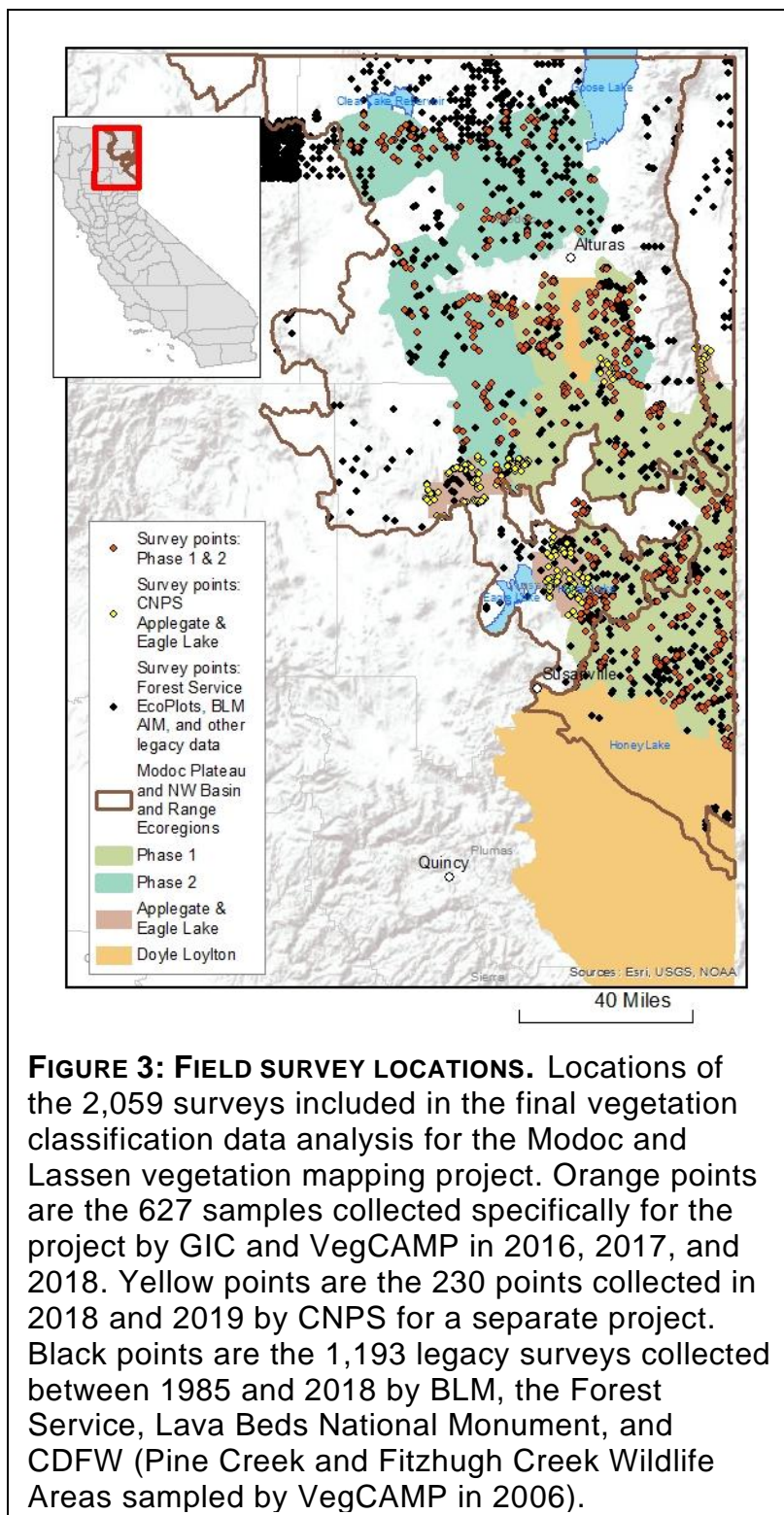
Figure 2 shows the distribution of field samples collected during this project. All data were recorded on paper field forms. Spatial information and a subset of the data included on the forms were captured on GPS-enabled devices. Spatial data were stored in an Esri geodatabase feature class. Survey data from field forms and field devices were entered into a Survey of California Vegetation (SCV)-compliant Microsoft Access database by GIC and CNPS staff and were quality-controlled for accuracy by VegCAMP.

Species names were entered in the survey database as they were recorded in the field, but the PLANTS Database (USDA NRCS 2015) was used as the standard for nomenclature (both botanical names and accompanying codes) for the final classification. A prefix of “2JM” was applied to codes for taxa not in PLANTS but recognized by *The Jepson Manual Online* (Jepson Flora Project 2015). General vegetation types, such as moss and lichen, also have codes beginning with the number 2 (e.g., 2MOSS).



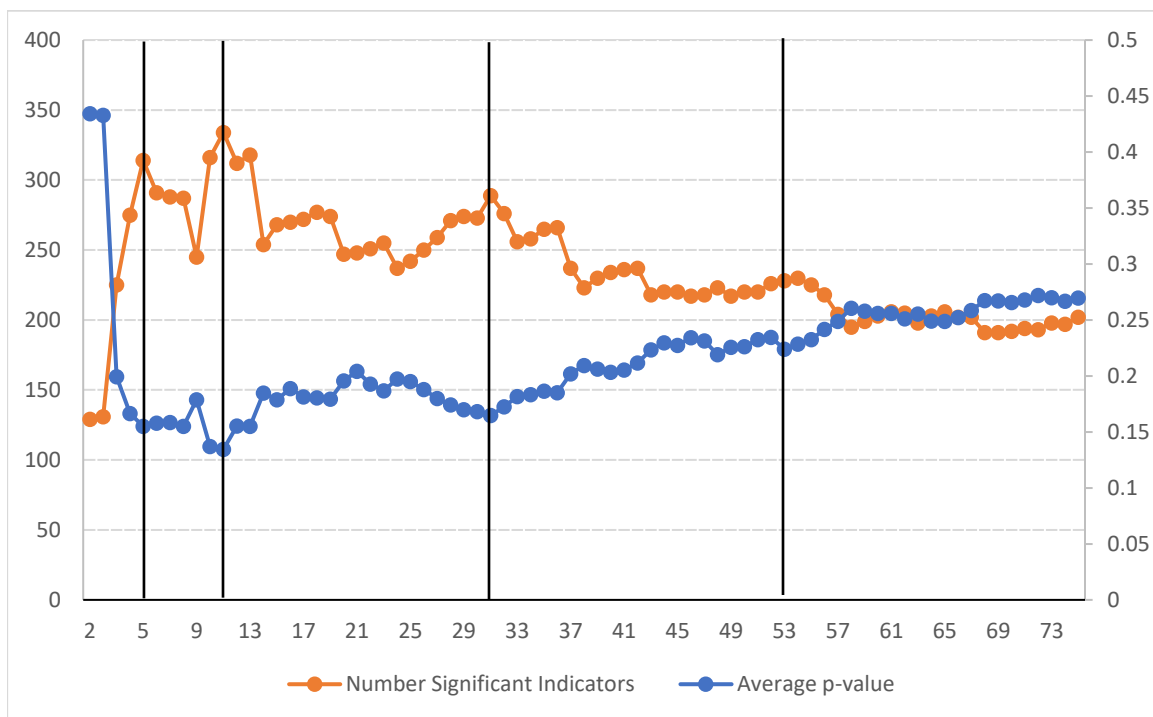
## Data Analysis

Vegetation Rapid Assessments and Relevé data were classified using a hierarchical agglomerative cluster analysis to define vegetation types by VegCAMP in 2016, 2017, 2018, and 2019. The classification was updated based on this analysis after every field season to help direct and prioritize sampling for the following field season. These intermediate classifications, conducted from 2016 to 2018, only used samples collected from the Phase 1, Phase 2, and portions of the Applegate/Eagle lake areas based on the timing of these sampling efforts. The final data analysis was conducted in 2019, using all 857 samples from the Phase 1, Phase 2, and Applegate and Eagle Lake study areas. In addition, 1,193 existing surveys from USFS Eco plots collected on the Modoc National Forest in the late 1980's and early 1990's and recently collected Assessment Inventory and Monitoring (AIM) BLM-NRCS (<https://jornada.nmsu.edu/aim>) sampled within the Modoc Plateau and NW Basin and Range Ecoregions, samples from the US National Parks Service for the Lava beds National Monument, and VegCAMP surveys from past projects were also included (Figure 3). The criteria for selecting these were to expand representation of 1) surveys in portions of the study area where new surveys were not



collected and 2) vegetation types that were under-sampled following the project-funded data collection. In addition, we paid specific attention to issues of autocorrelation, selecting a spatially balanced subset of these legacy plots. The final number of samples analyzed was 2,059. Figure 3 shows the location of all the surveys included in the final vegetation classification analysis.

For the final cluster analysis, VegCAMP analyzed species cover data for hierarchical agglomerative cluster analysis using the PC-Ord 6.08 software (McCune and Mefford 1997). Abundance (cover) values for all taxa were relativized using “General Relativization” in PC-Ord. The data were then screened for outliers using the Sorensen (Bray-Curtis) Distance Measure and all surveys and species greater than three standard deviations away from the mean were removed, resulting in the elimination of 426 species and 9 surveys from the analysis. An additional 317 species were removed from the analysis because they were found in fewer than 5 samples or were reported only in the 9 outlier surveys (Appendix C). The final cluster analysis, which included 588 taxa and 2050 plots, used the Sorensen 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). The primary and secondary matrices were utilized in R 3.1.0 to perform indicator species analysis (ISA) with vegan: Community Ecology Package (Oksanen et al., 2019). ISA produced indicator values for each species across different cluster group levels (ranging from 2 to 59), testing for statistical significance using a quantitative/binary response with 4999 randomizations (Dufrêne and Legendre 1997). Based on the ISA, the data was clustered into 53 groups to test for autocorrelation using the “Near” spatial analysis tool in ArcMap. Eighty-six surveys were removed after reviewing all surveys that fell within the same group and were within 500 meters of one another. The final cluster group level for the classification was selected by the group level with the highest numbers of statistically significant indicator species while maintaining the lowest mean p-values across indicator species (McCune and Grace 2002).



**FIGURE 4.** Indicator species analysis run for different numbers of groups. Cluster groupings 5, 11, 31, and 53 show relatively low p-values and concomitantly high numbers of significant indicator species.

As a result of the cluster analysis and ISA, samples were partitioned into 5, 11, 31, 53, and 140 groups based on cluster membership (Figure 4). See Appendix E for a sample of the resulting cluster analysis dendrogram. To further refine these vegetation types and understand how these fit into the existing MCV and NVC, membership rules for assigning samples to vegetation types were developed. Membership rules were primarily based on 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 the Survey of California Vegetation (SCV) (VegCAMP 2020) and the U.S. National Vegetation Classification (USNVC) (FGDC 2008). 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 and other important or indicator species in the understory; 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, and division, and upwards through the formation, subclass and class levels.

## **RESULTS**

### **Taxa**

A total of 1,331 taxa (including subspecies and synonyms) were recorded in the 2,059 field surveys included in the analysis and are listed in Appendix D. Of these, twenty-eight are considered rare in California. These twenty-eight taxa, their rarity ranks, and the vegetation types in which they were observed are listed in Appendix F.

### **Classification**

The classification analysis identified a total of 61 alliances and 83 associations in the study area including 8 tree-overstory, 25 shrub, and 28 herbaceous alliances, with 14 tree-overstory, 41 shrub, and 29 herbaceous associations. The classification also resulted in the identification of 3 new alliances and 29 new associations that are restricted in California to the northeastern corner of the state. This classification analysis also expanded the range of 7 vegetation types that were previously described for California. The classified types and their relationship to the U.S. National Vegetation Classification (USNVC) hierarchy are shown in Appendix A.

One purpose of the vegetation classification is to assist in determining the level of rarity and imperilment of vegetation types. The new alliances, alliances with several new associations, and alliances with significant range extensions identified in this project's classification were ranked for their rarity using the standardized ranking criteria used by the NatureServe Element Rank Estimator (Master et al. 2012). This calculator ranks types based on their degree of imperilment as measured by rarity, trends, and threats, with 5 being the least imperiled and 1 being the most imperiled. Ranks of G/S1, 2, or 3 are considered sensitive natural communities; 26 alliances and 48 associations found in the study area meet these criteria (Appendix A).

Descriptions of the classified vegetation types found within the study area, including stand tables, summaries of environmental variables, and maps of the distribution of mapped stands are presented in Appendix I at the end of this report. Review the Manual of California Vegetation Online for broader, California state-wide alliance descriptions (CNPS 2020).

Once the classification was finalized, a field key was developed (Appendix G). The field key is organized by vegetation layer (tree-overstory, shrubland, herbaceous) and then in order of the USNVC hierarchy. It contains the membership rules for each alliance in the classification. A table containing final classification names for each field sample is in the final survey database, which is available from VegCAMP by request.

A crosswalk of vegetation types to two other classifications, the California Wildlife Habitat Relationships (CWHR) and the Classification and Assessment with Landsat of Visible Ecological Groupings (Calveg) is presented in Appendix H.

## **Vegetation Map**

The vegetation map was completed for Phase 1 by GIC in 2019 and is available on BIOS (Schwenkler 2020). The mapping for Phase 2 is currently in progress by GIC and is projected to be completed in the spring of 2021, at which point a combined mapping report will be completed for phase 1 and phase 2 mapping areas. Among other things, the report will include methods and rules used for mapping, the mapping classification used, and field methods employed in support of the mapping. In addition, an important part of following the mapping standards set forth by VegCAMP (VegCAMP 2020) is testing the map for accuracy and reporting the accuracy of each community type mapped. Comprehensive accuracy assessment results will be included in the final mapping report due in the spring of 2021, but preliminary accuracy assessment results for phase 1 can be found in Appendix I of this report.

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<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=102342&inline>



## APPENDIX A: VEGETATION CLASSIFICATION AND HIERARCHY

Vegetation Classification organized within the current USNVC hierarchy. NatureServe global (G) and California state (S) rarity ranks are given for new and mapped types in the Rank column. GNR or CNR are global or California unranked types for which the entire range is not yet known; N/A means the type is not ranked because it is a semi-natural community; “?” indicates our best interpretation, based on the standardized rank estimator, given we have not sampled and mapped all of California; Y and N indicate whether or not an association is rare when more specific rarity ranks have not been assigned; a rank of S4 or S5 indicates a vegetation community that is not sensitive ; a rank of S1, S2 or S3 indicates a sensitive natural community; “–” is used for upper levels of the hierarchy that are not given rarity ranks. The status column indicates whether the type is newly added for this project (New) or had a range extension because of mapping for this project (RE). Vegetation types that denoted with an asterisk (\*) are not included in the key or descriptions because there was no data collected to represent them, but they may be present in the region so we have included them here.

Vegetation Type	Rank	Status
Forest & Woodland Class	–	–
Temperate & Boreal Forest & Woodland Subclass	–	–
Cool Temperate Forest & Woodland Formation	–	–
Rocky Mountain Forest & Woodland Division	–	–
Central Rocky Mountain Dry Lower Montane – Foothill Forest Macrogroup	–	–
Central Rocky Mountain Ponderosa Pine Open Woodland Group	–	–
Pinus ponderosa / Shrub Understory Alliance	GNR/S4	New
Pinus (jeffreyi, ponderosa) / (Ceanothus prostratus – Purshia tridentata) Association	S3	
Pinus ponderosa – Juniperus occidentalis / Artemisia tridentata – Purshia tridentata Association	Y	New
Pinus jeffreyi / Artemisia tridentata ssp. vaseyana / Festuca idahoensis Association	S3	
Pinus ponderosa / Arctostaphylos patula – Purshia tridentata Association	Y	New
Pinus ponderosa var. washoensis / Arctostaphylos nevadensis Association	S1	
Pinus ponderosa var. washoensis / Symphoricarpos spp. / Pseudostellaria jamesiana Association	S1	
Rocky Mountain Subalpine – High Montane Conifer Forest Macrogroup	–	–
Rocky Mountain Subalpine Moist Spruce – Fir Forest & Woodland Group	–	–
Populus tremuloides Alliance	G5/S3	
Populus tremuloides / Symphoricarpos rotundifolius Association	Y	
Vancouverian Forest & Woodland Division	–	–
Southern Vancouverian Montane – Foothill Forest Macrogroup	–	–
Californian Montane Conifer Forest & Woodland Group	–	–
Abies concolor Alliance	G4/S5	
Abies concolor – Pinus ponderosa / Amelanchier alnifolia Association	N	
Pinus ponderosa – Calocedrus decurrens – Pseudotsuga menziesii Alliance	G4/S4	RE



Vegetation Type	Rank	Status
Pinus ponderosa – Calocedrus decurrens / Ceanothus prostratus Association	N	
Cascadian Oregon White Oak - Conifer Forest & Woodland Group	–	–
Quercus garryana Alliance	G4/S3	
Quercus garryana / Ceanothus cuneatus / Festuca idahoensis Association	Y	
Western North American Pinyon – Juniper Woodland & Scrub Division	–	–
Intermountain Singleleaf Pinyon – Juniper Woodland Macrogroup	–	–
Columbia Plateau Western Juniper Open Woodland Group	–	–
Juniperus occidentalis Alliance	G5/S4	
Juniperus occidentalis – (Pinus jeffreyi – Pinus ponderosa) / Cercocarpus ledifolius Association	N	
Juniperus occidentalis / Artemisia arbuscula / Poa secunda Association	N	
Juniperus occidentalis / Artemisia tridentata – Purshia tridentata Association	N	New
Juniperus occidentalis / (Poa secunda – Festuca idahoensis – Pseudoroegneria spicata) Association	N	New
Intermountain Basins Curl-leaf Mountain-Mahogany Woodland & Scrub Group	–	–
Cercocarpus ledifolius Alliance	G5/S4	
Cercocarpus ledifolius – Artemisia tridentata ssp. vaseyana Association	S3	New
Cercocarpus ledifolius Association	N	
Temperate Flooded & Swamp Forest Formation	–	–
Rocky Mountain – Great Basin Montane Flooded & Swamp Forest Division	–	–
Rocky Mountain – Great Basin Montane Riparian & Swamp Forest Macrogroup	–	–
Northern Rocky Mountain Lowland – Foothill Riparian Forest Group	–	–
Populus trichocarpa Alliance	G5/S3	
Warm Temperate Forest & Woodland Formation	–	–
Californian Forest & Woodland Division	–	–
Californian Ruderal Forest Macrogroup	–	–
Californian Ruderal Forest Group	–	–
*Eucalyptus spp. – Ailanthus altissima – Robinia pseudoacacia Alliance	N/A	
Californian Forest & Woodland Macrogroup	–	–
Californian Broadleaf Forest & Woodland Group	–	–
Quercus kelloggii Alliance	G4/S4	
Desert & Semi-Desert Formation Class	–	–
Cool Semi-Desert Scrub & Grassland Formation Subclass	–	–
Cool Semi-Desert Scrub & Grassland Formation	–	–
Western North American Cool Semi-Desert Scrub & Grassland Division	–	–
Great Basin – Intermountain Dry Shrubland & Grassland Macrogroup	–	–
Great Basin-Intermountain Ruderal Dry Shrubland & Grassland Group	–	–
Bromus tectorum – Elymus caput-medusae Alliance	N/A	
Bromus tectorum Association	N/A	
Elymus caput-medusae Provisional Association	N/A	New
Ventenata dubia Provisional Association	N/A	New
Intermountain Semi-Desert Steppe & Shrubland Group	–	–

Vegetation Type	Rank	Status
Krascheninnikovia lanata Alliance	G4/S3	
Chrysothamnus viscidiflorus Alliance	G5/S5	RE
Chrysothamnus viscidiflorus Association	N	
Ericameria nauseosa Alliance	G5/S5	
Ericameria nauseosa Association	N	
Ericameria nauseosa / Bromus tectorum Association	N	
No Alliance	–	–
*Iliamna bakeri stands		
Mojave Mid-Elevation Mixed Desert Scrub Group	–	–
*Ephedra nevadensis – Lycium andersonii – Grayia spinosa Alliance	G5/S3S4	
Intermountain Tall and Dwarf Sagebrush Scrub Steppe Macrogroup	–	–
Intermountain Ruderal Steppe and Shrubland Group	–	–
Bromus tectorum – Elymus caput-medusae Alliance	N/A	RE
Bromus tectorum Association	N/A	
Elymus caput-medusae Provisional Association	N/A	
Ventenata dubia Provisional Association	N/A	
Great Basin – Intermountain Dwarf Shrub Steppe Group	–	–
Artemisia arbuscula Alliance	G5/S4	
Artemisia arbuscula / Poa secunda Association	Y	New
Artemisia arbuscula / Bromus spp. – Elymus caput-medusae Association	N/A	New
Artemisia arbuscula – Eriogonum (microthecum, sphaerocephalum) Association	Y	
Artemisia arbuscula ssp. arbuscula / Festuca idahoensis Association	S3	
*Artemisia arbuscula ssp. longicaulis – Grayia spinosa Shrubland Association	N	
Artemisia nova Alliance	G4/S3	
Artemisia nova / Poa secunda Association	Y	
Eriogonum spp. / Poa secunda Alliance	GNR/S3	New
Eriogonum sphaerocephalum / Poa secunda Association	Y	New
Intermountain Big Sagebrush Steppe & Shrubland Group	–	–
Artemisia tridentata Alliance	G5/S5	
Artemisia tridentata / Distichlis spicata Provisional Association	S3	New
Artemisia tridentata – Ephedra viridis / Pseudoroegneria spicata Association	N	New
Artemisia tridentata Association	N	
Artemisia tridentata – (Ericameria nauseosa) / Bromus tectorum Association	N	
Artemisia tridentata ssp. vaseyana Alliance	G4/S4	
Artemisia tridentata ssp. vaseyana / Festuca idahoensis Association	S3	New
Artemisia tridentata ssp. vaseyana – Symphoricarpos oreophilus / Bromus carinatus Association	N	New
Symphoricarpos oreophilus Association	N	New
Artemisia tridentata – Salvia dorrii – Chamaebatiaria millefolium Association	S3	
Purshia tridentata – Artemisia tridentata Alliance	G4/S4	
Purshia tridentata – Artemisia tridentata Association	Y	

<b>Vegetation Type</b>	<b>Rank</b>	<b>Status</b>
Purshia tridentata – Artemisia tridentata / Achnatherum hymenoides Association	S3	
Tetradymia canescens Provisional Association	Y	New
No Alliance	–	–
*Prunus andersonii Provisional Association		
Great Basin Saltbush Scrub Macrogroup	–	–
Intermountain Shadscale – Saltbush Scrub Group	–	–
Atriplex canescens Alliance	G5/S4	
*Atriplex confertifolia Alliance	G5/S4	
Shrub & Herb Vegetation Formation Class	–	–
Temperate & Boreal Grassland & Shrubland Formation Subclass	–	–
Temperate Grassland & Shrubland Formation	–	–
Western North American Interior Chaparral Division	–	–
Cool Interior Chaparral Macrogroup	–	–
Western North American Montane Scrub Group	–	–
Ceanothus velutinus Alliance	G5/S4	
Ceanothus velutinus Association	N	
Ceanothus velutinus – Prunus emarginata – Artemisia tridentata Association	Y	New
Prunus emarginata – Holodiscus discolor Alliance	G4/S4	RE
Prunus emarginata Association	N	
Holodiscus discolor Association	Y	New
Ribes velutinum Provisional Association	Y	New
Amelanchier utahensis – Cercocarpus montanus – Cercocarpus intricatus Alliance	G4/S3	RE
Amelanchier utahensis Association	S1	New
Cercocarpus montanus / Pseudoroegneria spicata Association	Y	New
Prunus virginiana Alliance	G4/S4	
Prunus virginiana / Symphoricarpos rotundifolius Association	S4	New
Arctostaphylos patula - Arctostaphylos nevadensis Alliance	G5/S3S4	
Arctostaphylos patula Association	N	
Arctostaphylos patula – Ceanothus velutinus Association	Y	New
Chrysolepis sempervirens Alliance	G4/S3	
Chrysolepis sempervirens Association	S3	
Western North American Grassland & Shrubland Division	–	–
Central Rocky Mountain Montane – Foothill Grassland & Shrubland Macrogroup	–	–
Central Rocky Mountain Lower Montane, Foothill & Valley Grassland Group	–	–
Festuca idahoensis – Pseudoroegneria spicata – Poa secunda Alliance	GNR/S3	
Pseudoroegneria spicata – Poa secunda Association	S2	
Festuca idahoensis – Pseudoroegneria spicata Association	Y	New
Elymus smithii Unique Stands		
Rocky Mountain-Vancouverian Subalpine-High Montane Mesic Meadow	–	–
Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow	–	–

Vegetation Type	Rank	Status
Poa secunda – Muhlenbergia richardsonis – Carex douglasii Alliance	G4?/S3	
Carex douglasii Association	Y	
Mediterranean Scrub & Grassland Formation	–	–
Californian Scrub & Grassland Division	–	–
Californian Ruderal Grassland, Meadow & Scrub Macrogroup	–	–
Californian Ruderal Grassland, Meadow & Scrub Group	–	–
Lolium perenne Alliance	N/A	
Lolium perenne – Lotus corniculatus Association	N/A	
Californian Annual & Perennial Grassland Macrogroup	–	–
Californian Annual Grassland & Forb Meadow Group	–	–
Lotus unifoliolatus Provisional Alliance	G4?/S4?	
Californian Perennial Grassland Group	–	–
Corethrogyne filaginifolia – Eriogonum (elongatum, nudum) Alliance	G4/S4	
Shrub & Herb Wetland Formation Subclass	–	–
Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland Formation	–	–
Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland Division	–	–
Western North American Montane – Subalpine – Boreal Marsh, Wet Meadow & Shrubland Macrogroup	–	–
Western Montane – Subalpine Riparian & Seep Shrubland Group	–	–
Western North American Sparsely Vegetated Rivershore mapping unit	–	–
Salix lasiolepis Alliance	G4/S4	
Salix lasiolepis – Rosa woodsii / Mixed Herbs Association	S3	
Salix boothii – Salix geyeriana – Salix lutea Alliance	GNR/S2	RE
Salix lucida / Poa pratensis Association	Y	
Betula occidentalis Alliance	G4/S2	
Cornus sericea – Rosa woodsii – Ribes spp. Alliance	G5/S3	
Cornus sericea Association	Y	New
Rosa woodsii Association	N	
Rocky Mountain – Great Basin Lowland – Foothill Riparian Shrubland Group	–	–
Artemisia cana Alliance	G5/S3	RE
Artemisia cana (ssp. bolanderi, ssp. viscidula) / Poa secunda Association	Y	New
Salix exigua Alliance	G5/S4	
Vancouverian – Rocky Mountain Montane Wet Meadow & Marsh Group	–	–
Carex (aquatilis, lenticularis) Alliance	G5/S3	RE
Carex aquatilis – Carex lenticularis Association	Y	
Carex simulata Alliance	G4/S3	
Carex simulata Association	Y	
Carex nebrascensis Alliance	G5/S4	
Carex nebrascensis Association	N	
Juncus nevadensis Alliance	G3?/S3	
Juncus nevadensis Association	Y	

Vegetation Type	Rank	Status
Eleocharis quinqueflora Alliance	G4/S4	
Carex scopulorum Alliance	G4/S3	
Carex scopulorum Association	Y	
Juncus arcticus (var. balticus, mexicanus) Alliance	G5/S4	
Juncus arcticus var. balticus – (var. mexicanus) Association	N	
Danthonia californica – Deschampsia cespitosa – Camassia quamash Alliance	GNR/S4	New
Danthonia unispicata – Poa secunda Association	S3	
Hordeum brachyantherum Association	G2	
Deschampsia cespitosa Association	Y	
Scirpus microcarpus Alliance	G4/S2	
Scirpus microcarpus Association	Y	
Solidago canadensis Alliance	G4?/S4?	
Vancouverian Lowland Marsh, Wet Meadow & Shrubland Macrogroup	–	–
Temperate Pacific Freshwater Wet Mudflat Group	–	–
Bidens cernua – Euthamia occidentalis – Ludwigia palustris Alliance	GNR/S4	New
Artemisia douglasiana Provisional Association	N	
Vancouverian Freshwater Wet Meadow & Marsh Group		
Carex (pansa, praegracilis) Alliance	G4?/S3?	
Carex praegracilis Association	Y	
Western North American Vernal Pool Macrogroup	–	–
Californian Vernal Pool Group	–	–
Eleocharis (acicularis, macrostachya) Alliance	GNR/S3S4	
Eleocharis macrostachya Provisional Association	N	
Oregon-Washington-British Columbia Vernal Pool Group	–	–
Navarretia leucocephala ssp. minima – Plagiobothrys cusickii Alliance	GNR/S2	New
Taraxia tanacetifolia – Iva axillaris Provisional Association	Y	New
Arid West Interior Freshwater Marsh Macrogroup	–	–
Arid West Interior Freshwater Marsh Group	–	–
Typha domingensis – Typha latifolia – Typha angustifolia Alliance	G5/S5	
Typha domingensis Association	N	
*Schoenoplectus americanus Alliance	S3	
*Schoenoplectus americanus Association	Y	
Western North American Ruderal Marsh, Wet Meadow & Shrubland Macrogroup	–	–
Western North American Ruderal Marsh, Wet Meadow & Shrubland Group	–	–
Phalaris aquatica – Phalaris arundinacea Alliance	GNR/SNR	
Phalaris arundinacea Association	N	
Poa pratensis – Agrostis gigantea – Agrostis stolonifera Alliance	N/A	
Agrostis (gigantea, stolonifera) Association	N/A	
Poa pratensis Association	N/A	
*Agropyron cristatum Semi-Natural Alliance	N/A	

Vegetation Type	Rank	Status
Salt Marsh Formation	–	–
North American Western Interior Brackish Marsh, Playa & Shrubland Division	–	–
Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland Macrogroup	–	–
North American Desert Alkaline-Saline Wet Scrub group	–	–
Sarcobatus vermiculatus Alliance	G5/S4	
Sarcobatus vermiculatus – Artemisia tridentata Association	S4	New
Sarcobatus vermiculatus – Atriplex confertifolia – (Picrothamnus desertorum, Suaeda moquinii)	S4	
Association		
North American Desert Alkaline-Saline Marsh & Playa Group	–	–
Distichlis spicata Alliance	GNR/S4	
Leymus cinereus – Leymus triticoides Alliance	G3/S3	
Leymus cinereus Association	G2G3/S2?	
Leymus triticoides – Poa secunda Association	Y	
Eleocharis (palustris, rostellata) Alliance	GNR/S2S3	
Eleocharis rostellata Association	G3/S3	
Open Rock Vegetation Class	–	–
Temperate & Boreal Open Rock Vegetation Subclass	–	–
Temperate & Boreal Cliff, Scree & Other Rock Vegetation Formation	–	–
Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation Division	–	–
Western North American Cliff, Scree & Rock Vegetation Macrogroup	–	–
Columbia Plateau cliff, scree and rock mapping unit	–	–
Agricultural & Developed Vegetation Class	–	–
Herbaceous & Woody Developed Vegetation Subclass	–	–
Other Developed Vegetation Formation	–	–
Other Developed Vegetation Division	–	–
Tree Developed Vegetation Macrogroup	–	–
Aquatic Vegetation Formation Class	–	–
Freshwater Aquatic Vegetation Formation Subclass	–	–
Temperate & Boreal Freshwater Aquatic Vegetation Formation	–	–
North American Freshwater Aquatic Vegetation Division	–	–
Western North American Freshwater Aquatic Vegetation Macrogroup	–	–
Western North American Temperate Freshwater Aquatic Vegetation Group	–	–

## **APPENDIX B:**

### **FIELD FORMS AND PROTOCOLS**

(Revised April 27, 2017 for the Lassen-Modoc project)

Page 1



(Revised April 27, 2017 for the Lassen-Mudoc project)

SPECIES SHEET

% NonVasc cover:\_\_\_\_\_ Total % Vasc Veg cover:\_\_\_\_\_

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

**% Cover Intervals for reference:** r = trace, + = <1%, 1-5%, ≥5-15%, ≥15-25%, ≥25-50%, ≥50-75%, ≥75%

**Unusual species:**

# **CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Field Form Modoc–Lassen**

(April 27, 2017)

## **Introduction**

This protocol describes the methodology for both the Relevé and Rapid Assessment (RA) vegetation sampling techniques as recorded in the Combined Vegetation Rapid Assessment and Relevé Field Form. The same environmental data are collected for both techniques. However, the relevé sample is a plot demarcated with a measuring tape, and each species in the plot is recorded along with its cover. The rapid assessment sample is not based on a taped plot, but is based on a visually estimated, usually circular area within a representative portion of the entire stand, with up to 20 of the dominant or characteristic species and their cover values recorded.

For this project, collect rapid assessments in woody vegetation and relevés in herbaceous vegetation. Some parts of this project area have not been sampled before, so RAs in woody vegetation may list more than 20 species.

## **Defining a Stand**

A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as a portion of a vernal pool, and some may be several square kilometers in size, such as a forest type. All samples should be in stands that meet the minimum mapping unit of 1 acre for upland and 0.5 acre for special stands such as small wetlands, riparian and serpentine barrens.

A stand is defined by two main unifying characteristics:

- 1) 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 indistinct.
- 1) 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, 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 structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous (uniform in structure and composition throughout).

## **Selecting a bounded plot (Relevé) or representative area (Rapid Assessment) to sample within a stand**

Stands to be sampled may be selected by evaluation prior to a site visit (e.g., from aerial photos) or they may be selected on site during reconnaissance to determine extent and boundaries, location of other similar stands, etc.

Because many stands are large, it may be difficult to summarize the species composition, cover, and structure of an entire stand. We are usually trying to capture the most information as efficiently as possible. Thus, we are typically forced to select a representative portion to sample.

When sampling a stand of vegetation, the main point is to select a sample that, in as many ways possible, is representative of that stand. This means that you are not randomly selecting a plot; on the contrary, you are actively using your own best judgment to find a representative example of the stand.

Selecting a relevé plot or RA area requires that you see enough of the stand you are sampling to feel comfortable in choosing a representative plot location. Take a brief walk through the stand and look for variations in species composition and in stand structure. In hilly or mountainous terrain, look for a vantage point from which you can get a representative view of the whole stand. Variations in vegetation that are repeated throughout the stand should be included in your plot. Once you assess the variation within the stand, attempt to find an area that captures the stand's common species composition and structural condition to sample.

### **Tracking sampled vegetation types**

For large projects, the number of samples should be tracked daily or weekly by field-assessed Alliance type so that samples are spread as evenly as possible over types and time is not wasted collecting excessive numbers of samples of certain types. When multiple teams are in the field in the same week, daily communication between teams about Alliances sampled can ensure even sampling. *Prior to selecting a stand to sample, determine if what you are going to sample is needed based on this Alliance tracking.*

### **Selecting plots to avoid spatial autocorrelation**

When possible, do not sample adjacent stands. Do not take more than one sample of the same vegetation type within a sub-watershed. Exceptions can be made due to limited access to private lands. For example, samples from different formations, subclasses or classes (e.g., wetlands vs. uplands, lithomorphic vs. mesomorphic) may be sampled in the same sub-watershed, however, avoid sampling a grassland adjacent to an open woodland, even though they are technically different formations.

### **Plot Size**

For this project, the herbaceous relevé plot size is 100 m<sup>2</sup>. In a very few cases, such as vernal pools, the plot size can be less (10 m<sup>2</sup>).

### **Plot Shape**

A relevé has no fixed shape, though plot shape should reflect the character of the stand and is either a square or a rectangle. Adjust the orientation and dimensions of the plot

to incorporate the best approximation of stand homogeneity. If the stand is about the same size as a Relevé, the plot boundaries may be similar to that of the entire stand. If we are sampling streamside riparian or other linear communities, our plot dimensions should not go beyond the community's natural ecological boundaries. Thus, a relatively long, narrow plot capturing the vegetation within the stand, but not outside it, would be appropriate. Species present along the edges of the plot that are clearly part of the adjacent stand should be excluded from the plot.

### **Location of GPS Points**

For Relevés, one corner will be considered the plot Identifier (ID point) and should be in the SW corner, if possible. If it is taken in another corner, this should be noted in the Site History section.

### **Definitions of fields in the Field Form**

#### **I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION**

**Relevé or RA:** Circle the appropriate survey type.

**Database #:** This is the unique ID number for Relevés and Rapid Assessments, in the form of PPPPxxxx, where PPPP is the 4-character project code and xxxx is a unique 4-digit number (e.g. MOLA0001 for Modoc-Lassen sample #1). If this is a long term plot, a character from A to Z can be added to the unique ID for each re-sampling survey; so the first re-sample for MOLA0001 would be MOLA0001A.

**Date:** Date of the sampling.

**Name of recorder:** The full name of the recorder should be provided for the first field form for the day. On successive forms, initials can be recorded.

**Other Surveyors:** The full names of each person assisting should be provided for the first field form for the day. On successive forms, initials of each person assisting can be recorded.

**Allocation UID:** The ID of a previously assigned point that was created to suggest survey locations. You can find this ID on the field map or the GPS device map.

**Location Name:** The name of the property or park, or the location within large holdings (like USFS or BLM properties).

**GPS name:** The name/number assigned to each GPS unit. This can be the serial number if another number is not assigned.

**Bearing°, left axis at ID point of Long / Short side:** Fill this in for Relevés only. For square or rectangular plots: from the ID Point, looking towards the plot, record the bearing of the axis to your left. If the plot is a rectangle, indicate whether the left side of the plot is the long or short side of the rectangle by circling "long" or "short" side (no need to circle anything for square plots). If there are no stand constraints, set up the plot with boundaries running in the cardinal directions and place the ID Point in the SW corner.

**UTM coordinates:** Easting (**UTME**) and northing (**UTMN**) location coordinates using the Universal Transverse Mercator (UTM) grid. Record the information from your GPS unit. These coordinates are always the base point of the survey. Soil samples and photos are taken from this point, and exposure, steepness, topography, etc. are measured here. If the GPS is not within the stand (i.e., the point is projected), these are the UTM's of the base point.

*For Relevé plots, take the GPS point in the southwest corner of the plot whenever possible or in the center of a circular plot.*

**Zone:** Universal Transverse Mercator zone. Zone 10 is for California west of the 120<sup>th</sup> longitude; zone 11 is for California east of 120<sup>th</sup> longitude. The UTM Zone is 10 for this project.

**NAD83:** This is the default GPS datum. If you use a different one, cross this out and write in the correct datum.

**GPS error: ft./ m./ PDOP:** Circle the appropriate unit of measure and record the error reading from the GPS unit.

**Decimal degrees:** *Use this only if your GPS unit will not record UTM coordinates.* Latitude–Longitude reading in decimal degrees. Record the information from your GPS unit. These coordinates are always the base point of the survey. Soil samples and photos are taken from this point, and exposure, steepness, topography, etc. are measured here.

*For Relevé plots, take the waypoint in the southwest corner of the plot whenever possible or in the center of a circular plot.*

**GPS within stand? Yes / No:** Circle “Yes” to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed for a Rapid Assessment, or circle “No” if the waypoint was taken at a distance from the stand (such as with a binocular view of the stand). If the point is taken at the edge of the stand, note the direction to the stand.

**If No, cite from GPS to stand: distance (m), bearing°, inclination°:** From the base GPS point, measure the distance to the projected point using a range finder. Record the compass bearing from the base point to the projected point; record the inclination if the base and projected points are not at the same elevation.

**and record Base point ID:** This is the waypoint # of the base GPS point, where the surveyors were standing to record the distance survey.

**and Projected UTM's:** These are the coordinates of the projected point, the point being surveyed. They are generated in the field if the GPS units have the ability to calculate projected points. If the GPS unit does not have this capability, make a note to that effect and leave these fields blank.

**Camera Name:** Write the camera name.

**Cardinal photos at ID point:** Take four photos in the main cardinal directions (N, E, S, W) clockwise from the north, from the ID Point, and record the jpeg numbers here. Try to include the horizon in at least some of these photos. If this is a distance survey to a projected point, take the four cardinal photos at the base point and at least one photo of the stand. A digital camera with a minimum 10 megapixel resolution must be used.

**Other photos:** This may include cardinal photos at additional corners or other relevant photos. Notes regarding photo locations or subjects can go here.

**Stand Size:** Estimate the size of the entire stand in which the sample is taken. As a measure, one acre is about 4,000 square meters (approximately 64 x 64 m), or 208 feet by 208 feet. One acre is similar in size to a football field.

**Plot Size:** If this is a Relevé, circle “100” for a 100m<sup>2</sup> plot, or record the plot size.

**Plot Shape:** Record the length and width of the Relevé plot in meters.

**RA Radius:** Enter the radius in meters of the visually estimated sample area for Rapid Assessments (should be a 20-meter radius at minimum). For a large stand, this limits the area covered by the RA. If you can see and assess the entire stand, the length and width should be recorded. If it is a long, narrow stand, note the width of the stand at your location. If your point is on the edge of the stand, record the radius into the stand, but note your location and the direction to which the RA Radius applies in the Site History section.

**Exposure:** (Enter Actual ° and circle general category): While facing in the general downhill direction, read degrees of the compass for the aspect or the direction you are standing, using degrees from north, adjusted for declination. Average the reading over the entire stand, even if you are sampling a Relevé plot, since your plot is representative of the stand. If estimating the exposure, write “N/A” for the actual degrees, and circle the general category chosen. “Variable” may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

**Steepness:** (Enter Actual ° and circle general category): Read degree slope from your compass. If estimating, write “N/A” for the actual degrees, and circle the general category chosen. Make sure to average the reading across the entire stand even if you are sampling in a Relevé plot.

**Topography:** First assess the broad (**Macro**) topographic feature or general position of the stand in the surrounding watershed, that is, the stand is at the top, upper (1/3 of slope), middle (1/3 of slope), lower (1/3 of slope), or bottom. **Circle all of the positions that apply for macrotopography.**

Then assess the local (**Micro**) topographic features or the lay of the area (e.g., surface is flat or concave). **Circle only one of the microtopographic descriptors.**

**Geology code:** Geological parent material of stand. If exact type is unknown, use a more general category (e.g., igneous, metamorphic, sedimentary). *See code list for types.*

**Soil Texture code:** Record soil texture that is characteristic of the plot (e.g., coarse loamy sand, sandy clay loam). See *soil texture key for types*.

**Upland or Wetland/Riparian:** Indicate if the stand is in upland or wetland/riparian setting. (Wetland and riparian are one category.) Note that a site need not be officially delineated as a wetland to qualify as such in this context (e.g., seasonally wet meadow).

**Restoration Code:** Circle the appropriate code. If you observe more than one type of restoration, circle all codes that apply. “6-Other” should only be used if the restoration type is not described by codes 2-5. Describe the type of restoration for code 6 in the Site History.

**% Surface cover:** The abiotic substrates of the plot. The total should sum to 100%. It is helpful to imagine “mowing off” all of the live vegetation at the base of the plants and removing it – you will be estimating what is left covering the surface. Note that non-vascular cover (lichens, mosses, cryptobiotic crusts) is not estimated in this section.

- H<sub>2</sub>O:** Percent surface cover of running or standing water, ignoring the substrate below the water.
- BA Stems:** Percent surface cover of the basal area of stems at the ground surface. For most vegetation types, BA is 1-3% cover.
- Litter:** Percent surface cover of litter, duff, or wood on the ground.
- Bedrock:** Percent surface cover of bedrock, including outcrops.
- Boulder:** Percent surface cover of rocks >60 cm in the longest dimension.
- Stone:** Percent surface cover of rocks >25–60 cm in the longest dimension.
- Cobble:** Percent surface cover of rocks >7.5–25 cm in the longest dimension.
- Gravel:** Percent surface cover of rocks 2 mm–7.5 cm in the longest dimension.
- Fines:** Percent surface cover of bare ground and fine sediment <2 mm in the longest dimension (e.g., dirt, sand).

**% Current year bioturbation:** Estimate the percent of the plot exhibiting soil disturbance by any organism that lives underground. Do not include disturbance by ungulates. Note that this is a separate estimation from surface cover.

**Past bioturbation present?** Circle Yes if there is evidence of bioturbation from previous years in the plot.

**% Hoof punch:** Note the percent of the plot surface that has been punched down by hooves (cattle or native grazers) in wet soil. Depressions must be >2 cm deep.

**Fire Evidence:** Circle Yes if there is visible evidence of fire within the stand, and note the type of evidence in the “Site history, stand age, comments section,” for example, “charred dead stems of *Quercus berberidifolia* extending 2 feet above resprouting shrubs.” If you are certain of the year of the fire, put this in the Site history section.

**Site history, stand age, comments:** Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors, such as distribution of species. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

**Disturbance code / Intensity (L,M,H):** List codes for potential or existing impacts on the stability of the plant community. See code list for impacts and definitions of levels of disturbance. Characterize each impact each as **L** (=Light), **M** (=Moderate), or **H** (=Heavy). Disturbance is evaluated on a stand basis.

## II. HABITAT AND VEGETATION DESCRIPTION

### California Wildlife Habitat Relationships (CWHR)

*For CWHR, identify the size/height class of the plot using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.*

**Tree DBH:** Circle one of the tree size classes provided when the tree canopy closure exceeds 10% of the total cover, or if young tree density indicates imminent tree dominance. Size class is based on the average diameter at breast height (dbh) of each trunk (standard breast height is 4.5ft or 137cm). When marking the main size class, make sure to estimate the mean diameter of all trees over the entire stand, and weight the mean toward the larger tree dbh's. The “**T6 multi-layered**” dbh size class signifies a multi-layered tree canopy (with a size class T3 and/or T4 layer growing under a T5 layer and a distinct height separation between the classes) exceeding 60% total cover. Stands in the T6 class need also to contain at least 10% cover of size class 5 (>24” dbh) trees growing over a distinct layer with at least 10% combined cover of trees in size classes 3 (>6-11” dbh) or 4 (>11-24” dbh).

**Shrub:** Circle one of the shrub size classes provided when shrub canopy closure exceeds 10% (except in desert types) by recording which class is predominant in the survey. Shrub size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

**Herbaceous:** Circle one of the herb height classes when herbaceous cover exceeds 2% by recording the predominant class in the survey. Note: *This height class is based on the average plant height at maturity, not necessarily at the time of observation.*

## III. INTERPRETATION OF STAND



**Field-assessed vegetation Alliance name:** Enter the name of the Alliance following the Manual of California Vegetation, 2<sup>nd</sup> Edition (Sawyer, Keeler-Wolf and Evens 2009). Please use scientific nomenclature, e.g., *Quercus agrifolia* forest. An Alliance is based on the dominant or diagnostic species of the stand, and usually reflects the uppermost and/or dominant height stratum. A dominant species covers the greatest area. A diagnostic species is consistently found in some vegetation types but not others.

The field-assessed Alliance name may not exist in the present classification, in which case you can provide a new Alliance name in this field. If this is the case, also make sure to state that it is not in the MCV under “Explain” below.

**Field-assessed Association name** (optional): Enter the name of the species in the Alliance and additional dominant/diagnostic species from any strata. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (e.g., *Quercus douglasii* / *Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (e.g., *Quercus lobata* – *Quercus douglasii*).

The field-assessed Association name may not exist in the present classification, in which you can provide a new Association name in this field.

**Adjacent Alliances/direction:** Identify other vegetation types that are directly adjacent to the stand being assessed by noting the dominant species (or known type). Also note the distance in meters from the GPS waypoint and the direction in degrees that the adjacent alliance is found (e.g., *Amsinckia tessellata* / 50m, 360° N or *Eriogonum fasciculatum* / 100m, 110°).

**Confidence in Alliance identification: (L, M, H)** With respect to the “Field-assessed Alliance name,” note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this Alliance name.

**Explain:** Please elaborate if your “Confidence in Alliance identification” is low or moderate. Low confidence can occur from such things as a poor view of the stand, an unusual mix of species that does not meet the criteria of any described Alliance, or a low confidence in your ability to identify species that are significant members of the stand.

**Phenology:** Indicate early (E), peak (P), or late (L) phenology for each of the strata. For herbs, this generally indicates if species are in flower and/or fruit and are therefore identifiable. For shrubs and trees, this attribute generally refers to cover, e.g., a tree that is fully leafed out will be considered peak (P) even if it is not in flower. Phenology is useful for cover estimation and species identification issues, and should be elaborated upon in the next field.

**Other identification or mapping information:** Discuss any further problems with the identification of the assessment or issues that may be of interest to mappers. Note if this sample represents a type that is likely too small to map.

#### IV. VEGETATION DESCRIPTION

**Database #:** Copy the database # from Page 1.

### ***Overall Cover of Vegetation***

Provide an estimate of cover for the life-form categories below. Record a specific number for the total aerial cover or “bird’s-eye view” looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

The porosity of the vegetation should be taken into consideration when estimating percent foliar cover for all categories below: consider how much of the sky you can see when you are standing under the canopy of a tree, or how much light passes through the canopy of the shrub layer to help you estimate foliar cover.

**% NonVasc cover:** The total cover of all lichens, bryophytes (mosses, liverworts, hornworts), and cryptogamic crust on substrate surfaces including downed logs, rocks and soil, but not on standing or inclined trees or vertical rock surfaces.

**Total % Vasc Veg cover:** The total cover of all vascular vegetation taking into consideration the porosity, or the holes, in the vegetation, and disregarding overlap<sup>1</sup> of the various tree, shrub, and/or herbaceous layers and species.

### ***% Cover by Layer***

**Conifer Tree /Hardwood Tree:** The total foliar cover (considering porosity) of all live tree species, disregarding overlap<sup>1</sup> of individual trees. Estimate conifer and hardwood covers separately. **Please note:** These cover values should not include the coverage of regenerating tree species (i.e., tree seedlings and saplings).

**Regenerating Tree:** The total foliar cover of seedlings and saplings, disregarding overlap<sup>1</sup> of individual recruits. See seedling and sapling definitions below.

**Shrub:** The total foliar cover (considering porosity) of all live shrub species disregarding overlap<sup>1</sup> of individual shrubs.

**Herbaceous:** The total cover (considering porosity) of all herbaceous species, disregarding overlap<sup>1</sup> of individual herbs.

### ***Height Class by Layer***

Modal height for conifer tree / hardwood tree, regenerating tree, shrub, and herbaceous categories. Record an average height value for each category by estimating the mean height for each group. Please use the following height intervals to record a height class: 1 = <1/2 m, 2 = 1/2-1 m, 3 = 1-2 m, 4 = 2-5 m, 5 = 5-10 m, 6 = 10-15 m, 7 = 15-20 m, 8 = 20-35 m, 9 = 35-50 m, 10 => 50 m.

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<sup>1</sup> Porosity reduces the total cover of the canopy. Overlapping strata should not be included in the total cover percent; for instance, if a shrub is growing under a tree, only the cover of the tree will be added into the total; the cover of the shrub will be disregarded, except for the amount by which it fills in the porosity of the tree canopy.

*Note: For the herbaceous layer height, this height class is based on the average plant height at the time of observation, as opposed to how this is recorded in the CWHR section (at maturity).*

### **Species List and Coverage**

**For Rapid Assessments:** List up to 20 species that are dominant or that are characteristically consistent within the assessment area. These species may or may not be abundant, but they should be constant representatives in the survey. When different layers of vegetation occur, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. There is a heavy line on the form under the 20<sup>th</sup> line to limit the RA section of the species list.

*Note: If constant, diagnostic, or interesting species occur outside the assessment area but in the stand, list the species and estimated stand cover in the Site History section.*

**For Relevés:** list all species present in the plot, using a second species list page if necessary.

**\*\*** If using a second species list page, note “Continued” on the bottom of the first page and be sure to note the **Database #** on the second page.

**For both sample types**, provide the stratum:

**T = Tree.** A woody perennial plant that has a single trunk.

**A = SApling.** 1" - <6" dbh and young in age, OR small trees that are <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 >6" dbh, then the re-sprouts would be recorded under the “Tree” stratum.

**E = SEedling.** A tree species clearly of a very young age that is <1" dbh or has not reached breast height. Applies only to trees propagating from seed; resprouts are not recorded here even if they meet the size requirements.

**S = Shrub.** A perennial, woody plant, that is multi-branched and doesn't die back to the ground every year.

**H = Herb.** An annual or perennial that dies down to ground level every year.

**N = Non-vascular.** Includes moss, lichen, liverworts, hornworts, cryptogammic crust, and algae.

Be consistent and don't break up a single species into two separate strata. The only time it would be appropriate to do so is when one or more tree species are regenerating, in which case the SEedling and/or SApling strata should be recorded for that species. These may be noted on the same line, e.g.:

Strata	Species	%Cover	C
T/A/E	Quercus douglasii	40/<1/<1	

In some cases, the stratum of a particular species might not be obvious. Some examples are *Juniperus californica*, which has the size and growth habit of a shrub, but it is considered a tree, and mistletoe, which is considered a shrub. It is useful to have a list of species with ambiguous strata for each project. Consult the MCV or contact VegCAMP if you are unsure.

**C.** If a species collection is made, it should be indicated in the collection column with a “C” (for collected). If the species is later keyed out, cross out the species name or description and write the keyed species name in pen on the data sheet. Do not erase what was written in the field, because this information can be used if specimens get mixed up later. If the specimen is then thrown out, add a “T” to the “C” in the collection column (CT = thrown out after confirmation) or cross out the “C”. If the specimen is kept but is still not confidently identified, add a “U” to the “C” in the collection column (CU = collected and unconfirmed). In this case the unconfirmed species epithet should be put in parentheses [e.g., *Hordeum (murinum)*]. If the specimen is kept and is confidently identified, add a “C” to the existing “C” in the collection column (CC = collected and confirmed). If the specimen is later deposited in an herbarium, add a “D” to the existing “C” in the collection column (CD = collected and deposited) and note the receiving herbarium.

Use Jepson Manual nomenclature. Write out the genus and species of the plant. Do not abbreviate except for dominant species that do not have ambiguous codes. If you aren’t sure there aren’t duplicate codes, don’t use a code. When uncertain of an identification (which you intend to confirm later) use parentheses to indicate what part of the determination needs to be confirmed. For example, you could write out *Brassica (nigra)* if you are sure it is a *Brassica* but you need further clarification on the specific epithet.

Provide the % absolute foliar cover for each species listed, considering porosity. When estimating, it is often helpful to think of coverage in terms of the following cover intervals at first:

<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%.

Keeping these classes in mind, refine your estimate to a specific percentage. All species percent covers may total over 100% because of overlap.

Include the percent cover of snags (standing dead) of trees and shrubs. Use the code “SNAG.” Note their species, if known, in the “Species” column (i.e. SNAG – *Quercus wislizeni*).

For Rapid Assessments, make sure that the major non-native species occurring in the stand also are listed in the space provided in the species list with their strata and % cover.

For Relevés, all non-native species should be included in the species list.

Also for Relevés, record the <1% cover in one of two categories: “r” for trace (i.e., rare in plot, or solitary individuals) and “+” for <1% but not rare or solitary individuals.

**Unusual species:** List species that are locally or regionally rare, endangered, or atypical (e.g., range extension or range limit) within the stand. This field will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

**Note:** Field forms are generally filled out in pencil, so that changes may be made easily while working in the plot or stand. Once out of the stand, however, entries on the field form should not be erased, but should be crossed out and corrected in a different-colored ink.

## **APPENDIX C:**

### **INITIALS USED ON FIELD SURVEY FORMS**

AH, APH	Amy Henderson	LA	Laura Askim
AH, ALH	Adam Hoeft	MD	Mike Dolan
AK	Anne Klein	MGP	Melanie Gogol-Prokurat
AO	Aicha Ougzin	MJ	Mary Jo Colletti
BH, BCH	Brett Hall	NHB	Nora Bales
BK	Brian Kreb	PF	Pete Figura
BLH	Betsy Harbert	RB, RDB	Rachelle Boul
CHC, CC	Catherine Curley	RB, RFB	Raphaella Floreani
DH, DEH	Diana Hickson	RY, RAY	Rosalie Yacoub
DKY	Dana Keeler-Wolf	SEW	Sophia Winitzky
DO	Dennis Odion	SS	Sean Smith
IA	Ioana Anghel	TH	Thomas Hender
JC	Josie Crawford	TKW	Todd Keeler-Wolf
JR, JSR	Jaime Ratchford	TL	Teresa LeBlanc
KGS	Kendra Sikes	VD	Virginia Danes
KH	Katie Heard	LO	Lorin Groshon
KL	Kari Lewis	GL	Groff Long

## APPENDIX D:

### PLANT TAXA INCLUDED IN THE MODOC AND LASSEN COUNTIES CLASSIFICATION

A total of 1,331 plant taxa were recorded in the 2,059 field surveys analyzed in the classification. All species are listed below; they are grouped by layer and then ordered alphabetically by species name. Species taxonomy used is from the USDA PLANTS database.

Of the 1,331 plants analyzed in this project, 426 were removed or consolidated before analysis began; these are marked with an \*. An additional 317 species were removed during the analysis because they were found in fewer than five samples or were reported in the nine outlier samples or as an outlier species. These removals are marked with \*\*. The remaining 588 taxa were analyzed to produce the classification.

#### Tree

ABCO	<i>Abies concolor</i>
CADE27	<i>Calocedrus decurrens</i>
CERCO	<i>Cercocarpus</i>
CELE3	<i>Cercocarpus ledifolius</i>
CELE1	* <i>Cercocarpus ledifolius</i> var. <i>intercedens</i>
CEMO2	<i>Cercocarpus montanus</i>
CEMOG	* <i>Cercocarpus montanus</i> var. <i>glaber</i>
JUOC	<i>Juniperus occidentalis</i>
JUOC	* <i>Juniperus occidentalis</i> var. <i>occidentalis</i>
JUOS	** <i>Juniperus osteosperma</i>
PINUS	<i>Pinus</i>
PIAL	** <i>Pinus albicaulis</i>
PICO	<i>Pinus contorta</i>
PIJE	<i>Pinus jeffreyi</i>
PIMO3	** <i>Pinus monticola</i>
PIPO	<i>Pinus ponderosa</i>
PIPOW	* <i>Pinus ponderosa</i> ssp. <i>washoensis</i>
PISA2	** <i>Pinus sabiniana</i>
PIPOW	* <i>Pinus washoensis</i>
POBAT	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
POTR5	<i>Populus tremuloides</i>
POBAT	* <i>Populus trichocarpa</i>
PRUNU	** <i>Prunus</i>
PRVI	<i>Prunus virginiana</i>
PRVID	* <i>Prunus virginiana</i> var. <i>demissa</i>
PSME	** <i>Pseudotsuga menziesii</i>
QUCE2	** <i>Quercus cedrosensis</i>
QUGA4	<i>Quercus garryana</i>
QUKE	<i>Quercus kelloggii</i>
SALUL	* <i>Salix lasiandra</i>
SALUL	* <i>Salix lasiandra</i> var. <i>lasiandra</i>
SALU	<i>Salix lucida</i>
SALUC	* <i>Salix lucida</i> ssp. <i>caudata</i>
SALUL	* <i>Salix lucida</i> ssp. <i>lasiandra</i>

#### Shrub

AMELA	<i>Amelanchier</i>
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AMAL2	<i>Amelanchier alnifolia</i>
AMALS	* <i>Amelanchier alnifolia</i> var. <i>semiintegrifolia</i>
AMPA2	** <i>Amelanchier pallida</i>
AMUT	<i>Amelanchier utahensis</i>
ARNE	<i>Arctostaphylos nevadensis</i>
ARPA6	<i>Arctostaphylos patula</i>
ARCTO3	* <i>Arctostaphylos patula</i>
ARTEM	** <i>Artemisia</i>
ARAR8	<i>Artemisia arbuscula</i>
ARARA	* <i>Artemisia arbuscula</i> ssp. <i>arbuscula</i>
ARARL3	* <i>Artemisia arbuscula</i> ssp. <i>longicaulis</i>
ARARL	* <i>Artemisia arbuscula</i> ssp. <i>longiloba</i>
ARCA13	<i>Artemisia cana</i>
ARCAB3	* <i>Artemisia cana</i> ssp. <i>bolanderi</i>
ARNO4	<i>Artemisia nova</i>
PIDE4	* <i>Artemisia spinescens</i>
ARTR2	<i>Artemisia tridentata</i>
ARTRT	* <i>Artemisia tridentata</i> ssp. <i>tridentata</i>
ARTRV	* <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>
ARTRW	* <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
ATCA2	<i>Atriplex canescens</i>
ATCAC	* <i>Atriplex canescens</i> ssp. <i>canescens</i>
ATCO	<i>Atriplex confertifolia</i>
ATPA3	** <i>Atriplex parryi</i>
BAOR	** <i>Barbarea orthoceras</i>
MAAQ2	<i>Berberis aquifolium</i>
MARE1	* <i>Berberis aquifolium</i> var. <i>repens</i>
BEOC2	** <i>Betula occidentalis</i>
CEANO	** <i>Ceanothus</i>
CECU	<i>Ceanothus cuneatus</i>
CECUC3	* <i>Ceanothus cuneatus</i> var. <i>cuneatus</i>
CEIN3	** <i>Ceanothus integerrimus</i>
CEPR	<i>Ceanothus prostratus</i>
CEVE	<i>Ceanothus velutinus</i>
CEOR9	** <i>Cercis orbiculata</i>
CERCO	<i>Cercocarpus</i>

CEMOG	* Cercocarpus betuloides	LEPTO2	* Leptodactylon
CELE3	Cercocarpus ledifolius	LINAN2	Linanthus
CELE1	* Cercocarpus ledifolius var. intercedens	LUPIN	Lupinus
CELE1	* Cercocarpus ledifolius var. intermontanus	PERA4	Peraphyllum ramosissimum
CHMI2	Chamaebatiaria millefolium	PIDE4	Picrothamnus desertorum
CHSE11	** Chrysolepis sempervirens	POSU2	Polygala subspinoso
CHRY9	Chrysothamnus	PRUNU	** Prunus
CHDE2	** Chrysothamnus depressus	PRAN2	Prunus andersonii
CHHU2	** Chrysothamnus humilis	PREM	Prunus emarginata
ERNA10	* Chrysothamnus nauseosus	PRSU2	Prunus subcordata
ERNAW	* Chrysothamnus nauseosus var. washoensis	PRVI	Prunus virginiana
CHVI8	Chrysothamnus viscidiflorus	PRVID	* Prunus virginiana ssp. demissa
CHVIL4	* Chrysothamnus viscidiflorus ssp. lanceolatus	PRVID	* Prunus virginiana var. demissa
CHVIP4	* Chrysothamnus viscidiflorus ssp. puberulus	PSPO	** Psorothamnus polydenius
CHVIV2	* Chrysothamnus viscidiflorus ssp. viscidiflorus	PUTR2	Purshia tridentata
CHVIV4	* Chrysothamnus viscidiflorus ssp. viscidiflorus	PUTR2	* Purshia tridentata var. tridentata
var.		FRRUM	* Rhamnus rubra ssp. modocensis
CORNU	* Cornus	RHTR	** Rhus trilobata
COSE16	Cornus sericea	RIBES	Ribes
EPVI	Ephedra viridis	RIAU	Ribes aureum
ERICA2	Ericameria	RICE	Ribes cereum
ERBL2	Ericameria bloomeri	RICEC2	* Ribes cereum var. cereum
ERDID	** Ericameria discoidea var. discoidea	RICEP	* Ribes cereum var. inebrians
ERGR16	** Ericameria greenei	RIMO2	** Ribes montigenum
ERNA10	Ericameria nauseosa	RINE	** Ribes nevadense
ERNAO	* Ericameria nauseosa ssp. consimilis var.	RIQU	** Ribes quercetorum
oreophila		RIRO	Ribes roezlii
ERNAC2	* Ericameria nauseosa var. oreophila	RIROR	* Ribes roezlii var. roezlii
ERNAW	* Ericameria nauseosa var. washoensis	RIVE	Ribes velutinum
ERPAN2	** Ericameria parryi var. nevadensis	RIVI3	Ribes viscosissimum
ERIOG	Eriogonum	ROSA5	** Rosa
ERMI4	Eriogonum microthecum	ROCA2	** Rosa californica
ERMIA2	* Eriogonum microthecum var. ambiguum	ROGY	** Rosa gymnocarpa
ERMIL2	* Eriogonum microthecum var. laxiflorum	ROWO	Rosa woodsii
ERMI4	* Eriogonum microthecum var. schoolcraftii	ROWO	* Rosa woodsii ssp. ultramontana
ERNU4	** Eriogonum nummulari	ROWO	* Rosa woodsii var. ultramontana
ERPO16	* Eriogonum polyanthum	RULE	** Rubus leucodermis
ERSP7	Eriogonum sphaerocephalum	SABE2	** Salix bebbiana
ERSPH	* Eriogonum sphaerocephalum var. halimioides	SAEX	Salix exigua
ERSPS4	* Eriogonum sphaerocephalum var.	SAEX	* Salix exigua var. hindsiana
sphaerocephalum		SAGE2	** Salix geyeriana
ERUM	Eriogonum umbellatum	SALA6	Salix lasiolepis
ERPO16	* Eriogonum umbellatum ssp. dumosum	SALE	Salix lemmonii
ERUMC	* Eriogonum umbellatum var. covillei	SALU2	** Salix lutea
ERUMM9	* Eriogonum umbellatum var. modocense	SASC	** Salix scouleriana
ERUMN	* Eriogonum umbellatum var. nevadense	SADO4	Salvia dorrii
ERWRT	** Eriogonum wrightii var. trachyonum	SADOI	* Salvia dorrii ssp. dorrii var. incana
ERCO25	** Eriophyllum confertiflorum	SAMBU	** Sambucus
FRRU	Frangula rubra	SANIC4	* Sambucus mexicana
GRSP	Grayia spinosa	SANI4	* Sambucus nigra
HOLOD	** Holodiscus	SANIC5	* Sambucus nigra ssp. caerulea
HODI	Holodiscus discolor	SANIC4	Sambucus nigra ssp. canadensis
HODI	* Holodiscus discolor var. glabrescens	SARA2	Sambucus racemosa
KRASC	* Krascheninnikovia	SARAR3	* Sambucus racemosa var. microbotrys
KRLA2	Krascheninnikovia lanata		



SARAR3	* Sambucus racemosa var. racemosa	AGROS	Agrostis
SABA14	* Sarcobatus baileyi	AGEX	Agrostis exarata
SAVE4	Sarcobatus vermiculatus	AGGI2	Agrostis gigantea
SOSC2	** Sorbus scopulina	AGPA8	Agrostis pallens
SPHAE	Sphaeralcea	ALLIU	Allium
SYMPH	Symphoricarpos	ALAC4	Allium acuminatum
SYAL	Symphoricarpos albus	ALAN	** Allium anceps
SYLO	Symphoricarpos longiflorus	ALAT	Allium atropurpureum
SYMO	Symphoricarpos mollis	ALBI2	Allium bisceptrum
SYOR2	* Symphoricarpos oreophilus	ALCA2	** Allium campanulatum
SYRO	Symphoricarpos rotundifolius	ALLE3	** Allium lemmonii
SYRO	* Symphoricarpos rotundifolius var. rotundifolius	ALOBO	** Allium obtusum var. obtusum
TETRA3	Tetradymia	ALOPE	** Alopecurus
TECA2	Tetradymia canescens	ALAE	Alopecurus aequalis
TEGL	Tetradymia glabrata	ALGE2	Alopecurus geniculatus
<b>Non-vasc</b>		ALPR3	Alopecurus pratensis
CRYPTO	Cryptogamic crust	ALYSS	Alyssum
<b>Herb</b>		ALAL3	* Alyssum alyssoides
ACMI2	** Achillea millefolium	ALDE	Alyssum desertorum
ACHNA	Achnatherum	ALSI8	* Alyssum minus var. micranthum
ACHY	Achnatherum hymenoides	ALSI8	Alyssum simplex
ACLE8	Achnatherum lemmonii	AMAC2	Ambrosia acanthicarpa
ACLEL	* Achnatherum lemmonii var. lemmonii	AMSIN	Amsinckia
ACLE9	Achnatherum lettermanii	AMME1	* Amsinckia intermedia
ACNE9	Achnatherum nelsonii	AMME	Amsinckia menziesii
ACNEN2	* Achnatherum nelsonii ssp. nelsonii	AMME1	* Amsinckia menziesii var. intermedia
ACOC3	Achnatherum occidentale	AMTE3	Amsinckia tessellata
ACOC	* Achnatherum occidentale ssp. californicum	AMTET	* Amsinckia tessellata var. tessellata
ACOCO	* Achnatherum occidentale ssp. occidentale	ANTEN	Antennaria
ACOC	* Achnatherum occidentale ssp. pubescens	ANAR5	Antennaria argentea
ACPI2	* Achnatherum pinetorum	ANDI2	Antennaria dimorpha
ACSP12	Achnatherum speciosum	ANGE3	Antennaria geyeri
ACTH7	Achnatherum thurberianum	ANLU2	Antennaria luzuloides
ACWE3	** Achnatherum webberii	ANLUL	* Antennaria luzuloides ssp. luzuloides
ACRU2	** Actaea rubra	ANRO2	Antennaria rosea
AGAST	** Agastache	ANROC	* Antennaria rosea ssp. confinis
AGPA2	Agastache parvifolia	ANROR	* Antennaria rosea ssp. rosea
AGUR	Agastache urticifolia	ANST2	Antennaria stenophylla
AGOC2	Ageratina occidentalis	ANUM	Antennaria umbrinella
AGOSE	Agoseris	APIN	Apera interrupta
AGGL	Agoseris glauca	APOCY	** Apocynum
AGGLG	* Agoseris glauca var. glauca	APAN2	Apocynum androsaemifolium
AGLL	* Agoseris glauca var. laciniata	AQUIL	* Aquilegia
AGGLM	* Agoseris glauca var. monticola	AQFO	Aquilegia formosa
AGGR	Agoseris grandiflora	ARABI2	Arabis
AGGR	* Agoseris grandiflora var. grandiflora	ARDI2	Arabis xdivaricarpa
AGHE2	Agoseris heterophylla	ARDR	** Arabis drummondii
AGHEH	* Agoseris heterophylla var. heterophylla	ARGL	** Arabis glabra
AGGLM	* Agoseris monticola	ARHO2	** Arabis holboellii
AGLL	* Agoseris parviflora	ARHOR	* Arabis holboellii var. retrofracta
AGRE	Agoseris retrorsa	ARPU	Arabis puberula
AGCR	Agropyron cristatum	ARPU2	** Arabis pulchra
AGCRP8	* Agropyron cristatum ssp. pectinatum	ARPUP2	* Arabis pulchra var. pulchra
AGDE2	Agropyron desertorum	ARSP	Arabis sparsiflora
THIN6	* Agropyron intermedium	ARSPA	* Arabis sparsiflora var. arcuata

ARSPS2	* <i>Arabis sparsiflora</i> var. <i>sparsiflora</i>	BLSC	<i>Blepharipappus scaber</i>
ARENA	<i>Arenaria</i>	BLSCS	* <i>Blepharipappus scaber</i> ssp. <i>scaber</i>
ARAC2	<i>Arenaria aculeata</i>	ARAB12	* <i>Boechera</i>
ARCO5	<i>Arenaria congesta</i>	ARPU	* <i>Boechera puberula</i>
ARCOC	* <i>Arenaria congesta</i> var. <i>congesta</i>	ARHOR	* <i>Boechera retrofracta</i>
ARKI	<i>Arenaria kingii</i>	ARSPS2	* <i>Boechera sparsiflora</i>
ARKIC	* <i>Arenaria kingii</i> ssp. <i>compacta</i>	BRODI	<i>Brodiaea</i>
ARLAS	** <i>Arenaria lanuginosa</i> ssp. <i>saxosa</i>	DICO19	* <i>Brodiaea congesta</i>
ARMU	** <i>Argemone munita</i>	TRHY3	* <i>Brodiaea hyacinthina</i>
ARNIC	<i>Arnica</i>	BROMU	<i>Bromus</i>
ARCH3	<i>Arnica chamissonis</i>	BRAR3	* <i>Bromus arenarius</i>
ARCO9	<i>Arnica cordifolia</i>	BRAR5	<i>Bromus arvensis</i>
ARDI6	* <i>Arnica discoidea</i>	BRBR5	* <i>Bromus brizaeformis</i>
ARAM2	* <i>Arnica lanceolata</i> subsp. <i>prima</i>	BRBR5	<i>Bromus briziformis</i>
ARLO6	* <i>Arnica longifolia</i>	BRCA5	<i>Bromus carinatus</i>
ARMO4	* <i>Arnica mollis</i>	BRCA5	* <i>Bromus carinatus</i> var. <i>carinatus</i>
ARSO2	<i>Arnica sororia</i>	BRMA4	* <i>Bromus carinatus</i> var. <i>marginatus</i>
ARDO3	<i>Artemisia douglasiana</i>	BRCA6	** <i>Bromus catharticus</i>
ARLU	<i>Artemisia ludoviciana</i>	BRDI3	<i>Bromus diandrus</i>
ARLUL2	* <i>Artemisia ludoviciana</i> ssp. <i>ludoviciana</i>	BRHO2	<i>Bromus hordeaceus</i>
ASCO	** <i>Asclepias cordifolia</i>	BRHOH	* <i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>
ASFA	<i>Asclepias fascicularis</i>	BRIN2	<i>Bromus inermis</i>
ASTER	<i>Aster</i>	BRINI	* <i>Bromus inermis</i> ssp. <i>inermis</i>
SYAS3	<i>Aster ascendens</i>	BRAR5	* <i>Bromus japonicus</i>
SYSPS	* <i>Aster occidentalis</i>	BRMA4	** <i>Bromus marginatus</i>
ASAG2	** <i>Astragalus agrestis</i>	BROR2	<i>Bromus orcuttianus</i>
ASCU4	<i>Astragalus curvicaupus</i>	BRAA2	<i>Bromus racemosus</i>
ASCUC	* <i>Astragalus curvicaupus</i> var. <i>curvicaupus</i>	BRSU2	** <i>Bromus suksdorfii</i>
ASFI	<i>Astragalus filipes</i>	BRTTE	<i>Bromus tectorum</i>
ASLE8	<i>Astragalus lentiginosus</i>	CALOC	<i>Calochortus</i>
ASMA6	** <i>Astragalus malacus</i>	CALE3	<i>Calochortus leichtlinii</i>
ASOB4	** <i>Astragalus obscurus</i>	CAMA5	<i>Calochortus macrocarpus</i>
ASDOP	<i>Astragalus parishii</i>	CIMO5	** <i>Calyptidium monospermum</i>
ASPU9	<i>Astragalus purshii</i>	CIUMU	<i>Calyptidium umbellatum</i>
ASPUL	* <i>Astragalus purshii</i> var. <i>lagopus</i>	CAOC6	<i>Calystegia occidentalis</i>
ASWH	<i>Astragalus whitneyi</i>	CALE5	** <i>Camassia leichtlinii</i>
ASWHS	* <i>Astragalus whitneyi</i> ssp. <i>siskiyouensis</i>	CAQU2	<i>Camassia quamash</i>
ASWHC	* <i>Astragalus whitneyi</i> var. <i>confusus</i>	CAQUB	* <i>Camassia quamash</i> ssp. <i>breviflora</i>
ASWH	* <i>Astragalus whitneyi</i> var. <i>whitneyi</i>	CAMIS	** <i>Camissonia</i>
ATPU	<i>Athyasanus pusillus</i>	CAAN14	<i>Camissonia andina</i>
ATRIP	** <i>Atriplex</i>	CASU18	** <i>Camissonia subacaulis</i>
BALSA	<i>Balsamorhiza</i>	CATA2	<i>Camissonia tanacetifolia</i>
BADE2	<i>Balsamorhiza deltoidea</i>	CATAT	* <i>Camissonia tanacetifolia</i> ssp. <i>tanacetifolia</i>
BAHOH	* <i>Balsamorhiza hirsuta</i>	CACH42	<i>Cardaria chalapensis</i>
BAHO	<i>Balsamorhiza hookeri</i>	CAREX	<i>Carex</i>
BALA8	* <i>Balsamorhiza hookeri</i> var. <i>lanata</i>	CAAN15	* <i>Carex angustata</i>
BAMAP	<i>Balsamorhiza macrolepis</i> var. <i>platylepis</i>	CAAQ	* <i>Carex aquatilis</i>
BASA3	<i>Balsamorhiza sagittata</i>	CAAT3	* <i>Carex athrostachya</i>
BASE2	<i>Balsamorhiza serrata</i>	CAAU3	* <i>Carex aurea</i>
BAHY	<i>Bassia hyssopifolia</i>	CABR7	<i>Carex brainerdii</i>
BESY	** <i>Beckmannia syzigachne</i>	CACA13	* <i>Carex capitata</i>
BEER	<i>Berula erecta</i>	CACU5	* <i>Carex cusickii</i>
POBI6	* <i>Bistorta bistortoides</i>	CADE8	* <i>Carex densa</i>
BLEPH2	* <i>Blepharipappus</i>	CADO2	<i>Carex douglasii</i>

CAEX4	* Carex filifolia var. erostrata	CIOCC	* Cirsium occidentale var. candidissimum
CAFR2	* Carex fracta	CISC2	** Cirsium scariosum
CAHO5	* Carex hoodii	CIVU	Cirsium vulgare
CAIN10	* Carex integra	CLARK	Clarkia
CAWH	* Carex jepsonii	CLGR	Clarkia gracilis
CAPE42	* Carex lanuginosa	CLGRG2	* Clarkia gracilis ssp. gracilis
CALA11	* Carex lasiocarpa	CLARK	* Clarkia lassenensis
CALE8	Carex lenticularis	CLLA	Clarkia lassenensis
CALEI	Carex lenticularis var. impressa	CLPU2	Clarkia purpurea
CALU7	* Carex luzulina	CLRH	** Clarkia rhomboidea
CAMU5	Carex multicaulis	CLAYT	** Claytonia
CANE2	Carex nebrascensis	CLEXE2	Claytonia exigua ssp. exigua
CAPE42	* Carex pellita	CLLA2	Claytonia lanceolata
CAPR5	Carex praegracilis	CLPE	Claytonia perfoliata
CARO5	Carex rossii	CLPEM	* Claytonia perfoliata ssp. mexicana
CASCB	* Carex scopulorum var. bracteosa	CLRU2	Claytonia rubra
CASH	* Carex sheldonii	CLRUR	* Claytonia rubra ssp. rubra
CASI2	Carex simulata	CLPL	Cleome platycarpa
CASU6	* Carex subfusca	COLLI	Collinsia
CASTI2	Castilleja	COGR2	Collinsia grandiflora
CAAP4	Castilleja applegatei	COPA2	* Collinsia parryi
CAAPD	* Castilleja applegatei ssp. disticha	COPA3	** Collinsia parviflora
CAAPP4	* Castilleja applegatei ssp. pinetorum	COSP	* Collinsia sparsiflora
CAAPP4	* Castilleja applegatei var. pinetorum	COTI	* Collinsia tinctoria
CAAR11	** Castilleja arachnoidea	COTO	* Collinsia torreyi
CACA79	Castilleja campestris	COLLO	Collomia
CACAC14	* Castilleja campestris ssp. campestris	COGR4	Collomia grandiflora
CAAND	* Castilleja chromosa	COHE2	** Collomia heterophylla
CALA68	Castilleja lacera	COLI2	** Collomia linearis
CALI4	Castilleja linariifolia	COTI2	Collomia tinctoria
CAPI3	Castilleja pilosa	COMA2	** Conium maculatum
CAPR14	** Castilleja pruinosa	CONVO	** Convolvulus
CATE26	Castilleja tenuis	CAOCO	Convolvulus polymorphus
CETE9	** Centaurium tenuiflorum	COMA25	** Corallorhiza maculata
CEFOV2	Cerastium fontanum ssp. vulgare	CORDY	** Cordylanthus
CETE5	Ceratocephala testiculata	CORA5	Cordylanthus ramosus
CHAEN	** Chaenactis	CREPI	Crepis
CHDO	Chaenactis douglasii	CRAC2	** Crepis acuminata
CHDOD	* Chaenactis douglasii var. douglasii	CRBA2	Crepis bakeri
CHSE6	Chamaesyce serpyllifolia	CRIN4	Crepis intermedia
CHSES	* Chamaesyce serpyllifolia ssp. serpyllifolia	CRMO4	Crepis modocensis
CHAN9	Chamerion angustifolium	CRMO	* Crepis modocensis ssp. modocensis
CHENO	Chenopodium	CRMO5	Crepis monticola
CHAL7	Chenopodium album	CROC	Crepis occidentalis
CHPR5	** Chenopodium pratericola	CROCC	* Crepis occidentalis ssp. conjuncta
CHME	** Chimaphila menziesii	CROCO	* Crepis occidentalis ssp. occidentalis
CHUMO2	Chimaphila umbellata ssp. occidentalis	CROCP	* Crepis occidentalis ssp. pumila
CACLC	** Chylismia claviformis subsp. cruciformis	CRPL	** Crepis pleurocarpa
CIDO	** Cicuta douglasii	CRMU	Crocidium multicaule
CIALP2	** Circaea alpina ssp. pacifica	CRSE11	Croton setigerus
CIRSI	Cirsium	CRSC	** Crypsis schoenoides
CIAN	** Cirsium andersonii	CRYPT	Cryptantha
CIAR4	Cirsium arvense	GRAM3	Cryptantha ambigua
CICY	Cirsium cymosum	CRCI2	Cryptantha circumscissa
CIOC	Cirsium occidentale		

CREC	<i>Cryptantha echinella</i>	ELACA	* <i>Eleocharis acicularis</i> var. <i>acicularis</i>
CRFL4	<i>Cryptantha flaccida</i>	ELBE	<i>Eleocharis bella</i>
CRGR3	** <i>Cryptantha gracilis</i>	ELBO	* <i>Eleocharis bolanderi</i>
CRIN8	<i>Cryptantha intermedia</i>	ELMA5	<i>Eleocharis macrostachya</i>
CRIN8	* <i>Cryptantha intermedia</i> var. <i>hendersonii</i>	ELOB2	* <i>Eleocharis obtusa</i>
CRIN8	* <i>Cryptantha intermedia</i> var. <i>intermedia</i>	ELQU2	* <i>Eleocharis pauciflora</i>
CRPT	<i>Cryptantha pterocarya</i>	ELQU2	* <i>Eleocharis quinqueflora</i>
CRPTP2	* <i>Cryptantha pterocarya</i> var. <i>pterocarya</i>	ELRO2	* <i>Eleocharis rostellata</i>
CRSI2	<i>Cryptantha simulans</i>	ELYMU	<i>Elymus</i>
CRSO3	** <i>Cryptantha sobolifera</i>	TACA8	* <i>Elymus caput-medusae</i>
CRT04	<i>Cryptantha torreyana</i>	LECI4	* <i>Elymus cinereus</i>
CRT04	* <i>Cryptantha torreyana</i> var. <i>torreyana</i>	ELEL5	<i>Elymus elymoides</i>
CRWA2	<i>Cryptantha watsonii</i>	ELGL	<i>Elymus glaucus</i>
CUSCU	** <i>Cuscuta</i>	ELGLG	* <i>Elymus glaucus</i> ssp. <i>glaucus</i>
CYHUH	** <i>Cycladenia humilis</i> var. <i>humilis</i>	THIN6	* <i>Elymus hispidus</i>
CYFR2	<i>Cystopteris fragilis</i>	ELMU3	<i>Elymus multisetus</i>
DANTH	<i>Danthonia</i>	THPO7	* <i>Elymus ponticus</i>
DACA3	<i>Danthonia californica</i>	ELRE4	<i>Elymus repens</i>
DAUN	<i>Danthonia unispicata</i>	PASM	* <i>Elymus smithii</i>
DELPH	<i>Delphinium</i>	PSSPS	* <i>Elymus spicatus</i>
DEAN	<i>Delphinium andersonii</i>	ELTR7	<i>Elymus trachycaulus</i>
DENU	** <i>Delphinium nudicaule</i>	ELTRT	* <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>
DENU2	<i>Delphinium nuttallianum</i>	LETR5	<i>Elymus triticoides</i>
DESCH	* <i>Deschampsia</i>	THPO7	* <i>Elytrigia elongata</i>
DECE	<i>Deschampsia cespitosa</i>	THPO7	* <i>Elytrigia pontica</i>
DECE	* <i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i>	EPAN4	** <i>Epilobium anagallidifolium</i>
DEDA	<i>Deschampsia danthonioides</i>	CHANC	* <i>Epilobium angustifolium</i> ssp. <i>circumvagum</i>
DEEL	<i>Deschampsia elongata</i>	EPBR3	<i>Epilobium brachycarpum</i>
DESCU	<i>Descurainia</i>	EPPY4	* <i>Epilobium campestre</i>
DECA6	<i>Descurainia californica</i>	EPCI	<i>Epilobium ciliatum</i>
DEIN5	<i>Descurainia incana</i>	EPCIC	* <i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>
DEPA14	** <i>Descurainia paradisica</i>	EPDE4	<i>Epilobium densiflorum</i>
DEPI	<i>Descurainia pinnata</i>	EPGL	<i>Epilobium glaberrimum</i>
DEPIF	* <i>Descurainia pinnata</i> ssp. <i>filipes</i>	EPGLF	* <i>Epilobium glaberrimum</i> ssp. <i>fastigiatum</i>
DEPIH	* <i>Descurainia pinnata</i> ssp. <i>halictorum</i>	EPGLG	* <i>Epilobium glaberrimum</i> ssp. <i>glaberrimum</i>
DESO2	<i>Descurainia sophia</i>	EPMI	** <i>Epilobium minutum</i>
DICA14	<i>Dichelostemma capitatum</i>	EPPA7	** <i>Epilobium pallidum</i>
DICO19	** <i>Dichelostemma congestum</i>	EPPY4	<i>Epilobium pygmaeum</i>
DIMU5	** <i>Dichelostemma multiflorum</i>	EPTO4	<i>Epilobium torreyi</i>
MACAC	* <i>Dieteria canescens</i>	EQUIS	<i>Equisetum</i>
DIHO2	<i>Dimeresia howellii</i>	EQAR	** <i>Equisetum arvense</i>
DISP	<i>Distichlis spicata</i>	EQHY	** <i>Equisetum hyemale</i>
DOWNI	<i>Downingia</i>	EQHYA	* <i>Equisetum hyemale</i> var. <i>affine</i>
DOBA	<i>Downingia bacigalupii</i>	EQLA	** <i>Equisetum laevigatum</i>
DOBIB	* <i>Downingia bicornuta</i> var. <i>bicornuta</i>	CRSE11	* <i>Eremocarpus setigerus</i>
DOCU	** <i>Downingia cuspidata</i>	ARAC2	* <i>Eremogone aculeata</i>
DOIN	** <i>Downingia insignis</i>	ARCOC	* <i>Eremogone congesta</i>
DOLA2	** <i>Downingia laeta</i>	ARCOC	* <i>Eremogone congesta</i> var. <i>crassula</i>
DRABA	* <i>Draba</i>	ERIAS	** <i>Eriastrum</i>
DRVE2	<i>Draba verna</i>	ERSP3	<i>Eriastrum sparsiflorum</i>
POGLG	* <i>Drymocallis glandulosa</i>	ERAP	<i>Erigeron aphanactis</i>
ELCA	** <i>Elatine californica</i>	ERAPA2	* <i>Erigeron aphanactis</i> var. <i>aphanactis</i>
ELEOC	<i>Eleocharis</i>	ERAU6	<i>Erigeron austiniiae</i>
ELAC	<i>Eleocharis acicularis</i>	ERBL	<i>Erigeron bloomeri</i>
		ERBLB	* <i>Erigeron bloomeri</i> var. <i>bloomeri</i>

ERAU6	* Erigeron chrysopsidis var. austiniae	VUOCO	* Festuca octoflora
ERDI4	Erigeron divergens	SCPR4	** Festuca pratensis
EREAP2	* Erigeron eatonii var. plantagineus	FEVI	** Festuca viridula
EREL4	Erigeron elegantulus	LOGA2	* Filago gallica
ERFI2	Erigeron filifolius	FRVE	* Fragaria vesca
ERIN2	Erigeron inornatus	FRVI	Fragaria virginiana
ERINC3	* Erigeron inornatus var. calidipetris	FRAL2	Frasera albicaulis
ERLI	Erigeron linearis	FRALM	* Frasera albicaulis var. modocensis
ERPH	Erigeron philadelphicus	FRALN	* Frasera albicaulis var. nitida
ERPHP	* Erigeron philadelphicus var. philadelphicus	FRITI	** Fritillaria
ERPUI	** Erigeron pumilus ssp. intermedius	FRAT	* Fritillaria atropurpurea
ERST3	Erigeron strigosus	FRPI	* Fritillaria pinetorum
ERIOG	Eriogonum	FRPU2	* Fritillaria pudica
ERBA7	Eriogonum baileyi	GALIU	Galium
ERCA8	Eriogonum caespitosum	GAAP2	Galium aparine
ERDO	Eriogonum douglasii	GABI	** Galium bifolium
ERHE2	** Eriogonum heracleoides	GATR2	** Galium trifidum
ERNU3	Eriogonum nudum	GATR3	** Galium triflorum
ERNUO	* Eriogonum nudum var. oblongifolium	GADI2	Gayophytum diffusum
ERNUP4	* Eriogonum nudum var. pubiflorum	GADIP	* Gayophytum diffusum ssp. parviflorum
EROV	Eriogonum ovalifolium	GARA	** Gayophytum helleri
EROVN	* Eriogonum ovalifolium var. nivale	GAHU2	** Gayophytum humile
EROVO	* Eriogonum ovalifolium var. ovalifolium	GAHU2	* Gayophytum nuttallii
ERPR9	** Eriogonum prociduum	GARA	** Gayophytum racemosum
ERSA6	** Eriogonum saxatile	GARA2	Gayophytum ramosissimum
ERST4	Eriogonum strictum	GETR	Geum triflorum
ERSTA3	* Eriogonum strictum ssp. proliferum var. anserinum	GETRC2	* Geum triflorum var. ciliatum
ERSTA3	* Eriogonum strictum var. anserinum	GILIA	Gilia
ERVI5	Eriogonum vimineum	GIIN2	Gilia inconspicua
ERLA6	Eriophyllum lanatum	GIMO	** Gilia modocensis
ERLAA	* Eriophyllum lanatum var. achillaeoides	GLST	** Glyceria elata
ERODI	** Erodium	GNPA	Gnaphalium palustre
ERCI6	Erodium cicutarium	GREB	Gratiola ebracteata
ERYNG	Eryngium	GRHE	** Gratiola heterosepala
ERAL8	Eryngium alismifolium	GRIND	** Grindelia
ERAR11	* Eryngium aristulatum	GRNA	Grindelia nana
ERAR14	Eryngium articulatum	HACKE	** Hackelia
ERMA1	Eryngium mathiasiae	HACA	** Hackelia californica
ERCA14	Erysimum capitatum	HACU	Hackelia cusickii
ERCAP	* Erysimum capitatum ssp. perenne	HASE	Hackelia setosa
ERCAC	* Erysimum capitatum var. capitatum	HAGL	** Halogeton glomeratus
ERRE4	Erysimum repandum	HECAN2	* Helianthella californica var. nevadensis
ESCA2	** Eschscholzia californica	HELIA3	** Helianthus
EUPHO	** Euphorbia	HEAN3	Helianthus annuus
CHSES	* Euphorbia serpyllifolia	HEBO3	** Helianthus bolanderi
EUSP	** Euphorbia spathulata	HECU2	Helianthus cusickii
EUOC4	Euthamia occidentalis	HEMI20	Hemizonella minima
FESTU	Festuca	HECA7	** Hesperochiron californicus
VUBR	* Festuca bromoides	HEMI9	Hesperolinon micranthum
FECA	** Festuca californica	HECO2	Hesperostipa comata
FEID	Festuca idahoensis	HECOC	* Hesperostipa comata ssp. comata
VUMIM	* Festuca microstachys	HERA3	** Heterocodon rariflorum
VUMY	* Festuca myuros	HECYA	Heuchera cylindrica var. alpina
FEOC	** Festuca occidentalis	HIERA	Hieracium

HAL2	Hieracium albiflorum	LASE	Lactuca serriola
HIHO	** Hieracium horridum	LAGOP	* Lagophylla
HISC2	Hieracium scouleri	LARA	Lagophylla ramosissima
HOUM	Holosteum umbellatum	LARAR	* Lagophylla ramosissima ssp. ramosissima
HOUM	* Holosteum umbellatum ssp. umbellatum	LALA3	Lathyrus lanszwertii
HORDE	Hordeum	LALAA	* Lathyrus lanszwertii var. aridus
HOB2	Hordeum brachyantherum	LANE3	Lathyrus nevadensis
HOB2	* Hordeum brachyantherum ssp. brachyantherum	LAGL5	Layia glandulosa
HOJU	** Hordeum jubatum	LEMNA	** Lemna
HOMA2	Hordeum marinum	LEPID	Lepidium
HOMAG	* Hordeum marinum ssp. gussoneanum	LECA5	** Lepidium campestre
HOMU	** Hordeum murinum	LEPE2	Lepidium perfoliatum
HOFU	** Horkelia fusca	LEVI3	Lepidium virginicum
HOFUP	* Horkelia fusca ssp. parviflora	LEVIV2	* Lepidium virginicum var. virginicum
HOTR	Horkelia tridentata	LIPU11	* Leptodactylon pungens
HYDRO	* Hydrophyllum	LEPTO22	Leptosiphon
HYCA4	Hydrophyllum capitatum	LECI18	** Leptosiphon ciliatus
HYCAA	* Hydrophyllum capitatum var. alpinum	LECI2	* Leptosiphon ciliatus ssp. ciliatus
HYOC	** Hydrophyllum occidentale	LEHA11	Leptosiphon harknessii
HYGL2	** Hypochaeris glabra	LESE17	** Leptosiphon septentrionalis
IDAHO	* Idahoa	LEMO4	** Leucocrinum montanum
IDSC	Idaho scapigera	LERE7	Lewisia rediviva
ILBA	Iliamna bakeri	LECI4	Leymus cinereus
IPAG	** Ipomopsis aggregata	LETR5	Leymus triticoides
IPCOP	** Ipomopsis congesta ssp. palmifrons	LIGR	** Ligusticum grayi
IRMI	Iris missouriensis	LIAQ	** Limosella aquatica
IVAX	Iva axillaris	LINAN2	Linanthus
IVPA	Ivesia paniculata	LEHA11	* Linanthus harknessii
JUNCU	Juncus	LIPU11	Linanthus pungens
JUAR2	Juncus arcticus	LINUM	** Linum
JUARL	* Juncus arcticus ssp. littoralis	LILE3	Linum lewisii
JUAR4	* Juncus articulatus	LILEL2	* Linum lewisii var. lewisii
JUARL	* Juncus balticus	LITHO2	** Lithophragma
JUARL	* Juncus balticus subsp. ater	LIGL2	** Lithophragma bulbiferum
JUME4	* Juncus balticus var. mexicanus	LIGL2	** Lithophragma glabrum
JUBR3	** Juncus brachyphyllus	LIPA5	** Lithophragma parviflorum
JUNCU	* Juncus bufonius	LITE4	Lithophragma tenellum
JUBU	Juncus bufonius	LICA11	** Lithospermum californicum
JUBUB	* Juncus bufonius var. bufonius	LIRU4	Lithospermum ruderales
JUBUO	* Juncus bufonius var. occidentalis	LOGF12	* Logfia
JUNCU	* Juncus capillaris	LOGA2	** Logfia gallica
JUDR	** Juncus drummondii	LOMAT	Lomatium
JUEN	Juncus ensifolius	LOBI	Lomatium bicolor
JULO	** Juncus longistylis	LOBIL	Lomatium bicolor var. leptocarpum
JUME4	* Juncus mexicanus	LOCA4	Lomatium canbyi
JUNE	Juncus nevadensis	LODI	Lomatium dissectum
JUNEN	* Juncus nevadensis var. nevadensis	LODID2	* Lomatium dissectum var. dissectum
JUOC2	Juncus occidentalis	LODIM	* Lomatium dissectum var. multifidum
JUOR	Juncus orthophyllus	LOHE2	** Lomatium hendersonii
JUSA	** Juncus saximontanus	LOMA3	Lomatium macrocarpum
JUTE	Juncus tenuis	LONE	Lomatium nevadense
KEGA	Kelloggia galioides	LONEN	* Lomatium nevadense var. nevadense
KOMA	Koeleria macrantha	LONU2	Lomatium nudicaule
LACTU	* Lactuca	LOTR2	Lomatium triternatum
LASA	* Lactuca saligna		

LOTRM	* Lomatium triternatum var. macrocarpum	MEFU	Melica fugax
LOTRT	* Lomatium triternatum var. triternatum	MESP	** Melica spectabilis
LOUT	** Lomatium utriculatum	MELIL	** Melilotus
LOVA	** Lomatium vaginatum	MEOF	** Melilotus albus
LOTUS	Lotus	MEIN2	* Melilotus indica
LOUNU	* Lotus unifoliolatus	MEIN2	** Melilotus indicus
LOCO6	Lotus corniculatus	MEOF	** Melilotus officinalis
LODE	Lotus denticulatus	MEAR4	Mentha arvensis
LOMI	** Lotus micranthus	MEAR4	* Mentha canadensis
LOTE4	Lotus tenuis	MESP3	** Mentha spicata
LOWR2	Lotus wrangelianus	MENTZ	Mentzelia
LUPIN	Lupinus	MEAL6	Mentzelia albicaulis
LUAR6	Lupinus arbustus	MECO2	** Mentzelia congesta
LUAR3	Lupinus argenteus	MEDI	Mentzelia dispersa
LUARA5	* Lupinus argenteus ssp. argenteus	MELA2	Mentzelia laevicaulis
LUARA11	* Lupinus argenteus ssp. argenteus var. argenteus	MEMO	Mentzelia montana
LUCAC3	* Lupinus argenteus var. heteranthus	MEOB	** Mertensia oblongifolia var. nevadensis
LUPA3	* Lupinus argenteus var. palmeri	MICRO	Microseris
LUBR2	Lupinus brevicaulis	MILA	Microseris laciniata
LUCA	Lupinus caudatus	MILAL	* Microseris laciniata ssp. laciniata
LUCAC3	* Lupinus caudatus ssp. caudatus	MINU	Microseris nutans
LULA4	** Lupinus latifolius	MIGR	Microseris gracilis
LUME	** Lupinus meionanthus	MIMUL	Mimulus
LUSUS	Lupinus microcarpus	MIBR3	** Mimulus breviflorus
LUSUS	* Lupinus microcarpus var. microcarpus	MIGU	Mimulus guttatus
LUNE	** Lupinus nevadensis	MIMO3	** Mimulus moschatus
LUPO2	** Lupinus polyphyllus	MINA	Mimulus nanus
LUPUI2	** Lupinus pusillus ssp. intermontanus	MIME	* Mimulus nanus var. mephiticus
LUCAC3	* Lupinus rosei	MINAN	* Mimulus nanus var. nanus
LUUN	** Lupinus uncialis	MIPR	** Mimulus primuloides
LYJU	** Lygodesmia juncea	MISU2	Mimulus suksdorfii
LYTHR	** Lythrum	MIWH3	** Mimulus whitneyi
LYTR2	Lythrum tribracteatum	MIDO3	Minuartia douglasii
MACA2	Machaeranthera canescens	MINU4	** Minuartia nuttallii
MACAC	* Machaeranthera canescens ssp. canescens var.	MONAR2	** Monardella
MADIA	Madia	MOOD	Monardella odoratissima
MACI2	Madia citriodora	MOGL	* Monardella odoratissima ssp. glauca
MAEL	** Madia elegans	MOOD	* Monardella odoratissima ssp. odoratissima
MAEX	Madia exigua	MOOD	* Monardella odoratissima ssp. pallida
MAGL2	Madia glomerata	MOCH	Montia chamissoi
MAGR3	Madia gracilis	MODI2	** Montia dichotoma
HEMI20	* Madia minima	MOLI4	Montia linearis
MAIAN	Maianthemum	MUHLE	Muhlenbergia
MARA7	Maianthemum racemosum	MUAS	** Muhlenbergia asperifolia
MAST4	Maianthemum stellatum	MUFI2	Muhlenbergia filiformis
MARSI	** Marsilea	MURI	Muhlenbergia richardsonis
MAVE2	Marsilea vestita	MYOSU	** Myosurus
MATRI	** Matricaria	NAMA4	** Nama
MADI6	** Matricaria discoidea	NADE2	Nama densum
MEDIC	** Medicago	NAOF	Nasturtium officinale
MELU	** Medicago lupulina	NAVAR	* Navarretia
MEPO3	Medicago polymorpha	NABR	Navarretia breweri
MELIC	Melica	NADI3	** Navarretia divaricata
MEBU	Melica bulbosa	NADIV	* Navarretia divaricata ssp. vividior

NAVAR	Navarretia intertexta	PESU10	Penstemon sudans
NAIN2	Navarretia intertexta	PERID	Perideridia
NAINI	* Navarretia intertexta ssp. intertexta	PEBO2	Perideridia bolanderi
NAINP3	* Navarretia intertexta ssp. propinqua	PEBOB	* Perideridia bolanderi ssp. bolanderi
NALE5	** Navarretia leptalea	PEGA3	** Perideridia gairdneri
NALEB2	* Navarretia leptalea ssp. bicolor	PEKE	** Perideridia kelloggii
NALE	Navarretia leucocephala	PEOR6	Perideridia oregana
NALEL	* Navarretia leucocephala ssp. leucocephala	PEPA21	** Perideridia parishii
NALEM	* Navarretia leucocephala ssp. minima	POAME	Persicaria amphibia
NEMOP	** Nemophila	PHACE	Phacelia
NEPA	Nemophila parviflora	PHBI	Phacelia bicolor
NEPAA	* Nemophila parviflora var. austinae	PHGR	** Phacelia grandiflora
NEPE	** Nemophila pedunculata	PHHA	Phacelia hastata
CAAN14	* Neoholmgrenia andina	PHHAC	* Phacelia hastata var. compacta
NEST5	Nestotus stenophyllus	PHHAH	* Phacelia hastata var. hastata
NIAT	Nicotiana attenuata	PHHE2	Phacelia heterophylla
NOAL2	** Nothocalais alpestris	PHHEV	* Phacelia heterophylla ssp. virgata
NOTR2	** Nothocalais troximoides	PHHU	Phacelia humilis
OECAC3	* Oenothera cespitosa ssp. crinita	PHHUH	* Phacelia humilis var. humilis
OEDE2	** Oenothera deltooides	PHIN3	** Phacelia inundata
OROBA	** Orobanche	PHLI	Phacelia linearis
ORCO5	Orobanche corymbosa	PHLU	** Phacelia lutea
ORFA	Orobanche fasciculata	PHMU2	Phacelia mutabilis
ORTHO	Orthocarpus	PHRA	* Phacelia racemosa
ORCU	Orthocarpus cuspidatus	PHRA2	Phacelia ramosissima
ORCUC	* Orthocarpus cuspidatus ssp. cryptanthus	PHRAR	* Phacelia ramosissima var. ramosissima
ORLU2	** Orthocarpus luteus	PHTH	Phacelia thermalis
OSBE	Osmorhiza berteroi	PHALA2	** Phalaris
OSBE	* Osmorhiza chilensis	PHAR3	Phalaris arundinacea
OSOC	Osmorhiza occidentalis	PHPR3	Phleum pratense
PACKE	Packera	PHLOX	Phlox
PACA15	Packera cana	PHAU3	Phlox austromontana
PAEU5	Packera eurycephala	PHCA7	Phlox caespitosa
PAEUE	* Packera eurycephala var. eurycephala	PHCO1	** Phlox condensata
PAMU1	Packera multilobata	PHDI3	Phlox diffusa
PAEON	** Paeonia	PHCA7	* Phlox douglasii
PABR	Paeonia brownii	PHRI5	* Phlox douglasii ssp. rigida
PASM	Pascopyrum smithii	MIGRG	* Phlox gracilis
PESE2	** Pedicularis semibarbata	PHHO	Phlox hoodii
PENST	Penstemon	PHHOC	* Phlox hoodii ssp. canescens
PECI2	Penstemon cinicola	PHLO2	Phlox longifolia
PEDE4	Penstemon deustus	PHHOM	** Phlox muscoides
PEDEP	* Penstemon deustus var. pedicellatus	PHSP	Phlox speciosa
PEDES2	* Penstemon deustus var. suffrutescens	PHST11	Phlox stansburyi
PEGR4	Penstemon gracilentus	PHSTS3	* Phlox stansburyi ssp. stansburyi
PEHEP	* Penstemon heterophyllus var. purdyi	PHSTS3	* Phlox stansburyi var. brevifolia
PEHU	Penstemon humilis	PHHI7	* Phlox stansburyi var. hirsuta
PEHUH	* Penstemon humilis ssp. humilis	PHCH	Phoenicaulis cheiranthoides
PELA7	Penstemon laetus	PLAGI	Plagiobothrys
PELAS	* Penstemon laetus ssp. sagittatus	PLBR	Plagiobothrys bracteatus
PERYO	* Penstemon oreocharis	PLSCH	** Plagiobothrys cognatus
PERO12	Penstemon roezlii	PLSCH	* Plagiobothrys hispidulus
PERY	Penstemon rydbergii	PLKIH	Plagiobothrys kingii var. harknessii
PERYO	* Penstemon rydbergii var. oreocharis	PLLE	Plagiobothrys leptocladus
PESP	Penstemon speciosus		



PLMO	Plagiobothrys mollis	POLYP2	** Polypogon
PLMOM	* Plagiobothrys mollis var. mollis	POMO5	Polypogon monspeliensis
PLST	Plagiobothrys stipitatus	POCA1	Porterella carnosula
PLSTM	* Plagiobothrys stipitatus var. micranthus	PONA4	Potamogeton natans
PLTE	** Plagiobothrys tenellus	PONO2	** Potamogeton nodosus
PLTET	** Plagiobothrys tener var. tener	POTEN	Potentilla
PLANT	** Plantago	PODR	Potentilla drummondii
PLMA2	** Plantago major	PODRB	* Potentilla drummondii ssp. breweri
PLATA2	** Platanthera	POGL9	Potentilla glandulosa
PLDIL	** Platanthera leucostachys	POGLG	* Potentilla glandulosa ssp. globosa
PLECT	Plectritis	POGLN	* Potentilla glandulosa ssp. nevadensis
PLCOB	* Plectritis brachystemon	POGLP	* Potentilla glandulosa ssp. pseudorupestris
PLCOB	Plectritis congesta ssp. brachystemon	POGR9	Potentilla gracilis
PLMA4	Plectritis macrocera	POGRF	* Potentilla gracilis var. fastigiata
PLSP7	Pleiacanthus spinosus	POGRF	* Potentilla gracilis var. flabelliformis
AGROS	* Poa	POGRG	* Potentilla gracilis var. gracilis
POA	Poa	PRIMU	Primula
POSE	* Poa ampla	PRVU	Prunella vulgaris
POBO	** Poa bolanderi	PRVUL2	* Prunella vulgaris var. lanceolata
POBU	Poa bulbosa	PSCAT	Pseudognaphalium thermale
POSE	* Poa canbyi	PSSP6	Pseudoroegneria spicata
POCO	Poa compressa	PSSPS	* Pseudoroegneria spicata ssp. spicata
POCU3	Poa cusickii	PSJA2	Pseudostellaria jamesiana
POCUC	* Poa cusickii ssp. cusickii	PSILO	Psilocarphus
POFE	** Poa fendleriana	PSBR	Psilocarphus brevissimus
POFEF	* Poa fendleriana ssp. fendleriana	PSBRB	* Psilocarphus brevissimus var. brevissimus
POFEL	* Poa fendleriana ssp. longiligula	PTAN2	Pterospora andromedea
POSE	* Poa juncifolia	PYPI2	Pyrola picta
POSE	* Poa nevadensis	PYCAC3	Pyrrocoma carthamoides var. cusickii
POPA2	** Poa palustris	RANUN	Ranunculus
POPR	Poa pratensis	RAAQ	** Ranunculus aquatilis
POPRP	* Poa pratensis ssp. pratensis	RAAQ	* Ranunculus aquatilis var. aquatilis
POSE	* Poa scabrella	RACA2	** Ranunculus californicus
POSE	Poa secunda	RAGL	** Ranunculus glaberrimus
POSE	* Poa secunda ssp. juncifolia	RAOC	Ranunculus occidentalis
POSE	* Poa secunda ssp. secunda	RAOCO	* Ranunculus occidentalis var. dissectus
POWH2	Poa wheeleri	RAOCO	* Ranunculus occidentalis var. occidentalis
POFL17	Pogogyne floribunda	RAOCO	* Ranunculus occidentalis var. ultramontanus
POMI	Polemonium micranthum	CETE5	* Ranunculus testiculatus
POLYG4	Polygonum	RAUN	Ranunculus uncinatus
POAR1	Polygonum arenastrum	RIGIO	** Rigiopappus
POAV	Polygonum aviculare	RILE2	Rigiopappus leptocladus
POBU2	* Polygonum aviculare ssp. buxiforme	ROAU	* Rorippa austriaca
POAR1	* Polygonum aviculare ssp. depressum	ROCU2	* Rorippa curvipes
POBI6	Polygonum bistortoides	ROCU	* Rorippa curvisiliqua
PODO4	Polygonum douglasii	RUMEX	Rumex
PODO	* Polygonum douglasii ssp. majus	RUCR	Rumex crispus
PODO	* Polygonum majus	RUSAL	Rumex lacustris
POPA8	** Polygonum parryi	RUAQF	Rumex occidentalis
POPO4	Polygonum polygaloides	RUSA	** Rumex salicifolius
POPOC	* Polygonum polygaloides ssp. confertiflorum	RUSAD	* Rumex salicifolius var. denticulatus
POPOK	* Polygonum polygaloides ssp. kelloggii	RUSAM	** Rumex triangulivalvis
PORA3	** Polygonum ramosissimum	RUVE2	** Rumex venosus
PODOS	** Polygonum spergulariiforme	SAGIT	** Sagittaria
		SACU	** Sagittaria cuneata

SALA2	**	<i>Sagittaria latifolia</i>	STRI	*	<i>Stachys rigida</i>
SALSO	**	<i>Salsola</i>	STRIR3	*	<i>Stachys rigida</i> var. <i>rigida</i>
SAKA	*	<i>Salsola kali</i>	STELL	*	<i>Stellaria</i>
SATR12		<i>Salsola tragus</i>	STLO	*	<i>Stellaria longifolia</i>
SAAE		<i>Salvia aethiopis</i>	STLO2		<i>Stellaria longipes</i>
LIMI12	*	<i>Scirpus micranthus</i>	STME2	*	<i>Stellaria media</i>
SCMI2		<i>Scirpus microcarpus</i>	STNI	*	<i>Stellaria nitens</i>
SCCA2		<i>Scrophularia californica</i>	STAC		<i>Stenotus acaulis</i>
SCDE	**	<i>Scrophularia desertorum</i>	NEST5	*	<i>Stenotus stenophyllus</i>
SCLA		<i>Scrophularia lanceolata</i>	STEPH		<i>Stephanomeria</i>
SCNA	*	<i>Scutellaria holmgreniorum</i>	STMIM		<i>Stephanomeria minor</i> var. <i>minor</i>
SCNA		<i>Scutellaria nana</i>	PLSP7	*	<i>Stephanomeria spinosa</i>
SECE	**	<i>Secale cereale</i>	STMIM	*	<i>Stephanomeria tenuifolia</i>
SEST2		<i>Sedum stenopetalum</i>	STVI2		<i>Stephanomeria virgata</i>
SENEC		<i>Senecio</i>	STIPA		<i>Stipa</i>
SEAR4		<i>Senecio aronicoides</i>	HECOC	*	<i>Stipa comata</i>
PACA15	*	<i>Senecio canus</i>	HECOC	*	<i>Stipa comata</i> var. <i>comata</i>
PAEUE	*	<i>Senecio eurycephalus</i>	ACHY	*	<i>Stipa hymenoides</i>
SEHY	**	<i>Senecio hydrophiloides</i>	ACLEL	*	<i>Stipa lemmonii</i>
SEHY2	**	<i>Senecio hydrophilus</i>	ACNEN2	*	<i>Stipa nelsonii</i>
SEIN2		<i>Senecio integerrimus</i>	ACNED	*	<i>Stipa nelsonii</i> var. <i>dorei</i>
SEINE	*	<i>Senecio integerrimus</i> var. <i>exaltatus</i>	ACNE10	**	<i>Stipa nevadensis</i>
SEINM	*	<i>Senecio integerrimus</i> var. <i>major</i>	ACOCO	*	<i>Stipa occidentalis</i>
SESE2		<i>Senecio serra</i>	ACOCO	*	<i>Stipa occidentalis</i> var. <i>californica</i>
SESES	*	<i>Senecio serra</i> var. <i>serra</i>	ACSP12	*	<i>Stipa speciosa</i>
SIDAL		<i>Sidalcea</i>	ACTH7	*	<i>Stipa thurberiana</i>
SIGL2		<i>Sidalcea glaucescens</i>	STCO6	**	<i>Streptanthus cordatus</i>
SIMA	**	<i>Sidalcea malachroides</i>	STCOC	*	<i>Streptanthus cordatus</i> var. <i>cordatus</i>
SIMA2	**	<i>Sidalcea malviflora</i>	STTO3	**	<i>Streptanthus tortuosus</i>
SIOR		<i>Sidalcea oregana</i>	SWERT	**	<i>Swertia</i>
SIORO	*	<i>Sidalcea oregana</i> ssp. <i>oregana</i>	SYMPH		<i>Symphyotrichum</i>
SIORS	*	<i>Sidalcea oregana</i> ssp. <i>spicata</i>	SYAS3		<i>Symphyotrichum ascendens</i>
SILEN		<i>Silene</i>	SYSP		<i>Symphyotrichum spatulatum</i>
SIDO		<i>Silene douglasii</i>	TACA8		<i>Taeniatherum caput-medusae</i>
SIDOD	*	<i>Silene douglasii</i> var. <i>douglasii</i>	TARAX	*	<i>Taraxacum</i>
SILE2	*	<i>Silene lemmonii</i>	TAOF		<i>Taraxacum officinale</i>
SIME	**	<i>Silene menziesii</i>	CASU18	*	<i>Taraxia subacaulis</i>
SIOR3		<i>Silene oregana</i>	CATA2	*	<i>Taraxia tanacetifolia</i>
SISYM	**	<i>Sisymbrium</i>	THFE	**	<i>Thalictrum fendleri</i>
SIAL2		<i>Sisymbrium altissimum</i>	THFEF	*	<i>Thalictrum fendleri</i> var. <i>fendleri</i>
SIIR	**	<i>Sisymbrium irio</i>	THELY	**	<i>Thelypodium</i>
SIID	**	<i>Sisyrinchium idahoense</i>	THIN6		<i>Thinopyrum intermedium</i>
SIIDI	*	<i>Sisyrinchium idahoense</i> var. <i>idahoense</i>	THCU	**	<i>Thysanocarpus curvipes</i>
MARA7	*	<i>Smilacina racemosa</i>	ZIGAD	*	<i>Toxicoscordion</i>
MARAA	*	<i>Smilacina racemosa</i> var. <i>amplexicaulis</i>	ZIPA2	*	<i>Toxicoscordion paniculatum</i>
MAST4	*	<i>Smilacina stellata</i>	ZIVEV	*	<i>Toxicoscordion venenosum</i>
SOLID	**	<i>Solidago</i>	ZIVEV	*	<i>Toxicoscordion venenosum</i> var. <i>venenosum</i>
SOCA5	**	<i>Solidago californica</i>	TRAGO		<i>Tragopogon</i>
SOCAS	*	<i>Solidago canadensis</i> ssp. <i>elongata</i>	TRDU		<i>Tragopogon dubius</i>
SOCAS	*	<i>Solidago lepida</i> var. <i>salebrosa</i>	TRPR	**	<i>Tragopogon pratensis</i>
SOMU		<i>Solidago multiradiata</i>	TRLA3	*	<i>Trichostema lanatum</i>
SOOL	**	<i>Sonchus oleraceus</i>	TRIFO		<i>Trifolium</i>
STAJ		<i>Stachys ajugoides</i>	TRAN		<i>Trifolium andersonii</i>
STRIR3	*	<i>Stachys ajugoides</i> var. <i>rigida</i>	TRANA2	*	<i>Trifolium andersonii</i> ssp. <i>andersonii</i>

TRCY	Trifolium cyathiferum	VESE	** Veronica serpyllifolia
TRHY	* Trifolium hybridum	VESEH2	* Veronica serpyllifolia ssp. humifusa
TRLO	Trifolium longipes	VICIA	** Vicia
TRLOH	* Trifolium longipes ssp. hansenii	VIAM	Vicia americana
TRLOH	* Trifolium longipes var. hansenii	VIAMA3	* Vicia americana var. oregana
TRMA3	Trifolium macrocephalum	VIOLA	Viola
TRMI4	* Trifolium microcephalum	VIBA2	** Viola bakeri
TRMO2	Trifolium monanthum	VIBE2	Viola beckwithii
TRRE3	** Trifolium repens	VIGL	** Viola glabella
TRVA	Trifolium variegatum	VIPRL	* Viola praemorsa ssp. linguifolia
TRVA	Trifolium variegatum var. major	VIPRP	* Viola praemorsa ssp. praemorsa
TRWI3	** Trifolium wilddenovii	VIPU4	Viola purpurea
TRWO	Trifolium wormskioldii	VIPUD	* Viola purpurea ssp. dimorpha
TRIPH3	** Triphysaria	VIPUI	* Viola purpurea ssp. integrifolia
TRCA21	** Trisetum canescens	VIPUP3	* Viola purpurea ssp. purpurea
TRHY3	Triteleia hyacinthina	VIPUQ	* Viola purpurea ssp. quercetorum
TRIXA	** Triteleia ixioides ssp. anilina	VIPUV2	* Viola purpurea ssp. venosa
TYPHA	** Typha	VULPI	** Vulpia
TYDO	** Typha domingensis	VUBR	Vulpia bromoides
EQUISE	* unknown Equisetaceae	VUMI	Vulpia microstachys
POACEA	** unknown Poaceae	VUMIM	* Vulpia microstachys var. microstachys
URDI	Urtica dioica	VUMIP	* Vulpia microstachys var. pauciflora
URDIH	* Urtica dioica ssp. holosericea	VUMY	Vulpia myuros
VEDU	Ventenata dubia	VUOC	Vulpia octoflora
DESCH	* Ventenata dubia	WOOR	** Woodsia oregana
VECA2	** Veratrum californicum	WYETH	Wyethia
VETH	Verbascum thapsus	WYAM	* Wyethia amplexicaulis
VERON	** Veronica	WYAN	Wyethia angustifolia
VEAM2	** Veronica americana	WYMO	Wyethia mollis
VEAN2	** Veronica anagallis-aquatica	XAST	Xanthium strumarium
VEPE2	Veronica peregrina	ZIGAD	Zigadenus
VEPEX2	* Veronica peregrina ssp. xalapensis	ZIFR	Zigadenus fremontii
VEPEX2	* Veronica peregrina var. xalapensis	ZIPA2	Zigadenus paniculatus
VESC2	** Veronica scutellata	ZIVE	Zigadenus venenosus

## APPENDIX E: CLUSTER ANALYSIS DENDROGRAM

Example diagram showing the arrangement of samples from the cluster analysis. Surveys that group to the left (with more information remaining) have more overlap than those that group to the right.

Quercus kelloggii Alliance	FSECO015	--- -----				
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO021	-----				
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO029	-----				
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO039					
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO041					
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO357	-----				
Pinus ponderosa var. washoensis / Symphoricarpos spp. / Pseudostellaria jamesiana Association	FSECO048	----- -----				
Pinus ponderosa var. washoensis / Symphoricarpos spp. / Pseudostellaria jamesiana Association	FSECO049	-----				
Pinus ponderosa var. washoensis / Symphoricarpos spp. / Pseudostellaria jamesiana Association	FSECO058		-----			
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO124	--		-		
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO125			-		
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO341	-----				
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO459	----- -----				
Pinus (jeffreyi, ponderosa) - Juniperus occidentalis Association	FSECO460	-----				
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO462		-----			

Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO010	- --		
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO078	-	---	
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO366			
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA1163	-----	--	
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA0783	-		
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO014	-- ---		
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA0767	--	-----	
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO017			
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO073			
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA0827	----		
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA0968		-----	
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	MOLA1162			
Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus Association	FSECO075			

## APPENDIX F: NOTEWORTHY TAXA

Twenty-eight of the taxa encountered in the field surveys are considered “noteworthy,” or rare, in California. The degree of scarcity is indicated by the CA Rare Plant Rank and the NatureServe Global/State Rank, as defined below.

*CA Rare Plant Rank* – a code assigned to a taxon based on its rarity in California. Lower numbers and letters indicate increased rarity. The California Rare Plant Ranking System is described at this website:

<http://www.cnps.org/cnps/rareplants/ranking.php>.

*NatureServe Global/State Rank* – the conservation status assigned to a species by the California Natural Diversity Database using NatureServe methodology. “G” indicates the taxon’s rarity and threat globally, and “S” indicates the taxon’s rarity and threat in California. The rankings range from possibly extinct (H) to critically imperiled (1), to secure (5). See <http://www.natureserve.org/conservation-tools/conservation-status-assessment> for a description of NatureServe conservation status assessment.

<b>Taxon Name</b> <b>Vegetation type(s) in which it was observed</b>	<b>CA Rare Plant Rank</b>	<b>NatureServe Global/State Rank</b>
<i>Astragalus agrestis</i> <i>Artemisia cana</i> (ssp. <i>bolanderi</i> , ssp. <i>viscidula</i> ) / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> Association	2B.2	G5/S2
<i>Balsamorhiza serrata</i> <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association	2B.3	G5/S2
<i>Carex lasiocarpa</i> <i>Agrostis (gigantea, stolonifera)</i> Association	2B.3	G5/S2
<i>Carex sheldonii</i> <i>Salix lucida</i> / <i>Poa pratensis</i> Association	2B.2	G4/S2

Taxon Name Vegetation type(s) in which it was observed	CA Rare Plant Rank	NatureServe Global/State Rank
<i>Dimeresia howellii</i> <i>Cercocarpus ledifolius</i> Alliance <i>Eriogonum</i> spp. / <i>Poa secunda</i> Alliance	2B.3	G4?/S3
<i>Downingia laeta</i> <i>Navarretia leucocephala</i> ssp. <i>minima</i> – <i>Plagiobothrys cusickii</i> Alliance <i>Taraxia tanacetifolia</i> – <i>Iva axillaris</i> Provisional Association	2B.2	G5/S3
<i>Eriastrum sparsiflorum</i> <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> Association <i>Artemisia tridentata</i> – <i>Ephedra viridis</i> / <i>Pseudoroegneria spicata</i> Provisional Association <i>Artemisia tridentata</i> – ( <i>Ericameria nauseosa</i> ) / <i>Bromus tectorum</i> Association <i>Juniperus occidentalis</i> / ( <i>Poa secunda</i> – <i>Festuca idahoensis</i> – <i>Pseudoroegneria spicata</i> ) Association	4.3	G5/S4
<i>Erigeron elegantulus</i> <i>Artemisia arbuscula</i> – <i>Eriogonum (microthecum, sphaerocephalum)</i> Association <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> Association <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> / <i>Festuca idahoensis</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Juniperus occidentalis</i> / ( <i>Poa secunda</i> – <i>Festuca idahoensis</i> – <i>Pseudoroegneria spicata</i> ) Association	4.3	G4/S4
<i>Eriogonum prociduum</i> <i>Eriogonum sphaerocephalum</i> / <i>Poa secunda</i> Association	1B.2	G3/S3
<i>Gratiola heterosepala</i> <i>Taraxia tanacetifolia</i> – <i>Iva axillaris</i> Provisional Association <i>Eleocharis macrostachya</i> Provisional Association	1B.2	G2/S2

Taxon Name Vegetation type(s) in which it was observed	CA Rare Plant Rank	NatureServe Global/State Rank
<i>Hackelia cusickii</i> <i>Abies concolor</i> – <i>Pinus ponderosa</i> / <i>Cercocarpus ledifolius</i> Association <i>Artemisia arbuscula</i> / <i>Festuca idahoensis</i> Association <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> – <i>Symphoricarpos oreophilus</i> / <i>Bromus carinatus</i> Association <i>Cercocarpus ledifolius</i> Association <i>Holodiscus discolor</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia tridentata</i> – <i>Purshia tridentata</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Juniperus occidentalis</i> – ( <i>Pinus jeffreyi</i> – <i>Pinus ponderosa</i> ) / <i>Cercocarpus ledifolius</i> Association <i>Juniperus occidentalis</i> / ( <i>Poa secunda</i> – <i>Festuca idahoensis</i> – <i>Pseudoroegneria spicata</i> ) Association <i>Pinus ponderosa</i> – <i>Juniperus occidentalis</i> / <i>Artemisia tridentata</i> – <i>Purshia tridentata</i> Association <i>Populus tremuloides</i> / <i>Symphoricarpos rotundifolius</i> Association <i>Prunus virginiana</i> / <i>Symphoricarpos rotundifolius</i> Association <i>Symphoricarpos oreophilus</i> Association	4.3	G4/S3S4
<i>Iliamna bakeri</i> <i>Bromus tectorum</i> Association <i>Ceanothus velutinus</i> Association <i>Chrysothamnus viscidiflorus</i> Association <i>Tetradymia canescens</i> Provisional Association	4.2	G4/S3
<i>Ivesia paniculata</i> <i>Eriogonum sphaerocephalum</i> / <i>Poa secunda</i> Association	1B.2	G2/S2



Taxon Name Vegetation type(s) in which it was observed	CA Rare Plant Rank	NatureServe Global/State Rank
<i>Lomatium canbyi</i> <i>Artemisia arbuscula</i> – <i>Eriogonum (microthecum, sphaerocephalum)</i> Association <i>Artemisia arbuscula</i> / <i>Festuca idahoensis</i> Association <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia cana</i> (ssp. <i>bolanderi</i> , ssp. <i>viscidula</i> ) / <i>Poa secunda</i> Association <i>Eriogonum sphaerocephalum</i> / <i>Poa secunda</i> Association <i>Festuca idahoensis</i> – <i>Pseudoroegneria spicata</i> Association <i>Pseudoroegneria spicata</i> – <i>Poa secunda</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Juniperus occidentalis</i> – ( <i>Pinus jeffreyi</i> – <i>Pinus ponderosa</i> ) / <i>Cercocarpus ledifolius</i> Association	4.3	G5/S3S4
<i>Lomatium hendersonii</i> <i>Ventenata dubia</i> Provisional Association	2B.3	G5?/S2
<i>Lupinus nevadensis</i> <i>Artemisia tridentata</i> Association <i>Artemisia tridentata</i> – ( <i>Ericameria nauseosa</i> ) / <i>Bromus tectorum</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Juniperus occidentalis</i> / ( <i>Poa secunda</i> – <i>Festuca idahoensis</i> – <i>Pseudoroegneria spicata</i> ) Association	4.3	G4/S4
<i>Lupinus uncialis</i> <i>Danthonia unispicata</i> – <i>Poa secunda</i> Association	2B.2	G4/S2
<i>Melica spectabilis</i> <i>Cercocarpus ledifolius</i> – <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> Association <i>Juncus arcticus</i> var. <i>balticus</i> – (var. <i>mexicanus</i> ) Association	4.3	G5/S4
<i>Penstemon cinicola</i> <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Bromus tectorum</i> Association <i>Pseudoroegneria spicata</i> – <i>Poa secunda</i> Association	4.3	G4/S3

Taxon Name Vegetation type(s) in which it was observed	CA Rare Plant Rank	NatureServe Global/State Rank
<i>Penstemon sudans</i> <i>Artemisia nova</i> Alliance	1B.2	G3/S3
<i>Phacelia inundata</i> <i>Ericameria nauseosa</i> Association <i>Ericameria nauseosa</i> / <i>Bromus tectorum</i> Association <i>Taraxia tanacetifolia</i> – <i>Iva axillaris</i> Provisional Association	1B.3	G2/S2
<i>Phlox muscoides</i> <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Ericameria nauseosa</i> Association <i>Juniperus occidentalis</i> / <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association	2B.3	G4G5/S3
<i>Pogogyne floribunda</i> <i>Artemisia cana</i> (ssp. <i>bolanderi</i> , ssp. <i>viscidula</i> ) / <i>Poa secunda</i> Association	4.2	G3G4/S3
<i>Polygala subspinosa</i> <i>Artemisia arbuscula</i> / <i>Poa secunda</i> Association <i>Artemisia tridentata</i> – <i>Ephedra viridis</i> / <i>Pseudoroegneria spicata</i> Provisional Association	2B.2	G4?/S3
<i>Rumex venosus</i> <i>Taraxia tanacetifolia</i> – <i>Iva axillaris</i> Provisional Association	2B.3	G5?/S3
<i>Salix bebbiana</i> <i>Ceanothus velutinus</i> Association <i>Populus tremuloides</i> Alliance	2B.3	G5/S2S3
<i>Senecio hydrophiloides</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> – <i>Symphoricarpos oreophilus</i> / <i>Bromus carinatus</i> Association <i>Ceanothus velutinus</i> Association <i>Juncus arcticus</i> var. <i>balticus</i> – (var. <i>mexicanus</i> ) Association <i>Prunus emarginata</i> Association	4.2	G5/S3

Taxon Name Vegetation type(s) in which it was observed	CA Rare Plant Rank	NatureServe Global/State Rank
<i>Silene oregana</i> <i>Abies concolor</i> – <i>Pinus ponderosa</i> / <i>Cercocarpus ledifolius</i> Association <i>Populus tremuloides</i> / <i>Symphoricarpos rotundifolius</i> Association <i>Prunus emarginata</i> Association <i>Purshia tridentata</i> – <i>Artemisia tridentata</i> Association	2B.2	G4/S2

## APPENDIX G:

### KEY TO THE VEGETATION OF MODOC AND LASSEN COUNTIES

This is the vegetation key for Modoc and Lassen Counties. It is based on 2,050 vegetation samples; 627 surveys collected between 2016 and 2019 specifically for the classification and 1,192 surveys collected for other projects and/or by other agencies. This key follows the hierarchy from the most current National Vegetation Classification System (NVCS). This is not a dichotomous key. Follow the instructions in each section carefully and sequentially to arrive at the correct vegetation type. Note that this vegetation key may include types that are not accurately detectable in remotely sensed imagery.

Alliance and association names are frequently followed by a number, e.g. (n=5). This is the number of vegetation samples that were classified to the type. If there is not a number following the vegetation type, then none of the samples collected thus far have classified to that type. In some cases, the number of samples recorded for an alliance will equal the sum of the samples recorded for the associations below it. If this is not the case, then some samples could not be classified below the alliance level.

I. Trees are evenly distributed and are typically >5% absolute cover in the overstory canopy. When *Juniperus occidentalis* is the sole tree species present it may have as low as 3% cover, but the trees will be of appreciable age, evenly distributed throughout the stand, there will be obvious regenerating juniper in the understory, and shrub cover will be sparse as well (usually <10% absolute cover)

.....  
 .....**Forest and Woodland**

II. Shrubs are evenly distributed throughout the stand and >4% cover. If the stand is characterized by very low overall vegetation cover (<10%) the shrub cover can be as low as 2%. Trees average less than 5% and are not evenly distributed.....

...**Shrubland**

III. Annual or perennial herbs, including grasses, graminoids (sedges and rushes), and forbs, average >2% cover and are evenly distributed across the stand. Trees and shrubs, if present, each average less than 4% cover and/or are not evenly distributed..... **Herbaceous stands**

#### **I. Forest and Woodland**

- 1) Overstory dominated by coniferous tree species.
  - a) *Juniperus occidentalis* is the sole coniferous tree species in the overstory or is strongly dominant with *Pinus jeffreyi*. *Juniperus occidentalis* may have as little as 3% cover but the trees will include mature individuals, be evenly distributed

throughout the stand, there will be obvious regenerating juniper in the understory, and the shrub layer will usually be less than 10% absolute cover.

***Juniperus occidentalis* Alliance (n=343)**

- i) *Juniperus occidentalis* is dominant with sub-dominant *Pinus jeffreyi* and/or *Pinus ponderosa* or has a shrub understory that is indicative of higher elevations. Pines may have as little as 1% cover or occasionally may not be present. Shrub understory is variable. When pines are present the understory can be dominated by *Artemisia tridentata* and *Purshia tridentata* with some *Cercocarpus ledifolius* and/or may include other higher elevation shrub species. When pines are not present, higher elevation shrub species such as *Cercocarpus ledifolius*, *Ribes* spp., *Artemisia tridentata* ssp. *vaseyana*, and *Symphoricarpos* spp. are present in the understory which differentiate this type from *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association. If pines are strongly dominant (>60% relative cover in the tree layer) then key to *Pinus ponderosa* / Shrub Understory Alliance.

*Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association (n=112)

- ii) Pines are typically absent, and stands are at lower elevations compared to *Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association. *Artemisia tridentata* present with at least 1% cover but typically dominates or co-dominates the shrub layer. *Purshia tridentata* usually present with *A. tridentata* and may dominate. However, *A. tridentata* is commonly the dominant shrub. *Cercocarpus ledifolius* and *Prunus* spp. are typically absent.

*Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association (n=87)

- iii) *Artemisia arbuscula* is strongly dominant to co-dominant in the shrub layer with *Purshia tridentata* and *Eriogonum* spp. Rarely, *A. arbuscula* is absent (usually disturbance-related), but associated herbs will still be present. Native grasses are common and diverse, including *Poa secunda*, *Festuca idahoensis*, *Pseudoroegneria spicata*, *Achnatherum thurberianum*, and *Danthonia unispicata*. Other herbs may include *Blepharipappus scaber*, *Epilobium brachycarpum*, and *Lomatium* spp. Stands are rocky with typically >30% cover of surficial rocks (cobble-bedrock).

*Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association (n=112)

- iv) *Juniperus occidentalis* stands with minimal shrub component (typically <4% absolute cover). Juniper cover is usually greater than 10% and trees are of mixed age classes. Herb layer is sparse to moderate, sometimes with significant cover of non-native grasses such as *Bromus tectorum*. However,

native grasses including *Poa secunda*, *Pseudoroegneria spicata*, *Festuca idahoensis*, and/or *Achnatherum thurberianum* are characteristic in the herb layer. If shrubs are present, they are patchy and insignificant.

*Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association (n=30)

- b) Other coniferous tree species characterize the overstory with or without *Juniperus occidentalis* as a co-dominant.

- i) *Quercus kelloggii* is dominant to co-dominant with pines.

***Quercus kelloggii* Alliance** (n=3)

- ii) *Pinus ponderosa*<sup>2</sup> and/or *Pinus jeffreyi* is characteristic in the tree layer and are dominant to co-dominant with either *Calocedrus decurrens* or *Juniperus occidentalis*. If *Abies concolor* is present, it is typically sub-dominant in the tree layer and is not evenly distributed

- (1) *Pinus ponderosa* and/or *Pinus jeffreyi* is dominant to co-dominant with *Juniperus occidentalis* in the overstory. *Calocedrus decurrens* is absent.

***Pinus ponderosa* / Shrub Understory Alliance** (n=179)

- (a) *Juniperus occidentalis* is often sub-dominant with *Pinus ponderosa* and/or *Pinus jeffreyi*. Shrub layer is sparse to moderately dense with a variety of higher elevation, cold-tolerant shrubs present including *Amelanchier utahensis*, *Cercocarpus ledifolius*, *Ceanothus prostratus*, *Prunus virginiana*, and *Symphoricarpos* spp. *Artemisia tridentata* is typically absent or only a small component of the shrub layer.

*Pinus (jeffreyi, ponderosa)* / (*Ceanothus prostratus* – *Purshia tridentata*) Association (n=105)

- (b) *Juniperus occidentalis* is typically present to co-dominant with *Pinus ponderosa* and lower elevation shrub species such as *Purshia tridentata*, *Artemisia tridentata*, and *Cercocarpus ledifolius* dominate the shrub layer. *Arctostaphylos patula* is typically absent or insignificant.

*Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association (n=22)

- (c) *Pinus jeffreyi* is dominant in the overstory while *Juniperus occidentalis* may just be present. Though there may be high shrub diversity,

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<sup>2</sup> Treatment of Ponderosa pine in this study: Based on recent taxonomy, “Washoe” pine (formerly *Pinus washoensis*) as discussed by Calliham (2013) is now subsumed into *Pinus ponderosa* ssp. *ponderosa*, Columbia Ponderosa pine. although we use the name here, *Pinus ponderosa* ssp. *ponderosa* is the most widespread subspecies in the study area, although some individuals on the northwest side of the Likely Tableland are probably more closely related to *P. ponderosa* ssp. *critchfieldiana*, Pacific Ponderosa pine.

*Artemisia tridentata* ssp. *vaseyana* is the dominant shrub. *Festuca idahoensis* is characteristically present and typically the dominant herb. *Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association (n=6)

- (d) *Pinus ponderosa* is dominant in the overstory while *Juniperus occidentalis* may be present to co-dominant. *Artemisia tridentata* is absent or insignificant in the understory and *Purshia tridentata*, *Ceanothus prostratus*, and *Arctostaphylos patula* dominate the shrub layer. Stands occur at higher elevations in the western portions of the study area or the Warner Mtns., where winter precipitation is relatively greater and persistent snow is more frequent.

*Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata* Association (n=37)

- (e) *Pinus ponderosa* var. *washoensis* is dominant in the tree layer with *Arctostaphylos nevadensis* in the understory.

*Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis* Association (n=1)

- (f) *Pinus ponderosa* var. *washoensis* is dominant in the tree layer with *Abies concolor* and/or *Pinus contorta*. *Symphoricarpos* spp. is characteristically present in the shrub layer and *Pseudostellaria jamesiana* is characteristically present in the herb layer. Stands of this type are more typical of higher elevation sites in the Warner Mountains (>6500 ft) and are, therefore, not common in the study area.

*Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association (n=6)

- (2) *Calocedrus decurrens* is dominant to co-dominant with *Pinus ponderosa*. *Abies concolor* may be present but is sub-dominant to the other conifers. *Juniperus occidentalis* is absent or <1% cover. *Pseudotsuga menziesii* is not likely to occur in these stands within the study area.

*Pinus ponderosa* – *Calocedrus decurrens* – *Pseudotsuga menziesii* Alliance (n=17)

- (a) The mat-forming shrub *Ceanothus prostratus* may be present in the understory, though it may have very little cover.

*Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association (n=17)

- iii) *Abies concolor* is dominant to co-dominant in the tree layer with *Pinus ponderosa* or *Pinus jeffreyi*.

***Abies concolor* Alliance (n=32)**

- (1) *Pinus ponderosa* or *Pinus jeffreyi* is co-dominant to absent. *Juniperus occidentalis* may be present but insignificant. *Cercocarpus ledifolius* may or may not be present in the understory. Other higher elevation, cold-tolerant shrubs are present and may include *Ribes* spp., *Symphoricarpos rotundifolius*, *Amelanchier utahensis*, *Artemisia tridentata* ssp. *vaseyana*, and *Prunus* spp. The shrub and herb layers are characteristically sparse (<10% absolute cover) and are low in species diversity.

*Abies concolor* – *Pinus ponderosa* / *Cercocarpus ledifolius* Association  
(n=28)

2) Overstory dominated by broad-leaved evergreen or deciduous trees.

- a) Trees are deciduous and depending upon site conditions, may be short and shrubby.

- i) *Quercus kelloggii* is dominant to co-dominant with pines.

***Quercus kelloggii* Alliance (n=3)**

- ii) *Quercus garryana* is dominant to co-dominant with *Juniperus occidentalis*, *Quercus kelloggii*, and/or *Pinus sabiniana*. *Ceanothus cuneatus* is co-dominant in the shrub layer with *Cercocarpus montanus* and *Rhus trilobata*.

*Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Association  
(n=4)

of the *Quercus garryana* Alliance (n=4)

- iii) *Populus tremuloides* is dominant to co-dominant in the tree layer (note: stands may be short, resprouting, shrubby “trees”). If co-dominating with *Populus trichocarpa*, then key to *Populus trichocarpa* Alliance.

***Populus tremuloides* Alliance (n=26)**

- (1) *Symphoricarpos rotundifolius* and/or other mesic shrubs are characteristic in the shrub layer. Stands are usually in concavities or on steep sheltered and rocky slopes

*Populus tremuloides* / *Symphoricarpos rotundifolius* Association (n=20)

- iv) *Populus trichocarpa* is dominant to co-dominant in the tree layer along persistent streams. If co-dominant with *Populus tremuloides* key here.

***Populus trichocarpa* Alliance (n=2)**

- b) Trees are evergreen.

- i) Tall shrubs or small trees of *Cercocarpus ledifolius* dominant to co-dominant in the mid/shrub layer. Other shrubs may include *Artemisia tridentata* (various



subspecies), *Symphoricarpos rotundifolius*, *Prunus virginiana*, *Ribes velutinum* and/or *Purshia tridentata*. *Juniperus occidentalis* and *Pinus ponderosa* may be emergent in the tree layer but do not have enough cover to key to the *Juniperus occidentalis* Alliance or the *Pinus ponderosa* / Shrub Understory Alliance.

***Cercocarpus ledifolius*<sup>3</sup> Alliance (n=49)**

- (1) *Artemisia tridentata* ssp. *vaseyana* is typically co-dominant in the shrub layer with *Cercocarpus ledifolius*, and no other shrub species are present with comparable cover.

*Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* Association  
(n=16)

- (2) *Cercocarpus ledifolius* is strongly dominant with low cover other shrubs such as *Ribes velutinum*, *Symphoricarpos rotundifolius*, and/or *Prunus virginiana*. *Artemisia tridentata* is typically present at low cover.

*Cercocarpus ledifolius* Association (n=25)

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<sup>3</sup> *Cercocarpus ledifolius* is considered under separate tree and shrub alliances in the NVCS. However, there is much overlap in California so we put it in one shrub alliance following Sawyer et al. (2009).

## II. Shrubland

- 1) Upland shrub stands dominated or co-dominated by a species of *Artemisia* and/or *Purshia tridentata*.
  - a) Stands characterized by the low subshrub *Artemisia arbuscula* and/or *A. nova* (dominant layer is generally < 0.5 m tall).
    - i) *Artemisia arbuscula* is strongly dominant to co-dominant in the shrub layer. *Purshia tridentata*, *Artemisia tridentata*, *Ericameria* spp., and *Chrysothamnus* spp. may be co-dominant to sub-dominant. *A. arbuscula* stands tend to grow on flats or gradual slopes and tolerate heavier clay soils ("pimpled plains" clay accretion mounds), or otherwise more impervious (shallow, or very rocky) soil than the various subspecies of *A. tridentata*. Stands are susceptible to type conversion. Many stands are in transition between *Artemisia arbuscula* and non-native annual grasses (*Bromus tectorum*, *Ventenata dubia*, and *Elymus caput-medusae*) or are sites of rapid and recent colonization by *Juniperus occidentalis*. *Artemisia arbuscula* ssp. *arbuscula* dominates. *Artemisia nova* is absent.

### ***Artemisia arbuscula* Alliance (n=192)**

- (1) *Artemisia arbuscula* is dominant and evenly distributed in the shrub layer and is usually >10% absolute cover although it may be as low as 3% absolute cover. Herb layer is sparse to moderately dense and is usually dominated by native grasses such as *Poa secunda* and *Pseudoroegneria spicata* although non-native annual grasses can exceed cover of natives. Other herbs may include *Blepharipappus scaber*, *Epilobium brachycarpum*, and *Antennaria dimorpha*. Typically found on flats or gentle slopes (0-5 degrees) with variable cover (0->35%) of surficial rock (cobble, stone, boulder, and/or bedrock).

#### *Artemisia arbuscula* / *Poa secunda* Association (n=130)

- (2) Stands are in a degraded state from clearing, grazing, fire, or other disturbances (although the mode of disturbance may not be obvious). *A. arbuscula* is dominant in the shrub layer although it may be as low as 5% absolute cover. The herbaceous layer typically has higher cover than more pristine stands of the alliance and is dominated by non-native annual grasses such as *Bromus tectorum* and *Elymus caput-medusae*. Native herbaceous cover is usually insignificant.

#### *Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association (n=19)

- (3) *Artemisia arbuscula* is the dominant shrub and one or more *Eriogonum* spp. subshrubs is characteristically present. Soils are very shallow with insignificant organic content, and the substrate is often derived from ash

flows or pumice and may often be less weathered than other local subshrub vegetation. Herb layer is very sparse but typically high in native forb diversity including *Phlox hoodii*, *Balsamorhiza hookeri*, *Phoenicaulis cheiranthoides*, *Lomatium* spp., and annual *Eriogonum* spp.

*Artemisia arbuscula* – *Eriogonum* (*microthecum*, *sphaerocephalum*)  
Association (n=27)

- (4) *Festuca idahoensis* dominates the herb layer. Stands occur in the northern portion of the study area at higher elevations where it is cooler and there is more precipitation.

*Artemisia arbuscula* ssp. *arbuscula* / *Festuca idahoensis* Shrub Grassland  
(n=15)

- ii) *Artemisia nova* is dominant to co-dominant in the shrub layer with *Artemisia arbuscula*. Overall shrub cover may be as low as 3% and is often under 10%. Although stands are ecologically similar and often co-dominate with *Artemisia arbuscula*, *A. nova* is much less common than *A. arbuscula* in the study area.

***Artemisia nova* Alliance** (n=11)

- (1) *Poa secunda* is characteristically present in the herb layer. Other common herbs may include *Antennaria dimorpha*, *Blepharipappus scaber*, and *Pseudoroegneria spicata*.

*Artemisia nova* / *Poa secunda* Association (n=8)

- b) *Artemisia tridentata* (ssp. *tridentata* or *vaseyana*) is dominant to co-dominant with *Purshia tridentata*, *Ericameria nauseosa*, *Symphoricarpos rotundifolius*, *Artemisia arbuscula*, or *Chrysothamnus viscidiflorus* in the shrub layer. If *Purshia tridentata* is >50% relative cover then key to *Purshia tridentata* – *Artemisia tridentata* Alliance. *Juniperus occidentalis* may occur at <3% cover in the overstory. Shrub cover is often >10% absolute cover and herb cover often <10% absolute cover with high relative cover of native herbs.

- i) *Artemisia tridentata* is dominant to co-dominant in the shrub layer (if *A. tridentata* ssp. *vaseyana* is present see associations in the *Artemisia tridentata* ssp. *vaseyana* Alliance). *Purshia tridentata* may be present as a co-dominant but if it is >50% relative cover then key to *Purshia tridentata* – *Artemisia tridentata* Alliance.

***Artemisia tridentata* Alliance<sup>4</sup>** (n=179)

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<sup>4</sup> In the NVCS, *Artemisia tridentata* and its subspecies have been divided into multiple alliances in the cool deserts of Western North America. Thus, the names for some of the associations technically fall within multiple alliances, including ***Artemisia tridentata* ssp. *tridentata* – *Artemisia tridentata* ssp. *xericensis* Mesic Shrubland & Steppe Alliance**, ***Artemisia tridentata* ssp. *tridentata* – *Artemisia tridentata* ssp. *xericensis* Dry Steppe & Shrubland**

- (1) *Artemisia tridentata* is strongly dominant to co-dominant with *Chrysothamnus viscidiflorus* or *Purshia tridentata* (if *P. tridentata* is >50% relative cover key to *Purshia tridentata* – *Artemisia tridentata* Alliance). The herb layer is sparse to moderately dense with high relative cover of native herbs. Stands are on lower slopes to bottom topographic positions with heavy soils. Many have significant regeneration of *Juniperus occidentalis*. If *A. tridentata* is co-dominating with *Chrysothamnus viscidiflorus* or *Ericameria nauseosa* then the herb layer has high relative nativity and signs of disturbance are minimal.

*Artemisia tridentata* Association (n=118)

- (2) *Artemisia tridentata* is dominant to co-dominant with or without *Ericameria nauseosa* and/or *Chrysothamnus viscidiflorus*. Shrub cover averages around 10% cover but may be as low as 2% and herb cover is typically >10% absolute cover, with very low relative cover of native herbs. Signs of disturbance such as fire, grazing, and roads/trails are present and typically severe. Herb layer is characterized by high non-native grass cover and very low nativity in general.

*Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum*  
Association (n=35)

- (3) *Ephedra viridis* is characteristically present in the shrub layer, sub-dominant to dominant with *Artemisia tridentata*. *E. viridis* may be <1%. *Artemisia tridentata* may not be present if the stand has had recent disturbance. *Pseudoroegneria spicata* may co-dominate in the herb layer.

*Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata*  
Provisional Association (n=21)

- (4) *Artemisia tridentata* is dominant to co-dominant with alkali- or salt-tolerant species such as *Distichlis spicata* and *Iva axillaris*. Stands are restricted to valleys or Pleistocene lakebeds with somewhat alkaline soils. Type is uncommon in the study area.

*Artemisia tridentata* / *Distichlis spicata* Provisional Association (n=3)

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**Alliance, *Artemisia tridentata* – Mixed Shrub Dry Steppe & Shrubland Alliance and *Artemisia tridentata* ssp. *wyomingensis* Mesic Steppe & Shrubland Alliance.** The gradational nature of infraspecific taxa in *A. tridentata*, outside of subsp. *vaseyanana*, seem insufficiently differentiated in the California botanical collections and the currently accepted associations in the USNVC lack strongly diagnostic species. We currently follow the second edition of *A Manual of California Vegetation* (Sawyer et al. 2009) by recognizing only *Artemisia tridentata* ssp. *vaseyanana* (mountain big sagebrush) Alliance and a more broadly defined *Artemisia tridentata*.

- ii) *Artemisia tridentata* ssp. *vaseyana* and/or *Symphoricarpos rotundifolius* dominate in the shrub layer. Found at higher elevations on slopes and ridges, often associated with *Cercocarpus ledifolius*, *Abies concolor*, and the winter-deciduous shrubs *Holodiscus discolor*, *Prunus virginiana*, *P. emarginata*, and shrubby *Populus tremuloides*.

***Artemisia tridentata* ssp. *vaseyana* Alliance (n=92)**

- (1) *Artemisia tridentata* ssp. *vaseyana* is strongly dominant to co-dominant in the shrub layer with *Purshia tridentata*, *Tetradymia canescens*, and/or *Chrysothamnus viscidiflorus*. Emergent *Pinus jeffreyi* and *Juniperus occidentalis* are often present although at low cover. *Festuca idahoensis* is dominant to co-dominant in the herb layer with *Poa secunda*, *Achnatherum thurberianum*, *Pseudoroegneria spicata* and/or *Achillea millefolium*.

*Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association  
(n=33)

- (2) The sparse shrub layer is co-dominated by *Artemisia tridentata*, *Salvia dorrii* and/or *Chamaebatiaria millefolium*. Shrub diversity can be high but other shrub species will usually have very little cover. Herb cover is usually <10% absolute cover and may include *Penstemon deustus*, *Achnatherum thurberianum*, and *Mimulus suksdorfii*. Stands are on lava breaks or small escarpments where jumbled boulders of basalt and other volcanic rock are present.

*Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium*  
Association (n=19)

- (3) *Artemisia tridentata* ssp. *vaseyana* dominates or co-dominates with mesic shrubs such as *Symphoricarpos rotundifolius* (a synonym for the Jepson manual's *S. oreophilus*), *Ribes velutinum*, and/or *Prunus virginiana*. *Bromus carinatus* and other mesic herbs are found in the understory.

*Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association (n=29)

- (4) *Symphoricarpos rotundifolius* (a synonym for the Jepson manual's *S. oreophilus*) co-dominates in the shrub layer with *Chrysothamnus viscidiflorus*, but without *Artemisia tridentata* ssp. *vaseyana*. Stands with high cover of *Wyethia mollis* and low shrub cover key here. This type is indicative of disturbance (fire, grazing, clearing) and is successional related to stands formerly dominated or co-dominated by *Artemisia tridentata* ssp. *vaseyana*.

*Symphoricarpos oreophilus* Association (n=10)

- c) *Artemisia cana* (ssp. *bolanderi*) is strongly dominant in the shrub layer. *Chrysothamnus* species may co-dominate in disturbed versions of this type. Herb layer may include vernal pool indicators such as *Psilocarphus brevissimus* and *Navarretia* spp. or more generally moist herbs such as *Hordeum brachyantherum*, *Muhlenbergia richardsonis*, and *Juncus* spp. Stands of this type occur on mesic sites including basin bottoms, stream terraces, swales, and flats.

***Artemisia cana* Alliance (n=55)**

*Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association (n=44)

- d) *Purshia tridentata* is always present with at least 50% relative cover and dominant to co-dominant in the shrub layer with *Artemisia tridentata* and/or *Tetradymia canescens*. If *P. tridentata* does not have at least 50% relative cover, and *A. tridentata* is important, key to *Artemisia tridentata* Alliance. *A. tridentata* may or may not be present. *Juniperus occidentalis* may be present in the overstory at low cover. Typically found on moderately steep, north facing slopes. If stands are disturbed by clearing or fire, *Tetradymia canescens* may replace *P. tridentata* as dominant shrub.

***Purshia tridentata* – *Artemisia tridentata* Alliance (n=51)**

- i) *Purshia tridentata* is dominant to co-dominant in the shrub layer with or without *Artemisia tridentata*. The herb layer is dominated by grasses including *Poa secunda*, *Pseudoroegneria spicata*, *Achnatherum thurberianum*, *Festuca idahoensis*, and/or *Bromus tectorum*.

*Purshia tridentata* – *Artemisia tridentata* Association (n=31)

- ii) *Purshia tridentata* is dominant to co-dominant with *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, and/or *Artemisia tridentata* in the shrub layer. Substrate is very sandy and supports a very sparse herb layer that may include *Achnatherum hymenoides*, *Phacelia ramosissima*, and/or *Hesperostipa comata*. Locally stands are best represented on the stabilized dunes on the east side of the Madeline Plain.

*Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides*  
Association (n=4)

- iii) *Tetradymia canescens* or *Tetradymia glabrata* are strongly dominant in the shrub layer with other disturbance related species such as *Chrysothamnus viscidiflorus* and *Ericameria nauseosa*. Severe disturbance is indicated by lack of *Purshia tridentata* and *Artemisia tridentata* cover. The herb layer is dominated by non-natives such as *Bromus tectorum*, *Tragopogon dubius*, and/or *Sisymbrium altissimum*.

*Tetradymia canescens* Provisional Association (n=11)

2) Stands of upland or wetland (riparian, basins, etc.) shrubs without conspicuous presence or dominance of the genus *Artemisia*.

a) Upland shrub stands.

i) *Amelanchier utahensis* or *Cercocarpus montanus* are dominant in the shrub layer.

***Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus* Alliance (n=2)**

(1) *Amelanchier utahensis* is strongly dominant in the shrub layer.

*Amelanchier utahensis* Association (n=1)

(2) *Cercocarpus montanus* is co-dominant to dominant in the shrub layer with *Artemisia arbuscula*.

*Cercocarpus montanus* / *Pseudoroegneria spicata* Association (n=1)

ii) *Tetradymia canescens* or *Tetradymia glabrata* are strongly dominant in the shrub layer with other disturbance related species such as *Chrysothamnus viscidiflorus* and *Ericameria nauseosa*. Significant recent disturbance is indicated by lack of *Purshia tridentata* and *Artemisia tridentata* cover. The herb layer is dominated by non-natives such as *Bromus tectorum*, *Tragopogon dubius*, and/or *Sisymbrium altissimum*.

*Tetradymia canescens* Provisional Association (n=11)  
of the ***Purshia tridentata* – *Artemisia tridentata* Alliance**

iii) *Ribes velutinum* is dominant in the shrub layer with *Cercocarpus ledifolius*, *Ericameria nauseosa*, *Prunus virginiana*, and/or *Prunus subcordata*. *Leymus cinereus* may be dominant in the herb layer.

*Ribes velutinum* Provisional Association (n=3)  
of the ***Prunus emarginata* – *Holodiscus discolor* Alliance**

iv) *Chrysothamnus viscidiflorus* dominates in the shrub layer without significant cover of *Artemisia tridentata* or *Purshia tridentata*. *Poa secunda* is generally present in the herb layer. In disturbed sites, *Bromus tectorum* may dominate the herb layer.

*Chrysothamnus viscidiflorus* Association (n=13)  
of the ***Chrysothamnus viscidiflorus* Alliance (n=13)**

v) Stands are composed of shrubs with evergreen, stiff or thickened leaves.

(1) *Ceanothus velutinus* is dominant to co-dominant in the shrub layer with *Prunus emarginata*, *Symphoricarpos rotundifolius*, and *Artemisia tridentata*. If *C. velutinus* is co-dominating with *Arctostaphylos patula* then key to the *Arctostaphylos patula* – *Ceanothus velutinus* Association (*Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance). Typically

found on moderately steep (>10 degrees), north-facing slopes. Emergent *Abies concolor* may be present. Herb layer may include *Bromus carinatus*, *Wyethia angustifolia*, and/or *Crepis acuminata*. Evidence of fire is common (locally after fires, *C. velutinus* germinates from seed bank within burned stands of conifers or *Cercocarpus*).

***Ceanothus velutinus* Alliance (n=16)**

- (a) *Ceanothus velutinus* is strongly dominate in the shrub layer. *Prunus emarginata* and *Artemisia tridentata* (ssp. *vaseyana*) might be present as sub-dominants.

*Ceanothus velutinus* Association (n=11)

- (b) *Ceanothus velutinus* is co-dominant with *Prunus emarginata*. Other shrubs like *Symphoricarpos rotundifolius* and *Artemisia tridentata* (ssp. *vaseyana*) are often present.

*Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata*  
Association (n=5)

- (2) Tall shrubs or small trees of *Cercocarpus ledifolius* dominant to co-dominant in the mid/shrub layer. Other shrubs may include *Artemisia tridentata* (various subspecies), *Symphoricarpos rotundifolius*, *Prunus virginiana*, *Ribes velutinum* and/or *Purshia tridentata*. *Juniperus occidentalis* and *Pinus ponderosa* may be emergent in the tree layer but do not have enough cover to key to the *Juniperus occidentalis* Alliance or the *Pinus ponderosa* / Shrub Understory Alliance

***Cercocarpus ledifolius*<sup>5</sup> Alliance (n=49)**

- (a) *Artemisia tridentata* ssp. *vaseyana* is typically co-dominant in the shrub layer with *Cercocarpus ledifolius*, and no other shrub species are present with comparable cover.

*Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana*  
Association (n=16)

- (b) *Cercocarpus ledifolius* is strongly dominant with low cover of other shrubs such as *Ribes velutinum*, *Symphoricarpos rotundifolius*, and/or *Prunus virginiana*. *Artemisia tridentata* is typically present at low cover. Typically found on rocky, north facing slopes and/or where *Cercocarpus ledifolius* is dense with a closing canopy.

*Cercocarpus ledifolius* Association (n=25)

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<sup>5</sup> *Cercocarpus ledifolius* is considered under separate tree and shrub alliances in the NVCS. However, there is much overlap in California so we put it in one shrub alliance following Sawyer et al. (2009).



- (3) *Arctostaphylos patula* is strongly dominant to co-dominant in the shrub layer with *Ceanothus velutinus*, *Cercocarpus ledifolius*, and/or *Artemisia tridentata* ssp. *vaseyana*.

***Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance (n=13)**

- (a) *Arctostaphylos patula* is strongly dominant in the shrub layer though many other shrub species may be present at low cover including *Cercocarpus ledifolius*, *Purshia tridentata*, and/or *Ceanothus velutinus*. Herb layer is usually sparse and may include *Poa secunda*, *Achillea millefolium* or *Castilleja applegatei*.

*Arctostaphylos patula* Association (n=6)

- (b) *Arctostaphylos patula* and *Ceanothus velutinus* co-dominate in the shrub layer with *Cercocarpus ledifolius*, *Prunus emarginata*, and/or *Ceanothus prostratus*. Herb layer is sparse and variable in species composition but may include *Viola purpurea*, *Wyethia mollis*, or *Elymus elymoides*.

*Arctostaphylos patula* – *Ceanothus velutinus* Association (n=7)

- (4) *Chrysolepis sempervirens* is dominant in the shrub layer. Stands of this type are rare in this study area.

*Chrysolepis sempervirens* Association (n=1)  
of the *Chrysolepis sempervirens* Alliance (n=1)

- vi) Dominant or characteristic shrubs are soft-leaved members of the genus *Ericameria* or *Eriogonum*.

- (1) *Ericameria nauseosa* is typically strongly dominant in the shrub layer with or without *Artemisia arbuscula* or *Artemisia tridentata*.

***Ericameria nauseosa* Alliance (n=64)**

- (a) The understory herb layer is characteristically sparse (<10%) and has a decent native component that may include *Poa secunda*, *Epilobium brachycarpum*, and/or *Pseudoroegneria spicata*.

*Ericameria nauseosa* Association (n=45)

- (b) Evidence of disturbance from fire, grazing, or other clearing is present. Typically, the low diversity herbaceous layer is dominated by non-native annual herbs such as *Bromus tectorum*, *Sisymbrium altissimum*, and *Taeniatherum caput-medusae*.

*Ericameria nauseosa* / *Bromus tectorum* Association (n=18)

- (2) Dwarf shrub *Eriogonum* spp. (*E. vimineum*, *E. sphaerocephalum*, *E. prociduum*) are characteristically present even as low as <1% cover and usually no other shrubs are present with greater cover. Generally, on flats or exposed hilltops with significant volcanic cobble and/or gravel covering the soil surface. Total vegetation cover is usually <10% and often <5%. This type is related to the *Artemisia arbuscula* – *Eriogonum* (*microthecum*, *sphaerocephalum*) Association, but occurs on harsher sites where an evenly-distributed subshrub layer dominated by *Artemisia arbuscula* is unlikely.

***Eriogonum* spp. / *Poa secunda* Alliance** (n=36)  
*Eriogonum sphaerocephalum* / *Poa secunda* Association (n=35)

- vii) Dominant or characteristic shrubs are associated with old playas or lakeshores occurring on semi-alkaline, sandy, or clayey soils. Stands are only known from the southern portion of the study area.

- (1) *Krascheninnikovia lanata* is dominant to co-dominant in the shrub layer.

***Krascheninnikovia lanata* Alliance** (n=1)

- (2) *Atriplex canescens* is dominant to co-dominant in the shrub layer with *Psoralea polydenia* and *Tetradymia glabrata*.

***Atriplex canescens* Alliance** (n=1)

- viii) Dominant or characteristic shrubs are winter-deciduous members of the genus *Prunus* or *Holodiscus*.

- (1) *Holodiscus discolor*, *Prunus emarginata* and/or *Ribes velutinum* dominate in the shrub layer. *Symphoricarpos rotundifolius*, *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, and *Artemisia tridentata* may be present as co-dominants or sub-dominants. Stands are found in forest openings or on rock outcrops.

***Prunus emarginata* – *Holodiscus discolor* Alliance** (n=12)

- (a) *Ribes velutinum* is dominant to co-dominant in the shrub layer with *Cercocarpus ledifolius* and/or *Prunus* spp.

*Ribes velutinum* Provisional Association (n=3)

- (b) *Holodiscus discolor* is dominant in the shrub layer with *Ericameria nauseosa*, *Chamaebatiaria millefolium*, *Artemisia tridentata* ssp. *vaseyana*, *Cercocarpus ledifolius*, and/or *Ribes velutinum*.

*Holodiscus discolor* Association (n=4)

- (c) *Prunus emarginata* is dominant in the shrub layer with *Symphoricarpos rotundifolius*, *Ribes velutinum*, and/or *Amelanchier utahensis*.  
*Holodiscus discolor* is absent.

*Prunus emarginata* Association (n=8)

- (2) *Prunus virginiana* or *Prunus subcordata* is dominant to co-dominant in the shrub layer. Typically found on rocky, moderately steep to steep (>10 degrees) north facing slopes.

***Prunus virginiana* Alliance** (n=22)

- (a) *Prunus virginiana* is dominant in the shrub layer with *Symphoricarpos rotundifolius*, *Ribes* spp., and/or *Cercocarpus ledifolius*. Herb layer is usually sparse and may include *Leymus cinereus*, *Lupinus argenteus*, *Agastache urticifolia*, and/or *Crepis acuminata*.

*Prunus virginiana* / *Symphoricarpos rotundifolius* Association (n=14)

- (b) *Prunus subcordata* is strongly dominant in the shrub layer with *Ericameria nauseosa*, *Prunus virginiana*, and/or *Ribes velutinum*.

*Prunus subcordata* Provisional Association (n=4)

b) Wetland shrub stands.

- i) Stands associated with larger playas or former Pleistocene lakebeds on fine, clayey soils often with a distinctly light color relative to adjacent upland substrates. *Sarcobatus vermiculatus* is dominant to sub-dominant in the shrub layer with *Artemisia tridentata*, *Atriplex confertifolia*, and/or *Chrysothamnus* spp. Herb layer is sparse, typically <10%. Stands are found on flats adjacent to playas.

***Sarcobatus vermiculatus* Alliance** (n=26)

- (1) *Sarcobatus vermiculatus* is dominant to sub-dominant with *Chrysothamnus viscidiflorus* and/or *Artemisia tridentata* in the shrub layer.

*Sarcobatus vermiculatus* – *Artemisia tridentata* Association (n=15)

- (2) *Sarcobatus vermiculatus* is dominant to sub-dominant with *Picrothamnus desertorum* and/or *Atriplex confertifolia*.

*Sarcobatus vermiculatus* – *Atriplex confertifolia* – (*Picrothamnus desertorum*, *Suaeda moquinii*) Association (n=7)

- ii) Shrub stands associated with non-alkaline wetlands such as streams, lakes, sloughs, or ditches. The genus *Salix* is dominant.

- (1) *Salix exigua* is dominant or co-dominant in the shrub layer with *Salix lasiolepis*, *Rosa woodsii* and/or *Ribes cereum*.

***Salix exigua* Alliance** (n=6)

- (2) *Salix lasiolepis* is strongly dominant to co-dominant with *Cornus sericea* in the shrub layer. If *Salix exigua* is present, it is sub-dominant. *Salix lasiandra* var. *lasiandra* is absent.

***Salix lasiolepis* Alliance** (n=9)

- (a) *Rosa woodsii* may be present in the shrub layer. A variety of wetland species can be found in the herb layer including *Carex simulata*, *Artemisia douglasiana*, *Scirpus microcarpus*, or *Achillea millefolium*.

***Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association** (n=9)

- (3) Shrubby *Salix lasiandra* var. *lasiandra* or *S. lasiandra* var. *caudata* (*Salix lucida*, *Salix lasiandra* in some taxonomies) is characteristic of the large shrub layer. *Salix lasiolepis* may be dominant.

***Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance** (n=10)

- (a) *Poa pratensis* is often in the herb layer although it may have very low cover. Other herbaceous species may include *Epilobium ciliatum*, *Agrostis gigantea*, *Mimulus guttatus*, and/or *Equisetum arvense*.

***Salix lucida* / *Poa pratensis* Association** (n=9)

- (4) *Betula occidentalis* is dominant in the shrub layer with *Salix lasiolepis* and *Rosa woodsii*.

***Betula occidentalis* Alliance** (n=1)

- (5) *Cornus sericea* or *Rosa woodsii* is dominant or co-dominant in the shrub canopy.

***Cornus sericea* – *Rosa woodsii* – *Ribes spp.* Alliance** (n=5)

- (a) *Cornus sericea* is dominant to co-dominant in the shrub layer with *Prunus virginiana* or *Salix scouleriana*.

***Cornus sericea* Association** (n=4)

- (b) *Rosa woodsii* is greater than 50% relative cover in the shrub layer.

***Rosa woodsii* Association** (n=1)

### III. Herbaceous stands

- 1) Upland stands without any long-term accumulation of water. Stands may be on slopes, flats, or ridges, but are not typical of concave drainages or basins.
- a) Stands dominated and/or characterized by native perennial grasses such as *Elymus smithii*, *Pseudoroegneria spicata*, *Elymus elymoides*, *Poa secunda*, and/or *Festuca idahoensis*.

#### **Central Rocky Mountain Lower Montane, Foothill & Valley Grassland Group**

- i) *Elymus smithii* is present, with at least 20% relative cover, with other mesic herbs such as *Juncus balticus* and *Eleocharis* spp. The most extensive stands of this vegetation occur on the northern slopes of Shinn Mountain and adjacent areas to the north between 6000 and 7000 ft elevation. Stands range from concavities and swales to mesic middle slopes. Much of this area was affected by the 2012 Rush fire and the grasslands dominated or co-dominated by *E. smithii* as sampled 4-6 years after the fire appear successional to *Purshia tridentata*-*Artemisia tridentata*, or *A. tridentata* var. *vaseyana* alliance stands.

*Elymus smithii* Stands (n=1)

- ii) Stands dominated and/or characterized by *Festuca idahoensis*, *Elymus spicatus*, and/or *Poa secunda*, without significant cover of *Elymus smithii*. Non-native annual grasses such as *Bromus tectorum* and *Taeniatherum caput-medusae* may exceed the cover of native grasses but total herbaceous nativity is usually >20% relative cover.

*Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda* Alliance (n=137)

- (1) Stands are characterized by *Pseudoroegneria spicata* and/or *Poa secunda*, usually on warmer aspects with rocky substrate. Non-native species such as *Bromus tectorum* or *Elymus caput-medusae* often co-dominate or dominate the herb layer but native cover is usually >20%. Other native herb species present include *Elymus elymoides*, *Epilobium brachycarpum*, *Blepharipappus scaber*, *Achnatherum thurberianum*, and/or *Lomatium* spp. *Festuca idahoensis* may be present but sub-dominant. Stands have typically burned within the past 10 years.

*Pseudoroegneria spicata* – *Poa secunda* Association (n=128)

- (2) Stands dominated or co-dominated by *Festuca idahoensis* with *Bromus tectorum*, *Elymus elymoides*, *Pseudoroegneria spicata*, and/or *Achnatherum thurberianum*. Compared to the *Pseudoroegneria spicata* – *Poa secunda* Grassland Association, stands are generally found on upper slopes on neutral to cooler aspects above 5500 ft.

*Festuca idahoensis* – *Pseudoroegneria spicata* Provisional Association (n=6)

- b) Upland stands dominated by non-native annual grasses and/or herbs.
  - i) Stands widespread and not solely associated with pastures or human habitation. Usually associated with recent fire or clearing and often formerly dominated by woody plants including *Artemisia arbuscula*, *Artemisia tridentata*, *Cercocarpus ledifolius*, or *Juniperus occidentalis* (evidence of charred stems or stumps is often found nearby).

**Intermountain Ruderal Steppe and Shrubland Group**

- (1) Stand with >75% relative cover of non-native herbs and grasses such as *Bromus tectorum*, *Elymus caput-medusae*, *Ventenata dubia*, *Poa bulbosa*, and *Sisymbrium altissimum*. *Elymus elymoides* may dominate or co-dominate although no single native species with significant cover is present. Signs of disturbance are typically present, such as fire, roads or trails, grazing, or *Juniperus occidentalis* removal.

***Bromus tectorum* – *Elymus caput-medusae* Alliance (n=109)**

- (a) *Bromus tectorum* is usually strongly dominant to co-dominant in the herb layer with *Elymus elymoides*, *Sisymbrium altissimum*, *Erodium cicutarium*, and/or *Descurainia sophia*. *Elymus caput-medusae* may be present but only as a sub-dominant. *Elymus elymoides* may be strongly dominant in areas with juniper removal. Low cover of shrubs such as *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, and/or *Tetradymia glabrata* may be present but usually patchy.

*Bromus tectorum* Association (n=53)

- (b) *Elymus caput-medusae* is strongly dominant to co-dominant with *Bromus tectorum*, *Bromus arvensis*, *Erodium cicutarium*, and/or *Lactuca serriola*. If co-dominant with *Ventenata dubia* key to *Ventenata dubia* Provisional Association.

*Elymus caput-medusae* Provisional Association (n=33)

- (c) *Ventenata dubia* is dominant to co-dominant with *Elymus caput-medusae*, *Bromus tectorum*, *Bromus arvensis*, and/or *Elymus caput-medusae*. Stands are in slightly more mesic sites compared to stands of *Elymus caput-medusae* Intermontane Provisional Association, including small swales and rocky flats with some water accumulation possible from spring to early summer.

*Ventenata dubia* Provisional Association (n=20)

- ii) Stands strongly dominated by *Elymus elymoides* with all other herbaceous species with very little cover. Species diversity is very low and may have obvious signs of disturbance such as fire and/or Juniper removal.

**Intermountain Semi-Desert Grassland Group**

*Aristida purpurea* – *Elymus elymoides* – *Poa secunda* Alliance

*Elymus elymoides* Provisional Association (n=4)

- iii) Stands of moist or upland lower slopes locally associated with ranch buildings and maintained pastures.

- (1) Stands dominated by non-native *Lolium perenne* (*Festuca perennis*), with the bright-yellow flowered *Lotus corniculatus* conspicuous. Uncommon. Found in heavily grazed or disturbed lands adjacent to human modification.

**Californian Ruderal Grassland, Meadow & Scrub Group**

***Lolium perenne* Alliance** (n=1)

*Lolium perenne* – *Lotus corniculatus* Association (n=1)

- 2) Stands of marshes, bottomlands, basins, swales, meadows, vernal pools, or other areas that are moist, wet, or saturated for much of the growing season. Depending on the year some areas may be dry but have evidence of water flow or ponding.

- a) Stands composed largely of short to tall perennial grasses and/or graminoids associated with alkaline and/or heavy soils of large basins, playas, or flats.

**North American Desert Alkaline-Saline Marsh & Playa Group**

- i) Stands characterized by saltgrass, *Distichlis spicata*, though other herbaceous species may have higher cover. May have other halophytes (*Bassia*, *Nitrophila*, etc.). Found at Horse Lake and expected on other Pleistocene alkaline lakebeds/playas. If *Juncus balticus* co-dominates then key here.

***Distichlis spicata* Alliance** (n=4)

- ii) *Eleocharis rostellata* is dominant in the herb layer. Rare and local at mineralized springs, forming a raised peat fen strongly dominated by *E. rostellata*. This species is a strong indicator of basic pH wetlands and is only locally represented from a few known sites in California.

*Eleocharis rostellata* Association (n=1)

of the ***Eleocharis (palustris, rostellata)* Alliance** (n=1)

- iii) Grassland stands of relatively heavy soils (including clay mounds), not always in obvious alkaline basins, but often moist in early summer. *Elymus triticoides* or *E. cinereus* are obvious and consistent throughout stand and are dominant

to sub-dominant in the herbaceous layer with *Bromus tectorum*, *Poa secunda*, and/or *Descurainia sophia*. Stands are on lower slopes, often conspicuous following fires.

***Elymus cinereus* – *Elymus triticoides* Alliance (n=19)**

- (1) The large tufted perennial grass *Elymus* (*Leymus*) *cinereus* is dominant to co-dominant with *Poa secunda* and/or *Bromus tectorum*.

*Elymus cinereus* Association (n=14)

- (2) *Elymus triticoides* dominant to co-dominant with *Poa secunda*. *Poa secunda* may be absent.

*Elymus triticoides* – *Poa secunda* Association (n=3)

- b) Stands of persistent fresh-water wetlands (wet meadows and stream-sides) or stands of seasonal fresh or somewhat alkaline wetlands.

- i) Stands of seasonally drying edges of reservoirs, lakes, livestock ponds, or vernal pools and swales.

- (1) Stands, in peak phenology, contain several genera typical of California vernal pools, including: *Eleocharis* (especially *E. acicularis*, or *E. macrostachya*), *Psilocarphus*, *Downingia* spp., *Gratiola*, and/or *Epilobium* (subgenus *Boisduvalia*).

***Eleocharis macrostachya* Alliance (n=17)  
of the Californian Vernal Pool Group**

- (a) *Eleocharis macrostachya* is co-dominant with other vernal pool species including *Downingia bacigalupii*, *Marsilea vestita*, and *Trifolium cyathiferum*.

*Eleocharis macrostachya* Vernal Pool Provisional Association (n=12)

- (2) Stands, in peak phenology, contain several genera typical of seasonal or ephemeral wetlands of the Great Basin, from montane Eastern California, to E Oregon, and E Washington. Settings include vernal saturated or flooded flats and smaller vernal pools. The key species include *Navarretia*



*leucocephala*, *Muhlenbergia richardsonis*, *Polygonum aviculare*, and/or *Downingia bacigalupii*.

***Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii***

**Alliance (n=37)**

of the **Oregon-Washington-British Columbia Vernal Pool Group**

- (a) *Taraxia tanacetifolia* and/or *Iva axillaris* dominate to co-dominate with other Great Basin vernal pool species such as *Polygonum aviculare*, *Psilocarphus brevissimus* and/or *Muhlenbergia richardsonis*.

*Taraxia tanacetifolia* – *Iva axillaris* Provisional Association (n=24)

- (3) Stands without strong representatives from either the Californian or Eastern Oregon/Washington Vernal Pool Groups, but species more widespread and typical of slightly alkaline western interior seasonal wetlands such as *Muhlenbergia* spp., *Carex douglasii*, *Poa secunda* (moist meadow ecotypes), *Taraxia tanacetifolia*.

- (a) Stands characterized by the presence of *Carex douglasii*.

*Carex douglasii* Association (n=5)

of the ***Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii***

**Alliance (n=6) of the Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow Group**

- ii) Stands occurring in flooded, wet, moist, or saturated meadows, stream-sides, springs, or swales. Water is usually fresh and not strongly alkaline or salty. This is a large group that encompasses stands that hold moisture in the soil until mid to late summer or stands that dry out before mid-summer. Dominated by wet meadow sedges, rushes, and grasses.

**Vancouverian – Rocky Mountain Montane Wet Meadow & Marsh Group**

- (1) Stands dominated by *Solidago canadensis*.

***Solidago canadensis* Alliance (n=1)**

- (2) Stands dominated or co-dominated by *Scirpus microcarpus*.

***Scirpus microcarpus* Alliance (n=1)**

- (3) Stands dominated or co-dominated by rushes (*Juncus* spp.) of several species. May be mixed with sedges or grasses, but rushes are most conspicuous.

- (a) *Juncus nevadensis* is dominant to co-dominant with *Juncus arcticus*.

*Juncus nevadensis* Association (n=3)

of the ***Juncus nevadensis* Alliance**

- (b) *Juncus* (*balticus*, *mexicanus*, *arcticus*) is dominant to co-dominant *Trifolium hybridum*, *Poa pratensis*, *Achillea millefolium* and other wetland herbs. If co-dominant with *Deschampsia cespitosa* then key to *Deschampsia cespitosa* Association in the *Deschampsia cespitosa* Alliance. If co-dominant with *Distichlis spicata* then key to *Distichlis spicata* Alliance.
- Juncus arcticus* var. *balticus* – (var. *mexicanus*) Association  
(n=27)
- of the ***Juncus balticus* – *Juncus mexicanus* Alliance** (n=29)
- (4) Stands not clearly dominated by sedges or rushes. May be moist to relatively dry later in the growing season. Dominated by grasses or herbs of small to large stature.
- (a) Stands dominated by relatively short native grasses.
- (i) *Hordeum brachyantherum* dominant to co-dominant in herb layer with *Juncus arcticus*, *Poa secunda*, and/or *Phleum pratense*.
- Hordeum brachyantherum* Association (n=4)  
of the ***Danthonia californica* – *Deschampsia cespitosa* –  
*Camassia quamash* Alliance** (n=4)
- (ii) Moist meadow stands with *Danthonia unispicata*, and/or broad-leaved bulbiferous monocots such as *Triteleia hyacinthina* or *Camassia* spp. conspicuous. *Poa secunda* is usually present to co-dominant. Other herbs may include *Lomatium bicolor*, *Blepharipappus scaber*, and *Epilobium minutum*.
- Danthonia unispicata* – *Poa secunda* Association (n=25)  
of the ***Danthonia californica* – *Deschampsia cespitosa* – *Camassia*  
*quamash* Alliance** (n=32)
- (5) Stands dominated by wet meadow sedges or spike rushes.
- (a) *Carex aquatilis* and/or *Carex lenticularis* dominate the herb layer.
- Carex aquatilis* – *Carex lenticularis* Association (n=4)  
of the ***Carex (aquatilis, lenticularis)* Alliance** (n=4)

(b) *Carex simulata* present and conspicuous.

*Carex simulata* Association (n=3)  
of the ***Carex simulata* Alliance** (n=3)

(c) *Carex scopulorum* is dominant in the herb layer.

*Carex scopulorum* Association (n=1)  
of the ***Carex scopulorum* Alliance** (n=1)

(d) *Carex praegracilis* is dominant to co-dominant in the herb layer.

*Carex praegracilis* Association (n=2)  
of the ***Carex (pansa, praegracilis)* Alliance** (n=2)

(e) *Carex nebrascensis* is present and conspicuous and is evenly distributed. Stands may be dominated by other meadow species including *Juncus bufonius*.

*Carex nebrascensis* Association (n=5)  
of the ***Carex nebrascensis* Alliance** (n=5)

(f) *Eleocharis quinqueflora* is dominant in the herb layer, stands are small and often associated with fens.

***Eleocharis quinqueflora* Alliance** (n=1)

(6) Stands with co-dominant *Deschampsia cespitosa* with other wet meadow herbs including *Juncus balticus*, *Eleocharis macrostachya*, and *Juncus nevadensis*.

*Deschampsia cespitosa* Association (n=3)  
of the ***Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance** (n=3)

iii) Stands dominated by larger non-native perennial pasture grasses (including *Phalaris arundinacea*, *Phleum pratense*, *Poa pratensis*, *Agrostis gigantea*).

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

(1) *Phalaris arundinacea* is dominant in the herb layer with *Juncus arcticus*, *Carex lenticularis*, and/or *Euthamia occidentalis*.

*Phalaris arundinacea* Association (n=2)  
of the ***Phalaris aquatica* – *Phalaris arundinacea* Alliance** (n=2)

(2) Stands dominated by *Agrostis gigantea*, *A. stolonifera*, *Alopecurus pratensis*, *Phleum pratense*, or *Poa pratensis*.

***Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance**  
(n=4)

(a) *Agrostis gigantea* is dominant in the herb layer.

*Agrostis (gigantea, stolonifera) Association* (n=1)

(b) *Phleum pratense* and/or *Poa pratense* dominate or co-dominate in the herb layer.

*Poa pratensis Association* (n=3)

iv) Stands dominated by broad-leaved annual or perennial herbs. These often have a shorter early season saturation period than typically adjacent meadows of the *Juncus balticus* – *Juncus mexicanus* and the *Danthonia* spp. – *Camassia* spp. Wet Meadow alliances.

(1) Small moist meadow stands dominated by the conspicuous trifoliate, hairy-leaved, pink-flowered, annual *Lotus unifoliolatus* (*Lotus purshianus*).

**Californian Annual Grassland & Forb Meadow Group**  
***Lotus unifoliolatus* Provisional Alliance** (n=4)

(2) Stands dominated by *Artemisia douglasiana*. Only known along an intermittent stream channel surrounded by coniferous forest on the western edge of the study area.

**Temperate Pacific Freshwater Wet Mudflat Group**  
***Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris***  
**Alliance** (n=1)  
*Artemisia douglasiana* Provisional Association (n=1)

v) Stands perennially flooded or saturated during the summer. Plants either emergent or floating at peak phenology.

(1) Stands of plants with stems or leaves emergent out of water during peak growing season, but not supported by water.

**Arid West Interior Freshwater Marsh Group**

(a) Wetlands (ponds, ditches, lake margins) dominated by *Typha* species.

*Typha domingensis* Association (n=1)

of the ***Typha domingensis* – *Typha latifolia* – *Typha angustifolia* Alliance** (n=1)

- (2) Stands composed of anchored or unanchored floating-leafed hydrophytes on ponds, shallow lakes, or in slow moving streams or sloughs.

**Western North American Temperate Freshwater Aquatic Vegetation Group (n=2)**

- 3) Stands are on steep slopes, rock outcrops or cliff faces where there is very little soil for plants to inhabit and therefore, living vegetation is very sparse, not evenly distributed, and does not meet the minimum cover required to fit any of the tree, shrub, or herbaceous vegetation types listed above

**Columbia Plateau cliff, scree and rock mapping unit**

## Terms and Concepts 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 hierarchy units in the USNVC from highest to lowest (i.e., broadest to finest) are:

1. Formation Class
2. Formation Subclass
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 Modoc-Lassen Vegetation Map, map classes for trees and shrubs are typically at the alliance level of the USNVC hierarchy. Herbaceous stands are mapped at a higher level of the hierarchy.

**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.

**Plant community nomenclature:** Species separated by "-" are within the same stratum; species 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. It 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 mapping 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 of the survey that is 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 within a survey area that is covered either by one species relative to other species within the same physiognomic stratum (tree, shrub, herbaceous) or one stratum relative to the total vegetation cover in a 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 all the 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. 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 13% shrub cover), technically only the *Baccharis* ( $5/13 = 39\%$  relative cover) and the *Frangula* ( $4/13 = 31\%$  relative cover) would be co-dominant because *Rubus* would only have 23% relative cover ( $3/13 = 23\%$ ).

**Characteristic/Diagnostic species:** Should be 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, since an even distribution of the diagnostic species is a much better indicator than overall cover. Characteristic species that are evenly distributed are better indicators of a type than species with higher cover and patchy distribution.

**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.

**Tree:** A one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases, trees may be multi-stemmed (ramified 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. It behooves one to memorize which species are "traditionally" placed in one life-form or another. We use the accepted lifeforms in the USNVC or the PLANTS Database (USDA NRCS 2015) to do this.

**Forest:** In the USNVC, 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:** In the USNVC, 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, individual *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*, *Fremontodendron californicum*, *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 subshrubs 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.

**Subshrub:** 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 subshrubs, 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.

## APPENDIX H: CLASSIFICATION CROSSWALK

This table is a crosswalk showing the relationship between the USNVC-compliant alliances of the Modoc–Lassen vegetation classification and two other classification systems: the California Wildlife Habitat Relationships (CWHR) and the Classification and Assessment with Landsat of Visible Ecological Groupings (Calveg). Associations are not included in this table because they generally crosswalk to the same CWHR and Calveg types as their parent alliances.

USNVC/MCV Name	CWHR Type	CWHR Code	Calveg Name	Calveg Code
<b>Tree</b>				
<i>Abies concolor</i> Dry Forest & Woodland Alliance	White Fir	WFR	White Fir	WF
<i>Juniperus occidentalis</i> Woodland Alliance	Juniper	JUN	Western Juniper	WJ
<i>Populus tremuloides</i> Forest & Woodland Alliance	Aspen	ASP	Quaking Aspen	QQ
<i>Populus trichocarpa</i> Forest Alliance	Montane Riparian	MRI	Black Cottonwood	QX
<i>Pinus ponderosa</i> - <i>Calocedrus decurrens</i> - <i>Pseudotsuga menziesii</i> Forest & Woodland Alliance	Montane Hardwood-Conifer	MHC	Mixed Conifer - Pine	MP
<i>Pinus ponderosa</i> / Shrub Understory Woodland Alliance	Eastside Pine	EPN	Eastside Pine	EP
<i>Quercus garryana</i> Forest & Woodland Alliance	Montane Hardwood	MHW	Oregon White Oak	QG
<i>Quercus kelloggii</i> Forest & Woodland Alliance	Montane Hardwood	MHW	Black Oak	QK
<b>Shrub</b>				
<i>Amelanchier utahensis</i> - <i>Cercocarpus montanus</i> - <i>Cercocarpus intricatus</i> Shrubland Alliance	Montane Chaparral	MCP	Lower Montane Mixed Chaparral	CV
<i>Arctostaphylos patula</i> - <i>Arctostaphylos nevadensis</i> Shrubland Alliance	Montane Chaparral	MCP	Greenleaf Manzanita	CG
<i>Artemisia arbuscula</i> ssp. <i>arbuscula</i> Shrubland Alliance	Low Sage	LSG	Low Sagebrush	BL
<i>Artemisia cana</i> Wet Shrubland Alliance	Sagebrush	SGB	Silver Sagebrush	TU
<i>Artemisia nova</i> Shrubland Alliance	Low Sage	LSG	Black Sagebrush	TN
<i>Artemisia tridentata</i> Shrubland Alliance	Sagebrush	SGB	Big Sagebrush	BS
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> Shrubland Alliance	Sagebrush	SGB	Big Sagebrush	BS
<i>Atriplex canescens</i> Shrubland Alliance	Alkali Desert Scrub	ASC	Saltbush	BC

USNVC/MCV Name	CWHR Type	CWHR Code	Calveg Name	Calveg Code
<i>Atriplex confertifolia</i> Shrubland Alliance	Alkali Desert Scrub	ASC	Shadscale	DS
<i>Betula occidentalis</i> Shrubland Alliance	Montane Riparian	MRI	Water Birch	FO
<i>Ceanothus velutinus</i> Shrubland Alliance	Montane Chaparral	MCP	Snowbrush	CV
<i>Cercocarpus ledifolius</i> Shrubland Alliance	Sagebrush	SGB	Curleaf Mountain Mahogany	FM
<i>Chrysothamnus viscidiflorus</i> Shrubland Alliance	Sagebrush	SGB	Rabbitbrush	BR
<i>Cornus sericea</i> - <i>Rosa woodsii</i> - <i>Ribes</i> spp. Shrubland Alliance	Montane Riparian	MRI	Riparian Mixed Shrub	NM
<i>Ericameria nauseosa</i> Shrubland Alliance	Sagebrush	SGB	Rabbitbrush	BR
<i>Eriogonum</i> spp. / <i>Poa secunda</i> Dwarf Shrubland Alliance	Bitterbrush	BBR	Desert Buckwheat	DB
<i>Krascheninnikovia lanata</i> Shrubland Alliance	Alkali Desert Scrub	ASC	Alkaline Mixed Scrub	NA
<i>Prunus emarginata</i> - <i>Holodiscus discolor</i> Shrubland Alliance	Montane Chaparral	MCP	Lower Montane Mixed Chaparral	CV
<i>Purshia tridentata</i> - <i>Artemisia tridentata</i> Shrubland Alliance	Bitterbrush	BBR	Bitterbrush - Sagebrush	TB
<i>Salix boothii</i> - <i>Salix geyeriana</i> - <i>Salix lutea</i> Shrubland Alliance	Montane Riparian	MRI	Willow	QO
<i>Salix exigua</i> Shrubland Alliance	Montane Riparian	MRI	Willow (Shrub)	WL
<i>Salix lasiolepis</i> Shrubland Alliance	Montane Riparian	MRI	Willow	QO
<i>Sarcobatus vermiculatus</i> Shrubland Alliance	Alkali Desert Scrub	ASC	Greasewood	BG
<b>Herb</b>				
<i>Bidens cernua</i> - <i>Euthamia occidentalis</i> - <i>Ludwigia palustris</i> Herbaceous Alliance	Fresh Emergent Wetland	FEW	Wet Grasses and Forbs	HJ
<i>Bromus tectorum</i> - <i>Taeniatherum caput-medusae</i> Herbaceous Alliance	Annual Grassland	AGS	Annual Grasses and Forbs	HG
<i>Carex nebrascensis</i> Herbaceous Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Carex (pansa, praegracilis)</i> Herbaceous Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Carex (aquatilis, lenticularis)</i> Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ

USNVC/MCV Name	CWHR Type	CWHR Code	Calveg Name	Calveg Code
<i>Carex scopulorum</i> Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Carex simulata</i> Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Danthonia californica</i> - <i>Deschampsia cespitosa</i> - <i>Camassia quamash</i> Herbaceous Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Distichlis spicata</i> Herbaceous Alliance	Saline Emergent Wetland	SEW	Alkaline Mixed Grasses and Forbs	HA
<i>Eleocharis (acicularis, macrostachya)</i> Alliance	Wet Meadow	WTM	Vernal Pool	VP
<i>Eleocharis (palustris, rostellata)</i> Alliance	Wet Meadow	WTM	Alkaline Mixed Grasses and Forbs	HA
<i>Eleocharis quinqueflora</i> Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Festuca idahoensis</i> - <i>Pseudoroegneria spicata</i> - <i>Poa secunda</i> Herbaceous Alliance	Perennial Grassland	PGS	Perennial Grasses and Forbs	HM
<i>Leymus cinereus</i> - <i>Leymus triticoides</i> Herbaceous Alliance	Perennial Grassland	PGS	Perennial Grasses and Forbs	HM
<i>Lolium perenne</i> Herbaceous Alliance	Annual Grassland	AGS	Annual Grasses and Forbs	HG
<i>Lotus unifoliolatus</i> Provisional Alliance	Annual Grassland	AGS	Annual Grasses and Forbs	HG
<i>Juncus arcticus</i> (var. <i>balticus</i> , <i>mexicanus</i> ) Alliance	Wet Meadow	WTM	Perennial Grasses and Forbs	HM
<i>Juncus nevadensis</i> Alliance	Wet Meadow	WTM	Perennial Grasses and Forbs	HM
<i>Phalaris aquatica</i> - <i>Phalaris arundinacea</i> Herbaceous Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Poa pratensis</i> - <i>Agrostis gigantea</i> - <i>Agrostis stolonifera</i> Herbaceous Alliance	Perennial Grassland	PGS	Perennial Grasses and Forbs	HM
<i>Poa secunda</i> - <i>Muhlenbergia richardsonis</i> - <i>Carex douglasii</i> Herbaceous Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Schoenoplectus americanus</i> Alliance	Fresh Emergent Wetland	FEW	Tule-Cattail	HT
<i>Scirpus microcarpus</i> Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ

<b>USNVC/MCV Name</b>	<b>CWHR Type</b>	<b>CWHR Code</b>	<b>Calveg Name</b>	<b>Calveg Code</b>
<i>Solidago canadensis</i> Provisional Alliance	Wet Meadow	WTM	Wet Grasses and Forbs	HJ
<i>Typha (angustifolia, domingensis, latifolia)</i> Herbaceous Alliance	Fresh Emergent Wetland	FEW	Tule-Cattail	HT

## APPENDIX I: ACCURACY ASSESSMENT

Preliminary accuracy assessment results for phase 1 of the Lassen and Modoc counties vegetation mapping. The Users' score accounts for errors of commission is from the perspective of the user of the map and the producers' score accounts for errors of omission and is from the perspective of the photo interpreter. If a map unit was sampled less than 5 times (Users'/Producers' count) the accuracy score for that type is not statistically valid. The mapping was completed by the Geographic information Center (GIC).

Map Unit	Users' count	Users' Score	Producers' count	Producers' score
Abies concolor – Pinus ponderosa / Cercocarpus ledifolius Association	6	100.00%	10	78.00%
Abies concolor Alliance	1	80.00%	--	--
Artemisia arbuscula – Purshia tridentata Mapping Unit	1	80.00%	--	--
Artemisia arbuscula / Bromus tectorum Ruderal Shrubland Association	12	61.67%	7	85.71%
Artemisia arbuscula / Poa secunda Association	29	82.07%	26	85.38%
Artemisia arbuscula Steppe and Shrubland Alliance	2	40.00%	--	--
Artemisia cana (ssp. bolanderi, ssp. viscidula) / Poa secunda Wet Shrubland Association	16	85.00%	19	77.89%
Artemisia cana Mesic - Riparian Shrubland Alliance	1	80.00%	--	--
Artemisia nova / Poa secunda Association	2	80.00%	1	100.00%
Artemisia tridentata – (Ericameria nauseosa) / Bromus tectorum Ruderal Shrubland Association	13	76.92%	7	85.71%
Artemisia tridentata – Ephedra spp. Shrubland Association	5	68.00%	--	--
Artemisia tridentata - Grayia spinosa Shrubland Association	1	20.00%	--	--
Artemisia tridentata Shrubland Association	15	78.67%	21	81.90%
Artemisia tridentata ssp. vaseyana - Mixed Steppe and Shrubland Alliance	2	60.00%	--	--
Artemisia tridentata ssp. vaseyana – Symphoricarpos oreophilus / Bromus carinatus Shrubland Association	6	83.33%	13	81.54%

Map Unit	Users' count	Users' Score	Producers' count	Producers' score
Artemisia tridentata ssp. vaseyana / Festuca idahoensis Shrub Grassland Association	5	68.00%	--	--
Bromus tectorum – Elymus caput-medusae Ruderal Annual Grassland Alliance	3	66.67%	--	--
Bromus tectorum Ruderal Grassland Association	8	90.00%	25	76.00%
Carex nebrascensis Association	1	60.00%	--	--
Ceanothus velutinus Shrubland Alliance	1	80.00%	--	--
Ceanothus velutinus Shrubland Association	14	100.00%	19	90.53%
Central Rocky Mountain Lower Montane, Foothill & Valley Grassland Group	1	60.00%	--	--
Cercocarpus ledifolius – Artemisia tridentata ssp. vaseyana Association	5	80.00%	--	--
Cercocarpus ledifolius – Prunus virginiana – Symphoricarpos rotundifolius Scrub Association	8	97.50%	18	81.11%
Cercocarpus ledifolius Scrub Alliance	2	80.00%	--	--
Danthonia unispicata - Poa secunda Wet Meadow Association	2	80.00%	6	53.33%
Eleocharis macrostachya Vernal Pool Provisional Association	2	40.00%	--	--
Elymus caput-medusae Intermontane Provisional Association	17	60.00%	1	100.00%
Elymus cinereus Bottomland Wet Meadow Association	3	66.67%	6	50.00%
Elymus spicatus – Poa secunda Grassland Association	10	86.00%	2	90.00%
Elymus triticoides - Poa secunda Wet Meadow Association	1	80.00%	17	63.53%
Ericameria nauseosa / Bromus tectorum Ruderal Shrubland Association	4	65.00%	--	--
Ericameria nauseosa Shrubland Association	7	94.29%	16	63.75%
Eriogonum sphaerocephalum / Poa secunda Dwarf-shrub Grassland Association	1	60.00%	--	--
Festuca idahoensis – Elymus spicatus – Poa secunda Dry Grassland Alliance	4	45.00%	--	--
Juncus balticus - Juncus mexicanus Wet Meadow Alliance	1	80.00%	--	--
Juncus balticus Wet Meadow Association	6	86.67%	11	70.91%
Juncus nevadensis Association	1	60.00%	--	--

Map Unit	Users' count	Users' Score	Producers' count	Producers' score
Juniperus occidentalis – Pinus jeffreyi / (Purshia tridentata, Prunus virginiana) Association	7	65.71%	11	85.45%
Juniperus occidentalis / Artemisia arbuscula / Poa secunda Association	7	80.00%	--	--
Juniperus occidentalis / Artemisia tridentata – Purshia tridentata Association	16	96.25%	24	89.17%
Juniperus occidentalis / Pseudoroegneria spicata Wooded Grassland Association	1	80.00%	--	--
Juniperus occidentalis / Purshia tridentata / Festuca idahoensis – Pseudoroegneria spicata Association	5	80.00%	--	--
Juniperus occidentalis Woodland and Savanna Alliance	2	80.00%	--	--
Pinus jeffreyi - Pinus washoensis Mixed Conifer Woodland Alliance	1	80.00%	6	60.00%
Pinus jeffreyi / Lupinus caudatus Association	2	80.00%	--	--
Pinus jeffreyi / Artemisia tridentata ssp. vaseyana / Festuca idahoensis Association		0.00%	1	80.00%
Pinus ponderosa – Juniperus occidentalis / Artemisia tridentata – Purshia tridentata Association	1	20.00%	--	--
Pinus ponderosa / Shrub Understory Central Rocky Mountain Alliance	1	40.00%	--	--
Poa pratensis – Agrostis gigantea – Agrostis stolonifera Ruderal Marsh Alliance	1	40.00%	--	--
Populus tremuloides / Symphoricarpos rotundifolius Association	15	100.00%	16	98.75%
Populus tremuloides Forest Alliance	1	80.00%	--	--
Prunus emarginata Sierran Chaparral Shrubland Association	2	70.00%	--	--
Prunus virginiana / Leymus cinereus Shrubland Association	2	50.00%	--	--
Purshia tridentata – Artemisia tridentata – Tetradymia canescens Association	2	60.00%	--	--
Purshia tridentata – Artemisia tridentata Alliance	1	100.00%	--	--
Purshia tridentata – Artemisia tridentata Association	13	87.69%	18	82.22%



Map Unit	Users' count	Users' Score	Producers' count	Producers' score
Sarcobatus vermiculatus – Artemisia tridentata Wet Shrubland Association	15	89.33%	18	77.78%
Sarcobatus vermiculatus Intermountain Shrub Alliance	1	20.00%	--	--
Symphoricarpos oreophilus Shrubland Association	1	80.00%	--	--
Tetradymia canescens Provisional Association	2	40.00%	--	--
Vancouverian – Rocky Mountain Montane Wet Meadow & Marsh Group	3	86.67%	3	86.67%
Ventenata dubia Provisional Association	1	20.00%	--	--
<b>Overall scores</b>		<b>70.76%</b>		<b>79.82%</b>

# APPENDIX J: VEGETATION TYPE DESCRIPTIONS

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## Introduction

The vegetation type descriptions in this volume are divided into three sections based on dominance by trees, shrubs, and herbs; they are organized alphabetically by alliance within each section, with association-level descriptions located under the alliance they fall within hierarchically. Alliance descriptions begin with a statewide and local narrative, followed by a local summary of sample size, elevation, global and state ranking, list of related associations, vegetation layer information, slope, and surface cover.

Stand tables summarizing species composition by type show constancy and cover estimate values (average, minimum and maximum) for all taxa occurring in at least 20% of stands. Association descriptions, which are located directly under their related alliance, include similar local summary information with additional details such as the ecological subsections where they are found.

## Definitions of terms used in vegetation descriptions

Bare ground – 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.

Con / Avg / Min / Max – the percent constancy of the species within all stands of the alliance or association; average, minimum, and maximum estimated percent cover of the species across all stands within that type.

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).

Litter – percent cover of litter, duff, and/or unattached wood on the ground.

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).

Microtopography – term used to describe local topographic features or the lay of the area (e.g., surface is flat, concave, convex, undulating).

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.

SCV Global/State Rank - The Survey of California Vegetation (SCV) uses the NatureServe's Heritage Program methodology defined 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. Ranks for alliances and associations in this classification were assigned by Todd Keeler-Wolf, Senior Vegetation Ecologist, with CDFW's VegCAMP.

- G1/S1: Fewer than 6 viable occurrences worldwide/statewide, and/or up to 518 hectares
- G2/S2: 6–20 viable occurrences worldwide/statewide, and/or more than 518–2,590 hectares
- G3/S3: 21–100 viable occurrences worldwide/statewide, and/or more than 2,590–12,950 hectares
- G4/S4: Greater than 100 viable occurrences worldwide/statewide, and/or more than 12,950 hectares
- G5/S5: Demonstrably secure because of its worldwide/statewide abundance

Notes:

- 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.

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).

Species names and codes – species names and codes are those defined in the PLANTS Database (USDA NRCS 2015), except in two cases. When a more current name has been assigned in The Jepson Manual, second edition (Baldwin et al. 2012), that name is frequently used and a code beginning with "2JM" is assigned. General vegetation types, such as moss and lichen, have codes beginning with the number 2 (e.g., 2MOSS).

Understory tree – trees that grow beneath the main canopy of a forest/woodland.



## Tree-Overstory Communities

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### *Abies concolor* Alliance

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**Common Name:** White fir forest Alliance

**NVC Alliance Code:** A3420. *Abies concolor* Dry Forest & Woodland Alliance

#### **Alliance Concept**

The *Abies concolor* Alliance forms an open to continuous tree canopy with a sparse to intermittent shrub understory. It is found primarily on north-facing slopes. Soils are derived from a variety of substrates but primarily andesite, volcanics, and basalt, and soil texture is loamy. Elevation range is approximately 1554 – 2344 meters. The dominant tree is *Abies concolor* and *Symphoricarpos rotundifolius* is often present in the shrub layer.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous tree canopy of *Abies concolor*, which ranges from 6 to 93 percent cover. The overall tree cover ranges from 10 to 93 percent.



### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Warner Mountains (M261Gf)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Abies concolor* – *Pinus ponderosa* / *Cercocarpus ledifolius* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1924 m, Range 1554 – 2344 m

Aspect: NE (14), NW (12), SE (4), SW (2)

Slope: Mean 16.0 degrees, Range 2 – 30 degrees

Macro Topography: Upper 1/3 of slope (9), Middle 1/3 of slope (6), Middle to Upper 1/3 of slope (5), Lower 1/3 of slope (3), Lower to Upper 1/3 of slope (2), Ridge summit, crest (2), Bottom (1), Upper 1/3 of slope to Ridgetop (1), Midslope (1), Lower to Middle 1/3 of slope (1), Draw, intermittent stream bottom (1)

Tree Cover: Mean 18.7%, Range 10 – 93%

Shrub Cover: Mean 5.1%, Range 0 – 40%

Herb Cover: Mean 13.3%, Range 0.2 – 61%

Large Rock: Mean 3.8%, Range 0 – 12%

Small Rock: Mean 8%, Range 0 – 39%

Fines Cover: Mean 8.4%, Range 0 – 43%

Litter Cover: Mean 74.5%, Range 15 – 98%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Coarse, loamy sand (2), Medium loam (2), Moderately coarse, sandy loam (2), Moderately fine sandy clay loam (2), Medium silt loam (1), Moderately fine clay loam (1), Sandy Loam (1)

Geology (map data): Andesite (11), General volcanic extrusives (7), Basalt (5)

**Environment:** Stands of *Abies concolor* within the Modoc Plateau and NW Basin and Range ecoregions are restricted to the highest elevations where the summer-time temperatures are more moderate and precipitation is higher than at the lower elevation ranges.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous tree layer with a sparse to intermittent shrub layer and sparse to intermittent herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Abies concolor* in the overstory. *Symphoricarpos rotundifolius* is often present in the shrub layer.

**Dynamics:** *Abies concolor* is a large, long-lived conifer that tends to increase in areas that have not burned recently. The ecological amplitude of *Abies concolor* is broader than for other firs in California. It is the only member of the genus within the study area.

**Species of Interest:** *Hackelia cusickii* and *Silene oregana*

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S5

### **References**

None

**Total Sample Size Used for Description:** N=32

### **Alliance Stand Table**

#### ***Abies concolor* Alliance**

n =32

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Abies concolor</i>	100	26.88	6	93
<i>Pinus ponderosa</i>	50	12.86	1	48
<i>Juniperus occidentalis</i>	19	1.65	0.2	3.5
<i>Pinus jeffreyi</i>	19	14.03	0.2	35
<b>Sapling</b>				
<i>Abies concolor</i>	78	3.48	0.2	12
<i>Pinus jeffreyi</i>	13	3.3	0.2	7
<b>Seedling</b>				
<i>Abies concolor</i>	81	2.08	0.2	11
<i>Pinus ponderosa</i>	13	0.6	0.2	1
<b>Shrub</b>				
<i>Symphoricarpos rotundifolius</i>	53	2.75	0.2	25
<i>Amelanchier utahensis</i>	31	0.98	0.2	3
<i>Ribes velutinum</i>	28	0.89	0.2	3
<i>Cercocarpus ledifolius</i>	25	1.23	0.2	4
<i>Ribes cereum</i>	25	0.6	0.2	1
<i>Prunus virginiana</i>	19	3.57	0.2	18
<i>Mahonia aquifolium</i>	19	0.73	0.2	1

## Alliance Stand Table continued

### ***Abies concolor* Alliance**

n =32

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Ceanothus velutinus</i>	16	2.64	0.2	5
	<i>Ribes viscosissimum</i>	16	8.8	1	40
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	13	1.35	0.2	4
	<i>Prunus emarginata</i>	13	1.3	0.2	2
	<i>Ribes</i>	13	1	1	1
	<i>Artemisia tridentata</i>	13	0.2	0.2	0.2
	<i>Arctostaphylos patula</i>	13	2.23	0.2	7.5
Herb					
	<i>Collinsia parviflora</i>	41	1.82	0.2	15
	<i>Elymus elymoides</i>	34	0.35	0.2	1
	<i>Arnica cordifolia</i>	34	8.75	0.2	30
	<i>Pseudostellaria jamesiana</i>	31	8.32	0.2	30
	<i>Maianthemum racemosum</i>	22	1.74	0.2	7
	<i>Osmorhiza chilensis</i>	22	1.03	0.2	2
	<i>Viola purpurea</i>	22	0.69	0.2	2
	<i>Wyethia mollis</i>	19	0.97	0.2	4
	<i>Carex rossii</i>	19	1.87	0.2	6
	<i>Collomia grandiflora</i>	19	0.2	0.2	0.2
	<i>Poa secunda</i>	19	1.1	0.2	3
	<i>Poa wheeleri</i>	16	0.84	0.2	1
	<i>Maianthemum stellatum</i>	16	0.52	0.2	1
	<i>Hieracium horridum</i>	16	0.88	0.2	2
	<i>Galium aparine</i>	16	0.52	0.2	1
	<i>Elymus glaucus</i>	16	1.84	0.2	5
	<i>Cryptantha</i>	16	0.52	0.2	1
	<i>Aquilegia formosa</i>	16	0.68	0.2	1
	<i>Bromus carinatus</i>	16	1.48	0.2	3
	<i>Phacelia humilis</i>	13	0.68	0.2	2
	<i>Hieracium scouleri</i>	13	0.6	0.2	1
	<i>Pyrola picta</i>	13	0.8	0.2	1
	<i>Hydrophyllum capitatum</i>	13	0.8	0.2	1
	<i>Bromus orcuttianus</i>	13	1	1	1
	<i>Osmorhiza occidentalis</i>	13	1.05	0.2	2

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## ***Abies concolor* – *Pinus ponderosa* / *Amelanchier alnifolia* Association**

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**Common Name:** White Fir - Ponderosa Pine / Serviceberry

**NVC Association Code:** CEG000014, *Abies lowiana* - *Pinus ponderosa* / *Amelanchier alnifolia* Forest

**Alliance:** *Abies concolor* Alliance

### **Association Concept**

The *Abies concolor* – *Pinus ponderosa* / *Amelanchier alnifolia* Association forms an open to continuous tree canopy with a sparse to open shrub understory. It is found primarily on slopes, ridges, and draws with intermittent streams at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, or basalt and textures vary widely. Elevations range from approximately 1554 to 2344 meters. The dominant tree is *Abies concolor*, and *Pinus ponderosa* is often present.

**Diagnostic Criteria:** This association is characterized by an open to continuous tree canopy of *Abies concolor* which ranges from 6 to 93 percent cover. The overall tree cover ranges from 10 to 93 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1895 m, Range 1554 – 2344 m

Aspect: NE (12), NW (10), SE (4), SW (2)

Slope: Mean 15.4 degrees, Range 2 – 30 degrees

Macro Topography: Middle 1/3 of slope (6), Upper 1/3 of slope (5), Middle to Upper 1/3 of slope (5), Lower 1/3 of slope (3), Ridge summit, crest (2), Lower to Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Midslope (1), Draw, intermittent stream bottom (1), Bottom (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 17%, Range 10 – 93%

Shrub Cover: Mean 3.3%, Range 0.2 – 11%

Herb Cover: Mean 10.4%, Range 0.2 – 61%

Large Rock: Mean 3.8%, Range 0 – 12%

Small Rock: Mean 8%, Range 0 – 39%

Fines Cover: Mean 9.3%, Range 0 – 43%

Litter Cover: Mean 73.8%, Range 15 – 98%

Soil Texture (field assessed): Not recorded (6), Medium to very fine, sandy loam (3), Coarse, loamy sand (2), Medium loam (2), Moderately coarse, sandy loam (2), Moderately fine sandy clay loam (2), Sandy Loam (1), Medium silt loam (1), Moderately fine clay loam (1)

Geology (map data): Andesite (7), General volcanic extrusives (7), Basalt (5)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with a sparse to open shrub layer and sparse or intermittent herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Abies concolor* in the overstory, and *Pinus ponderosa* is often present.

**Dynamics:** *Abies concolor* is dominant to co-dominant in the tree layer with *Pinus ponderosa* or *Pinus jeffreyi*. *Juniperus occidentalis* may be present but insignificant. Higher elevation, cold-tolerant shrubs are present and may include *Amelanchier utahensis*, *Cercocarpus ledifolius*, *Ribes* spp., *Symphoricarpos rotundifolius*, *Artemisia tridentata* ssp. *vaseyana*, and *Prunus* spp.

**Species of Interest:** *Hackelia cusickii*, *Silene oregana*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

None.

**Total Sample Size Used for Description:** N=28

### **Association Stand Table**

#### ***Abies concolor* – *Pinus ponderosa* / *Amelanchier alnifolia* Association**

n =28

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Abies concolor</i>	100	22.93	6	93
	<i>Pinus ponderosa</i>	57	12.86	1	48
	<i>Juniperus occidentalis</i>	21	1.65	0.2	3.5
	<i>Pinus jeffreyi</i>	21	14.03	0.2	35
<b>Sapling</b>					
	<i>Abies concolor</i>	75	3.2	0.2	12
	<i>Pinus jeffreyi</i>	14	3.3	0.2	7
	<i>Juniperus occidentalis</i>	11	0.63	0.2	1.5
<b>Seedling</b>					
	<i>Abies concolor</i>	79	2.28	0.2	11

## Association Stand Table continued

### ***Abies concolor* – *Pinus ponderosa* / *Amelanchier alnifolia* Association**

n =28

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Pinus ponderosa</i>	14	0.6	0.2	1
<i>Juniperus occidentalis</i>	11	0.2	0.2	0.2
<i>Pinus jeffreyi</i>	11	2.67	2	3
<b>Shrub</b>				
<i>Symphoricarpos rotundifolius</i>	46	1.45	0.2	7
<i>Amelanchier utahensis</i>	36	0.98	0.2	3
<i>Ribes velutinum</i>	32	0.89	0.2	3
<i>Cercocarpus ledifolius</i>	29	1.23	0.2	4
<i>Ribes cereum</i>	29	0.6	0.2	1
<i>Mahonia aquifolium</i>	21	0.73	0.2	1
<i>Prunus virginiana</i>	21	3.57	0.2	18
<i>Ceanothus velutinus</i>	18	2.64	0.2	5
<i>Prunus emarginata</i>	14	1.3	0.2	2
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	14	1.35	0.2	4
<i>Artemisia tridentata</i>	14	0.2	0.2	0.2
<i>Arctostaphylos patula</i>	14	2.23	0.2	7.5
<i>Ribes</i>	14	1	1	1
<i>Ceanothus prostratus</i>	11	0.73	0.2	1
<i>Ericameria nauseosa</i>	11	0.47	0.2	1
<i>Symphoricarpos</i>	11	0.73	0.2	1
<i>Collinsia parviflora</i>	43	0.72	0.2	3
<i>Elymus elymoides</i>	39	0.35	0.2	1
<i>Arnica cordifolia</i>	25	9.89	0.2	30
<i>Poa secunda</i>	21	1.1	0.2	3
<i>Wyethia mollis</i>	21	0.97	0.2	4
<i>Pseudostellaria jamesiana</i>	21	6.87	0.2	30
<i>Collomia grandiflora</i>	21	0.2	0.2	0.2
<i>Carex rossii</i>	21	1.87	0.2	6
<i>Viola purpurea</i>	21	0.63	0.2	2
<i>Bromus carinatus</i>	18	1.48	0.2	3
<i>Cryptantha</i>	18	0.52	0.2	1
<i>Galium aparine</i>	18	0.52	0.2	1
<i>Maianthemum racemosum</i>	18	2.04	0.2	7
<i>Maianthemum stellatum</i>	18	0.52	0.2	1
<i>Poa wheeleri</i>	18	0.84	0.2	1
<i>Elymus glaucus</i>	14	1.05	0.2	2

# Association Stand Table continued

## ***Abies concolor* – *Pinus ponderosa* / *Amelanchier alnifolia* Association**

n =28

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Osmorhiza chilensis</i>	14	1.05	0.2	2
<i>Phacelia humilis</i>	14	0.68	0.2	2
<i>Hieracium scouleri</i>	14	0.6	0.2	1
<i>Hieracium horridum</i>	14	0.85	0.2	2
<i>Lupinus</i>	14	0.6	0.2	1
<i>Melica bulbosa</i>	11	0.2	0.2	0.2
<i>Stellaria longipes</i>	11	0.47	0.2	1
<i>Silene</i>	11	0.47	0.2	1
<i>Senecio aronicoides</i>	11	1.33	1	2
<i>Phacelia hastata</i>	11	0.2	0.2	0.2
<i>Osmorhiza occidentalis</i>	11	1.07	0.2	2
<i>Lupinus arbustus</i>	11	1.07	0.2	2
<i>Kelloggia galioides</i>	11	1	1	1
<i>Hydrophyllum capitatum</i>	11	0.73	0.2	1
<i>Festuca idahoensis</i>	11	0.2	0.2	0.2
<i>Claytonia rubra</i>	11	0.2	0.2	0.2
<i>Bromus tectorum</i>	11	1.07	0.2	2
<i>Penstemon</i>	11	0.8	0.2	2

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## ***Juniperus occidentalis* Alliance**

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**Common Name:** Western Juniper Woodland Alliance

**NVC Alliance Code:** A3500. *Juniperus occidentalis* Grassy Open Woodland Alliance

### **Alliance Concept**

The *Juniperus occidentalis* Alliance forms a sparse to continuous tree canopy with a sparse to intermittent shrub understory. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite or basalt, and textures are widely variable. Elevation range is approximately 1157 – 2030 meters. The dominant tree is *Juniperus occidentalis*, the most often associated shrub is *Purshia tridentata*, and commonly associated herbs include *Bromus tectorum*, *Poa secunda*, *Elymus elymoides*, and *Festuca idahoensis*.

**Diagnostic Criteria:** This alliance is characterized by a sparse to continuous tree canopy of *Juniperus occidentalis* which ranges from 0.2 to 80 percent cover. The overall tree cover ranges from 0.2 to 80 percent.



## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg), Warner Mountains (M261Gf)

**Northwestern Basin and Range:** Blacks Mountain - Susanville Peak (M261Dd), Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Blacks Mountain - Susanville Peak (M261Dd), Medicine Lake Lava Flows (M261Dh)

## **Associations**

*Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association

*Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association

*Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association

*Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1611 m, Range 1157 – 2030 m

Aspect: NE (79), SW (56), SE (41), NW (39), Flat (8), Variable (5)

Slope: Mean 7.2 degrees, Range 0 – 38 degrees

Macro Topography: Other (47), Middle 1/3 of slope (40), Upper 1/3 of slope (27), Lower 1/3 of slope (22), Middle to Upper 1/3 of slope (20), Ridge top (9), Ridge summit, crest (8), Bench (8), High slope (8), Midslope (8), Upper 1/3 of slope to Ridgetop (7), Lower to Upper 1/3 of slope (6), Lower to Middle 1/3 of slope (6), Lowslope (3), Lower 1/3 of slope to Ridgetop (2), Toeslope (1), Low level (1), Basin floor (1), Interfluvium/Summit (1)

Tree Cover: Mean 8.2%, Range 0.2 – 80%

Shrub Cover: Mean 12.2%, Range 0 – 60%

Herb Cover: Mean 18%, Range 1 – 80%

Large Rock: Mean 12.2%, Range 0 – 71%

Small Rock: Mean 22.3%, Range 1 – 68%

Fines Cover: Mean 24.9%, Range 0 – 88%

Litter Cover: Mean 23.1%, Range 1 – 90%

Soil Texture (field assessed): Moderately fine clay loam (17), Moderately fine sandy clay loam (15), Fine sandy clay (13), Sandy Loam (13), Fine clay (11), Moderately coarse, sandy loam (10), Medium to very fine, sandy loam (10),

Medium loam (8), Fine silty clay (7), Sand (5), Medium to very fine, loamy sand (4), Moderately fine silty clay loam (4), Coarse, loamy sand (4), Medium silt loam (3), Rock/Sand (2), Loamy Sand (2), Medium silt (2), Medium sand (1), Coarse sand (1), Silt Loam (1)

Geology (map data): Andesite (84), Basalt (54), General volcanic extrusives (29), Igneous (type unknown) (10), Ash (of any origin) (1), Rhyolite (1)

**Environment:** This alliance is the most wide-spread, tree-dominated community within the Modoc Plateau and NW Ecoregions.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to continuous tree layer with a sparse to intermittent shrub layer and sparse to dense herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Juniperus occidentalis* in the overstory. In the shrub layer, *Purshia tridentata* is often present. Characteristic herbs include *Bromus tectorum* and *Poa secunda*, and *Elymus elymoides* and *Festuca idahoensis* are often present.

**Dynamics:** *Juniperus occidentalis* is a long-lived conifer that may reach 3000 years of age and 15 m in height. Seed establishment occurs on mineral soil and seeds germinate preferentially under the canopy of *Artemisia* and other shrub species. The species is considered a highly competitive native that is relatively shade intolerant and can invade native plant communities (Dealy 1990, Tirmenstein 1999g). The range of *Juniperus occidentalis* has expanded in the past 150 years due to fire suppression, overgrazing, and climatic change. In the last 50 years, trees have been removed to improve rangelands for livestock by cabling, chaining, and herbicide. More recently, ecologists have come to better understand the wildlife value of juniper woodlands. Stands with *Bromus tectorum* will experience more intense and more frequent fires (Riegel et al. 2006).

**Species of Interest:** *Balsamorhiza serrata*, *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Hackelia cusickii*, *Lomatium canbyi*, *Lupinus nevadensis*, and *Phlox muscoides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5 **State:** S4

## References

Dealy 1990, Hickson et al. 2008, Riegel et al. 2006, Tirmenstein 1999g

Total Sample Size Used for Description: N=343

## Alliance Stand Table

### ***Juniperus occidentalis* Alliance**

n =343

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	99	16.15	0.2	80
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	27	1.69	0.2	37.5
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	33	0.73	0.2	3
<b>Shrub</b>				
<i>Purshia tridentata</i>	53	3.97	0.2	30
<i>Artemisia arbuscula</i>	42	7.34	0.2	32
<i>Artemisia tridentata</i>	36	6.63	0.2	37
<i>Ribes velutinum</i>	28	1.29	0.2	7
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	22	7.15	0.2	31
<i>Ericameria nauseosa</i>	19	1.85	0.2	15
<i>Cercocarpus ledifolius</i>	19	9.41	0.2	41
<i>Chrysothamnus viscidiflorus</i>	13	1.43	0.2	20
<b>Herb</b>				
<i>Poa secunda</i>	87	4.91	0.2	44
<i>Bromus tectorum</i>	78	4.7	0.2	62
<i>Elymus elymoides</i>	72	2.13	0.2	20
<i>Festuca idahoensis</i>	52	7.9	0.2	60
<i>Pseudoroegneria spicata</i>	49	3.99	0.2	37.5
<i>Achnatherum thurberianum</i>	38	2.77	0.2	20
<i>Bromus arvensis</i>	29	2.77	0.2	37
<i>Blepharipappus scaber</i>	27	1.06	0.2	4
<i>Collinsia parviflora</i>	19	1.26	0.2	7
<i>Epilobium brachycarpum</i>	18	1.91	0.2	26
<i>Microsteris gracilis</i>	17	1.24	0.2	17
<i>Eriophyllum lanatum</i>	15	1.02	0.2	10
<i>Bromus briziformis</i>	14	1.08	0.2	5
<i>Crepis acuminata</i>	14	1.13	0.2	8
<i>Lupinus argenteus</i>	13	2.08	0.2	18
<i>Arenaria congesta</i>	12	1.32	0.2	7

**Alliance Stand Table continued**

***Juniperus occidentalis* Alliance**

n =343

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Koeleria macrantha</i>	12	1.8	0.2	18

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## ***Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association**

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**Common Name:** Western Juniper / Low Sagebrush / Pine Bluegrass

**NVC Association Code:** CEG001715, *Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Wooded Grassland

**Alliance:** *Juniperus occidentalis* Alliance

### **Association Concept**

The *Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association forms an open to continuous tree canopy with an open to intermittent shrub understory. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, general volcanic extrusives, or igneous (type unknown) and textures are widely variable. Elevations range from approximately 1157 to 1974 meters. The dominant tree is *Juniperus occidentalis*. Commonly associated shrubs include *Artemisia arbuscula* and commonly associated herbs include *Bromus tectorum*, *Poa secunda*, *Blepharipappus scaber*, *Bromus arvensis*, and *Elymus elymoides*.

**Diagnostic Criteria:** This association is characterized by an open to continuous tree canopy of *Juniperus occidentalis* which ranges from 0.2 to 80 percent cover, an open shrub layer of *Artemisia arbuscula* which ranges from 0.2 to 32 percent cover, and an open herbaceous layer of *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda* which ranges from 0.2 to 33 percent cover. The overall covers range from 0.2 to 80 percent for trees, 0 to 36 percent for shrubs, and 3 to 61 percent for herbs.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1594 m, Range 1157 – 1974 m

Aspect: SW (20), NE (19), NW (13), SE (12), Flat (3), Variable (2)

Slope: Mean 3.9 degrees, Range 0 – 25 degrees

Macro Topography: Other (28), Upper 1/3 of slope (8), Lower 1/3 of slope (8), Ridge top (6), Middle 1/3 of slope (6), Middle to Upper 1/3 of slope (5), Upper 1/3 of slope to Ridgetop (3), Lower to Middle 1/3 of slope (2), Ridge summit, crest (2), Bench (1)

Tree Cover: Mean 13%, Range 0.2 – 80%

Shrub Cover: Mean 10.7%, Range 0 – 36%

Herb Cover: Mean 17.9%, Range 3 – 61%

Large Rock: Mean 15.4%, Range 0 – 71%

Small Rock: Mean 28.3%, Range 4 – 68%

Fines Cover: Mean 24.4%, Range 1 – 88%

Litter Cover: Mean 17.7%, Range 1 – 90%

Soil Texture (field assessed): Fine clay (8), Moderately fine clay loam (5), Fine sandy clay (5), Fine silty clay (5), Moderately fine sandy clay loam (3), Medium loam (3), Medium to very fine, sandy loam (2), Medium sand (1), Moderately fine silty clay loam (1), Not recorded (1), Medium silt (1)

Geology (map data): Andesite (33), Basalt (19), General volcanic extrusives (6), Igneous (type unknown) (2)

**Environment:** This association is found at the lower elevational range for the *Juniperus occidentalis* Alliance.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with an open to intermittent shrub layer and an open to intermittent herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Juniperus occidentalis* in the overstory. The dominant shrub is *Artemisia arbuscula*. Herbs that are characteristic or often present include *Bromus tectorum*, *Poa secunda*, *Blepharipappus scaber*, *Bromus arvensis*, and *Elymus elymoides*.

**Species of Interest:** *Balsamorhiza serrata*, *Erigeron elegantulus*, *Hackelia cusickii*, *Lomatium canbyi*, *Lupinus nevadensis*, *Phlox muscoides*

### **Classification Comments**

Stands of this association that have been disturbed by fire, grazing, and/or clearing may have very low cover of *Artemisia arbuscula* and significant cover of non-native annual grasses. This association has some floristic overlap with the *Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** NR

### **References**

Hickson et al. 2008

**Total Sample Size Used for Description:** N=112

## Association Stand Table

### ***Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association**

n =112

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	99	12.52	0.2	80
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	21	0.86	0.2	2
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	31	0.89	0.2	3
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	91	9.49	0.2	32
	<i>Purshia tridentata</i>	42	2.16	0.2	9
	<i>Artemisia tridentata</i>	21	2.96	1	11
	<i>Eriogonum sphaerocephalum</i>	11	1.45	0.2	4
<b>Herb</b>					
	<i>Poa secunda</i>	89	5.2	0.2	21
	<i>Bromus tectorum</i>	80	4.41	0.2	33
	<i>Elymus elymoides</i>	71	1.73	0.2	10
	<i>Bromus arvensis</i>	57	2.86	0.2	37
	<i>Blepharipappus scaber</i>	54	1.2	0.2	4
	<i>Festuca idahoensis</i>	49	7.84	0.2	60
	<i>Pseudoroegneria spicata</i>	40	3.16	0.2	17
	<i>Achnatherum thurberianum</i>	32	1.53	0.2	5
	<i>Danthonia unispicata</i>	29	2.11	0.2	10
	<i>Epilobium brachycarpum</i>	28	2.55	0.2	26
	<i>Arenaria congesta</i>	26	1.35	0.2	5
	<i>Eriophyllum lanatum</i>	23	1.39	0.2	10
	<i>Antennaria dimorpha</i>	22	0.95	0.2	3
	<i>Microsteris gracilis</i>	21	1.08	0.2	4
	<i>Bromus briziformis</i>	21	0.9	0.2	3
	<i>Taeniatherum caput-medusae</i>	21	11.12	0.2	55
	<i>Phlox hoodii</i>	19	1.33	1	4
	<i>Balsamorhiza hookeri</i>	19	4.98	0.2	70
	<i>Lomatium</i>	19	2.83	0.2	11
	<i>Koeleria macrantha</i>	18	2.08	0.2	18
	<i>Lomatium triternatum</i>	17	1.29	0.2	6
	<i>Penstemon roezlii</i>	17	0.62	0.2	1
	<i>Ventenata dubia</i>	15	7.15	0.2	35

**Association Stand Table** continued

***Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda*  
Association**

n =112

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Collinsia parviflora</i>	15	0.96	0.2	2
<i>Epilobium minutum</i>	15	0.87	0.2	2
<i>Lomatium nudicaule</i>	14	0.91	0.2	2
<i>Poa bulbosa</i>	14	2.06	0.2	9
<i>Arenaria kingii</i>	13	1.23	0.2	3
<i>Idahoia scapigera</i>	13	0.83	0.2	1
<i>Draba verna</i>	12	1.63	0.2	6
<i>Lomatium bicolor</i>	12	0.88	0.2	1
<i>Frasera albicaulis</i>	12	0.88	0.2	1
<i>Lupinus</i>	12	1.26	0.2	3
<i>Vulpia microstachys</i>	11	0.98	0.2	4
<i>Arabis holboellii</i>	11	0.93	0.2	1
<i>Nothocalais troximoides</i>	11	0.93	0.2	1



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## ***Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association**

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**Common Name:** Western Juniper / Big Sagebrush – Antelope Bitterbrush

**NVC Association Code:** CEG001722, *Juniperus occidentalis* / *Artemisia tridentata* - *Purshia tridentata* Wooded Grassland

**Alliance:** *Juniperus occidentalis* Alliance

### **Association Concept**

The *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association forms an open to intermittent tree canopy with an open to intermittent shrub understory. It is found primarily on slopes, benches, and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, basalt, or igneous (type unknown) and textures are widely variable. Elevations range from approximately 1256 to 1914 meters. The dominant tree is *Juniperus occidentalis*. Commonly associated shrubs include *Artemisia tridentata* and *Purshia tridentata* and commonly associated herbs include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, *Achnatherum thurberianum*, and *Pseudoroegneria spicata*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Juniperus occidentalis* which ranges from 3 to 50 percent cover with an open shrub layer of *Artemisia tridentata* and/or *Purshia tridentata* which ranges from 0.2 to 37 percent cover. The overall tree cover ranges from 1 to 41 percent, and the overall shrub cover ranges from 1 to 55 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1608 m, Range 1256 – 1914 m

Aspect: NE (21), SE (14), SW (14), NW (6), Variable (1), Flat (1)

Slope: Mean 7.0 degrees, Range 0 – 22 degrees

Macro Topography: Middle 1/3 of slope (13), Other (10), Lower 1/3 of slope (7), Upper 1/3 of slope (6), Ridge summit, crest (3), Middle to Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Midslope (2), Bench (2), Lower 1/3 of slope to Ridgetop (1), Low level (1), High slope (1), Ridge top (1), Basin floor (1), Lower to Upper 1/3 of slope (1)

Tree Cover: Mean 16%, Range 1 – 50%

Shrub Cover: Mean 14.7%, Range 1 – 55%

Herb Cover: Mean 17.3%, Range 2 – 63%

Large Rock: Mean 8.7%, Range 0 – 47%

Small Rock: Mean 21%, Range 1 – 50%

Fines Cover: Mean 29.9%, Range 1 – 87%

Litter Cover: Mean 20.4%, Range 1 – 70%

Soil Texture (field assessed): Moderately fine clay loam (6), Moderately fine sandy clay loam (5), Medium to very fine, sandy loam (4), Sandy Loam (3), Moderately coarse, sandy loam (3), Coarse, loamy sand (2), Medium silt loam (2), Silt Loam (1), Rock/Sand (1), Moderately fine silty clay loam (1), Fine sandy clay (1), Coarse sand (1), Fine clay (1), Fine silty clay (1)

Geology (map data): Andesite (22), General volcanic extrusives (11), Basalt (6), Igneous (type unknown) (3), Ash (of any origin) (1), Not recorded (1)

**Environment:** This association is a common type within the study area. It tends to be on better draining soils than the *Juniperus occidentalis* / *Artemisia arbuscula* / *Poa secunda* Association forms.

### **Vegetation Description**

**Vegetation Structure:** The association forms open to intermittent tree, shrub, and herbaceous layers.

**Vegetation Floristics:** The dominant tree is *Juniperus occidentalis* in the overstory. Shrubs that are characteristic or often present include *Artemisia tridentata* and *Purshia tridentata*. Herbs that are characteristic or often present include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, *Achnatherum thurberianum*, and *Pseudoroegneria spicata*.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** NR

### **References**

None.

**Total Sample Size Used for Description:** N=87

## Association Stand Table

### ***Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association**

n =87

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	99	15.35	3	50
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	29	1.9	0.2	7.5
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	33	0.64	0.2	1.5
<b>Shrub</b>					
	<i>Purshia tridentata</i>	69	6.9	0.2	30
	<i>Artemisia tridentata</i>	60	9.67	1	37
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	34	7.65	0.2	31
	<i>Ericameria nauseosa</i>	30	2.22	0.2	13
	<i>Ribes velutinum</i>	28	0.98	0.2	3
	<i>Chrysothamnus viscidiflorus</i>	23	1.11	0.2	3
<b>Herb</b>					
	<i>Artemisia arbuscula</i>	21	2.59	0.2	10
	<i>Eriogonum umbellatum</i>	10	0.93	0.2	2
	<i>Poa secunda</i>	90	5.32	0.2	44
	<i>Bromus tectorum</i>	85	4.4	0.2	39
	<i>Elymus elymoides</i>	79	1.85	0.2	10
	<i>Pseudoroegneria spicata</i>	63	4.48	0.2	30
	<i>Achnatherum thurberianum</i>	51	3.3	0.2	20
	<i>Festuca idahoensis</i>	48	8.78	0.2	39
	<i>Crepis acuminata</i>	20	0.86	0.2	3
	<i>Bromus arvensis</i>	18	2.05	0.2	9
	<i>Lupinus argenteus</i>	17	1.81	0.2	13
	<i>Collinsia parviflora</i>	15	1.8	0.2	7
	<i>Epilobium brachycarpum</i>	14	1.15	0.2	5
	<i>Eriophyllum lanatum</i>	14	0.77	0.2	2
	<i>Lupinus</i>	14	1.68	0.2	5
	<i>Microsteris gracilis</i>	14	0.6	0.2	1
	<i>Blepharipappus scaber</i>	13	0.96	0.2	3
	<i>Carex rossii</i>	13	1.47	0.2	3
	<i>Lomatium triternatum</i>	13	1.31	0.2	3
	<i>Phlox hoodii</i>	11	1.32	0.2	3
	<i>Arenaria congesta</i>	11	1.42	0.2	7

**Association Stand Table continued**

***Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata*  
Association**

n =87

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Bromus briziformis</i>	11	1.54	0.2	5
<i>Antennaria rosea</i>	10	1.1	0.2	3
<i>Arabis sparsiflora</i>	10	1.24	0.2	3
<i>Crepis</i>	10	0.8	0.2	3
<i>Lomatium</i>	10	1.62	0.2	9
<i>Tragopogon dubius</i>	10	0.64	0.2	1
<i>Achillea millefolium</i>	10	0.73	0.2	1

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## ***Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association**

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**Common Name:** Western Juniper – (Jeffrey Pine - Western Yellow Pine) / Curl leaf mountain mahogany

**NVC Association Code:**

**Alliance:** *Juniperus occidentalis* Alliance

### **Association Concept**

The *Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association forms an open to continuous tree canopy with a sparse to intermittent shrub understory. It is found primarily on slopes, benches, and ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, or general volcanic extrusives and textures are widely variable. Elevations range from approximately 1170 to 2030 meters. The dominant tree is *Juniperus occidentalis*. Commonly associated shrubs include *Cercocarpus ledifolius*, *Purshia tridentata*, and *Ribes velutinum* and commonly associated herbs include *Poa secunda*, *Bromus tectorum*, *Elymus elymoides*, and *Festuca idahoensis*.

**Diagnostic Criteria:** This association is characterized by an open to continuous tree canopy of *Juniperus occidentalis* which ranges from 2.5 to 60 percent cover. The overall tree cover ranges from 5 to 65 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1655 m, Range 1170 – 2030 m

Aspect: NE (28), NW (18), SW (16), SE (11), Flat (4), Variable (1), Not recorded (1)

Slope: Mean 10.8 degrees, Range 0 – 38 degrees

Macro Topography: Middle 1/3 of slope (12), Middle to Upper 1/3 of slope (11), Upper 1/3 of slope (10), High slope (6), Lower 1/3 of slope (6), Midslope (6), Lower to Upper 1/3 of slope (5), Other (4), Bench (3), Upper 1/3 of slope to Ridgetop (3), Ridge summit, crest (3), Lowslope (3), Lower to Middle 1/3 of slope (2), Ridge top (2), Toeslope (1)

Tree Cover: Mean 9%, Range 5 – 65%

Shrub Cover: Mean 14.8%, Range 0 – 60%

Herb Cover: Mean 18.9%, Range 1 – 80%

Large Rock: Mean 11.6%, Range 0 – 49%

Small Rock: Mean 16.2%, Range 1 – 41%

Fines Cover: Mean 19.8%, Range 0 – 75%

Litter Cover: Mean 31.4%, Range 2.1 – 82%

Soil Texture (field assessed): Sandy Loam (10), Moderately coarse, sandy loam (6), Fine sandy clay (6), Moderately fine clay loam (5), Moderately fine sandy clay loam (5), Medium loam (4), Medium to very fine, sandy loam (4), Sand (4), Not recorded (3), Medium to very fine, loamy sand (2), Coarse, loamy sand (1), Moderately fine silty clay loam (1), Fine clay (1), Loamy Sand (1), Medium silt loam (1), Medium silt (1), Rock/Sand (1)

Geology (map data): Basalt (21), Andesite (20), General volcanic extrusives (9), Igneous (type unknown) (4), Not recorded (1)

**Environment:** This association is found at the upper elevational range for the *Juniperus occidentalis* Alliance.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with an open to intermittent shrub layer and an open to continuous herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Juniperus occidentalis* in the overstory. Shrubs that are characteristic or often present include *Cercocarpus ledifolius*, *Purshia tridentata*, and *Ribes velutinum*. Herbs that are characteristic or often present include *Poa secunda*, *Bromus tectorum*, *Elymus elymoides*, and *Festuca idahoensis*.

**Species of Interest:** *Hackelia cusickii*, *Lomatium canbyi*

### **Classification Comments**

While tree-dominated stands with *Juniperus occidentalis* and yellow pines is a common occurrence in the study area, this particular association may have some overlap with the *Pinus (jeffreyi, ponderosa) – Juniperus occidentalis* Association that is in the *Pinus ponderosa* / Shrub Understory Association. Stands of this association, however, are strongly dominated by *J. occidentalis* rather than a co-dominance of or dominance of a yellow pine species. In addition, stands of this association do not need to have a yellow pine species present in order to fit this association. Rather, this type is distinguished from other associations in the *Juniperus occidentalis* Alliance by its relatively higher elevation and the presence of understory shrubs that reflect that, including *Cercocarpus ledifolius* and *Artemisia tridentata* ssp. *vaseyana*.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Hickson et al. 2008

**Total Sample Size Used for Description:** N=112

## Association Stand Table

### ***Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association**

n =112

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	99	18.47	2.5	60
	<i>Pinus jeffreyi</i>	27	3.35	0.2	10
	<i>Cercocarpus ledifolius</i>	16	15.39	1	45
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	30	2.45	0.2	37.5
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	32	0.69	0.2	3
	<i>Purshia tridentata</i>	57	3.06	0.2	15
	<i>Cercocarpus ledifolius</i>	51	10.36	0.2	41
	<i>Ribes velutinum</i>	51	1.61	0.2	7
	<i>Artemisia tridentata</i>	36	5.86	0.2	23
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	29	8.63	0.2	31
	<i>Ericameria nauseosa</i>	21	1.48	0.2	15
	<i>Prunus virginiana</i>	16	4.26	0.2	30
	<i>Artemisia arbuscula</i>	16	2.27	0.2	9
	<i>Symphoricarpos rotundifolius</i>	15	1.34	0.2	9
	<i>Chrysothamnus viscidiflorus</i>	12	2.51	0.2	20
	<i>Eriogonum polyanthum</i>	12	1.36	0.2	3.5
	<i>Ribes cereum</i>	12	1.54	0.2	5
<b>Herb</b>					
	<i>Poa secunda</i>	79	4.18	0.2	19
	<i>Bromus tectorum</i>	71	4.61	0.2	43
	<i>Elymus elymoides</i>	64	2.98	0.2	20
	<i>Festuca idahoensis</i>	59	7.5	0.2	39
	<i>Pseudoroegneria spicata</i>	47	4.11	0.2	20
	<i>Achnatherum thurberianum</i>	30	3.61	0.2	17
	<i>Collinsia parviflora</i>	23	1.44	0.2	7
	<i>Microsteris gracilis</i>	19	1.86	0.2	17
	<i>Crepis acuminata</i>	17	1.47	0.2	8
	<i>Lupinus argenteus</i>	17	2.62	0.2	18
	<i>Achillea millefolium</i>	15	1.29	0.2	10
	<i>Carex rossii</i>	14	1.74	0.2	8
	<i>Arabis sparsiflora</i>	14	0.6	0.2	1
	<i>Balsamorhiza sagittata</i>	14	1.68	0.2	8

**Association Stand Table** continued

***Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association**

n =112

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Cryptantha</i>	13	0.68	0.2	1
	<i>Senecio integerrimus</i>	12	0.98	0.2	3
	<i>Wyethia mollis</i>	11	0.88	0.2	2
	<i>Koeleria macrantha</i>	11	2.12	0.2	11
	<i>Epilobium brachycarpum</i>	11	1.5	0.2	7



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## ***Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association**

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**Common Name:** Western Juniper / (Pine Bluegrass – Blue Fescue – Blue-bunch Wheat Grass)

**NVC Association Code:** CEG001728, *Juniperus occidentalis* / *Pseudoroegneria spicata* Wooded Grassland

**Alliance:** *Juniperus occidentalis* Alliance

### **Association Concept**

The *Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association forms an open to intermittent tree canopy with a sparse to open shrub understory and an open to continuous herbaceous layer. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, or general volcanic extrusives and textures are widely variable. Elevations range from approximately 1327 to 1742 meters. The dominant tree is *Juniperus occidentalis*. Characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Juniperus occidentalis* which ranges from 6 to 50 percent cover with an open to intermittent herbaceous layer of *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda* which ranges from 0.2 to 62 percent cover. The overall tree cover ranges from 0.2 to 50 percent, and overall herb cover ranges from 2 to 70 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1512 m, Range 1327 – 1742 m

Aspect: NE (11), SW (6), SE (4), NW (2), Variable (1)

Slope: Mean 7.2 degrees, Range 0 – 30 degrees

Macro Topography: Middle 1/3 of slope (9), Other (5), Upper 1/3 of slope (3), Bench (2), Upper 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1), Lower 1/3 of slope (1), Interfluvium/Summit (1), High slope (1), Lower 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 21%, Range 0.2 – 50%

Shrub Cover: Mean 2.2%, Range 0 – 10%

Herb Cover: Mean 17.2%, Range 2 – 70%

Large Rock: Mean 10.6%, Range 0 – 36%

Small Rock: Mean 26%, Range 7 – 59%

Fines Cover: Mean 32.2%, Range 0 – 70%

Litter Cover: Mean 18%, Range 1 – 50%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Medium to very fine, loamy sand (2), Unknown (1), Moderately fine silty clay loam (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Loamy Sand (1), Fine silty clay (1), Fine sandy clay (1), Fine clay (1), Coarse, loamy sand (1), Sand (1), Medium loam (1)

Geology (map data): Andesite (9), Basalt (8), General volcanic extrusives (3), Igneous (type unknown) (1), Rhyolite (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent tree layer with a sparse to open shrub understory and an open to continuous herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Juniperus occidentalis* in the overstory. Herbs that are characteristic or often present include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Dynamics:** *Juniperus occidentalis* stands with minimal shrub component (typically <4% absolute cover). Juniper cover is usually greater than 10% and trees are of mixed age classes. Herb layer is sparse to moderate, sometimes with significant cover of non-native grasses such as *Bromus tectorum*. However, native grasses including *Poa secunda*, *Pseudoroegneria spicata*, *Festuca idahoensis*, and/or *Achnatherum thurberianum* are characteristic in the herb layer. If shrubs are present, they are patchy and insignificant.

**Species of Interest:** *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Hackelia cusickii*, *Lupinus nevadensis*

### **Classification Comments**

This association has some floristic overlap with the *Juniperus occidentalis* / *Artemisia arbuscula* Association. The lack of shrubs may be a result of disturbance.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

None.

**Total Sample Size Used for Description:** N=30

## Association Stand Table

### ***Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association**

n = 30

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	100	22.67	6	60
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	27	0.3	0.2	1
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	40	0.6	0.2	1
<b>Shrub</b>					
	<i>Purshia tridentata</i>	33	0.68	0.2	1
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	27	1.58	0.2	5
	<i>Ericameria nauseosa</i>	27	1.08	0.2	3
	<i>Artemisia tridentata</i>	27	1.9	1	3.2
	<i>Artemisia arbuscula</i>	23	1.23	0.2	3
	<i>Ribes velutinum</i>	20	0.63	0.2	2
<b>Herb</b>					
	<i>Poa secunda</i>	97	4.54	0.2	20
	<i>Bromus tectorum</i>	83	6.99	0.2	62
	<i>Elymus elymoides</i>	80	1.72	0.2	10
	<i>Achnatherum thurberianum</i>	50	2.31	0.2	10
	<i>Festuca idahoensis</i>	47	7.91	0.2	30
	<i>Pseudoroegneria spicata</i>	47	4.52	0.2	37.5
	<i>Blepharipappus scaber</i>	33	0.6	0.2	1
	<i>Collinsia parviflora</i>	27	0.5	0.2	1
	<i>Bromus arvensis</i>	27	1.43	0.2	5
	<i>Crepis acuminata</i>	20	0.6	0.2	1
	<i>Epilobium brachycarpum</i>	20	1.23	0.2	4
	<i>Astragalus purshii</i>	20	0.9	0.2	2
	<i>Plectritis macrocera</i>	20	0.6	0.2	1
	<i>Alyssum desertorum</i>	20	0.77	0.2	2
	<i>Arabis sparsiflora</i>	13	0.6	0.2	1
	<i>Bromus briziformis</i>	13	1.3	0.2	3
	<i>Cryptantha</i>	13	0.4	0.2	1
	<i>Draba verna</i>	13	0.4	0.2	1
	<i>Eriogonum vimineum</i>	13	0.2	0.2	0.2
	<i>Hackelia cusickii</i>	13	1.5	1	3
	<i>Lupinus</i>	13	1.1	0.2	3
	<i>Vulpia microstachys</i>	13	0.6	0.2	1

**Association Stand Table**

***Juniperus occidentalis* / (*Poa secunda* – *Festuca idahoensis* – *Pseudoroegneria spicata*) Association**

n = 30

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achnatherum occidentale</i>	13	1.1	0.2	3

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***Pinus ponderosa* – *Calocedrus decurrens* – *Pseudotsuga menziesii*  
Alliance**

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**Common Name:** Mixed conifer forest Alliance

**NVC Alliance Code:** A3673. *Pinus ponderosa* - *Calocedrus decurrens* - *Pseudotsuga menziesii* Forest Alliance

**Alliance Concept**

The *Pinus ponderosa* – *Calocedrus decurrens* Alliance forms an open to continuous tree canopy with an open shrub layer and an open herbaceous understory. It is found primarily on the upper and middle portions of slopes at all aspects. Soils are derived from a variety of substrates but primarily andesite or basalt, and textures are sandy to clay loam. Elevation range is approximately 1102 – 1714 meters. The dominant trees are *Pinus ponderosa* and *Calocedrus decurrens*. Commonly associated shrubs include *Amelanchier utahensis* and *Ceanothus prostratus*, and commonly associated herbs include *Elymus elymoides*, *Collinsia parviflora* and *Poa secunda*.



**Diagnostic Criteria:** This alliance is characterized by an open to continuous mixed tree canopy of *Pinus ponderosa*, which ranges from 3 to 64 percent cover, and *Calocedrus decurrens*, which ranges from 0.2 to 40 percent cover. The overall tree cover ranges from 7 to 80 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Mowitz Buttes (M261Gd), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1513 m, Range 1102 – 1714 m

Aspect: NE (7), NW (5), SE (2), SW (2), Variable (1)

Slope: Mean 10.9 degrees, Range 0 – 24 degrees

Macro Topography: Upper 1/3 of slope (7), Middle 1/3 of slope (4), Middle to Upper 1/3 of slope (2), Ridge summit, crest (1), Lower 1/3 of slope (1), Bench (1)

Tree Cover: Mean 18.9%, Range 7 – 80%

Shrub Cover: Mean 5%, Range 0.2 – 26%

Herb Cover: Mean 5%, Range 0.2 – 13%

Large Rock: Mean 2.6%, Range 0 – 8.2%

Small Rock: Mean 3.9%, Range 0 – 14%

Fines Cover: Mean 7.2%, Range 1 – 37%

Litter Cover: Mean 81%, Range 25 – 97%

Soil Texture (field assessed): Medium to very fine, sandy loam (4), Moderately coarse, sandy loam (2), Moderately fine sandy clay loam (1), Fine clay (1), Moderately fine clay loam (1)

Geology (map data): Andesite (7), Basalt (5), General volcanic extrusives (2), Rhyolite (1)

**Environment:** Stands of this alliance exist on mountain slopes throughout portions of the Modoc Plateau, particularly large stands occur along Hunter's Ridge and Slate Spring Ridge, south of Hermit Butte.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous tree layer with open shrub and herbaceous layers.

**Vegetation Floristics:** The dominant trees are *Pinus ponderosa* and *Calocedrus decurrens* in the overstory. Shrubs that are often present include *Amelanchier utahensis* and *Ceanothus prostratus*. *Elymus elymoides* is characteristic in the herbaceous layer and *Collinsia parviflora* and *Poa secunda* are often present.

**Dynamics:** *Calocedrus decurrens* is typically dominant to co-dominant with *Pinus ponderosa*. *Abies concolor* may be present but is sub-dominant to the other conifers. *Juniperus occidentalis* is absent or <1% cover. *Pseudotsuga menziesii* is not likely to occur in these stands within the study area.

**Species of Interest:** None

## **Classification Comments**

This is an uncommon association within the study area.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G4    **State:** S4

## **References**

Sawyer and Thornburgh 1977

**Total Sample Size Used for Description:** N=17

## **Alliance Stand Table**

### ***Pinus ponderosa* – *Calocedrus decurrens* – *Pseudotsuga menziesii* Alliance**

n =17

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Calocedrus decurrens</i>	100	10.31	0.2	40
<i>Pinus ponderosa</i>	88	26.2	3	64
<i>Abies concolor</i>	47	4	1	12
<i>Quercus kelloggii</i>	29	1.92	0.2	5
<i>Pinus jeffreyi</i>	24	3.8	0.2	6
Sapling				
<i>Calocedrus decurrens</i>	47	2.9	0.2	12
<i>Pinus ponderosa</i>	29	1.32	0.2	3

**Alliance Stand Table continued**

***Pinus ponderosa* – *Calocedrus decurrens* – *Pseudotsuga menziesii*  
Alliance**

n =17

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Abies concolor</i>	18	1.4	0.2	2
	<i>Pinus jeffreyi</i>	18	0.73	0.2	1
<b>Seedling</b>					
	<i>Calocedrus decurrens</i>	88	3.33	0.2	16
	<i>Pinus ponderosa</i>	71	1.08	0.2	3
	<i>Quercus kelloggii</i>	41	2.51	0.2	14
	<i>Pinus jeffreyi</i>	24	0.4	0.2	1
	<i>Juniperus occidentalis</i>	18	0.73	0.2	1
	<i>Abies concolor</i>	18	0.47	0.2	1
<b>Shrub</b>					
	<i>Amelanchier utahensis</i>	65	1.15	0.2	3
	<i>Ceanothus prostratus</i>	65	5.22	0.2	18
	<i>Purshia tridentata</i>	47	1.45	0.2	7
	<i>Arctostaphylos patula</i>	29	1.24	0.2	2
	<i>Cercocarpus ledifolius</i>	18	1	1	1
	<i>Ribes velutinum</i>	12	0.6	0.2	1
<b>Herb</b>					
	<i>Elymus elymoides</i>	88	0.87	0.2	2
	<i>Collinsia parviflora</i>	53	0.82	0.2	1
	<i>Poa secunda</i>	53	0.93	0.2	2
	<i>Bromus tectorum</i>	47	1.18	0.2	3
	<i>Hieracium horridum</i>	35	0.87	0.2	1
	<i>Lupinus argenteus</i>	35	2.07	0.2	7
	<i>Clarkia rhomboidea</i>	35	1	1	1
	<i>Carex rossii</i>	35	1.4	0.2	3



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## ***Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association**

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**Common Name:** Western Yellow Pine – Incense Cedar / Pinemat

**NVC Association Code:**

**Alliance:** *Pinus ponderosa* – *Calocedrus decurrens* – *Pseudotsuga menziesii* Alliance

### **Association Concept**

The *Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association forms an open to continuous tree canopy with an open shrub layer and an open herbaceous understory. It is found primarily on the lower to upper thirds of slopes and ridge summits/crests at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, or general volcanic extrusives and textures include medium to very fine sandy loam, moderately coarse sandy loam, and fine clay. Elevations range from approximately 1102 to 1714 meters. The dominant trees are *Pinus ponderosa* and *Calocedrus decurrens*. Commonly associated shrubs include *Amelanchier utahensis* and *Ceanothus prostratus* and commonly associated herbs include *Elymus elymoides*, *Collinsia parviflora*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Calocedrus decurrens*, which ranges from 0.2 to 40 percent cover, and *Pinus ponderosa*, which ranges from 3 to 64 percent cover. The overall tree cover ranges from 0 to 80 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1513 m, Range 1102 – 1714 m

Aspect: NE (7), NW (5), SW (2), SE (2), Variable (1)

Slope: Mean 10.9 degrees, Range 0 – 24 degrees

Macro Topography: Upper 1/3 of slope (7), Middle 1/3 of slope (4), Middle to Upper 1/3 of slope (2), Ridge summit, crest (1), Bench (1), Not recorded (1), Lower 1/3 of slope (1)

Tree Cover: Mean 19%, Range 0.2 – 80%

Shrub Cover: Mean 5%, Range 0.2 – 26%

Herb Cover: Mean 5%, Range 0.2 – 13%

Large Rock: Mean 2.6%, Range 0 – 8.2%

Small Rock: Mean 3.9%, Range 0 – 14%

Fines Cover: Mean 7.2%, Range 1 – 37%

Litter Cover: Mean 81%, Range 25 – 97%

Soil Texture (field assessed): Medium to very fine, sandy loam (4), Moderately coarse, sandy loam (2), Fine clay (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (map data): Andesite (7), Basalt (5), General volcanic extrusives (2), Rhyolite (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with an open shrub layer and open herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* in the overstory, and *Calocedrus decurrens* is characteristic. Shrubs that are characteristic or often present include *Amelanchier utahensis* and *Ceanothus prostratus*. Herbs that are characteristic or often present include *Elymus elymoides*, *Collinsia parviflora*, and *Poa secunda*.

**Dynamics:** *Ceanothus prostratus* may be present in the understory, though it may have very little cover.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** SNR

### **References**

Sawyer and Thornburgh 1977

**Total Sample Size Used for Description:** N=17

### **Association Stand Table**

#### ***Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association**

n =17

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Calocedrus decurrens</i>	100	10.31	0.2	40
<i>Pinus ponderosa</i>	88	26.2	3	64
<i>Abies concolor</i>	47	4	1	12
<i>Quercus kelloggii</i>	29	1.92	0.2	5

**Association Stand Table continued**

***Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus*  
Association**

n =17

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus jeffreyi</i>	24	3.8	0.2	6
<b>Sapling</b>					
	<i>Calocedrus decurrens</i>	47	2.9	0.2	12
	<i>Pinus ponderosa</i>	29	1.32	0.2	3
	<i>Pinus jeffreyi</i>	18	0.73	0.2	1
	<i>Abies concolor</i>	18	1.4	0.2	2
<b>Seedling</b>					
	<i>Calocedrus decurrens</i>	88	3.33	0.2	16
	<i>Pinus ponderosa</i>	71	1.08	0.2	3
	<i>Quercus kelloggii</i>	41	2.51	0.2	14
	<i>Pinus jeffreyi</i>	24	0.4	0.2	1
	<i>Juniperus occidentalis</i>	18	0.73	0.2	1
	<i>Abies concolor</i>	18	0.47	0.2	1
<b>Shrub</b>					
	<i>Ceanothus prostratus</i>	65	5.22	0.2	18
	<i>Amelanchier utahensis</i>	65	1.15	0.2	3
	<i>Purshia tridentata</i>	47	1.45	0.2	7
	<i>Arctostaphylos patula</i>	29	1.24	0.2	2
	<i>Cercocarpus ledifolius</i>	18	1	1	1
	<i>Ribes velutinum</i>	12	0.6	0.2	1
<b>Herb</b>					
	<i>Elymus elymoides</i>	88	0.87	0.2	2
	<i>Collinsia parviflora</i>	53	0.82	0.2	1
	<i>Poa secunda</i>	53	0.93	0.2	2
	<i>Bromus tectorum</i>	47	1.18	0.2	3
	<i>Carex rossii</i>	35	1.4	0.2	3
	<i>Clarkia rhomboidea</i>	35	1	1	1
	<i>Hieracium horridum</i>	35	0.87	0.2	1
	<i>Lupinus argenteus</i>	35	2.07	0.2	7
	<i>Agoseris retrorsa</i>	29	0.84	0.2	1
	<i>Cryptantha</i>	24	0.8	0.2	1
	<i>Antennaria luzuloides</i>	24	1	1	1
	<i>Arnica cordifolia</i>	24	1.35	0.4	2
	<i>Balsamorhiza sagittata</i>	24	3.05	0.2	5

## Association Stand Table continued

### ***Pinus ponderosa* – *Calocedrus decurrens* / *Ceanothus prostratus* Association**

n =17

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Collomia linearis</i>	24	0.8	0.2	1
	<i>Epilobium brachycarpum</i>	24	0.4	0.2	1
	<i>Festuca idahoensis</i>	24	0.8	0.2	1
	<i>Hieracium scouleri</i>	24	0.4	0.2	1
	<i>Lathyrus nevadensis</i>	24	1	1	1
	<i>Wyethia mollis</i>	24	0.6	0.2	1
	<i>Zigadenus paniculatus</i>	24	1	1	1
	<i>Carex multicaulis</i>	24	0.8	0.2	1
	<i>Senecio integerrimus</i>	18	1	1	1
	<i>Collomia grandiflora</i>	18	0.2	0.2	0.2
	<i>Crepis acuminata</i>	18	1	1	1
	<i>Erigeron inornatus</i>	18	0.73	0.2	1
	<i>Lomatium triternatum</i>	18	1	1	1
	<i>Microseris nutans</i>	18	0.73	0.2	1
	<i>Apocynum</i>	12	0.6	0.2	1
	<i>Hesperolinon micranthum</i>	12	1	1	1
	<i>Arabis holboellii</i>	12	0.6	0.2	1
	<i>Viola purpurea</i>	12	1	1	1
	<i>Pyrola picta</i>	12	1	1	1
	<i>Pseudoroegneria spicata</i>	12	0.2	0.2	0.2
	<i>Poa wheeleri</i>	12	1	1	1
	<i>Juncus</i>	12	0.2	0.2	0.2
	<i>Galium aparine</i>	12	0.6	0.2	1
	<i>Epilobium minutum</i>	12	1	1	1
	<i>Claytonia exigua</i> ssp. <i>exigua</i>	12	1	1	1
	<i>Antennaria argentea</i>	12	0.2	0.2	0.2
	<i>Achillea millefolium</i>	12	0.2	0.2	0.2
	<i>Microsteris gracilis</i>	12	1	1	1
	<i>Achnatherum lemmonii</i>	12	0.2	0.2	0.2
	<i>Clarkia lassenensis</i>	12	0.6	0.2	1
	<i>Apocynum androsaemifolium</i>	12	1	1	1
	<i>Aster ascendens</i>	12	1	1	1
	<i>Bromus carinatus</i>	12	0.2	0.2	0.2
	<i>Carex</i>	12	0.2	0.2	0.2
	<i>Clarkia</i>	12	0.2	0.2	0.2

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## ***Pinus ponderosa* / Shrub Understory Alliance**

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**Common Name:** Yellow pine / shrub understory woodland Alliance

**NVC Alliance Code:** A3446. *Pinus ponderosa* / Shrub Understory Central Rocky Mountain Woodland Alliance

### **Alliance Concept**

The *Pinus ponderosa* / Shrub Understory Alliance forms an open to continuous tree canopy with an open to dense shrub understory and an open to intermittent herbaceous layer. It is found on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, or general volcanic extrusives and textures are generally sandy or clay loam. Elevation range is approximately 1152 – 2359 meters. The dominant tree is *Pinus ponderosa* and/or *Pinus jeffreyi* and *Juniperus occidentalis* is often present. Commonly associated shrubs include *Purshia tridentata*, *Cercocarpus ledifolius*, and *Ceanothus prostratus* and commonly associated herbs include *Elymus elymoides*, *Carex rossii*, and *Poa secunda*.

**Diagnostic Criteria:** This alliance is characterized by a sparse to continuous tree canopy of *Pinus ponderosa*, which ranges from 0.2 to 86 percent cover. The overall tree cover ranges from 5 to 87 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Big Valley Mountains (M261Gn), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Mowitz Buttes (M261Gd), Pit River Valley (M261Gg), Warner Mountains (M261Gf)

**Northwestern Basin and Range:** Blacks Mountain - Susanville Peak (M261Dd), Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Blacks Mountain - Susanville Peak (M261Dd), Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Pinus (jeffreyi, ponderosa)* – *Juniperus occidentalis* Association

*Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association

*Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association

*Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata* Association

*Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis* Association

*Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1612 m, Range 1152 – 2359 m

Aspect: NE (65), NW (38), SE (37), SW (29)

Slope: Mean 7.8 degrees, Range 0 – 35 degrees

Macro Topography: Other (30), Middle 1/3 of slope (27), Lower 1/3 of slope (24), Ridge summit, crest (20), Upper 1/3 of slope (18), Middle to Upper 1/3 of slope (14), Bench (4), Lowslope (4), Lower to Middle 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (3), Toeslope (3), High slope (3), Edge of basin or wetland (3), Bottom (3), Lower to Upper 1/3 of slope (2), Midslope (2), Middle 1/3 of slope to Ridgetop (1), Entire slope (1), Draw, intermittent stream bottom (1), Bottom to Lower 1/3 of slope (1)

Tree Cover: Mean 21.4%, Range 5 – 87%

Shrub Cover: Mean 11.3%, Range 0.2 – 80%

Herb Cover: Mean 10.9%, Range 1 – 61%

Large Rock: Mean 4.7%, Range 0 – 32%  
Small Rock: Mean 6.4%, Range 0 – 32%  
Fines Cover: Mean 6%, Range 0 – 63%  
Litter Cover: Mean 81.1%, Range 3 – 99%

Soil Texture (field assessed): Medium to very fine, sandy loam (16), Moderately fine sandy clay loam (10), Medium loam (6), Sandy Loam (6), Moderately fine clay loam (6), Moderately coarse, sandy loam (5), Loamy Sand (2), Sand (1), Fine silty clay (1), Fine sandy clay (1), Medium silt loam (1)

Geology (map data): Andesite (105), Basalt (19), General volcanic extrusives (12), Igneous (type unknown) (3), Pumice (2), Rhyolite (2), Ultramafic (type unknown) (1), Volcanic mud (1), Pyroclastic flow (1)

**Environment:** This alliance is restricted to the northeastern corner of California, including the Modoc Plateau and NW Basin and Range ecoregions, where *Pinus ponderosa* and *Pinus jeffreyi* overlap and can co-dominate in the tree canopy. Everywhere else in the state these two pine species are elevationally separated with *P. jeffreyi* occurring at higher elevations than *P. ponderosa*.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous tree layer with an open to dense shrub understory and an open to intermittent herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* in the overstory and *Juniperus occidentalis* is often present. *Purshia tridentata* is usually present in the shrub layer, *Cercocarpus ledifolius* and *Amelanchier utahensis* are sometimes present. Herbs that are often present include *Elymus elymoides*, *Carex rossii*, and *Poa secunda*.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

Outside of the northeastern corner of the state, *Pinus ponderosa* and *Pinus jeffreyi* communities are separated elevationally and would fit into the *Pinus ponderosa* Alliance (87.010.00) and *Pinus jeffreyi* Alliance (87.020.00) respectively rather than this alliance where these yellow pine species mix.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S4

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=179

## Alliance Stand Table

### ***Pinus ponderosa* / Shrub Understory Alliance**

n =179

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus ponderosa</i>	76	36.62	0.2	86
	<i>Juniperus occidentalis</i>	60	5.53	0.2	25
	<i>Pinus jeffreyi</i>	33	21.73	1	75
	<i>Abies concolor</i>	12	4.77	0.2	15
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	19	0.82	0.2	3
	<i>Pinus jeffreyi</i>	14	1.54	0.2	6
<b>Seedling</b>					
	<i>Pinus ponderosa</i>	51	1.62	0.2	11
	<i>Juniperus occidentalis</i>	49	1.1	0.2	3
	<i>Pinus jeffreyi</i>	19	0.76	0.2	2
<b>Shrub</b>					
	<i>Purshia tridentata</i>	55	3.31	0.2	23
	<i>Cercocarpus ledifolius</i>	47	3.37	0.2	27
	<i>Amelanchier utahensis</i>	45	2.14	0.2	30
	<i>Ceanothus prostratus</i>	45	4.74	0.2	46
	<i>Prunus virginiana</i>	26	2.51	0.2	15
	<i>Arctostaphylos patula</i>	25	6.09	0.2	39
	<i>Ericameria bloomeri</i>	17	1.03	1	2
	<i>Rosa woodsii</i>	16	1.37	0.2	4
	<i>Artemisia tridentata</i>	16	4.73	0.2	25
	<i>Ribes velutinum</i>	15	0.92	0.2	4
	<i>Symphoricarpos rotundifolius</i>	15	2.22	0.2	22
	<i>Prunus subcordata</i>	14	3.33	0.2	60
	<i>Mahonia aquifolium</i>	13	1.32	0.2	6
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	12	4.96	0.2	19
	<i>Ericameria nauseosa</i>	11	0.81	0.2	1.5
	<i>Ribes cereum</i>	11	1.44	0.2	9
<b>Herb</b>					
	<i>Elymus elymoides</i>	82	1.85	0.2	19
	<i>Poa secunda</i>	56	1.77	0.2	15
	<i>Carex rossii</i>	52	1.91	0.2	12
	<i>Bromus tectorum</i>	45	2.07	0.2	49
	<i>Collinsia parviflora</i>	43	0.94	0.2	4
	<i>Wyethia mollis</i>	42	1.89	0.2	15



**Alliance Stand Table continued**

***Pinus ponderosa* / Shrub Understory Alliance**

n =179

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Achillea millefolium</i>	39	1.01	0.2	4
<i>Festuca idahoensis</i>	39	3.74	0.2	27
<i>Hieracium horridum</i>	31	1.15	0.2	2
<i>Balsamorhiza sagittata</i>	29	2.78	0.2	20
<i>Crepis acuminata</i>	29	1.09	0.2	3
<i>Lupinus argenteus</i>	29	2.25	0.2	12
<i>Clarkia rhomboidea</i>	28	1.03	0.2	3.5
<i>Collomia linearis</i>	28	1.01	0.2	2
<i>Senecio integerrimus</i>	27	1.04	0.2	5
<i>Pseudoroegneria spicata</i>	23	1.39	0.2	10
<i>Poa wheeleri</i>	20	1.89	0.2	10
<i>Apocynum androsaemifolium</i>	18	1.11	0.2	5

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## ***Pinus (jeffreyi, ponderosa) / (Ceanothus prostratus – Purshia tridentata) Association***

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**Common Name:** Yellow pine / (Mahala Mat – Bitterbrush)

**NVC Association Code:**

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

### **Association Concept**

The *Pinus (jeffreyi, ponderosa) / (Ceanothus prostratus – Purshia tridentata)* Association forms an open to continuous tree canopy with an open to dense shrub understory and an open to intermittent herbaceous layer. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, or general volcanic extrusives and textures are widely variable. Elevations range from approximately 1158 to 2182 meters. The dominant tree is *Pinus ponderosa* and/or *Pinus jeffreyi* and *Juniperus occidentalis* is often present. Commonly associated shrubs include *Amelanchier utahensis* and *Cercocarpus ledifolius*, and commonly associated herbs include *Elymus elymoides*, *Carex rossii*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to continuous tree canopy of *Pinus ponderosa* which ranges from 0.2 to 86 percent cover. The overall tree cover ranges from 7 to 87 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1626 m, Range 1158 – 2182 m

Aspect: NE (36), SE (23), NW (22), SW (18), Not recorded (1)

Slope: Mean 9.4 degrees, Range 0 – 35 degrees

Macro Topography: Other (18), Lower 1/3 of slope (18), Middle 1/3 of slope (14), Upper 1/3 of slope (12), Middle to Upper 1/3 of slope (10), Ridge summit, crest (10), Lower to Middle 1/3 of slope (3), Edge of basin or wetland (2), Bench (2), High slope (2), Lower to Upper 1/3 of slope (2), Lowslope (2), Upper 1/3 of slope to Ridgetop (1), Draw, intermittent stream bottom (1), Bottom to Lower 1/3 of slope (1), Entire slope (1)

Tree Cover: Mean 23%, Range 7 – 87%

Shrub Cover: Mean 8.5%, Range 0.2 – 80%

Herb Cover: Mean 9.9%, Range 1 – 61%

Large Rock: Mean 5.1%, Range 0 – 32%

Small Rock: Mean 5.2%, Range 0 – 28.2%

Fines Cover: Mean 4.6%, Range 0 – 60%

Litter Cover: Mean 83%, Range 3 – 99%

Soil Texture (field assessed): Medium to very fine, sandy loam (9), Moderately fine sandy clay loam (7), Medium loam (5), Moderately fine clay loam (4), Sandy Loam (3), Not recorded (1), Medium silt loam (1), Loamy Sand (1), Fine silty clay (1), Fine sandy clay (1), Moderately coarse, sandy loam (1)

Geology (map data): Andesite (63), Basalt (16), General volcanic extrusives (5), Igneous (type unknown) (2), Not recorded (1), Rhyolite (1), Volcanic mud (1)

**Environment:** Stands of this association are found at mid to higher elevations within the study area; below where *Abies concolor* becomes significant but above where *Juniperus occidentalis* will dominate the overstory.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with an open to dense shrub understory and an open to intermittent herbaceous layer.

**Vegetation Floristics:** The dominant tree is either *Pinus jeffreyi* or *Pinus ponderosa* in the overstory. Trees that are characteristic or often present include *Juniperus occidentalis*. Shrubs that are characteristic or often present include *Amelanchier utahensis* and *Cercocarpus ledifolius*. Herbs that are characteristic or often present include *Elymus elymoides*, *Carex rossii*, and *Poa secunda*.

**Dynamics:** *Juniperus occidentalis* is often sub-dominant with *Pinus ponderosa* and/or *Pinus jeffreyi*. Shrub layer is sparse to moderately dense with a variety of higher elevation, cold-tolerant shrubs present including *Amelanchier utahensis*, *Cercocarpus ledifolius*, *Ceanothus prostratus*, *Prunus virginiana*, and *Symphoricarpos* spp. *Artemisia tridentata* is typically absent or only a small component of the shrub layer.

**Species of Interest:** None.

### **Classification Comments**

The understory shrub species composition and cover can be hugely variable for stands that fit this association.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** S3

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=104

## Association Stand Table

### ***Pinus (jeffreyi, ponderosa) / (Ceanothus prostratus – Purshia tridentata) Association***

n =104

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus ponderosa</i>	72	40.54	0.2	86
	<i>Juniperus occidentalis</i>	66	4.27	0.2	25
	<i>Pinus jeffreyi</i>	47	22.78	3	75
	<i>Abies concolor</i>	14	3.33	1	13
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	21	0.9	0.2	3
	<i>Pinus jeffreyi</i>	19	1.75	0.2	6
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	51	1.07	0.2	3
	<i>Pinus ponderosa</i>	49	1.56	0.2	7
	<i>Pinus jeffreyi</i>	27	0.83	0.2	2
	<i>Amelanchier utahensis</i>	56	2.58	0.2	30
	<i>Cercocarpus ledifolius</i>	52	3.08	0.2	27
	<i>Ceanothus prostratus</i>	49	2.23	0.2	10
	<i>Purshia tridentata</i>	47	1.35	0.2	10
	<i>Prunus virginiana</i>	32	2.46	0.2	15
	<i>Rosa woodsii</i>	19	1.24	0.2	4
	<i>Arctostaphylos patula</i>	18	2.38	0.2	10
	<i>Symphoricarpos rotundifolius</i>	17	2.61	0.2	22
	<i>Prunus subcordata</i>	16	4.47	1	60
	<i>Ribes velutinum</i>	15	1.1	0.2	4
	<i>Mahonia aquifolium</i>	14	1.16	0.2	3
	<i>Ericameria bloomeri</i>	11	1	1	1
	<i>Artemisia tridentata</i>	11	2.27	1	4
<b>Herb</b>					
	<i>Elymus elymoides</i>	78	1.84	0.2	19
	<i>Poa secunda</i>	53	1.84	0.2	15
	<i>Carex rossii</i>	51	1.7	0.2	10
	<i>Wyethia mollis</i>	47	1.72	0.2	15
	<i>Collinsia parviflora</i>	41	0.89	0.2	2
	<i>Achillea millefolium</i>	40	0.98	0.2	2
	<i>Festuca idahoensis</i>	39	1.91	0.2	17
	<i>Bromus tectorum</i>	38	1.63	0.2	16
	<i>Hieracium horridum</i>	37	1.01	0.2	2

**Association Stand Table continued**

***Pinus (jeffreyi, ponderosa) / (Ceanothus prostratus – Purshia tridentata) Association***

n =104

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Lupinus argenteus</i>	35	2.12	0.2	12
	<i>Balsamorhiza sagittata</i>	29	3.21	0.2	20
	<i>Clarkia rhomboidea</i>	29	1.06	0.2	3.5
	<i>Collomia linearis</i>	29	0.98	0.2	2
	<i>Senecio integerrimus</i>	27	1.03	0.2	5
	<i>Apocynum androsaemifolium</i>	22	1.19	0.2	5
	<i>Crepis acuminata</i>	22	1.27	0.2	3
	<i>Poa wheeleri</i>	21	1.92	0.2	10
	<i>Epilobium minutum</i>	18	1.03	1	1.5
	<i>Antennaria luzuloides</i>	17	1.17	1	4
	<i>Lomatium triternatum</i>	17	1.11	1	2
	<i>Pseudoroegneria spicata</i>	17	1.03	0.2	3
	<i>Eriophyllum lanatum</i>	15	0.85	0.2	1
	<i>Arnica cordifolia</i>	14	7.8	1	43
	<i>Erigeron inornatus</i>	14	0.84	0.2	1
	<i>Pterospora andromedea</i>	14	0.89	0.2	1
	<i>Achnatherum occidentale</i>	13	0.96	0.2	2
	<i>Lathyrus nevadensis</i>	13	1.36	1	3
	<i>Pyrola picta</i>	13	1.08	1	2
	<i>Viola purpurea</i>	12	0.87	0.2	1
	<i>Bromus orcuttianus</i>	12	1.42	1	4
	<i>Microsteris gracilis</i>	12	0.93	0.2	1
	<i>Cryptantha</i>	11	1	1	1
	<i>Hieracium scouleri</i>	11	0.98	0.2	3
	<i>Osmorhiza chilensis</i>	11	1.18	1	2

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## ***Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

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**Common Name:** Jeffrey Pine / Mountain Big Sagebrush / Idaho Fescue

**NVC Association Code:**

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

### **Association Concept**

The *Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association forms an open tree canopy with an open shrub understory and herbaceous layer. It is found primarily on the lower to middle third of slopes up to ridgetops at northeastern and northwestern aspects. Soil substrates are derived primarily from general volcanic extrusives or ultramafic (type unknown), and textures include medium to very fine sandy loam, moderately coarse sandy loam, moderately fine sandy clay loam, and sandy loam. Elevations range from approximately 1471 to 1862 meters. The dominant tree is *Pinus jeffreyi*. Commonly associated shrubs include *Ribes velutinum* and *Artemisia tridentata* ssp. *vaseyana* and commonly associated herbs include *Festuca idahoensis*, *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Lupinus argenteus*.

**Diagnostic Criteria:** This association is characterized by an open tree canopy of *Pinus jeffreyi*, which ranges from 9 to 31 percent cover. The overall tree cover ranges from 0.2 to 16 percent cover.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1747 m, Range 1471 – 1862 m

Aspect: NE (3), NW (2)

Slope: Mean 12.0 degrees, Range 2 – 33 degrees

Macro Topography: Middle to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Midslope (1)

Tree Cover: Mean 11%, Range 9 – 16%

Shrub Cover: Mean 16.2%, Range 3 – 20%

Herb Cover: Mean 25%, Range 18 – 30%

Large Rock: Mean 5.2%, Range 0.2 – 12%

Small Rock: Mean 12.4%, Range 2.2 – 23%

Fines Cover: Mean 19.3%, Range 0 – 33%

Litter Cover: Mean 46.6%, Range 30 – 70%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (1), Moderately fine sandy clay loam (1), Sandy Loam (1)

Geology (map data): General volcanic extrusives (3), Ultramafic (type unknown) (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open tree overstory with an open shrub understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus jeffreyi* in the overstory. Shrubs that are characteristic or often present include *Ribes velutinum* and *Artemisia tridentata* ssp. *vaseyana*. Herbs that are characteristic or often present include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Lupinus argenteus*.

**Dynamics:** *Pinus jeffreyi* is dominant in the overstory while *Juniperus occidentalis* may just be present. Though there may be high shrub diversity, *Artemisia tridentata* ssp. *vaseyana* is the dominant shrub. *Festuca idahoensis* is characteristically present and typically the dominant herb

**Species of Interest:** None.

### **Classification Comments**

More data needs to be collected for this association in order to more thoroughly understand it.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR **State:** S3

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=6

### **Association Stand Table**

#### ***Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Pinus jeffreyi</i>	83	15.2	9	31
<i>Juniperus occidentalis</i>	33	3.6	0.2	7
<i>Cercocarpus ledifolius</i>	17	4	4	4
<i>Pinus ponderosa</i>	17	37.5	37.5	37.5

# Association Stand Table continued

## ***Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Pinus jeffreyi</i>	67	0.8	0.2	1
	<i>Juniperus occidentalis</i>	33	0.2	0.2	0.2
<b>Seedling</b>					
	<i>Pinus jeffreyi</i>	50	0.2	0.2	0.2
	<i>Juniperus occidentalis</i>	33	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Ribes velutinum</i>	83	0.36	0.2	1
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	67	11.3	0.2	19
	<i>Cercocarpus ledifolius</i>	50	4	1	9
	<i>Purshia tridentata</i>	50	0.73	0.2	1
	<i>Chrysothamnus viscidiflorus</i>	33	0.2	0.2	0.2
	<i>Ericameria nauseosa</i>	33	0.85	0.2	1.5
	<i>Amelanchier utahensis</i>	17	0.2	0.2	0.2
	<i>Artemisia tridentata</i>	17	20	20	20
	<i>Eriogonum polyanthum</i>	17	1.5	1.5	1.5
	<i>Ribes cereum</i>	17	1.5	1.5	1.5
	<i>Ribes roezlii</i>	17	0.2	0.2	0.2
	<i>Bromus tectorum</i>	100	1.3	0.2	4
	<i>Festuca idahoensis</i>	100	13.75	9	22
	<i>Poa secunda</i>	100	3.58	1	9
	<i>Elymus elymoides</i>	83	2.9	1	5
	<i>Lupinus argenteus</i>	67	3.55	0.2	7
	<i>Crepis acuminata</i>	50	0.2	0.2	0.2
	<i>Pseudoroegneria spicata</i>	50	0.2	0.2	0.2
	<i>Linum lewisii</i>	33	0.2	0.2	0.2
	<i>Achillea millefolium</i>	33	0.6	0.2	1
	<i>Bromus carinatus</i>	33	1.6	0.2	3
	<i>Collinsia parviflora</i>	33	0.2	0.2	0.2
	<i>Collomia grandiflora</i>	33	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	33	0.2	0.2	0.2
	<i>Hieracium scouleri</i>	33	0.2	0.2	0.2
	<i>Microsteris gracilis</i>	33	0.6	0.2	1
	<i>Phacelia hastata</i>	17	0.2	0.2	0.2
	<i>Silene douglasii</i>	17	0.2	0.2	0.2
	<i>Sidalcea oregana</i>	17	0.2	0.2	0.2



**Association Stand Table continued**

***Pinus jeffreyi* / *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Achnatherum thurberianum</i>	17	1	1	1
<i>Senecio integerrimus</i>	17	2	2	2
<i>Monardella odoratissima</i>	17	0.2	0.2	0.2
<i>Potentilla glandulosa</i>	17	0.2	0.2	0.2
<i>Polygonum douglasii</i>	17	0.2	0.2	0.2
<i>Stephanomeria minor</i> var. <i>minor</i>	17	0.2	0.2	0.2
<i>Phacelia humilis</i>	17	0.2	0.2	0.2
<i>Packera cana</i>	17	0.2	0.2	0.2
<i>Microseris nutans</i>	17	0.2	0.2	0.2
<i>Lupinus</i>	17	1	1	1
<i>Linanthus pungens</i>	17	0.2	0.2	0.2
<i>Hydrophyllum capitatum</i>	17	0.2	0.2	0.2
<i>Calochortus leichtlinii</i>	17	0.2	0.2	0.2
<i>Phlox speciosa</i>	17	1	1	1
<i>Arnica</i>	17	0.2	0.2	0.2
<i>Hieracium albiflorum</i>	17	0.2	0.2	0.2
<i>Carex brainerdii</i>	17	5	5	5
<i>Castilleja</i>	17	0.2	0.2	0.2
<i>Claytonia rubra</i>	17	0.2	0.2	0.2
<i>Delphinium</i>	17	0.2	0.2	0.2
<i>Heuchera cylindrica</i> var. <i>alpina</i>	17	1.5	1.5	1.5
<i>Agoseris glauca</i>	17	0.2	0.2	0.2
<i>Delphinium andersonii</i>	17	1	1	1
<i>Gilia modocensis</i>	17	1	1	1
<i>Geum triflorum</i>	17	0.2	0.2	0.2
<i>Fritillaria atropurpurea</i>	17	0.2	0.2	0.2
<i>Eriogonum nudum</i>	17	0.2	0.2	0.2
<i>Epilobium minutum</i>	17	0.2	0.2	0.2

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## ***Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association**

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**Common Name:** Western Yellow Pine – Western Juniper / Big Sagebrush – Antelope Bitterbrush

**NVC Association Code:** CEG002688, *Pinus ponderosa* - *Juniperus occidentalis* / *Artemisia tridentata* - *Purshia tridentata* Woodland

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

### **Association Concept**

The *Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association forms an open to intermittent tree canopy with an open to intermittent shrub understory and herbaceous layer. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite or general volcanic extrusives and textures include medium to very fine sandy loam, moderately fine sandy clay loam, and moderately fine clay loam. Elevations range from approximately 1317 to 1937 meters. The dominant trees are *Pinus ponderosa* and *Juniperus occidentalis*. Commonly associated shrubs include *Artemisia tridentata* and *Purshia tridentata*, and commonly associated herbs include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, *Festuca idahoensis*, and *Pseudoroegneria spicata*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Pinus ponderosa*, which ranges from 3 to 40 percent cover, and an open canopy of *Juniperus occidentalis*, which ranges from 2 to 20 percent cover. The overall tree cover ranges from 5 to 62 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1561 m, Range 1317 – 1937 m

Aspect: NE (10), SE (5), NW (4), SW (1)

Slope: Mean 5.0 degrees, Range 1 – 15 degrees

Macro Topography: Ridge summit, crest (5), Other (3), Middle 1/3 of slope (3), Lower 1/3 of slope (2), Upper 1/3 of slope (2), Middle 1/3 of slope to Ridgetop (1), Middle to Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1), Toeslope (1)

Tree Cover: Mean 27%, Range 5 – 62%

Shrub Cover: Mean 10.2%, Range 1 – 38%

Herb Cover: Mean 11.2%, Range 1 – 41%

Large Rock: Mean 4.9%, Range 0 – 22%

Small Rock: Mean 9.2%, Range 1 – 32%

Fines Cover: Mean 10.7%, Range 0 – 63%

Litter Cover: Mean 75.6%, Range 15 – 98%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Moderately fine sandy clay loam (2), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Medium loam (1)

Geology (map data): Andesite (11), General volcanic extrusives (3), Basalt (1), Igneous (type unknown) (1), Pumice (1)

**Environment:** This association is found at the lowest elevational range for this alliance.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent tree layer with an open intermittent understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* in the overstory, and *Juniperus occidentalis* is characteristic. Shrubs that are characteristic or often present include *Artemisia tridentata* and *Purshia tridentata*. Herbs that are characteristic or often present include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, *Festuca idahoensis*, and *Pseudoroegneria spicata*.

**Dynamics:** *Juniperus occidentalis* is typically present to co-dominant with *Pinus ponderosa* and lower elevation shrub species such as *Purshia tridentata*, *Artemisia tridentata*, and *Cercocarpus ledifolius* dominate the shrub layer. *Arctostaphylos patula* is typically absent or insignificant.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

This association may have some species composition overlap with the *Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association that is in the *Juniperus occidentalis* Alliance. This association, however, can have co-dominance of *P. ponderosa* and *J. occidentalis* in the tree canopy, whereas *J. occidentalis* must be strongly dominant in the tree canopy to fit the *Juniperus occidentalis* – (*Pinus jeffreyi* – *Pinus ponderosa*) / *Cercocarpus ledifolius* Association.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=23

## Association Stand Table

### ***Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* – *Purshia tridentata* Association**

n =23

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus ponderosa</i>	96	17.36	3	40
	<i>Juniperus occidentalis</i>	87	10.35	2	20
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	30	0.77	0.2	1
	<i>Pinus ponderosa</i>	13	0.47	0.2	1
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	65	0.93	0.2	2
	<i>Pinus ponderosa</i>	35	0.7	0.2	1
<b>Shrub</b>					
	<i>Purshia tridentata</i>	70	4.88	1	16
	<i>Artemisia tridentata</i>	65	5.69	0.2	25
	<i>Cercocarpus ledifolius</i>	48	4.65	0.2	15
	<i>Amelanchier utahensis</i>	22	0.84	0.2	1
	<i>Ribes velutinum</i>	17	0.85	0.2	2
	<i>Chrysothamnus viscidiflorus</i>	17	0.8	0.2	1
	<i>Eriogonum umbellatum</i>	13	0.73	0.2	1
	<i>Artemisia arbuscula</i>	13	2.73	0.2	5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	13	2.67	1	4
	<i>Ericameria nauseosa</i>	13	0.73	0.2	1
	<i>Ericameria bloomeri</i>	13	1	1	1
<b>Herb</b>					
	<i>Elymus elymoides</i>	91	2.13	0.2	11
	<i>Bromus tectorum</i>	78	4.13	0.2	49
	<i>Poa secunda</i>	78	1.41	0.2	5
	<i>Festuca idahoensis</i>	61	6.23	0.2	27
	<i>Pseudoroegneria spicata</i>	52	2.45	0.2	10
	<i>Carex rossii</i>	43	1.7	1	4
	<i>Astragalus purshii</i>	35	1.05	0.2	3
	<i>Epilobium brachycarpum</i>	35	1.05	0.2	3
	<i>Achillea millefolium</i>	35	1	1	1
	<i>Achnatherum thurberianum</i>	35	1.5	1	3
	<i>Collinsia parviflora</i>	30	1.2	0.2	4
	<i>Achnatherum occidentale</i>	26	1.53	0.2	3
	<i>Wyethia mollis</i>	22	0.72	0.2	2

**Association Stand Table continued**

***Pinus ponderosa* – *Juniperus occidentalis* / *Artemisia tridentata* –  
*Purshia tridentata* Association**

n =23

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Collomia linearis</i>	22	1	1	1
<i>Koeleria macrantha</i>	22	2	1	6
<i>Crepis acuminata</i>	22	1	1	1
<i>Bromus arvensis</i>	17	4.8	0.2	17
<i>Balsamorhiza sagittata</i>	17	1.05	0.2	2
<i>Arabis holboellii</i>	17	1	1	1
<i>Antennaria rosea</i>	17	1.5	1	3
<i>Lupinus argenteus</i>	17	1.1	0.2	3
<i>Lomatium triternatum</i>	17	1	1	1
<i>Clarkia rhomboidea</i>	13	1	1	1
<i>Paeonia brownii</i>	13	0.73	0.2	1
<i>Eriophyllum lanatum</i>	13	1	1	1
<i>Collinsia grandiflora</i>	13	1	1	1
<i>Poa bulbosa</i>	13	6.33	2	11
<i>Zigadenus paniculatus</i>	13	0.2	0.2	0.2
<i>Galium aparine</i>	13	1	1	1
<i>Epilobium minutum</i>	13	0.73	0.2	1
<i>Claytonia rubra</i>	13	0.2	0.2	0.2
<i>Microsteris gracilis</i>	13	0.73	0.2	1
<i>Clarkia</i>	13	0.47	0.2	1
<i>Arabis</i>	13	1	1	1
<i>Collomia grandiflora</i>	13	0.2	0.2	0.2

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## ***Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata* Association**

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**Common Name:** Western Yellow Pine / Greenleaf Manzanita – Antelope bitterbrush

**NVC Association Code:** CEG000063, *Pinus ponderosa* / *Arctostaphylos patula* - *Purshia tridentata* Woodland

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

### **Association Concept**

The *Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata* Association forms an open to continuous tree canopy with an open to intermittent shrub understory and herbaceous layer. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, or pumice, and textures are widely variable. Elevations range from approximately 1152 to 1734 meters. The dominant tree is *Pinus ponderosa*. Commonly associated shrubs include *Purshia tridentata*, *Arctostaphylos patula*, and *Ceanothus prostratus* and commonly associated herbs include *Elymus elymoides*, *Carex rossii*, *Collinsia parviflora*, *Crepis acuminata*, *Poa secunda*, and *Wyethia mollis*.

**Diagnostic Criteria:** This association is characterized by an open to continuous tree canopy of *Pinus ponderosa* which ranges from 5 to 85 percent cover and an open to intermittent shrub understory of *Purshia tridentata*, which ranges from 1 to 23 percent cover. The overall tree cover ranges from 5 to 87 percent, and the overall shrub cover ranges from 3 to 50 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1489 m, Range 1152 – 1734 m

Aspect: NE (16), NW (8), SE (7), SW (5)

Slope: Mean 4.6 degrees, Range 0 – 22 degrees

Macro Topography: Other (9), Middle 1/3 of slope (6), Lower 1/3 of slope (4), Ridge summit, crest (3), Upper 1/3 of slope (3), Toeslope (2), Bench (2), Lowslope (2), Edge of basin or wetland (1), Middle to Upper 1/3 of slope (1), Midslope (1), Bottom (1), High slope (1)

Tree Cover: Mean 44%, Range 5 – 87%

Shrub Cover: Mean 20%, Range 3 – 50%

Herb Cover: Mean 12.4%, Range 3 – 55%

Large Rock: Mean 2%, Range 0 – 3.2%

Small Rock: Mean 2%, Range 0 – 3%

Fines Cover: Mean 5.6%, Range 0 – 40%

Litter Cover: Mean 83.8%, Range 26 – 99%

Soil Texture (field assessed): Moderately coarse, sandy loam (2), Sandy Loam (2), Medium to very fine, sandy loam (2), Moderately fine clay loam (1), Loamy Sand (1), Sand (1)

Geology (map data): Andesite (26), General volcanic extrusives (1), Pumice (1)

**Environment:** Stands of this association occur at higher elevations in the western portions of the study area or the Warner Mountains, where winter precipitation is relatively greater and persistent snow is more frequent.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with an open to intermittent shrub understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* in the overstory. Shrubs that are characteristic or often present include *Arctostaphylos patula*, *Ceanothus prostratus*, and *Purshia tridentata*. Herbs that are characteristic or often present include *Elymus elymoides*, *Carex rossii*, *Collinsia parviflora*, *Crepis acuminata*, *Poa secunda*, and *Wyethia mollis*.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

None.

**Total Sample Size Used for Description:** N=37

## Association Stand Table

### ***Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata* Association**

n =37

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus ponderosa</i>	97	38.12	5	85
	<i>Juniperus occidentalis</i>	35	5.09	0.2	16
<b>Sapling</b>					
	<i>Pinus ponderosa</i>	11	2.05	0.2	6
<b>Seedling</b>					
	<i>Pinus ponderosa</i>	78	1.9	0.2	11
	<i>Juniperus occidentalis</i>	46	1.38	0.2	3
	<i>Calocedrus decurrens</i>	14	1.04	0.2	2
<b>Shrub</b>					
	<i>Purshia tridentata</i>	81	5.92	1	23
	<i>Ceanothus prostratus</i>	73	9.74	1	46
	<i>Arctostaphylos patula</i>	70	8.8	1	39
	<i>Amelanchier utahensis</i>	43	1.12	1	2
	<i>Cercocarpus ledifolius</i>	43	3.43	0.2	19
	<i>Ericameria bloomeri</i>	35	1.08	1	2
	<i>Prunus virginiana</i>	27	1.34	0.2	2
	<i>Prunus subcordata</i>	22	0.9	0.2	1
	<i>Ribes cereum</i>	16	1.03	0.2	2
	<i>Rosa woodsii</i>	16	1.83	1	3
	<i>Ceanothus velutinus</i>	14	9.34	1	25
	<i>Ericameria nauseosa</i>	14	1.1	1	1.5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	11	1.05	0.2	2
	<i>Mahonia aquifolium</i>	11	1	1	1
	<i>Prunus emarginata</i>	11	3.25	1	9
<b>Herb</b>					
	<i>Elymus elymoides</i>	89	1.59	0.2	7.5
	<i>Carex rossii</i>	68	2.37	0.2	12
	<i>Poa secunda</i>	57	1.37	0.2	3.5
	<i>Collinsia parviflora</i>	51	0.96	0.2	1
	<i>Crepis acuminata</i>	51	1.05	1	2
	<i>Wyethia mollis</i>	51	2.75	0.2	10
	<i>Balsamorhiza sagittata</i>	49	2.44	1	11
	<i>Clarkia rhomboidea</i>	46	1	1	1
	<i>Bromus tectorum</i>	46	1.18	1	3



**Association Stand Table continued**

***Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata*  
Association**

n =37

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achillea millefolium</i>	43	1.2	0.2	4
<i>Hieracium horridum</i>	41	1.53	1	2
<i>Senecio integerrimus</i>	41	1	1	1
<i>Bromus orcuttianus</i>	41	1.27	1	5
<i>Achnatherum lettermanii</i>	35	1.62	1	3
<i>Castilleja applegatei</i>	35	0.94	0.2	1
<i>Sidalcea oregana</i>	35	1.08	1	2
<i>Viola purpurea</i>	35	1	1	1
<i>Antennaria luzuloides</i>	32	1	1	1
<i>Collomia linearis</i>	32	1	1	1
<i>Eriophyllum lanatum</i>	32	0.93	0.2	1
<i>Microsteris gracilis</i>	32	1	1	1
<i>Cryptantha</i>	27	1	1	1
<i>Erigeron inornatus</i>	24	1.44	1	2
<i>Antennaria rosea</i>	24	1.11	1	2
<i>Lomatium triternatum</i>	24	1	1	1
<i>Microseris nutans</i>	24	1	1	1
<i>Agoseris retrorsa</i>	24	1	1	1
<i>Achnatherum lemmonii</i>	22	1.12	1	2
<i>Apocynum androsaemifolium</i>	22	0.9	0.2	1
<i>Festuca idahoensis</i>	22	1.25	1	3
<i>Lathyrus nevadensis</i>	22	1.12	1	2
<i>Pseudoroegneria spicata</i>	22	1.03	0.2	2
<i>Achnatherum occidentale</i>	19	1.07	1	1.5
<i>Phlox diffusa</i>	19	1.29	1	2
<i>Arabis holboellii</i>	16	1	1	1
<i>Convolvulus polymorphus</i>	16	1	1	1
<i>Epilobium minutum</i>	16	1	1	1
<i>Fritillaria atropurpurea</i>	16	1	1	1
<i>Tragopogon dubius</i>	14	1	1	1
<i>Zigadenus paniculatus</i>	14	1	1	1
<i>Horkelia tridentata</i>	14	1	1	1
<i>Hydrophyllum capitatum</i>	14	1	1	1
<i>Kelloggia galioides</i>	14	1.2	1	2

**Association Stand Table continued**

***Pinus ponderosa* / *Arctostaphylos patula* – *Purshia tridentata*  
Association**

n =37

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Koeleria macrantha</i>	14	1	1	1
<i>Madia exigua</i>	14	1	1	1
<i>Senecio aronicoides</i>	14	1	1	1
<i>Clarkia</i>	11	0.4	0.2	1
<i>Astragalus purshii</i>	11	1	1	1
<i>Collomia grandiflora</i>	11	0.85	0.2	2
<i>Crepis monticola</i>	11	1	1	1
<i>Fritillaria pinetorum</i>	11	1	1	1
<i>Monardella odoratissima</i>	11	1.3	0.2	2
<i>Poa wheeleri</i>	11	1.5	1	2
<i>Pterospora andromedea</i>	11	1	1	1
<i>Solidago multiradiata</i>	11	1.5	1	2

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## ***Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis* Association**

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**Common Name:** Washoe Pine / Pinemat Manzanita

**NVC Association Code:**

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

### **Association Concept**

The *Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis* Association forms an open tree canopy with an intermittent shrub understory and open herbaceous layer. It is found primarily on ridge summits/crests at SW aspects. Soil substrates are primarily derived from andesite. Elevation is approximately 2359 meters. The dominant tree is *Pinus ponderosa* var. *washoensis*, and *Pinus contorta* is characteristic. Commonly associated shrubs include *Arctostaphylos nevadensis*, *Ericameria greenei*, *Eriogonum umbellatum*, and *Prunus emarginata*, and commonly associated herbs include *Achnatherum occidentale*, *Arabis holboellii*, *Arenaria aculeata*, *Calyptridium umbellatum*, *Carex* spp., *Castilleja* spp., *Crepis modocensis*, *Elymus elymoides*, *Eriogonum* spp., *Hieracium horridum*, *Pedicularis semibarbata*, *Phlox diffusa*, and *Poa wheeleri*.

**Diagnostic Criteria:** This association is characterized by an open tree canopy of *Pinus ponderosa* var. *washoensis* at approximately 13 percent cover with a shrub understory of *Arctostaphylos nevadensis* at approximately 45 percent cover. The overall tree cover is approximately 13 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 2359 m

Aspect: SW (1)

Slope: 6 degrees

Macro Topography: Ridge summit, crest (1)

Tree Cover: 13%

Shrub Cover: 51%

Herb Cover: 8%

Large Rock: None recorded

Small Rock: None recorded

Fines Cover: 1%

Litter Cover: 38%

Soil Texture (field assessed): None recorded

Geology (map data): Andesite (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open tree overstory with an intermittent shrub understory and open herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* var. *washoensis* in the overstory, and *Pinus contorta* is characteristic. Shrubs that are characteristic or often present include *Arctostaphylos nevadensis*, *Ericameria greenei*, *Eriogonum umbellatum*, and *Prunus emarginata*. Herbs that are characteristic or often present include *Achnatherum occidentale*, *Arabis holboellii*, *Arenaria aculeata*, *Calyptridium umbellatum*, *Carex* spp., *Castilleja* spp., *Crepis modocensis*, *Elymus elymoides*, *Eriogonum* spp., *Hieracium horridum*, *Pedicularis semibarbata*, *Phlox diffusa*, and *Poa wheeleri*.

**Species of Interest:** None.

### **Classification Comments**

Only one survey was collected within the study area for this project. More sampling and analysis are necessary to fully understand this association and its relationship to other associations in this alliance.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** GNR    **State:** S1

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=1

### **Association Stand Table**

#### ***Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Pinus contorta</i>	100	1	1	1
<i>Pinus washoensis</i>	100	10	10	10
<b>Seedling</b>				
<i>Pinus washoensis</i>	100	1	1	1
<i>Pinus contorta</i>	100	2	2	2

**Association Stand Table continued**

***Pinus ponderosa* var. *washoensis* / *Arctostaphylos nevadensis*  
Association**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Arctostaphylos nevadensis</i>	100	45	45	45
	<i>Ericameria greenei</i>	100	1	1	1
	<i>Eriogonum umbellatum</i>	100	1	1	1
	<i>Prunus emarginata</i>	100	1	1	1
<b>Herb</b>					
	<i>Calyptridium umbellatum</i>	100	1	1	1
	<i>Phlox diffusa</i>	100	4	4	4
	<i>Hieracium horridum</i>	100	1	1	1
	<i>Pedicularis semibarbata</i>	100	1	1	1
	<i>Eriogonum</i>	100	1	1	1
	<i>Poa wheeleri</i>	100	1	1	1
	<i>Crepis modocensis</i>	100	1	1	1
	<i>Arenaria aculeata</i>	100	1	1	1
	<i>Arabis holboellii</i>	100	1	1	1
	<i>Achnatherum occidentale</i>	100	1	1	1
	<i>Castilleja</i>	100	1	1	1
	<i>Carex</i>	100	2	2	2
	<i>Elymus elymoides</i>	100	2	2	2

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***Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association**

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**Common Name:** Washoe Pine / Snowberry / Sticky Starwort

**NVC Association Code:** None.

**Alliance:** *Pinus ponderosa* / Shrub Understory Alliance

**Association Concept**

The *Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association forms a sparse to continuous tree canopy with a sparse shrub understory and open herbaceous layer. It is found primarily on the middle and upper third of slopes and ridge summits/crests at southwestern, southeastern, and northwestern aspects. Soils are derived from a variety of substrates but primarily andesite, pyroclastic flow, or rhyolite. Elevations range from approximately 1859 to 2310 meters. The dominant tree is *Pinus ponderosa* var. *washoensis* and *Abies concolor* is characteristic. *Symphoricarpos rotundifolius* is the characteristic shrub. Commonly associated herbs include *Carex rossii*, *Collinsia parviflora*, *Elymus elymoides*, *Poa wheeleri*, *Pseudostellaria jamesiana*, *Achnatherum occidentale*, *Lupinus argenteus*, and *Senecio integerrimus*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Pinus ponderosa* var. *washoensis* which ranges from 18 to 50 percent cover with a sparse shrub understory of *Symphoricarpos rotundifolius* at 1 percent cover. The overall tree cover ranges from 25 to 87 percent, and the overall shrub cover ranges from 1 to 8 percent.

**Environmental Description**

**Plot/Sample Data Environmental Summary:**

Elevation: Mean 2116 m, Range 1859 – 2310 m

Aspect: SW (3), SE (2), NW (1)

Slope: Mean 10.3 degrees, Range 1 – 27 degrees

Macro Topography: Middle 1/3 of slope (4), Ridge summit, crest (1), Upper 1/3 of slope (1)

Tree Cover: Mean 61%, Range 25 – 87%

Shrub Cover: Mean 2.7%, Range 1 – 8%

Herb Cover: Mean 7.8%, Range 2 – 13%

Large Rock: None recorded

Small Rock: None recorded

Fines Cover: Mean 1.7%, Range 1 – 4%

Litter Cover: Mean 97%, Range 95 – 99%

Soil Texture (field assessed): None recorded

Geology (map data): Andesite (4), Pyroclastic flow (1), Rhyolite (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous tree layer with a sparse shrub understory and open herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Pinus ponderosa* var. *washoensis* in the overstory, and *Abies concolor* is characteristic. *Symphoricarpos rotundifolius* is characteristic in the shrub layer, and *Ericameria bloomeri* is often present. Herbs that are characteristic or often present include *Carex rossii*, *Collinsia parviflora*, *Elymus elymoides*, *Poa wheeleri*, *Pseudostellaria jamesiana*, *Achnatherum occidentale*, *Lupinus argenteus*, and *Senecio integerrimus*.

**Species of Interest:** None.

### **Classification Comments**

Only one survey was collected within the study area for this project. More sampling and analysis are necessary to fully understand this association and its relationship to other associations in this alliance.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** GNR **State:** S1

### **References**

Smith 1994

**Total Sample Size Used for Description:** N=6

### **Association Stand Table**

#### ***Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Abies concolor</i>	83	10	5	15
<i>Pinus washoensis</i>	67	32.75	18	50
<i>Pinus contorta</i>	33	11.5	8	15
<i>Pinus ponderosa</i>	33	74	65	83
<i>Juniperus occidentalis</i>	17	7	7	7

**Association Stand Table continued**

***Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Pinus ponderosa</i>	50	2.33	1	5
	<i>Abies concolor</i>	50	1	1	1
	<i>Populus tremuloides</i>	33	1	1	1
	<i>Pinus washoensis</i>	33	1	1	1
	<i>Pinus contorta</i>	33	1	1	1
	<i>Juniperus occidentalis</i>	17	2	2	2
<b>Shrub</b>					
	<i>Symphoricarpos rotundifolius</i>	100	1	1	1
	<i>Ericameria bloomeri</i>	50	1	1	1
	<i>Ribes cereum</i>	33	1	1	1
	<i>Mahonia aquifolium</i>	17	6	6	6
	<i>Amelanchier utahensis</i>	17	1	1	1
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	17	3	3	3
	<i>Cercocarpus ledifolius</i>	17	2	2	2
	<i>Ribes velutinum</i>	17	1	1	1
	<i>Ribes viscosissimum</i>	17	1	1	1
	<i>Ceanothus velutinus</i>	17	1	1	1
<b>Herb</b>					
	<i>Poa wheeleri</i>	100	1.33	1	2
	<i>Collinsia parviflora</i>	100	1.17	1	2
	<i>Pseudostellaria jamesiana</i>	100	1.33	1	3
	<i>Carex rossii</i>	83	2.2	1	5
	<i>Elymus elymoides</i>	83	1	1	1
	<i>Senecio integerrimus</i>	67	1	1	1
	<i>Lupinus argenteus</i>	67	1	1	1
	<i>Achnatherum occidentale</i>	67	1	1	1
	<i>Phacelia heterophylla</i>	50	1	1	1
	<i>Collomia linearis</i>	50	1.33	1	2
	<i>Lathyrus nevadensis</i>	50	1.67	1	3
	<i>Microseris nutans</i>	50	1	1	1
	<i>Osmorhiza chilensis</i>	50	1	1	1
	<i>Wyethia mollis</i>	50	1	1	1
	<i>Crepis acuminata</i>	33	1	1	1
	<i>Arabis holboellii</i>	33	1	1	1



**Association Stand Table continued**

***Pinus ponderosa* var. *washoensis* / *Symphoricarpos* spp. / *Pseudostellaria jamesiana* Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Carex</i>	33	1	1	1
	<i>Solidago multiradiata</i>	33	1	1	1
	<i>Epilobium minutum</i>	33	1	1	1
	<i>Hieracium horridum</i>	33	1	1	1
	<i>Leptodactylon pungens</i>	33	1	1	1
	<i>Nemophila parviflora</i>	33	1	1	1
	<i>Penstemon gracilentus</i>	33	1	1	1
	<i>Pyrola picta</i>	33	1	1	1
	<i>Bromus orcuttianus</i>	33	1	1	1
	<i>Hydrophyllum capitatum</i>	17	1	1	1
	<i>Chimaphila umbellata</i> ssp. <i>occidentalis</i>	17	1	1	1
	<i>Apocynum androsaemifolium</i>	17	1	1	1
	<i>Maianthemum</i>	17	1	1	1
	<i>Arabis</i>	17	1	1	1
	<i>Allium atropurpureum</i>	17	1	1	1
	<i>Arabis xdivaricarpa</i>	17	1	1	1
	<i>Sisymbrium altissimum</i>	17	1	1	1
	<i>Castilleja applegatei</i>	17	1	1	1
	<i>Cryptantha</i>	17	1	1	1
	<i>Erigeron eatonii</i> var. <i>plantagineus</i>	17	1	1	1
	<i>Eriogonum nudum</i>	17	1	1	1
	<i>Eriophyllum lanatum</i>	17	1	1	1
	<i>Lomatium</i>	17	1	1	1
	<i>Maianthemum racemosum</i>	17	1	1	1
	<i>Paeonia brownii</i>	17	1	1	1
	<i>Phlox diffusa</i>	17	1	1	1
	<i>Phoenicautis cheiranthoides</i>	17	1	1	1
	<i>Polygonum arenastrum</i>	17	1	1	1
	<i>Arnica cordifolia</i>	17	10	10	10

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## ***Populus tremuloides* Alliance**

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**Common Name:** Aspen groves Alliance

**NVC Alliance Code:** A2036. *Populus tremuloides* Rocky Mountain Forest & Woodland Alliance

### **Alliance Concept**

The *Populus tremuloides* Alliance forms an open to continuous tree canopy with an open to dense shrub understory and herbaceous layer. It is found primarily on slopes at northern aspects. Soils are derived from a variety of substrates but primarily basalt, general volcanic extrusives, or andesite, and textures are generally sandy or clay loam. Elevation range is approximately 1433 – 2233 meters. The dominant tree is *Populus tremuloides*.

**Diagnostic Criteria:** This alliance is characterized by an open tree canopy of *Populus tremuloides* which ranges from 2 to 90 percent cover. The overall tree cover ranges from 1 to 90 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

## **Associations**

*Populus tremuloides* / *Symphoricarpos rotundifolius* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1845 m, Range 1433 – 2233 m

Aspect: NE (14), NW (8), SE (2), SW (1)

Slope: Mean 9.2 degrees, Range 0 – 24 degrees

Macro Topography: Middle 1/3 of slope (6), Upper 1/3 of slope (5), Lower 1/3 of slope (4), Bottom (2), Bottom to Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Other (2), Ridge summit, crest (1), Middle to Upper 1/3 of slope (1)

Tree Cover: Mean 8.5%, Range 1 – 90%

Shrub Cover: Mean 13.1%, Range 0 – 70%

Herb Cover: Mean 25.4%, Range 2 – 80%

Large Rock: Mean 3.2%, Range 0 – 25%

Small Rock: Mean 9.9%, Range 0 – 81%

Fines Cover: Mean 19%, Range 0 – 90%

Litter Cover: Mean 57.9%, Range 2 – 94%

Soil Texture (field assessed): Medium loam (3), Moderately fine sandy clay loam (3), Moderately coarse, sandy loam (3), Medium to very fine, sandy loam (3), Moderately fine clay loam (2), Fine sandy clay (1), Medium silt (1), Coarse, loamy sand (1), Clay, (class unknown) (1), Medium silt loam (1)

Geology (map data): Basalt (6), General volcanic extrusives (3), Andesite (3), Silty alluvium (2), Pumice (1), Igneous (type unknown) (1)

**Environment:** Stands of this alliance within the study, tend to be small and in moist or riparian settings where the soil stays moist through the growing season.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to continuous tree layer with an open to dense shrub understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Populus tremuloides* in the overstory. *Symphoricarpos rotundifolius* is often present in the shrub layer and *Prunus virginiana*, *Ribes velutinum*, *Rosa woodsii*, and other mesic shrubs are sometimes present.

**Dynamics:** *Populus tremuloides* is a fast-growing, deciduous tree that attains 20 m in height. Plants develop lateral rhizomes that create a set of sprouts with age. The developing stems create a clone of many trees that may cover a large area. Clones differ in phenology, leaf size and shape, branching habit, bark character, and nucleic acid composition. A clone in Utah occupies 43 ha, has more than 47,000 stems, and may be 10,000 years old (Mitton and Grant 1996).

**Species of Interest:** *Hackelia cusickii*, *Salix bebbiana*, and *Silene oregana*

### Classification Comments

None.

**Classification Confidence:** High

### Conservation Status Rank

**Global:** G5 **State:** S3

### References

Potter 1994, Smith 1998b, Mitton and Grant 1996

**Total Sample Size Used for Description:** N=26

### Alliance Stand Table

#### ***Populus tremuloides* Alliance**

n =26

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Populus tremuloides</i>	69	21.44	2	90
<i>Juniperus occidentalis</i>	35	2.49	0.2	12
<i>Pinus ponderosa</i>	12	1.07	0.2	2
<b>Sapling</b>				
<i>Populus tremuloides</i>	58	9.41	0.2	30
<i>Juniperus occidentalis</i>	19	0.92	0.2	3
<i>Abies concolor</i>	15	0.6	0.2	1
<b>Seedling</b>				
<i>Populus tremuloides</i>	88	8.89	0.2	70
<i>Juniperus occidentalis</i>	23	0.47	0.2	1
<i>Abies concolor</i>	15	0.6	0.2	1
<i>Pinus ponderosa</i>	12	0.73	0.2	1
<b>Shrub</b>				
<i>Symphoricarpos rotundifolius</i>	50	3.29	0.2	9
<i>Prunus virginiana</i>	35	3.53	0.2	20

## Alliance Stand Table continued

### ***Populus tremuloides* Alliance**

n =26

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ribes velutinum</i>	35	2.84	0.2	10
	<i>Ericameria nauseosa</i>	27	2.4	0.2	10
	<i>Rosa woodsii</i>	23	1.27	0.2	5
	<i>Chrysothamnus viscidiflorus</i>	23	0.8	0.2	3
	<i>Artemisia tridentata</i>	23	4.83	2	10
	<i>Ribes cereum</i>	19	0.36	0.2	1
	<i>Cercocarpus ledifolius</i>	19	4.28	0.2	10
	<i>Amelanchier utahensis</i>	15	4.1	0.2	15
	<i>Amelanchier alnifolia</i>	12	5	1	10
	<i>Prunus emarginata</i>	12	1.67	1	2
<b>Herb</b>					
	<i>Achillea millefolium</i>	46	0.93	0.2	4
	<i>Poa secunda</i>	35	3.29	0.2	16
	<i>Tragopogon dubius</i>	35	0.47	0.2	1
	<i>Collomia grandiflora</i>	35	0.71	0.2	3
	<i>Wyethia mollis</i>	31	1.68	0.2	5
	<i>Bromus carinatus</i>	31	4.75	0.2	25
	<i>Bromus tectorum</i>	27	5.23	0.2	15
	<i>Collinsia parviflora</i>	27	0.31	0.2	1
	<i>Elymus elymoides</i>	27	0.86	0.2	4
	<i>Vicia americana</i>	27	1.99	0.2	6
	<i>Lupinus argenteus</i>	27	0.97	0.2	4
	<i>Galium aparine</i>	23	2.3	0.2	10
	<i>Taraxacum officinale</i>	23	3.33	2	5
	<i>Poa bulbosa</i>	19	0.56	0.2	2
	<i>Poa pratensis</i>	19	3.84	0.2	13
	<i>Agastache urticifolia</i>	19	1.24	0.2	3
	<i>Elymus cinereus</i>	19	1.04	0.2	2
	<i>Paeonia brownii</i>	19	0.36	0.2	1
	<i>Mimulus guttatus</i>	15	1.05	0.2	2
	<i>Elymus glaucus</i>	15	0.9	0.2	3
	<i>Sidalcea oregana</i>	15	0.85	0.2	2
	<i>Crepis acuminata</i>	15	0.4	0.2	1
	<i>Nemophila parviflora</i>	15	1.1	0.2	3
	<i>Lupinus</i>	15	1.15	0.2	4
	<i>Elymus triticoides</i>	15	2.05	0.2	5

**Alliance Stand Table continued**

***Populus tremuloides* Alliance**

n =26

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Lactuca serriola</i>	15	0.85	0.2	2
<i>Juncus arcticus</i>	15	3.75	1	7
<i>Carex</i>	15	2.73	0.2	10
<i>Aquilegia formosa</i>	15	0.65	0.2	2
<i>Phacelia humilis</i>	15	0.6	0.2	1
<i>Kelloggia galioides</i>	12	8.73	0.2	25
<i>Wyethia angustifolia</i>	12	1.13	0.2	3
<i>Ranunculus</i>	12	0.47	0.2	1
<i>Poa</i>	12	1.73	1	3
<i>Phacelia hastata</i>	12	0.2	0.2	0.2
<i>Lupinus arbustus</i>	12	1.4	0.2	2
<i>Crepis</i>	12	0.2	0.2	0.2
<i>Castilleja applegatei</i>	12	0.73	0.2	1
<i>Allium bisceptrum</i>	12	1.07	0.2	2
<i>Microsteris gracilis</i>	12	1.47	0.2	4



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## ***Populus tremuloides* / *Symphoricarpos rotundifolius* Association**

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**Common Name:** Quaking Aspen / Mountain Snowberry

**NVC Association Code:**

**Alliance:** *Populus tremuloides* Alliance

### **Association Concept**

The *Populus tremuloides* / *Symphoricarpos rotundifolius* Association forms an open to intermittent tree canopy with an open to dense shrub understory and an open to intermittent herbaceous layer. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt, general volcanic extrusives, or silty alluvium and textures are widely variable. Elevations range from approximately 1433 to 2233 meters. The dominant and characteristic tree is *Populus tremuloides*. *Symphoricarpos rotundifolius* is often present in the shrub layer.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Populus tremuloides* which ranges from 2 to 50 percent cover, often with an open shrub understory of *Symphoricarpos rotundifolius*, which ranges from 0.2 to 9 percent cover. The overall tree cover ranges from 1 to 49 percent, and the overall shrub cover ranges from 0.2 to 70 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1908 m, Range 1433 – 2233 m

Aspect: NE (9), NW (8), SE (1), SW (1)

Slope: Mean 9.4 degrees, Range 1 – 24 degrees

Macro Topography: Upper 1/3 of slope (5), Middle 1/3 of slope (5), Lower 1/3 of slope (3), Bottom (2), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge summit, crest (1), Bottom to Lower 1/3 of slope (1)

Tree Cover: Mean 6%, Range 1 – 49%

Shrub Cover: Mean 11.2%, Range 0.2 – 70%

Herb Cover: Mean 18.2%, Range 2 – 61%

Large Rock: Mean 3.5%, Range 0 – 25%

Small Rock: Mean 10.2%, Range 0 – 81%

Fines Cover: Mean 20.2%, Range 0 – 90%

Litter Cover: Mean 58.5%, Range 2 – 94%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Medium to very fine, sandy loam (3), Medium loam (3), Moderately fine sandy clay loam (2), Clay,

(class unknown) (1), Medium silt loam (1), Medium silt (1), Coarse, loamy sand (1), Not recorded (1), Fine sandy clay (1)

Geology (map data): Basalt (6), General volcanic extrusives (2), Silty alluvium (2), Pumice (1), Andesite (1)

**Environment:** Stands are usually in concavities or on steep sheltered and rocky slopes.

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent tree layer with a sparse to continuous shrub layer and sparse or intermittent herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Populus tremuloides* in the overstory. Shrubs that are characteristic or often present include *Symphoricarpos rotundifolius*.

**Dynamics:** *Symphoricarpos rotundifolius* and/or other mesic shrubs are characteristic in the shrub layer.

**Species of Interest:** *Hackelia cusickii*, *Silene oregana*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Potter 1994, Smith 1998b

**Total Sample Size Used for Description:** N=20

### **Association Stand Table**

#### ***Populus tremuloides* / *Symphoricarpos rotundifolius* Association**

n =20

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Populus tremuloides</i>	60	17.58	2	50
<i>Juniperus occidentalis</i>	35	2.91	0.2	12
<b>Sapling</b>				
<i>Populus tremuloides</i>	60	11.5	3	30
<i>Juniperus occidentalis</i>	20	1.1	0.2	3



## Association Stand Table continued

### ***Populus tremuloides* / *Symphoricarpos rotundifolius* Association**

n =20

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Populus tremuloides</i>	85	7.6	0.2	30
	<i>Juniperus occidentalis</i>	20	0.4	0.2	1
<b>Shrub</b>					
	<i>Symphoricarpos rotundifolius</i>	65	3.29	0.2	9
	<i>Ribes velutinum</i>	40	3.08	0.2	10
	<i>Ericameria nauseosa</i>	35	2.4	0.2	10
	<i>Chrysothamnus viscidiflorus</i>	30	0.8	0.2	3
	<i>Artemisia tridentata</i>	25	5.4	3	10
	<i>Prunus virginiana</i>	25	2.24	0.2	5
	<i>Cercocarpus ledifolius</i>	20	2.85	0.2	10
	<i>Prunus emarginata</i>	15	1.67	1	2
	<i>Ribes cereum</i>	15	0.2	0.2	0.2
	<i>Rosa woodsii</i>	15	0.47	0.2	1
<b>Herb</b>					
	<i>Achillea millefolium</i>	45	0.8	0.2	4
	<i>Collomia grandiflora</i>	45	0.71	0.2	3
	<i>Poa secunda</i>	40	3.68	0.2	16
	<i>Bromus carinatus</i>	40	4.75	0.2	25
	<i>Bromus tectorum</i>	35	5.23	0.2	15
	<i>Elymus elymoides</i>	35	0.86	0.2	4
	<i>Lupinus argenteus</i>	35	0.97	0.2	4
	<i>Tragopogon dubius</i>	35	0.43	0.2	1
	<i>Wyethia mollis</i>	35	1.77	0.2	5
	<i>Collinsia parviflora</i>	30	0.2	0.2	0.2
	<i>Vicia americana</i>	30	1.65	0.2	6
	<i>Poa bulbosa</i>	25	0.56	0.2	2
	<i>Galium aparine</i>	25	0.76	0.2	3
	<i>Paeonia brownii</i>	25	0.36	0.2	1
	<i>Phacelia humilis</i>	20	0.6	0.2	1
	<i>Poa pratensis</i>	20	4.3	0.2	13
	<i>Lupinus</i>	20	1.15	0.2	4
	<i>Elymus triticoides</i>	20	2.05	0.2	5
	<i>Elymus cinereus</i>	20	1.05	0.2	2
	<i>Lactuca serriola</i>	20	0.85	0.2	2
	<i>Crepis acuminata</i>	20	0.4	0.2	1
	<i>Agastache urticifolia</i>	20	1.3	0.2	3

**Association Stand Table continued**

***Populus tremuloides* / *Symphoricarpos rotundifolius* Association**

n =20

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Microsteris gracilis</i>	15	1.47	0.2	4
<i>Wyethia angustifolia</i>	15	1.13	0.2	3
<i>Crepis</i>	15	0.2	0.2	0.2
<i>Elymus glaucus</i>	15	1.13	0.2	3
<i>Lupinus arbustus</i>	15	1.4	0.2	2
<i>Phacelia hastata</i>	15	0.2	0.2	0.2
<i>Taraxacum officinale</i>	15	3	2	4
<i>Castilleja applegatei</i>	15	0.73	0.2	1
<i>Kelloggia galioides</i>	15	8.73	0.2	25

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## ***Populus trichocarpa* Alliance**

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**Common Name:** Black cottonwood forest Alliance

**NVC Alliance Code:** A3743. *Fraxinus latifolia* - *Populus balsamifera* ssp. *trichocarpa* - *Alnus* spp. Riparian Forest Alliance

### **Alliance Concept**

The *Populus trichocarpa* Alliance forms an open tree canopy with an intermittent shrub understory and open herbaceous layer. It is found primarily at the bottom of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, and textures include moderately coarse, sandy loam. Elevation range is approximately 1397 – 1467 meters. The dominant tree is *Populus trichocarpa* and *Juniperus occidentalis* is characteristic. *Salix lasiolepis* and *Cornus sericea* are characteristic shrubs, and *Carex lanuginosa*, *Poa pratensis*, and *Vicia americana* are characteristic herbs.

**Diagnostic Criteria:** This alliance is characterized by an open tree canopy of *Populus trichocarpa*, which ranges from 6 to 28 percent cover. The overall tree cover ranges from 6 to 28 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Likely Tableland (M261Gh)

## **Associations**

None.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1432 m, Range 1397 – 1467 m

Aspect: SW (1), NW (1)

Slope: Mean 3 degrees, Range 1 – 5 degrees

Macro Topography: Bottom (2)

Tree Cover: Mean 14.6%, Range 6 – 28%

Shrub Cover: Mean 35%

Herb Cover: Mean 11%, Range 7 – 15%

Large Rock: Mean 9%, Range 9%

Small Rock: Mean 21%, Range 21%

Fines Cover: Mean 15.5%, Range 15 – 16%

Litter Cover: Mean 33.5%, Range 20 – 47%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): Basalt (2)

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open tree layer with an intermittent shrub understory and open herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Populus trichocarpa* in the overstory and *Juniperus occidentalis* is characteristic. Shrubs that are characteristic include *Salix lasiolepis* and *Cornus sericea*, and *Amelanchier pallida*, *Ericameria nauseosa*, *Mahonia aquifolium*, *Prunus subcordata*, *Prunus virginiana*, and *Rosa woodsii* are often present. Herbs that are characteristic include *Carex lanuginosa*, *Poa pratensis*, and *Vicia americana*.

**Dynamics:** *Populus trichocarpa* is a large, fast-growing tree that reaches 30 (–50) m in height and 200+ years in age. It has a shallow, spreading root system with lateral roots.

**Species of Interest:** None.

### **Classification Comments**

This alliance is uncommon in the study area. Stands of this alliance within the study, tend to be small and in moist or riparian settings where the soil stays moist through the growing season.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=2

### **Alliance Stand Table**

#### ***Populus trichocarpa* Alliance**

n =2

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	100	1.5	1	2
	<i>Populus trichocarpa</i>	100	17	6	28
	<i>Pinus jeffreyi</i>	50	0.2	0.2	0.2
	<i>Salix lucida</i> ssp. <i>caudata</i>	50	18	18	18
<b>Sapling</b>					
	<i>Populus trichocarpa</i>	50	7	7	7
<b>Shrub</b>					
	<i>Cornus sericea</i>	100	7.6	0.2	15
	<i>Salix lasiolepis</i>	100	15	2	28
	<i>Rosa woodsii</i>	50	0.2	0.2	0.2
	<i>Ericameria nauseosa</i>	50	0.2	0.2	0.2
	<i>Prunus virginiana</i>	50	8	8	8
	<i>Amelanchier pallida</i>	50	0.2	0.2	0.2
	<i>Mahonia aquifolium</i>	50	0.2	0.2	0.2
	<i>Prunus subcordata</i>	50	7	7	7
<b>Herb</b>					
	<i>Carex lanuginosa</i>	100	1	1	1
	<i>Poa pratensis</i>	100	0.6	0.2	1
	<i>Vicia americana</i>	100	0.2	0.2	0.2
	<i>Maianthemum stellatum</i>	50	1	1	1
	<i>Trifolium</i>	50	0.2	0.2	0.2

**Alliance Stand Table continued**

***Populus trichocarpa* Alliance**

n =2

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Tragopogon dubius</i>	50	0.2	0.2	0.2
<i>Phleum pratense</i>	50	0.2	0.2	0.2
<i>Maianthemum racemosum</i>	50	0.2	0.2	0.2
<i>Lupinus polyphyllus</i>	50	0.2	0.2	0.2
<i>Juncus arcticus</i>	50	2	2	2
<i>Achillea millefolium</i>	50	0.2	0.2	0.2
<i>Equisetum</i>	50	0.2	0.2	0.2
<i>Scirpus microcarpus</i>	50	1	1	1
<i>Corallorhiza maculata</i>	50	0.2	0.2	0.2
<i>Artemisia douglasiana</i>	50	0.2	0.2	0.2
<i>Elymus triticoides</i>	50	10	10	10



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## ***Quercus garryana* Alliance**

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**Common Name:** Oregon white oak woodland Alliance

**NVC Alliance Code:** A3328. *Quercus garryana* - *Pseudotsuga menziesii* / *Toxicodendron diversilobum* Forest & Woodland Alliance

### **Alliance Concept**

The *Quercus garryana* Alliance forms an open to intermittent tree canopy with an open shrub understory. Elevation range is approximately 1084 – 1207 meters. The dominant tree is *Quercus garryana* and *Juniperus occidentalis* is characteristic. *Cercocarpus montanus* is also characteristic as an emergent shrub in the tree layer. *Ceanothus cuneatus* is characteristic in the shrub layer, and *Rhus trilobata* is often present. Characteristic herbs include *Bromus tectorum*, *Elymus elymoides* and *Poa secunda*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent tree canopy of *Quercus garryana*, which ranges from 11 to 53 percent cover. The overall tree cover ranges from 11 to 53 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Bald Mountain - Dixie Valley (M261Gj), Big Valley Mountains (M261Gn)

## **Associations**

*Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1170 m, Range 1084 – 1207 m

Aspect: None recorded

Slope: Mean 4.5 degrees, Range 1 – 13 degrees

Macro Topography: None recorded

Tree Cover: None recorded

Shrub Cover: Mean 18.8%, Range 9 – 27%

Herb Cover: None recorded

Large Rock: 0%

Small Rock: 13%

Fines Cover: Mean 1.5%, Range 0 – 3%

Litter Cover: None recorded

Soil Texture (field assessed): None recorded

Geology (map data): None recorded

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent tree layer with a sparse to intermittent shrub layer and sparse or intermittent herbaceous understory.

**Vegetation Floristics:** The dominant tree is *Quercus garryana* and *Juniperus occidentalis* is characteristic. *Cercocarpus montanus* is also characteristic as an emergent shrub in the tree layer. *Ceanothus cuneatus* is characteristic in the shrub layer, and *Rhus trilobata* is often present. Herbs that are characteristic include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Alyssum desertorum*, *Bromus arvensis*, *Epilobium brachycarpum*, *Pseudoroegneria spicata*, and *Taeniatherum caput-medusae* are often present.

**Species of Interest:** None.

## **Classification Comments**

This alliance is uncommon in the study area.

**Classification Confidence:** High

## **Conservation Status Rank**



Global: G4 State: S4

## References

Lee 2004, NPS-SEKI 2009

Total Sample Size Used for Description: N=4

## Alliance Stand Table

### ***Quercus garryana* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Quercus garryana</i>	100	34.5	11	53
	<i>Cercocarpus montanus</i>	75	11	8	15
	<i>Juniperus occidentalis</i>	75	17	3	35
	<i>Quercus kelloggii</i>	50	2.5	1	4
	<i>Prunus</i>	25	1	1	1
	<i>Pinus sabiniana</i>	25	2	2	2
<b>Shrub</b>					
	<i>Ceanothus cuneatus</i>	100	11.5	2	21
	<i>Rhus trilobata</i>	50	14	1	27
	<i>Cercis orbiculata</i>	25	3	3	3
<b>Herb</b>					
	<i>Elymus elymoides</i>	75	3.33	1	6
	<i>Poa secunda</i>	75	6.33	1	9
	<i>Bromus tectorum</i>	75	7	1	11
	<i>Bromus arvensis</i>	50	4.5	3	6
	<i>Pseudoroegneria spicata</i>	50	2	1	3
	<i>Taeniatherum caput-medusae</i>	50	6	5	7
	<i>Epilobium brachycarpum</i>	50	1	1	1
	<i>Alyssum desertorum</i>	50	1	1	1
	<i>Poa bulbosa</i>	25	4	4	4
	<i>Ventenata dubia</i>	25	29	29	29
	<i>Lagophylla ramosissima</i>	25	6	6	6
	<i>Hesperolinon micranthum</i>	25	1	1	1
	<i>Galium aparine</i>	25	2	2	2
	<i>Danthonia unispicata</i>	25	1	1	1
	<i>Microsteris gracilis</i>	25	2	2	2
	<i>Collinsia parryi</i>	25	1	1	1
	<i>Phlox longifolia</i>	25	1	1	1
	<i>Elymus triticoides</i>	25	2	2	2

**Alliance Stand Table continued**

***Quercus garryana* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Bromus diandrus</i>	25	8	8	8
	<i>Achnatherum thurberianum</i>	25	4	4	4
	<i>Collinsia parviflora</i>	25	1	1	1

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## ***Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Association**

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**Common Name:** Oregon Oak / Buck Brush / Blue Fescue

**NVC Association Code:** C EGL000930, *Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Woodland

**Alliance:** *Quercus garryana* Alliance

### **Association Concept**

The *Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Association forms an open to intermittent tree canopy with an open shrub understory and herbaceous layer. Elevations range from approximately 1084 to 1207 meters. The dominant tree is *Quercus garryana*, and *Juniperus occidentalis* is characteristic. *Cercocarpus montanus* is also characteristic as an emergent shrub in the tree layer. *Ceanothus cuneatus* is characteristic in the shrub layer, and *Rhus trilobata* is often present. Characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent tree canopy of *Quercus garryana*, which ranges from 11 to 53 percent cover, with an open shrub understory of *Ceanothus cuneatus*, which ranges from 2 to 21 percent cover. The overall tree cover is approximately 11 to 53 percent, and the overall shrub cover is 9 to 27 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1170 m, Range 1084 – 1207 m

Aspect: None recorded

Slope: Mean 4.5 degrees, Range 1 – 13 degrees

Macro Topography: None recorded

Tree Cover: None recorded

Shrub Cover: Mean 18.8%, Range 9 – 27%

Herb Cover: None recorded

Large Rock: 0%

Small Rock: 13%

Fines Cover: Mean 1.5%, Range 0 – 3%

Litter Cover: None recorded

Soil Texture (field assessed): None recorded

Geology (map data): None recorded

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent tree layer with an open shrub understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Quercus garryana* and *Juniperus occidentalis* is characteristic. *Cercocarpus montanus* is also characteristic as an emergent shrub in the tree layer. *Ceanothus cuneatus* is characteristic in the shrub layer, and *Rhus trilobata* is often present. Herbs that are characteristic include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Alyssum desertorum*, *Bromus arvensis*, *Epilobium brachycarpum*, *Pseudoroegneria spicata*, and *Taeniatherum caput-medusae* are often present.

**Species of Interest:** None.

### **Classification Comments**

This association is uncommon in the study area and more data is needed to thoroughly describe this association.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Lee 2004, NPS-SEKI 2009

**Total Sample Size Used for Description:** N=4

### **Association Stand Table**

#### ***Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Quercus garryana</i>	100	34.5	11	53
<i>Juniperus occidentalis</i>	75	17	3	35
<i>Cercocarpus montanus</i>	75	11	8	15
<i>Quercus kelloggii</i>	50	2.5	1	4
<i>Pinus sabiniana</i>	25	2	2	2
<i>Prunus</i>	25	1	1	1
<b>Shrub</b>				
<i>Ceanothus cuneatus</i>	100	11.5	2	21
<i>Rhus trilobata</i>	50	14	1	27
<i>Cercis orbiculata</i>	25	3	3	3

**Association Stand Table continued**

***Quercus garryana* / *Ceanothus cuneatus* / *Festuca idahoensis*  
Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Elymus elymoides</i>	75	3.33	1	6
	<i>Bromus tectorum</i>	75	7	1	11
	<i>Poa secunda</i>	75	6.33	1	9
	<i>Bromus arvensis</i>	50	4.5	3	6
	<i>Pseudoroegneria spicata</i>	50	2	1	3
	<i>Alyssum desertorum</i>	50	1	1	1
	<i>Epilobium brachycarpum</i>	50	1	1	1
	<i>Taeniatherum caput-medusae</i>	50	6	5	7
	<i>Lagophylla ramosissima</i>	25	6	6	6
	<i>Poa bulbosa</i>	25	4	4	4
	<i>Achnatherum thurberianum</i>	25	4	4	4
	<i>Bromus diandrus</i>	25	8	8	8
	<i>Collinsia parryi</i>	25	1	1	1
	<i>Collinsia parviflora</i>	25	1	1	1
	<i>Danthonia unispicata</i>	25	1	1	1
	<i>Hesperolinon micranthum</i>	25	1	1	1
	<i>Elymus triticoides</i>	25	2	2	2
	<i>Microsteris gracilis</i>	25	2	2	2
	<i>Phlox longifolia</i>	25	1	1	1
	<i>Galium aparine</i>	25	2	2	2
	<i>Ventenata dubia</i>	25	29	29	29

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## ***Quercus kelloggii* Alliance**

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**Common Name:** California black oak forest Alliance

**NVC Alliance Code:** A3349. *Quercus chrysolepis* - *Quercus kelloggii* Forest & Woodland Alliance

### **Alliance Concept**

The *Quercus kelloggii* Alliance forms an open to intermittent tree canopy with an open shrub understory and herbaceous layer. It is found primarily on the upper third of north-facing slopes. Soils are derived from a variety of substrates but primarily volcanics or andesite, and soil texture is moderately coarse, sandy loam. Elevation range is approximately 1463 – 1590 meters. The dominant tree is *Quercus kelloggii*. *Juniperus occidentalis* and *Pinus jeffreyi* are often present. *Cercocarpus ledifolius* is a characteristic shrub, and commonly associated shrubs include *Amelanchier utahensis*, *Arctostaphylos patula*, *Prunus subcordata*, *Prunus virginiana*, and *Purshia tridentata*. Commonly associated herbs include *Elymus elymoides*, *Hieracium horridum*, *Crepis acuminata*, and *Wyethia mollis*.

**Diagnostic Criteria:** This alliance is characterized by an open tree canopy of *Quercus kelloggii*, which ranges from 22 to 27 percent cover. The overall tree cover ranges from 2 to 42 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Pit River Valley (M261Gg)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1516 m, Range 1463 – 1590 m

Aspect: NE (1), NW (1), Variable (1)

Slope: Mean 16.0 degrees, Range 12 – 18 degrees

Macro Topography: Upper 1/3 of slope (3)

Tree Cover: Mean 19.8%, Range 2 – 42%

Shrub Cover: Mean 14.3%, Range 5 – 24%

Herb Cover: Mean 6.3%, Range 3– 10%

Large Rock: Mean 9%, Range 4 – 14%

Small Rock: Mean 3.5%, Range 2 – 5%

Fines Cover: Mean 11.3%, Range 1 – 31%

Litter Cover: Mean 76.3%, Range 47 – 91%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): General volcanic extrusives (2), Andesite (1)

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent tree layer with an open shrub understory and herbaceous layer.

**Vegetation Floristics:** The dominant tree is *Quercus kelloggii*. *Juniperus occidentalis* and *Pinus jeffreyi* are often present. *Cercocarpus ledifolius* is a characteristic shrub, and commonly associated shrubs include *Amelanchier utahensis*, *Arctostaphylos patula*, *Prunus subcordata*, *Prunus virginiana*, and *Purshia tridentata*. *Elymus elymoides* and *Hieracium horridum* are characteristic herbs and *Crepis acuminata* and *Wyethia mollis* are often present.

**Species of Interest:** None.

### **Classification Comments**

This alliance is uncommon in the study area.

**Classification Confidence:** High



## Conservation Status Rank

Global: G4 State: S4

## References

None.

Total Sample Size Used for Description: N=3

## Alliance Stand Table

### ***Quercus kelloggii* Alliance**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Quercus kelloggii</i>	100	25.33	22	27
	<i>Pinus jeffreyi</i>	67	1	1	1
	<i>Juniperus occidentalis</i>	67	1.5	1	2
	<i>Pinus ponderosa</i>	33	48	48	48
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	67	0.6	0.2	1
	<i>Quercus kelloggii</i>	67	0.2	0.2	0.2
	<i>Pinus jeffreyi</i>	33	0.2	0.2	0.2
	<i>Pinus</i>	33	0.2	0.2	0.2
<b>Seedling</b>					
	<i>Quercus kelloggii</i>	100	1.4	0.2	3
	<i>Juniperus occidentalis</i>	100	0.47	0.2	1
	<i>Pinus</i>	33	0.2	0.2	0.2
	<i>Pinus ponderosa</i>	33	1	1	1
<b>Shrub</b>					
	<i>Cercocarpus ledifolius</i>	100	2.73	0.2	7
	<i>Amelanchier utahensis</i>	67	12	5	19
	<i>Arctostaphylos patula</i>	67	0.6	0.2	1
	<i>Prunus subcordata</i>	67	0.6	0.2	1
	<i>Prunus virginiana</i>	67	2.5	1	4
	<i>Purshia tridentata</i>	67	1.6	0.2	3
	<i>Mahonia aquifolium</i>	33	2	2	2
	<i>Amelanchier</i>	33	0.2	0.2	0.2
	<i>Ceanothus prostratus</i>	33	0.2	0.2	0.2
	<i>Prunus emarginata</i>	33	1	1	1
	<i>Ribes velutinum</i>	33	1	1	1
	<i>Symphoricarpos rotundifolius</i>	33	1	1	1
	<i>Artemisia tridentata</i>	33	0.2	0.2	0.2



**Alliance Stand Table continued**

***Quercus kelloggii* Alliance**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Elymus elymoides</i>	100	2	1	4
	<i>Hieracium horridum</i>	100	2.4	0.2	6
	<i>Crepis acuminata</i>	67	0.6	0.2	1
	<i>Wyethia mollis</i>	67	0.6	0.2	1
	<i>Woodsia oregana</i>	33	1	1	1
	<i>Elymus glaucus</i>	33	0.2	0.2	0.2
	<i>Balsamorhiza sagittata</i>	33	1	1	1
	<i>Bromus arvensis</i>	33	0.2	0.2	0.2
	<i>Bromus tectorum</i>	33	0.2	0.2	0.2
	<i>Poa secunda</i>	33	1	1	1
	<i>Cryptantha</i>	33	1	1	1
	<i>Arnica cordifolia</i>	33	1	1	1
	<i>Festuca idahoensis</i>	33	1	1	1
	<i>Kelloggia galioides</i>	33	1	1	1
	<i>Lathyrus nevadensis</i>	33	1	1	1
	<i>Linum</i>	33	0.2	0.2	0.2
	<i>Lupinus</i>	33	1	1	1
	<i>Achillea millefolium</i>	33	0.2	0.2	0.2
	<i>Pterospora andromedea</i>	33	1	1	1
	<i>Apocynum androsaemifolium</i>	33	1	1	1
	<i>Achnatherum nelsonii</i>	33	1	1	1
	<i>Claytonia exigua</i> ssp. <i>exigua</i>	33	1	1	1

## Shrub Communities

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### ***Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus* Alliance**

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**Common Name:** Utah serviceberry – birch leaf mountain mahogany – small leaf mountain mahogany scrub Alliance

**NVC Alliance Code:** A3732. *Amelanchier utahensis* - *Cercocarpus montanus* - *Cercocarpus intricatus* Shrubland Alliance

#### **Alliance Concept**

The *Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus* Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is also sparse. It is found primarily on the upper third of northeast-facing slopes to ridgetops. Soils have a coarse, loamy sand texture. Elevation range is approximately 1715 – 1980 meters. Dominant and characteristic shrubs include *Amelanchier utahensis* and *Cercocarpus montanus*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Amelanchier utahensis* with emergent *Cercocarpus montanus*. The overall shrub cover ranges from 8 to 23 percent.

#### **Local Alliance Distribution**

**Modoc Plateau:** Bald Mountain - Dixie Valley (M261Gj), Horsehead Mountain (M261Gk)

#### **Associations**

*Amelanchier utahensis* Association

*Cercocarpus montanus* / *Pseudoroegneria spicata* Association

#### **Environmental Description**

##### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1848 m, Range 1715 – 1980 m

Aspect: NE (1)

Slope: Mean 18 degrees, Range 9 – 27 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 7.5%, Range 0 – 15%

Shrub Cover: Mean 15.5%, Range 8 – 23%

Herb Cover: Mean 4%, Range 4 – 4%

Large Rock: Mean 29%, Range 29 – 29%

Small Rock: Mean 10%, Range 10 – 10%

Fines Cover: Mean 9.5%, Range 9 – 10%

Litter Cover: Mean 47%, Range 47 – 47%

Soil Texture (field assessed): Coarse, loamy sand (1)

Geology (map data): None recorded.

**Environment:** Stands of this alliance are found on xeric mountain ridges and rocky outcrops and tends to form small stands that are less than an acre in size.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open shrub layer, and the overall shrub cover ranges from 8 to 23 percent. The tree layer is typically sparse to open, and the herbaceous layer is also sparse.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Amelanchier utahensis* and *Cercocarpus montanus*.

**Species of Interest:** None.

### **Classification Comments**

This alliance has been expanded from the *Cercocarpus intricatus* Alliance that was cited in the 2009 publication A Manual of California Vegetation, Second Edition to include stands of *Amelanchier utahensis* and *Cercocarpus montanus* that occur on the Modoc Plateau. This alliance is not well sampled throughout the study area, but there is enough documentation in California to be confident about its validity.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=2

## Alliance Stand Table

### ***Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus* Alliance**

n =2

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Cercocarpus montanus</i>	50	15	15	15
	<i>Symphoricarpos rotundifolius</i>	50	1	1	1
	<i>Ribes velutinum</i>	50	0.2	0.2	0.2
	<i>Prunus virginiana</i>	50	5	5	5
	<i>Eriogonum umbellatum</i>	50	0.2	0.2	0.2
	<i>Chrysolepis sempervirens</i>	50	2	2	2
	<i>Amelanchier utahensis</i>	50	13	13	13
	<i>Prunus emarginata</i>	50	1	1	1
	<i>Artemisia arbuscula</i>	50	7	7	7
	<i>Artemisia tridentata</i>	50	0.2	0.2	0.2
	<i>Cercocarpus ledifolius</i>	50	1	1	1
	<i>Eriogonum</i>	50	1	1	1
<b>Herb</b>					
	<i>Lomatium</i>	50	1	1	1
	<i>Microsteris gracilis</i>	50	1	1	1
	<i>Muhlenbergia richardsonis</i>	50	1	1	1
	<i>Navarretia</i>	50	1	1	1
	<i>Koeleria macrantha</i>	50	1	1	1
	<i>Poa bulbosa</i>	50	6	6	6
	<i>Danthonia unispicata</i>	50	1	1	1
	<i>Poa secunda</i>	50	34	34	34
	<i>Sidalcea</i>	50	0.2	0.2	0.2
	<i>Osmorhiza occidentalis</i>	50	2	2	2
	<i>Hieracium</i>	50	1	1	1
	<i>Festuca idahoensis</i>	50	0.2	0.2	0.2
	<i>Elymus elymoides</i>	50	2	2	2
	<i>Crepis</i>	50	1	1	1
	<i>Antennaria</i>	50	2	2	2
	<i>Bromus arvensis</i>	50	5	5	5
	<i>Agastache urticifolia</i>	50	1	1	1
	<i>Ventenata dubia</i>	50	1	1	1
	<i>Collinsia parviflora</i>	50	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	50	1	1	1
	<i>Arenaria congesta</i>	50	1	1	1

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## ***Amelanchier utahensis* Association**

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**Common Name:** Pale leaved serviceberry

**NVC Association Code:** CEG001067, *Amelanchier utahensis* Shrubland

**Alliance:** *Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus*  
Alliance

### **Association Concept**

The *Amelanchier utahensis* Association forms an open shrub layer. The emergent tree layer is typically sparse to absent, and the herbaceous layer is sparse. The association is found primarily on the upper third of northeast-facing slopes to ridgetops. Soil textures include coarse, loamy sand. Elevation is approximately 1980 meters. *Amelanchier utahensis* is the dominant shrub, and characteristic shrubs include *Artemisia tridentata*, *Cercocarpus ledifolius*, *Chrysolepis sempervirens*, *Eriogonum umbellatum*, *Prunus emarginata*, *Prunus virginiana*, *Ribes velutinum*, and *Symphoricarpos rotundifolius*. Characteristic herbs include *Osmorhiza occidentalis*, *Agastache urticifolia*, *Collinsia parviflora*, *Festuca idahoensis*, *Hieracium* spp., and *Sidalcea* spp.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Amelanchier utahensis*, *Artemisia tridentata* with *Cercocarpus ledifolius*, *Chrysolepis sempervirens*, *Eriogonum umbellatum*, *Prunus emarginata*, *Prunus virginiana*, *Ribes velutinum*, and *Symphoricarpos rotundifolius* at low cover. The overall shrub cover is 23 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1980 m

Aspect: NE (1)

Slope: 27 degrees

Macro Topography: Upper 1/3 of slope to Ridgetop (1)

Tree Cover: 0%

Shrub Cover: 23%

Herb Cover: 4%

Large Rock: 29%

Small Rock: 10%

Fines Cover: 10%

Litter Cover: 47%

Soil Texture (field assessed): Coarse, loamy sand (1)

Geology (map data): None recorded

## **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover is 23 percent. The tree layer is typically sparse to absent, and the herbaceous layer is sparse.

**Vegetation Floristics:** *Amelanchier utahensis* is dominant, and characteristic shrubs include *Artemisia tridentata*, *Cercocarpus ledifolius*, *Chrysolepis sempervirens*, *Eriogonum umbellatum*, *Prunus emarginata*, *Prunus virginiana*, *Ribes velutinum*, and *Symphoricarpos rotundifolius*. The herbaceous layer typically includes *Osmorhiza occidentalis*, *Agastache urticifolia*, *Collinsia parviflora*, *Festuca idahoensis*, *Hieracium* spp., and *Sidalcea* spp.

**Species of Interest:** None.

## **Classification Comments**

This is a newly described association for California based on the work from this project. Although it was under sampled, this association is likely more common in the study area than is represented here and it is well described and common in Utah and Colorado. More data collection and analysis are necessary to fully understand the variability of this type in California and the study area.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** GNR    **State:** S1

## **References**

None.

**Total Sample Size Used for Description:** N=1

## **Association Stand Table**

### ***Amelanchier utahensis* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Chrysolepis sempervirens</i>	100	2	2	2
<i>Ribes velutinum</i>	100	0.2	0.2	0.2
<i>Prunus virginiana</i>	100	5	5	5
<i>Symphoricarpos rotundifolius</i>	100	1	1	1
<i>Cercocarpus ledifolius</i>	100	1	1	1
<i>Artemisia tridentata</i>	100	0.2	0.2	0.2

**Association Stand Table continued**

***Amelanchier utahensis* Association**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Amelanchier utahensis</i>	100	13	13	13
	<i>Prunus emarginata</i>	100	1	1	1
	<i>Eriogonum umbellatum</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Osmorhiza occidentalis</i>	100	2	2	2
	<i>Sidalcea</i>	100	0.2	0.2	0.2
	<i>Hieracium</i>	100	1	1	1
	<i>Festuca idahoensis</i>	100	0.2	0.2	0.2
	<i>Collinsia parviflora</i>	100	0.2	0.2	0.2
	<i>Agastache urticifolia</i>	100	1	1	1

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## ***Cercocarpus montanus* / *Pseudoroegneria spicata* Association**

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**Common Name:** Birch leaf mountain mahogany / bluebunch wheatgrass

**NVC Association Code:** CEG001090, *Cercocarpus montanus* / *Pseudoroegneria spicata* Shrubland

**Alliance:** *Amelanchier utahensis* – *Cercocarpus montanus* – *Cercocarpus intricatus* Alliance

### **Association Concept**

The *Cercocarpus montanus* / *Pseudoroegneria spicata* Association forms an open shrub layer. The emergent tree layer is typically open, and the herbaceous layer is sparse. Elevations are approximately 1715 meters. Dominant and characteristic shrubs include *Artemisia arbuscula*, *Eriogonum* spp., and emergent *Cercocarpus montanus*. Characteristic herbs include *Poa secunda*, *Antennaria* spp., *Arenaria congesta*, *Bromus arvensis*, *Crepis* spp., *Danthonia unispicata*, *Elymus elymoides*, *Epilobium brachycarpum*, *Koeleria macrantha*, *Lomatium*, *Microsteris gracilis*, *Muhlenbergia richardsonis*, *Navarretia*, *Poa bulbosa*, and *Ventenata dubia*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia arbuscula*, *Eriogonum* spp., and emergent *Cercocarpus montanus*. The overall shrub cover is 8 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1715 m

Aspect: None recorded

Slope: 9 degrees

Macro Topography: None recorded

Tree Cover: None recorded

Shrub Cover: 8%

Herb Cover: None recorded

Large Rock: None recorded

Small Rock: None recorded

Fines Cover: 9%

Litter Cover: None recorded

Soil Texture (field assessed): None recorded

Geology (map data): None recorded



## **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover is 8 percent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia arbuscula*, *Eriogonum* spp., and emergent *Cercocarpus montanus*. The herbaceous layer typically includes *Poa secunda*, *Antennaria* spp., *Arenaria congesta*, *Bromus arvensis*, *Crepis* spp., *Danthonia unispicata*, *Elymus elymoides*, *Epilobium brachycarpum*, *Koeleria macrantha*, *Lomatium* spp., *Microsteris gracilis*, *Muhlenbergia richardsonis*, *Navarretia* spp., *Poa bulbosa*, and *Ventenata dubia*.

**Species of Interest:** None.

## **Classification Comments**

This is a newly described association for California based on the work from this project. Although it was under sampled, this association is likely more common in the study area than is represented here and was previously described from Utah, Colorado, and Wyoming. More data collection and analysis is necessary to fully understand the variability of this type in California and the study area.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=1

## **Association Stand Table**

### ***Cercocarpus montanus* / *Pseudoroegneria spicata* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Cercocarpus montanus</i>	100	15	15	15
<b>Shrub</b>				
<i>Artemisia arbuscula</i>	100	7	7	7
<i>Eriogonum</i>	100	1	1	1
<b>Herb</b>				
<i>Koeleria macrantha</i>	100	1	1	1
<i>Muhlenbergia richardsonis</i>	100	1	1	1

**Association Stand Table continued**

***Cercocarpus montanus* / *Pseudoroegneria spicata* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Ventenata dubia</i>	100	1	1	1
<i>Poa secunda</i>	100	34	34	34
<i>Navarretia</i>	100	1	1	1
<i>Microsteris gracilis</i>	100	1	1	1
<i>Lomatium</i>	100	1	1	1
<i>Elymus elymoides</i>	100	2	2	2
<i>Danthonia unispicata</i>	100	1	1	1
<i>Poa bulbosa</i>	100	6	6	6
<i>Crepis</i>	100	1	1	1
<i>Epilobium brachycarpum</i>	100	1	1	1
<i>Bromus arvensis</i>	100	5	5	5
<i>Arenaria congesta</i>	100	1	1	1
<i>Antennaria</i>	100	2	2	2

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## ***Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance**

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**Common Name:** Green leaf manzanita – Pinemat manzanita chaparral Alliance

**NVC Alliance Code:** A0788. *Arctostaphylos patula* - *Arctostaphylos nevadensis*  
Shrubland Alliance

### **Alliance Concept**

The *Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. It is found primarily from middle to upper slopes and on ridgetops at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, igneous, or andesite, and textures are widely variable, but typically loams. Elevation range is approximately 1525 – 2380 meters. Dominant and characteristic shrubs include *Arctostaphylos patula*, *Cercocarpus ledifolius*, and *Ceanothus velutinus*. *Poa secunda* is often present in the herbaceous layer.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Arctostaphylos patula* with *Cercocarpus ledifolius* at sparse to open cover. The overall shrub cover ranges from 25 to 65 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Arctostaphylos patula* Association

*Arctostaphylos patula* – *Ceanothus velutinus* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1953 m, Range 1525 – 2380 m

Aspect: NE (4), SE (3), SW (2), Variable (2), NW (2)

Slope: Mean 15.5 degrees, Range 3 – 35 degrees

Macro Topography: Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (3), Upper 1/3 of slope to Ridgetop (3), High slope (2), Midslope (1), Ridge summit, crest (1)

Tree Cover: Mean 0.7%, Range 0 – 3%

Shrub Cover: Mean 45.4%, Range 25 – 65%

Herb Cover: Mean 7.2%, Range 0 – 18%

Large Rock: Mean 6.6%, Range 0 – 28%

Small Rock: Mean 30%, Range 4 – 65%

Fines Cover: Mean 27.2%, Range 10 – 50%

Litter Cover: Mean 19.6%, Range 2 – 52%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Loamy Sand (2), Medium to very fine, loamy sand (2), Coarse, loamy sand (1), Medium loam (1), Medium sand (1), Medium silt loam (1), Sandy Loam (1)

Geology (map data): General volcanic extrusives (7), Igneous (type unknown) (1), Andesite (1)

**Environment:** Stands of this alliance are found in post-fire areas in a matrix with conifer forests at the upper elevations of the study area.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to continuous shrub layer, and the overall shrub cover ranges from 25 to 65 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Arctostaphylos patula*, *Cercocarpus ledifolius*, and *Ceanothus velutinus*. *Poa secunda* is often present in the herbaceous layer.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G5    **State:** S3S4

## **References**

Barbour 1988, DiPaolo et al. 2015, Keeler-Wolf et al. 2003b, Solomeshch et al. 2013

**Total Sample Size Used for Description:** N=13

## **Alliance Stand Table**

### ***Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance**

n =13

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Abies concolor</i>	38	1.84	0.2	3
<i>Juniperus occidentalis</i>	15	1	1	1
<b>Sapling</b>				
<i>Abies concolor</i>	31	0.4	0.2	1
<i>Juniperus occidentalis</i>	23	0.63	0.2	1.5
<i>Pinus jeffreyi</i>	15	0.2	0.2	0.2
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	15	0.6	0.2	1
<b>Shrub</b>				
<i>Arctostaphylos patula</i>	100	24.5	3.5	53
<i>Cercocarpus ledifolius</i>	100	2.55	0.2	7
<i>Ceanothus velutinus</i>	69	11.08	3	20
<i>Prunus emarginata</i>	38	5.84	0.2	15

## Alliance Stand Table continued

### **Arctostaphylos patula – Arctostaphylos nevadensis Alliance**

n =13

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Purshia tridentata</i>	31	1.55	1	2
	<i>Ceanothus prostratus</i>	31	1.6	0.2	4
	<i>Artemisia tridentata</i>	31	1.1	0.2	3
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	23	1.37	0.2	3.7
	<i>Eriogonum polyanthum</i>	23	1.3	0.2	3.5
	<i>Ribes velutinum</i>	23	0.47	0.2	1
	<i>Symphoricarpos</i>	23	0.47	0.2	1
	<i>Symphoricarpos rotundifolius</i>	23	0.2	0.2	0.2
	<i>Ribes cereum</i>	15	0.2	0.2	0.2
	<i>Chrysothamnus</i>	15	0.2	0.2	0.2
	<i>Chrysothamnus viscidiflorus</i>	15	2.85	2	3.7
	<i>Eriogonum umbellatum</i>	15	1.1	0.2	2
	<i>Holodiscus discolor</i>	15	0.2	0.2	0.2
	<i>Prunus subcordata</i>	15	2	2	2
<b>Herb</b>					
	<i>Poa secunda</i>	54	0.97	0.2	3
	<i>Elymus elymoides</i>	38	0.88	0.2	2
	<i>Bromus tectorum</i>	31	1.5	1	2
	<i>Castilleja applegatei</i>	31	2.12	1.5	3.5
	<i>Crepis acuminata</i>	31	0.73	0.2	1.5
	<i>Pseudoroegneria spicata</i>	31	14.05	0.2	37.5
	<i>Wyethia mollis</i>	31	0.6	0.2	1
	<i>Phacelia hastata</i>	23	0.47	0.2	1
	<i>Viola purpurea</i>	23	0.47	0.2	1
	<i>Phlox diffusa</i>	23	1.13	0.2	3
	<i>Penstemon</i>	23	0.2	0.2	0.2
	<i>Crepis</i>	23	0.27	0.2	0.4
	<i>Carex rossii</i>	23	0.47	0.2	1
	<i>Achnatherum occidentale</i>	23	0.2	0.2	0.2
	<i>Achillea millefolium</i>	23	0.47	0.2	1
	<i>Stephanomeria minor</i> var. <i>minor</i>	15	0.2	0.2	0.2
	<i>Senecio</i>	15	0.6	0.2	1
	<i>Phacelia humilis</i>	15	0.2	0.2	0.2
	<i>Penstemon humilis</i>	15	0.2	0.2	0.2
	<i>Packera cana</i>	15	0.2	0.2	0.2
	<i>Machaeranthera canescens</i>	15	0.6	0.2	1

**Alliance Stand Table continued**

***Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance**

n =13

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Lupinus arbustus</i>	15	1.1	0.2	2
<i>Eriophyllum lanatum</i>	15	0.2	0.2	0.2
<i>Tragopogon dubius</i>	15	0.6	0.2	1
<i>Castilleja pilosa</i>	15	0.2	0.2	0.2
<i>Antennaria geyeri</i>	15	0.2	0.2	0.2
<i>Gayophytum diffusum</i>	15	0.6	0.2	1
<i>Clarkia rhomboidea</i>	15	0.6	0.2	1
<i>Epilobium brachycarpum</i>	15	0.6	0.2	1
<i>Linanthus pungens</i>	15	1.1	0.2	2
<i>Festuca idahoensis</i>	15	3	3	3

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## ***Arctostaphylos patula* Association**

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**Common Name:** Greenleaf manzanita

**NVC Association Code:** CEG005820, *Arctostaphylos patula* Sierran Chaparral Shrubland

**Alliance:** *Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance

### **Association Concept**

The *Arctostaphylos patula* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily from mid-slopes to ridge summits or crests at northeastern and northwestern aspects. Soils are derived from general volcanic extrusives and andesite, and textures include sandy loam, coarse loamy sand, loamy sand, and medium loam. Elevations range from approximately 1525 to 2350 meters. Dominant and characteristic shrubs include *Arctostaphylos patula* and *Cercocarpus ledifolius*. *Poa secunda* is a characteristic herb, and *Elymus elymoides* is often present.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Arctostaphylos patula* with *Cercocarpus ledifolius* at sparse to open cover. The overall shrub cover ranges from 28 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1741 m, Range 1525 – 2350 m

Aspect: NE (4), NW (1), Variable (1)

Slope: Mean 16.3 degrees, Range 3 – 35 degrees

Macro Topography: High slope (1), Middle to Upper 1/3 of slope (1), Midslope (1), Ridge summit, crest (1), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 2%, Range 0 – 3%

Shrub Cover: Mean 44%, Range 28 – 60%

Herb Cover: Mean 6.1%, Range 0. – 18%

Large Rock: Mean 1.2%, Range 0.2 – 2.2%

Small Rock: Mean 8.4%, Range 4 – 11%

Fines Cover: Mean 25%, Range 15 – 40%

Litter Cover: Mean 25.1%, Range 2 – 52%

Soil Texture (field assessed): Sandy Loam (1), Coarse, loamy sand (1), Loamy Sand (1), Medium loam (1), Medium to very fine, sandy loam (1)

Geology (map data): General volcanic extrusives (3), Andesite (1)



## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 28 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Arctostaphylos patula* and *Cercocarpus ledifolius*. The herbaceous layer typically includes *Poa secunda*, and *Elymus elymoides* is often present.

**Dynamics:** *Arctostaphylos patula* is strongly dominant in the shrub layer though many other shrub species may be present at low cover including *Cercocarpus ledifolius*, *Purshia tridentata*, and/or *Ceanothus velutinus*.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G5? **State:** N

## **References**

Barbour 1988, DiPaolo et al. 2015, Keeler-Wolf et al. 2003b, Solomeshch et al. 2013

**Total Sample Size Used for Description:** N=6

## **Association Stand Table**

### ***Arctostaphylos patula* Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	33	1	1	1
	<i>Abies concolor</i>	17	1	1	1
	<i>Calocedrus decurrens</i>	17	3	3	3
	<i>Pinus ponderosa</i>	17	0.2	0.2	0.2
<b>Sapling</b>					
	<i>Pinus</i>	17	0.2	0.2	0.2
	<i>Pinus ponderosa</i>	17	0.2	0.2	0.2
	<i>Juniperus occidentalis</i>	17	0.2	0.2	0.2
	<i>Abies concolor</i>	17	0.2	0.2	0.2

## Association Stand Table continued

### **Arctostaphylos patula Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	17	1	1	1
<b>Shrub</b>					
	<i>Arctostaphylos patula</i>	100	30.08	3.5	53
	<i>Cercocarpus ledifolius</i>	100	2.73	0.2	7
	<i>Purshia tridentata</i>	50	1.73	1.5	2
	<i>Prunus emarginata</i>	33	3	1	5
	<i>Symphoricarpos</i>	33	0.6	0.2	1
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	33	1.95	0.2	3.7
	<i>Eriogonum polyanthum</i>	33	0.2	0.2	0.2
	<i>Ceanothus velutinus</i>	33	5.35	3	7.7
	<i>Chrysothamnus viscidiflorus</i>	17	2	2	2
	<i>Symphoricarpos rotundifolius</i>	17	0.2	0.2	0.2
	<i>Ribes velutinum</i>	17	1	1	1
	<i>Ribes cereum</i>	17	0.2	0.2	0.2
	<i>Ericameria bloomeri</i>	17	0.2	0.2	0.2
	<i>Chrysothamnus</i>	17	0.2	0.2	0.2
	<i>Ceanothus prostratus</i>	17	0.2	0.2	0.2
	<i>Artemisia tridentata</i>	17	3	3	3
	<i>Amelanchier utahensis</i>	17	1	1	1
	<i>Amelanchier</i>	17	2	2	2
	<i>Prunus subcordata</i>	17	2	2	2
<b>Herb</b>					
	<i>Poa secunda</i>	83	1.12	0.2	3
	<i>Elymus elymoides</i>	67	0.6	0.2	1
	<i>Castilleja applegatei</i>	50	2.33	1.5	3.5
	<i>Carex rossii</i>	50	0.47	0.2	1
	<i>Achnatherum occidentale</i>	50	0.2	0.2	0.2
	<i>Achillea millefolium</i>	33	0.6	0.2	1
	<i>Bromus tectorum</i>	33	1.75	1.5	2
	<i>Clarkia rhomboidea</i>	33	0.6	0.2	1
	<i>Crepis acuminata</i>	33	1.25	1	1.5
	<i>Gayophytum diffusum</i>	33	0.6	0.2	1
	<i>Machaeranthera canescens</i>	33	0.6	0.2	1
	<i>Packera cana</i>	33	0.2	0.2	0.2
	<i>Pseudoroegneria spicata</i>	33	9.25	1	17.5
	<i>Hieracium horridum</i>	17	1	1	1

## Association Stand Table continued

### **Arctostaphylos patula Association**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Phlox diffusa</i>	17	0.2	0.2	0.2
	<i>Lupinus</i>	17	1	1	1
	<i>Madia gracilis</i>	17	0.2	0.2	0.2
	<i>Monardella odoratissima</i>	17	0.2	0.2	0.2
	<i>Penstemon humilis</i>	17	0.2	0.2	0.2
	<i>Penstemon speciosus</i>	17	0.2	0.2	0.2
	<i>Festuca idahoensis</i>	17	3	3	3
	<i>Phacelia heterophylla</i>	17	0.2	0.2	0.2
	<i>Koeleria macrantha</i>	17	0.2	0.2	0.2
	<i>Potentilla glandulosa</i>	17	0.2	0.2	0.2
	<i>Senecio</i>	17	1	1	1
	<i>Stephanomeria minor</i> var. <i>minor</i>	17	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	17	1	1	1
	<i>Ventenata dubia</i>	17	0.2	0.2	0.2
	<i>Wyethia mollis</i>	17	1	1	1
	<i>Phacelia hastata</i>	17	1	1	1
	<i>Elymus</i>	17	0.2	0.2	0.2
	<i>Antennaria luzuloides</i>	17	0.2	0.2	0.2
	<i>Arabis holboellii</i>	17	1	1	1
	<i>Balsamorhiza sagittata</i>	17	5	5	5
	<i>Calochortus macrocarpus</i>	17	1	1	1
	<i>Calystegia occidentalis</i>	17	1	1	1
	<i>Clarkia lasenensis</i>	17	0.2	0.2	0.2
	<i>Lomatium bicolor</i>	17	1	1	1
	<i>Collomia linearis</i>	17	1	1	1
	<i>Linanthus pungens</i>	17	0.2	0.2	0.2
	<i>Erigeron filifolius</i>	17	0.2	0.2	0.2
	<i>Eriogonum nudum</i>	17	0.2	0.2	0.2
	<i>Eriophyllum lanatum</i>	17	0.2	0.2	0.2
	<i>Geum triflorum</i>	17	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	17	1	1	1
	<i>Antennaria geyeri</i>	17	0.2	0.2	0.2
	<i>Collinsia grandiflora</i>	17	1	1	1
	<i>Erigeron inornatus</i>	17	0.2	0.2	0.2

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## ***Arctostaphylos patula* – *Ceanothus velutinus* Association**

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**Common Name:** Greenleaf Manzanita – Tobacco Brush

**NVC Association Code:** CEG000957, *Arctostaphylos patula* / *Ceanothus velutinus* - *Ceanothus prostratus* Shrubland

**Alliance:** *Arctostaphylos patula* – *Arctostaphylos nevadensis* Alliance

### **Association Concept**

The *Arctostaphylos patula* – *Ceanothus velutinus* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily from middle to upper slopes, ridgetops, and high slopes at southeastern, southwestern, and northwestern aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives or igneous (type unknown), and textures include medium to very fine loamy sand, medium to very fine sandy loam, loamy sand, and medium sand. Elevations range from approximately 1663 to 2380 meters. Dominant and characteristic shrubs include *Arctostaphylos patula*, *Ceanothus velutinus*, and *Cercocarpus ledifolius*. The most commonly associated emergent tree at sparse cover is *Abies concolor*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Arctostaphylos patula* with *Ceanothus velutinus* and *Cercocarpus ledifolius* at sparse to open cover. The overall shrub cover ranges from 25 to 65 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 2135 m, Range 1663 – 2380 m

Aspect: SE (3), SW (2), Variable (1), NW (1)

Slope: Mean 14.9 degrees, Range 6 – 23 degrees

Macro Topography: Middle to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (2), Upper 1/3 of slope (2), High slope (1)

Tree Cover: Mean 1%, Range 0 – 3%

Shrub Cover: Mean 46.3%, Range 25 – 65%

Herb Cover: Mean 8%, Range 0 – 15%

Large Rock: Mean 9.3%, Range 0 – 28%

Small Rock: Mean 40.8%, Range 5 – 65%

Fines Cover: Mean 29.1%, Range 10 – 50%

Litter Cover: Mean 14.9%, Range 3 – 40%

Soil Texture (field assessed): Medium to very fine, loamy sand (2), Medium to very fine, sandy loam (2), Loamy Sand (1), Medium sand (1), Medium silt loam (1)

Geology (map data): General volcanic extrusives (4), Igneous (type unknown) (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 25 to 65 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Arctostaphylos patula*, *Ceanothus velutinus*, and *Cercocarpus ledifolius*. The tree layer is emergent and typically or often includes *Abies concolor*.

**Dynamics:** *Arctostaphylos patula* and *Ceanothus velutinus* co-dominate in the shrub layer with *Cercocarpus ledifolius*, *Prunus emarginata*, and/or *Ceanothus prostratus*.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G3    **State:** Y

### **References**

None.

**Total Sample Size Used for Description:** N=7

### **Association Stand Table**

#### ***Arctostaphylos patula* – *Ceanothus velutinus* Association**

n =7

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Abies concolor</i>	57	2.05	0.2	3
	<i>Pinus jeffreyi</i>	14	0.2	0.2	0.2
	<i>Pinus contorta</i>	14	0.2	0.2	0.2
<b>Sapling</b>					
	<i>Abies concolor</i>	43	0.47	0.2	1
	<i>Pinus jeffreyi</i>	29	0.2	0.2	0.2
	<i>Juniperus occidentalis</i>	29	0.85	0.2	1.5
<b>Seedling</b>					
	<i>Abies concolor</i>	14	0.2	0.2	0.2
	<i>Juniperus occidentalis</i>	14	0.2	0.2	0.2

## Association Stand Table continued

### **Arctostaphylos patula – Ceanothus velutinus Association**

n =7

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Pinus jeffreyi</i>	14	0.2	0.2	0.2
<b>Shrub</b>				
<i>Cercocarpus ledifolius</i>	100	2.39	0.2	6
<i>Arctostaphylos patula</i>	100	19.71	7	45
<i>Ceanothus velutinus</i>	100	12.71	5	20
<i>Prunus emarginata</i>	43	7.73	0.2	15
<i>Ceanothus prostratus</i>	43	2.07	0.2	4
<i>Artemisia tridentata</i>	43	0.47	0.2	1
<i>Ribes velutinum</i>	29	0.2	0.2	0.2
<i>Holodiscus discolor</i>	29	0.2	0.2	0.2
<i>Eriogonum umbellatum</i>	29	1.1	0.2	2
<i>Symphoricarpos rotundifolius</i>	29	0.2	0.2	0.2
<i>Prunus subcordata</i>	14	2	2	2
<i>Symphoricarpos</i>	14	0.2	0.2	0.2
<i>Ribes cereum</i>	14	0.2	0.2	0.2
<i>Ribes</i>	14	0.2	0.2	0.2
<i>Purshia tridentata</i>	14	1	1	1
<i>Prunus virginiana</i>	14	2	2	2
<i>Chrysothamnus viscidiflorus</i>	14	3.7	3.7	3.7
<i>Chrysothamnus</i>	14	0.2	0.2	0.2
<i>Eriogonum polyanthum</i>	14	3.5	3.5	3.5
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	14	0.2	0.2	0.2
<i>Ericameria nauseosa</i>	14	2	2	2
<b>Herb</b>				
<i>Penstemon</i>	43	0.2	0.2	0.2
<i>Crepis</i>	43	0.27	0.2	0.4
<i>Viola purpurea</i>	43	0.47	0.2	1
<i>Wyethia mollis</i>	43	0.47	0.2	1
<i>Phacelia humilis</i>	29	0.2	0.2	0.2
<i>Bromus tectorum</i>	29	1.25	1	1.5
<i>Castilleja pilosa</i>	29	0.2	0.2	0.2
<i>Crepis acuminata</i>	29	0.2	0.2	0.2
<i>Lupinus</i>	29	1.1	0.2	2
<i>Phacelia hastata</i>	29	0.2	0.2	0.2
<i>Phlox diffusa</i>	29	1.6	0.2	3
<i>Poa secunda</i>	29	0.6	0.2	1

## Association Stand Table continued

### **Arctostaphylos patula – Ceanothus velutinus Association**

n =7

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Pseudoroegneria spicata</i>	29	18.85	0.2	37.5
<i>Antennaria geyeri</i>	14	0.2	0.2	0.2
<i>Antennaria dimorpha</i>	14	3	3	3
<i>Achillea millefolium</i>	14	0.2	0.2	0.2
<i>Arabis</i>	14	0.2	0.2	0.2
<i>Linanthus pungens</i>	14	2	2	2
<i>Silene</i>	14	0.2	0.2	0.2
<i>Cryptantha</i>	14	0.2	0.2	0.2
<i>Crepis occidentalis</i>	14	1	1	1
<i>Elymus elymoides</i>	14	2	2	2
<i>Zigadenus</i>	14	0.2	0.2	0.2
<i>Tragopogon dubius</i>	14	0.2	0.2	0.2
<i>Eriophyllum lanatum</i>	14	0.2	0.2	0.2
<i>Stephanomeria minor</i> var. <i>minor</i>	14	0.2	0.2	0.2
<i>Arenaria</i>	14	0.5	0.5	0.5
<i>Senecio</i>	14	0.2	0.2	0.2
<i>Collinsia sparsiflora</i>	14	0.2	0.2	0.2
<i>Poa bulbosa</i>	14	0.2	0.2	0.2
<i>Phlox</i>	14	3	3	3
<i>Epilobium brachycarpum</i>	14	0.2	0.2	0.2
<i>Bromus carinatus</i>	14	1	1	1
<i>Stipa</i>	14	0.2	0.2	0.2
<i>Arenaria congesta</i>	14	1	1	1
<i>Phacelia mutabilis</i>	14	0.2	0.2	0.2
<i>Castilleja</i>	14	0.2	0.2	0.2
<i>Elymus glaucus</i>	14	1	1	1
<i>Festuca idahoensis</i>	14	3	3	3
<i>Lomatium</i>	14	1	1	1
<i>Lupinus argenteus</i>	14	0.2	0.2	0.2
<i>Madia citriodora</i>	14	1	1	1
<i>Mimulus</i>	14	0.2	0.2	0.2
<i>Penstemon humilis</i>	14	0.2	0.2	0.2
<i>Castilleja applegatei</i>	14	1.5	1.5	1.5

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## ***Artemisia arbuscula* Alliance**

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**Common Name:** Low Sage Alliance

**NVC Alliance Code:** A3219. *Artemisia arbuscula* ssp. *arbuscula* Steppe & Shrubland Alliance

### **Alliance Concept**

The *Artemisia arbuscula* Alliance forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to continuous. It is found primarily on bottom land, slopes, and ridgetops and at all aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, general volcanic extrusives, or igneous, and textures are widely variable. Elevation range is approximately 1282 – 1956 meters. The dominant and characteristic shrub is *Artemisia arbuscula*. Dominant and characteristic herbs include *Elymus elymoides*, *Poa secunda*, *Blepharipappus scaber*, and *Bromus tectorum*.

**Diagnostic Criteria:** This alliance is characterized by a sparse to intermittent shrub layer of *Artemisia arbuscula*. The overall shrub cover ranges from 3 to 45 percent.



## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg)

## **Associations**

*Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association

*Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association

*Artemisia arbuscula* / *Festuca idahoensis* Association

*Artemisia arbuscula* / *Poa secunda* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1560 m, Range 1282 – 1956 m

Aspect: NE (57), NW (25), SW (20), SE (15), Flat (12), Variable (2)

Slope: Mean 3.6 degrees, Range 0 – 73 degrees

Macro Topography: Other (36), Lower 1/3 of slope (26), Middle 1/3 of slope (17), Ridge top (9), Upper 1/3 of slope (8), Bottom to Lower 1/3 of slope (7), Lower to Middle 1/3 of slope (5), Middle to Upper 1/3 of slope (5), Bottom (4), Edge of basin or wetland (4), Ridge summit, crest (3), Upper 1/3 of slope to Ridgetop (2), Bench (2), Lower 1/3 of slope to Ridegetop (1), Entire slope (1)

Tree Cover: Mean 0.5%, Range 0 – 4%

Shrub Cover: Mean 15.4%, Range 3 – 45%

Herb Cover: Mean 16.1%, Range 3 – 60%

Large Rock: Mean 8.5%, Range 0 – 45%

Small Rock: Mean 33.9%, Range 0 – 83%

Fines Cover: Mean 35.8%, Range 0 – 95%

Litter Cover: Mean 10.7%, Range 0.2 – 50%

Soil Texture (field assessed): Fine silty clay (14), Fine clay (13), Fine sandy clay (13), Moderately fine sandy clay loam (10), Moderately fine clay loam (9), Moderately coarse, sandy loam (7), Medium silt (4), Medium to very fine, sandy loam (3), Moderately fine silty clay loam (2), Medium loam (1), Medium silt loam (1), Clay, (class unknown) (1), Coarse, loamy sand (1)

Geology (map data): Andesite (50), Basalt (33), General volcanic extrusives (17), Igneous (type unknown) (5), Mixed alluvium (2), Ash (of any origin) (2), Clayey alluvium (1), Pumice (1), Silty alluvium (1)

**Environment:** This association is found at the lower elevations within the study area and is found on smectitic clay soils that crack and swell throughout the year with the ebb and flow of precipitation. This association can have a particularly diverse herbaceous layer.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 3 to 45 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to continuous.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia arbuscula*. The herbaceous layer typically includes *Elymus elymoides*, *Poa secunda*, *Blepharipappus scaber*, and *Bromus tectorum*.

**Dynamics:** *Artemisia arbuscula* typically grows on flats or gradual slopes and can tolerate more impervious soils than the various subspecies of *A. tridentata*. Stands occur on shallow, rocky, heavy clayey volcanic soils that are wet in the spring and dry out quickly in the summer

**Species of Interest:** *Balsamorhiza serrata*, *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Hackelia cusickii*, *Lomatium canbyi*, *Penstemon cinicola*, *Phlox muscoides*, *Polygala subspinoso*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S4

### **References**

Keeler-Wolf et al. 2003b, Stillman 1980

**Total Sample Size Used for Description:** N=192

## Alliance Stand Table

### ***Artemisia arbuscula* Alliance**

n =192

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	24	1.38	0.2	3
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	15	0.74	0.2	4
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	13	0.52	0.2	1
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	100	13.97	0.2	45
	<i>Eriogonum sphaerocephalum</i>	27	1.17	0.2	6
	<i>Purshia tridentata</i>	21	1.83	0.2	12
<b>Herb</b>					
	<i>Poa secunda</i>	91	6.06	0.2	24
	<i>Elymus elymoides</i>	79	1.8	0.2	10
	<i>Bromus tectorum</i>	61	7.36	0.2	58
	<i>Blepharipappus scaber</i>	53	1.6	0.2	30
	<i>Bromus arvensis</i>	43	3.06	0.2	24
	<i>Arenaria congesta</i>	28	1.22	0.2	5
	<i>Festuca idahoensis</i>	27	5.07	0.2	33
	<i>Antennaria dimorpha</i>	25	1.34	0.2	8
	<i>Epilobium brachycarpum</i>	25	1.09	0.2	5
	<i>Elymus caput-medusae</i>	24	6.55	0.2	58
	<i>Lomatium</i>	21	1.28	0.2	5
	<i>Pseudoroegneria spicata</i>	20	5.56	0.2	32
	<i>Trifolium macrocephalum</i>	20	1.21	0.2	5
	<i>Balsamorhiza hookeri</i>	19	1.65	0.2	3
	<i>Danthonia unispicata</i>	18	1.48	0.2	10
	<i>Phlox hoodii</i>	17	1.34	0.2	3
	<i>Epilobium minutum</i>	17	0.63	0.2	4
	<i>Bromus briziformis</i>	16	1.84	0.2	20
	<i>Eriophyllum lanatum</i>	15	0.78	0.2	3
	<i>Microsteris gracilis</i>	14	1.15	0.2	7
	<i>Nothocalais troximoides</i>	14	0.78	0.2	1
	<i>Perideridia bolanderi</i>	13	1.38	0.2	5
	<i>Lomatium bicolor</i>	13	2.38	0.2	35
	<i>Achnatherum thurberianum</i>	12	1.8	0.2	10
	<i>Ventenata dubia</i>	12	6.93	0.2	30

**Alliance Stand Table continued**

***Artemisia arbuscula* Alliance**

n =192

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Arenaria kingii</i>	11	1.47	0.2	10
<i>Collinsia parviflora</i>	11	0.92	0.2	3
<i>Phoenicaulis cheiranthoides</i>	11	0.82	0.2	1
<i>Arabis holboellii</i>	11	0.89	0.2	1
<i>Lomatium triternatum</i>	11	1.82	0.2	7

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## ***Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association**

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**Common Name:** Low sagebrush / slender buckwheat

**NVC Association Code:** CEG003483, *Artemisia arbuscula* ssp. *arbuscula* / *Eriogonum microthecum* Shrubland

**Alliance:** *Artemisia arbuscula* Alliance

### **Association Concept**

The *Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to intermittent. The association is found primarily at the edges of basins and wetlands or on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite or basalt, and textures include fine sandy clay, fine silty clay, and moderately fine sandy clay loam. Elevations range from approximately 1286 to 1615 meters. The dominant and characteristic shrub is *Artemisia arbuscula* and *Eriogonum sphaerocephalum* is often present. Dominant and characteristic herbs include *Blepharipappus scaber*, *Elymus elymoides*, and *Poa secunda*, and those often present are *Balsamorhiza hookeri*, *Festuca idahoensis*, *Phlox hoodii*, and *Trifolium macrocephalum*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia arbuscula*. The overall shrub cover ranges from 3 to 25 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1486 m, Range 1286 – 1615 m

Aspect: NE (19), SE (3), SW (2), NW (1)

Slope: Mean 1.4 degrees, Range 0 – 8 degrees

Macro Topography: Other (16), Bench (2), Lower 1/3 of slope (2), Middle 1/3 of slope (2), Upper 1/3 of slope (1), Ridge summit, crest (1), Edge of basin or wetland (1)

Tree Cover: Mean 0%, Range 0 – 3%

Shrub Cover: Mean 13.9%, Range 3 – 25%

Herb Cover: Mean 16.5%, Range 3 – 43%

Large Rock: Mean 5.5%, Range 0 – 13%

Small Rock: Mean 42%, Range 25 – 57%

Fines Cover: Mean 39.8%, Range 3 – 70%

Litter Cover: Mean 13.5%, Range 0.2 – 40%

Soil Texture (field assessed): Fine sandy clay (2), Fine silty clay (1), Moderately fine sandy clay loam (1)

Geology (map data): Andesite (21), Basalt (2), General volcanic extrusives (1), Igneous (type unknown) (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 3 to 25 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia arbuscula*, and *Eriogonum sphaerocephalum* is often present. *Blepharipappus scaber*, *Elymus elymoides*, and *Poa secunda* are characteristic in the herbaceous layer, and *Balsamorhiza hookeri*, *Festuca idahoensis*, *Phlox hoodii*, and *Trifolium macrocephalum* are often present.

**Species of Interest:** *Erigeron elegantulus*, *Lomatium canbyi*

### **Classification Comments**

There is some ecological and floristic similarity between this association and the *Eriogonum* spp. / *Poa secunda* Alliance.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G2G3? **State:** Y

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=27

### **Association Stand Table**

#### ***Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association**

n =27

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	26	1.57	1	3
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	15	0.8	0.2	1

# Association Stand Table continued

## ***Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association**

n =27

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	100	13.15	6	24
	<i>Eriogonum sphaerocephalum</i>	67	1.56	1	6
	<i>Eriogonum umbellatum</i>	19	5.4	1	10
	<i>Purshia tridentata</i>	11	1.67	1	2
<b>Herb</b>					
	<i>Poa secunda</i>	96	3.16	0.2	10
	<i>Elymus elymoides</i>	89	1.89	0.2	10
	<i>Blepharipappus scaber</i>	78	2.5	0.2	30
	<i>Trifolium macrocephalum</i>	59	1.2	0.2	3
	<i>Phlox hoodii</i>	56	1.4	1	3
	<i>Festuca idahoensis</i>	52	2.09	0.2	3
	<i>Balsamorhiza hookeri</i>	52	1.71	1	3
	<i>Danthonia unispicata</i>	48	2	1	10
	<i>Antennaria dimorpha</i>	44	1.5	1	3
	<i>Bromus arvensis</i>	44	1.27	0.2	3
	<i>Nothocalais troximoides</i>	44	1	1	1
	<i>Phoenicaulis cheiranthoides</i>	44	1	1	1
	<i>Arabis holboellii</i>	33	1	1	1
	<i>Crepis bakeri</i>	30	2.12	1	10
	<i>Epilobium minutum</i>	30	1	1	1
	<i>Bromus tectorum</i>	30	1.75	1	4
	<i>Arenaria kingii</i>	30	2.62	1	10
	<i>Antennaria rosea</i>	30	1.5	1	3
	<i>Lomatium bicolor</i>	30	1	1	1
	<i>Arenaria congesta</i>	26	1.46	0.2	3
	<i>Collinsia parviflora</i>	26	1	1	1
	<i>Epilobium brachycarpum</i>	26	1	1	1
	<i>Lomatium nevadense</i>	26	1	1	1
	<i>Elymus caput-medusae</i>	26	2.74	0.2	7
	<i>Perideridia bolanderi</i>	22	1.33	1	3
	<i>Idahoia scapigera</i>	22	0.87	0.2	1
	<i>Lomatium nudicaule</i>	22	1.33	1	3
	<i>Arabis</i>	19	0.84	0.2	1
	<i>Lomatium macrocarpum</i>	19	0.84	0.2	1
	<i>Penstemon roezlii</i>	19	1	1	1

**Association Stand Table continued**

***Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)*  
Association**

n =27

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Erigeron austinae</i>	19	1	1	1
<i>Stenotus stenophyllus</i>	19	1	1	1
<i>Microsteris gracilis</i>	19	1.4	1	3
<i>Crepis occidentalis</i>	15	1	1	1
<i>Draba verna</i>	15	1	1	1
<i>Fritillaria</i>	15	1	1	1
<i>Viola beckwithii</i>	15	1.3	0.2	3
<i>Vulpia microstachys</i>	15	1	1	1
<i>Allium acuminatum</i>	11	0.73	0.2	1
<i>Polygonum polygaloides</i>	11	1	1	1
<i>Polygonum</i>	11	0.73	0.2	1
<i>Perideridia oregana</i>	11	0.73	0.2	1
<i>Lomatium triternatum</i>	11	1	1	1
<i>Lomatium</i>	11	1.67	1	3
<i>Collinsia grandiflora</i>	11	1	1	1
<i>Antennaria stenophylla</i>	11	1.67	1	3
<i>Chamerion angustifolium</i>	11	1	1	1



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## ***Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association**

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**Common Name:** Low sagebrush / brome – medusa head

**NVC Association Code:** CEG005472, *Artemisia arbuscula* ssp. *arbuscula* / *Bromus tectorum* Ruderal Shrubland

**Alliance:** *Artemisia arbuscula* Alliance

### **Association Concept**

The *Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association forms a sparse to open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily from low slopes to ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt or general volcanic extrusives, and textures are widely variable. Elevations range from approximately 1282 to 1615 meters. The dominant and characteristic shrub is *Artemisia arbuscula*. Dominant and characteristic herbs include *Bromus arvensis*, *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Elymus caput-medusae*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia arbuscula*. The overall shrub cover ranges from 5 to 26 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1479 m, Range 1282 – 1615 m

Aspect: NW (5), NE (4), SE (3), Flat (2), SW (1)

Slope: Mean 3.5 degrees, Range 0 – 15 degrees

Macro Topography: Lower 1/3 of slope (6), Middle 1/3 of slope (4), Ridge top (2), Upper 1/3 of slope (2), Middle to Upper 1/3 of slope (1)

Tree Cover: Mean 0%, Range 0 – 1%

Shrub Cover: Mean 11.7%, Range 5 – 26%

Herb Cover: Mean 19.5%, Range 6 – 33%

Large Rock: Mean 11.7%, Range 0 – 45%

Small Rock: Mean 32.4%, Range 0 – 75%

Fines Cover: Mean 32.2%, Range 0.2 – 95%

Litter Cover: Mean 14.9%, Range 2 – 50%

Soil Texture (field assessed): Moderately fine clay loam (4), Fine clay (3), Moderately coarse, sandy loam (2), Medium silt loam (1), Moderately fine sandy clay loam

(1), Fine sandy clay (1), Coarse, loamy sand (1), Moderately fine silty clay loam (1), Medium silt (1)

Geology (map data): Basalt (6), General volcanic extrusives (4)

**Environment:** Stands are in a degraded state from clearing, grazing, fire, or other disturbances (although the mode of disturbance may not be obvious).

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 5 to 26 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia arbuscula*. The herbaceous layer typically includes *Bromus arvensis*, *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Elymus caput-medusae*.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNA    **State:** SNA

### **References**

None.

**Total Sample Size Used for Description:** N=19

### **Association Stand Table**

#### ***Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association**

n =19

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	21	0.6	0.2	1
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	32	0.67	0.2	3
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	16	0.47	0.2	1

# Association Stand Table continued

## ***Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae* Association**

n =19

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	100	9.89	1	26
	<i>Eriogonum sphaerocephalum</i>	26	0.96	0.2	4
	<i>Artemisia tridentata</i>	11	3.1	0.2	6
	<i>Ericameria nauseosa</i>	11	0.6	0.2	1
	<i>Peraphyllum ramosissimum</i>	11	1	1	1
<b>Herb</b>					
	<i>Elymus caput-medusae</i>	74	8.96	0.2	25
	<i>Bromus tectorum</i>	68	7.85	1	35
	<i>Elymus elymoides</i>	68	0.98	0.2	3
	<i>Bromus arvensis</i>	68	4.91	0.2	24
	<i>Poa secunda</i>	63	2.62	0.2	11
	<i>Ventenata dubia</i>	47	12.8	0.2	30
	<i>Eriophyllum lanatum</i>	32	0.33	0.2	1
	<i>Perideridia bolanderi</i>	26	0.2	0.2	0.2
	<i>Pseudoroegneria spicata</i>	26	1.24	0.2	2
	<i>Blepharipappus scaber</i>	21	0.6	0.2	1
	<i>Arabis holboellii</i>	21	0.4	0.2	1
	<i>Arenaria congesta</i>	21	0.2	0.2	0.2
	<i>Clarkia gracilis</i>	21	1.3	0.2	3
	<i>Lactuca serriola</i>	21	0.2	0.2	0.2
	<i>Lupinus microcarpus</i>	21	0.2	0.2	0.2
	<i>Arenaria aculeata</i>	21	0.8	0.2	1
	<i>Vulpia microstachys</i>	16	0.8	0.2	2
	<i>Festuca idahoensis</i>	16	1.07	0.2	2
	<i>Draba verna</i>	16	1.13	0.2	3
	<i>Balsamorhiza hookeri</i>	16	0.73	0.2	1
	<i>Agoseris grandiflora</i>	16	0.2	0.2	0.2
	<i>Zigadenus paniculatus</i>	16	0.2	0.2	0.2
	<i>Alyssum desertorum</i>	11	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	11	0.2	0.2	0.2
	<i>Lomatium</i>	11	0.6	0.2	1
	<i>Agoseris</i>	11	0.2	0.2	0.2
	<i>Penstemon roezlii</i>	11	0.2	0.2	0.2
	<i>Phlox caespitosa</i>	11	0.6	0.2	1
	<i>Poa bulbosa</i>	11	1.6	0.2	3

**Association Stand Table continued**

***Artemisia arbuscula* / *Bromus* spp. – *Elymus caput-medusae*  
Association**

n =19

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Descurainia sophia</i>	11	3	1	5
	<i>Lomatium bicolor</i>	11	0.2	0.2	0.2

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## ***Artemisia arbuscula* / *Festuca idahoensis* Association**

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**Common Name:** Low sagebrush / Idaho fescue

**NVC Association Code:**

**Alliance:** *Artemisia arbuscula* Alliance

### **Association Concept**

The *Artemisia arbuscula* / *Festuca idahoensis* Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to intermittent. The association is found primarily on the lower third of slopes, summits, crests, and ridge tops at northeastern, northwestern, or southwestern aspects. Soils are derived primarily from andesite or basalt and have a fine silty clay texture. Elevations range from approximately 1335 to 1843 meters. The dominant and characteristic shrub is *Artemisia arbuscula*. *Juniperus occidentalis* is a commonly associated emergent tree. Dominant and characteristic herbs include *Festuca idahoensis*, *Elymus elymoides*, and *Poa secunda*, and those often present are *Blepharipappus scaber* and *Bromus tectorum*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia arbuscula*. The overall shrub cover ranges from 10 to 31 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1536 m, Range 1335 – 1843 m

Aspect: NE (6), NW (3), SW (2)

Slope: Mean 1.5 degrees, Range 0 – 6 degrees

Macro Topography: Other (7), Lower 1/3 of slope (3), Ridge summit, crest (1), Ridge top (1)

Tree Cover: Mean 9%, Range 0 – 15%

Shrub Cover: Mean 15.6%, Range 10 – 31%

Herb Cover: Mean 23.3%, Range 10 – 60%

Large Rock: Mean 4.3%, Range 0 – 11%

Small Rock: Mean 20.8%, Range 3 – 38%

Fines Cover: Mean 39.1%, Range 9 – 92%

Litter Cover: Mean 11.5%, Range 2 – 30%

Soil Texture (field assessed): Fine silty clay (2)

Geology (map data): Andesite (10), Basalt (1)

**Environment:** Stands occur in the northern portion of the study area at higher elevations where it is cooler and there is more precipitation.

## **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 10 to 31 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia arbuscula*. The tree layer is emergent and typically includes *Juniperus occidentalis*. *Festuca idahoensis*, *Elymus elymoides*, and *Poa secunda* are characteristic herbs, and those that are often present include *Blepharipappus scaber* and *Bromus tectorum*.

**Species of Interest:** *Hackelia cusickii*, *Lomatium canbyi*

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** S3

## **References**

Stillman 1980

**Total Sample Size Used for Description:** N=15

## **Association Stand Table**

### ***Artemisia arbuscula* / *Festuca idahoensis* Association**

n =15

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	60	1.89	1	3
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	27	0.8	0.2	1
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	100	13.07	3	26
	<i>Eriogonum sphaerocephalum</i>	47	0.89	0.2	1
	<i>Purshia tridentata</i>	40	1.53	0.2	3
	<i>Artemisia tridentata</i>	13	1.5	1	2
<b>Herb</b>					
	<i>Festuca idahoensis</i>	100	12.33	3	33
	<i>Elymus elymoides</i>	93	1.8	0.2	10
	<i>Poa secunda</i>	80	5.42	3	12

# Association Stand Table continued

## ***Artemisia arbuscula* / *Festuca idahoensis* Association**

n =15

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Blepharipappus scaber</i>	73	1.73	1	5
<i>Bromus tectorum</i>	67	2.12	0.2	7
<i>Antennaria dimorpha</i>	40	2.33	1	3
<i>Arenaria congesta</i>	40	2	1	3
<i>Bromus arvensis</i>	40	1.5	1	3
<i>Lomatium nudicaule</i>	40	1	1	1
<i>Trifolium macrocephalum</i>	40	1	1	1
<i>Danthonia unispicata</i>	33	2.2	1	3
<i>Erigeron austini</i>	33	1	1	1
<i>Phlox hoodii</i>	27	1	1	1
<i>Pseudoroegneria spicata</i>	27	6.75	1	21
<i>Arabis holboellii</i>	27	1	1	1
<i>Achnatherum thurberianum</i>	27	1.5	1	3
<i>Castilleja pilosa</i>	27	1	1	1
<i>Lomatium triternatum</i>	27	0.8	0.2	1
<i>Epilobium brachycarpum</i>	27	1.25	1	2
<i>Bromus briziformis</i>	27	0.8	0.2	1
<i>Balsamorhiza hookeri</i>	27	1.25	1	2
<i>Eriophyllum lanatum</i>	20	1.67	1	3
<i>Koeleria macrantha</i>	20	1	1	1
<i>Microsteris gracilis</i>	20	1	1	1
<i>Lomatium nevadense</i>	20	1	1	1
<i>Crepis bakeri</i>	20	1	1	1
<i>Idahoia scapigera</i>	13	0.6	0.2	1
<i>Penstemon</i>	13	1	1	1
<i>Zigadenus venenosus</i>	13	1	1	1
<i>Phoenicautis cheiranthoides</i>	13	1	1	1
<i>Phlox caespitosa</i>	13	1.6	0.2	3
<i>Phlox</i>	13	2	1	3
<i>Nothocalais troximoides</i>	13	1	1	1
<i>Lomatium dissectum</i>	13	1	1	1
<i>Lomatium bicolor</i>	13	1.6	0.2	3
<i>Frasera albicaulis</i>	13	1	1	1
<i>Draba verna</i>	13	1	1	1
<i>Collinsia parviflora</i>	13	0.6	0.2	1
<i>Arenaria kingii</i>	13	2	1	3

**Association Stand Table continued**

***Artemisia arbuscula* / *Festuca idahoensis* Association**

**n =15**

<b>Lifeform Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Herb</b>				
<i>Arenaria aculeata</i>	13	1	1	1
<i>Antennaria rosea</i>	13	1	1	1
<i>Allium acuminatum</i>	13	0.6	0.2	1
<i>Lomatium canbyi</i>	13	1	1	1



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## ***Artemisia arbuscula* / *Poa secunda* Association**

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**Common Name:** Low sagebrush / pine bluegrass

**NVC Association Code:** CEGJ001411, *Artemisia arbuscula* ssp. *arbuscula* / *Poa secunda* Shrub Grassland

**Alliance:** *Artemisia arbuscula* Alliance

### **Association Concept**

The *Artemisia arbuscula* / *Poa secunda* Association forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent. The association is found primarily on the edge of basins or wetlands, slopes, and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, or general volcanic extrusives and textures are widely variable. Elevations range from approximately 1325 to 1956 meters. The dominant and characteristic shrub is *Artemisia arbuscula*. Dominant and characteristic herbs include *Elymus elymoides* and *Poa secunda*, and those often present are *Blepharipappus scaber* and *Bromus tectorum*.

**Diagnostic Criteria:** This association is characterized by a sparse to intermittent shrub layer of *Artemisia arbuscula* with a sparse to open herbaceous layer of *Poa secunda* and *Elymus elymoides*. The overall shrub cover ranges from 3 to 45 percent, and the overall herbaceous cover ranges from 3 to 50 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1591 m, Range 1325 – 1956 m

Aspect: NE (28), NW (16), SW (14), Flat (10), SE (9), Variable (2), Not recorded (1)

Slope: Mean 4.2 degrees, Range 0 – 73 degrees

Macro Topography: Lower 1/3 of slope (14), Other (13), Middle 1/3 of slope (11), Bottom to Lower 1/3 of slope (7), Ridge top (6), Lower to Middle 1/3 of slope (5), Upper 1/3 of slope (5), Middle to Upper 1/3 of slope (4), Bottom (4), Edge of basin or wetland (3), Upper 1/3 of slope to Ridgetop (2), Lower 1/3 of slope to Ridgetop (1), Entire slope (1), Ridge summit, crest (1), Not recorded (1)

Tree Cover: Mean 0.3%, Range 0 – 10%

Shrub Cover: Mean 16.3%, Range 3 – 45%

Herb Cover: Mean 14.4%, Range 3 – 50%

Large Rock: Mean 8.3%, Range 0 – 38%

Small Rock: Mean 34.4%, Range 0 – 83%

Fines Cover: Mean 35%, Range 0 – 94%

Litter Cover: Mean 9%, Range 0.2 – 50%

Soil Texture (field assessed): Fine silty clay (11), Fine clay (10), Fine sandy clay (9), Moderately fine sandy clay loam (8), Moderately fine clay loam (5), Moderately coarse, sandy loam (5), Medium silt (3), Medium to very fine, sandy loam (3), Not recorded (2), Clay, (class unknown) (1), Moderately fine silty clay loam (1), Medium loam (1)

Geology (map data): Basalt (23), Andesite (19), General volcanic extrusives (12), Igneous (type unknown) (4), Ash (of any origin) (2), Mixed alluvium (2), Pumice (1), Silty alluvium (1), Clayey alluvium (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 3 to 45 percent. The tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia arbuscula*. *Elymus elymoides* and *Poa secunda* are characteristic herbs, and *Blepharipappus scaber* and *Bromus tectorum* are often present.

**Dynamics:** The herbaceous layer is dominated by native grasses such as *Poa secunda* and *Pseudoroegneria spicata* although non-native annual grasses can exceed cover of natives.

**Species of Interest:** *Balsamorhiza serrata*, *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Hackelia cusickii*, *Lomatium canbyi*, *Penstemon cinicola*, *Phlox muscoides*, *Polygala subspinosus*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

None.

**Total Sample Size Used for Description:** N=130

## Association Stand Table

### ***Artemisia arbuscula* / *Poa secunda* Association**

n =130

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	20	1.27	0.2	3
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	15	0.77	0.2	4
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	11	0.37	0.2	1
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	100	14.89	0.2	45
	<i>Purshia tridentata</i>	23	1.56	0.2	6
	<i>Eriogonum sphaerocephalum</i>	16	0.98	0.2	3
	<i>Ericameria nauseosa</i>	11	2.43	0.2	11
<b>Herb</b>					
	<i>Poa secunda</i>	95	7.06	0.2	24
	<i>Elymus elymoides</i>	78	1.88	0.2	10
	<i>Bromus tectorum</i>	65	8.5	0.2	58
	<i>Blepharipappus scaber</i>	51	1.35	0.2	11
	<i>Bromus arvensis</i>	40	3.19	0.2	22
	<i>Arenaria congesta</i>	28	1.16	0.2	5
	<i>Epilobium brachycarpum</i>	27	1.14	0.2	5
	<i>Lomatium</i>	27	1.26	0.2	5
	<i>Antennaria dimorpha</i>	24	1.14	0.2	8
	<i>Pseudoroegneria spicata</i>	23	6.13	0.2	32
	<i>Elymus caput-medusae</i>	19	6.52	0.2	58
	<i>Bromus briziformis</i>	18	2.18	0.2	20
	<i>Epilobium minutum</i>	18	0.35	0.2	2
	<i>Festuca idahoensis</i>	15	2.17	0.2	12
	<i>Eriophyllum lanatum</i>	13	0.75	0.2	3
	<i>Achnatherum thurberianum</i>	13	1.96	0.2	10
	<i>Microsteris gracilis</i>	13	1.15	0.2	7
	<i>Trifolium macrocephalum</i>	13	1.29	0.2	5
	<i>Danthonia unispicata</i>	12	0.84	0.2	3
	<i>Balsamorhiza hookeri</i>	12	1.88	0.2	3
	<i>Phlox hoodii</i>	11	1.37	0.2	3

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## ***Artemisia cana* Alliance**

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**Common Name:** Silver sagebrush wet shrubland Alliance

**NVC Alliance Code:** A2557. *Artemisia cana* Wet Shrubland Alliance

### **Alliance Concept**

The *Artemisia cana* Alliance forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse or absent and the herbaceous layer is sparse to continuous. It is found primarily on the edge of basins or wetlands and the bottom to middle third of slopes at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, or clayey alluvium and textures include a wide variety of clays. Elevation range is approximately 1362 – 1942 meters. The dominant and characteristic shrub is *Artemisia cana*. *Poa secunda* is often present in the herbaceous layer.

**Diagnostic Criteria:** This alliance is characterized by a sparse to intermittent shrub layer of *Artemisia cana*. The overall shrub cover ranges from 0.2 to 34 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi)

### **Associations**

*Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1590 m, Range 1362 – 1942 m

Aspect: NE (23), Flat (21), NW (4), SE (3)

Slope: Mean 0.5 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (22), Edge of basin or wetland (7), Other (7), Bottom to Lower 1/3 of slope (6), Lower 1/3 of slope (4), Middle 1/3 of slope (2)

Tree Cover: Mean 0%, Range 0 – 0.2%

Shrub Cover: Mean 15.7%, Range 0 – 34%

Herb Cover: Mean 24.1%, Range 1 – 100%

Large Rock: Mean 1.9%, Range 0 – 42%

Small Rock: Mean 5.6%, Range 0 – 47%

Fines Cover: Mean 65.0%, Range 1 – 98%

Litter Cover: Mean 18.6%, Range 0 – 80%

Soil Texture (field assessed): Fine silty clay (18), Moderately fine silty clay loam (4), Fine clay (4), Medium silt (4), Fine sandy clay (1), Clay, (class unknown) (1)

Geology (map data): Andesite (16), General volcanic extrusives (4), Clayey alluvium (3), Igneous (type unknown) (2), Silty alluvium (2), Pumice (1), Basalt (1)

**Environment:** Stands of this alliance occur on mesic sites including basin bottoms, stream terraces, swales, and flats.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 0.2 to 34 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to continuous.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia cana*. *Poa secunda* is often present in the herbaceous layer.

**Dynamics:** *Artemisia cana* (ssp. *bolanderi*) is strongly dominant in the shrub layer. *Chrysothamnus* species may co-dominate in disturbed versions of this type. Herb layer may include vernal pool indicators such as *Psilocarphus brevissimus* and *Navarretia*

spp. or more generally moist herbs such as *Hordeum brachyantherum*, *Muhlenbergia richardsonis*, and *Juncus* spp.

**Species of Interest:** *Astragalus agrestis*, *Lomatium canbyi*, *Pogogyne floribunda*

**Classification Comments**

None.

**Classification Confidence:** High

**Conservation Status Rank**

**Global:** G5    **State:** S3

**References**

Manning and Padgett 1995, Smith 1998b

**Total Sample Size Used for Description:** N=55

**Alliance Stand Table**

***Artemisia cana* Alliance**

n =55

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia cana</i>	100	15.64	0.2	40
	<i>Ericameria nauseosa</i>	24	3.34	0.2	20
<b>Herb</b>					
	<i>Poa secunda</i>	53	4.31	0.2	30
	<i>Elymus elymoides</i>	40	0.97	0.2	3
	<i>Epilobium brachycarpum</i>	33	1.04	0.2	3
	<i>Blepharipappus scaber</i>	31	0.95	0.2	3
	<i>Psilocarphus brevissimus</i>	29	2.46	0.2	7
	<i>Deschampsia danthonioides</i>	29	7.09	0.2	60
	<i>Bromus arvensis</i>	29	3.61	0.2	20
	<i>Bromus tectorum</i>	29	2.08	0.2	10
	<i>Elymus caput-medusae</i>	27	1.32	0.2	3
	<i>Ventenata dubia</i>	22	3.01	0.2	11
	<i>Hordeum brachyantherum</i>	20	2.36	0.2	15
	<i>Juncus arcticus</i>	18	4.36	0.2	20
	<i>Navarretia</i>	18	1.02	0.2	4
	<i>Microsteris gracilis</i>	16	0.87	0.2	3

## Alliance Stand Table continued

### ***Artemisia cana* Alliance**

n =55

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Polygonum polygaloides</i>	16	1	0.2	5
	<i>Poa nevadensis</i>	15	7.5	1	30
	<i>Camissonia tanacetifolia</i>	15	1.23	0.2	5
	<i>Plagiobothrys</i>	15	1	0.2	5
	<i>Juncus</i>	15	4.33	0.2	20
	<i>Lomatium</i>	13	2.23	0.2	10
	<i>Iva axillaris</i>	13	1.31	0.2	2
	<i>Lupinus</i>	13	0.46	0.2	2
	<i>Navarretia intertexta</i>	13	3.51	0.2	10
	<i>Epilobium minutum</i>	13	3.89	0.2	20
	<i>Epilobium campestre</i>	13	0.83	0.2	3
	<i>Elymus triticoides</i>	11	1.4	0.2	4
	<i>Downingia</i>	11	0.33	0.2	1
	<i>Lotus wrangelianus</i>	11	7.33	1	10
	<i>Plagiobothrys leptocladus</i>	11	0.2	0.2	0.2
	<i>Lomatium bicolor</i>	11	9	1	30

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## ***Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association**

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**Common Name:** Silver Sagebrush / Pine Bluegrass

**NVC Association Code:** CEG001548, *Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Wet Shrubland

**Alliance:** *Artemisia cana* Alliance

### **Association Concept**

The *Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse to absent, and the herbaceous layer is sparse to continuous. The association is found primarily at the edge of basins or wetlands, and from slope bottoms to mid-slopes at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, or clayey alluvium, and textures include fine silty clay, medium silt, moderately fine silty clay loam, and fine clay. Elevations range from approximately 1362 to 1942 meters. The dominant and characteristic shrub is *Artemisia cana*. *Poa secunda* is often present in the herbaceous layer.

**Diagnostic Criteria:** This association is characterized by a sparse to intermittent shrub layer of *Artemisia cana*. The overall shrub cover ranges from 0.2 to 34 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1591 m, Range 1362 – 1942 m

Aspect: NE (20), Flat (16), NW (3), SE (3)

Slope: Mean 0.5 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (19), Other (6), Edge of basin or wetland (6), Bottom to Lower 1/3 of slope (4), Lower 1/3 of slope (3), Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 16%, Range 0 – 34%

Herb Cover: Mean 23.9%, Range 1 – 83%

Large Rock: Mean 0.7%, Range 0 – 7%

Small Rock: Mean 3.7%, Range 0 – 47%

Fines Cover: Mean 66%, Range 1 – 98%

Litter Cover: Mean 20%, Range 0 – 80%

Soil Texture (field assessed): Fine silty clay (15), Medium silt (4), Moderately fine silty clay loam (4), Fine clay (2), Not recorded (1), Clay, (class unknown) (1)



Geology (map data): Andesite (14), General volcanic extrusives (3), Clayey alluvium (2), Silty alluvium (2), Basalt (1), Igneous (type unknown) (1), Pumice (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 0.2 to 34 percent. The tree layer is typically sparse to absent, and the herbaceous layer is sparse to continuous.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia cana*. *Poa secunda* is often present in the herbaceous layer.

**Species of Interest:** *Astragalus agrestis*, *Lomatium canbyi*, *Pogogyne floribunda*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Manning and Padgett 1995, Smith 1998b

**Total Sample Size Used for Description:** N=44

### **Association Stand Table**

#### ***Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association**

n =44

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Artemisia cana</i>	100	16.3	0.2	40
<i>Ericameria nauseosa</i>	18	3.78	0.2	20
<b>Herb</b>				
<i>Poa secunda</i>	50	5.07	0.2	30
<i>Elymus elymoides</i>	45	1.01	0.2	3
<i>Epilobium brachycarpum</i>	34	1.03	0.2	3
<i>Psilocarphus brevissimus</i>	34	2.56	0.2	7
<i>Blepharipappus scaber</i>	32	1	0.2	3
<i>Deschampsia danthonioides</i>	30	8.03	0.2	60
<i>Bromus arvensis</i>	27	2.48	0.2	10
<i>Bromus tectorum</i>	27	2.32	0.2	10

# Association Stand Table continued

## ***Artemisia cana* (ssp. *bolanderi*, ssp. *viscidula*) / *Poa secunda* Association**

n =44

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Elymus caput-medusae</i>	25	1.33	0.2	3
	<i>Ventenata dubia</i>	25	3.85	0.2	11
	<i>Hordeum brachyantherum</i>	23	2.58	0.2	15
	<i>Juncus</i>	20	4.4	0.2	20
	<i>Microsteris gracilis</i>	20	0.87	0.2	3
	<i>Navarretia</i>	20	1.11	0.2	4
	<i>Juncus arcticus</i>	18	5.3	0.2	20
	<i>Polygonum polygaloides</i>	18	1.1	0.2	5
	<i>Navarretia intertexta</i>	16	3.51	0.2	10
	<i>Poa nevadensis</i>	16	8.43	1	30
	<i>Plagiobothrys</i>	14	0.33	0.2	1
	<i>Camissonia tanacetifolia</i>	14	1.13	0.2	5
	<i>Epilobium campestre</i>	14	0.8	0.2	3
	<i>Lupinus</i>	14	0.2	0.2	0.2
	<i>Iva axillaris</i>	11	1.24	0.2	2
	<i>Carex</i>	11	0.52	0.2	1
	<i>Epilobium minutum</i>	11	5.2	1	20
	<i>Elymus triticoides</i>	11	0.88	0.2	2
	<i>Lomatium</i>	11	2.88	0.2	10
	<i>Lomatium bicolor</i>	11	10.6	1	30
	<i>Muhlenbergia filiformis</i>	11	0.36	0.2	1
	<i>Pogogyne floribunda</i>	11	0.52	0.2	1
	<i>Camassia quamash</i>	11	1.6	1	3
	<i>Downingia</i>	11	0.36	0.2	1

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## ***Artemisia nova* Alliance**

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**Common Name:** Black sagebrush scrub Alliance

**NVC Alliance Code:** A3222. *Artemisia nova* Steppe & Shrubland Alliance

### **Alliance Concept**

The *Artemisia nova* Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. Stands of this alliance are found primarily on valley bottoms, lower slopes, and ridgetops at all aspects. Soils are generally derived from basalt or general volcanic extrusives and have a variety of clay textures. Elevation range is approximately 1350 – 1926 meters. *Artemisia nova* is the dominant and characteristic shrub. *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda* are characteristic herbs, and *Blepharipappus scaber* is often present.

**Diagnostic Criteria:** This alliance is characterized by a sparse to open shrub layer of *Artemisia nova*. The overall shrub cover ranges from 3 to 25 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm), Likely Tableland (M261Gh)

### **Associations**

*Artemisia nova* / *Poa secunda* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1563 m, Range 1350 – 1926 m

Aspect: NE (2), NW (2), SW (1), SE (1)

Slope: Mean 5.3 degrees, Range 1 – 15 degrees

Macro Topography: Middle 1/3 of slope (3), Bottom to Lower 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1), Lower 1/3 of slope (1)

Tree Cover: Mean 1.2%, Range 2 – 11%

Shrub Cover: Mean 10.2%, Range 3 – 25%

Herb Cover: Mean 9.5%, Range 4 – 23%

Large Rock: Mean 17.4%, Range 2 – 46%

Small Rock: Mean 46.5%, Range 21 – 72%

Fines Cover: Mean 18.8%, Range 2 – 50%

Litter Cover: Mean 3.2%, Range 1 – 6%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Fine clay (2), Fine silty clay (1), Fine sandy clay (1)

Geology (map data): Basalt (3), General volcanic extrusives (2)

**Environment:** Stands of this alliances are found in the driest habitats of all the *Artemisia* dominated alliances.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to open shrub layer, and the overall shrub cover ranges from 3 to 25 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia nova*. Stands may have sparse, emergent *Juniperus occidentalis* in the tree layer. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and often includes *Blepharipappus scaber*.

**Dynamics:** *Artemisia nova* is a dwarf evergreen shrub with low, spreading branches. The plants are flat-topped and strongly aromatic. It reproduces by light, wind-dispersed seeds. *A. nova* may be confused with *A. arbuscula* when plants lack flowers or fruits, but the dark green glands on the leaf surface are a helpful characteristic for identification.

**Species of Interest:** *Penstemon sudans*

**Classification Comments**

None.

**Classification Confidence:** High

**Conservation Status Rank**

**Global:** G4   **State:** S3

**References**

None.

**Total Sample Size Used for Description:** N=11

**Alliance Stand Table**

***Artemisia nova* Alliance**

n =11

Lifeform	Botanical Name	Con	Avg	Min	Max
Tree					
	<i>Juniperus occidentalis</i>	18	6.5	2	11
Shrub					
	<i>Artemisia nova</i>	100	9.09	2	25
	<i>Artemisia arbuscula</i>	45	1.84	0.2	5
	<i>Purshia tridentata</i>	18	0.6	0.2	1
	<i>Eriogonum sphaerocephalum</i>	18	0.6	0.2	1
	<i>Tetradymia glabrata</i>	18	0.2	0.2	0.2
Herb					
	<i>Elymus elymoides</i>	100	2.05	0.2	10
	<i>Bromus tectorum</i>	100	8.93	0.2	49
	<i>Poa secunda</i>	91	4.44	0.2	11
	<i>Blepharipappus scaber</i>	55	0.2	0.2	0.2
	<i>Pseudoroegneria spicata</i>	45	2.44	0.2	9
	<i>Antennaria dimorpha</i>	45	0.76	0.2	3
	<i>Bromus arvensis</i>	45	7.24	0.2	23
	<i>Bromus briziformis</i>	36	0.4	0.2	1
	<i>Epilobium brachycarpum</i>	36	4.8	0.2	14
	<i>Elymus caput-medusae</i>	36	4.8	0.2	10
	<i>Phlox stansburyi</i>	27	0.2	0.2	0.2
	<i>Achnatherum thurberianum</i>	27	1.67	1	2
	<i>Lomatium</i>	27	2	1	3

**Alliance Stand Table continued**

***Artemisia nova* Alliance**

n =11

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Balsamorhiza hookeri</i>	27	0.2	0.2	0.2
	<i>Festuca idahoensis</i>	18	1	1	1
	<i>Orobancha fasciculata</i>	18	0.6	0.2	1
	<i>Eriophyllum lanatum</i>	18	0.6	0.2	1
	<i>Crepis acuminata</i>	18	0.6	0.2	1
	<i>Collinsia parviflora</i>	18	1	1	1
	<i>Arenaria congesta</i>	18	7.1	0.2	14
	<i>Tragopogon dubius</i>	18	0.6	0.2	1

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## ***Artemisia nova* / *Poa secunda* Association**

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**Common Name:** Black Sagebrush / Pine Bluegrass

**NVC Association Code:** CEG001423, *Artemisia nova* / *Poa secunda* Shrubland

**Alliance:** *Artemisia nova* Alliance

### **Association Concept**

The *Artemisia nova* / *Poa secunda* Association forms an open shrub layer. The herbaceous layer is sparse to open. The association is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt or general volcanic extrusives, and textures include moderately fine sandy clay loam, fine clay, fine sandy clay, and fine silty clay. Elevations range from approximately 1350 to 1642 meters. The dominant and characteristic shrub is *Artemisia nova*, and *Artemisia arbuscula* is often present. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Blepharipappus scaber* is often present.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia nova*. The overall shrub cover ranges from 3 to 12 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1521 m, Range 1350 – 1642 m

Aspect: NW (2), NE (2), SE (1), SW (1)

Slope: Mean 5.6 degrees, Range 1 – 15 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope to Ridgetop (1), Lower 1/3 of slope (1), Bottom to Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 8%, Range 3 – 12%

Herb Cover: Mean 9.5%, Range 4 – 23%

Large Rock: Mean 16.9%, Range 2 – 46%

Small Rock: Mean 49.7%, Range 21 – 72%

Fines Cover: Mean 23%, Range 3 – 50%

Litter Cover: Mean 3.2%, Range 1 – 6%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Fine clay (2), Fine sandy clay (1), Fine silty clay (1)

Geology (map data): Basalt (3), General volcanic extrusives (2)

## **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to open shrub layer, and the overall shrub cover ranges from 3 to 12 percent. The tree layer is typically sparse to absent, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia nova*, and *Artemisia arbuscula* is often present. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Blepharipappus scaber* is often present.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=8

## **Association Stand Table**

### ***Artemisia nova* / *Poa secunda* Association**

n =8

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia nova</i>	100	6.75	2	12
	<i>Artemisia arbuscula</i>	63	1.84	0.2	5
	<i>Eriogonum sphaerocephalum</i>	25	0.6	0.2	1
	<i>Tetradymia glabrata</i>	25	0.2	0.2	0.2
	<i>Eriogonum microthecum</i>	13	0.2	0.2	0.2
	<i>Purshia tridentata</i>	13	0.2	0.2	0.2
	<i>Chrysothamnus depressus</i>	13	2	2	2
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	9.4	0.2	49
	<i>Elymus elymoides</i>	100	0.7	0.2	1
	<i>Poa secunda</i>	100	3.43	0.2	9
	<i>Blepharipappus scaber</i>	75	0.2	0.2	0.2



## Association Stand Table continued

### ***Artemisia nova* / *Poa secunda* Association**

n =8

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Antennaria dimorpha</i>	50	0.2	0.2	0.2
<i>Pseudoroegneria spicata</i>	50	0.8	0.2	1
<i>Lomatium</i>	38	2	1	3
<i>Balsamorhiza hookeri</i>	38	0.2	0.2	0.2
<i>Bromus briziformis</i>	38	0.2	0.2	0.2
<i>Phlox stansburyi</i>	38	0.2	0.2	0.2
<i>Elymus caput-medusae</i>	38	3.07	0.2	5
<i>Bromus arvensis</i>	38	2.73	0.2	5
<i>Epilobium brachycarpum</i>	25	1.1	0.2	2
<i>Cryptantha intermedia</i>	13	0.2	0.2	0.2
<i>Phoenicaulis cheiranthoides</i>	13	0.2	0.2	0.2
<i>Danthonia unispicata</i>	13	0.2	0.2	0.2
<i>Lomatium dissectum</i>	13	0.2	0.2	0.2
<i>Festuca idahoensis</i>	13	1	1	1
<i>Microsteris gracilis</i>	13	0.2	0.2	0.2
<i>Orobancha fasciculata</i>	13	0.2	0.2	0.2
<i>Epilobium minutum</i>	13	0.2	0.2	0.2
<i>Perideridia</i>	13	0.2	0.2	0.2
<i>Lomatium bicolor</i>	13	0.2	0.2	0.2
<i>Poa bulbosa</i>	13	0.2	0.2	0.2
<i>Sisymbrium altissimum</i>	13	0.2	0.2	0.2
<i>Tragopogon dubius</i>	13	0.2	0.2	0.2
<i>Ventenata dubia</i>	13	0.2	0.2	0.2
<i>Vulpia octoflora</i>	13	0.2	0.2	0.2
<i>Agoseris grandiflora</i>	13	0.2	0.2	0.2
<i>Penstemon gracilentus</i>	13	0.2	0.2	0.2
<i>Cirsium cymosum</i>	13	0.2	0.2	0.2
<i>Arenaria aculeata</i>	13	3	3	3
<i>Arenaria congesta</i>	13	0.2	0.2	0.2
<i>Castilleja</i>	13	0.2	0.2	0.2
<i>Lomatium utriculatum</i>	13	2	2	2
<i>Castilleja chromosa</i>	13	0.2	0.2	0.2
<i>Erigeron linearis</i>	13	0.2	0.2	0.2
<i>Clarkia</i>	13	0.2	0.2	0.2
<i>Crepis occidentalis</i>	13	0.2	0.2	0.2
<i>Crepis acuminata</i>	13	0.2	0.2	0.2

**Association Stand Table continued**

***Artemisia nova* / *Poa secunda* Association**

n =8

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Erodium cicutarium</i>	13	1	1	1
<i>Eriophyllum lanatum</i>	13	0.2	0.2	0.2
<i>Eriogonum vimineum</i>	13	0.2	0.2	0.2
<i>Eriogonum</i>	13	0.2	0.2	0.2
<i>Eriogonum caespitosum</i>	13	1	1	1
<i>Crepis</i>	13	0.2	0.2	0.2
<i>Helianthus cusickii</i>	13	0.2	0.2	0.2

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## ***Artemisia tridentata* Alliance**

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**Common Name:** Big sagebrush Alliance

**NVC Alliance Code:** A3198. *Artemisia tridentata* - Mixed Shrub Dry Steppe & Shrubland Alliance

### **Alliance Concept**

The *Artemisia tridentata* 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. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, basalt, or andesite, and soil texture is widely variable. Elevation range is approximately 1218 – 2271 meters. The dominant and characteristic shrub is *Artemisia tridentata*. The dominant and characteristic herbs include *Bromus tectorum* and *Elymus elymoides*, and *Poa secunda* is often present.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Artemisia tridentata*. The overall shrub cover ranges from 2 to 60 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Lower Klamath - Tule Lake Basins (M261Ga), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

## **Associations**

*Artemisia tridentata* Association

*Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum* Association

*Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata* Provisional Association

*Artemisia tridentata* / *Distichlis spicata* Provisional Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1523 m, Range 1218 – 2271 m

Aspect: NE (34), SW (29), SE (20), Flat (17), NW (17), Variable (1)

Slope: Mean 6.8 degrees, Range 0 – 45 degrees

Macro Topography: Lower 1/3 of slope (20), Middle 1/3 of slope (18), Other (12), Middle to Upper 1/3 of slope (12), Upper 1/3 of slope (8), Lowslope (8), Bottom to Lower 1/3 of slope (6), Lower to Middle 1/3 of slope (6), Upper 1/3 of slope to Ridgetop (4), Ridge summit, crest (4), Low level (4), Midslope (3), Bottom (3), Bench (3), Ridge top (2), Toeslope (1), Basin floor (1)

Tree Cover: Mean 0.5%, Range 0 – 11%

Shrub Cover: Mean 21.3%, Range 2 – 60%

Herb Cover: Mean 13.9%, Range 1 – 45%

Large Rock: Mean 5.1%, Range 0 – 45%

Small Rock: Mean 20.3%, Range 0 – 86%

Fines Cover: Mean 37.7%, Range 0 – 98%

Litter Cover: Mean 14.5%, Range 0 – 71%

Soil Texture (field assessed): Moderately fine clay loam (13), Moderately fine sandy clay loam (11), Moderately fine silty clay loam (9), Fine sandy clay (9), Medium to very fine, sandy loam (7), Fine clay (6), Loamy Sand (6), Sandy Loam (5), Moderately coarse, sandy loam (5), Silt Loam (3), Sand (3), Fine silty clay (2), Medium sand (2), Medium silt (2), Medium to very fine, loamy sand (2), Clay, (class unknown) (2), Coarse, loamy sand (2), Medium silt loam (1), Medium loam (1)

Geology (map data): General volcanic extrusives (25), Basalt (25), Andesite (13), Pumice (2), Igneous (type unknown) (2), Mixed alluvium (2), Ash (of any origin) (1), Rhyolite (1)

**Environment:** *Artemisia tridentata* ssp. *tridentata* usually does not tolerate saturated soils or alkaline conditions. Stands are found where soils are deep, lacking well-developed hardpans, gravel, and rock fragments.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 2 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** *Artemisia tridentata* is the dominant and characteristic shrub. Stands sometimes have sparse, emergent *Juniperus occidentalis* in the tree layer. The herbaceous layer typically includes *Bromus tectorum* and *Elymus elymoides*, and often includes *Poa secunda*.

**Dynamics:** *Artemisia tridentata* is dominant to co-dominant in the shrub layer. *Purshia tridentata* may be present as a co-dominant but if it is >50% relative cover then it would fit the *Purshia tridentata* – *Artemisia tridentata* Alliance.

**Species of Interest:** *Astragalus agrestis*, *Balsamorhiza serrata*, *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Lupinus nevadensis*, and *Polygala subspinosa*

### **Classification Comments**

The identification of the *Artemisia tridentata* subspecies in this region is difficult and there is much debate about which ones are actually present and where they occur. Although, we are very confident that this alliance is common within the study area, we have some reservation about the distinction of *Artemisia tridentata* ssp. *tridentata* and *Artemisia tridentata* ssp. *vaseyana* defining this alliance and the *Artemisia tridentata* ssp. *vaseyana* Alliance. While these *Artemisia tridentata* subspecies generally fall into their respectively named alliances, elevation and associated species are a better indicator for these alliances. In addition, *Artemisia tridentata* ssp. *wyomingensis* has also been reported to be in the area but its identification was inconsistent. It's likely to be most closely ecologically related to *Artemisia tridentata* ssp. *tridentata* and so stands of it would, therefore, fit within this alliance. This, however, is not conclusive and more data analysis and subspecies identification would need to occur to be sure.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S5

### **References**

Evens et al. 2014, Gordon and White 1994, Klein and Evens 2005, Menke et al. 2019, Peterson 1984a

**Total Sample Size Used for Description:** N=184

## **Alliance Stand Table**

### ***Artemisia tridentata* Alliance**

n =184

<b>Lifeform</b>	<b>Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	25	1.88	0.2	11
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	14	0.81	0.2	3
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	10	0.31	0.2	1
<b>Shrub</b>					
	<i>Artemisia tridentata</i>	81	15.66	1	45
	<i>Purshia tridentata</i>	46	5.45	0.2	23
	<i>Ericameria nauseosa</i>	42	3.22	0.2	18
	<i>Chrysothamnus viscidiflorus</i>	33	2.01	0.2	13
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	21	17.98	0.2	51
	<i>Artemisia arbuscula</i>	16	5.19	0.2	15
	<i>Tetradymia canescens</i>	12	0.84	0.2	3
	<i>Ribes velutinum</i>	11	1.06	0.2	7.5
	<i>Tetradymia glabrata</i>	11	1.45	0.2	4
<b>Herb</b>					
	<i>Bromus tectorum</i>	93	14.12	0.2	75
	<i>Elymus elymoides</i>	76	3.68	0.2	41
	<i>Poa secunda</i>	72	5.56	0.2	33
	<i>Pseudoroegneria spicata</i>	42	5.75	0.2	35
	<i>Achnatherum thurberianum</i>	34	2.32	0.2	13
	<i>Epilobium brachycarpum</i>	20	2.17	0.2	25
	<i>Blepharipappus scaber</i>	18	1.28	0.2	14
	<i>Festuca idahoensis</i>	18	4.24	0.2	24
	<i>Elymus cinereus</i>	18	1.46	0.2	10
	<i>Microsteris gracilis</i>	15	1.08	0.2	5
	<i>Tragopogon dubius</i>	14	0.68	0.2	1
	<i>Erodium cicutarium</i>	13	3.45	0.2	16
	<i>Lupinus argenteus</i>	13	1.44	0.2	9
	<i>Sisymbrium altissimum</i>	12	1.95	0.2	13

**Alliance Stand Table continued**

***Artemisia tridentata* Alliance**

**n =184**

<b>Lifeform</b>	<b>Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Herb</b>					
	<i>Collinsia parviflora</i>	11	1.02	0.2	3
	<i>Lupinus</i>	11	1.18	0.2	4
	<i>Crepis acuminata</i>	10	1.05	0.2	4

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## ***Artemisia tridentata* Association**

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**Common Name:** Big Sagebrush

**NVC Association Code:** CEGJ000991, *Artemisia tridentata* Shrubland

**Alliance:** *Artemisia tridentata* Alliance

### **Association Concept**

The *Artemisia tridentata* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily on basin floors, slopes, and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, or general volcanic extrusives, and textures are widely variable. Elevations range from approximately 1234 to 2271 meters. The dominant and characteristic shrub is *Artemisia tridentata*, and *Purshia tridentata* is often present. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Artemisia tridentata*. The overall shrub cover ranges from 5 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1555 m, Range 1234 – 2271 m

Aspect: NE (27), SW (17), NW (14), SE (13), Flat (12)

Slope: Mean 6.6 degrees, Range 0 – 45 degrees

Macro Topography: Middle 1/3 of slope (15), Other (10), Lower 1/3 of slope (9), Middle to Upper 1/3 of slope (9), Lowslope (7), Bottom to Lower 1/3 of slope (5), Upper 1/3 of slope (4), Ridge summit, crest (4), Lower to Middle 1/3 of slope (4), Bench (3), Low level (3), Upper 1/3 of slope to Ridgetop (2), Midslope (2), Bottom (1), Ridge top (1), Basin floor (1)

Tree Cover: Mean 0.7%, Range 0 – 6%

Shrub Cover: Mean 23.9%, Range 5 – 60%

Herb Cover: Mean 14.1%, Range 1 – 45%

Large Rock: Mean 4.6%, Range 0 – 45%

Small Rock: Mean 19.1%, Range 0 – 80%

Fines Cover: Mean 37.4%, Range 0 – 98%

Litter Cover: Mean 15.6%, Range 0 – 71%

Soil Texture (field assessed): Moderately fine sandy clay loam (10), Moderately fine clay loam (9), Medium to very fine, sandy loam (6), Sandy Loam (5), Fine clay (4), Moderately fine silty clay loam (3), Moderately coarse, sandy loam (3),



Loamy Sand (3), Fine sandy clay (3), Sand (3), Fine silty clay (2), Clay, (class unknown) (2), Silt Loam (2), Medium silt (1), Medium silt loam (1), Coarse, loamy sand (1), Medium loam (1)

Geology (map data): Basalt (16), Andesite (13), General volcanic extrusives (12), Not recorded (2), Pumice (2), Mixed alluvium (2), Ash (of any origin) (1), Rhyolite (1), Igneous (type unknown) (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 5 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia tridentata*, and *Purshia tridentata* is often present. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Species of Interest:** *Astragalus agrestis*, *Balsamorhiza serrata*, *Eriastrum sparsiflorum*, *Erigeron elegantulus*, *Lupinus nevadensis*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Evens et al. 2014, Gordon and White 1994, Klein and Evens 2005, Menke et al. 2019, Peterson 1984a

**Total Sample Size Used for Description: N=121**

### **Association Stand Table**

#### ***Artemisia tridentata* Association**

n =121

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	35	1.77	0.2	6
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	17	0.84	0.2	3

## Association Stand Table continued

### ***Artemisia tridentata* Association**

n =121

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	13	0.33	0.2	1
<b>Shrub</b>				
<i>Artemisia tridentata</i>	80	17.18	2	45
<i>Purshia tridentata</i>	56	5.74	0.2	23
<i>Chrysothamnus viscidiflorus</i>	36	2.03	0.2	13
<i>Ericameria nauseosa</i>	35	2.9	0.2	14
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	23	21.71	4	51
<i>Artemisia arbuscula</i>	19	6.14	0.2	15
<i>Tetradymia canescens</i>	16	0.89	0.2	3
<i>Ribes velutinum</i>	15	0.59	0.2	2
<b>Herb</b>				
<i>Bromus tectorum</i>	90	8.28	0.2	67
<i>Elymus elymoides</i>	81	4.03	0.2	41
<i>Poa secunda</i>	81	6.12	0.2	33
<i>Pseudoroegneria spicata</i>	43	4.58	0.2	29
<i>Achnatherum thurberianum</i>	40	2.32	0.2	10
<i>Festuca idahoensis</i>	25	4.23	0.2	24
<i>Blepharipappus scaber</i>	19	0.9	0.2	4
<i>Elymus cinereus</i>	19	1.38	0.2	10
<i>Epilobium brachycarpum</i>	17	1.28	0.2	7
<i>Tragopogon dubius</i>	17	0.64	0.2	1
<i>Microsteris gracilis</i>	15	0.79	0.2	4
<i>Lupinus argenteus</i>	15	1.66	0.2	9
<i>Crepis acuminata</i>	13	1.06	0.2	4
<i>Lomatium</i>	13	0.74	0.2	3
<i>Collinsia parviflora</i>	12	1.19	0.2	3
<i>Lupinus</i>	12	1.15	0.2	3

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## ***Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum* Association**

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**Common Name:** Big Sagebrush – (Rabbitbrush) / Cheatgrass

**NVC Association Code:** CEG002699, *Artemisia tridentata* - (*Ericameria nauseosa*) / *Bromus tectorum* Ruderal Shrubland

**Alliance:** *Artemisia tridentata* Alliance

### **Association Concept**

The *Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily on bottoms, slopes, and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily basalt, general volcanic extrusives, or igneous and textures are widely variable. Elevations range from approximately 1225 to 1751 meters. Dominant and characteristic shrubs include *Artemisia tridentata* and *Ericameria nauseosa*. The dominant and characteristic herb is *Bromus tectorum*, and *Elymus elymoides* is often present.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Artemisia tridentata* and *Ericameria nauseosa*. The overall shrub cover ranges from 5 to 41 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1455 m, Range 1225 – 1751 m

Aspect: NE (6), SW (6), Flat (3), SE (3), NW (1), Variable (1)

Slope: Mean 5.3 degrees, Range 0 – 26 degrees

Macro Topography: Lower 1/3 of slope (6), Other (2), Middle to Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (1), Upper 1/3 of slope (1), Ridge top (1), Toeslope (1), Lowslope (1), Low level (1), Bottom (1), Midslope (1)

Tree Cover: Mean 0.3%, Range 0 – 11%

Shrub Cover: Mean 16.7%, Range 5 – 41%

Herb Cover: Mean 17.6%, Range 4 – 38%

Large Rock: Mean 3.9%, Range 0 – 26%

Small Rock: Mean 19.4%, Range 0.4 – 86%

Fines Cover: Mean 35.1%, Range 0 – 94%

Litter Cover: Mean 17.1%, Range 3 – 63%

Soil Texture (field assessed): Moderately fine clay loam (4), Loamy Sand (3), Moderately coarse, sandy loam (2), Medium to very fine, loamy sand (2), Fine sandy clay (2), Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1), Not recorded (1), Silt Loam (1), Medium sand (1)

Geology (map data): Basalt (5), General volcanic extrusives (5), Igneous (type unknown) (1)

**Environment:** Signs of disturbance such as fire, grazing, and roads/trails are present and typically severe.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 5 to 41 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia tridentata* and *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum*, and often present is *Elymus elymoides*.

**Species of Interest:** *Eriastrum sparsiflorum*, *Lupinus nevadensis*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** N

### **References**

Evens et al. 2014, Gordon and White 1994, Klein and Evens 2005, Menke et al. 2019, Peterson 1984a

**Total Sample Size Used for Description:** N=37

### **Association Stand Table**

#### ***Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum* Association**

n =37

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	11	3.1	0.2	11

# Association Stand Table continued

## ***Artemisia tridentata* – (*Ericameria nauseosa*) / *Bromus tectorum* Association**

n =37

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia tridentata</i>	84	13.76	1	37.5
	<i>Ericameria nauseosa</i>	57	3.21	0.2	12
	<i>Chrysothamnus viscidiflorus</i>	30	1.62	0.2	7
	<i>Purshia tridentata</i>	30	4.78	0.2	16
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	19	7.03	0.2	19
	<i>Artemisia arbuscula</i>	11	2.05	0.2	3
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	29.38	2	75
	<i>Elymus elymoides</i>	70	3.03	0.2	11
	<i>Poa secunda</i>	49	3.12	0.2	14
	<i>Epilobium brachycarpum</i>	32	3.6	0.2	25
	<i>Pseudoroegneria spicata</i>	30	6.7	0.2	19
	<i>Sisymbrium altissimum</i>	27	3.38	0.2	13
	<i>Achnatherum thurberianum</i>	24	2.49	0.2	13
	<i>Microsteris gracilis</i>	24	1.77	0.2	5
	<i>Elymus caput-medusae</i>	24	9.51	0.2	36
	<i>Bromus arvensis</i>	22	5.15	0.2	23
	<i>Erodium cicutarium</i>	22	3.3	0.2	13
	<i>Elymus cinereus</i>	22	1.65	0.2	3
	<i>Blepharipappus scaber</i>	19	2.91	0.2	14
	<i>Alyssum desertorum</i>	16	7.2	0.2	19
	<i>Lactuca serriola</i>	16	2.2	0.2	4
	<i>Lagophylla ramosissima</i>	14	1.08	0.2	3
	<i>Phlox longifolia</i>	14	1.2	1	2
	<i>Collinsia parviflora</i>	11	0.6	0.2	1
	<i>Tragopogon dubius</i>	11	1	1	1
	<i>Descurainia sophia</i>	11	0.4	0.2	1
	<i>Astragalus filipes</i>	11	0.6	0.2	1
	<i>Pleiocanthus spinosus</i>	11	1.75	1	3
	<i>Balsamorhiza hookeri</i>	11	0.8	0.2	1

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## ***Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata*** **Provisional Association**

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**Common Name:** Big Sagebrush - Green Ephedra / Blue bunch wheat grass

**NVC Association Code:**

**Alliance:** *Artemisia tridentata* Alliance

### **Association Concept**

The *Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata* Provisional Association forms a sparse to intermittent shrub layer. The herbaceous layer is sparse to open. The association is found primarily on slope bottoms, slopes, and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives or basalt and textures are widely variable. Elevations range from approximately 1311 to 1729 meters. The dominant and characteristic shrub is *Artemisia tridentata*, and those that are often present include *Ephedra viridis*, *Ericameria nauseosa*, and *Tetradymia glabrata*. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Pseudoroegneria spicata*.

**Diagnostic Criteria:** This association is characterized by a sparse to intermittent shrub layer of *Artemisia tridentata* and *Ephedra viridis*. The overall shrub cover ranges from 2 to 43 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1491 m, Range 1311 – 1729 m

Aspect: SW (6), SE (3), NW (2), NE (1)

Slope: Mean 12.4 degrees, Range 2 – 27 degrees

Macro Topography: Upper 1/3 of slope (3), Lower 1/3 of slope (3), Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (1), Bottom (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: 0%

Shrub Cover: Mean 15.6%, Range 2 – 43%

Herb Cover: Mean 10%, Range 3 – 17%

Large Rock: Mean 10.1%, Range 0 – 30%

Small Rock: Mean 30.8%, Range 3.2 – 80%

Fines Cover: Mean 36.1%, Range 1 – 94%

Litter Cover: Mean 4.6%, Range 1 – 12%

Soil Texture (field assessed): Fine sandy clay (4), Moderately fine silty clay loam (4), Moderately fine sandy clay loam (1), Medium sand (1), Coarse, loamy sand (1), Fine clay (1)

Geology (map data): General volcanic extrusives (8), Basalt (2)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 2 to 43 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia tridentata*, and those often present include *Ephedra viridis*, *Ericameria nauseosa*, and *Tetradymia glabrata*. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, *Poa secunda*, and *Pseudoroegneria spicata*.

**Dynamics:** *Ephedra viridis* is characteristically present in the shrub layer, sub-dominant to dominant with *Artemisia tridentata*. *E. viridis* may be <1%. *Artemisia tridentata* may not be present if the stand has had recent disturbance. *Pseudoroegneria spicata* may co-dominate in the herb layer. **Species of Interest:** *Eriastrum sparsiflorum*, *Polygala subspinosa*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** SNR

### **References**

None.

**Total Sample Size Used for Description:** N=21

### **Association Stand Table**

#### ***Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata* Provisional Association**

n =21

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Artemisia tridentata</i>	76	11.69	1	24
<i>Ephedra viridis</i>	71	1.68	0.2	6

# Association Stand Table continued

## ***Artemisia tridentata* – *Ephedra viridis* / *Pseudoroegneria spicata* Provisional Association**

n =21

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	52	1.98	0.2	5
	<i>Tetradymia glabrata</i>	52	1.16	0.2	3
	<i>Chrysothamnus viscidiflorus</i>	24	2.68	0.2	7
	<i>Purshia tridentata</i>	19	3.6	0.2	7
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	14	8.67	1	21
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	18.34	0.2	67
	<i>Pseudoroegneria spicata</i>	71	9.12	0.2	35
	<i>Poa secunda</i>	67	5.91	0.2	33
	<i>Elymus elymoides</i>	62	2.88	0.2	15
	<i>Erodium cicutarium</i>	48	5.2	1	16
	<i>Balsamorhiza hookeri</i>	38	0.73	0.2	1.2
	<i>Sisymbrium altissimum</i>	24	0.56	0.2	2
	<i>Achnatherum thurberianum</i>	19	2	1	5
	<i>Eriogonum</i>	19	0.4	0.2	1
	<i>Crepis</i>	14	0.47	0.2	1
	<i>Blepharipappus scaber</i>	14	0.73	0.2	1
	<i>Epilobium brachycarpum</i>	14	2.67	1	5



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## ***Artemisia tridentata* / *Distichlis spicata* Provisional Association**

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**Common Name:** Big Sagebrush / Salt Grass

**NVC Association Code:** CEG001000, *Artemisia tridentata* ssp. *tridentata* / *Distichlis spicata* Shrubland

**Alliance:** *Artemisia tridentata* Alliance

### **Association Concept**

The *Artemisia tridentata* / *Distichlis spicata* Provisional Association forms an open shrub layer. The emergent tree layer is typically absent, and the herbaceous layer is sparse. The association is found primarily on flats and the lower third of southeast-facing slopes. Soils are derived from basalt and textures include fine clay, medium silt, and moderately fine silty clay loam. Elevations range from approximately 1337 to 1541 meters. Dominant and characteristic shrubs include *Artemisia tridentata* and *Ericameria nauseosa*. Dominant and characteristic herbs include *Bromus tectorum*, *Distichlis spicata*, *Iva axillaris*, *Lepidium perfoliatum*, and *Poa secunda*, and those often present are *Crepis intermedia*, *Elymus elymoides*, *Juncus arcticus*, *Elymus triticoides*, *Matricaria discoidea*, and *Vicia americana*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Artemisia tridentata* and *Ericameria nauseosa*. The overall shrub cover ranges from 15 to 21 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1473 m, Range 1337 – 1541 m

Aspect: Flat (2), SE (1)

Slope: Mean 0.3 degrees, Range 0 – 1 degree

Macro Topography: Lower 1/3 of slope (2), Bottom to Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 19%, Range 15 – 21%

Herb Cover: Mean 5.3%, Range 2 – 9%

Large Rock: 0%

Small Rock: Mean 0.4%, Range 0 – 1.2%

Fines Cover: Mean 93.3%, Range 90 – 95%

Litter Cover: Mean 4.3%, Range 3 – 7%

Soil Texture (field assessed): Fine clay (1), Medium silt (1), Moderately fine silty clay loam (1)

Geology (map data): Basalt (2)

**Environment:** Stands are restricted to valleys or Pleistocene lakebeds with somewhat alkaline soils.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 15 to 21 percent. The tree layer is typically sparse, and the herbaceous layer is also sparse.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia tridentata* and *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum*, *Distichlis spicata*, *Iva axillaris*, *Lepidium perfoliatum*, and *Poa secunda*, and those that are often present include *Crepis intermedia*, *Elymus elymoides*, *Juncus arcticus*, *Elymus triticoides*, *Matricaria discoidea*, and *Vicia americana*.

**Species of Interest:** None.

### **Classification Comments**

Stands of this association are uncommon in the study area.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=3

### **Association Stand Table**

#### ***Artemisia tridentata* / *Distichlis spicata* Provisional Association**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	33	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	100	12.33	9	18
	<i>Artemisia tridentata</i>	100	6.67	3	12
	<i>Artemisia cana</i>	33	0.2	0.2	0.2
	<i>Purshia tridentata</i>	33	0.2	0.2	0.2
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	0.47	0.2	1
	<i>Distichlis spicata</i>	100	1.4	0.2	3

## Association Stand Table continued

### ***Artemisia tridentata* / *Distichlis spicata* Provisional Association**

n =3

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Herb</b>				
<i>Iva axillaris</i>	100	0.2	0.2	0.2
<i>Lepidium perfoliatum</i>	100	0.47	0.2	1
<i>Poa secunda</i>	100	0.2	0.2	0.2
<i>Juncus arcticus</i>	67	0.2	0.2	0.2
<i>Elymus triticoides</i>	67	1.1	0.2	2
<i>Matricaria discoidea</i>	67	0.2	0.2	0.2
<i>Crepis</i>	67	0.2	0.2	0.2
<i>Crepis intermedia</i>	67	0.2	0.2	0.2
<i>Elymus elymoides</i>	67	0.6	0.2	1
<i>Vicia americana</i>	67	0.2	0.2	0.2
<i>Ceratocephala testiculata</i>	33	0.2	0.2	0.2
<i>Rumex occidentalis</i>	33	0.2	0.2	0.2
<i>Poa bulbosa</i>	33	0.2	0.2	0.2
<i>Phlox stansburyi</i>	33	0.2	0.2	0.2
<i>Navarretia breweri</i>	33	0.2	0.2	0.2
<i>Elymus cinereus</i>	33	3	3	3
<i>Idahoa scapigera</i>	33	0.2	0.2	0.2
<i>Gilia</i>	33	0.2	0.2	0.2
<i>Gayophytum diffusum</i>	33	0.2	0.2	0.2
<i>Cirsium cymosum</i>	33	0.2	0.2	0.2
<i>Carex simulata</i>	33	2	2	2
<i>Camissonia tanacetifolia</i>	33	0.2	0.2	0.2
<i>Bromus briziformis</i>	33	0.2	0.2	0.2
<i>Blepharipappus scaber</i>	33	0.2	0.2	0.2
<i>Bassia hyssopifolia</i>	33	0.2	0.2	0.2
<i>Astragalus filipes</i>	33	0.2	0.2	0.2
<i>Achnatherum occidentale</i>	33	0.2	0.2	0.2
<i>Vicia</i>	33	0.2	0.2	0.2
<i>Vulpia octoflora</i>	33	0.2	0.2	0.2
<i>Descurainia sophia</i>	33	0.2	0.2	0.2
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	67	3	1	5

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## ***Artemisia tridentata* ssp. *vaseyana* Alliance**

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**Common Name:** Mountain big sagebrush Alliance

**NVC Alliance Code:** A3208. *Artemisia tridentata* ssp. *vaseyana* - Mixed Steppe & Shrubland Alliance

### **Alliance Concept**

The *Artemisia tridentata* ssp. *vaseyana* Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to intermittent and the herbaceous layer is open to intermittent. It is found from ridgetops to lower slopes at all aspects. Soils are derived from a variety of substrates but primarily volcanic, andesite, or basalt and soil texture is widely variable. Elevation range is approximately 1244 – 2500 meters. *Artemisia tridentata* ssp. *vaseyana* is the dominant and characteristic shrub. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Artemisia tridentata* ssp. *vaseyana*. The overall shrub cover ranges from 0.2 to 49 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Warner Mountains (M261Gf)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium* Association

*Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association

*Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association

*Symphoricarpos oreophilus* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1748 m, Range 1244 – 2500 m

Aspect: NE (30), Flat (13), NW (12), SE (11), SW (11)

Slope: Mean 11.1 degrees, Range 0 – 47 degrees

Macro Topography: Middle 1/3 of slope (13), Upper 1/3 of slope (9), Middle to Upper 1/3 of slope (9), Other (8), Upper 1/3 of slope to Ridgetop (7), Midslope (4), Step in slope (3), Low level (3), High slope (3), Lowslope (3), Toeslope (2), Basin floor (2), Lower to Middle 1/3 of slope (2), Channel wall (2), Lower 1/3 of slope (1), Ridge summit, crest (1), Ridge top (1), Bottom to Mid 1/3 of slope (1), Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 0.7%, Range 0 – 35%

Shrub Cover: Mean 21.2%, Range 0.2 – 49%

Herb Cover: Mean 19.5%, Range 2 – 56%

Large Rock: Mean 8.7%, Range 0 – 55%

Small Rock: Mean 16.6%, Range 1 – 85%

Fines Cover: Mean 28.4%, Range 0 – 90%

Litter Cover: Mean 17.1%, Range 0 – 86%

Soil Texture (field assessed): Medium to very fine, sandy loam (9), Medium loam (7), Rock (6), Sandy Loam (5), Sand (5), Moderately coarse, sandy loam (5), Moderately fine sandy clay loam (4), Medium to very fine, loamy sand (4),

Moderately fine clay loam (3), Loamy Sand (3), Moderately fine silty clay loam (2), Coarse, loamy sand (2), Silt Loam (2), Medium silt (1), Loam (1), Clay Loam (1), Medium silt loam (1)

Geology (map data): General volcanic extrusives (13), Andesite (6), Basalt (5), Igneous (type unknown) (2), Ash (of any origin) (1)

**Environment:** Stands of this alliance are found at higher elevations than the *Artemisia tridentata* Alliance,

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 0.2 to 49 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Artemisia tridentata* ssp. *vaseyana*. Stands sometimes have sparse, emergent *Juniperus occidentalis* in the tree layer. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Species of Interest:** *Erigeron elegantulus*, *Hackelia cusickii*, *Senecio hydrophiloides*

### **Classification Comments**

The identification of the *Artemisia tridentata* subspecies in this region is difficult and there is much debate about which ones are actually present and where they occur. Although, we are very confident that this alliance is common within the higher elevations of the study area, we have some reservation about the distinction of *Artemisia tridentata* ssp. *tridentata* and *Artemisia tridentata* ssp. *vaseyana* defining this alliance and the *Artemisia tridentata* Alliance. While these *Artemisia tridentata* subspecies generally fall into their respectively named alliances, elevation and associated species are a better indicator for these alliances.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S4

### **References**

None.

**Total Sample Size Used for Description:** N=92

## Alliance Stand Table

### ***Artemisia tridentata* ssp. *vaseyana* Alliance**

n =92

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	22	2.35	0.2	7.5
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	18	0.93	0.2	3.5
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	15	0.37	0.2	1
<b>Shrub</b>					
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	53	16.96	1	47
	<i>Ribes velutinum</i>	45	0.8	0.2	3
	<i>Artemisia tridentata</i>	41	13.94	0.2	39
	<i>Purshia tridentata</i>	38	3.72	0.2	17.5
	<i>Chrysothamnus viscidiflorus</i>	36	1.89	0.2	11
	<i>Ericameria nauseosa</i>	33	1.48	0.2	7.5
	<i>Symphoricarpos rotundifolius</i>	33	5.35	0.2	37.5
	<i>Ribes cereum</i>	24	1.2	0.2	3.5
	<i>Salvia dorrii</i>	17	2.56	0.2	7.5
	<i>Cercocarpus ledifolius</i>	15	1.14	0.2	5.2
	<i>Tetradymia canescens</i>	15	1.24	0.2	5
	<i>Chamaebatiaria millefolium</i>	14	3.26	0.2	21.2
<b>Herb</b>					
	<i>Poa secunda</i>	70	4.58	0.2	56
	<i>Bromus tectorum</i>	66	5.76	0.2	37.5
	<i>Elymus elymoides</i>	64	3.04	0.2	24
	<i>Festuca idahoensis</i>	49	10.05	0.2	51
	<i>Pseudoroegneria spicata</i>	43	6.09	0.2	37.5
	<i>Crepis acuminata</i>	36	1.06	0.2	9
	<i>Achnatherum thurberianum</i>	33	2.88	0.2	11
	<i>Lupinus argenteus</i>	29	1.91	0.2	6
	<i>Bromus carinatus</i>	23	1.52	0.2	6
	<i>Collomia grandiflora</i>	21	0.37	0.2	1
	<i>Microsteris gracilis</i>	20	0.53	0.2	2
	<i>Wyethia mollis</i>	20	5.39	0.2	27
	<i>Phacelia humilis</i>	17	0.53	0.2	2
	<i>Phlox diffusa</i>	16	1.65	0.2	7.5
	<i>Collinsia parviflora</i>	15	1.73	0.2	10
	<i>Phacelia hastata</i>	14	0.26	0.2	1

**Alliance Stand Table continued**

***Artemisia tridentata* ssp. *vaseyana* Alliance**

n =92

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Lupinus</i>	13	2.2	0.2	7
	<i>Achillea millefolium</i>	13	0.77	0.2	3
	<i>Elymus cinereus</i>	13	3.9	0.2	25
	<i>Castilleja</i>	12	0.93	0.2	4
	<i>Lupinus arbustus</i>	12	3.36	0.2	15
	<i>Koeleria macrantha</i>	11	2.22	0.2	7.5
	<i>Linanthus pungens</i>	11	1.28	0.2	5
	<i>Phlox hoodii</i>	11	1.62	0.2	4
	<i>Tragopogon dubius</i>	11	0.28	0.2	1



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## ***Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium* Association**

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**Common Name:** Big Sagebrush – Dorr's Sage – Fern Bush

**NVC Association Code:**

**Alliance:** *Artemisia tridentata* ssp. *vaseyana* Alliance

### **Association Concept**

The *Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium* Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily on flats, basin floors, channel walls, and slopes at all aspects. Soils are derived from a variety of substrates and textures include but are not limited to rock, loamy sand, and clay loam. Elevations range from approximately 1244 to 1548 meters. *Salvia dorrii* is the characteristic shrub, and *Chamaebatiaria millefolium*, *Purshia tridentata*, and *Ribes cereum* are often present. *Artemisia tridentata* is sometimes present, generally with high cover relative to other shrub species. Dominant and characteristic herbs include *Bromus tectorum* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Salvia dorrii*. The overall shrub cover ranges from 12 to 20 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1359 m, Range 1244 – 1548 m

Aspect: Flat (8), NE (5), SE (3), SW (2), NW (1)

Slope: Mean 10.9 degrees, Range 0 – 47 degrees

Macro Topography: Other (4), Midslope (3), Toeslope (2), Basin floor (2), Channel wall (2), High slope (2), Lowslope (2), Step in slope (1)

Tree Cover: Mean 2%, Range 0 – 3.5%

Shrub Cover: Mean 16.3%, Range 12 – 20%

Herb Cover: Mean 9%, Range 2 – 19%

Large Rock: None recorded

Small Rock: None recorded

Fines Cover: Mean 8.8%, Range 0 – 40%

Litter Cover: Mean 4.7%, Range 0 – 25%

Soil Texture (field assessed): Rock (6), Loamy Sand (3), Sand (2), Sandy Loam (2), Silt Loam (1), Clay Loam (1)

Geology (map data): None recorded

**Environment:** Stands of this association are found on lava breaks or small escarpments where jumbled boulders of basalt and other volcanic rock are present.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 12 to 20 percent. The tree and herbaceous layers are typically sparse to open.

**Vegetation Floristics:** In the shrub layer, *Salvia dorrii* is characteristic. *Chamaebatiaria millefolium*, *Purshia tridentata*, and *Ribes cereum* are often present, and *Artemisia tridentata*, *Artemisia tridentata* ssp. *vaseyana*, *Cercocarpus ledifolius*, *Ericameria nauseosa*, and *Ribes velutinum* are sometimes present. *Artemisia tridentata* is generally found at high cover where it does occur. The herbaceous layer typically includes *Bromus tectorum* and *Poa secunda*. *Juniperus occidentalis* is sometimes present in the tree layer.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=19

### **Association Stand Table**

#### ***Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium* Association**

n =19

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	32	2.17	1	3.5
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	11	1.85	0.2	3.5
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	11	0.6	0.2	1

# Association Stand Table continued

## ***Artemisia tridentata* – *Salvia dorrii* – *Chamaebatiaria millefolium* Association**

n =19

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Salvia dorrii</i>	84	2.56	0.2	7.5
	<i>Chamaebatiaria millefolium</i>	63	3.52	0.2	21.2
	<i>Purshia tridentata</i>	58	3.87	0.2	17.5
	<i>Ribes cereum</i>	58	1.74	0.2	3.5
	<i>Ribes velutinum</i>	47	0.38	0.2	1
	<i>Artemisia tridentata</i>	42	16.86	0.2	37.5
	<i>Ericameria nauseosa</i>	42	2.2	0.2	7.5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	32	6.83	3	15
	<i>Cercocarpus ledifolius</i>	32	1.9	0.2	5.2
	<i>Eriogonum polyanthum</i>	16	0.2	0.2	0.2
	<i>Eriogonum microthecum</i>	11	1	1	1
	<i>Eriogonum umbellatum</i>	11	1	1	1
<b>Herb</b>					
	<i>Poa secunda</i>	63	2.12	0.2	17.5
	<i>Bromus tectorum</i>	53	7.59	0.2	37.5
	<i>Pseudoroegneria spicata</i>	47	5.97	0.2	17.5
	<i>Elymus elymoides</i>	37	0.43	0.2	1
	<i>Achnatherum thurberianum</i>	32	2.78	0.2	7.5
	<i>Penstemon deustus</i>	26	1.5	1	3.5
	<i>Linanthus pungens</i>	21	0.85	0.2	1.5
	<i>Scrophularia californica</i>	21	1	1	1
	<i>Phacelia heterophylla</i>	16	0.73	0.2	1
	<i>Carex rossii</i>	11	0.6	0.2	1
	<i>Scrophularia lanceolata</i>	11	0.85	0.2	1.5
	<i>Phlox diffusa</i>	11	3.85	0.2	7.5
	<i>Penstemon humilis</i>	11	0.85	0.2	1.5
	<i>Packera cana</i>	11	0.6	0.2	1
	<i>Leptodactylon pungens</i>	11	1	1	1
	<i>Festuca idahoensis</i>	11	4.25	1	7.5
	<i>Chaenactis douglasii</i>	11	1	1	1
	<i>Calochortus macrocarpus</i>	11	1	1	1
	<i>Arabis</i>	11	1	1	1
	<i>Epilobium brachycarpum</i>	11	1.5	1	2

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## ***Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association**

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**Common Name:** Mountain Sagebrush – Mountain Snowberry / California Bromegrass

**NVC Association Code:** CEGL001035, *Artemisia tridentata* ssp. *vaseyana* - *Symphoricarpos oreophilus* / *Bromus carinatus* Shrubland

**Alliance:** *Artemisia tridentata* ssp. *vaseyana* Alliance

### **Association Concept**

The *Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily on slopes and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, basalt, or andesite, and textures are widely variable. Elevations range from approximately 1346 to 2250 meters. Dominant and characteristic shrubs include *Artemisia tridentata* ssp. *vaseyana* and *Symphoricarpos oreophilus*, and those that are often present include *Ribes velutinum* and *Symphoricarpos rotundifolius*. The dominant and characteristic herb is *Bromus tectorum*, and those often present are *Elymus elymoides* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by a sparse to intermittent shrub layer of *Artemisia tridentata* ssp. *vaseyana* and *Symphoricarpos oreophilus*. The overall shrub cover ranges from 5 to 47 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1910 m, Range 1346 – 2250 m

Aspect: NE (9), NW (4), SE (4), SW (4), Flat (1)

Slope: Mean 12.6 degrees, Range 0 – 30 degrees

Macro Topography: Middle 1/3 of slope (6), Middle to Upper 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (3), Upper 1/3 of slope (2), Step in slope (1), Other (1), Middle 1/3 of slope to Ridgetop (1), Lowslope (1), Lower to Middle 1/3 of slope (1), Lower 1/3 of slope (1), Ridge top (1)

Tree Cover: Mean 0%, Range 0 – 5%

Shrub Cover: Mean 23.4%, Range 5 – 47%

Herb Cover: Mean 15.1%, Range 2 – 32%

Large Rock: Mean 10.3%, Range 0 – 46%

Small Rock: Mean 17.7%, Range 1 – 85%

Fines Cover: Mean 34.2%, Range 1 – 90%

Litter Cover: Mean 20.2%, Range 3 – 65%

Soil Texture (field assessed): Medium to very fine, sandy loam (5), Moderately fine sandy clay loam (3), Medium loam (3), Moderately fine clay loam (3), Moderately coarse, sandy loam (2), Coarse, loamy sand (1), Moderately fine silty clay loam (1), Sand (1), Sandy Loam (1), Medium to very fine, loamy sand (1)

Geology (map data): General volcanic extrusives (5), Basalt (3), Andesite (1)

**Environment:** This association is found on north-facing slopes and other mesic environments.

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 5 to 47 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia tridentata* ssp. *vaseyana* and *Symphoricarpos oreophilus*. Those often present include *Ribes velutinum* and *Symphoricarpos rotundifolius*. The herbaceous layer typically includes *Bromus tectorum*, and those that are often present include *Elymus elymoides* and *Poa secunda*.

**Species of Interest:** *Hackelia cusickii*, *Senecio hydrophiloides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR   **State:** N

### **References**

None.

**Total Sample Size Used for Description: N=29**

## Association Stand Table

### ***Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association**

n =29

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	17	2.24	0.2	5
	<i>Pinus ponderosa</i>	10	1.23	0.2	2
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	24	0.57	0.2	2
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	17	0.36	0.2	1
<b>Shrub</b>					
	<i>Symphoricarpos rotundifolius</i>	62	4.05	0.2	16
	<i>Artemisia tridentata</i>	59	16.35	1	39
	<i>Ribes velutinum</i>	59	1.18	0.2	3
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	48	13.68	3	34
	<i>Chrysothamnus viscidiflorus</i>	48	1.76	0.2	9
	<i>Ericameria nauseosa</i>	38	1.46	0.2	6
	<i>Purshia tridentata</i>	34	4.1	1	10
	<i>Ribes cereum</i>	21	0.55	0.2	1.5
	<i>Prunus virginiana</i>	17	0.36	0.2	1
	<i>Tetradymia canescens</i>	17	0.52	0.2	1
	<i>Eriogonum umbellatum</i>	17	0.36	0.2	1
	<i>Cercocarpus ledifolius</i>	14	0.4	0.2	1
	<i>Prunus emarginata</i>	14	2.35	0.2	6
	<i>Ceanothus velutinus</i>	14	0.93	0.2	2
	<i>Amelanchier utahensis</i>	10	0.73	0.2	1
<b>Herb</b>					
	<i>Bromus tectorum</i>	86	6.57	0.2	35
	<i>Elymus elymoides</i>	69	2.24	0.2	9
	<i>Poa secunda</i>	66	8.46	0.2	56
	<i>Crepis acuminata</i>	48	0.9	0.2	3
	<i>Lupinus argenteus</i>	41	0.92	0.2	3
	<i>Collomia grandiflora</i>	41	0.4	0.2	1
	<i>Bromus carinatus</i>	41	1.95	0.2	6
	<i>Pseudoroegneria spicata</i>	41	6.34	0.2	37.5
	<i>Microsteris gracilis</i>	34	0.72	0.2	2
	<i>Festuca idahoensis</i>	31	4.41	0.2	20
	<i>Phacelia humilis</i>	31	0.49	0.2	2

**Association Stand Table** continued

***Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association**

n =29

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Collinsia parviflora</i>	28	1.23	0.2	5
<i>Wyethia mollis</i>	28	4.28	0.2	9
<i>Achnatherum thurberianum</i>	24	1.91	0.2	8
<i>Elymus cinereus</i>	21	5.4	0.2	25
<i>Lupinus arbustus</i>	21	3.07	0.2	10
<i>Castilleja</i>	17	1.44	0.2	4
<i>Galium aparine</i>	14	0.6	0.2	1
<i>Wyethia angustifolia</i>	14	2.35	0.2	7
<i>Senecio integerrimus</i>	14	1.23	0.2	3
<i>Poa bulbosa</i>	14	3.85	0.2	14
<i>Phlox hoodii</i>	14	2.75	1	4
<i>Madia citriodora</i>	14	0.85	0.2	2
<i>Phacelia hastata</i>	14	0.2	0.2	0.2
<i>Crepis</i>	10	1.4	0.2	3
<i>Vicia americana</i>	10	1.13	0.2	3
<i>Tragopogon dubius</i>	10	0.2	0.2	0.2
<i>Paeonia brownii</i>	10	0.47	0.2	1
<i>Lupinus</i>	10	2.73	0.2	5
<i>Lomatium</i>	10	1.8	0.2	5
<i>Gayophytum diffusum</i>	10	0.47	0.2	1
<i>Castilleja chromosa</i>	10	0.2	0.2	0.2
<i>Balsamorhiza sagittata</i>	10	1.73	0.2	4
<i>Agastache urticifolia</i>	10	0.47	0.2	1
<i>Epilobium brachycarpum</i>	10	0.2	0.2	0.2

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## ***Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

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**Common Name:** Mountain Sagebrush / Blue Fescue

**NVC Association Code:** CEGL001533, *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Shrub Grassland

**Alliance:** *Artemisia tridentata* ssp. *vaseyana* Alliance

### **Association Concept**

The *Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association forms open to intermittent shrub and herbaceous layers. The emergent tree layer is typically sparse to open. The association is found primarily from midslopes to ridge summits at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, andesite, or igneous, and textures are widely variable. Elevations range from approximately 1292 to 2384 meters. *Artemisia tridentata* ssp. *vaseyana* is the characteristic shrub. Characteristic herbs include *Festuca idahoensis* and *Poa secunda*, and those often present are *Bromus tectorum* and *Elymus elymoides*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Artemisia tridentata* ssp. *vaseyana* with an open to intermittent herbaceous layer of *Festuca idahoensis*. The overall shrub cover ranges from 8 to 49 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1731 m, Range 1292 – 2384 m

Aspect: NE (13), SW (4), Flat (4), NW (3), SE (1)

Slope: Mean 8.6 degrees, Range 0 – 40 degrees

Macro Topography: Middle 1/3 of slope (6), Middle to Upper 1/3 of slope (4), Other (3), Upper 1/3 of slope to Ridgetop (3), Low level (3), Ridge summit, crest (1), Midslope (1), Bottom to Mid 1/3 of slope (1), Upper 1/3 of slope (1), Bottom to Lower 1/3 of slope (1), High slope (1)

Tree Cover: Mean 1%, Range 0 – 10%

Shrub Cover: Mean 24.6%, Range 8 – 49%

Herb Cover: Mean 24.4%, Range 12 – 56%

Large Rock: Mean 9.1%, Range 0 – 55%

Small Rock: Mean 20.3%, Range 2 – 50%

Fines Cover: Mean 30%, Range 1 – 70%

Litter Cover: Mean 16.4%, Range 0.6 – 50%

Soil Texture (field assessed): Moderately coarse, sandy loam (3), Medium to very fine, loamy sand (3), Sand (2), Medium to very fine, sandy loam (2), Loam (1), Sandy



Loam (1), Silt Loam (1), Not recorded (1), Medium loam (1), Medium silt (1),  
Medium silt loam (1)

Geology (map data): General volcanic extrusives (8), Andesite (5), Igneous (type  
unknown) (2), Not recorded (1), Ash (of any origin) (1), Basalt (1)

**Environment:** This association is found in dryer sites than the *Artemisia tridentata* ssp. *vaseyana* – *Symphoricarpos oreophilus* / *Bromus carinatus* Association and has a more open shrub canopy.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer with an open to intermittent herbaceous layer. The overall shrub cover ranges from 8 to 49 percent, and the overall herb cover ranges from 12 to 56 percent. The tree layer is typically sparse to open.

**Vegetation Floristics:** The characteristic shrub is *Artemisia tridentata* ssp. *vaseyana*. *Festuca idahoensis* and *Poa secunda* are characteristic in the herbaceous layer, and herbs that are often present include *Bromus tectorum* and *Elymus elymoides*.

**Species of Interest:** *Erigeron elegantulus*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=33

### **Association Stand Table**

#### ***Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

n =33

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	27	2.52	0.2	7.5
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	24	1.01	0.2	3
<i>Pinus jeffreyi</i>	12	0.2	0.2	0.2

# Association Stand Table continued

## ***Artemisia tridentata* ssp. *vaseyana* / *Festuca idahoensis* Association**

n =33

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	21	0.31	0.2	1
<b>Shrub</b>					
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	82	21.02	3	47
	<i>Purshia tridentata</i>	36	3.59	0.2	7.7
	<i>Chrysothamnus viscidiflorus</i>	30	0.94	0.2	3
	<i>Artemisia tridentata</i>	27	12.67	1	20
	<i>Ribes velutinum</i>	27	0.68	0.2	1
	<i>Ericameria nauseosa</i>	24	1.01	0.2	3.5
	<i>Tetradymia canescens</i>	21	2.06	0.2	5
	<i>Ribes cereum</i>	15	0.78	0.2	1.5
<b>Herb</b>					
	<i>Festuca idahoensis</i>	97	12.4	0.2	51
	<i>Poa secunda</i>	76	3.76	0.2	11
	<i>Elymus elymoides</i>	67	5.39	0.2	24
	<i>Bromus tectorum</i>	52	4.62	0.2	30
	<i>Pseudoroegneria spicata</i>	48	6.51	0.2	37.5
	<i>Achnatherum thurberianum</i>	45	3.73	0.2	11
	<i>Lupinus</i>	39	1.95	0.2	7
	<i>Crepis acuminata</i>	33	1.82	0.2	9
	<i>Phlox diffusa</i>	27	1.72	0.2	5
	<i>Achillea millefolium</i>	24	0.85	0.2	3
	<i>Koeleria macrantha</i>	24	1.71	0.2	3.5
	<i>Wyethia mollis</i>	21	0.97	0.2	4
	<i>Lupinus argenteus</i>	18	2.87	2	5
	<i>Castilleja</i>	15	0.56	0.2	2
	<i>Phlox hoodii</i>	15	0.84	0.2	1
	<i>Phlox speciosa</i>	15	0.52	0.2	1
	<i>Astragalus purshii</i>	15	0.36	0.2	1
	<i>Erigeron filifolius</i>	12	0.2	0.2	0.2
	<i>Linanthus pungens</i>	12	1.8	0.2	5
	<i>Phacelia hastata</i>	12	0.4	0.2	1
	<i>Frasera albicaulis</i>	12	0.9	0.2	3
	<i>Collinsia parviflora</i>	12	3.3	0.2	10
	<i>Astragalus filipes</i>	12	0.4	0.2	1
	<i>Carex</i>	12	2.3	0.2	6
	<i>Crepis</i>	12	0.4	0.2	1

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## ***Symphoricarpos oreophilus* Association**

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**Common Name:** Mountain Snowberry

**NVC Association Code:** C EGL002951, *Symphoricarpos oreophilus* Shrubland

**Alliance:** *Artemisia tridentata* ssp. *vaseyana* Alliance

### **Association Concept**

The *Symphoricarpos oreophilus* Association forms a sparse to open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily from middle slopes to ridgetops at northwestern, northeastern, and southeastern aspects. Soils are primarily derived from basalt, and textures are widely variable. Elevations range from approximately 1370 to 2251 meters. Dominant and characteristic shrubs include *Symphoricarpos rotundifolius* and *Chrysothamnus viscidiflorus*, and *Ribes velutinum* is often present. Dominant and characteristic herbs include *Bromus carinatus*, *Bromus tectorum*, *Crepis acuminata*, *Elymus elymoides*, and *Poa secunda*, and those often present are *Collomia grandiflora* and *Microsteris gracilis*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Symphoricarpos rotundifolius* with open cover of *Chrysothamnus viscidiflorus*. The overall shrub cover ranges from 0.2 to 20 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1991 m, Range 1370 – 2251 m

Aspect: NW (4), NE (3), SE (3)

Slope: Mean 15.2 degrees, Range 1 – 23 degrees

Macro Topography: Upper 1/3 of slope (5), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Step in slope (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: 0%

Shrub Cover: Mean 8.5%, Range 0.2 – 20%

Herb Cover: Mean 22.3%, Range 8 – 47%

Large Rock: Mean 3.6%, Range 0 – 11%

Small Rock: Mean 5.8%, Range 1 – 12%

Fines Cover: Mean 44.6%, Range 0 – 74%

Litter Cover: Mean 34.8%, Range 3 – 86%

Soil Texture (field assessed): Medium loam (3), Medium to very fine, sandy loam (2), Not recorded (1), Sandy Loam (1), Moderately fine silty clay loam (1), Moderately fine sandy clay loam (1), Coarse, loamy sand (1)

Geology (map data): Basalt (1)

**Environment:** This type is indicative of disturbance (fire, grazing, clearing) and is successional related to stands formerly dominated or co-dominated by *Artemisia tridentata* ssp. *vaseyana*.

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to open shrub layer, and the overall shrub cover ranges from 0.2 to 20 percent. The tree layer is typically absent, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Symphoricarpos rotundifolius* and *Chrysothamnus viscidiflorus*, and *Ribes velutinum* is often present. The herbaceous layer typically includes *Bromus carinatus*, *Bromus tectorum*, *Crepis acuminata*, *Elymus elymoides*, and *Poa secunda*, and those that are often present include *Collomia grandiflora* and *Microsteris gracilis*.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

This is a newly described association for California. *Symphoricarpos rotundifolius* is a synonym for *S. oreophilus*.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

None.

**Total Sample Size Used for Description:** N=10

### **Association Stand Table**

#### ***Symphoricarpos oreophilus* Association**

n =10

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Symphoricarpos rotundifolius</i>	100	8.31	0.2	37.5
<i>Chrysothamnus viscidiflorus</i>	80	3.36	0.2	11

**Association Stand Table continued**

***Symphoricarpos oreophilus* Association**

n =10

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ribes velutinum</i>	60	0.55	0.2	1.5
	<i>Artemisia tridentata</i>	40	0.73	0.2	1.5
	<i>Ericameria nauseosa</i>	30	0.9	0.2	1.5
	<i>Prunus virginiana</i>	20	1.85	0.2	3.5
	<i>Purshia tridentata</i>	20	1.75	1.5	2
<b>Herb</b>					
	<i>Bromus tectorum</i>	90	3.6	0.2	6
	<i>Elymus elymoides</i>	90	1.02	0.2	4
	<i>Crepis acuminata</i>	80	0.3	0.2	1
	<i>Poa secunda</i>	80	1.66	0.2	5
	<i>Bromus carinatus</i>	80	0.95	0.2	2
	<i>Collomia grandiflora</i>	60	0.33	0.2	1
	<i>Microsteris gracilis</i>	60	0.2	0.2	0.2
	<i>Lactuca serriola</i>	50	0.2	0.2	0.2
	<i>Elymus cinereus</i>	50	2.08	0.2	6
	<i>Lupinus argenteus</i>	50	2.84	0.2	6
	<i>Phacelia hastata</i>	50	0.2	0.2	0.2
	<i>Wyethia angustifolia</i>	40	1.85	0.2	4
	<i>Tragopogon dubius</i>	40	0.2	0.2	0.2
	<i>Poa bulbosa</i>	40	2.85	0.2	8
	<i>Phacelia humilis</i>	40	0.4	0.2	1
	<i>Lupinus arbustus</i>	40	3.9	0.2	15
	<i>Pseudoroegneria spicata</i>	30	3.23	0.2	7.5
	<i>Wyethia mollis</i>	30	18.67	14	27
	<i>Vicia americana</i>	20	0.2	0.2	0.2
	<i>Sidalcea glaucescens</i>	20	0.2	0.2	0.2
	<i>Poa pratensis</i>	20	0.2	0.2	0.2
	<i>Phlox diffusa</i>	20	0.2	0.2	0.2
	<i>Phlox caespitosa</i>	20	0.2	0.2	0.2
	<i>Madia citriodora</i>	20	0.2	0.2	0.2
	<i>Linanthus pungens</i>	20	1.1	0.2	2
	<i>Hordeum brachyantherum</i>	20	0.2	0.2	0.2
	<i>Elymus smithii</i>	20	1	1	1
	<i>Elymus glaucus</i>	20	0.2	0.2	0.2

**Association Stand Table continued**

***Symphoricarpos oreophilus* Association**

n =10

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Collinsia parviflora</i>	20	0.6	0.2	1
	<i>Castilleja chromosa</i>	20	0.2	0.2	0.2
	<i>Balsamorhiza sagittata</i>	20	2.6	0.2	5
	<i>Achnatherum thurberianum</i>	20	0.2	0.2	0.2
	<i>Achillea millefolium</i>	20	0.6	0.2	1
	<i>Festuca idahoensis</i>	20	3.75	1.5	6

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## ***Atriplex canescens* Alliance**

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PHOTO FROM DEATH VALLEY NP

**Common Name:** Fourwing saltbush scrub Alliance

**NVC Alliance Code:** A0869. *Atriplex canescens* Scrub Alliance

### **Alliance Concept**

The *Atriplex canescens* Alliance forms an open shrub layer. The emergent tree and herbaceous layers are open. It is found primarily on lower slopes on southeast aspects. Soils are typically sandy. Elevation is 1256 meters. Dominant and characteristic shrubs include *Atriplex canescens*, *Psoralea polydenia*, and *Tetradymia glabrata*. Dominant and characteristic herbs include *Bromus tectorum*, *Amsinckia tessellata*, and *Chylisma claviformis* subsp. *cruciformis*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Atriplex canescens* with sparse *Psoralea polydenia* and *Tetradymia glabrata*. The overall shrub cover is roughly 8 percent.

### **Local Alliance Distribution**

**Northwestern Basin and Range:** Cottonwood - Skedaddle Mountains (342Bd)

## **Associations**

None.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1256 m

Aspect: SE (1)

Slope: 17 degrees

Macro Topography: Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 8%

Herb Cover: 11%

Large Rock: 0%

Small Rock: 0%

Fines Cover: 94%

Litter Cover: 3%

Soil Texture (field assessed): Medium sand (1)

Geology (map data): None.

**Environment:** Stands of this alliance exist around the alkali lakes.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open shrub layer, and the overall shrub cover is approximately 8 percent. The tree and herbaceous layers are sparse.

**Vegetation Floristics:** Characteristic shrubs include *Atriplex canescens*, *Psoralea polydenia*, and *Tetradymia glabrata*. The herbaceous layer typically includes *Bromus tectorum*, *Amsinckia tessellata*, and *Chylisma claviformis* subsp. *cruciformis*.

**Species of Interest:** None.

## **Classification Comments**

This alliance is uncommon within the study area, but it is a well-defined type and is found widely throughout California deserts and the San Joaquin Valley.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G5    **State:** S4



## References

None.

Total Sample Size Used for Description: N=1

## Alliance Stand Table

### *Atriplex canescens* Alliance

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Atriplex canescens</i>	100	5	5	5
	<i>Psoralea arguta</i>	100	2	2	2
	<i>Tetradymia glabrata</i>	100	1	1	1
<b>Herb</b>					
	<i>Chylisma claviformis subsp. cruciformis</i>	100	0.2	0.2	0.2
	<i>Amsinckia tessellata</i>	100	2	2	2
	<i>Bromus tectorum</i>	100	8	8	8

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## ***Atriplex confertifolia* Alliance**

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PHOTO FROM DEATH VALLEY NP

**Common Name:** Shadscale scrub Alliance

**NVC Alliance Code:** A0870. *Atriplex confertifolia* Scrub Alliance

### **Alliance Concept**

The *Atriplex confertifolia* Alliance forms an open shrub layer. The emergent tree layer is typically sparse and the herbaceous layer is open. It is found primarily on lower to middle southwest-facing slopes in sandy loam soils. Elevation is approximately 1294 meters. Dominant and characteristic shrubs include *Artemisia spinescens*, *Artemisia spinescens*, *Artemisia tridentata*, *Atriplex confertifolia*, *Atriplex parryi*, and *Ericameria nauseosa*. Dominant and characteristic herbs include *Bromus tectorum*, *Astragalus curvicaupus*, and *Erodium cicutarium*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Artemisia spinescens*, *Artemisia spinescens*, *Artemisia tridentata*, *Atriplex confertifolia*, *Atriplex parryi*, and *Ericameria nauseosa*.

### **Local Alliance Distribution**

**Northwestern Basin and Range:** Cottonwood - Skedaddle Mountains (342Bd)

**Associations**

None.

**Environmental Description**

**Plot/Sample Data Environmental Summary:**

Elevation: 1294 m

Aspect: SW (1)

Slope: 5 degrees

Macro Topography: Lower to Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 10%

Herb Cover: 13%

Large Rock: 3%

Small Rock: 32%

Fines Cover: 60%

Litter Cover: 2%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): None recorded.

**Environment:** Large stands exist in the Surprise Valley, east of the Alkali Lakes area, and on the north shore of Honey Lake. They mix with those of the *Sarcobatus vermiculatus* and *Suaeda moquinii* alliances near the margins of playas.

**Vegetation Description**

**Vegetation Structure:** The Alliance forms an open shrub layer, and the overall shrub cover is around 10 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Artemisia spinescens*, *Artemisia spinescens*, *Artemisia tridentata*, *Atriplex confertifolia*, *Atriplex parryi*, and *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum*, *Astragalus curvicaupus*, and *Erodium cicutarium*.

**Species of Interest:** None

**Classification Comments**

This alliance is under-sampled and relatively uncommon within the study area although it is a well-defined type for California.

**Classification Confidence:** High

**Conservation Status Rank**

**Global:** G5    **State:** S4

**References**

None.

**Total Sample Size Used for Description:** N=1

**Alliance Stand Table**

***Atriplex confertifolia* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia spinescens</i>	100	5	5	5
	<i>Artemisia tridentata</i>	100	1	1	1
	<i>Atriplex confertifolia</i>	100	2	2	2
	<i>Ericameria nauseosa</i>	100	0.2	0.2	0.2
	<i>Atriplex parryi</i>	100	2	2	2
<b>Herb</b>					
	<i>Erodium cicutarium</i>	100	1	1	1
	<i>Bromus tectorum</i>	100	10	10	10
	<i>Astragalus curvicaupus</i>	100	1	1	1



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## ***Betula occidentalis* Alliance**

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PHOTO FROM BIG PINE CREEK

**Common Name:** Water birch thicket Alliance

**NVC Alliance Code:** A3772. *Betula occidentalis* Wet Shrubland Alliance

### **Alliance Concept**

The *Betula occidentalis* Alliance forms an open shrub layer. The emergent tree layer is typically sparse and the herbaceous layer is open. It is found primarily at the bottom to lower third of northeast-facing slopes. Soil textures are typically moderately coarse, sandy loams. Elevation is approximately 1840 meters. Dominant and characteristic shrubs include *Betula occidentalis*, *Rosa woodsii*, and *Salix lasiolepis*. Commonly associated emergent trees include *Pinus jeffreyi*, *Juniperus occidentalis*, *Pinus ponderosa*, and *Populus tremuloides*. Dominant and characteristic herbs include *Achillea millefolium*, *Aquilegia formosa*, *Carex nebrascensis*, *Cerastium fontanum* ssp. *vulgare*, *Galium trifidum*, *Juncus arcticus*, *Mimulus guttatus*, *Montia chamissoi*, *Poa*

*pratensis*, *Ranunculus occidentalis*, *Taraxacum officinale*, *Veronica americana*, *Veronica serpyllifolia*, and *Vicia americana*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Betula occidentalis* with lower cover of *Salix lasiolepis* and sparse *Rosa woodsii*.

### **Local Alliance Distribution**

**Northwestern Basin and Range:** Cottonwood - Skedaddle Mountains (342Bd)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1840 m, Range 1840 – 1840 m

Aspect: NE (1)

Slope: Mean 12 degrees.

Macro Topography: Bottom to Lower 1/3 of slope (1)

Tree Cover: 3%

Shrub Cover: 25%

Herb Cover: 20%

Large Rock: 2%

Small Rock: 14%

Fines Cover: 27%

Litter Cover: 30%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): None recorded.

**Environment:** Stands of *Betula occidentalis* are found in intermittently saturated stream banks, alluvial terraces, and seeps.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open shrub layer. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Betula occidentalis*, *Rosa woodsii*, and *Salix lasiolepis*. The tree layer is emergent and typically or often includes *Pinus jeffreyi*, *Juniperus occidentalis*, *Pinus ponderosa*, and *Populus tremuloides*. The herbaceous layer typically includes *Achillea millefolium*, *Aquilegia formosa*, *Carex nebrascensis*, *Cerastium fontanum* ssp. *vulgare*, *Galium trifidum*, *Juncus arcticus*, *Mimulus guttatus*, *Montia chamissoi*, *Poa pratensis*, *Ranunculus*

*occidentalis*, *Taraxacum officinale*, *Veronica americana*, *Veronica serpyllifolia*, and *Vicia americana*.

**Species of Interest:** None.

### **Classification Comments**

This alliance is under-sampled and relatively uncommon within the study area although it is a well-defined type for California.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S2

### **References**

None.

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Betula occidentalis* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Pinus jeffreyi</i>	100	2	2	2
	<i>Pinus ponderosa</i>	100	1	1	1
	<i>Juniperus occidentalis</i>	100	0.2	0.2	0.2
	<i>Populus tremuloides</i>	100	0.2	0.2	0.2
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	100	0.2	0.2	0.2
	<i>Abies concolor</i>	100	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Betula occidentalis</i>	100	21	21	21
	<i>Rosa woodsii</i>	100	0.2	0.2	0.2
	<i>Salix lasiolepis</i>	100	4	4	4
<b>Herb</b>					
	<i>Montia chamissoi</i>	100	0.2	0.2	0.2
	<i>Vicia americana</i>	100	0.2	0.2	0.2
	<i>Poa pratensis</i>	100	1	1	1
	<i>Ranunculus occidentalis</i>	100	1	1	1
	<i>Taraxacum officinale</i>	100	1	1	1
	<i>Veronica americana</i>	100	1	1	1

**Alliance Stand Table continued**

***Betula occidentalis* Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Mimulus guttatus</i>	100	0.2	0.2	0.2
<i>Veronica serpyllifolia</i>	100	0.2	0.2	0.2
<i>Trifolium</i>	100	0.2	0.2	0.2
<i>Galium trifidum</i>	100	0.2	0.2	0.2
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	100	0.2	0.2	0.2
<i>Carex nebrascensis</i>	100	0.2	0.2	0.2
<i>Carex</i>	100	4	4	4
<i>Aquilegia formosa</i>	100	2	2	2
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Poa</i>	100	1	1	1
<i>Juncus arcticus</i>	100	3	3	3



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## ***Ceanothus velutinus* Alliance**

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**Common Name:** Tobacco brush or snow bush chaparral Alliance

**NVC Alliance Code:** A3936. *Ceanothus velutinus* Shrubland Alliance

### **Alliance Concept**

The *Ceanothus velutinus* Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse or absent and the herbaceous layer is sparse to open. Stands of this alliance are found primarily from low slopes to ridgetops at northeastern, southeastern, and southwestern aspects. They occur on a variety of loam soils generally derived from igneous, basalt, or general volcanic extrusive substrates. Elevation range is approximately 1778 – 2254 meters. *Ceanothus velutinus* is the dominant and characteristic shrub, and *Symphoricarpos rotundifolius* is often present. Dominant and characteristic herbs include *Bromus carinatus*, *Bromus tectorum*, and *Elymus elymoides*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Ceanothus velutinus* with the overall shrub cover ranging from 8 to 50 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi)

## **Associations**

*Ceanothus velutinus* Association

*Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1992 m, Range 1778 – 2254 m

Aspect: NE (12), SE (2), SW (1)

Slope: Mean 12.3 degrees, Range 5 – 20 degrees

Macro Topography: Middle 1/3 of slope (5), Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (3), Lower to Middle 1/3 of slope (2), Lower 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 0.1%, Range 0 – 2%

Shrub Cover: Mean 30.1%, Range 8 – 50%

Herb Cover: Mean 8.1%, Range 2 – 21%

Large Rock: Mean 5.3%, Range 0 – 24%

Small Rock: Mean 9.3%, Range 0 – 22%

Fines Cover: Mean 28.8%, Range 0 – 73%

Litter Cover: Mean 44.9%, Range 0 – 82%

Soil Texture (field assessed): Moderately fine sandy clay loam (4), Medium to very fine, sandy loam (4), Medium loam (3), Moderately coarse, sandy loam (2), Moderately fine silty clay loam (1)

Geology (map data): General volcanic extrusives (3), Igneous (type unknown) (1), Basalt (1)

**Environment:** Typically found on moderately steep (>10 degrees), north-facing slopes. Emergent *Abies concolor* may be present.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 8 to 50 percent. The tree layer is typically absent, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ceanothus velutinus*, and *Symphoricarpos rotundifolius* is often present. The tree layer is usually emergent or

absent. The herbaceous layer typically includes *Bromus carinatus*, *Bromus tectorum*, and *Elymus elymoides*.

**Dynamics:** Locally, *Ceanothus velutinus* germinates from the seed bank within burned stands of conifers or *Cercocarpus ledifolius*.

**Species of Interest:** *Iliamna bakeri*, *Salix bebbiana*, *Senecio hydrophiloides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S4

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=16

## **Alliance Stand Table**

### ***Ceanothus velutinus* Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Abies concolor</i>	13	0.2	0.2	0.2
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	13	0.6	0.2	1
	<i>Pinus jeffreyi</i>	13	1.6	0.2	3
<b>Seedling</b>					
	<i>Abies concolor</i>	13	0.6	0.2	1
	<i>Pinus ponderosa</i>	13	1.6	0.2	3
	<i>Juniperus occidentalis</i>	13	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Ceanothus velutinus</i>	100	20.69	7	44
	<i>Symphoricarpos rotundifolius</i>	69	2.96	0.2	10
	<i>Prunus emarginata</i>	50	6.7	0.2	20
	<i>Artemisia tridentata</i>	38	1.47	0.2	5
	<i>Ericameria nauseosa</i>	38	1.9	0.2	5
	<i>Prunus virginiana</i>	25	1.35	0.2	4
	<i>Ribes velutinum</i>	25	1.4	0.2	5
	<i>Chrysothamnus viscidiflorus</i>	19	0.2	0.2	0.2

## Alliance Stand Table continued

### **Ceanothus velutinus Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ribes cereum</i>	19	1.13	0.2	3
	<i>Sambucus racemosa</i>	19	0.8	0.2	2
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	19	6.07	0.2	14
	<i>Arctostaphylos patula</i>	19	1.07	0.2	2
	<i>Cercocarpus ledifolius</i>	13	0.6	0.2	1
	<i>Purshia tridentata</i>	13	1.5	1	2
<b>Herb</b>					
	<i>Elymus elymoides</i>	75	0.95	0.2	3
	<i>Bromus tectorum</i>	69	3.13	0.2	28
	<i>Bromus carinatus</i>	56	0.8	0.2	3
	<i>Crepis acuminata</i>	44	0.83	0.2	2
	<i>Poa secunda</i>	38	2.27	0.2	6
	<i>Achnatherum thurberianum</i>	31	0.96	0.2	4
	<i>Phacelia hastata</i>	31	0.2	0.2	0.2
	<i>Phacelia humilis</i>	31	0.36	0.2	1
	<i>Poa bulbosa</i>	31	1.68	0.2	4
	<i>Collomia grandiflora</i>	25	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	25	0.2	0.2	0.2
	<i>Lupinus argenteus</i>	25	3.1	0.2	11
	<i>Lupinus arbustus</i>	25	0.4	0.2	1
	<i>Elymus</i>	25	0.65	0.2	2
	<i>Wyethia angustifolia</i>	25	2.55	0.2	7
	<i>Festuca idahoensis</i>	25	1.35	0.2	3
	<i>Madia citriodora</i>	19	0.2	0.2	0.2
	<i>Wyethia mollis</i>	19	1.4	0.2	2
	<i>Phlox caespitosa</i>	19	0.73	0.2	1
	<i>Penstemon roezlii</i>	19	0.2	0.2	0.2
	<i>Microsteris gracilis</i>	19	0.2	0.2	0.2
	<i>Iliamna bakeri</i>	19	5.73	0.2	16
	<i>Epilobium minutum</i>	19	0.2	0.2	0.2
	<i>Castilleja chromosa</i>	19	0.47	0.2	1
	<i>Achillea millefolium</i>	19	0.47	0.2	1
	<i>Agastache urticifolia</i>	19	0.2	0.2	0.2
	<i>Gayophytum diffusum</i>	13	3.1	0.2	6
	<i>Claytonia rubra</i>	13	0.2	0.2	0.2
	<i>Stipa</i>	13	1.6	0.2	3

**Alliance Stand Table continued**

***Ceanothus velutinus* Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Phacelia</i>	13	0.2	0.2	0.2
	<i>Orthocarpus cuspidatus</i>	13	0.2	0.2	0.2
	<i>Lactuca serriola</i>	13	0.6	0.2	1
	<i>Hordeum brachyantherum</i>	13	2	1	3
	<i>Elymus smithii</i>	13	1.5	1	2
	<i>Delphinium andersonii</i>	13	0.2	0.2	0.2
	<i>Cryptantha torreyana</i>	13	0.2	0.2	0.2
	<i>Collinsia parviflora</i>	13	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	13	0.6	0.2	1
	<i>Cryptantha</i>	13	0.2	0.2	0.2

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## ***Ceanothus velutinus* Association**

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**Common Name:** Tobacco Brush

**NVC Association Code:** CEG002167, *Ceanothus velutinus* Shrubland

**Alliance:** *Ceanothus velutinus* Alliance

### **Association Concept**

The *Ceanothus velutinus* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is typically open. The association is found from lower to upper slopes at mostly northeastern aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, igneous (type unknown), or basalt, typically with a sandy loam texture. Elevations range from approximately 1778 to 2232 meters. The dominant and characteristic shrub is *Ceanothus velutinus*, and *Symphoricarpos rotundifolius* is often present. *Elymus elymoides* is characteristic in the herb layer, *Bromus carinatus* and *Bromus tectorum* are often present.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Ceanothus velutinus*. The overall shrub cover ranges from 8 to 47 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1986 m, Range 1778 – 2232 m

Aspect: NE (8), SE (1), SW (1)

Slope: Mean 12.6 degrees, Range 5 – 20 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Lower 1/3 of slope (1)

Tree Cover: Mean 0%, Range 0 – 0.2%

Shrub Cover: Mean 27.6%, Range 8 – 47%

Herb Cover: Mean 9.5%, Range 2 – 21%

Large Rock: Mean 4.8%, Range 0 – 12%

Small Rock: Mean 10.4%, Range 2 – 22%

Fines Cover: Mean 35.4%, Range 3 – 73%

Litter Cover: Mean 42.1%, Range 11 – 70%

Soil Texture (field assessed): Moderately fine sandy clay loam (4), Medium to very fine, sandy loam (2), Medium loam (3), Moderately coarse, sandy loam (1)

Geology (map data): General volcanic extrusives (1), Igneous (type unknown) (1), Basalt (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 8 to 47 percent. The tree layer is typically sparse or absent, and the herb layer is typically open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ceanothus velutinus*. *Symphoricarpos rotundifolius* is often present. *Elymus elymoides* is characteristic in the herb layer, *Bromus carinatus* and *Bromus tectorum* are often present.

**Dynamics:** *Ceanothus velutinus* is strongly dominant in the shrub layer.

**Species of Interest:** *Iliamna bakeri*, *Senecio hydrophiloides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=11

### **Association Stand Table**

#### ***Ceanothus velutinus* Association**

n =11

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Pinus ponderosa</i>	18	1.6	0.2	3
<b>Shrub</b>				
<i>Ceanothus velutinus</i>	100	22.82	7	44
<i>Symphoricarpos rotundifolius</i>	73	1.83	0.2	5
<i>Ericameria nauseosa</i>	45	1.28	0.2	3
<i>Artemisia tridentata</i>	36	0.9	0.2	3
<i>Sambucus racemosa</i>	27	0.8	0.2	2
<b>Shrub</b>				
<i>Ribes cereum</i>	27	1.13	0.2	3
<i>Prunus emarginata</i>	27	0.2	0.2	0.2
<i>Ribes velutinum</i>	27	0.2	0.2	0.2
<i>Purshia tridentata</i>	18	1.5	1	2
<i>Prunus virginiana</i>	18	0.6	0.2	1

## Association Stand Table continued

### ***Ceanothus velutinus* Association**

n =11

Lifeform	Botanical Name	Con	Avg	Min	Max
Shrub					
	<i>Chrysothamnus viscidiflorus</i>	18	0.2	0.2	0.2
Herb					
	<i>Elymus elymoides</i>	91	1.1	0.2	3
	<i>Bromus tectorum</i>	73	4.23	0.2	28
	<i>Bromus carinatus</i>	73	0.88	0.2	3
	<i>Poa secunda</i>	45	2.68	0.2	6
	<i>Poa bulbosa</i>	45	1.68	0.2	4
	<i>Crepis acuminata</i>	45	1.08	0.2	2
	<i>Lupinus argenteus</i>	36	3.1	0.2	11
	<i>Lupinus arbustus</i>	36	0.4	0.2	1
	<i>Phacelia humilis</i>	36	0.2	0.2	0.2
	<i>Achnatherum thurberianum</i>	36	1.15	0.2	4
	<i>Phacelia hastata</i>	36	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	36	0.2	0.2	0.2
	<i>Wyethia angustifolia</i>	36	2.55	0.2	7
	<i>Epilobium minutum</i>	27	0.2	0.2	0.2
	<i>Collomia grandiflora</i>	27	0.2	0.2	0.2
	<i>Achillea millefolium</i>	27	0.47	0.2	1
	<i>Madia citriodora</i>	27	0.2	0.2	0.2
	<i>Phacelia</i>	18	0.2	0.2	0.2
	<i>Stipa</i>	18	1.6	0.2	3
	<i>Epilobium brachycarpum</i>	18	0.6	0.2	1
	<i>Festuca idahoensis</i>	18	1.1	0.2	2
	<i>Elymus smithii</i>	18	1.5	1	2
	<i>Gayophytum diffusum</i>	18	3.1	0.2	6
	<i>Hordeum brachyantherum</i>	18	2	1	3
	<i>Iliamna bakeri</i>	18	8.1	0.2	16
	<i>Lactuca serriola</i>	18	0.6	0.2	1
	<i>Microsteris gracilis</i>	18	0.2	0.2	0.2
	<i>Phlox caespitosa</i>	18	0.6	0.2	1
	<i>Penstemon roezlii</i>	18	0.2	0.2	0.2
	<i>Delphinium andersonii</i>	18	0.2	0.2	0.2
	<i>Elymus</i>	18	0.2	0.2	0.2
	<i>Cryptantha torreyana</i>	18	0.2	0.2	0.2
	<i>Claytonia rubra</i>	18	0.2	0.2	0.2



**Association Stand Table continued**

***Ceanothus velutinus* Association**

n =11

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Wyethia mollis</i>	18	1.1	0.2	2
	<i>Castilleja chromosa</i>	18	0.2	0.2	0.2
	<i>Agastache urticifolia</i>	18	0.2	0.2	0.2
	<i>Orthocarpus cuspidatus</i>	18	0.2	0.2	0.2

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## ***Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata* Association**

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**Common Name:** Tobacco Brush

**NVC Association Code:** C EGL002167, *Ceanothus velutinus* Shrubland

**Alliance:** *Ceanothus velutinus* Alliance

### **Association Concept**

The *Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The association is found primarily from middle slopes to ridgetops at mostly northeastern aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, with moderately fine silty clay loam or coarse to fine sandy loam textures. Elevations range from approximately 1839 to 2254 meters. *Ceanothus velutinus* and *Prunus emarginata* are both characteristic shrubs, but *Ceanothus velutinus* often dominates the stand. *Symphoricarpos rotundifolius* and *Arctostaphylos patula* are often present. *Bromus tectorum* is often present in the herbaceous layer.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Ceanothus velutinus* and *Prunus emarginata*. The overall shrub cover ranges from 30 to 50 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 2003 m, Range 1839 – 2254 m

Aspect: NE (4), SE (1)

Slope: Mean 11.4 degrees, Range 10 – 15 degrees

Macro Topography: Middle 1/3 of slope (3), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: Mean 0.6%, Range 0 – 2%

Shrub Cover: Mean 35.4%, Range 30 – 50%

Herb Cover: Mean 5.4%, Range 3 – 8%

Large Rock: Mean 6.3%, Range 0 – 24%

Small Rock: Mean 6.8%, Range 0 – 26%

Fines Cover: Mean 14.2%, Range 0 – 26%

Litter Cover: Mean 50.4%, Range 0 – 82%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (1), Moderately fine silty clay loam (1), Not recorded (1)

Geology (map data): General volcanic extrusives (2), Not recorded (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 30 to 50 percent. The tree layer is typically sparse, and the herb layer is open.

**Vegetation Floristics:** The dominant shrub is *Ceanothus velutinus* and *Symphoricarpos rotundifolius* is characteristic. The herbaceous layer often includes *Bromus tectorum*.

**Dynamics:** *Ceanothus velutinus* is co-dominant with *Prunus emarginata*. Other shrubs like *Symphoricarpos rotundifolius* and *Artemisia tridentata* (ssp. *vaseyana*) are often present.

**Species of Interest:** *Iliamna bakeri*, *Salix bebbiana*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G3? **State:** Y

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=5

### **Association Stand Table**

#### ***Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata* Association**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Pinus jeffreyi</i>	20	0.2	0.2	0.2
<i>Juniperus occidentalis</i>	20	0.2	0.2	0.2
<i>Abies concolor</i>	20	0.2	0.2	0.2
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	40	0.6	0.2	1
<i>Abies concolor</i>	20	0.2	0.2	0.2
<i>Pinus jeffreyi</i>	20	0.2	0.2	0.2

**Association Stand Table continued**

***Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata* Association**

n =5

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Abies concolor</i>	20	0.2	0.2	0.2
	<i>Pinus jeffreyi</i>	20	0.2	0.2	0.2
	<i>Juniperus occidentalis</i>	20	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Ceanothus velutinus</i>	100	16	8	26
	<i>Prunus emarginata</i>	100	10.6	1	20
	<i>Symphoricarpos rotundifolius</i>	60	6	3	10
	<i>Arctostaphylos patula</i>	60	1.07	0.2	2
	<i>Prunus virginiana</i>	40	2.1	0.2	4
	<i>Artemisia tridentata</i>	40	2.6	0.2	5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	40	2.1	0.2	4
	<i>Ribes</i>	20	0.2	0.2	0.2
	<i>Amelanchier utahensis</i>	20	0.2	0.2	0.2
	<i>Cercocarpus ledifolius</i>	20	1	1	1
	<i>Ericameria nauseosa</i>	20	5	5	5
	<i>Ribes aureum</i>	20	5	5	5
	<i>Ribes velutinum</i>	20	5	5	5
	<i>Salix bebbiana</i>	20	0.2	0.2	0.2
	<i>Sambucus</i>	20	0.2	0.2	0.2
	<i>Chrysothamnus viscidiflorus</i>	20	0.2	0.2	0.2
<b>Herb</b>					
	<i>Bromus tectorum</i>	60	0.2	0.2	0.2
	<i>Elymus</i>	40	1.1	0.2	2
	<i>Elymus elymoides</i>	40	0.2	0.2	0.2
	<i>Crepis acuminata</i>	40	0.2	0.2	0.2
	<i>Festuca idahoensis</i>	40	1.6	0.2	3
	<i>Agastache</i>	20	4	4	4
	<i>Stellaria longipes</i>	20	0.2	0.2	0.2
	<i>Galium</i>	20	0.2	0.2	0.2
	<i>Hieracium scouleri</i>	20	0.2	0.2	0.2
	<i>Poa pratensis</i>	20	0.2	0.2	0.2
	<i>Delphinium nuttallianum</i>	20	0.2	0.2	0.2
	<i>Collomia grandiflora</i>	20	0.2	0.2	0.2
	<i>Achnatherum thurberianum</i>	20	0.2	0.2	0.2

**Association Stand Table continued**

***Ceanothus velutinus* – *Prunus emarginata* – *Artemisia tridentata*  
Association**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Leymus triticoides</i>	20	1	1	1
<i>Agastache urticifolia</i>	20	0.2	0.2	0.2
<i>Achnatherum occidentale</i>	20	3	3	3
<i>Bromus carinatus</i>	20	0.2	0.2	0.2
<i>Castilleja chromosa</i>	20	1	1	1
<i>Chenopodium</i>	20	0.2	0.2	0.2
<i>Collinsia parviflora</i>	20	0.2	0.2	0.2
<i>Cryptantha</i>	20	0.2	0.2	0.2
<i>Penstemon roezlii</i>	20	0.2	0.2	0.2
<i>Phlox speciosa</i>	20	0.2	0.2	0.2
<i>Phlox diffusa</i>	20	0.2	0.2	0.2
<i>Silene</i>	20	0.2	0.2	0.2
<i>Senecio integerrimus</i>	20	0.2	0.2	0.2
<i>Poa secunda</i>	20	0.2	0.2	0.2
<i>Phlox caespitosa</i>	20	1	1	1
<i>Iliamna bakeri</i>	20	1	1	1
<i>Phacelia hastata</i>	20	0.2	0.2	0.2
<i>Kelloggia galioides</i>	20	4	4	4
<i>Paeonia brownii</i>	20	0.2	0.2	0.2
<i>Microsteris gracilis</i>	20	0.2	0.2	0.2
<i>Melica</i>	20	0.2	0.2	0.2
<i>Madia</i>	20	0.2	0.2	0.2
<i>Lupinus</i>	20	1	1	1
<i>Wyethia mollis</i>	20	2	2	2
<i>Phacelia humilis</i>	20	1	1	1

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## ***Cercocarpus ledifolius* Alliance**

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**Common Name:** Curl leaf mountain mahogany scrub Alliance

**NVC Alliance Code:** A0586. *Cercocarpus ledifolius* Shrubby Woodland Alliance

### **Alliance Concept**

The *Cercocarpus ledifolius* Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse to open and the herbaceous layer is sparse to intermittent. It is found primarily from middle slopes to ridgetops at all aspects. Soils are derived from a variety of substrates but primarily basalt, igneous, or general volcanic extrusives and textures are widely variable. Elevation range is approximately 1336 – 2218 meters. The dominant and characteristic shrub is *Cercocarpus ledifolius*, which is in some cases emergent, and *Ribes velutinum* is often present. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Cercocarpus ledifolius*. The overall shrub cover ranges from 10 to 50 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* Association

*Cercocarpus ledifolius* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1813 m, Range 1336 – 2218 m

Aspect: NE (16), NW (8), SE (7), SW (7), Flat (4), Variable (1)

Slope: Mean 13.4 degrees, Range 0 – 37 degrees

Macro Topography: Upper 1/3 of slope (11), Middle 1/3 of slope (6), Upper 1/3 of slope to Ridgetop (6), Midslope (6), Middle to Upper 1/3 of slope (4), High slope (4), Ridge top (2), Lower to Middle 1/3 of slope (1), Lower 1/3 of slope (1), Other (1), Step in slope (1), Lowslope (1)

Tree Cover: Mean 1.1%, Range 0 – 15%

Shrub Cover: Mean 27.8%, Range 10 – 50%

Herb Cover: Mean 16.9%, Range 4 – 50%

Large Rock: Mean 11.6%, Range 0 – 75%

Small Rock: Mean 12.6%, Range 0.2 – 47%

Fines Cover: Mean 24.2%, Range 0.25 – 71%

Litter Cover: Mean 30.8%, Range 1.6 – 86%

Soil Texture (field assessed): Moderately fine sandy clay loam (8), Medium to very fine, sandy loam (6), Sand (5), Moderately fine clay loam (5), Sandy Loam (4), Moderately coarse, sandy loam (3), Medium silt loam (3), Medium to very fine, loamy sand (2), Medium loam (2), Loamy Sand (1), Loam (1), Rock (1), Fine sandy clay (1)

Geology (map data): Basalt (8), General volcanic extrusives (8), Igneous (type unknown) (5), Andesite (2)

**Environment:** Stands of this alliance are common at higher elevation ranges within the study area.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 10 to 50 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Cercocarpus ledifolius* with *Ribes velutinum* often present. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*. *Juniperus occidentalis* is sometimes present in the tree layer.

**Species of Interest:** *Dimeresia howellii*, *Hackelia cusickii*, and *Melica spectabilis*

## **Classification Comments**

*Cercocarpus ledifolius* is variable in form and can be relatively short-statured or almost tree-like forming a multi-layered canopy with shorter shrubs in the understory. For this classification, and in general in the Manual of California Vegetation online, *C ledifolius* is considered a shrub.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G5 **State:** S4

## **References**

Keeler-Wolf and Keeler-Wolf 1976

**Total Sample Size Used for Description:** N=49

## **Alliance Stand Table**

### ***Cercocarpus ledifolius* Alliance**

n =49

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	43	1.74	0.2	5
<i>Cercocarpus ledifolius</i>	14	22.86	5	57
<i>Pinus ponderosa</i>	10	1.64	0.2	3
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	37	0.91	0.2	3.5
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	35	0.51	0.2	1.5



## Alliance Stand Table continued

### ***Cercocarpus ledifolius* Alliance**

n =49

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Cercocarpus ledifolius</i>	88	17.36	3	41
	<i>Ribes velutinum</i>	71	1.55	0.2	9
	<i>Artemisia tridentata</i>	47	6.23	0.2	18
	<i>Purshia tridentata</i>	43	2.79	0.2	17
	<i>Symphoricarpos rotundifolius</i>	43	2.55	0.2	14
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	39	8.23	0.2	30
	<i>Ericameria nauseosa</i>	37	1.17	0.2	4
	<i>Chrysothamnus viscidiflorus</i>	22	1.04	0.2	3
	<i>Ribes cereum</i>	18	1.06	0.2	3.5
	<i>Prunus emarginata</i>	12	2.32	0.2	7
	<i>Eriogonum polyanthum</i>	10	0.46	0.2	1.5
	<i>Amelanchier utahensis</i>	10	0.36	0.2	1
	<i>Ceanothus prostratus</i>	10	1.98	0.2	4
	<i>Prunus virginiana</i>	10	6.48	0.2	18
<b>Herb</b>					
	<i>Bromus tectorum</i>	71	4.19	0.2	37
	<i>Elymus elymoides</i>	65	1.79	0.2	6
	<i>Poa secunda</i>	63	3.01	0.2	20
	<i>Festuca idahoensis</i>	45	8.09	0.2	37.5
	<i>Collinsia parviflora</i>	31	1.63	0.2	13
	<i>Pseudoroegneria spicata</i>	29	5.81	0.2	17.5
	<i>Wyethia mollis</i>	29	1.86	0.2	7
	<i>Crepis acuminata</i>	29	1.27	0.2	8
	<i>Bromus carinatus</i>	27	2.38	0.2	12
	<i>Collomia grandiflora</i>	24	0.47	0.2	1
	<i>Phacelia humilis</i>	24	0.97	0.2	3
	<i>Achillea millefolium</i>	24	0.47	0.2	1
	<i>Galium aparine</i>	22	2.96	0.2	18
	<i>Lupinus argenteus</i>	22	0.67	0.2	2
	<i>Microsteris gracilis</i>	22	0.35	0.2	1
	<i>Hieracium scouleri</i>	16	0.85	0.2	3
	<i>Phacelia ramosissima</i>	16	1.63	0.2	6
	<i>Poa bulbosa</i>	14	2.06	0.2	5
	<i>Claytonia rubra</i>	14	0.86	0.2	4
	<i>Achnatherum thurberianum</i>	12	1.57	0.2	3

**Alliance Stand Table continued**

***Cercocarpus ledifolius* Alliance**

n =49

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Epilobium brachycarpum</i>	12	0.2	0.2	0.2
	<i>Phacelia heterophylla</i>	12	0.63	0.2	1.5
	<i>Viola purpurea</i>	12	0.33	0.2	1
	<i>Cryptantha</i>	10	0.2	0.2	0.2
	<i>Lupinus arbustus</i>	10	1.32	0.2	4
	<i>Madia citriodora</i>	10	0.76	0.2	3
	<i>Melica bulbosa</i>	10	1.68	0.2	4
	<i>Phlox speciosa</i>	10	0.36	0.2	1
	<i>Phlox diffusa</i>	10	0.88	0.2	1.5
	<i>Phacelia hastata</i>	10	0.2	0.2	0.2
	<i>Microseris nutans</i>	10	1.28	0.2	3.5

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## ***Cercocarpus ledifolius* Association**

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**Common Name:** Curl-leaf Mountain Mahogany

**NVC Association Code:**

**Alliance:** *Cercocarpus ledifolius* Alliance

### **Association Concept**

The *Cercocarpus ledifolius* 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. The association is found primarily on slopes and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily basalt, general volcanic extrusives, igneous (type unknown), or andesite and textures are widely variable. Elevations range from approximately 1475 to 2146 meters. Dominant and characteristic shrubs include *Cercocarpus ledifolius* and *Ribes velutinum*, and *Symphoricarpos rotundifolius* is often present. Commonly associated emergent trees at sparse cover include *Juniperus occidentalis*. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Cercocarpus ledifolius* with typically sparse *Ribes velutinum*. The overall shrub cover ranges from 15 to 50 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1871 m, Range 1475 – 2146 m

Aspect: NE (9), NW (6), SE (4), SW (4), Variable (1)

Slope: Mean 14.4 degrees, Range 3 – 37 degrees

Macro Topography: Upper 1/3 of slope (9), Upper 1/3 of slope to Ridgetop (5), Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (2), Midslope (1), Lower to Middle 1/3 of slope (1), Lower 1/3 of slope (1), High slope (1), Other (1)

Tree Cover: Mean 1%, Range 0 – 15%

Shrub Cover: Mean 28.6%, Range 15 – 50%

Herb Cover: Mean 16.4%, Range 4 – 50%

Large Rock: Mean 14.4%, Range 0 – 75%

Small Rock: Mean 12%, Range 0.2 – 47%

Fines Cover: Mean 24.2%, Range 1 – 71%

Litter Cover: Mean 38.7%, Range 4 – 86%

Soil Texture (field assessed): Moderately fine sandy clay loam (5), Medium to very fine, sandy loam (4), Moderately coarse, sandy loam (3), Moderately fine clay loam

(3), Sand (2), Medium silt loam (2), Fine sandy clay (1), Medium loam (1),  
Medium to very fine, loamy sand (1)

Geology (map data): Basalt (6), General volcanic extrusives (5), Igneous (type  
unknown) (2), Andesite (2)

**Environment:** Stands of this association are typically found on rocky, north facing  
slopes and/or where *Cercocarpus ledifolius* is dense with a closing canopy.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and  
the overall shrub cover ranges from 15 to 50 percent. The tree layer is typically sparse  
to open, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Cercocarpus  
ledifolius* and *Ribes velutinum*, and *Symphoricarpos rotundifolius* is often present at low  
cover. The tree layer is emergent and typically or often includes *Juniperus occidentalis*.  
The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa  
secunda*.

**Dynamics:** *Cercocarpus ledifolius* is strongly dominant with low cover of other shrubs  
such as *Ribes velutinum*, *Symphoricarpos rotundifolius*, and/or *Prunus virginiana*.  
*Artemisia tridentata* is typically present at low cover.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** N

### **References**

Keeler-Wolf and Keeler-Wolf 1976

**Total Sample Size Used for Description: N=25**

## Association Stand Table

### ***Cercocarpus ledifolius* Association**

n =25

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	60	1.39	0.2	4
<i>Pinus ponderosa</i>	16	1.8	0.2	3
<i>Pinus jeffreyi</i>	12	0.47	0.2	1
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	40	0.72	0.2	2
<i>Pinus ponderosa</i>	12	0.2	0.2	0.2
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	48	0.51	0.2	1.5
<b>Shrub</b>				
<i>Cercocarpus ledifolius</i>	92	20.52	8	41
<i>Ribes velutinum</i>	88	1.92	0.2	9
<i>Symphoricarpos rotundifolius</i>	60	3.21	0.2	14
<i>Artemisia tridentata</i>	40	2.34	0.2	7
<i>Ericameria nauseosa</i>	40	0.79	0.2	4
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	36	6.13	0.2	20
<i>Chrysothamnus viscidiflorus</i>	20	1.32	0.2	3
<i>Prunus virginiana</i>	20	6.48	0.2	18
<i>Ribes cereum</i>	20	0.52	0.2	1
<i>Purshia tridentata</i>	16	1.65	0.2	3.7
<i>Amelanchier alnifolia</i>	12	4.4	0.2	10
<i>Amelanchier utahensis</i>	12	0.2	0.2	0.2
<i>Prunus emarginata</i>	12	1.73	0.2	3
<i>Bromus tectorum</i>	68	2.06	0.2	7
<i>Poa secunda</i>	64	3.94	0.2	20
<i>Elymus elymoides</i>	60	1.69	0.2	6
<i>Collinsia parviflora</i>	48	1.92	0.2	13
<i>Wyethia mollis</i>	36	2.38	0.2	7
<i>Bromus carinatus</i>	36	2.42	0.2	12
<i>Crepis acuminata</i>	36	1.67	0.2	8
<i>Festuca idahoensis</i>	36	7.29	0.2	20
<i>Galium aparine</i>	32	3.68	0.2	18
<i>Hieracium scouleri</i>	32	0.85	0.2	3
<i>Collomia grandiflora</i>	32	0.5	0.2	1
<i>Phacelia humilis</i>	28	1.26	0.2	3
<i>Claytonia rubra</i>	24	0.97	0.2	4
<i>Microsteris gracilis</i>	24	0.47	0.2	1

## Association Stand Table continued

### ***Cercocarpus ledifolius* Association**

n =25

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Herb</b>				
<i>Phacelia ramosissima</i>	24	2.1	0.2	6
<i>Melica bulbosa</i>	20	1.68	0.2	4
<i>Viola purpurea</i>	16	0.4	0.2	1
<i>Pseudoroegneria spicata</i>	16	2.85	0.2	10
<i>Madia citriodora</i>	16	0.9	0.2	3
<i>Hydrophyllum capitatum</i>	16	0.6	0.2	1
<i>Achillea millefolium</i>	16	0.6	0.2	1
<i>Epilobium brachycarpum</i>	16	0.2	0.2	0.2
<i>Lupinus</i>	12	1.4	0.2	2
<i>Microseris nutans</i>	12	0.47	0.2	1
<i>Phlox speciosa</i>	12	0.47	0.2	1
<i>Senecio integerrimus</i>	12	1	1	1
<i>Lupinus arbustus</i>	12	1.47	0.2	4
<i>Clarkia rhomboidea</i>	12	7.4	0.2	20
<i>Clarkia</i>	12	0.87	0.2	2.2
<i>Poa bulbosa</i>	12	1.73	0.2	4
<i>Cryptantha</i>	12	0.2	0.2	0.2
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	16	1.1	0.2	3

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## ***Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* Association**

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**Common Name:** Curl-leaf Mountain Mahogany – Mountain Sagebrush

**NVC Association Code:** CEG001022, *Cercocarpus ledifolius* / *Artemisia tridentata* ssp. *vaseyana* Woodland

**Alliance:** *Cercocarpus ledifolius* Alliance

### **Association Concept**

The *Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* 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. The association is found primarily on slopes to ridgetops at all aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, igneous (type unknown), or basalt and textures are widely variable. Elevations range from approximately 1336 to 2218 meters. The dominant and characteristic shrub is *Cercocarpus ledifolius*, and those that are often present include *Artemisia tridentata* ssp. *vaseyana*, *Purshia tridentata*, and *Ribes velutinum*. The dominant and characteristic herb is *Bromus tectorum*, and those often present are *Elymus elymoides* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Cercocarpus ledifolius*. The overall shrub cover ranges from 10 to 37 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1791 m, Range 1336 – 2218 m

Aspect: NE (5), SW (3), Flat (3), SE (2), Not recorded (1), NW (1)

Slope: Mean 10.8 degrees, Range 0 – 28 degrees

Macro Topography: Middle 1/3 of slope (3), Midslope (3), Upper 1/3 of slope (2), Ridge top (2), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (1), Lowslope (1), High slope (1)

Tree Cover: Mean 1%, Range 0 – 12%

Shrub Cover: Mean 23.9%, Range 10 – 37%

Herb Cover: Mean 18%, Range 7 – 30%

Large Rock: Mean 6.6%, Range 1 – 23%

Small Rock: Mean 14.1%, Range 3 – 35%

Fines Cover: Mean 30.9%, Range 0.25 – 70%

Litter Cover: Mean 26.4%, Range 1.6 – 55%

Soil Texture (field assessed): Moderately fine sandy clay loam (3), Sandy Loam (3), Medium to very fine, sandy loam (2), Moderately fine clay loam (2), Medium to very fine, loamy sand (1), Medium loam (1), Loamy Sand (1), Rock (1), Medium silt loam (1)

Geology (map data): General volcanic extrusives (3), Igneous (type unknown) (3), Basalt (2)

**Environment:** Stands of this association are typically with more open shrub canopies allowing for other shrubs to co-dominate with *C. ledifolius*.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 10 to 37 percent. The tree layer is typically sparse to open, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Cercocarpus ledifolius*. Those often present include *Artemisia tridentata* ssp. *vaseyana* Purshia *tridentata*, and *Ribes velutinum*. The herbaceous layer typically includes *Bromus tectorum*, and those that are often present include *Elymus elymoides* and *Poa secunda*.

**Species of Interest:** *Melica spectabilis*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** S3

### **References**

None.

**Total Sample Size Used for Description:** N=16

### **Association Stand Table**

#### ***Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* Association**

n =16

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	38	2.62	0.2	5
<i>Cercocarpus ledifolius</i>	13	13.5	5	22



# Association Stand Table continued

## ***Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana* Association**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	38	0.68	0.2	1.5
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	31	0.52	0.2	1
<b>Shrub</b>					
	<i>Cercocarpus ledifolius</i>	94	11.99	3	19
	<i>Purshia tridentata</i>	69	1.91	0.2	5
	<i>Artemisia tridentata</i>	63	7.29	1	17.7
	<i>Ribes velutinum</i>	63	1.03	0.2	3.5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	56	11.21	0.2	30
	<i>Symphoricarpos rotundifolius</i>	31	0.88	0.2	2
	<i>Chrysothamnus viscidiflorus</i>	31	0.56	0.2	2
	<i>Ericameria nauseosa</i>	25	2.05	0.2	4
	<i>Ribes cereum</i>	19	2.23	0.2	3.5
	<i>Eriogonum umbellatum</i>	19	0.2	0.2	0.2
	<i>Ceanothus prostratus</i>	13	0.2	0.2	0.2
	<i>Eriogonum polyanthum</i>	13	0.85	0.2	1.5
	<i>Prunus emarginata</i>	13	0.85	0.2	1.5
<b>Herb</b>					
	<i>Bromus tectorum</i>	81	4.39	0.2	17.5
	<i>Elymus elymoides</i>	75	1.69	0.2	5
	<i>Poa secunda</i>	75	2.05	0.2	5
	<i>Lupinus argenteus</i>	50	0.75	0.2	2
	<i>Festuca idahoensis</i>	50	3.18	0.2	11
	<i>Achillea millefolium</i>	38	0.33	0.2	1
	<i>Phacelia humilis</i>	31	0.56	0.2	2
	<i>Pseudoroegneria spicata</i>	31	7.54	0.2	17.5
	<i>Wyethia mollis</i>	31	0.92	0.2	3
	<i>Microsteris gracilis</i>	31	0.2	0.2	0.2
	<i>Poa bulbosa</i>	25	2.3	0.2	5
	<i>Bromus carinatus</i>	25	2.3	0.2	5
	<i>Collomia grandiflora</i>	25	0.4	0.2	1
	<i>Crepis acuminata</i>	25	0.65	0.2	2
	<i>Phacelia hastata</i>	19	0.2	0.2	0.2
	<i>Galium aparine</i>	19	1.07	0.2	2

**Association Stand Table** continued

***Cercocarpus ledifolius* – *Artemisia tridentata* ssp. *vaseyana*  
Association**

n =16

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achnatherum thurberianum</i>	19	1.4	0.2	3
<i>Crepis</i>	19	1.4	0.2	2
<i>Cryptantha</i>	13	0.2	0.2	0.2
<i>Viola purpurea</i>	13	0.2	0.2	0.2
<i>Epilobium brachycarpum</i>	13	0.2	0.2	0.2
<i>Tragopogon dubius</i>	13	0.2	0.2	0.2
<i>Sisymbrium altissimum</i>	13	1.85	0.2	3.5
<i>Phlox speciosa</i>	13	0.2	0.2	0.2
<i>Phacelia linearis</i>	13	0.85	0.2	1.5
<i>Phacelia heterophylla</i>	13	0.85	0.2	1.5
<i>Orthocarpus cuspidatus</i>	13	0.2	0.2	0.2
<i>Balsamorhiza deltoidea</i>	13	0.2	0.2	0.2
<i>Mimulus nanus</i>	13	0.2	0.2	0.2
<i>Crepis occidentalis</i>	13	2.6	0.2	5
<i>Collinsia parviflora</i>	13	0.2	0.2	0.2
<i>Clarkia lassenensis</i>	13	0.85	0.2	1.5

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## ***Chrysolepis sempervirens* Alliance**

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PHOTO FROM LASSEN NATIONAL PARK

**Common Name:** Bush chinquapin chaparral Alliance

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Chrysolepis sempervirens* Alliance forms an intermittent shrub layer. It is found primarily on the upper third of northeastern-facing slopes. Soils have a medium to very fine, loamy sand texture. Elevation is approximately 2050 meters. The dominant and characteristic shrub is *Chrysolepis sempervirens*.

**Diagnostic Criteria:** This alliance is characterized by an intermittent shrub layer of *Chrysolepis sempervirens*.

### **Local Alliance Distribution**

**Modoc Plateau:** Horsehead Mountain (M261Gk)

## **Associations**

### *Chrysolepis sempervirens* Association

**Note:** Because this description is based on a single sample, the statistics of the above association are the same as the alliance. There will not be a separate description for the association.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 2050 m

Aspect: NE (1)

Slope: 16 degrees

Macro Topography: Upper 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 60%

Herb Cover: 0%

Large Rock: 0%

Small Rock: 0%

Fines Cover: 2%

Litter Cover: 93%

Soil Texture (field assessed): Medium to very fine, loamy sand (1)

Geology (map data): None recorded.

**Environment:** Ridges and steep upper slopes.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an intermittent shrub layer, and the overall shrub cover is 60 percent. The tree and herbaceous layers are typically absent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Chrysolepis sempervirens*.

**Species of Interest:** None.

## **Classification Comments**

This alliance is under-sampled and relatively uncommon within the study area although it is a well-defined type for California.

**Classification Confidence:** High

### Conservation Status Rank

Global: G4 State: S3

### References

Howard 1992d, Keeler-Wolf et al. 2003b

Total Sample Size Used for Description: N=1

### Alliance Stand Table

#### ***Chrysolepis sempervirens* Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Populus tremuloides</i>	100	1	1	1
<i>Abies concolor</i>	100	0.2	0.2	0.2
<b>Shrub</b>				
<i>Chrysolepis sempervirens</i>	100	60	60	60



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## ***Chrysothamnus viscidiflorus* Alliance**

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**Common Name:** Yellow rabbitbrush shrubland Alliance

**NVC Alliance Code:** A3195. *Chrysothamnus viscidiflorus* Steppe & Shrubland Alliance

### **Alliance Concept**

The *Chrysothamnus viscidiflorus* Alliance forms an open shrub layer. The herbaceous layer is open to continuous. It is found primarily on slopes and basin floors at all aspects. Soils are derived from a variety of substrates but primarily basalt, igneous, or andesite and textures are primarily sandy or clay loam. Elevation range is approximately 1255 – 2230 meters. The dominant and characteristic shrub is *Chrysothamnus viscidiflorus*. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Chrysothamnus viscidiflorus*. The overall shrub cover ranges from 5 to 18 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Chrysothamnus viscidiflorus* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1604 m, Range 1255 – 2230 m

Aspect: NW (5), NE (3), SE (2), SW (1)

Slope: Mean 7.5 degrees, Range 0 – 20 degrees

Macro Topography: Lower 1/3 of slope (3), Upper 1/3 of slope (2), Basin floor (1), Middle to Upper 1/3 of slope (1), Lower to Middle 1/3 of slope (1), High level (1), Bench (1), High slope (1)

Tree Cover: Mean 0.1%, Range 0 – 1%

Shrub Cover: Mean 9.6%, Range 5 – 18%

Herb Cover: Mean 23.8%, Range 10 – 80%

Large Rock: Mean 1.2%, Range 0 – 6%

Small Rock: Mean 17.6%, Range 0 – 72%

Fines Cover: Mean 42.2%, Range 5 – 93%

Litter Cover: Mean 19.7%, Range 3 – 75%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately fine sandy clay loam (2), Fine silty clay (1), Sandy Loam (1), Sand (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Loam (1)

Geology (map data): Basalt (2), Igneous (type unknown) (1), Andesite (1)

**Environment:** Stands of *Chrysothamnus viscidiflorus* are found on flat to moderately sloping, disturbed sites on slopes, ridges and in valleys.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open shrub layer, and the overall shrub cover ranges from 5 to 18 percent. The tree layer is typically sparse or absent, and the herbaceous layer is open to continuous.

**Vegetation Floristics:** The dominant and characteristic shrub is *Chrysothamnus viscidiflorus*. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Species of Interest:** *Iliamna bakeri*

### **Classification Comments**

Stands of *Chrysothamnus viscidiflorus* have ecological and, sometimes, floristic overlap with stands of *Ericameria nauseosa* which can make differentiating these two alliances difficult, although *Chrysothamnus viscidiflorus* tends to occur at higher elevations.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S5

### **References**

DiPaolo et al. 2015, Evens et al. 2014

**Total Sample Size Used for Description:** N=13

### **Alliance Stand Table**

#### ***Chrysothamnus viscidiflorus* Alliance**

n =13

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	15	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Chrysothamnus viscidiflorus</i>	100	12.04	3	45
	<i>Purshia tridentata</i>	31	0.58	0.2	1.7
	<i>Tetradymia canescens</i>	31	0.4	0.2	1
	<i>Artemisia tridentata</i>	31	0.4	0.2	1
	<i>Ericameria nauseosa</i>	23	2.07	0.2	3
	<i>Ribes velutinum</i>	23	0.47	0.2	1
	<i>Amelanchier utahensis</i>	15	0.6	0.2	1
	<i>Symphoricarpos rotundifolius</i>	15	0.6	0.2	1
<b>Herb</b>					
	<i>Bromus tectorum</i>	92	4.81	0.2	30
	<i>Elymus elymoides</i>	85	3.62	0.2	20
	<i>Poa secunda</i>	77	4.09	0.2	16
	<i>Epilobium brachycarpum</i>	38	1.16	0.2	5
	<i>Achillea millefolium</i>	31	0.4	0.2	1
	<i>Achnatherum occidentale</i>	31	1.75	1	3.5
	<i>Bromus carinatus</i>	31	3.75	1	9
	<i>Festuca idahoensis</i>	31	10.05	0.2	37.5
	<i>Lupinus argenteus</i>	31	2.8	0.2	6
	<i>Achnatherum thurberianum</i>	23	0.2	0.2	0.2



## Alliance Stand Table continued

### ***Chrysothamnus viscidiflorus* Alliance**

n =13

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Elymus cinereus</i>	23	3.73	0.2	10
	<i>Phacelia hastata</i>	23	0.2	0.2	0.2
	<i>Poa bulbosa</i>	23	1.8	0.2	5
	<i>Wyethia mollis</i>	23	1.47	0.2	4
	<i>Tragopogon dubius</i>	23	0.2	0.2	0.2
	<i>Cirsium</i>	15	0.6	0.2	1
	<i>Phlox diffusa</i>	15	1.5	1.5	1.5
	<i>Thinopyrum intermedium</i>	15	2	1	3
	<i>Sidalcea oregana</i>	15	0.2	0.2	0.2
	<i>Phacelia linearis</i>	15	0.85	0.2	1.5
	<i>Packera cana</i>	15	0.2	0.2	0.2
	<i>Microsteris gracilis</i>	15	0.2	0.2	0.2
	<i>Linum lewisii</i>	15	0.6	0.2	1
	<i>Lagophylla ramosissima</i>	15	0.6	0.2	1
	<i>Lactuca serriola</i>	15	0.2	0.2	0.2
	<i>Descurainia</i>	15	0.6	0.2	1
	<i>Crepis acuminata</i>	15	0.6	0.2	1
	<i>Crepis</i>	15	0.6	0.2	1
	<i>Agoseris grandiflora</i>	15	0.2	0.2	0.2
	<i>Bromus arvensis</i>	15	4.1	0.2	8
	<i>Blepharipappus scaber</i>	15	0.6	0.2	1
	<i>Antennaria geyeri</i>	15	0.2	0.2	0.2
	<i>Sisymbrium altissimum</i>	15	2.1	0.2	4
	<i>Alyssum desertorum</i>	15	0.6	0.2	1
	<i>Koeleria macrantha</i>	15	1.85	0.2	3.5

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## ***Chrysothamnus viscidiflorus* Association**

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**Common Name:** Yellow rabbitbrush

**NVC Association Code:** CEGL002530, *Chrysothamnus viscidiflorus* Shrub Grassland

**Alliance:** *Chrysothamnus viscidiflorus* Alliance

### **Association Concept**

The *Chrysothamnus viscidiflorus* Association forms a sparse to open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to continuous. The association is found primarily from basin floors to high slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, or igneous (type unknown), and textures are widely variable. Elevations range from approximately 1255 to 2230 meters. The dominant and characteristic shrub is *Chrysothamnus viscidiflorus*. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by a sparse to open shrub layer of *Chrysothamnus viscidiflorus*. The overall shrub cover ranges from 5 to 18 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1604 m, Range 1255 – 2230 m

Aspect: NW (5), NE (3), SE (2), SW (1)

Slope: Mean 7.5 degrees, Range 0 – 20 degrees

Macro Topography: Lower 1/3 of slope (3), Upper 1/3 of slope (2), Middle to Upper 1/3 of slope (1), Lower to Middle 1/3 of slope (1), Bench (1), Basin floor (1), High slope (1), High level (1)

Tree Cover: Mean 0.1%, Range 0 – 1%

Shrub Cover: Mean 9.6%, Range 5 – 18%

Herb Cover: Mean 23.8%, Range 10 – 80%

Large Rock: Mean 1.2%, Range 0 – 6%

Small Rock: Mean 17.6%, Range 0 – 72%

Fines Cover: Mean 42.2%, Range 5 – 93%

Litter Cover: Mean 19.7%, Range 3 – 75%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Medium to very fine, sandy loam (2), Sand (1), Sandy Loam (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Loam (1), Fine silty clay (1)

Geology (map data): Basalt (2), Andesite (1), Igneous (type unknown) (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to open shrub layer, and the overall shrub cover ranges from 5 to 18 percent. The tree layer is typically sparse, and the herb layer is sparse to continuous.

**Vegetation Floristics:** The dominant and characteristic shrub is *Chrysothamnus viscidiflorus*. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*.

**Species of Interest:** *Iliamna bakeri*

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** N

## **References**

DiPaolo et al. 2015, Evens et al. 2014

**Total Sample Size Used for Description:** N=13

## **Association Stand Table**

### ***Chrysothamnus viscidiflorus* Association**

n =13

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	15	0.2	0.2	0.2
<b>Shrub</b>				
<i>Chrysothamnus viscidiflorus</i>	100	12.04	3	45
<i>Tetradymia canescens</i>	31	0.4	0.2	1
<i>Artemisia tridentata</i>	31	0.4	0.2	1
<i>Purshia tridentata</i>	31	0.58	0.2	1.7
<i>Ericameria nauseosa</i>	23	2.07	0.2	3
<i>Ribes velutinum</i>	23	0.47	0.2	1
<i>Amelanchier utahensis</i>	15	0.6	0.2	1
<i>Symphoricarpos rotundifolius</i>	15	0.6	0.2	1
<b>Herb</b>				
<i>Bromus tectorum</i>	92	4.81	0.2	30
<i>Elymus elymoides</i>	85	3.62	0.2	20

**Association Stand Table continued**

***Chrysothamnus viscidiflorus* Association**

n =13

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Poa secunda</i>	77	4.09	0.2	16
	<i>Epilobium brachycarpum</i>	38	1.16	0.2	5
	<i>Bromus carinatus</i>	31	3.75	1	9
	<i>Festuca idahoensis</i>	31	10.05	0.2	37.5
	<i>Achnatherum occidentale</i>	31	1.75	1	3.5
	<i>Achillea millefolium</i>	31	0.4	0.2	1
	<i>Lupinus argenteus</i>	31	2.8	0.2	6
	<i>Tragopogon dubius</i>	23	0.2	0.2	0.2
	<i>Wyethia mollis</i>	23	1.47	0.2	4
	<i>Poa bulbosa</i>	23	1.8	0.2	5
	<i>Phacelia hastata</i>	23	0.2	0.2	0.2
	<i>Elymus cinereus</i>	23	3.73	0.2	10
	<i>Achnatherum thurberianum</i>	23	0.2	0.2	0.2
	<i>Crepis acuminata</i>	15	0.6	0.2	1
	<i>Thinopyrum intermedium</i>	15	2	1	3
	<i>Lactuca serriola</i>	15	0.2	0.2	0.2
	<i>Sidalcea oregana</i>	15	0.2	0.2	0.2
	<i>Phlox diffusa</i>	15	1.5	1.5	1.5
	<i>Phacelia linearis</i>	15	0.85	0.2	1.5
	<i>Packera cana</i>	15	0.2	0.2	0.2
	<i>Microsteris gracilis</i>	15	0.2	0.2	0.2
	<i>Linum lewisii</i>	15	0.6	0.2	1
	<i>Lagophylla ramosissima</i>	15	0.6	0.2	1
	<i>Sisymbrium altissimum</i>	15	2.1	0.2	4
	<i>Alyssum desertorum</i>	15	0.6	0.2	1
	<i>Koeleria macrantha</i>	15	1.85	0.2	3.5
	<i>Agoseris grandiflora</i>	15	0.2	0.2	0.2
	<i>Antennaria geyeri</i>	15	0.2	0.2	0.2
	<i>Blepharipappus scaber</i>	15	0.6	0.2	1
	<i>Bromus arvensis</i>	15	4.1	0.2	8
	<i>Cirsium</i>	15	0.6	0.2	1
	<i>Crepis</i>	15	0.6	0.2	1
	<i>Descurainia</i>	15	0.6	0.2	1

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***Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance**

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**Common Name:** Red-osier dogwood - Interior rose - Currant thickets Alliance

**NVC Alliance Code:** A3773. *Cornus sericea* - *Dasiphora fruticosa* - *Ribes* spp. Wet Shrubland Alliance

**Alliance Concept**

The *Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. It is found primarily from the bottom to middle portions of slopes at northwestern and northeastern aspects. Soils are derived primarily from basalt and textures include fine silty clay and moderately fine to moderately coarse sandy, silty, or clay loam. Elevation range is approximately 1283 – 1764 meters. The dominant and characteristic shrub is *Cornus sericea*, and those that are often present include *Prunus virginiana* and *Salix lasiolepis*. *Poa pratensis* is often present in the herbaceous layer.



**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Cornus sericea* or *Rosa woodsii*. The overall shrub cover ranges from 30 to 60 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261GI), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

### **Associations**

*Cornus sericea* Association

*Rosa woodsii* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1464 m, Range 1283 – 1764 m

Aspect: NW (3), NE (2)

Slope: Mean 2.2 degrees, Range 1 – 4 degrees

Macro Topography: Bottom (3), Bottom to Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Tree Cover: Mean 0.5%, Range 0 – 4%

Shrub Cover: Mean 40%, Range 30 – 60%

Herb Cover: Mean 13.4%, Range 4 – 18%

Large Rock: Mean 3.4%, Range 0 – 11%

Small Rock: Mean 11.6%, Range 0 – 27.2%

Fines Cover: Mean 44.6%, Range 5 – 67%

Litter Cover: Mean 25.2%, Range 2 – 70%

Soil Texture (field assessed): Fine silty clay (1), Moderately fine sandy clay loam (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Medium silt loam (1)

Geology (map data): Basalt (3)

**Environment:** Stands of this alliance are found at meadow margins, stream terraces, wet valley bottoms, and slopes near springs and seeps.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 30 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Cornus sericea* and/or *Rosa woodsii*, and shrubs that are often present include *Prunus virginiana* and *Salix lasiolepis*. The herbaceous layer typically includes *Poa pratensis*.

**Dynamics:** *Cornus sericea* and *Rosa woodsii* are species that are typically found as an understory component in other riparian alliances, but will sometimes occur in small patches where they are characterizing the stand as the dominant overstory species or with other riparian shrubs.

**Species of Interest:** None.

### **Classification Comments**

This alliance has been expanded to include various non-willow riparian species, following the lead of the National Vegetation Classification with their concept of *Cornus sericea* - *Dasiphora fruticosa* - *Ribes* spp. However, we have added *Rosa woodsii* to the name since it is diagnostic of many riparian shrubland stands in the study area and in general in eastern California and the western U.S. that are not wet enough to support *Salix*, *Alnus*, or *Betula* species. We need more sampling and analysis to further describe the variation of the alliance and to evaluate relationships with related alliances.

### **Classification**

**Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G5 **State:** S3

### **References**

Klein et al. 2007, Manning and Padgett 1995, Menke et al. 2019, Smith 1998b, VegCAMP (Vegetation Classification and Mapping Program) 2014b

**Total Sample Size Used for Description:** N=5

### **Alliance Stand Table**

#### ***Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Populus tremuloides</i>	40	1.5	1	2
<i>Salix lucida</i> ssp. <i>Lasiandra</i>	20	2	2	2
<i>Juniperus occidentalis</i>	20	2	2	2
<i>Salix lucida</i> ssp. <i>caudata</i>	20	2	2	2

## Alliance Stand Table continued

### ***Cornus sericea* – *Rosa woodsii* – *Ribes spp.* Alliance**

n =5

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Calocedrus decurrens</i>	20	0.2	0.2	0.2
	<i>Abies concolor</i>	20	0.2	0.2	0.2
<b>Seedling</b>					
	<i>Pinus ponderosa</i>	20	0.2	0.2	0.2
	<i>Calocedrus decurrens</i>	20	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Cornus sericea</i>	80	32	20	55
	<i>Prunus virginiana</i>	60	6.13	0.2	18
	<i>Salix lasiolepis</i>	60	2.67	1	5
	<i>Rosa woodsii</i>	40	17.5	2	33
	<i>Salix exigua</i>	20	0.2	0.2	0.2
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	20	4	4	4
	<i>Salix scouleriana</i>	20	8	8	8
	<i>Ericameria nauseosa</i>	20	2	2	2
	<i>Betula occidentalis</i>	20	2	2	2
	<i>Mahonia aquifolium</i>	20	4	4	4
	<i>Artemisia tridentata</i>	20	0.2	0.2	0.2
	<i>Amelanchier utahensis</i>	20	2	2	2
	<i>Amelanchier alnifolia</i>	20	1	1	1
<b>Herb</b>					
	<i>Poa pratensis</i>	60	2.4	0.2	6
	<i>Claytonia rubra</i>	40	0.2	0.2	0.2
	<i>Mimulus guttatus</i>	40	1.1	0.2	2
	<i>Maianthemum stellatum</i>	40	0.6	0.2	1
	<i>Elymus glaucus</i>	40	4	4	4
	<i>Ranunculus</i>	40	1.1	0.2	2
	<i>Achillea millefolium</i>	40	0.2	0.2	0.2
	<i>Galium</i>	40	1.5	1	2
	<i>Madia glomerata</i>	20	0.2	0.2	0.2
	<i>Galium aparine</i>	20	0.2	0.2	0.2
	<i>Hieracium scouleri</i>	20	2	2	2
	<i>Festuca pratensis</i>	20	0.2	0.2	0.2
	<i>Lemna</i>	20	0.2	0.2	0.2
	<i>Elymus cinereus</i>	20	1	1	1
	<i>Lupinus argenteus</i>	20	0.2	0.2	0.2



**Alliance Stand Table continued**

***Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Mentha arvensis</i>	20	0.2	0.2	0.2
<i>Nasturtium officinale</i>	20	1	1	1
<i>Viola glabella</i>	20	0.2	0.2	0.2
<i>Phalaris arundinacea</i>	20	5	5	5
<i>Trifolium variegatum</i>	20	0.2	0.2	0.2
<i>Tragopogon dubius</i>	20	1	1	1
<i>Agrostis exarata</i>	20	7	7	7
<i>Equisetum laevigatum</i>	20	3	3	3
<i>Prunella vulgaris</i>	20	0.2	0.2	0.2
<i>Aquilegia formosa</i>	20	0.2	0.2	0.2
<i>Agrostis pallens</i>	20	2	2	2
<i>Actaea rubra</i>	20	1	1	1
<i>Equisetum hyemale</i>	20	2	2	2
<i>Agrostis gigantea</i>	20	0.2	0.2	0.2
<i>Bromus tectorum</i>	20	0.2	0.2	0.2
<i>Carex</i>	20	6	6	6
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	20	0.2	0.2	0.2
<i>Collomia grandiflora</i>	20	0.2	0.2	0.2
<i>Cryptantha torreyana</i>	20	0.2	0.2	0.2
<i>Epilobium ciliatum</i>	20	1	1	1
<i>Epilobium minutum</i>	20	0.2	0.2	0.2
<i>Equisetum</i>	20	5	5	5
<i>Agoseris grandiflora</i>	20	1	1	1

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## ***Cornus sericea* Association**

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**Common Name:** American Dogwood

**NVC Association Code:** CEGL1165. *Cornus sericea* Rocky Mountain Wet Shrubland Association

**Alliance:** *Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance

### **Association Concept**

The *Cornus sericea* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily on the bottom to lower third of north-facing slopes. Soils are primarily derived from basalt and textures include fine silty clay, moderately coarse sandy loam, moderately fine clay loam, and moderately fine sandy clay loam. Elevations range from approximately 1283 to 1466 meters. The dominant and characteristic shrub is *Cornus sericea*, and *Salix lasiolepis* is often present.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Cornus sericea*. The overall shrub cover ranges from 30 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1390 m, Range 1283 – 1466 m

Aspect: NW (3), NE (1)

Slope: Mean 2.3 degrees, Range 1 – 4 degrees

Macro Topography: Bottom (3), Bottom to Lower 1/3 of slope (1)

Tree Cover: Mean 1%, Range 0 – 4%

Shrub Cover: Mean 40%, Range 30 – 60%

Herb Cover: Mean 12.8%, Range 4– 18%

Large Rock: Mean 4.3%, Range 0 – 11%

Small Rock: Mean 6.3%, Range 0 – 11%

Fines Cover: Mean 48.3%, Range 5 – 67%

Litter Cover: Mean 22.5%, Range 2 – 70%

Soil Texture (field assessed): Fine silty clay (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1), Moderately fine sandy clay loam (1)

Geology (map data): Basalt (2)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 30 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Cornus sericea*, and *Salix lasiolepis* is often present. *Populus tremuloides* is often present in the tree layer.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

Klein et al. 2007, Manning and Padgett 1995, Smith 1998b

**Total Sample Size Used for Description: N=4**

## **Association Stand Table**

### ***Cornus sericea* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Populus tremuloides</i>	50	1.5	1	2
<i>Juniperus occidentalis</i>	25	2	2	2
<i>Salix lucida</i> ssp. <i>caudata</i>	25	2	2	2
<b>Sapling</b>				
<i>Abies concolor</i>	25	0.2	0.2	0.2
<i>Calocedrus decurrens</i>	25	0.2	0.2	0.2
<b>Seedling</b>				
<i>Calocedrus decurrens</i>	25	0.2	0.2	0.2
<b>Shrub</b>				
<i>Cornus sericea</i>	100	32	20	55
<i>Salix lasiolepis</i>	75	2.67	1	5
<i>Prunus virginiana</i>	50	9.1	0.2	18
<i>Salix scouleriana</i>	25	8	8	8
<i>Amelanchier alnifolia</i>	25	1	1	1

## Association Stand Table continued

### **Cornus sericea Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Amelanchier utahensis</i>	25	2	2	2
<i>Mahonia aquifolium</i>	25	4	4	4
<i>Rosa woodsii</i>	25	2	2	2
<i>Salix exigua</i>	25	0.2	0.2	0.2
<b>Herb</b>				
<i>Poa pratensis</i>	50	0.6	0.2	1
<i>Galium</i>	50	1.5	1	2
<i>Ranunculus</i>	50	1.1	0.2	2
<i>Maianthemum stellatum</i>	50	0.6	0.2	1
<i>Mentha arvensis</i>	25	0.2	0.2	0.2
<i>Equisetum</i>	25	5	5	5
<i>Equisetum laevigatum</i>	25	3	3	3
<i>Festuca pratensis</i>	25	0.2	0.2	0.2
<i>Hieracium scouleri</i>	25	2	2	2
<i>Lemna</i>	25	0.2	0.2	0.2
<i>Mimulus guttatus</i>	25	0.2	0.2	0.2
<i>Nasturtium officinale</i>	25	1	1	1
<i>Epilobium minutum</i>	25	0.2	0.2	0.2
<i>Prunella vulgaris</i>	25	0.2	0.2	0.2
<i>Carex</i>	25	6	6	6
<i>Trifolium variegatum</i>	25	0.2	0.2	0.2
<i>Viola glabella</i>	25	0.2	0.2	0.2
<i>Phalaris arundinacea</i>	25	5	5	5
<i>Agrostis gigantea</i>	25	0.2	0.2	0.2
<i>Achillea millefolium</i>	25	0.2	0.2	0.2
<i>Claytonia rubra</i>	25	0.2	0.2	0.2
<i>Agrostis exarata</i>	25	7	7	7
<i>Epilobium ciliatum</i>	25	1	1	1
<i>Agrostis pallens</i>	25	2	2	2
<i>Aquilegia formosa</i>	25	0.2	0.2	0.2
<i>Bromus tectorum</i>	25	0.2	0.2	0.2
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	25	0.2	0.2	0.2
<i>Elymus glaucus</i>	25	4	4	4
<i>Actaea rubra</i>	25	1	1	1

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## ***Rosa woodsii* Association**

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**Common Name:** Woods' Rose

**NVC Association Code:** CEG001126, *Rosa woodsii* Wet Shrubland

**Alliance:** *Cornus sericea* – *Rosa woodsii* – *Ribes* spp. Alliance

### **Association Concept**

The *Rosa woodsii* Association forms an intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The association is found primarily on the lower to middle third of northeast-facing slopes. Soils are derived primarily from basalt and textures include medium silt loam. Elevation is approximately 1764 meters. *Rosa woodsii* is the dominant shrub, and characteristic shrubs include *Rosa woodsii*, *Artemisia tridentata*, *Artemisia tridentata* ssp. *vaseyana*, *Betula occidentalis*, *Ericameria nauseosa*, and *Prunus virginiana*. Commonly associated emergent trees at sparse cover include *Salix lasiandra* ssp. *lasiandra*. Dominant and characteristic herbs include *Poa pratensis*, *Achillea millefolium*, *Agoseris grandiflora*, *Claytonia rubra*, *Collomia grandiflora*, *Cryptantha torreyana*, *Elymus glaucus*, *Equisetum hyemale*, *Galium aparine*, *Elymus cinereus*, *Lupinus argenteus*, *Madia glomerata*, *Mimulus guttatus*, and *Tragopogon dubius*.

**Diagnostic Criteria:** This association is characterized by an intermittent shrub layer of *Rosa woodsii*, *Artemisia tridentata*, *Artemisia tridentata* ssp. *vaseyana*, *Betula occidentalis*, *Ericameria nauseosa*, and *Prunus virginiana*. The overall shrub cover is 40 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1764 m

Aspect: NE (1)

Slope: 2 degrees

Macro Topography: Lower to Middle 1/3 of slope (1)

Tree Cover: 2%

Shrub Cover: 40%

Herb Cover: 16%

Large Rock: 0.4%

Small Rock: 27.2%

Fines Cover: 30%

Litter Cover: 36%

Soil Texture (field assessed): Medium silt loam (1)

Geology (map data): Basalt (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent shrub layer, and the overall shrub cover is 40 percent. The tree layer is typically sparse, and the herbaceous layer is open.

**Vegetation Floristics.** *Rosa woodsii* is the dominant shrub, and characteristic shrubs include *Rosa woodsii*, *Artemisia tridentata*, *Artemisia tridentata* ssp. *vaseyana*, *Betula occidentalis*, *Ericameria nauseosa*, and *Prunus virginiana*. The tree layer is emergent and typically or often includes *Salix lasiandra* ssp. *lasiandra*. The herbaceous layer typically includes *Poa pratensis*, *Achillea millefolium*, *Agoseris grandiflora*, *Claytonia rubra*, *Collomia grandiflora*, *Cryptantha torreyana*, *Elymus glaucus*, *Equisetum hyemale*, *Galium aparine*, *Elymus cinereus*, *Lupinus argenteus*, *Madia glomerata*, *Mimulus guttatus*, and *Tragopogon dubius*.

**Species of Interest:** None.

### **Classification Comments**

*Rosa woodsii* stands are typically very small and this alliance is under-sampled throughout its range in California and within the study area. Additional sampling and analysis are necessary to fully understand the variability of this type and its relationship to other associations in this alliance.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Manning and Padgett 1995, Menke et al. 2019, VegCAMP (Vegetation Classification and Mapping Program) 2014b

**Total Sample Size Used for Description: N=1**

### **Association Stand Table**

#### ***Rosa woodsii* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	100	2	2	2
Seedling				
<i>Pinus ponderosa</i>	100	0.2	0.2	0.2

## Association Stand Table continued

### ***Rosa woodsii* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Betula occidentalis</i>	100	2	2	2
<i>Rosa woodsii</i>	100	33	33	33
<i>Ericameria nauseosa</i>	100	2	2	2
<i>Artemisia tridentata</i>	100	0.2	0.2	0.2
<i>Prunus virginiana</i>	100	0.2	0.2	0.2
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	100	4	4	4
<b>Herb</b>				
<i>Elymus glaucus</i>	100	4	4	4
<i>Tragopogon dubius</i>	100	1	1	1
<i>Poa pratensis</i>	100	6	6	6
<i>Mimulus guttatus</i>	100	2	2	2
<i>Madia glomerata</i>	100	0.2	0.2	0.2
<i>Lupinus argenteus</i>	100	0.2	0.2	0.2
<i>Elymus cinereus</i>	100	1	1	1
<i>Equisetum hyemale</i>	100	2	2	2
<i>Cryptantha torreyana</i>	100	0.2	0.2	0.2
<i>Collomia grandiflora</i>	100	0.2	0.2	0.2
<i>Claytonia rubra</i>	100	0.2	0.2	0.2
<i>Agoseris grandiflora</i>	100	1	1	1
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Galium aparine</i>	100	0.2	0.2	0.2

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## ***Ericameria nauseosa* Alliance**

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**Common Name:** Rubber rabbitbrush scrub Alliance

**NVC Alliance Code:** A3196. *Ericameria nauseosa* Steppe & Shrubland Alliance

### **Alliance Concept**

The *Ericameria nauseosa* Alliance forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. It can be found at any slope position and aspect. Soils are derived from a variety of substrates but primarily basalt, general volcanic extrusives, andesite, or clayey alluvium and textures are widely variable. Elevation range is approximately 1224 – 1804 meters. The dominant and characteristic shrub is *Ericameria nauseosa*. Dominant and characteristic herbs include *Bromus tectorum* and *Elymus elymoides*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Ericameria nauseosa*. The overall shrub cover ranges from 4 to 30 percent.

### **Local Alliance Distribution**



**Modoc Plateau:** Bald Mountain - Dixie Valley (M261Gj), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Lower Klamath - Tule Lake Basins (M261Ga), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Ericameria nauseosa* Association

*Ericameria nauseosa* / *Bromus tectorum* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1432 m, Range 1224 – 1804 m

Aspect: NE (17), SE (10), SW (9), Flat (6), NW (6), Variable (2)

Slope: Mean 3.4 degrees, Range 0 – 34 degrees

Macro Topography: Lower 1/3 of slope (10), Other (9), Middle 1/3 of slope (7), Bottom to Lower 1/3 of slope (6), Bottom (3), Basin floor (2), Interfluvium/Summit (2), Lower to Middle 1/3 of slope (2), Ridge summit, crest (2), Bench (1), Upper 1/3 of slope (1), Backslope (1), Edge of basin or wetland (1), Toeslope (1), Midslope (1), Step in slope (1)

Tree Cover: Mean 0.2%, Range 0 – 5%

Shrub Cover: Mean 14.2%, Range 4 – 30%

Herb Cover: Mean 17.4%, Range 2 – 50%

Large Rock: Mean 4.9%, Range 0 – 34%

Small Rock: Mean 18.3%, Range 0 – 60%

Fines Cover: Mean 43.9%, Range 0 – 97%

Litter Cover: Mean 13.2%, Range 0 – 85%

Soil Texture (field assessed): Fine silty clay (12), Medium silt (4), Medium to very fine, sandy loam (3), Loamy Sand (3), Sand (2), Moderately fine clay loam (2), Peat (1), Medium to very fine, loamy sand (1), Medium silt loam (1), Loam (1), Fine clay (1), Sandy Loam (1), Fine sandy clay (1)

Geology (map data): Basalt (7), General volcanic extrusives (6), Andesite (6), Clayey alluvium (3), Sandy alluvium (most alluvial fans and washes) (1), Silty alluvium (1)

**Environment:** Stands of this alliance are found on all topographic settings and, typically, in disturbed settings.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open shrub layer, and the overall shrub cover ranges from 4 to 30 percent. The tree layer is typically sparse or absent, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum* and *Elymus elymoides*.

**Dynamics:** *Ericameria nauseosa* is a fast-growing, early-seral shrub that establishes after disturbance although stands are not necessarily invaded by non-natives..

**Species of Interest:** *Phacelia inundata* and *Phlox muscoides*

### **Classification Comments**

Stands of *Ericameria nauseosa* have ecological and, sometimes, floristic overlap with stands of *Chrysothamnus viscidiflorus* which can make differentiating these two alliances difficult, although they are typically separated elevationally with *Ericameria* stand occurring at relatively lower elevations within the study area.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S5

### **References**

Buck-Diaz and Evens 2011b, Evens et al. 2014, Menke et al. 2019

**Total Sample Size Used for Description:** N=59

### **Alliance Stand Table**

#### ***Ericameria nauseosa* Alliance**

n =59

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	27	1.15	0.2	3
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	100	12.51	3	37.5
	<i>Chrysothamnus viscidiflorus</i>	20	1.67	0.2	8
	<i>Artemisia arbuscula</i>	19	3.4	0.2	10
	<i>Artemisia tridentata</i>	17	1.21	0.2	3
	<i>Tetradymia glabrata</i>	14	1.08	0.2	4
<b>Herb</b>					
	<i>Bromus tectorum</i>	90	8.58	0.2	65
	<i>Elymus elymoides</i>	63	2.14	0.2	20

## Alliance Stand Table continued

### ***Ericameria nauseosa* Alliance**

n =59

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Poa secunda</i>	36	3.76	0.2	20
<i>Epilobium brachycarpum</i>	32	2.94	0.2	19
<i>Sisymbrium altissimum</i>	31	2.54	0.2	17.5
<i>Blepharipappus scaber</i>	27	0.79	0.2	3
<i>Lactuca serriola</i>	25	0.64	0.2	2
<i>Tragopogon dubius</i>	24	0.6	0.2	1
<i>Bromus arvensis</i>	24	5.26	0.2	27
<i>Elymus caput-medusae</i>	22	5.69	0.2	30
<i>Pseudoroegneria spicata</i>	19	3.7	0.2	8
<i>Achnatherum thurberianum</i>	19	5.91	1	37.5
<i>Helianthus cusickii</i>	17	3.24	0.2	11
<i>Microsteris gracilis</i>	17	0.72	0.2	3
<i>Iva axillaris</i>	14	0.3	0.2	1
<i>Epilobium minutum</i>	12	0.8	0.2	2
<i>Elymus cinereus</i>	10	3.37	0.2	10

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## ***Ericameria nauseosa* Association**

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**Common Name:** Rubber Rabbitbrush

**NVC Association Code:** CEG002713, *Ericameria nauseosa* Shrubland

**Alliance:** *Ericameria nauseosa* Alliance

### **Association Concept**

The *Ericameria nauseosa* Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily on the edge of basins and wetlands, slopes, and interfluvium/summits at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, basalt, or clayey alluvium, and textures are widely variable. Elevations range from approximately 1224 to 1804 meters. The dominant and characteristic shrub is *Ericameria nauseosa*. Dominant and characteristic herbs include *Bromus tectorum* and *Elymus elymoides*.

**Diagnostic Criteria:** This association is characterized by a sparse to open shrub layer of *Ericameria nauseosa*. The overall shrub cover ranges from 4 to 30 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1462 m, Range 1224 – 1804 m

Aspect: NE (14), SE (9), SW (6), NW (4), Flat (3), Variable (1)

Slope: Mean 3.1 degrees, Range 0 – 34 degrees

Macro Topography: Other (9), Middle 1/3 of slope (6), Lower 1/3 of slope (6), Bottom to Lower 1/3 of slope (4), Bottom (3), Ridge summit, crest (2), Edge of basin or wetland (1), Interfluvium/Summit (1), Lower to Middle 1/3 of slope (1), Backslope (1), Midslope (1), Step in slope (1), Bench (1)

Tree Cover: Mean 0%, Range 0 – 5%

Shrub Cover: Mean 15.7%, Range 4 – 30%

Herb Cover: Mean 16.2%, Range 2 – 50%

Large Rock: Mean 3.9%, Range 0 – 20.2%

Small Rock: Mean 19.3%, Range 0 – 60%

Fines Cover: Mean 49.9%, Range 3 – 97%

Litter Cover: Mean 12%, Range 0.1 – 40%

Soil Texture (field assessed): Fine silty clay (8), Medium to very fine, sandy loam (3), Medium silt (3), Sand (2), Moderately fine clay loam (2), Medium silt loam (1), Loam (1), Fine sandy clay (1), Sandy Loam (1), Peat (1)

Geology (map data): Andesite (6), General volcanic extrusives (6), Basalt (4), Clayey alluvium (3), Silty alluvium (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 4 to 30 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum* and *Elymus elymoides*.

**Dynamics:** The understory herb layer is characteristically sparse (<10%) and has a decent native component that may include *Poa secunda*, *Epilobium brachycarpum*, and/or *Pseudoroegneria spicata*.

**Species of Interest:** *Phacelia inundata*, *Phlox muscoides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Buck-Diaz and Evens 2011b, Evens et al. 2014, Menke et al. 2019

**Total Sample Size Used for Description: N=40**

### **Association Stand Table**

#### ***Ericameria nauseosa* Association**

n =40

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	33	1.25	0.2	3
<b>Shrub</b>				
<i>Ericameria nauseosa</i>	100	13.21	3	30
<i>Artemisia arbuscula</i>	28	3.4	0.2	10
<i>Chrysothamnus viscidiflorus</i>	23	1.61	0.2	8
<i>Artemisia tridentata</i>	15	1.2	0.2	3
<i>Tetradymia glabrata</i>	13	0.52	0.2	1
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	13	1.4	1	2

## Association Stand Table continued

### ***Ericameria nauseosa* Association**

n =40

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Bromus tectorum</i>	85	3.45	0.2	17.5
<i>Elymus elymoides</i>	68	2.31	0.2	20
<i>Poa secunda</i>	45	3.82	0.2	20
<i>Epilobium brachycarpum</i>	33	2.41	0.2	15
<i>Blepharipappus scaber</i>	28	0.82	0.2	3
<i>Tragopogon dubius</i>	28	0.64	0.2	1
<i>Achnatherum thurberianum</i>	25	6.3	1	37.5
<i>Pseudoroegneria spicata</i>	25	3.87	0.2	8
<i>Bromus arvensis</i>	20	3.58	0.2	20
<i>Sisymbrium altissimum</i>	20	1.3	0.2	3
<i>Microsteris gracilis</i>	20	0.85	0.2	3
<i>Helianthus cusickii</i>	20	3.55	0.2	11
<i>Lactuca serriola</i>	20	0.5	0.2	1
<i>Iva axillaris</i>	15	0.33	0.2	1
<i>Elymus caput-medusae</i>	15	2.3	0.2	10
<i>Epilobium minutum</i>	13	1.04	0.2	2
<i>Festuca idahoensis</i>	13	2.3	1	3.5
<i>Elymus cinereus</i>	13	3.64	0.2	10

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## ***Ericameria nauseosa* / *Bromus tectorum* Association**

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**Common Name:** Rubber Rabbitbrush / Cheatgrass

**NVC Association Code:** C EGL002937, *Ericameria nauseosa* / *Bromus tectorum*  
Ruderal Shrubland

**Alliance:** *Ericameria nauseosa* Alliance

### **Association Concept**

The *Ericameria nauseosa* / *Bromus tectorum* Association forms a sparse to open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. The association is found primarily on basin floors, at the bottom to upper third of slopes, and interfluvial/summits at all aspects. Soils are derived from a variety of substrates but primarily basalt or sandy alluvium (most alluvial fans and washes), and textures include fine silty clay, loamy sand, and fine clay. Elevations range from approximately 1237 to 1533 meters. The dominant and characteristic shrub is *Ericameria nauseosa*. The dominant and characteristic herb is *Bromus tectorum*, and those often present are *Elymus elymoides* and *Sisymbrium altissimum*.

**Diagnostic Criteria:** This association is characterized by a sparse to open shrub layer of *Ericameria nauseosa*. The overall shrub cover ranges from 5 to 18 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1377 m, Range 1237 – 1533 m

Aspect: NE (3), SW (3), Flat (3), NW (2), Variable (1), SE (1)

Slope: Mean 3.9 degrees, Range 0 – 14 degrees

Macro Topography: Lower 1/3 of slope (4), Basin floor (2), Bottom to Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Middle 1/3 of slope (1), Toeslope (1), Upper 1/3 of slope (1), Interfluvial/Summit (1)

Tree Cover: Mean 0.7%, Range 0 – 1%

Shrub Cover: Mean 10.3%, Range 5 – 18%

Herb Cover: Mean 21.4%, Range 7 – 47%

Large Rock: Mean 6.7%, Range 0 – 34%

Small Rock: Mean 16.5%, Range 0 – 32%

Fines Cover: Mean 31.6%, Range 0 – 82%

Litter Cover: Mean 16.4%, Range 0 – 85%

Soil Texture (field assessed): Fine silty clay (4), Loamy Sand (3), Not recorded (1), Fine clay (1), Medium silt (1), Medium to very fine, loamy sand (1)

Geology (map data): Basalt (3), Sandy alluvium (most alluvial fans and washes) (1)

**Environment:** Stands of this association are found on sites where there is evidence of disturbance from fire, grazing, or other clearing.

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to open shrub layer, and the overall shrub cover ranges from 5 to 18 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum*, and herbs that are often present include *Elymus elymoides* and *Sisymbrium altissimum*.

**Dynamics:** Typically, the low diversity herbaceous layer is dominated by non-native annual herbs such as *Bromus tectorum*, *Sisymbrium altissimum*, and *Taeniatherum caput-medusae*.

**Species of Interest:** *Phacelia inundata*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

Menke et al. 2019

**Total Sample Size Used for Description:** N=18

### **Association Stand Table**

#### ***Ericameria nauseosa* / *Bromus tectorum* Association**

n =18

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	17	0.73	0.2	1
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	100	10.71	3	37.5
	<i>Artemisia tridentata</i>	22	1.23	0.2	3
	<i>Tetradymia glabrata</i>	17	2	1	4
	<i>Chrysothamnus viscidiflorus</i>	11	2.25	1	3.5
	<i>Prunus andersonii</i>	11	5.5	5	6



**Association Stand Table continued**

***Ericameria nauseosa* / *Bromus tectorum* Association**

n =18

Lifeform	Botanical Name	Con	Avg	Min	Max
Shrub					
	<i>Grayia spinosa</i>	11	1.85	0.2	3.5
Herb					
	<i>Bromus tectorum</i>	100	17.54	0.2	65
	<i>Elymus elymoides</i>	56	1.68	0.2	5
	<i>Sisymbrium altissimum</i>	56	3.53	0.2	17.5
	<i>Lactuca serriola</i>	39	0.8	0.2	2
	<i>Elymus caput-medusae</i>	39	8.6	0.2	30
	<i>Bromus arvensis</i>	33	7.5	1	27
	<i>Epilobium brachycarpum</i>	33	4.1	0.2	19
	<i>Blepharipappus scaber</i>	28	0.72	0.2	2
	<i>Tragopogon dubius</i>	17	0.47	0.2	1
	<i>Cryptantha</i>	17	0.2	0.2	0.2
	<i>Bromus carinatus</i>	17	2.73	0.2	5
	<i>Cleome platycarpa</i>	17	0.47	0.2	1
	<i>Asclepias fascicularis</i>	11	1.1	0.2	2
	<i>Microsteris gracilis</i>	11	0.2	0.2	0.2
	<i>Galium aparine</i>	11	1.1	0.2	2
	<i>Mentzelia dispersa</i>	11	0.2	0.2	0.2
	<i>Phacelia hastata</i>	11	0.2	0.2	0.2
	<i>Lomatium</i>	11	0.6	0.2	1
	<i>Poa secunda</i>	11	0.6	0.2	1
	<i>Iva axillaris</i>	11	0.2	0.2	0.2
	<i>Hesperostipa comata</i>	11	6.5	1	12
	<i>Helianthus cusickii</i>	11	2	2	2
	<i>Erysimum repandum</i>	11	13.5	6	21
	<i>Erodium cicutarium</i>	11	19	17	21
	<i>Epilobium minutum</i>	11	0.2	0.2	0.2
	<i>Descurainia sophia</i>	11	3.25	1.5	5
	<i>Bromus briziformis</i>	11	1.1	0.2	2
	<i>Alyssum desertorum</i>	11	0.2	0.2	0.2
	<i>Croton setigerus</i>	11	0.2	0.2	0.2

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## ***Eriogonum* spp. / *Poa secunda* Alliance**

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**Common Name:** Buckwheat / bluegrass dwarf-shrubland

**NVC Alliance Code:** A1568. *Eriogonum* spp. / *Poa secunda* Dwarf-shrub Steppe Alliance

### **Alliance Concept**

The *Eriogonum* spp. / *Poa secunda* Alliance forms a sparse to open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. It is found primarily on slopes and ridgetops at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, or basalt and textures are widely variable. Elevation range is approximately 1325 – 2005 meters. The dominant and characteristic shrub is *Eriogonum sphaerocephalum* and *Artemisia arbuscula* is often present. Dominant and characteristic herbs include *Poa secunda*, *Blepharipappus scaber*, and *Elymus elymoides*.

**Diagnostic Criteria:** This alliance is characterized by a sparse to open shrub layer of *Eriogonum sphaerocephalum* and an open herbaceous layer of *Poa secunda*. The

overall shrub cover ranges from 0 to 30 percent, and the overall herbaceous cover ranges from 2 to 37 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi)

### **Associations**

*Eriogonum sphaerocephalum* / *Poa secunda* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1551 m, Range 1325 – 2005 m

Aspect: NE (11), SE (10), SW (7), NW (5), Variable (2)

Slope: Mean 2.3 degrees, Range 0 – 13 degrees

Macro Topography: Other (12), Middle 1/3 of slope (6), Lower 1/3 of slope (4), Upper 1/3 of slope to Ridgetop (2), Ridge top (2), Upper 1/3 of slope (2), Bench (2), Middle 1/3 of slope to Ridgetop (2), Bottom to Lower 1/3 of slope (2), Ridge summit, crest (1), Middle to Upper 1/3 of slope (1)

Tree Cover: Mean 0.2%, Range 0 – 3%

Shrub Cover: Mean 3.5%, Range 0 – 30%

Herb Cover: Mean 11.2%, Range 2 – 37%

Large Rock: Mean 1.7%, Range 0 – 8%

Small Rock: Mean 56.6%, Range 14 – 98%

Fines Cover: Mean 30.9%, Range 1 – 80%

Litter Cover: Mean 5%, Range 0 – 35%

Soil Texture (field assessed): Fine sandy clay (4), Moderately coarse, sandy loam (4), Coarse, loamy sand (2), Medium to very fine, loamy sand (2), Medium to very fine, sandy loam (2), Moderately fine sandy clay loam (1), Medium loam (1), Moderately fine clay loam (1)

Geology (map data): Andesite (16), General volcanic extrusives (8), Basalt (2), Igneous (type unknown) (2), Pumice (1)

**Environment:** Stands of this alliance are most common on southern slopes and flat to undulating ridgetops and plateaus. Soils are shallow with a high percentage of rock fragments and exposed rock. These are some of the harshest, least-vegetated settings within the study area.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms a sparse to open shrub layer, and the overall shrub cover ranges from 0.2 to 30 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Eriogonum sphaerocephalum* and often present is *Artemisia arbuscula*. The tree layer is emergent. The herbaceous layer typically includes *Poa secunda*, *Blepharipappus scaber*, and *Elymus elymoides*.

**Dynamics:** Dwarf shrub *Eriogonum* spp. (*E. vimineum*, *E. sphaerocephalum*, *E. prociduum*) are characteristically present even as low as <1% cover and usually no other shrubs are present with greater cover.

**Species of Interest:** *Dimeresia howellii*, *Eriogonum prociduum*, *Ivesia paniculata*, *Lomatium canbyi*

## **Classification Comments**

Though the total vegetation cover is typically quite low (sometimes only 1 or 2%), stands of this alliance can have very high species diversity and support many native annual and perennial forbs typically not found in more common vegetation types within this study area. This type is related to the *Artemisia arbuscula* – *Eriogonum (microthecum, sphaerocephalum)* Association, but this one occurs on harsher sites where an evenly-distributed sub-shrub layer dominated by *Artemisia arbuscula* is unlikely.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** S3

## **References**

None.

**Total Sample Size Used for Description:** N=36

## **Alliance Stand Table**

### ***Eriogonum* spp. / *Poa secunda* Alliance**

n =36

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	17	2	1	3

# Alliance Stand Table continued

## ***Eriogonum* spp. / *Poa secunda* Alliance**

n =36

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Eriogonum sphaerocephalum</i>	81	2.81	0.2	10
	<i>Artemisia arbuscula</i>	53	1.2	0.2	4
	<i>Eriogonum umbellatum</i>	25	1.82	0.2	10
	<i>Purshia tridentata</i>	14	0.84	0.2	1
<b>Herb</b>					
	<i>Poa secunda</i>	97	3.15	0.2	10
	<i>Elymus elymoides</i>	67	1.29	0.2	3
	<i>Blepharipappus scaber</i>	64	0.72	0.2	1
	<i>Phoenicaulis cheiranthoides</i>	47	0.81	0.2	1
	<i>Bromus tectorum</i>	42	1.2	0.2	3
	<i>Bromus arvensis</i>	36	1.82	0.2	10
	<i>Festuca idahoensis</i>	28	4.42	0.2	20
	<i>Epilobium brachycarpum</i>	28	0.68	0.2	1
	<i>Arenaria congesta</i>	22	2.38	1	10
	<i>Balsamorhiza hookeri</i>	22	1.15	0.2	3
	<i>Lomatium</i>	22	0.4	0.2	1
	<i>Danthonia unispicata</i>	19	1.71	1	3
	<i>Eriophyllum lanatum</i>	19	1.46	0.2	3
	<i>Phlox hoodii</i>	19	2.46	0.2	10
	<i>Antennaria dimorpha</i>	17	0.93	0.2	3
	<i>Trifolium macrocephalum</i>	17	1.2	0.2	3
	<i>Idahoia scapigera</i>	17	0.6	0.2	1
	<i>Draba verna</i>	17	0.6	0.2	1
	<i>Arabis holboellii</i>	17	1	1	1
	<i>Allium</i>	17	0.47	0.2	1
	<i>Arenaria kingii</i>	17	1.67	1	3
	<i>Navarretia</i>	14	0.52	0.2	1
	<i>Penstemon roezlii</i>	14	1.4	1	3
	<i>Stenotus stenophyllus</i>	14	1.8	1	3
	<i>Penstemon deustus</i>	14	1.4	1	3
	<i>Nothocalais troximoides</i>	14	0.84	0.2	1
	<i>Lomatium bicolor</i>	14	1	1	1
	<i>Epilobium minutum</i>	14	0.68	0.2	1
	<i>Crepis bakeri</i>	14	1	1	1
	<i>Ventenata dubia</i>	14	4.04	0.2	10

**Alliance Stand Table continued**

***Eriogonum* spp. / *Poa secunda* Alliance**

n =36

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Antennaria stenophylla</i>	14	3.2	1	10
	<i>Allium acuminatum</i>	14	1	1	1
	<i>Microsteris gracilis</i>	14	0.52	0.2	1
	<i>Collinsia parviflora</i>	11	1	1	1
	<i>Eriogonum vimineum</i>	11	0.6	0.2	1
	<i>Polygonum douglasii</i>	11	0.8	0.2	1

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## ***Eriogonum sphaerocephalum* / *Poa secunda* Association**

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### **Common Name:**

**NVC Association Code:** CEG001448, *Eriogonum sphaerocephalum* / *Poa secunda*  
Dwarf-shrub Grassland

**Alliance:** *Eriogonum* spp. / *Poa secunda* Alliance

### **Association Concept**

The *Eriogonum sphaerocephalum* / *Poa secunda* Association forms a sparse to intermittent shrub layer with an open to intermittent herbaceous layer. The tree layer is sparse. The alliance is found primarily on middle to lower slopes at all aspects. Soils are derived from a variety of substrates but primarily Andesite and textures include fine sandy clay and moderately coarse, sandy loam. Elevations range from approximately 1325 to 2005 meters. *Eriogonum sphaerocephalum* is the characteristic shrub, and *Artemisia arbuscula* is often present. *Poa secunda* is the characteristic herb, and those often present are *Blepharipappus scaber* and *Elymus elymoides*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Eriogonum sphaerocephalum* and an open herbaceous layer of *Poa secunda*. The overall shrub cover ranges from 0 to 30 percent, and the overall herbaceous cover ranges from 2 to 37 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1548 m, Range 1325 – 2005 m

Aspect: NE (11), SE (9), SW (7), NW (5), Variable (2)

Slope: Mean 2.2 degrees, Range 0 – 13 degrees

Macro Topography: Other (12), Middle 1/3 of slope (6), Lower 1/3 of slope (4), Upper 1/3 of slope (2), Bench (2), Upper 1/3 of slope to Ridgetop (2), Middle 1/3 of slope to Ridgetop (2), Bottom to Lower 1/3 of slope (2), Ridge summit, crest (1), Middle to Upper 1/3 of slope (1), Ridge top (1)

Tree Cover: Mean 0%, Range 0 – 3%

Shrub Cover: Mean 3.6%, Range 0 – 30%

Herb Cover: Mean 11.3%, Range 2 – 37%

Large Rock: Mean 1.8%, Range 0 – 8%

Small Rock: Mean 55.9%, Range 14 – 98%

Fines Cover: Mean 30.9%, Range 1 – 80%

Litter Cover: Mean 5.1%, Range 0 – 35%

Soil Texture (field assessed): Fine sandy clay (4), Moderately coarse, sandy loam (3), Medium to very fine, sandy loam (2), Coarse, loamy sand (2), Medium to very fine, loamy sand (2), Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Medium loam (1)

Geology (map data): Andesite (16), General volcanic extrusives (8), Igneous (type unknown) (2), Basalt (2), Pumice (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer with an open to intermittent herbaceous layer. The overall shrub cover ranges from 0 to 30 percent and the overall herbaceous cover ranges from 2 to 37 percent. The tree layer is typically sparse to open.

**Vegetation Floristics:** *Eriogonum sphaerocephalum* is a characteristic shrub, and *Artemisia arbuscula* is often present. *Poa secunda* is a characteristic herb, and those often present are *Blepharipappus scaber* and *Elymus elymoides*. The tree layer is emergent and occasionally includes *Juniperus occidentalis*.

**Species of Interest:** *Eriogonum prociduum*, *Ivesia paniculata*, *Lomatium canbyi*

### **Classification Comments**

None.

**Classification Confidence:** High

### **References**

None.

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

**Total Sample Size Used for Description:** N=35

### **Association Stand Table**

#### ***Eriogonum sphaerocephalum* / *Poa secunda* Association**

n =35

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	17	2	1	3
<b>Shrub</b>				
<i>Eriogonum sphaerocephalum</i>	83	2.81	0.2	10
<i>Artemisia arbuscula</i>	54	1.2	0.2	4



**Association Stand Table continued**

***Eriogonum sphaerocephalum* / *Poa secunda* Association**

n =35

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Eriogonum umbellatum</i>	26	1.82	0.2	10
	<i>Purshia tridentata</i>	14	0.84	0.2	1
<b>Herb</b>					
	<i>Poa secunda</i>	97	3.24	1	10
	<i>Elymus elymoides</i>	66	1.3	0.2	3
	<i>Blepharipappus scaber</i>	66	0.72	0.2	1
	<i>Phoenicaulis cheiranthoides</i>	49	0.81	0.2	1
	<i>Bromus tectorum</i>	43	1.2	0.2	3
	<i>Bromus arvensis</i>	37	1.82	0.2	10
	<i>Epilobium brachycarpum</i>	29	0.68	0.2	1
	<i>Festuca idahoensis</i>	29	4.42	0.2	20
	<i>Arenaria congesta</i>	23	2.38	1	10
	<i>Balsamorhiza hookeri</i>	23	1.15	0.2	3
	<i>Lomatium</i>	23	0.4	0.2	1
	<i>Danthonia unispicata</i>	20	1.71	1	3
	<i>Eriophyllum lanatum</i>	20	1.46	0.2	3
	<i>Phlox hoodii</i>	20	2.46	0.2	10
	<i>Arabis holboellii</i>	17	1	1	1
	<i>Idahoia scapigera</i>	17	0.6	0.2	1
	<i>Trifolium macrocephalum</i>	17	1.2	0.2	3
	<i>Antennaria dimorpha</i>	17	0.93	0.2	3
	<i>Allium</i>	17	0.47	0.2	1
	<i>Arenaria kingii</i>	17	1.67	1	3
	<i>Draba verna</i>	17	0.6	0.2	1
	<i>Epilobium minutum</i>	14	0.68	0.2	1
	<i>Stenotus stenophyllus</i>	14	1.8	1	3
	<i>Penstemon roezlii</i>	14	1.4	1	3
	<i>Penstemon deustus</i>	14	1.4	1	3
	<i>Nothocalais troximoides</i>	14	0.84	0.2	1
	<i>Navarretia</i>	14	0.52	0.2	1
	<i>Lomatium bicolor</i>	14	1	1	1
	<i>Crepis bakeri</i>	14	1	1	1
	<i>Antennaria stenophylla</i>	14	3.2	1	10
	<i>Allium acuminatum</i>	14	1	1	1
	<i>Ventenata dubia</i>	14	4.04	0.2	10

**Association Stand Table continued**

***Eriogonum sphaerocephalum* / *Poa secunda* Association**

n =35

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Microsteris gracilis</i>	14	0.52	0.2	1
<i>Polygonum douglasii</i>	11	0.8	0.2	1
<i>Eriogonum vimineum</i>	11	0.6	0.2	1
<i>Collinsia parviflora</i>	11	1	1	1

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## ***Krascheninnikovia lanata* Alliance**

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**Common Name:** Winterfat scrubland Alliance

**NVC Alliance Code:** A3202. *Krascheninnikovia lanata* Steppe & Dwarf-shrubland Alliance

### **Alliance Concept**

The *Krascheninnikovia lanata* Alliance forms an open shrub layer. The emergent tree layer is typically sparse or absent and the herbaceous layer is open. It is found primarily on lower, northwest-facing slopes. Soils are derived from a variety of substrates and textures include medium loam. Elevation range is approximately 1296 meters. The dominant and characteristic shrub is *Krascheninnikovia lanata*. Dominant and characteristic herbs include *Bromus tectorum*, *Amsinckia menziesii*, *Descurainia sophia*, *Erodium cicutarium*, *Poa secunda*, and *Sisymbrium altissimum*.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Krascheninnikovia lanata*. The overall shrub cover is 17 percent.

### **Local Alliance Distribution**

**Northwestern Basin and Range:** Cottonwood - Skedaddle Mountains (342Bd)

**Associations**

None.

**Environmental Description**

**Plot/Sample Data Environmental Summary:**

Elevation: 1296 m

Aspect: NW (1)

Slope: 4 degrees

Macro Topography: Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 17%

Herb Cover: 11%

Large Rock: 0%

Small Rock: 1%

Fines Cover: 94%

Litter Cover: 1%

Soil Texture (field assessed): Medium loam (1)

Geology (map data): None recorded.

**Environment:** Stands of this alliance are found on alkaline flats around playas and along drainages, plains, and old lakebeds above current drainages.

**Vegetation Description**

**Vegetation Structure:** The alliance forms an open shrub layer, and the overall shrub cover is 17 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Krascheninnikovia lanata*. The herbaceous layer typically includes *Bromus tectorum*, *Amsinckia menziesii*, *Descurainia sophia*, *Erodium cicutarium*, *Poa secunda*, and *Sisymbrium altissimum*.

**Species of Interest:** None.

**Classification Comments**

This alliance is uncommon within the study area and was only found once at the very southern end of the study area. Although this is a well-defined type for California, *Krascheninnikovia lanata* does not usually dominate stands over most of its California range but it is a component of other alliances.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G4    **State:** S3

## **References**

None.

**Total Sample Size Used for Description:** N=1

## **Alliance Stand Table**

### ***Krascheninnikovia lanata* Alliance**

n =1

<b>Lifeform Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Shrub</b>				
<i>Krascheninnikovia lanata</i>	100	17	17	17
<b>Herb</b>				
<i>Bromus tectorum</i>	100	11	11	11
<i>Amsinckia menziesii</i>	100	0.2	0.2	0.2
<i>Descurainia sophia</i>	100	0.2	0.2	0.2
<i>Erodium cicutarium</i>	100	0.2	0.2	0.2
<i>Poa secunda</i>	100	0.2	0.2	0.2
<i>Sisymbrium altissimum</i>	100	0.2	0.2	0.2
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	100	3	3	3



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## ***Prunus emarginata* – *Holodiscus discolor* Alliance**

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**Common Name:** Bitter Cherry - Ocean Spray Brush Alliance

**NVC Alliance Code:** A3918. *Prunus emarginata* - *Holodiscus discolor* Shrubland Alliance

### **Alliance Concept**

The *Prunus emarginata* – *Holodiscus discolor* Alliance forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. It is found primarily from the middle of slopes to summits and ridge tops at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, igneous, or basalt and textures include rock and variations of loam. Elevation range is approximately 1237 – 2417 meters. While no shrub is typically dominant in this alliance, *Prunus emarginata* and *Holodiscus discolor* tend to occur at higher cover than other shrubs when they are present. *Ericameria nauseosa* and *Ribes velutinum* are also often present. *Bromus tectorum* and *Elymus elymoides* are often present in the herbaceous layer.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous mixed shrub layer in which *Prunus emarginata*, *Holodiscus discolor*, and/or *Ribes velutinum* are often present, and *Holodiscus discolor* is sometimes present at higher cover than other shrubs. The overall shrub cover ranges from 10 to 68 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Lower Klamath - Tule Lake Basins (M261Ga)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Holodiscus discolor* Association

*Prunus emarginata* Association

*Ribes velutinum* Provisional Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1700 m, Range 1237 – 2417 m

Aspect: NE (5), SE (5), Flat (3), Variable (1), NW (1), SW (1)

Slope: Mean 12.9 degrees, Range 0 – 31 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Step in slope (3), High slope (2), Upper 1/3 of slope (2), Ridge summit, crest (1), Ridge top (1)

Tree Cover: Mean 0.6%, Range 0 – 8%

Shrub Cover: Mean 30.2%, Range 10 – 68%

Herb Cover: Mean 10.4%, Range 1 – 20%

Large Rock: Mean 23.3%, Range 0 – 96%

Small Rock: Mean 12.8%, Range 3 – 25%

Fines Cover: Mean 21.1%, Range 0 – 66%

Litter Cover: Mean 16.6%, Range 0.2 – 55%

Soil Texture (field assessed): Rock (3), Moderately fine sandy clay loam (2), Sand (1), Moderately coarse, sandy loam (1), Medium loam (1), Loam (1), Coarse, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (map data): Andesite (2), General volcanic extrusives (2), Igneous (type unknown) (1), Basalt (1)

**Environment:** Stands of this alliance are found on rocky ridges, slopes, and outcrops including steep, montane slopes, moraines, talus, and rocky chutes and in forest openings.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to continuous shrub layer, and the overall shrub cover ranges from 10 to 68 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** *Holodiscus discolor*, *Ribes velutinum*, and/or *Prunus emarginata* are often present in the shrub layer. *Ericameria nauseosa* is sometimes present at high relative cover. The tree layer is emergent. The herbaceous layer typically includes *Bromus tectorum* and *Elymus elymoides*.

**Species of Interest:** *Hackelia cusickii*, *Senecio hydrophiloides*, *Silene oregana*

### **Classification Comments**

Classification analysis from this project expanded our understanding for this combined alliance to include additional characteristic species and a new association for *Ribes velutinum*, although further sampling and analysis would improve the definition of this type and help clarify the full variability of this type.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G4    **State:** S4

### **References**

None.

**Total Sample Size Used for Description:** N=16

### **Alliance Stand Table**

#### ***Prunus emarginata* – *Holodiscus discolor* Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
Tree					
	<i>Juniperus occidentalis</i>	13	3	1	5
Sapling					
	<i>Juniperus occidentalis</i>	13	0.85	0.2	1.5



## Alliance Stand Table continued

### ***Prunus emarginata* – *Holodiscus discolor* Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	63	2.52	0.2	20
	<i>Ribes velutinum</i>	50	7.64	0.2	17.7
	<i>Prunus emarginata</i>	50	18.62	6	55
	<i>Symphoricarpos rotundifolius</i>	44	3.31	0.2	10
	<i>Cercocarpus ledifolius</i>	38	3.28	0.2	7.7
	<i>Amelanchier utahensis</i>	31	4.44	0.2	10
	<i>Artemisia tridentata</i>	31	2.04	0.2	5
	<i>Chrysothamnus viscidiflorus</i>	31	1.38	0.2	3.2
	<i>Holodiscus discolor</i>	31	7.2	1.5	21
	<i>Prunus virginiana</i>	25	1.1	0.2	3
	<i>Ribes cereum</i>	25	0.8	0.2	1
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	19	1.3	0.2	3.5
	<i>Ceanothus velutinus</i>	19	4.07	0.2	7
	<i>Sambucus nigra</i>	19	1.07	0.2	2
	<i>Rosa woodsii</i>	13	0.6	0.2	1
	<i>Chamaebatiaria millefolium</i>	13	1.1	0.2	2
	<i>Ribes</i>	13	8	1	15
<b>Herb</b>					
	<i>Elymus elymoides</i>	63	0.7	0.2	2
	<i>Bromus tectorum</i>	56	2.69	0.2	10
	<i>Poa secunda</i>	44	1.93	1	4
	<i>Elymus cinereus</i>	31	6.5	1	15
	<i>Gayophytum diffusum</i>	25	0.4	0.2	1
	<i>Tragopogon dubius</i>	25	0.4	0.2	1
	<i>Festuca idahoensis</i>	25	1.75	1	3
	<i>Collomia grandiflora</i>	25	0.2	0.2	0.2
	<i>Wyethia mollis</i>	25	1.05	0.2	2
	<i>Achillea millefolium</i>	19	0.47	0.2	1
	<i>Agastache urticifolia</i>	19	1.4	0.2	3
	<i>Crepis acuminata</i>	19	0.2	0.2	0.2
	<i>Penstemon deustus</i>	19	0.73	0.2	1
	<i>Pseudoroegneria spicata</i>	19	0.47	0.2	1
	<i>Sidalcea oregana</i>	19	0.47	0.2	1
	<i>Epilobium brachycarpum</i>	13	1	1	1
	<i>Phacelia humilis</i>	13	0.2	0.2	0.2

**Alliance Stand Table continued**

***Prunus emarginata* – *Holodiscus discolor* Alliance**

n =16

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Phacelia ramosissima</i>	13	0.85	0.2	1.5
	<i>Lupinus argenteus</i>	13	1.5	1	2
	<i>Bromus carinatus</i>	13	3.5	3	4
	<i>Poa bulbosa</i>	13	0.2	0.2	0.2
	<i>Ageratina occidentalis</i>	13	1	1	1
	<i>Crepis</i>	13	0.6	0.2	1

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## ***Holodiscus discolor* Association**

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**Common Name:** Ocean Spray

**NVC Association Code:**

**Alliance:** *Prunus emarginata* – *Holodiscus discolor* Alliance

### **Association Concept**

The *Holodiscus discolor* Association forms an open shrub layer. The emergent tree layer is typically sparse to absent, and the herbaceous layer is sparse. The association is found primarily on steps in slopes, ridge tops, and high slopes at flat, northeastern, and southeastern aspects. Soil textures include rock and moderately coarse, sandy loam. Elevations range from approximately 1324 to 2417 meters. The dominant and characteristic shrubs are *Holodiscus discolor* and *Ericameria nauseosa*. *Artemisia tridentata* ssp. *vaseyana*, *Cercocarpus ledifolius*, and *Chamaebatiaria millefolium* are often present.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Holodiscus discolor*. The overall shrub cover is 13 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1674 m, Range 1324 – 2417 m

Aspect: Flat (2), NE (1), SE (1)

Slope: Mean 7.8 degrees, Range 0 – 21 degrees

Macro Topography: Step in slope (2), Ridge top (1), High slope (1)

Tree Cover: 0%

Shrub Cover: 13%

Herb Cover: 1%

Large Rock: 68%

Small Rock: 24%

Fines Cover: Mean 1.3%, Range 0 – 2%

Litter Cover: Mean 2.1%, Range 0.25 – 6%

Soil Texture (field assessed): Rock (3), Moderately coarse, sandy loam (1)

Geology (map data): None recorded

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover is 13 percent. The tree layer is typically sparse absent, and the herbaceous layer is sparse.

**Vegetation Floristics:** The dominant and characteristic shrubs are *Holodiscus discolor* and *Ericameria nauseosa*. *Artemisia tridentata* ssp. *vaseyana*, *Cercocarpus ledifolius*, and *Chamaebatiaria millefolium* are often present.

**Dynamics:** *Holodiscus discolor* is dominant in the shrub layer with *Ericameria nauseosa*, *Chamaebatiaria millefolium*, *Artemisia tridentata* ssp. *vaseyana*, *Cercocarpus ledifolius*, and/or *Ribes velutinum*.

**Species of Interest:** *Hackelia cusickii*

### Classification Comments

None.

**Classification Confidence:** High

### Conservation Status Rank

**Global:** GNR    **State:** Y

### References

None.

**Total Sample Size Used for Description:** N=4

### Association Stand Table

#### ***Holodiscus discolor* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Holodiscus discolor</i>	100	8.25	1.5	21
<i>Ericameria nauseosa</i>	75	0.47	0.2	1
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	50	1.85	0.2	3.5
<i>Cercocarpus ledifolius</i>	50	0.4	0.4	0.4
<i>Chamaebatiaria millefolium</i>	50	1.1	0.2	2
<i>Symphoricarpos rotundifolius</i>	25	2	2	2
<i>Artemisia tridentata</i>	25	1	1	1
<i>Ribes</i>	25	1	1	1
<i>Ribes velutinum</i>	25	3.5	3.5	3.5
<b>Herb</b>				
<i>Hackelia cusickii</i>	25	0.2	0.2	0.2
<i>Bromus tectorum</i>	25	0.2	0.2	0.2
<i>Elymus elymoides</i>	25	0.2	0.2	0.2

**Association Stand Table continued**

***Holodiscus discolor* Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Erigeron filifolius</i>	25	0.2	0.2	0.2
	<i>Penstemon deustus</i>	25	0.2	0.2	0.2
	<i>Phlox diffusa</i>	25	0.2	0.2	0.2
	<i>Poa secunda</i>	25	1.5	1.5	1.5
	<i>Achnatherum thurberianum</i>	25	0.2	0.2	0.2
	<i>Penstemon laetus</i>	25	0.2	0.2	0.2

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## ***Prunus emarginata* Association**

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**Common Name:** Bitter Cherry

**NVC Association Code:** C EGL005822, *Prunus emarginata* Sierran Chaparral Shrubland

**Alliance:** *Prunus emarginata* – *Holodiscus discolor* Alliance

### **Association Concept**

The *Prunus emarginata* Association forms an open to continuous shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The association is found primarily on the middle to upper third of slopes and ridge summits/crests at northeastern, southeastern, and northwestern aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, igneous (type unknown), andesite, or basalt, and textures are widely variable. Elevations range from approximately 1396 to 2104 meters. The dominant and characteristic shrub is *Prunus emarginata*, and those that are often present include *Amelanchier utahensis*, *Ericameria nauseosa*, and *Symphoricarpos rotundifolius*. The dominant and characteristic herb is *Elymus elymoides*, and those often present are *Bromus tectorum* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to continuous shrub layer of *Prunus emarginata*. The overall shrub cover ranges from 10 to 68 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1805 m, Range 1396 – 2104 m

Aspect: NE (4), SE (3), NW (1), Variable (1)

Slope: Mean 16.1 degrees, Range 3 – 31 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Ridge summit, crest (1), Upper 1/3 of slope (1)

Tree Cover: Mean 1%, Range 0 – 8%

Shrub Cover: Mean 32.1%, Range 10 – 68%

Herb Cover: Mean 10.8%, Range 2 – 20%

Large Rock: Mean 16.9%, Range 0 – 96%

Small Rock: Mean 11.1%, Range 3 – 25%

Fines Cover: Mean 34.5%, Range 0.2 – 66%

Litter Cover: Mean 25%, Range 0.2 – 55%

Soil Texture (field assessed): Moderately fine sandy clay loam (2), Not recorded (2), Medium loam (1), Coarse, loamy sand (1), Medium to very fine, sandy loam (1)

Geology (map data): General volcanic extrusives (2), Igneous (type unknown) (1), Andesite (1), Basalt (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 10 to 68 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Prunus emarginata*. Those often present include *Amelanchier utahensis*, *Ericameria nauseosa*, and *Symphoricarpos rotundifolius*. The herbaceous layer is characterized by *Elymus elymoides*, and *Bromus tectorum* and *Poa secunda* are often present.

**Dynamics:** *Prunus emarginata* is dominant in the shrub layer with *Symphoricarpos rotundifolius*, *Ribes velutinum*, and/or *Amelanchier utahensis*. *Holodiscus discolor* is absent.

**Species of Interest:** *Senecio hydrophiloides*, *Silene oregana*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** N

### **References**

None.

**Total Sample Size Used for Description:** N=9

### **Association Stand Table**

#### ***Prunus emarginata* Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	11	1	1	1
<i>Abies concolor</i>	11	6	6	6
<i>Pinus jeffreyi</i>	11	3	3	3
<b>Sapling</b>				
<i>Pinus jeffreyi</i>	11	1	1	1
<i>Juniperus occidentalis</i>	11	0.2	0.2	0.2
<i>Abies concolor</i>	11	1	1	1

## Association Stand Table continued

### ***Prunus emarginata* Association**

n =9

#### **Lifeform Botanical Name**

##### **Seedling**

<i>Abies concolor</i>	11	0.2	0.2	0.2
<i>Pinus jeffreyi</i>	11	0.2	0.2	0.2

##### **Shrub**

<i>Prunus emarginata</i>	89	18.62	6	55
<i>Symphoricarpos rotundifolius</i>	67	3.53	0.2	10
<i>Ericameria nauseosa</i>	56	4.68	0.2	20
<i>Amelanchier utahensis</i>	56	4.44	0.2	10
<i>Ribes cereum</i>	44	0.8	0.2	1
<i>Ribes velutinum</i>	44	3.1	0.2	10
<i>Ceanothus velutinus</i>	33	4.07	0.2	7
<i>Prunus virginiana</i>	33	0.47	0.2	1
<i>Chrysothamnus viscidiflorus</i>	33	1.47	0.2	3.2
<i>Artemisia tridentata</i>	33	2.73	0.2	5
<i>Sambucus nigra</i>	22	0.6	0.2	1
<i>Cercocarpus ledifolius</i>	22	5.5	5	6
<i>Salix scouleriana</i>	11	10	10	10
<i>Eriogonum umbellatum</i>	11	1	1	1
<i>Rosa woodsii</i>	11	0.2	0.2	0.2
<i>Amelanchier alnifolia</i>	11	3	3	3
<i>Artemisia arbuscula</i>	11	0.2	0.2	0.2
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	11	0.2	0.2	0.2
<i>Rubus leucodermis</i>	11	1	1	1
<i>Ericameria bloomeri</i>	11	3	3	3
<i>Sambucus racemosa</i>	11	0.2	0.2	0.2
<i>Frangula rubra</i>	11	3	3	3
<i>Holodiscus discolor</i>	11	3	3	3
<i>Ribes quercetorum</i>	11	1	1	1
<i>Chrysolepis sempervirens</i>	11	7	7	7

##### **Herb**

<i>Elymus elymoides</i>	78	0.8	0.2	2
<i>Bromus tectorum</i>	56	3.6	1	10
<i>Poa secunda</i>	56	2.2	1	4
<i>Gayophytum diffusum</i>	44	0.4	0.2	1
<i>Collomia grandiflora</i>	44	0.2	0.2	0.2
<i>Tragopogon dubius</i>	33	0.2	0.2	0.2



## Association Stand Table continued

### ***Prunus emarginata* Association**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Sidalcea oregana</i>	33	0.47	0.2	1
	<i>Elymus cinereus</i>	33	3.33	1	8
	<i>Festuca idahoensis</i>	33	2	1	3
	<i>Crepis acuminata</i>	33	0.2	0.2	0.2
	<i>Wyethia mollis</i>	33	1.07	0.2	2
	<i>Achillea millefolium</i>	33	0.47	0.2	1
	<i>Agastache urticifolia</i>	33	1.4	0.2	3
	<i>Lupinus argenteus</i>	22	1.5	1	2
	<i>Bromus carinatus</i>	22	3.5	3	4
	<i>Crepis</i>	22	0.6	0.2	1
	<i>Phacelia humilis</i>	22	0.2	0.2	0.2
	<i>Ageratina occidentalis</i>	22	1	1	1
	<i>Poa bulbosa</i>	22	0.2	0.2	0.2
	<i>Potentilla gracilis</i>	11	1	1	1
	<i>Kelloggia galioides</i>	11	0.2	0.2	0.2
	<i>Leptodactylon pungens</i>	11	1	1	1
	<i>Lomatium dissectum</i>	11	0.2	0.2	0.2
	<i>Lupinus</i>	11	0.2	0.2	0.2
	<i>Lupinus arbustus</i>	11	2	2	2
	<i>Madia citriodora</i>	11	0.2	0.2	0.2
	<i>Madia gracilis</i>	11	0.2	0.2	0.2
	<i>Melica bulbosa</i>	11	2	2	2
	<i>Orthocarpus cuspidatus</i>	11	0.2	0.2	0.2
	<i>Packera</i>	11	1	1	1
	<i>Penstemon deustus</i>	11	1	1	1
	<i>Pseudoroegneria spicata</i>	11	0.2	0.2	0.2
	<i>Senecio hydrophiloides</i>	11	1	1	1
	<i>Silene</i>	11	0.2	0.2	0.2
	<i>Silene oregana</i>	11	1	1	1
	<i>Verbascum thapsus</i>	11	1	1	1
	<i>Viola purpurea</i>	11	0.2	0.2	0.2
	<i>Wyethia angustifolia</i>	11	5	5	5
	<i>Viola praemorsa</i> ssp. <i>praemorsa</i>	11	0.2	0.2	0.2
	<i>Hydrophyllum capitatum</i>	11	0.2	0.2	0.2
	<i>Senecio aronicoides</i>	11	0.2	0.2	0.2

## Association Stand Table continued

### ***Prunus emarginata* Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Paeonia brownii</i>	11	0.2	0.2	0.2
<i>Hieracium scouleri</i>	11	0.2	0.2	0.2
<i>Allium</i>	11	0.2	0.2	0.2
<i>Achnatherum occidentale</i>	11	0.2	0.2	0.2
<i>Arabis</i>	11	0.2	0.2	0.2
<i>Senecio serra</i>	11	0.2	0.2	0.2
<i>Astragalus whitneyi</i>	11	0.2	0.2	0.2
<i>Balsamorhiza deltoidea</i>	11	0.2	0.2	0.2
<i>Bromus arvensis</i>	11	0.2	0.2	0.2
<i>Castilleja</i>	11	0.2	0.2	0.2
<i>Castilleja applegatei</i>	11	0.2	0.2	0.2
<i>Galium aparine</i>	11	0.2	0.2	0.2
<i>Chenopodium album</i>	11	0.2	0.2	0.2
<i>Claytonia lanceolata</i>	11	0.2	0.2	0.2
<i>Collinsia parviflora</i>	11	0.2	0.2	0.2
<i>Collomia</i>	11	0.2	0.2	0.2
<i>Cryptantha echinella</i>	11	0.2	0.2	0.2
<i>Delphinium</i>	11	0.2	0.2	0.2
<i>Descurainia incana</i>	11	1	1	1
<i>Epilobium brachycarpum</i>	11	1	1	1
<i>Castilleja chromosa</i>	11	0.2	0.2	0.2
<i>Agropyron cristatum</i>	11	1	1	1

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## ***Ribes velutinum* Provisional Association**

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**Common Name:** Desert gooseberry

**NVC Association Code:**

**Alliance:** *Prunus emarginata* – *Holodiscus discolor* Alliance

### **Association Concept**

The *Ribes velutinum* Provisional Association forms an intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The association is found primarily on the upper third of slopes, high slopes, and step in slopes at southeastern, southwestern, and flat aspects. Soils are derived primarily from andesite and textures include loam and sand. Elevations range from approximately 1237 to 1531 meters. The dominant and characteristic shrub is *Ribes velutinum*, and those that are often present include *Cercocarpus ledifolius*, *Chrysothamnus viscidiflorus*, and *Ericameria nauseosa*. The dominant and characteristic herb is *Bromus tectorum*, and those often present are *Elymus elymoides*, *Elymus cinereus*, *Phacelia ramosissima*, and *Pseudoroegneria spicata*.

**Diagnostic Criteria:** This association is characterized by an intermittent shrub layer of *Ribes velutinum*. The overall shrub cover is 30 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1423 m, Range 1237 – 1531 m

Aspect: SE (1), SW (1), Flat (1)

Slope: Mean 10 degrees, Range 0 – 24 degrees

Macro Topography: Upper 1/3 of slope (1), High slope (1), Step in slope (1)

Tree Cover: 5%

Shrub Cover: 30%

Herb Cover: 16%

Large Rock: None recorded.

Small Rock: None recorded.

Fines Cover: Mean 7.7%, Range 1 – 20%

Litter Cover: Mean 10.7%, Range 2 – 15%

Soil Texture (field assessed): Loam (1), Sand (1)

Geology (map data): Andesite (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent shrub layer, and the overall shrub cover is 30 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Ribes velutinum*. Those often present include *Cercocarpus ledifolius*, *Chrysothamnus viscidiflorus*, and *Ericameria nauseosa*. The herbaceous layer is characterized by *Bromus tectorum*, and other herbs that are often present include *Elymus elymoides*, *Elymus cinereus*, *Phacelia ramosissima*, and *Pseudoroegneria spicata*.

**Dynamics:** *Ribes velutinum* is dominant to co-dominant in the shrub layer with *Cercocarpus ledifolius* and/or *Prunus* spp.

**Species of Interest:** None.

## **Classification Comments**

This is a provisional association for California. More sampling and analysis are necessary to fully understand the variability of this type and its relationship to other associations in this alliance.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=3

## **Association Stand Table**

### ***Ribes velutinum* Provisional Association**

n =3

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	33	5	5	5
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	33	1.5	1.5	1.5
<b>Shrub</b>				
<i>Ribes velutinum</i>	100	15.07	10	17.7
<i>Cercocarpus ledifolius</i>	67	3.95	0.2	7.7
<i>Ericameria nauseosa</i>	67	0.2	0.2	0.2

## Association Stand Table continued

### ***Ribes velutinum* Provisional Association**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Chrysothamnus viscidiflorus</i>	67	1.25	1	1.5
	<i>Prunus subcordata</i>	33	1	1	1
	<i>Artemisia tridentata</i>	33	1	1	1
	<i>Prunus virginiana</i>	33	3	3	3
	<i>Ribes</i>	33	15	15	15
	<i>Sambucus nigra</i>	33	2	2	2
	<i>Tetradymia canescens</i>	33	0.2	0.2	0.2
	<i>Rosa woodsii</i>	33	1	1	1
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	2	1	3.5
	<i>Pseudoroegneria spicata</i>	67	0.6	0.2	1
	<i>Elymus cinereus</i>	67	11.25	7.5	15
	<i>Phacelia ramosissima</i>	67	0.85	0.2	1.5
	<i>Elymus elymoides</i>	67	0.6	0.2	1
	<i>Poa secunda</i>	33	1	1	1
	<i>Phacelia heterophylla</i>	33	0.2	0.2	0.2
	<i>Phacelia hastata</i>	33	0.2	0.2	0.2
	<i>Mentzelia montana</i>	33	0.2	0.2	0.2
	<i>Penstemon deustus</i>	33	1	1	1
	<i>Festuca idahoensis</i>	33	1	1	1
	<i>Tragopogon dubius</i>	33	1	1	1
	<i>Epilobium brachycarpum</i>	33	1	1	1
	<i>Urtica dioica</i>	33	0.2	0.2	0.2
	<i>Wyethia mollis</i>	33	1	1	1
	<i>Sisymbrium altissimum</i>	33	0.2	0.2	0.2
	<i>Erysimum capitatum</i>	33	0.2	0.2	0.2
	<i>Eriogonum nudum</i>	33	0.2	0.2	0.2
	<i>Eriophyllum lanatum</i>	33	1	1	1
	<i>Collomia tinctoria</i>	33	0.2	0.2	0.2
	<i>Blepharipappus scaber</i>	33	1	1	1

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## ***Prunus virginiana* Provisional Alliance**

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**Common Name:** Choke cherry thickets

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Prunus virginiana* Provisional Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. It is found primarily from low slopes to ridge summits at all aspects. Soils are derived primarily from andesite, basalt, and general volcanic extrusives and textures include medium to very fine sandy loam, moderately fine clay loam, clay loam, and rock. Elevation range is approximately 1274 – 2202 meters. Dominant and characteristic shrubs include *Prunus virginiana*, *Prunus subcordata*, *Ericameria nauseosa*, and *Ribes cereum*. Dominant and characteristic herbs include *Bromus tectorum* and *Elymus cinereus*.



**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Prunus virginiana* or *Prunus subcordata*. The overall shrub cover ranges from 6 to 60 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Prunus subcordata* Provisional Association

*Prunus virginiana* / *Symphoricarpos rotundifolius* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1648 m, Range 1274 – 2202 m

Aspect: NE (10), SW (3), NW (2), SE (2)

Slope: Mean 16.6 degrees, Range 6 – 29 degrees

Macro Topography: Middle 1/3 of slope (4), Middle to Upper 1/3 of slope (4), Upper 1/3 of slope (3), Other (2), Lower 1/3 of slope (2), High slope (1), Ridge summit, crest (1), Lowslope (1)

Tree Cover: Mean 0.6%, Range 0 – 5%

Shrub Cover: Mean 26.1%, Range 6 – 60%

Herb Cover: Mean 9.5%, Range 0 – 20%

Large Rock: Mean 50.8%, Range 0 – 97%

Small Rock: Mean 8.3%, Range 0 – 36.5%

Fines Cover: Mean 12.8%, Range 0 – 89%

Litter Cover: Mean 23.9%, Range 2 – 86%

Soil Texture (field assessed): Medium to very fine, sandy loam (4), Moderately fine clay loam (1), Medium loam (1), Fine sandy clay (1), Clay Loam (1), Rock (1)

Geology (map data): Andesite (4), Basalt (3), General volcanic extrusives (2), Igneous (type unknown) (1)

**Environment:** Stands of this alliance are typically found on rocky, moderately steep to steep, north-facing slopes, and in rocky forest openings.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 6 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Prunus virginiana*, *Prunus subcordata*, *Ericameria nauseosa*, and *Ribes cereum*. The tree layer is emergent. The herbaceous layer typically includes *Bromus tectorum* and *Elymus cinereus*.

**Species of Interest:** *Hackelia cusickii*

## **Classification Comments**

Although *Prunus virginiana* is a widespread species in California, as an alliances it tends to be fairly uncommon and forms small stands and is generally not well sampled or understood and is, therefore, considered a provisional alliance. Within this study area, this alliance has much ecological and floristic overlap with the *Prunus emarginata* – *Holodiscus discolor* Alliance.

Sampling and data analysis from this project added to our understanding of this alliance by added two new association for California; including an expanded concept that includes stands dominated by *Prunus subcordata*. Further sampling and analysis would help to solidify and flesh out these new concepts.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** G4    **State:** S2?

## **References**

None.

**Total Sample Size Used for Description:** N=18

## **Alliance Stand Table**

### ***Prunus virginiana* Alliance**

n =18

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	39	2.17	0.2	5
Seedling				
<i>Juniperus occidentalis</i>	17	0.73	0.2	1
<i>Populus tremuloides</i>	11	2	1	3



## Alliance Stand Table continued

### ***Prunus virginiana* Alliance**

n =18

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Prunus virginiana</i>	94	14.26	1	40
	<i>Ericameria nauseosa</i>	61	2.72	0.2	10
	<i>Ribes cereum</i>	56	2.45	0.2	10
	<i>Ribes velutinum</i>	50	1.1	0.2	3
	<i>Sambucus nigra</i>	33	1.15	0.2	3.5
	<i>Symphoricarpos rotundifolius</i>	33	2.95	0.2	10
	<i>Cercocarpus ledifolius</i>	33	2.32	0.2	10
	<i>Purshia tridentata</i>	28	1.78	0.2	3.7
	<i>Amelanchier utahensis</i>	22	3.05	0.2	10
	<i>Prunus subcordata</i>	22	19.75	6	50
	<i>Artemisia arbuscula</i>	17	0.47	0.2	1
	<i>Artemisia tridentata</i>	17	1.13	0.2	3
	<i>Chrysothamnus viscidiflorus</i>	17	1.67	1	2
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	11	3.25	3	3.5
	<i>Prunus emarginata</i>	11	3	1	5
	<i>Rosa woodsii</i>	11	0.2	0.2	0.2
	<i>Symphoricarpos albus</i>	11	2	1	3
<b>Herb</b>					
	<i>Bromus tectorum</i>	72	3.81	1	10
	<i>Elymus cinereus</i>	56	2.59	0.2	10
	<i>Elymus elymoides</i>	50	1.23	0.2	3.5
	<i>Pseudoroegneria spicata</i>	39	2.39	0.2	7.5
	<i>Poa secunda</i>	33	2.28	0.2	7
	<i>Crepis acuminata</i>	22	0.73	0.2	1.5
	<i>Lupinus argenteus</i>	22	1.55	0.2	3
	<i>Epilobium brachycarpum</i>	17	0.47	0.2	1
	<i>Phacelia humilis</i>	17	0.2	0.2	0.2
	<i>Collomia grandiflora</i>	17	0.2	0.2	0.2
	<i>Balsamorhiza sagittata</i>	17	3.33	1	8
	<i>Agastache urticifolia</i>	17	1.4	0.2	3
	<i>Bromus carinatus</i>	17	1.73	0.2	3
	<i>Poa bulbosa</i>	17	0.2	0.2	0.2
	<i>Eriophyllum lanatum</i>	11	0.6	0.2	1
	<i>Phacelia ramosissima</i>	11	1.85	0.2	3.5
	<i>Penstemon deustus</i>	11	1	1	1

**Alliance Stand Table continued**

***Prunus virginiana* Alliance**

**n =18**

<b>Lifeform</b>	<b>Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Herb</b>					
	<i>Penstemon</i>	11	0.6	0.2	1
	<i>Lupinus arbustus</i>	11	2.1	0.2	4
	<i>Lithospermum ruderales</i>	11	0.6	0.2	1
	<i>Festuca idahoensis</i>	11	1.5	1	2
	<i>Epilobium minutum</i>	11	0.2	0.2	0.2
	<i>Achnatherum thurberianum</i>	11	2	1	3
	<i>Scrophularia californica</i>	11	0.6	0.2	1
	<i>Lactuca serriola</i>	11	2.6	0.2	5

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## ***Prunus subcordata* Provisional Association**

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**Common Name:** Klamath/Sierra Plum

**NVC Association Code:**

**Alliance:** *Prunus virginiana* Alliance

### **Association Concept**

The *Prunus subcordata* Provisional Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily from the middle third of slopes to ridge summits and crests at northeastern aspects. Soils are derived from a variety of substrates but primarily andesite or general volcanic extrusives, and textures include fine sandy clay and medium to very fine sandy loam. Elevations range from approximately 1536 to 1711 meters. The dominant and characteristic shrub is *Prunus subcordata*, and those that are often present include *Ericameria nauseosa*, *Prunus virginiana*, and *Ribes velutinum*. Commonly associated emergent trees at sparse cover include *Juniperus occidentalis*. Dominant and characteristic herbs include *Bromus tectorum* and *Elymus elymoides*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Prunus subcordata*. The overall shrub cover ranges from 15 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1594 m, Range 1536 – 1711 m

Aspect: NE (4)

Slope: Mean 12.5 degrees, Range 6 – 18 degrees

Macro Topography: Middle 1/3 of slope (1), Upper 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Ridge summit, crest (1)

Tree Cover: Mean 2%, Range 0 – 5%

Shrub Cover: Mean 36.3%, Range 15 – 60%

Herb Cover: Mean 12%, Range 7 – 20%

Large Rock: Mean 63.6%, Range 55.2 – 72%

Small Rock: Mean 6.5%, Range 2 – 11%

Fines Cover: Mean 10.8%, Range 3 – 17%

Litter Cover: Mean 36.5%, Range 6 – 80%

Soil Texture (field assessed): Fine sandy clay (1), Medium to very fine, sandy loam (1)

Geology (map data): Andesite (2), General volcanic extrusives (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 15 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Prunus subcordata*. Those often present include *Ericameria nauseosa*, *Prunus virginiana*, and *Ribes velutinum*. The tree layer is emergent and typically or often includes *Juniperus occidentalis*. The herbaceous layer typically includes *Bromus tectorum* and *Elymus elymoides*.

**Species of Interest:** None.

## **Classification Comments**

This is a newly described association for California that is provisional due to the limited sample size. Additional sampling and analysis will need to occur to fully understand the variability of this type and its relationship to other similar communities.

**Classification Confidence:** Low

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=4

## **Association Stand Table**

### ***Prunus subcordata* Provisional Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	75	3.33	2	5
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	75	0.73	0.2	1
<b>Shrub</b>				
<i>Prunus subcordata</i>	100	19.75	6	50
<i>Ericameria nauseosa</i>	75	1	1	1
<i>Prunus virginiana</i>	75	3	1	5
<i>Ribes velutinum</i>	75	1.67	1	3
<i>Symphoricarpos albus</i>	50	2	1	3
<i>Amelanchier utahensis</i>	50	5.5	1	10
<i>Purshia tridentata</i>	50	2	1	3

## Association Stand Table continued

### ***Prunus subcordata* Provisional Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ribes cereum</i>	50	5.1	0.2	10
	<i>Sambucus nigra</i>	50	1	1	1
	<i>Chrysothamnus viscidiflorus</i>	25	1	1	1
	<i>Prunus emarginata</i>	25	1	1	1
	<i>Ceanothus velutinus</i>	25	1	1	1
	<i>Artemisia arbuscula</i>	25	1	1	1
	<i>Ribes</i>	25	1	1	1
	<i>Cercocarpus ledifolius</i>	25	10	10	10
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	3.75	1	10
	<i>Elymus elymoides</i>	75	0.73	0.2	1
	<i>Penstemon</i>	50	0.6	0.2	1
	<i>Poa secunda</i>	50	2	1	3
	<i>Elymus cinereus</i>	50	1.5	1	2
	<i>Eriophyllum lanatum</i>	50	0.6	0.2	1
	<i>Balsamorhiza sagittata</i>	50	1	1	1
	<i>Pseudoroegneria spicata</i>	50	2	1	3
	<i>Elymus caput-medusae</i>	25	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	25	0.2	0.2	0.2
	<i>Juncus</i>	25	0.2	0.2	0.2
	<i>Lactuca serriola</i>	25	0.2	0.2	0.2
	<i>Lithospermum ruderales</i>	25	1	1	1
	<i>Lomatium</i>	25	0.2	0.2	0.2
	<i>Lomatium bicolor</i>	25	2	2	2
	<i>Descurainia incana</i>	25	1	1	1
	<i>Plagiobothrys</i>	25	1	1	1
	<i>Potentilla glandulosa</i>	25	1	1	1
	<i>Poa bulbosa</i>	25	0.2	0.2	0.2
	<i>Senecio integerrimus</i>	25	1	1	1
	<i>Plectritis macrocera</i>	25	1	1	1
	<i>Achnatherum thurberianum</i>	25	3	3	3
	<i>Wyethia mollis</i>	25	5	5	5
	<i>Collomia grandiflora</i>	25	0.2	0.2	0.2
	<i>Bromus briziformis</i>	25	1	1	1
	<i>Bromus arvensis</i>	25	0.2	0.2	0.2
	<i>Balsamorhiza hookeri</i>	25	1	1	1

**Association Stand Table continued**

***Prunus subcordata* Provisional Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Herb</b>					
	<i>Athysanus pusillus</i>	25	1	1	1
	<i>Arabis glabra</i>	25	1	1	1
	<i>Agropyron cristatum</i>	25	5	5	5
	<i>Achnatherum occidentale</i>	25	1	1	1
	<i>Amsinckia</i>	25	0.2	0.2	0.2
	<i>Crepis acuminata</i>	25	1	1	1
<b>Non-vasc</b>					
	<i>Cryptogammic crust</i>	25	10	10	10

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## ***Prunus virginiana* / *Symphoricarpos rotundifolius* Association**

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**Common Name:** Chokecherry / Mountain Snowberry

**NVC Association Code:** CEG005444, *Prunus virginiana* - Mixed Shrub Talus Shrubland

**Alliance:** *Prunus virginiana* Alliance

### **Association Concept**

The *Prunus virginiana* / *Symphoricarpos rotundifolius* Association forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily from the lower to upper third of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, general volcanic extrusives, or igneous (type unknown), and textures are widely variable. Elevations range from approximately 1274 to 2202 meters. The dominant and characteristic shrub is *Prunus virginiana*, and those that are often present include *Ericameria nauseosa* and *Ribes cereum*. Dominant and characteristic herbs include *Bromus tectorum* and *Elymus cinereus*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent shrub layer of *Prunus virginiana*. The overall shrub cover ranges from 6 to 45 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1663 m, Range 1274 – 2202 m

Aspect: NE (6), SW (3), NW (2), SE (2)

Slope: Mean 17.9 degrees, Range 6 – 29 degrees

Macro Topography: Middle 1/3 of slope (3), Middle to Upper 1/3 of slope (3), Upper 1/3 of slope (2), Lower 1/3 of slope (2), Other (2), High slope (1), Lowslope (1)

Tree Cover: Mean 1%, Range 0 – 5%

Shrub Cover: Mean 22.4%, Range 6 – 45%

Herb Cover: Mean 8.7%, Range 0 – 18%

Large Rock: Mean 47.9%, Range 0 – 97%

Small Rock: Mean 8.7%, Range 0 – 36.5%

Fines Cover: Mean 13.4%, Range 0 – 89%

Litter Cover: Mean 20%, Range 2 – 86%

Soil Texture (field assessed): Medium to very fine, sandy loam (3), Not recorded (2), Unknown (1), Rock (1), Medium loam (1), Clay Loam (1), Moderately fine clay loam (1)

Geology (map data): Basalt (3), Andesite (2), General volcanic extrusives (1), Igneous (type unknown) (1), Not recorded (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 6 to 45 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Prunus virginiana*. Those often present include *Ericameria nauseosa* and *Ribes cereum*. The herbaceous layer typically includes *Bromus tectorum* and *Elymus cinereus*. *Juniperus occidentalis* is sometimes present in the tree layer.

**Species of Interest:** *Hackelia cusickii*

### **Classification Comments**

This is a newly described association for California and the National Vegetation Classification also recognizes this type. However, more sampling and analysis will need to occur in order to fully understand the variability of this association in California and how it relates to other similar communities.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR    **State:** S4

### **References**

None.

**Total Sample Size Used for Description:** N=14

### **Association Stand Table**

#### ***Prunus virginiana* / *Symphoricarpos rotundifolius* Association**

n =14

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	29	1.3	0.2	3
<b>Seedling</b>				
<i>Populus tremuloides</i>	14	2	1	3
<b>Shrub</b>				
<i>Prunus virginiana</i>	100	16.68	5	40
<i>Ericameria nauseosa</i>	57	3.36	0.2	10
<i>Ribes cereum</i>	57	1.79	0.2	5



## Association Stand Table continued

### ***Prunus virginiana* / *Symphoricarpos rotundifolius* Association**

n =14

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Symphoricarpos rotundifolius</i>	43	2.95	0.2	10
	<i>Ribes velutinum</i>	43	0.82	0.2	1.5
	<i>Cercocarpus ledifolius</i>	36	0.78	0.2	1.5
	<i>Sambucus nigra</i>	29	1.23	0.2	3.5
	<i>Artemisia tridentata</i>	21	1.13	0.2	3
	<i>Purshia tridentata</i>	21	1.63	0.2	3.7
	<i>Amelanchier utahensis</i>	14	0.6	0.2	1
	<i>Artemisia arbuscula</i>	14	0.2	0.2	0.2
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	14	3.25	3	3.5
	<i>Chrysothamnus viscidiflorus</i>	14	2	2	2
	<i>Rosa woodsii</i>	14	0.2	0.2	0.2
<b>Herb</b>					
	<i>Bromus tectorum</i>	64	3.83	1	10
	<i>Elymus cinereus</i>	57	2.86	0.2	10
	<i>Elymus elymoides</i>	43	1.48	0.2	3.5
	<i>Pseudoroegneria spicata</i>	36	2.54	0.2	7.5
	<i>Lupinus argenteus</i>	29	1.55	0.2	3
	<i>Poa secunda</i>	29	2.43	0.2	7
	<i>Phacelia humilis</i>	21	0.2	0.2	0.2
	<i>Agastache urticifolia</i>	21	1.4	0.2	3
	<i>Bromus carinatus</i>	21	1.73	0.2	3
	<i>Crepis acuminata</i>	21	0.63	0.2	1.5
	<i>Epilobium brachycarpum</i>	14	0.6	0.2	1
	<i>Scrophularia californica</i>	14	0.6	0.2	1
	<i>Poa bulbosa</i>	14	0.2	0.2	0.2
	<i>Phacelia ramosissima</i>	14	1.85	0.2	3.5
	<i>Penstemon deustus</i>	14	1	1	1
	<i>Lupinus arbustus</i>	14	2.1	0.2	4
	<i>Epilobium minutum</i>	14	0.2	0.2	0.2
	<i>Collomia grandiflora</i>	14	0.2	0.2	0.2
	<i>Festuca idahoensis</i>	14	1.5	1	2

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## ***Purshia tridentata* – *Artemisia tridentata* Alliance**

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**Common Name:** Bitter brush scrub Alliance

**NVC Alliance Code:** A3179. *Purshia tridentata* - *Artemisia tridentata* Mesic Steppe & Shrubland Alliance

### **Alliance Concept**

The *Purshia tridentata* – *Artemisia tridentata* Alliance forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to intermittent. It is found primarily on basin floors, slopes, and ridges at all aspects. Soils are derived from a variety of substrates but primarily andesite, general volcanic extrusives, igneous, or basalt and textures are widely variable. Elevation range is approximately 1263 – 2073 meters. *Purshia tridentata* is the characteristic and often dominant shrub, *Artemisia tridentata* and *Ericameria nauseosa* are often present. Dominant and characteristic herbs include *Bromus tectorum*, *Poa secunda*, and *Elymus elymoides*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Purshia tridentata*. The overall shrub cover ranges from 1 to 45 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg), Warner Mountains (M261Gf)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Purshia tridentata* – *Artemisia tridentata* Association

*Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides* Association

*Tetradymia canescens* Provisional Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1621 m, Range 1263 – 2073 m

Aspect: NE (13), SW (9), NW (6), SE (6)

Slope: Mean 9.6 degrees, Range 0 – 30 degrees

Macro Topography: Middle to Upper 1/3 of slope (6), Middle 1/3 of slope (6), Upper 1/3 of slope (4), High slope (3), Lower 1/3 of slope (3), Lower to Middle 1/3 of slope (3), Midslope (2), Other (2), Low level (2), Interfluvium/Summit (1), Basin floor (1), Ridge summit, crest (1), Lower 1/3 of slope to Ridge top (1)

Tree Cover: Mean 0.3%, Range 0 – 4%

Shrub Cover: Mean 18.2%, Range 1 – 45%

Herb Cover: Mean 16.7%, Range 2 – 53%

Large Rock: Mean 10.1%, Range 0 – 75%

Small Rock: Mean 16.3%, Range 0 – 48.2%

Fines Cover: Mean 34.5%, Range 1 – 95%

Litter Cover: Mean 11.5%, Range 0.1 – 36%

Soil Texture (field assessed): Fine clay (4), Moderately fine sandy clay loam (4), Medium to very fine, loamy sand (3), Sandy Loam (3), Moderately fine clay loam (3), Sand (2), Rock & Sand (2), Medium to very fine, sandy loam (2), Fine sand (2), Moderately coarse, sandy loam (1), Fine silty clay (1), Fine sandy clay (1), Sand/Rock (1), Coarse, loamy sand (1), Loamy Sand (1)

Geology (map data): Andesite (4), General volcanic extrusives (4), Igneous (type unknown) (3), Basalt (3), Sandy alluvium (most alluvial fans and washes) (2)

**Environment:** Stands of this alliance are found on well-draining soils in diverse settings that have likely seen recent disturbance from fire.

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 1 to 45 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to intermittent.

**Vegetation Floristics:** *Purshia tridentata* is the characteristic and often dominant shrub, *Artemisia tridentata* and *Ericameria nauseosa* are often present. The herbaceous layer typically includes *Bromus tectorum*, *Poa secunda*, and *Elymus elymoides*.

**Dynamics:** *Purshia tridentata* resprouts after fire while *Artemisia tridentata* does not, resulting in areas with recent and/or repeat fires converting from the *Artemisia tridentata* alliance to this alliance.

**Species of Interest:** *Iliamna bakeri*, *Silene oregana*

### **Classification Comments**

This is a common, wide-ranging alliance within the study area. This alliance is floristically similar the *Artemisia tridentata* alliance; especially in the *Purshia tridentata* – *Artemisia tridentata* stands that have had historical fire-disturbance but haven't burned recently and, therefore, the *Artemisia tridentata* has had a chance to return.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S4

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=49

## Alliance Stand Table

### ***Purshia tridentata* – *Artemisia tridentata* Alliance**

n =49

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	24	1.17	0.2	3
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	18	0.38	0.2	1
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	16	0.63	0.2	2
<b>Shrub</b>					
	<i>Purshia tridentata</i>	88	8.45	0.2	23
	<i>Ericameria nauseosa</i>	55	3.14	0.2	17.5
	<i>Artemisia tridentata</i>	49	6.59	0.2	15
	<i>Chrysothamnus viscidiflorus</i>	41	1.62	0.2	7.5
	<i>Tetradymia canescens</i>	37	4.21	0.2	17.5
	<i>Ribes velutinum</i>	20	1.66	0.2	5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	16	7.38	1	15
	<i>Artemisia arbuscula</i>	12	8.83	1	28
	<i>Ribes cereum</i>	12	1.1	0.2	3
	<i>Cercocarpus ledifolius</i>	10	1.58	0.2	3.5
	<i>Symphoricarpos rotundifolius</i>	10	0.36	0.2	1
<b>Herb</b>					
	<i>Bromus tectorum</i>	86	10.7	0.2	69
	<i>Poa secunda</i>	82	4.02	0.2	20
	<i>Elymus elymoides</i>	71	2.95	0.2	17
	<i>Pseudoroegneria spicata</i>	49	6.8	0.2	20
	<i>Achnatherum thurberianum</i>	43	2.62	0.2	10
	<i>Festuca idahoensis</i>	24	5.08	1	11
	<i>Crepis acuminata</i>	22	0.27	0.2	1
	<i>Achillea millefolium</i>	22	0.61	0.2	1.5
	<i>Lupinus argenteus</i>	20	1.18	0.2	4
	<i>Pleiacanthus spinosus</i>	16	2.1	0.2	8
	<i>Linanthus pungens</i>	16	2.7	0.2	7.5
	<i>Poa bulbosa</i>	14	2.89	0.2	13
	<i>Balsamorhiza sagittata</i>	12	0.93	0.2	3
	<i>Elymus caput-medusae</i>	12	2.5	1	5
	<i>Phlox diffusa</i>	12	0.55	0.2	1.5
	<i>Phacelia ramosissima</i>	12	0.2	0.2	0.2
	<i>Lupinus</i>	12	1.2	0.2	2

**Alliance Stand Table continued**

***Purshia tridentata* – *Artemisia tridentata* Alliance**

n =49

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Collinsia parviflora</i>	12	0.77	0.2	2
	<i>Tragopogon dubius</i>	12	0.47	0.2	1
	<i>Bromus arvensis</i>	10	1.64	0.2	5
	<i>Hesperostipa comata</i>	10	1.98	0.2	6
	<i>Microsteris gracilis</i>	10	0.92	0.2	3
	<i>Phacelia linearis</i>	10	0.2	0.2	0.2
	<i>Blepharipappus scaber</i>	10	1.28	0.2	3
	<i>Sisymbrium altissimum</i>	10	0.52	0.2	1
	<i>Phacelia hastata</i>	10	0.2	0.2	0.2
	<i>Crepis</i>	10	1.04	0.2	2

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## ***Purshia tridentata* – *Artemisia tridentata* Association**

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**Common Name:** Antelope Bitterbrush - Big Sagebrush - Round-leaf Snowberry

**NVC Association Code:** CEG003480, *Purshia tridentata* - *Artemisia tridentata* - *Symphoricarpos rotundifolius* Shrubland

**Alliance:** *Purshia tridentata* – *Artemisia tridentata* Alliance

### **Association Concept**

The *Purshia tridentata* – *Artemisia tridentata* Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open to intermittent. The association is found primarily on basin floors, lower to upper slopes, and ridge summits at all aspects. Soils are derived from a variety of substrates but primarily andesite, igneous, basalt, or general volcanic extrusives, and textures are widely variable. Elevations range from approximately 1292 to 1983 meters. The dominant and characteristic shrub is *Purshia tridentata*, and those that are often present include *Artemisia tridentata* and *Ericameria nauseosa*. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Pseudoroegneria spicata* is often present.

**Diagnostic Criteria:** This association is characterized by a sparse to intermittent shrub layer of *Purshia tridentata*. The overall shrub cover ranges from 3 to 45 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1599 m, Range 1292 – 1983 m

Aspect: NE (9), SW (5), NW (4), SE (3)

Slope: Mean 11.1 degrees, Range 0 – 30 degrees

Macro Topography: Middle to Upper 1/3 of slope (4), High slope (3), Middle 1/3 of slope (3), Upper 1/3 of slope (3), Other (2), Midslope (2), Ridge summit, crest (1), Lower to Middle 1/3 of slope (1), Low level (1), Basin floor (1), Lower 1/3 of slope (1)

Tree Cover: Mean 1%, Range 0 – 4%

Shrub Cover: Mean 20.9%, Range 3 – 45%

Herb Cover: Mean 18.7%, Range 7 – 53%

Large Rock: Mean 15.8%, Range 0 – 75%

Small Rock: Mean 22.4%, Range 1 – 48.2%

Fines Cover: Mean 25%, Range 1 – 69%

Litter Cover: Mean 10.7%, Range 0.1 – 35%

Soil Texture (field assessed): Sandy Loam (3), Moderately fine sandy clay loam (2), Medium to very fine, loamy sand (2), Medium to very fine, sandy loam (2), Rock & Sand (2), Moderately fine clay loam (2), Sand/Rock (1), Sand (1), Moderately coarse, sandy loam (1), Fine sandy clay (1), Fine silty clay (1)

Geology (map data): Andesite (4), Igneous (type unknown) (3), Basalt (2), General volcanic extrusives (2), Not recorded (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 3 to 45 percent. The tree layer is typically sparse, and the herbaceous layer is open to intermittent.

**Vegetation Floristics:** The dominant and characteristic shrub is *Purshia tridentata*. Those often present include *Artemisia tridentata* and *Ericameria nauseosa*. The herbaceous layer typically includes *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Pseudoroegneria spicata* is often present.

**Species of Interest:** *Silene oregana*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description:** N=31

### **Association Stand Table**

#### ***Purshia tridentata* – *Artemisia tridentata* Association**

n =31

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	29	1.4	0.2	3
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	16	0.36	0.2	1
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	19	0.77	0.2	2



**Association Stand Table continued**

***Purshia tridentata* – *Artemisia tridentata* Association**

n =31

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Purshia tridentata</i>	100	9.67	3	23
	<i>Ericameria nauseosa</i>	61	2.14	0.2	6
	<i>Artemisia tridentata</i>	55	8.36	0.2	15
	<i>Ribes velutinum</i>	32	1.66	0.2	5
	<i>Chrysothamnus viscidiflorus</i>	29	1.33	0.2	7.5
	<i>Tetradymia canescens</i>	26	1.33	0.2	5
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	23	7.71	1	15
	<i>Ribes cereum</i>	19	1.1	0.2	3
	<i>Cercocarpus ledifolius</i>	16	1.58	0.2	3.5
<b>Herb</b>					
	<i>Poa secunda</i>	84	3.98	0.2	20
	<i>Bromus tectorum</i>	81	12.6	0.2	69
	<i>Elymus elymoides</i>	77	3.1	0.2	17
	<i>Pseudoroegneria spicata</i>	58	6.42	0.2	20
	<i>Achnatherum thurberianum</i>	48	3.21	0.2	10
	<i>Festuca idahoensis</i>	29	5.22	1.5	10
	<i>Achillea millefolium</i>	26	0.66	0.2	1.5
	<i>Collinsia parviflora</i>	16	0.72	0.2	2
	<i>Crepis acuminata</i>	16	0.36	0.2	1
	<i>Linanthus pungens</i>	16	2.18	0.2	7.5
	<i>Lupinus argenteus</i>	16	0.88	0.2	2
	<i>Phlox diffusa</i>	16	0.62	0.2	1.5
	<i>Crepis</i>	13	0.8	0.2	1
	<i>Elymus caput-medusae</i>	13	2.25	1	5
	<i>Pleiacanthus spinosus</i>	13	4	1	8
	<i>Epilobium brachycarpum</i>	13	1.1	0.2	3
	<i>Balsamorhiza sagittata</i>	13	1.3	0.2	3
	<i>Microsteris gracilis</i>	13	1.1	0.2	3

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## ***Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides* Association**

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**Common Name:** Antelope Bitterbrush - Big Sagebrush / Indian Ricegrass

**NVC Association Code:** CEG003478, *Purshia tridentata* - *Artemisia tridentata* / *Achnatherum hymenoides* Shrubland

**Alliance:** *Purshia tridentata* – *Artemisia tridentata* Alliance

### **Association Concept**

The *Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides* Association forms an open shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. The association is found primarily on the lower third of slopes and ridgetops at all aspects. Soils are primarily derived from sandy alluvium (most alluvial fans and washes), and textures include fine sand, medium to very fine loamy sand, and coarse loamy sand. Elevations range from approximately 1462 to 1748 meters. Dominant and characteristic shrubs include *Purshia tridentata*, *Chrysothamnus viscidiflorus*, and *Ericameria nauseosa*, *Artemisia tridentata*, and *Eriogonum umbellatum*. *Tetradymia canescens* is often present. *Phacelia ramosissima*, *Bromus tectorum*, *Cryptantha circumscissa*, and *Hesperostipa comata* are characteristic herbs, and *Achnatherum hymenoides*, *Poa secunda*, *Phacelia hastata*, *Mentzelia congesta*, *Chaenactis douglasii*, and *Linanthus pungens* are often present.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Purshia tridentata*, with *Artemisia tridentata*, *Chrysothamnus viscidiflorus*, and *Ericameria nauseosa* and low cover and sparse *Eriogonum umbellatum*. The overall shrub cover ranges from 15 to 25 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1603 m, Range 1462 – 1748 m

Aspect: NE (1), NW (1), SE (1), SW (1)

Slope: Mean 9.0 degrees, Range 5 – 14 degrees

Macro Topography: Lower 1/3 of slope to Ridgetop (1), Lower to Middle 1/3 of slope (1), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Tree Cover: Mean 0%, Range 0 – 1%

Shrub Cover: Mean 21.5%, Range 15 – 25%

Herb Cover: Mean 11%, Range 2 – 26%

Large Rock: Mean 0%, Range 0 – 0%

Small Rock: Mean 5.1%, Range 0 – 14.2%

Fines Cover: Mean 80.5%, Range 62 – 95%

Litter Cover: Mean 12.5%, Range 3 – 30%

Soil Texture (field assessed): Fine sand (2), Medium to very fine, loamy sand (1),  
Coarse, loamy sand (1)

Geology (map data): Sandy alluvium (most alluvial fans and washes) (2)

**Environment:** Locally, stands of this association are best represented on the stabilized dunes on the east side of the Madeline Plain where the substrate is very sandy and supports a very sparse herb layer.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 15 to 25 percent. The tree layer is typically sparse, and the herbaceous layer is open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Purshia tridentata*, *Chrysothamnus viscidiflorus*, and *Ericameria nauseosa*, *Artemisia tridentata*, and *Eriogonum umbellatum*. *Tetradymia canescens* is often present. *Phacelia ramosissima*, *Bromus tectorum*, *Cryptantha circumscissa*, and *Hesperostipa comata* are characteristic herbs, and *Achnatherum hymenoides*, *Poa secunda*, *Phacelia hastata*, *Mentzelia congesta*, *Chaenactis douglasii*, and *Linanthus pungens* are often present.

**Species of Interest:** None.

### **Classification Comments**

Additional sampling throughout the range of this association is necessary to fully understand the variability of this community.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR    **State:** S3

### **References**

Keeler-Wolf et al. 2003b

**Total Sample Size Used for Description: N=4**

## Association Stand Table

### ***Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides* Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	25	1	1	1
<b>Sapling</b>					
	<i>Juniperus occidentalis</i>	50	0.2	0.2	0.2
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	50	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Purshia tridentata</i>	100	11	5	17
	<i>Chrysothamnus viscidiflorus</i>	100	2.75	2	3
	<i>Ericameria nauseosa</i>	100	5.5	4	8
	<i>Artemisia tridentata</i>	75	2.67	1	6
	<i>Eriogonum umbellatum</i>	75	0.2	0.2	0.2
	<i>Tetradymia canescens</i>	50	0.6	0.2	1
	<i>Atriplex confertifolia</i>	25	0.2	0.2	0.2
<b>Herb</b>					
	<i>Phacelia ramosissima</i>	100	0.2	0.2	0.2
	<i>Bromus tectorum</i>	75	6.73	0.2	13
	<i>Cryptantha circumscissa</i>	75	0.2	0.2	0.2
	<i>Hesperostipa comata</i>	75	2.73	0.2	6
	<i>Achnatherum hymenoides</i>	50	1.1	0.2	2
	<i>Poa secunda</i>	50	0.6	0.2	1
	<i>Phacelia hastata</i>	50	0.2	0.2	0.2
	<i>Mentzelia congesta</i>	50	0.2	0.2	0.2
	<i>Chaenactis douglasii</i>	50	0.2	0.2	0.2
	<i>Linanthus pungens</i>	50	3.6	0.2	7
	<i>Mentzelia albicaulis</i>	25	0.2	0.2	0.2
	<i>Erodium cicutarium</i>	25	0.2	0.2	0.2
	<i>Muhlenbergia</i>	25	1	1	1
	<i>Muhlenbergia asperifolia</i>	25	1	1	1
	<i>Oenothera caespitosa</i>	25	0.2	0.2	0.2
	<i>Phacelia linearis</i>	25	0.2	0.2	0.2
	<i>Madia</i>	25	0.2	0.2	0.2
	<i>Machaeranthera canescens</i>	25	0.2	0.2	0.2
	<i>Elymus triticoides</i>	25	2	2	2
	<i>Layia glandulosa</i>	25	0.2	0.2	0.2

**Association Stand Table continued**

***Purshia tridentata* – *Artemisia tridentata* / *Achnatherum hymenoides*  
Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Herb</b>				
<i>Lagophylla ramosissima</i>	25	0.2	0.2	0.2
<i>Gilia modocensis</i>	25	0.2	0.2	0.2
<i>Gayophytum diffusum</i>	25	0.2	0.2	0.2
<i>Eriogonum vimineum</i>	25	0.2	0.2	0.2
<i>Packera cana</i>	25	0.2	0.2	0.2
<i>Achnatherum thurberianum</i>	25	0.2	0.2	0.2
<i>Alyssum desertorum</i>	25	0.2	0.2	0.2
<i>Antennaria rosea</i>	25	0.2	0.2	0.2
<i>Cryptantha</i>	25	0.2	0.2	0.2
<i>Cryptantha watsonii</i>	25	0.2	0.2	0.2
<i>Delphinium</i>	25	0.2	0.2	0.2
<i>Blepharipappus scaber</i>	25	0.2	0.2	0.2
<i>Eriogonum</i>	25	0.2	0.2	0.2
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	50	23.5	22	25

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## ***Tetradymia canescens* Provisional Association**

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**Common Name:** Spineless horsebrush

**NVC Association Code:**

**Alliance:** *Purshia tridentata* – *Artemisia tridentata* Alliance

### **Association Concept**

The *Tetradymia canescens* Provisional Association forms an open shrub layer. The emergent tree layer is typically sparse or absent, and the herbaceous layer is open. The association is found primarily from the lower to upper third of slopes and interfluvium/summits at all aspects. Soils are derived primarily from general volcanic extrusives or basalt, and textures include fine clay, moderately fine sandy clay loam, sand, loamy sand, and moderately fine clay loam. Elevations range from approximately 1263 to 2073 meters. The dominant and characteristic shrub is *Tetradymia canescens*, and *Chrysothamnus viscidiflorus* is often present. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Crepis acuminata* is often present.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Tetradymia canescens*. The overall shrub cover ranges from 1 to 13 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1654 m, Range 1263 – 2073 m

Aspect: SW (3), NE (3), SE (2), NW (1)

Slope: Mean 7.5 degrees, Range 1 – 20 degrees

Macro Topography: Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (2), Upper 1/3 of slope (1), Interfluvium/Summit (1), Low level (1), Lower 1/3 of slope (1), Lower to Middle 1/3 of slope (1)

Tree Cover: Mean 0%, Range 0 – 0.2%

Shrub Cover: Mean 9%, Range 1 – 13%

Herb Cover: Mean 15.6%, Range 7 – 27%

Large Rock: Mean 5.5%, Range 0.1 – 18%

Small Rock: Mean 12.9%, Range 3 – 27%

Fines Cover: Mean 51.1%, Range 7 – 87%

Litter Cover: Mean 13.2%, Range 1 – 36%

Soil Texture (field assessed): Fine clay (4), Moderately fine sandy clay loam (2), Sand (1), Loamy Sand (1), Moderately fine clay loam (1)

Geology (map data): General volcanic extrusives (2), Basalt (1)

**Environment:** This association is found on sites that have had recent disturbance from fire or clearing of some sort.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open shrub layer, and the overall shrub cover ranges from 1 to 13 percent. The tree layer is typically sparse or absent, and the herbaceous layer is open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Tetradymia canescens*, and *Chrysothamnus viscidiflorus* is often present. Dominant and characteristic herbs include *Bromus tectorum*, *Elymus elymoides*, and *Poa secunda*, and *Crepis acuminata* is often present.

**Dynamics:** Severe disturbance is indicated by dominance of *Tetradymia* spp. and lack of *Purshia tridentata* and *Artemisia tridentata* cover. The herb layer is dominated by non-natives.

**Species of Interest:** *Iliamna bakeri*

### **Classification Comments**

This is a newly described association for California and will remain as a provisional type until more sampling is completed throughout its range and additional analysis is conducted in order to clarify the variability of this disturbance type.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

None.

**Total Sample Size Used for Description: N=11**

### **Association Stand Table**

#### ***Tetradymia canescens* Provisional Association**

n =11

Lifeform	Botanical Name	Con	Avg	Min	Max
Tree					
	<i>Juniperus occidentalis</i>	18	0.2	0.2	0.2
Sapling					
	<i>Juniperus occidentalis</i>	18	0.6	0.2	1

## Association Stand Table continued

### ***Tetradymia canescens* Provisional Association**

n =11

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Tetradymia canescens</i>	73	8	2	17.5
<i>Chrysothamnus viscidiflorus</i>	64	1.34	1	2.2
<i>Purshia tridentata</i>	45	0.68	0.2	1
<i>Artemisia tridentata</i>	36	1.98	0.2	4
<i>Ericameria nauseosa</i>	36	5.55	0.2	17.5
<i>Symphoricarpos rotundifolius</i>	27	0.47	0.2	1
<i>Tetradymia glabrata</i>	18	5.5	5	6
<b>Herb</b>				
<i>Bromus tectorum</i>	100	7.56	0.2	28
<i>Elymus elymoides</i>	82	1.76	0.2	5
<i>Poa secunda</i>	82	2.01	0.2	6
<i>Crepis acuminata</i>	55	0.2	0.2	0.2
<i>Lupinus argenteus</i>	45	1.48	0.2	4
<i>Pleiocanthus spinosus</i>	36	0.2	0.2	0.2
<i>Pseudoroegneria spicata</i>	36	7.62	2	17.5
<i>Achnatherum thurberianum</i>	27	1.57	0.2	3.5
<i>Poa bulbosa</i>	27	1	1	1
<i>Tragopogon dubius</i>	27	0.2	0.2	0.2
<i>Cirsium cymosum</i>	18	0.2	0.2	0.2
<i>Wyethia angustifolia</i>	18	2.6	0.2	5
<i>Sisymbrium altissimum</i>	18	0.2	0.2	0.2
<i>Lomatium</i>	18	1	1	1
<i>Elymus smithii</i>	18	3.5	1	6
<i>Collomia grandiflora</i>	18	0.2	0.2	0.2
<i>Chaenactis douglasii</i>	18	0.2	0.2	0.2
<i>Balsamorhiza sagittata</i>	18	0.2	0.2	0.2
<i>Achnatherum occidentale</i>	18	3.5	3	4
<i>Achillea millefolium</i>	18	0.2	0.2	0.2
<i>Crepis occidentalis</i>	18	0.6	0.2	1



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## ***Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance**

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**Common Name:** Booth' s Willow – Geyer's Willow – Yellow Willow thickets Alliance

**NVC Alliance Code:** A3769. *Salix boothii* - *Salix geyeriana* - *Salix lutea* Montane Wet Shrubland Alliance

### **Alliance Concept**

The *Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse to open and the herbaceous layer is open to intermittent. It is found primarily on slope bottoms and lower slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, mixed alluvium, and general volcanic extrusives and textures include various loams, muck, and fine clay. Elevation range is approximately 1239 – 1608 meters. The dominant and characteristic tree is *Salix lucida* ssp. *lasiandra*. The shrub layer is variable; *Amelanchier utahensis*, *Prunus virginiana*, *Ribes velutinum*, *Rosa woodsii*, *Salix exigua*, *Salix lasiolepis*, *Salix lemmonii*, or a mixture of these shrubs may be present. *Poa pratensis* is often present in the herbaceous layer.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent tree layer of *Salix lucida* ssp. *lasianдра* generally with either *Rosa woodsii*, *Salix lemmonii*, or *Salix lasilepis* at open cover in the shrub layer. The overall tree cover ranges from 0 to 14 percent, and the overall shrub cover ranges from 0 to 40 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Lower Klamath - Tule Lake Basins (M261Ga)

### **Associations**

*Salix lucida* / *Poa pratensis* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1448 m, Range 1239 – 1608 m

Aspect: NW (3), Flat (2), SW (2), NE (1), SE (1)

Slope: Mean 1.3 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (6), Bottom to Lower 1/3 of slope (2), Low level (1), Other (1)

Tree Cover: Mean 2.6%, Range 0 – 14%

Shrub Cover: Mean 19.4%, Range 0 – 40%

Herb Cover: Mean 35.4%, Range 13 – 65%

Large Rock: Mean 4.7%, Range 0 – 15%

Small Rock: Mean 8.6%, Range 1 – 25.2%

Fines Cover: Mean 29.7%, Range 2 – 95%

Litter Cover: Mean 33.7%, Range 1 – 83%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately fine silty clay loam (2), Muck (1), Fine clay (1), Loamy Sand (1), Medium loam (1), Medium silt loam (1)

Geology (map data): Basalt (3), Silty alluvium (1), Mixed alluvium (1), General volcanic extrusives (1), Clayey alluvium (1), Andesite (1)

**Environment:** Stands of this alliance are found on stream benches, alluvial stream terraces, broad meadows, springs, and seeps in meadows. Stands of shrubby *S. lucida* typically link up meadows along low-gradient streams at elevations above 5000 ft. (Smith 1998b).

### **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open tree layer and an open to intermittent shrub layer. The overall tree cover ranges from 0 to 14 percent, and the

overall shrub cover ranges from 0 to 40 percent. The herbaceous layer is open to nearly continuous.

**Vegetation Floristics:** The dominant and characteristic tree is *Salix lucida* ssp. *lasiandra*. The shrub layer is variable; *Amelanchier utahensis*, *Prunus virginiana*, *Ribes velutinum*, *Rosa woodsii*, *Salix exigua*, *Salix lasiolepis*, *Salix lemmonii*, or a mixture of these shrubs may be present. *Poa pratensis* is often present in the herbaceous layer.

**Species of Interest:** *Carex sheldonii*

### **Classification Comments**

Stands of *Salix lucida* that fall within this alliance are shrubby in form. *Salix lucida* ssp. *caudata* is the genetically shrubby form of this species, so stands that are dominated by this subspecies will always be considered under this alliance. However, *Salix lucida* ssp. *lasiandra* can also occur in shrubby form, although it is typically a tree, and can dominate or be a component of stands that fall within this alliance. These stands are differentiated from the *Salix lucida* ssp. *lasiandra* alliance by its shrubby form, higher elevation, and associated species.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S2

### **References**

Smith 1998b

**Total Sample Size Used for Description:** N=10

### **Alliance Stand Table**

#### ***Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance**

n =10

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	80	13.56	2	37.5
<i>Pinus ponderosa</i>	20	1	1	1
<i>Populus trichocarpa</i>	20	5	4	6
<i>Juniperus occidentalis</i>	20	2	2	2
<b>Sapling</b>				
<i>Populus trichocarpa</i>	20	0.6	0.2	1
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	30	0.2	0.2	0.2

**Alliance Stand Table continued**

***Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance**

n =10

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Rosa woodsii</i>	30	7	1	17
	<i>Salix lemmonii</i>	30	16	6	24
	<i>Amelanchier utahensis</i>	20	2.25	1	3.5
	<i>Ribes velutinum</i>	20	4.25	1	7.5
	<i>Salix exigua</i>	20	1.6	0.2	3
	<i>Salix lasiolepis</i>	20	27	24	30
	<i>Prunus virginiana</i>	20	0.2	0.2	0.2
<b>Herb</b>					
	<i>Poa pratensis</i>	50	4.84	0.2	13
	<i>Mimulus guttatus</i>	40	0.6	0.2	1
	<i>Bromus tectorum</i>	40	4.73	0.2	17.5
	<i>Epilobium ciliatum</i>	40	0.85	0.2	2
	<i>Achillea millefolium</i>	30	1.07	0.2	2
	<i>Agrostis gigantea</i>	30	2.07	0.2	5
	<i>Artemisia douglasiana</i>	30	0.73	0.2	1
	<i>Carex</i>	30	3.07	0.2	7
	<i>Carex lanuginosa</i>	30	8	2	20
	<i>Rumex crispus</i>	30	0.73	0.2	1
	<i>Taraxacum officinale</i>	30	1.07	0.2	2
	<i>Verbascum thapsus</i>	30	0.2	0.2	0.2
	<i>Scirpus microcarpus</i>	20	8.5	8	9
	<i>Typha</i>	20	1.5	1	2
	<i>Trifolium longipes</i>	20	0.6	0.2	1
	<i>Galium aparine</i>	20	0.2	0.2	0.2
	<i>Urtica dioica</i>	20	0.2	0.2	0.2
	<i>Phalaris arundinacea</i>	20	1	1	1
	<i>Juncus arcticus</i>	20	3.5	2	5
	<i>Eleocharis acicularis</i>	20	0.6	0.2	1
	<i>Prunella vulgaris</i>	20	2	1	3
	<i>Elymus triticoides</i>	20	0.2	0.2	0.2

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## ***Salix lucida* / *Poa pratensis* Association**

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**Common Name:** Shining willow / Kentucky Blue Grass

**NVC Association Code:**

**Alliance:** *Salix boothii* – *Salix geyeriana* – *Salix lutea* Alliance

### **Association Concept**

The *Salix lucida* / *Poa pratensis* Association forms a sparse to open tree layer with a sparse to intermittent shrub layer and an open to nearly continuous herbaceous layer. The association is found primarily from the bottom to lower third of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, andesite, clayey alluvium, general volcanic extrusives, or mixed alluvium and textures are widely variable. Elevations range from approximately 1361 to 1608 meters. The dominant and characteristic tree is *Salix lucida* ssp. *lasiandra*. The shrub layer is mixed, notable shrubs that are sometimes present include *Rosa woodsii*, *Salix lasiolepis*, and *Salix lemmonii*. The dominant and characteristic herb is *Poa pratensis*.

**Diagnostic Criteria:** This association is characterized by an emergent tree layer of *Salix lucida* ssp. *lasiandra* and an open to nearly continuous herbaceous layer of *Poa pratensis*. The overall tree cover ranges from 0 to 14 percent and the overall herbaceous cover ranges from 13 to 65 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1471 m, Range 1361 – 1608 m

Aspect: Flat (2), SW (2), NW (2), SE (1), NE (1)

Slope: Mean 1.1 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (6), Bottom to Lower 1/3 of slope (2), Other (1)

Tree Cover: Mean 3%, Range 0 – 14%

Shrub Cover: Mean 19.4%, Range 0 – 40%

Herb Cover: Mean 35.4%, Range 13 – 65%

Large Rock: Mean 4.7%, Range 0 – 15%

Small Rock: Mean 8.6%, Range 1 – 25.2%

Fines Cover: Mean 32.8%, Range 2 – 95%

Litter Cover: Mean 32.8%, Range 1 – 83%

Soil Texture (field assessed): Medium to very fine, sandy loam (2), Moderately fine silty clay loam (2), Muck (1), Medium loam (1), Fine clay (1), Medium silt loam (1)

Geology (map data): Basalt (3), Andesite (1), Clayey alluvium (1), General volcanic extrusives (1), Mixed alluvium (1), Silty alluvium (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to open tree layer and an open to nearly continuous herbaceous layer. Overall tree cover is 0 to 14 percent and overall herbaceous cover is 13 to 65 percent. The shrub layer is sparse to intermittent.

**Vegetation Floristics:** *Salix lasiandra* ssp. *lasiandra* is characteristic in the tree layer. Notable shrubs that are sometimes present include *Rosa woodsii*, *Salix lasiolepis*, and *Salix lemmonii*. The herbaceous layer typically includes *Poa pratensis*.

**Species of Interest:** *Carex sheldonii*

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

Smith 1998b

**Total Sample Size Used for Description:** N=9

## **Association Stand Table**

### ***Salix lucida* / *Poa pratensis* Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	78	10.14	2	23
<i>Populus trichocarpa</i>	22	5	4	6
<i>Pinus ponderosa</i>	22	1	1	1
<i>Juniperus occidentalis</i>	22	2	2	2
<i>Salix lucida</i> ssp. <i>caudata</i>	11	14	14	14
<b>Sapling</b>				
<i>Populus trichocarpa</i>	22	0.6	0.2	1
<i>Pinus ponderosa</i>	11	0.2	0.2	0.2
<i>Salix lucida</i> ssp. <i>lasiandra</i>	11	8	8	8
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	33	0.2	0.2	0.2
<b>Shrub</b>				
<i>Salix lemmonii</i>	33	16	6	24

## Association Stand Table continued

### ***Salix lucida* / *Poa pratensis* Association**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Rosa woodsii</i>	33	7	1	17
	<i>Prunus virginiana</i>	22	0.2	0.2	0.2
	<i>Salix exigua</i>	22	1.6	0.2	3
	<i>Salix lasiolepis</i>	22	27	24	30
	<i>Ribes velutinum</i>	11	1	1	1
	<i>Sambucus nigra</i>	11	0.2	0.2	0.2
	<i>Amelanchier utahensis</i>	11	1	1	1
	<i>Barbarea orthoceras</i>	11	0.2	0.2	0.2
	<i>Cornus sericea</i>	11	6	6	6
	<i>Ribes</i>	11	0.2	0.2	0.2
<b>Herb</b>					
	<i>Poa pratensis</i>	56	4.84	0.2	13
	<i>Epilobium ciliatum</i>	44	0.85	0.2	2
	<i>Mimulus guttatus</i>	44	0.6	0.2	1
	<i>Achillea millefolium</i>	33	1.07	0.2	2
	<i>Verbascum thapsus</i>	33	0.2	0.2	0.2
	<i>Taraxacum officinale</i>	33	1.07	0.2	2
	<i>Rumex crispus</i>	33	0.73	0.2	1
	<i>Carex lanuginosa</i>	33	8	2	20
	<i>Carex</i>	33	5.07	0.2	13
	<i>Bromus tectorum</i>	33	0.47	0.2	1
	<i>Artemisia douglasiana</i>	33	0.73	0.2	1
	<i>Agrostis gigantea</i>	33	2.07	0.2	5
	<i>Juncus arcticus</i>	22	3.5	2	5
	<i>Typha</i>	22	1.5	1	2
	<i>Eleocharis acicularis</i>	22	0.6	0.2	1
	<i>Elymus</i>	22	6	2	10
	<i>Urtica dioica</i>	22	0.2	0.2	0.2
	<i>Trifolium longipes</i>	22	0.6	0.2	1
	<i>Scirpus microcarpus</i>	22	8.5	8	9
	<i>Prunella vulgaris</i>	22	2	1	3
	<i>Phalaris arundinacea</i>	22	1	1	1
	<i>Elymus triticoides</i>	22	0.2	0.2	0.2
	<i>Hordeum brachyantherum</i>	11	1	1	1
	<i>Eryngium articulatum</i>	11	1	1	1
	<i>Rumex</i>	11	0.2	0.2	0.2



## Association Stand Table continued

### ***Salix lucida* / *Poa pratensis* Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Equisetum</i>	11	0.2	0.2	0.2
<i>Conium maculatum</i>	11	0.2	0.2	0.2
<i>Erigeron philadelphicus</i>	11	1	1	1
<i>Eleocharis</i>	11	2	2	2
<i>Euthamia occidentalis</i>	11	0.2	0.2	0.2
<i>Festuca</i>	11	1	1	1
<i>Festuca pratensis</i>	11	1	1	1
<i>Hordeum</i>	11	0.2	0.2	0.2
<i>Iris missouriensis</i>	11	11	11	11
<i>Equisetum hyemale</i>	11	1	1	1
<i>Galium aparine</i>	11	0.2	0.2	0.2
<i>Trifolium repens</i>	11	2	2	2
<i>Potentilla</i>	11	6	6	6
<i>Potentilla gracilis</i>	11	1	1	1
<i>Collinsia parviflora</i>	11	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	11	0.2	0.2	0.2
<i>Epilobium pallidum</i>	11	2	2	2
<i>Sisymbrium</i>	11	0.2	0.2	0.2
<i>Ranunculus</i>	11	1	1	1
<i>Thalictrum fendleri</i>	11	0.2	0.2	0.2
<i>Plantago major</i>	11	4	4	4
<i>Trifolium wormskioldii</i>	11	1	1	1
<i>Triteleia hyacinthina</i>	11	1	1	1
<i>Veronica</i>	11	0.2	0.2	0.2
<i>Veronica americana</i>	11	0.2	0.2	0.2
<i>Veronica anagallis-aquatica</i>	11	1	1	1
<i>Veronica scutellata</i>	11	0.2	0.2	0.2
<i>Viola glabella</i>	11	4	4	4
<i>Stachys ajugoides</i>	11	1	1	1
<i>Mentha arvensis</i>	11	1	1	1
<i>Juncus ensifolius</i>	11	0.2	0.2	0.2
<i>Lactuca serriola</i>	11	0.2	0.2	0.2
<i>Lepidium perfoliatum</i>	11	0.2	0.2	0.2
<i>Lotus</i>	11	1	1	1
<i>Lotus corniculatus</i>	11	0.2	0.2	0.2
<i>Lupinus polyphyllus</i>	11	0.2	0.2	0.2



## Association Stand Table continued

### ***Salix lucida* / *Poa pratensis* Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Madia glomerata</i>	11	1	1	1
<i>Polypogon monspeliensis</i>	11	3	3	3
<i>Melilotus officinalis</i>	11	0.2	0.2	0.2
<i>Poa bulbosa</i>	11	2	2	2
<i>Mentha spicata</i>	11	2	2	2
<i>Mimulus</i>	11	0.2	0.2	0.2
<i>Perideridia bolanderi</i>	11	1	1	1
<i>Phalaris</i>	11	3	3	3
<i>Phleum pratense</i>	11	6	6	6
<i>Plagiobothrys mollis</i>	11	3	3	3
<i>Juncus</i>	11	3	3	3
<i>Maianthemum stellatum</i>	11	0.2	0.2	0.2
<i>Carex integra</i>	11	1	1	1
<i>Claytonia rubra</i>	11	0.2	0.2	0.2
<i>Agrostis exarata</i>	11	5	5	5
<i>Amsinckia</i>	11	0.2	0.2	0.2
<i>Amsinckia menziesii</i>	11	0.2	0.2	0.2
<i>Arnica</i>	11	0.2	0.2	0.2
<i>Artemisia ludoviciana</i>	11	1	1	1
<i>Bromus carinatus</i>	11	0.2	0.2	0.2
<i>Equisetum arvense</i>	11	2	2	2
<i>Carex nebrascensis</i>	11	30	30	30
<i>Carex pellita</i>	11	0.2	0.2	0.2
<i>Carex sheldonii</i>	11	8	8	8
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	11	0.2	0.2	0.2
<i>Chenopodium album</i>	11	0.2	0.2	0.2
<i>Cicuta douglasii</i>	11	4	4	4
<i>Cirsium</i>	11	1	1	1
<i>Cirsium arvense</i>	11	13	13	13
<i>Aster ascendens</i>	11	1	1	1

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## ***Salix exigua* Alliance**

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**Common Name:** Sandbar willow thickets Alliance

**NVC Alliance Code:** A0947. *Salix exigua* Warm Desert Wet Shrubland Alliance

### **Alliance Concept**

The *Salix exigua* Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is open. It is found primarily from the bottom to lower third of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, clayey alluvium, or general volcanic extrusives and textures are widely variable. Elevation range is approximately 1276 – 1848 meters. The dominant and characteristic shrub is *Salix exigua*. *Juncus arcticus* and *Poa pratensis* are often present in the herbaceous layer.

**Diagnostic Criteria:** This alliance is characterized by an open shrub layer of *Salix exigua*. The overall shrub cover ranges from 11 to 60 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1496 m, Range 1276 – 1848 m

Aspect: NW (2), SW (2), Flat (1), Variable (1)

Slope: Mean 1.8 degrees, Range 0 – 4 degrees

Macro Topography: Bottom (3), Bottom to Lower 1/3 of slope (2), Lower 1/3 of slope (1)

Tree Cover: Mean 0.2%, Range 0 – 1%

Shrub Cover: Mean 26.5%, Range 11 – 60%

Herb Cover: Mean 17.0%, Range 5 – 32%

Large Rock: Mean 3.0%, Range 0 – 15%

Small Rock: Mean 20.5%, Range 0 – 75%

Fines Cover: Mean 59.2%, Range 7 – 82%

Litter Cover: Mean 7.0%, Range 2 – 14%

Soil Texture (field assessed): Medium loam (1), Medium silt loam (1), Moderately fine silty clay loam (1), Coarse, loamy sand (1), Fine sand (1), Fine sandy clay (1)

Geology (map data): Basalt (1), Clayey alluvium (1), General volcanic extrusives (1)

**Environment:** Temporarily flooded floodplains, depositions along rivers and streams, and at springs. Stands occur along the Pit River west of Goose Lake and in several of the lower valleys of the Modoc Plateau.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 11 to 60 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Salix exigua*. *Juncus arcticus* and *Poa pratensis* are often present in the herbaceous layer.

**Species of Interest:** None.

### **Classification Comments**

Stands of this alliance are relatively uncommon within the study area but are widely found throughout California in riparian settings.

**Classification Confidence:** High

**Conservation Status Rank**

**Global:** G5    **State:** S4

**References**

None.

**Total Sample Size Used for Description:** N=6

**Alliance Stand Table**

***Salix exigua* Alliance**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	33	1	1	1
<b>Seedling</b>				
<i>Juniperus occidentalis</i>	17	0.2	0.2	0.2
<b>Shrub</b>				
<i>Salix exigua</i>	100	18.17	9	25
<i>Rosa woodsii</i>	50	5	2	10
<i>Salix lasiolepis</i>	50	12	1	25
<i>Purshia tridentata</i>	33	0.2	0.2	0.2
<i>Artemisia tridentata</i>	33	0.2	0.2	0.2
<i>Salix lutea</i>	17	0.2	0.2	0.2
<i>Ericameria nauseosa</i>	17	0.2	0.2	0.2
<i>Ribes cereum</i>	17	0.2	0.2	0.2
<b>Herb</b>				
<i>Juncus arcticus</i>	50	2.73	0.2	7
<i>Poa pratensis</i>	50	2.67	2	4
<i>Rumex crispus</i>	33	0.2	0.2	0.2
<i>Achillea millefolium</i>	33	0.2	0.2	0.2
<i>Artemisia douglasiana</i>	33	0.6	0.2	1
<i>Bromus tectorum</i>	33	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	33	0.6	0.2	1
<i>Verbascum thapsus</i>	33	0.2	0.2	0.2
<i>Urtica dioica</i>	33	0.2	0.2	0.2
<i>Stachys ajugoides</i>	17	0.2	0.2	0.2
<i>Rumex</i>	17	0.2	0.2	0.2
<i>Senecio serra</i>	17	0.2	0.2	0.2
<i>Muhlenbergia richardsonis</i>	17	2	2	2

## Alliance Stand Table continued

### ***Salix exigua* Alliance**

n =6

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Phleum pratense</i>	17	4	4	4
<i>Plagiobothrys stipitatus</i>	17	0.2	0.2	0.2
<i>Poa</i>	17	1	1	1
<i>Poa bulbosa</i>	17	6	6	6
<i>Poa secunda</i>	17	0.2	0.2	0.2
<i>Polygonum aviculare</i>	17	0.2	0.2	0.2
<i>Potentilla</i>	17	1	1	1
<i>Potentilla gracilis</i>	17	1	1	1
<i>Madia citriodora</i>	17	0.2	0.2	0.2
<i>Rorippa curvisiliqua</i>	17	1	1	1
<i>Lotus unifoliolatus</i>	17	1	1	1
<i>Rumex occidentalis</i>	17	0.2	0.2	0.2
<i>Scirpus microcarpus</i>	17	10	10	10
<i>Sidalcea glaucescens</i>	17	0.2	0.2	0.2
<i>Equisetum laevigatum</i>	17	1	1	1
<i>Symphyotrichum</i>	17	0.2	0.2	0.2
<i>Elymus caput-medusae</i>	17	0.2	0.2	0.2
<i>Thinopyrum intermedium</i>	17	5	5	5
<i>Tragopogon dubius</i>	17	0.2	0.2	0.2
<i>Ventenata dubia</i>	17	0.2	0.2	0.2
<i>Wyethia mollis</i>	17	0.2	0.2	0.2
<i>Psilocarphus brevissimus</i>	17	0.2	0.2	0.2
<i>Epilobium densiflorum</i>	17	0.2	0.2	0.2
<i>Alopecurus aequalis</i>	17	1	1	1
<i>Alyssum desertorum</i>	17	0.2	0.2	0.2
<i>Bromus racemosus</i>	17	0.2	0.2	0.2
<i>Camassia quamash</i>	17	0.2	0.2	0.2
<i>Carex lenticularis</i>	17	2	2	2
<i>Castilleja lacera</i>	17	0.2	0.2	0.2
<i>Centaurium tenuiflorum</i>	17	0.2	0.2	0.2
<i>Crypsis schoenoides</i>	17	1	1	1
<i>Eleocharis</i>	17	9	9	9
<i>Eleocharis acicularis</i>	17	0.2	0.2	0.2
<i>Monardella odoratissima</i>	17	2	2	2
<i>Eleocharis macrostachya</i>	17	5	5	5
<i>Ageratina occidentalis</i>	17	1	1	1

## Alliance Stand Table continued

### ***Salix exigua* Alliance**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Erigeron divergens</i>	17	0.2	0.2	0.2
<i>Galium aparine</i>	17	0.2	0.2	0.2
<i>Grindelia</i>	17	3	3	3
<i>Hypochaeris glabra</i>	17	16	16	16
<i>Iris missouriensis</i>	17	0.2	0.2	0.2
<i>Juncus</i>	17	2	2	2
<i>Lepidium</i>	17	0.2	0.2	0.2
<i>Lepidium perfoliatum</i>	17	1	1	1
<i>Elymus cinereus</i>	17	3	3	3
<i>Lotus corniculatus</i>	17	3	3	3
<i>Eleocharis bella</i>	17	1	1	1
<i>Euphorbia serpyllifolia</i>	17	0.2	0.2	0.2



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## ***Salix lasiolepis* Alliance**

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**Common Name:** Arroyo willow thickets Alliance

**NVC Alliance Code:** A3878. *Salix lasiolepis* Warm Desert Wet Shrubland Alliance

### **Alliance Concept**

The *Salix lasiolepis* Alliance forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. It is found primarily at the bottom to middle third of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt and textures are variable. Elevation range is approximately 1390 – 1996 meters. The dominant and characteristic shrub is *Salix lasiolepis*, and *Rosa woodsii* is often present. Herbs that are often present include *Achillea millefolium*, *Artemisia douglasiana*, *Berula erecta*, and *Juncus arcticus*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent shrub layer of *Salix lasiolepis*. The overall shrub cover ranges from 15 to 40 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi)

## **Associations**

*Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1525 m, Range 1390 – 1996 m

Aspect: SW (4), SE (3), NE (1), NW (1)

Slope: Mean 5.6 degrees, Range 1 – 18 degrees

Macro Topography: Bottom (7), Middle 1/3 of slope (1), Lower 1/3 of slope (1)

Tree Cover: Mean 0.5%, Range 0 – 5%

Shrub Cover: Mean 25.9%, Range 15 – 40%

Herb Cover: Mean 13%, Range 1 – 28%

Large Rock: Mean 5%, Range 0.4 – 20%

Small Rock: Mean 7.9%, Range 2 – 20.2%

Fines Cover: Mean 40.7%, Range 10 – 81%

Litter Cover: Mean 29.9%, Range 2 – 75%

Soil Texture (field assessed): Fine silty clay (3), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Fine sandy clay (1), Moderately fine sandy clay loam (1)

Geology (map data): Basalt (5)

**Environment:** Stands of this alliance are found in stream banks and benches, slope seeps, and stringers along drainages.

## **Vegetation Description**

**Vegetation Structure:** The Alliance forms an open to intermittent shrub layer, and the overall shrub cover ranges from 15 to 40 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Salix lasiolepis*, and *Rosa woodsii* is often present. The herbaceous layer often includes *Achillea millefolium*, *Artemisia douglasiana*, *Berula erecta*, and *Juncus arcticus*.

**Species of Interest:** None.

## **Classification Comments**

Stands of this alliance are relatively uncommon within the study area but are widely found throughout California in riparian settings.



Classification Confidence: High

**Conservation Status Rank**

Global: G4 State: S4

**References**

Evens et al. 2014

**Total Sample Size Used for Description:** N=9

**Alliance Stand Table**

***Salix lasiolepis* Alliance**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Populus trichocarpa</i>	11	1	1	1
<i>Salix lucida</i> ssp. <i>lasiandra</i>	11	2	2	2
<i>Juniperus occidentalis</i>	11	5	5	5
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	22	0.6	0.2	1
<i>Populus tremuloides</i>	11	1	1	1
<i>Pinus ponderosa</i>	11	0.2	0.2	0.2
<i>Calocedrus decurrens</i>	11	0.2	0.2	0.2
<i>Abies concolor</i>	11	0.2	0.2	0.2
<b>Shrub</b>				
<i>Salix lasiolepis</i>	100	20.89	8	32
<i>Rosa woodsii</i>	56	1.28	0.2	3
<i>Ericameria nauseosa</i>	44	0.4	0.2	1
<i>Salix exigua</i>	22	0.6	0.2	1
<i>Artemisia tridentata</i>	22	0.6	0.2	1
<i>Cornus sericea</i>	22	11	8	14
<i>Symphoricarpos rotundifolius</i>	11	0.2	0.2	0.2
<i>Salix lutea</i>	11	0.2	0.2	0.2
<i>Artemisia cana</i>	11	0.2	0.2	0.2
<i>Salix lemmonii</i>	11	18	18	18
<b>Herb</b>				
<i>Artemisia douglasiana</i>	67	0.33	0.2	1
<i>Achillea millefolium</i>	56	0.56	0.2	2
<i>Berula erecta</i>	56	2.12	0.2	6
<i>Juncus arcticus</i>	56	2.04	0.2	4
<i>Mimulus guttatus</i>	44	0.6	0.2	1

## Alliance Stand Table continued

### ***Salix lasiolepis* Alliance**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Poa pratensis</i>	44	3.05	0.2	6
	<i>Scirpus microcarpus</i>	44	1.9	0.2	7
	<i>Epilobium ciliatum</i>	33	0.8	0.2	2
	<i>Nasturtium officinale</i>	33	1.07	0.2	2
	<i>Poa secunda</i>	33	4.33	1	8
	<i>Rumex crispus</i>	33	0.2	0.2	0.2
	<i>Artemisia ludoviciana</i>	22	0.2	0.2	0.2
	<i>Polypogon monspeliensis</i>	22	0.2	0.2	0.2
	<i>Phleum pratense</i>	22	1.6	0.2	3
	<i>Mentha canadensis</i>	22	0.2	0.2	0.2
	<i>Lotus tenuis</i>	22	1.1	0.2	2
	<i>Juncus ensifolius</i>	22	0.2	0.2	0.2
	<i>Juncus</i>	22	0.2	0.2	0.2
	<i>Galium aparine</i>	22	0.2	0.2	0.2
	<i>Euthamia occidentalis</i>	22	2.1	0.2	4
	<i>Carex simulata</i>	22	8.1	0.2	16
	<i>Verbascum thapsus</i>	22	0.2	0.2	0.2
	<i>Cirsium vulgare</i>	22	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	22	0.2	0.2	0.2
	<i>Trifolium wormskioldii</i>	22	2.5	2	3
	<i>Medicago</i>	11	0.2	0.2	0.2
	<i>Vicia americana</i>	11	0.2	0.2	0.2
	<i>Veronica anagallis-aquatica</i>	11	5	5	5
	<i>Urtica dioica</i>	11	0.2	0.2	0.2
	<i>Trifolium</i>	11	2	2	2
	<i>Melilotus officinalis</i>	11	1	1	1
	<i>Elymus triticoides</i>	11	3	3	3
	<i>Lemna</i>	11	2	2	2
	<i>Erigeron divergens</i>	11	0.2	0.2	0.2
	<i>Equisetum laevigatum</i>	11	0.2	0.2	0.2
	<i>Equisetum</i>	11	0.2	0.2	0.2
	<i>Epilobium brachycarpum</i>	11	0.2	0.2	0.2
	<i>Elymus elymoides</i>	11	0.2	0.2	0.2
	<i>Eleocharis macrostachya</i>	11	0.2	0.2	0.2
	<i>Eleocharis</i>	11	0.2	0.2	0.2
	<i>Conium maculatum</i>	11	0.2	0.2	0.2

## Alliance Stand Table continued

### ***Salix lasiolepis* Alliance**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Carex lenticularis</i>	11	0.2	0.2	0.2
	<i>Carex</i>	11	7	7	7
	<i>Bromus tectorum</i>	11	0.2	0.2	0.2
	<i>Bromus carinatus</i>	11	0.2	0.2	0.2
	<i>Aquilegia formosa</i>	11	0.2	0.2	0.2
	<i>Agoseris</i>	11	0.2	0.2	0.2
	<i>Platanthera leucostachys</i>	11	0.2	0.2	0.2
	<i>Epilobium glaberrimum</i>	11	0.2	0.2	0.2

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## ***Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association**

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**Common Name:** Arroyo Willow / Woods' Rose / Mixed Herbs

**NVC Association Code:** CEG001217, *Salix lasiolepis* / *Rosa woodsii* / Mixed Herbs  
Wet Shrubland

**Alliance:** *Salix lasiolepis* Alliance

### **Association Concept**

The *Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association forms an open to intermittent shrub layer. The emergent tree layer is typically sparse, and the herbaceous layer is sparse to open. The association is found primarily on the bottom, lower third, and middle third of slopes at all aspects. Soils are derived primarily from basalt, and textures include fine silty clay, medium to very fine sandy loam, moderately coarse sandy loam, moderately fine sandy clay loam, and fine sandy clay. Elevations range from approximately 1390 to 1996 meters. The dominant and characteristic shrub is *Salix lasiolepis*, and *Rosa woodsii* is often present. Herbs that are often present include *Achillea millefolium*, *Artemisia douglasiana*, *Berula erecta*, and *Juncus arcticus*.

**Diagnostic Criteria:** This association is characterized by an open shrub layer of *Salix lasiolepis* with an open, mixed herbaceous layer. The overall shrub cover ranges from 15 to 40 percent and the overall herb cover ranges from 1 to 28 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1525 m, Range 1390 – 1996 m

Aspect: SW (4), SE (3), NE (1), NW (1)

Slope: Mean 5.6 degrees, Range 1 – 18 degrees

Macro Topography: Bottom (7), Lower 1/3 of slope (1), Middle 1/3 of slope (1)

Tree Cover: Mean 0%, Range 0 – 5%

Shrub Cover: Mean 25.9%, Range 15 – 40%

Herb Cover: Mean 13%, Range 1 – 28%

Large Rock: Mean 5%, Range 0.4 – 20%

Small Rock: Mean 7.9%, Range 2 – 20.2%

Fines Cover: Mean 40.7%, Range 10 – 81%

Litter Cover: Mean 29.9%, Range 2 – 75%

Soil Texture (field assessed): Fine silty clay (3), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Moderately fine sandy clay loam (1), Fine sandy clay (1)

Geology (map data): Basalt (5)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent shrub layer, and the overall shrub cover ranges from 15 to 40 percent. The tree layer is typically sparse, and the herbaceous layer is open.

**Vegetation Floristics:** The dominant and characteristic shrub is *Salix lasiolepis*, and *Rosa woodsii* is often present. The herbaceous layer often includes *Achillea millefolium*, *Artemisia douglasiana*, *Berula erecta*, and *Juncus arcticus*.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR   **State:** S3

## **References**

Evens et al. 2014

**Total Sample Size Used for Description:** N=9

## **Association Stand Table**

### ***Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association**

n =9

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Populus trichocarpa</i>	11	1	1	1
<i>Juniperus occidentalis</i>	11	5	5	5
<i>Salix lucida</i> ssp. <i>lasiandra</i>	11	2	2	2
<b>Sapling</b>				
<i>Juniperus occidentalis</i>	22	0.6	0.2	1
<i>Populus tremuloides</i>	11	1	1	1
<i>Pinus ponderosa</i>	11	0.2	0.2	0.2
<i>Calocedrus decurrens</i>	11	0.2	0.2	0.2
<i>Abies concolor</i>	11	0.2	0.2	0.2
<b>Shrub</b>				
<i>Salix lasiolepis</i>	100	20.89	8	32
<i>Rosa woodsii</i>	56	1.28	0.2	3
<i>Ericameria nauseosa</i>	44	0.4	0.2	1

## Association Stand Table continued

### ***Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Salix exigua</i>	22	0.6	0.2	1
	<i>Artemisia tridentata</i>	22	0.6	0.2	1
	<i>Cornus sericea</i>	22	11	8	14
	<i>Salix lutea</i>	11	0.2	0.2	0.2
	<i>Symphoricarpos rotundifolius</i>	11	0.2	0.2	0.2
	<i>Salix lemmonii</i>	11	18	18	18
	<i>Artemisia cana</i>	11	0.2	0.2	0.2
<b>Herb</b>					
	<i>Artemisia douglasiana</i>	67	0.33	0.2	1
	<i>Juncus arcticus</i>	56	2.04	0.2	4
	<i>Berula erecta</i>	56	2.12	0.2	6
	<i>Achillea millefolium</i>	56	0.56	0.2	2
	<i>Poa pratensis</i>	44	3.05	0.2	6
	<i>Mimulus guttatus</i>	44	0.6	0.2	1
	<i>Scirpus microcarpus</i>	44	1.9	0.2	7
	<i>Poa secunda</i>	33	4.33	1	8
	<i>Nasturtium officinale</i>	33	1.07	0.2	2
	<i>Rumex crispus</i>	33	0.2	0.2	0.2
	<i>Epilobium ciliatum</i>	33	0.8	0.2	2
	<i>Carex simulata</i>	22	8.1	0.2	16
	<i>Galium aparine</i>	22	0.2	0.2	0.2
	<i>Cirsium vulgare</i>	22	0.2	0.2	0.2
	<i>Euthamia occidentalis</i>	22	2.1	0.2	4
	<i>Juncus</i>	22	0.2	0.2	0.2
	<i>Lotus tenuis</i>	22	1.1	0.2	2
	<i>Mentha canadensis</i>	22	0.2	0.2	0.2
	<i>Phleum pratense</i>	22	1.6	0.2	3
	<i>Polypogon monspeliensis</i>	22	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	22	0.2	0.2	0.2
	<i>Trifolium wormskioldii</i>	22	2.5	2	3
	<i>Verbascum thapsus</i>	22	0.2	0.2	0.2
	<i>Artemisia ludoviciana</i>	22	0.2	0.2	0.2
	<i>Juncus ensifolius</i>	22	0.2	0.2	0.2
	<i>Equisetum</i>	11	0.2	0.2	0.2
	<i>Aquilegia formosa</i>	11	0.2	0.2	0.2
	<i>Bromus carinatus</i>	11	0.2	0.2	0.2

**Association Stand Table continued**

***Salix lasiolepis* – *Rosa woodsii* / Mixed Herbs Association**

n =9

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Bromus tectorum</i>	11	0.2	0.2	0.2
	<i>Carex</i>	11	7	7	7
	<i>Carex lenticularis</i>	11	0.2	0.2	0.2
	<i>Conium maculatum</i>	11	0.2	0.2	0.2
	<i>Eleocharis</i>	11	0.2	0.2	0.2
	<i>Eleocharis macrostachya</i>	11	0.2	0.2	0.2
	<i>Elymus elymoides</i>	11	0.2	0.2	0.2
	<i>Agoseris</i>	11	0.2	0.2	0.2
	<i>Epilobium glaberrimum</i>	11	0.2	0.2	0.2
	<i>Trifolium</i>	11	2	2	2
	<i>Equisetum laevigatum</i>	11	0.2	0.2	0.2
	<i>Erigeron divergens</i>	11	0.2	0.2	0.2
	<i>Lemna</i>	11	2	2	2
	<i>Elymus triticoides</i>	11	3	3	3

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## ***Sarcobatus vermiculatus* Alliance**

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**Common Name:** Greasewood scrub Alliance

**NVC Alliance Code:** A1046. *Sarcobatus vermiculatus* Intermountain Wet Shrubland Alliance

### **Alliance Concept**

The *Sarcobatus vermiculatus* Alliance forms a sparse to intermittent shrub layer. The emergent tree layer is typically sparse or absent and the herbaceous layer is sparse to open. It is found primarily at the bottom to lower third of slopes at all aspects. Soils are derived from a variety of substrates but primarily sandy alluvium, basalt, or general volcanic extrusives and textures are typically variations of clay and loam. Elevation range is approximately 1216 – 1715 meters. Dominant and characteristic shrubs include *Sarcobatus vermiculatus* and *Artemisia tridentata*. *Bromus tectorum* is often present in the herbaceous layer.



**Diagnostic Criteria:** This alliance is characterized by a sparse to intermittent shrub layer of *Sarcobatus vermiculatus*. The overall shrub cover ranges from 0.2 to 46 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm)

### **Associations**

*Sarcobatus vermiculatus* – *Artemisia tridentata* Association

*Sarcobatus vermiculatus* – *Atriplex confertifolia* – (*Picrothamnus desertorum*, *Suaeda moquinii*) Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1410 m, Range 1216 – 1715 m

Aspect: NE (3), SE (2), Variable (1), Flat (1), NW (1), SW (1)

Slope: Mean 2.0 degrees, Range 0 – 11 degrees

Macro Topography: Lower 1/3 of slope (5), Bottom to Lower 1/3 of slope (2), Bottom (2)

Tree Cover: 0%

Shrub Cover: Mean 16.7%, Range 0.2 – 46%

Herb Cover: Mean 6.7%, Range 1 – 14%

Large Rock: Mean 0.1%, Range 0 – 1%

Small Rock: Mean 8.7%, Range 0.2 – 42%

Fines Cover: Mean 68.3%, Range 7 – 98%

Litter Cover: Mean 6.4%, Range 1 – 15%

Soil Texture (field assessed): Fine clay (4), Moderately fine clay loam (2), Medium loam (1), Fine silty clay (1), Medium to very fine, sandy loam (1)

Geology (map data): Sandy alluvium (most alluvial fans and washes) (2), Basalt (2), General volcanic extrusives (1)

**Environment:** Stands of this alliance occur on dry lake beds, old lake beds perched above current drainages, plains, and alkali stream terraces. Small stands of *Sarcobatus vermiculatus* occur in alkali basins near Alturas with *Artemisia tridentata*.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 0.2 to 46 percent. The tree layer is typically sparse, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Sarcobatus vermiculatus* and *Artemisia tridentata*. The herbaceous layer typically includes *Bromus tectorum*.

**Species of Interest:** None.

### **Classification Comments**

Stands are associated with larger playas or former Pleistocene lakebeds on fine, clayey soils often with a distinctly light color relative to adjacent upland substrates. *Sarcobatus vermiculatus* is a strong indicator species for this setting and alliance and may even be sub-dominant to other shrubs (along with other halophytes) and would still fit the definition for this type.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S4

### **References**

Ferren and Davis 1991, Menke et al. 2019, VegCAMP (Vegetation Classification and Mapping Program) 2014b

**Total Sample Size Used for Description:** N=26

### **Alliance Stand Table**

#### ***Sarcobatus vermiculatus* Alliance**

n =26

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Sarcobatus vermiculatus</i>	92	8.55	0.2	21
	<i>Artemisia tridentata</i>	54	7.66	0.2	32
	<i>Atriplex confertifolia</i>	42	2.76	0.2	6
	<i>Ericameria nauseosa</i>	27	3.6	0.2	9
	<i>Picrothamnus desertorum</i>	23	3.17	1	7
	<i>Tetradymia glabrata</i>	19	1.64	0.2	3
	<i>Chrysothamnus viscidiflorus</i>	15	3.75	1	6
<b>Herb</b>					
	<i>Bromus tectorum</i>	58	8.71	0.2	52
	<i>Lepidium perfoliatum</i>	38	1.66	0.2	6
	<i>Elymus elymoides</i>	27	1.11	0.2	3
	<i>Elymus cinereus</i>	27	0.8	0.2	2
	<i>Distichlis spicata</i>	19	4.4	1	13

**Alliance Stand Table continued**

***Sarcobatus vermiculatus* Alliance**

n =26

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Herb</b>				
<i>Poa secunda</i>	19	0.52	0.2	1
<i>Bromus briziformis</i>	15	0.4	0.2	1
<i>Ceratocephala testiculata</i>	15	2.1	0.2	5
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	15	1.1	0.2	2

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## ***Sarcobatus vermiculatus* – *Artemisia tridentata* Association**

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**Common Name:** Black Greasewood – Big Sagebrush

**NVC Association Code:** CEG001359, *Sarcobatus vermiculatus* / *Artemisia tridentata*  
Wet Shrubland

**Alliance:** *Sarcobatus vermiculatus* Alliance

### **Association Concept**

The *Sarcobatus vermiculatus* – *Artemisia tridentata* Association forms a sparse to intermittent shrub layer. The herbaceous layer is sparse to open. The association is found primarily on the bottom to lower third of slopes at all aspects. Soils are derived from a variety of substrates but primarily sandy alluvium (most alluvial fans and washes), basalt, or general volcanic extrusives, and textures include fine clay, moderately fine clay loam, fine silty clay, and medium loam. Elevations range from approximately 1216 to 1715 meters. Dominant and characteristic shrubs include *Sarcobatus vermiculatus* and *Artemisia tridentata*. Dominant and characteristic herbs include *Bromus tectorum* and *Lepidium perfoliatum*.

**Diagnostic Criteria:** This association is characterized by a sparse to open shrub layer of *Sarcobatus vermiculatus* and *Artemisia tridentata*. The overall shrub cover ranges from 2 to 39 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1427 m, Range 1216 – 1715 m

Aspect: NE (3), SE (2), Flat (1), NW (1), SW (1), Variable (1)

Slope: Mean 2.1 degrees, Range 0 – 11 degrees

Macro Topography: Lower 1/3 of slope (5), Bottom (2), Bottom to Lower 1/3 of slope (2)

Tree Cover: 0%

Shrub Cover: Mean 17.3%, Range 2 – 39%

Herb Cover: Mean 6.7%, Range 1 – 14%

Large Rock: Mean 0.1%, Range 0 – 1%

Small Rock: Mean 6.4%, Range 0.2 – 42%

Fines Cover: Mean 70.5%, Range 15 – 98%

Litter Cover: Mean 6.4%, Range 1 – 15%

Soil Texture (field assessed): Fine clay (4), Moderately fine clay loam (2), Fine silty clay (1), Medium loam (1), Medium to very fine, sandy loam (1)

Geology (map data): Sandy alluvium (most alluvial fans and washes) (2), Basalt (2), General volcanic extrusives (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms a sparse to intermittent shrub layer, and the overall shrub cover ranges from 2 to 39 percent. The tree layer is typically sparse to absent, and the herbaceous layer is sparse to open.

**Vegetation Floristics:** Dominant and characteristic shrubs include *Sarcobatus vermiculatus* and *Artemisia tridentata*. The herbaceous layer typically includes *Bromus tectorum* and often includes *Lepidium perfoliatum*.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** S4

## **References**

None.

**Total Sample Size Used for Description:** N=15

## **Association Stand Table**

### ***Sarcobatus vermiculatus* – *Artemisia tridentata* Association**

n =15

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Sarcobatus vermiculatus</i>	100	7.55	0.2	19
<i>Artemisia tridentata</i>	80	8.52	0.2	32
<i>Ericameria nauseosa</i>	47	3.6	0.2	9
<i>Atriplex confertifolia</i>	27	2.35	0.2	6
<i>Tetradymia glabrata</i>	20	1.07	0.2	2
<i>Chrysothamnus viscidiflorus</i>	13	3.5	1	6
<b>Herb</b>				
<i>Bromus tectorum</i>	80	7.72	0.2	52
<i>Lepidium perfoliatum</i>	67	1.66	0.2	6
<i>Elymus elymoides</i>	47	1.11	0.2	3
<i>Elymus cinereus</i>	40	0.77	0.2	2
<i>Poa secunda</i>	33	0.52	0.2	1
<i>Distichlis spicata</i>	27	2.25	1	6

**Association Stand Table continued**

***Sarcobatus vermiculatus* – *Artemisia tridentata* Association**

n =15

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Herb</b>				
<i>Bromus briziformis</i>	27	0.4	0.2	1
<i>Ceratocephala testiculata</i>	20	1.13	0.2	3
<i>Blepharipappus scaber</i>	13	0.2	0.2	0.2
<i>Vulpia octoflora</i>	13	0.6	0.2	1
<i>Tragopogon dubius</i>	13	0.2	0.2	0.2
<i>Packera eurycephala</i>	13	0.2	0.2	0.2
<i>Poa bulbosa</i>	13	0.2	0.2	0.2
<b>Non-vasc</b>				
<i>Cryptogammic crust</i>	27	1.1	0.2	2

## Herbaceous Communities

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

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**Common Name:** Nodding beggarticks – western goldentop – marsh seedbox mudflats Alliance

**NVC Alliance Code:** A3850. *Bidens cernua* - *Euthamia occidentalis* - *Ludwigia palustris* Intertidal Mudflat Alliance

#### **Alliance Concept**

The *Bidens cernua* – *Euthamia occidentalis* – *Ludwigia palustris* Alliance forms an open herbaceous layer. The shrub layer is sparse and trees are absent. It is found primarily in flat or low-gradient areas. Soils are derived from basalt, and have a moderately coarse, sandy loam texture. Elevation is approximately 1386 m. The dominant herb is *Artemisia douglasiana*, and characteristic or often present herbs include *Achillea millefolium*, *Agrostis gigantea*, *Carex fracta*, *Cirsium andersonii*, *Clarkia gracilis*, *Danthonia californica*, *Eleocharis acicularis*, *Eriophyllum lanatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Elymus triticoides*, *Mimulus guttatus*, *Muhlenbergia richardsonis*,

*Perideridia bolanderi*, *Poa bulbosa*, *Poa pratensis*, *Potentilla glandulosa*, *Potentilla gracilis*, *Ranunculus occidentalis*, *Solidago canadensis* ssp. *elongata*, and *Triteleia hyacinthina*. Commonly associated emergent shrubs at sparse cover include *Cercocarpus ledifolius* and *Salix lasiolepis*.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Artemisia douglasiana*, *Achillea millefolium*, *Agrostis gigantea*, *Carex fraxea*, *Cirsium andersonii*, *Clarkia gracilis*, *Danthonia californica*, *Eleocharis acicularis*, *Eriophyllum lanatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Elymus triticoides*, *Mimulus guttatus*, *Muhlenbergia richardsonis*, *Perideridia bolanderi*, *Poa bulbosa*, *Poa pratensis*, *Potentilla glandulosa*, *Potentilla gracilis*, *Ranunculus occidentalis*, *Solidago canadensis* ssp. *Elongata*, *Triteleia hyacinthina*. The overall herbaceous cover is 9 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Mountain (M261Gi)

### **Associations**

*Artemisia douglasiana* Provisional Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1386 m

Aspect: SW (1)

Slope: 2 degrees

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: 0.2%

Herb Cover: 9%

Large Rock: 54.2%

Small Rock: 30%

Fines Cover: 2%

Litter Cover: 14%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): Basalt (1)

**Environment:** Stands of this alliance are found in wet-to-moist meadows, mudflats, and ditches along low-gradient streams, shallow ponds, and depressional wetlands.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 9 percent. The tree layer is absent, and the shrub layer is sparse.



**Vegetation Floristics:** The dominant herb is *Artemisia douglasiana*, and characteristic herbs include *Achillea millefolium*, *Agrostis gigantea*, *Carex fracta*, *Cirsium andersonii*, *Clarkia gracilis*, *Danthonia californica*, *Eleocharis acicularis*, *Eriophyllum lanatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Elymus triticoides*, *Mimulus guttatus*, *Muhlenbergia richardsonis*, *Perideridia bolanderi*, *Poa bulbosa*, *Poa pratensis*, *Potentilla glandulosa*, *Potentilla gracilis*, *Ranunculus occidentalis*, *Solidago canadensis* ssp. *elongata*, and *Triteleia hyacinthina*. The shrub layer is emergent and includes *Cercocarpus ledifolius* and *Salix lasiolepis*.

**Species of Interest:** None.

### **Classification Comments**

This herbaceous alliance 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 subirrigation. More sampling and analysis in wet meadows needs to occur to understand the full variability of this alliance. .

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNR    **State:** S4

### **References**

Buck-Diaz et al. 2012, VegCAMP (Vegetation Classification and Mapping Program) and GIC 2013

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

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

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Cercocarpus ledifolius</i>	100	0.2	0.2	0.2
	<i>Salix lasiolepis</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Mimulus guttatus</i>	100	0.2	0.2	0.2
	<i>Poa bulbosa</i>	100	0.2	0.2	0.2
	<i>Achillea millefolium</i>	100	0.2	0.2	0.2
	<i>Agrostis gigantea</i>	100	1	1	1
	<i>Artemisia douglasiana</i>	100	3	3	3

**Alliance Stand Table continued**

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

n =1

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Carex fraxa</i>	100	0.2	0.2	0.2
<i>Cirsium andersonii</i>	100	0.2	0.2	0.2
<i>Clarkia gracilis</i>	100	0.2	0.2	0.2
<i>Danthonia californica</i>	100	0.2	0.2	0.2
<i>Eleocharis acicularis</i>	100	0.2	0.2	0.2
<i>Eriophyllum lanatum</i>	100	0.2	0.2	0.2
<i>Hordeum brachyantherum</i>	100	0.2	0.2	0.2
<i>Juncus arcticus</i>	100	0.2	0.2	0.2
<i>Elymus triticoides</i>	100	1	1	1
<i>Perideridia bolanderi</i>	100	0.2	0.2	0.2
<i>Muhlenbergia richardsonis</i>	100	0.2	0.2	0.2
<i>Poa pratensis</i>	100	0.2	0.2	0.2
<i>Potentilla glandulosa</i>	100	0.2	0.2	0.2
<i>Potentilla gracilis</i>	100	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	100	0.2	0.2	0.2
<i>Solidago canadensis</i> ssp. <i>Elongata</i>	100	0.2	0.2	0.2
<i>Triteleia hyacinthina</i>	100	0.2	0.2	0.2

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## ***Artemisia douglasiana* Provisional Association**

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**Common Name:** California mugwort

**NVC Association Code:** None.

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

### **Association Concept**

The *Artemisia douglasiana* Provisional Association forms an open herbaceous layer. The alliance is found primarily at the bottom of southwest-facing slopes. Soils are derived from a variety of substrates but primarily basalt and textures include moderately coarse, sandy loam. Elevations is approximately 1386 meters. *Artemisia douglasiana* is the dominant herb, and characteristic herbs include *Achillea millefolium*, *Agrostis gigantea*, *Carex fraxta*, *Cirsium andersonii*, *Clarkia gracilis*, *Danthonia californica*, *Eleocharis acicularis*, *Eriophyllum lanatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Elymus triticoides*, *Mimulus guttatus*, *Muhlenbergia richardsonis*, *Perideridia bolanderi*, *Poa bulbosa*, *Poa pratensis*, *Potentilla glandulosa*, *Potentilla gracilis*, *Ranunculus occidentalis*, *Solidago canadensis* ssp. *elongata*, and *Triteleia hyacinthina*. Commonly associated emergent shrubs at sparse cover include *Cercocarpus ledifolius* and *Salix lasiolepis*.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Artemisia douglasiana*, with all other characteristic herbs at sparse cover. The overall herbaceous cover is 9 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1386 m

Aspect: SW (1)

Slope: 2 degrees

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: 0.2%

Herb Cover: 9%

Large Rock: 54.2%

Small Rock: 30%

Fines Cover: 2%

Litter Cover: 14%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): Basalt (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open herbaceous layer, and the overall herbaceous cover is 9 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Artemisia douglasiana* is the dominant herb, and characteristic herbs include *Achillea millefolium*, *Agrostis gigantea*, *Carex fracta*, *Cirsium andersonii*, *Clarkia gracilis*, *Danthonia californica*, *Eleocharis acicularis*, *Eriophyllum lanatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Elymus triticoides*, *Mimulus guttatus*, *Muhlenbergia richardsonis*, *Perideridia bolanderi*, *Poa bulbosa*, *Poa pratensis*, *Potentilla glandulosa*, *Potentilla gracilis*, *Ranunculus occidentalis*, *Solidago canadensis* ssp. *elongata*, and *Triteleia hyacinthina*. The shrub layer is emergent and typically or often includes *Cercocarpus ledifolius* and *Salix lasiolepis*.

**Species of Interest:** None.

## **Classification Comments**

Additional sampling and analysis will need to occur to fully understand the variability of this type and its relationship to other similar communities.

**Classification Confidence:** Moderate

## **References**

Buck-Diaz et al. 2012, VegCAMP (Vegetation Classification and Mapping Program) and GIC 2013

## **Conservation Status Rank**

**Global:** GNR    **State:** N

**Total Sample Size Used for Description:** N=1

## **Association Stand Table**

### ***Artemisia douglasiana* Provisional Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Cercocarpus ledifolius</i>	100	0.2	0.2	0.2
<i>Salix lasiolepis</i>	100	0.2	0.2	0.2
<b>Herb</b>				
<i>Artemisia douglasiana</i>	100	3	3	3
<i>Elymus triticoides</i>	100	1	1	1
<i>Agrostis gigantea</i>	100	1	1	1

## Association Stand Table continued

### ***Artemisia douglasiana* Provisional Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Potentilla glandulosa</i>	100	0.2	0.2	0.2
<i>Poa pratensis</i>	100	0.2	0.2	0.2
<i>Triteleia hyacinthina</i>	100	0.2	0.2	0.2
<i>Solidago canadensis</i> ssp. <i>Elongata</i>	100	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	100	0.2	0.2	0.2
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Poa bulbosa</i>	100	0.2	0.2	0.2
<i>Perideridia bolanderi</i>	100	0.2	0.2	0.2
<i>Muhlenbergia richardsonis</i>	100	0.2	0.2	0.2
<i>Mimulus guttatus</i>	100	0.2	0.2	0.2
<i>Hordeum brachyantherum</i>	100	0.2	0.2	0.2
<i>Eriophyllum lanatum</i>	100	0.2	0.2	0.2
<i>Eleocharis acicularis</i>	100	0.2	0.2	0.2
<i>Danthonia californica</i>	100	0.2	0.2	0.2
<i>Potentilla gracilis</i>	100	0.2	0.2	0.2
<i>Clarkia gracilis</i>	100	0.2	0.2	0.2
<i>Cirsium andersonii</i>	100	0.2	0.2	0.2
<i>Carex fracta</i>	100	0.2	0.2	0.2
<i>Juncus arcticus</i>	100	0.2	0.2	0.2

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## ***Bromus tectorum* – *Elymus caput-medusae* Alliance**

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**Common Name:** Cheatgrass – medusahead grassland Alliance

**NVC Alliance Code:** A1814. *Bromus tectorum* - *Elymus caput-medusae* Ruderal Annual Grassland Alliance

### **Alliance Concept**

The *Bromus tectorum* – *Elymus caput-medusae* Alliance forms an open to intermittent herbaceous layer. The shrub layer is open and trees are absent. It is found at all aspects, primarily at valley bottoms or on the lower portions of slopes, but also on upper slopes and ridges. Soils are derived from a variety of substrates but primarily basalt, textures are variable. Elevation range is approximately 1100 – 2021 m. The dominant herb is *Bromus tectorum*. *Elymus elymoides* and *Elymus caput-medusae* are often present.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous herbaceous layer of *Bromus tectorum*, *Elymus caput-medusae*, and/or *Ventenata dubia*. The overall herbaceous cover ranges from 11 to 60 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Big Valley Mountains (M261Gn), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Lower Klamath - Tule Lake Basins (M261Ga), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

## **Associations**

*Bromus tectorum* Association

*Elymus caput-medusae* Provisional Association

*Ventenata dubia* Provisional Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1449 m, Range 1100 – 2021 m

Aspect: SW (12), NW (11), SE (11), Flat (10), NE (10), Variable (1)

Slope: Mean 4.5 degrees, Range 0 – 60 degrees

Macro Topography: Lower 1/3 of slope (18), Bottom (12), Middle 1/3 of slope (7), Upper 1/3 of slope (7), Ridge top (3), Middle to Upper 1/3 of slope (2), Bottom to Lower 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Step in slope (1), Upper 1/3 of slope to Ridgetop (1)

Tree Cover: 0%

Shrub Cover: Mean 1.5%, Range 0 – 15%

Herb Cover: Mean 25.5%, Range 11 – 60%

Large Rock: Mean 5.4%, Range 0 – 50%

Small Rock: Mean 20.1%, Range 0 – 75%

Fines Cover: Mean 21.3%, Range 0 – 97%

Litter Cover: Mean 31.3%, Range 0.1 – 96%

Soil Texture (field assessed): Fine silty clay (11), Fine clay (9), Moderately fine sandy clay loam (8), Fine sandy clay (5), Moderately fine clay loam (4), Loamy Sand (4), Medium to very fine, sandy loam (3), Silt Loam (3), Moderately fine silty clay loam (2), Sandy Loam (2), Moderately coarse, sandy loam (1), Loam (1), Rock (1), Medium silt (1)

Geology (map data): Basalt (20), General volcanic extrusives (5), Igneous (type unknown) (2), Andesite (1)

**Environment:** Stands of this alliance are found on overgrazed rangeland, road verges, waste places, and lower montane slopes.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 11 to 60 percent. The tree layer is typically absent, and the shrub layer is emergent to open.

**Vegetation Floristics:** The dominant herb is *Bromus tectorum*. *Elymus elymoides* and *Elymus caput-medusae* are often present.

**Dynamics:** *Bromus tectorum*, *Elymus caput-medusae*, and *Ventenata dubia* are a major component of many regional vegetation types in the Modoc Plateau, including the *Juniperus occidentalis* and *Artemisia arbuscula* alliances although they regularly dominate immediately following fires in these settings. These three species can intermingle and co-dominate in expansive stands, but they do tend to separate out based on soil moisture retention; *Bromus tectorum* tends to dominate in the driest sites with well-draining soils; *Ventenata dubia* tends to favor heavy, clay soils that hold more moisture; and *Elymus caput-medusae* tends to occur in intermediate settings.

**Species of Interest:** *Lilium bakeri*

### **Classification Comments**

The *Ventenata dubia* and *Elymus caput-medusae* associations are newly described California based on the sampling and analysis for this project.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNA    **State:** SNA

### **References**

Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Evens and San 2005, Evens et al. 2014, Menke et al. 2019, Stuart et al. 1992

**Total Sample Size Used for Description:** N=109

### **Alliance Stand Table**

#### ***Bromus tectorum* – *Elymus caput-medusae* Alliance**

n =109

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Artemisia tridentata</i>	11	1.25	0.2	5
<i>Ericameria nauseosa</i>	11	2.23	0.2	5
<i>Artemisia arbuscula</i>	10	0.78	0.2	1



**Alliance Stand Table continued**

***Bromus tectorum* – *Elymus caput-medusae* Alliance**

n =109

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Bromus tectorum</i>	83	22.43	0.2	76
	<i>Elymus caput-medusae</i>	61	21.15	0.2	93
	<i>Elymus elymoides</i>	51	2.48	0.2	19
	<i>Bromus arvensis</i>	38	3.48	0.2	19
	<i>Poa secunda</i>	35	1.29	0.2	9
	<i>Erodium cicutarium</i>	28	8.02	0.2	55
	<i>Blepharipappus scaber</i>	26	1.84	0.2	12
	<i>Sisymbrium altissimum</i>	26	3.61	0.2	37.5
	<i>Ventenata dubia</i>	23	23.62	0.2	88
	<i>Epilobium brachycarpum</i>	22	3.92	0.2	46
	<i>Lactuca serriola</i>	20	2.31	0.2	14
	<i>Descurainia sophia</i>	17	9.72	0.2	85
	<i>Pseudoroegneria spicata</i>	16	1.68	0.2	7
	<i>Lomatium</i>	11	2.62	0.2	8
	<i>Poa bulbosa</i>	11	7.13	0.2	30

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## ***Bromus tectorum* Association**

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**Common Name:** Cheatgrass

**NVC Association Code:** CEGL003019, *Bromus tectorum* Ruderal Grassland

**Alliance:** *Bromus tectorum* – *Elymus caput-medusae* Alliance

### **Association Concept**

The *Bromus tectorum* Association forms an open herbaceous layer. The shrub layer is open. The alliance is found primarily in low, level areas and on lower slopes but also on middle and upper slopes, at all aspects. Soils are derived from a variety of substrates but primarily basalt, and textures include loamy sand, fine clay, fine sandy clay, fine silty clay, silt loam, and moderately fine sandy clay loam. Elevations range from approximately 1217 to 2021 meters. *Bromus tectorum* is the dominant herb, and *Elymus elymoides* is often present.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Bromus tectorum*. The overall herbaceous cover ranges from 11 to 27 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1470 m, Range 1217 – 2021 m

Aspect: SE (7), Flat (6), SW (5), NW (4), NE (3), Variable (1)

Slope: Mean 6.7 degrees, Range 0 – 60 degrees

Macro Topography: Lower 1/3 of slope (6), Low level (5), Middle 1/3 of slope (3), Upper 1/3 of slope (3), Basin floor (3), Middle to Upper 1/3 of slope (2), Lowslope (2), Step in slope (1), Bottom (1)

Tree Cover: 0%

Shrub Cover: Mean 2.8%, Range 0 – 15%

Herb Cover: Mean 19.3%, Range 11 – 27%

Large Rock: Mean 6.5%, Range 0 – 50%

Small Rock: Mean 21.9%, Range 0 – 65%

Fines Cover: Mean 25%, Range 0 – 97%

Litter Cover: Mean 12.3%, Range 0.1 – 90%

Soil Texture (field assessed): Loamy Sand (4), Fine clay (4), Fine sandy clay (3), Fine silty clay (3), Silt Loam (3), Moderately fine sandy clay loam (3), Sandy Loam (2), Rock (1), Loam (1), Medium to very fine, sandy loam (1), Moderately fine silty clay loam (1)

Geology (map data): Basalt (6), General volcanic extrusives (3)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open herbaceous layer, and the overall herbaceous cover ranges from 11 to 27 percent. The tree layer is typically absent, and the shrub layer is sparse to open.

**Vegetation Floristics:** *Bromus tectorum* is the dominant herb and *Elymus elymoides* is often present.

**Species of Interest:** *Iliamna bakeri*, *Penstemon cinicola*

## **Classification Comments**

None.

**Classification Confidence:** High

## **References**

Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Evens and San 2005, Evens et al. 2014, Menke et al. 2019, Stuart et al. 1992

## **Conservation Status Rank**

**Global:** GNA    **State:** SNA

**Total Sample Size Used for Description:** N=53

## **Association Stand Table**

### ***Bromus tectorum* Association**

n =53

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Artemisia tridentata</i>	17	0.78	0.2	2
<i>Ericameria nauseosa</i>	17	2.29	0.2	5
<i>Purshia tridentata</i>	13	0.69	0.2	2
<i>Tetradymia canescens</i>	11	0.87	0.2	1
<b>Herb</b>				
<i>Bromus tectorum</i>	98	30.54	1	76
<i>Elymus elymoides</i>	64	2.83	0.2	19
<i>Sisymbrium altissimum</i>	45	3.74	0.2	37.5
<i>Erodium cicutarium</i>	34	9.18	0.2	55
<i>Poa secunda</i>	32	0.99	0.2	3.5
<i>Descurainia sophia</i>	28	11.37	0.2	85
<i>Elymus caput-medusae</i>	25	2.82	0.2	10
<i>Epilobium brachycarpum</i>	23	7.13	0.2	46

**Association Stand Table continued**

***Bromus tectorum* Association**

n =53

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Blepharipappus scaber</i>	21	2.47	0.2	12
<i>Lactuca serriola</i>	19	2.86	0.2	14
<i>Bromus arvensis</i>	17	4.47	0.2	19
<i>Pseudoroegneria spicata</i>	17	1.42	0.2	4
<i>Microsteris gracilis</i>	13	2.66	0.2	6
<i>Holosteum umbellatum</i>	13	0.54	0.2	1
<i>Elymus cinereus</i>	13	0.66	0.2	1

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## ***Elymus caput-medusae* Provisional Association**

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**Common Name:** Medusa head

**NVC Association Code:**

**Alliance:** *Bromus tectorum* – *Elymus caput-medusae* Alliance

### **Association Concept**

The *Elymus caput-medusae* Provisional Association forms an open to intermittent herbaceous layer. The shrub layer is sparse. The alliance is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt, and textures are primarily fine silty clay or moderately fine clay loam. Elevations range from approximately 1100 to 1593 meters. *Elymus caput-medusae* is the dominant herb, *Bromus tectorum* is characteristic, and *Bromus arvensis* is often present.

**Diagnostic Criteria:** This association is characterized by an open to continuous herbaceous layer of *Elymus caput-medusae* with open to intermittent cover of *Bromus tectorum*. The overall herbaceous cover ranges from 14 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1423 m, Range 1100 – 1593 m

Aspect: NW (5), SW (3), NE (2), SE (2), Flat (1)

Slope: Mean 2.5 degrees, Range 0 – 9 degrees

Macro Topography: Ridge top (3), Lower 1/3 of slope (3), Middle 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Upper 1/3 of slope (1), Upper 1/3 of slope to Ridgetop (1), Bottom (1)

Tree Cover: 0%

Shrub Cover: Mean 0.7%, Range 0 – 6%

Herb Cover: Mean 29.8%, Range 14 – 60%

Large Rock: Mean 6.0%, Range 0 – 29%

Small Rock: Mean 17.7%, Range 0 – 45%

Fines Cover: Mean 12.3%, Range 0 – 79%

Litter Cover: Mean 51.4%, Range 1 – 96%

Soil Texture (field assessed): Fine silty clay (4), Moderately fine clay loam (3), Fine clay (2), Moderately fine sandy clay loam (1), Medium silt (1), Fine sandy clay (1), Medium to very fine, sandy loam (1)

Geology (map data): Basalt (7), Igneous (type unknown) (1), Andesite (1), General volcanic extrusives (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 14 to 60 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Elymus caput-medusae*, and characteristic herbs include *Bromus tectorum*. *Bromus arvensis* is often present.

**Species of Interest:** None.

### **Classification Comments**

This is a newly described association for California, and it will remain provisional until more sampling is completed throughout its range and the full variability is better understood.

**Classification Confidence:** Moderate

### **References**

None.

### **Conservation Status Rank**

**Global:** GNA    **State:** SNA

**Total Sample Size Used for Description:** N=33

### **Association Stand Table**

#### ***Elymus caput-medusae* Provisional Association**

n =33

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Artemisia arbuscula</i>	15	1	1	1
<b>Herb</b>				
<i>Elymus caput-medusae</i>	100	29.58	5	93
<i>Bromus tectorum</i>	94	14.11	0.2	55
<i>Bromus arvensis</i>	55	3.86	0.2	10
<i>Elymus elymoides</i>	45	1.97	0.2	5
<i>Blepharipappus scaber</i>	42	1.57	0.2	9
<i>Lactuca serriola</i>	27	2.31	0.2	10
<i>Erodium cicutarium</i>	27	6.16	0.2	22
<i>Epilobium brachycarpum</i>	24	0.63	0.2	2
<i>Poa secunda</i>	18	1.03	0.2	2

**Association Stand Table continued**

***Elymus caput-medusae* Provisional Association**

n =33

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Lepidium perfoliatum</i>	15	7	2	13
<i>Pseudoroegneria spicata</i>	15	1.12	0.2	4
<i>Lupinus microcarpus</i>	12	0.4	0.2	1
<i>Sisymbrium altissimum</i>	12	2.8	0.2	8
<i>Lomatium triternatum</i>	12	4.9	0.2	19
<i>Lomatium</i>	12	0.85	0.2	2
<i>Descurainia sophia</i>	12	3.5	1	11

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## ***Ventenata dubia* Provisional Association**

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**Common Name:** Ventenata grass

**NVC Association Code:**

**Alliance:** *Bromus tectorum* – *Elymus caput-medusae* Alliance

### **Association Concept**

The *Ventenata dubia* Provisional Association forms an open to intermittent herbaceous layer. The shrub layer is sparse. The alliance is found primarily on slopes, at all aspects. Soils are derived from a variety of substrates but primarily basalt, and textures are primarily moderately fine sandy clay loam or fine clay. Elevations range from approximately 1288 to 1709 meters. Dominant herbs include *Elymus caput-medusae* and *Ventenata dubia*. Those often present are *Bromus arvensis* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open to continuous herbaceous layer of *Elymus caput-medusae* and *Ventenata dubia*. The overall herbaceous cover ranges from 18 to 46 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1443 m, Range 1288 – 1709 m

Aspect: SW (4), Flat (3), NE (3), NW (2), SE (2)

Slope: Mean 2.6 degrees, Range 0 – 11 degrees

Macro Topography: Lower 1/3 of slope (6), Upper 1/3 of slope (3), Bottom (2), Bottom to Lower 1/3 of slope (2), Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 1%

Herb Cover: Mean 27.4%, Range 18 – 46%

Large Rock: Mean 3.4%, Range 0 – 12%

Small Rock: Mean 20%, Range 0 – 75%

Fines Cover: Mean 23.5%, Range 2 – 82%

Litter Cover: Mean 44.6%, Range 2 – 95%

Soil Texture (field assessed): Moderately fine sandy clay loam (4), Fine clay (3), Fine silty clay (2), Moderately fine silty clay loam (1), Moderately fine clay loam (1), Moderately coarse, sandy loam (1), Medium to very fine, sandy loam (1), Fine sandy clay (1)

Geology (map data): Basalt (5), General volcanic extrusives (1), Igneous (type unknown) (1)



## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 18 to 46 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Elymus caput-medusae* and *Ventenata dubia*. Those often present are *Bromus arvensis* and *Poa secunda*.

**Species of Interest:** *Lomatium hendersonii*

## **Classification Comments**

This is a newly described association for California, and it will remain provisional until more sampling is completed throughout its range and the full variability is better understood.

**Classification Confidence:** Moderate

## **References**

None.

## **Conservation Status Rank**

**Global:** GNA    **State:** SNA

**Total Sample Size Used for Description:** N=20

## **Association Stand Table**

### ***Ventenata dubia* Provisional Association**

n =20

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Ventenata dubia</i>	100	29.35	7	88
<i>Elymus caput-medusae</i>	100	20.17	0.2	63
<i>Poa secunda</i>	70	1.79	0.2	9
<i>Bromus arvensis</i>	60	1.83	0.2	8
<i>Bromus tectorum</i>	40	1.95	0.2	8
<i>Elymus elymoides</i>	35	1.89	0.2	5
<i>Perideridia bolanderi</i>	25	1.08	0.2	3
<i>Dichelostemma capitatum</i>	25	1	1	1
<i>Poa bulbosa</i>	20	7.55	0.2	16
<i>Agoseris</i>	20	0.2	0.2	0.2
<i>Lomatium</i>	15	3.33	1	8
<i>Trifolium macrocephalum</i>	15	0.47	0.2	1

**Association Stand Table continued**

***Ventenata dubia* Provisional Association**

n =20

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Pseudoroegneria spicata</i>	15	3.4	0.2	7
<i>Lupinus</i>	15	1	1	1
<i>Festuca idahoensis</i>	15	1.73	0.2	4
<i>Erodium cicutarium</i>	15	6.67	1	16
<i>Epilobium brachycarpum</i>	15	0.8	0.2	2
<i>Bromus</i>	15	1.07	0.2	2
<i>Blepharipappus scaber</i>	15	0.8	0.2	2
<i>Perideridia</i>	15	0.8	0.2	2

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## ***Carex (aquatilis, lenticularis)* Alliance**

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**Common Name:** Water sedge and lakeshore sedge meadows Alliance

**NVC Alliance Code:**

### **Alliance Concept**

The *Carex (aquatilis, lenticularis)* Alliance forms an open to continuous herbaceous layer. It is found primarily in flat or low-gradient areas. Soils are derived from basalt or clayey alluvium and textures include fine silty clay, moderately fine clay loam, and peat. Elevation range is approximately 1553 – 1641 m. The dominant herb is *Carex lenticularis*, and *Achillea millefolium* is characteristic. Herbs that are often present include *Epilobium ciliatum*, *Juncus arcticus*, *Phleum pratense*, *Poa pratensis*, *Poa secunda*, *Rumex crispus*, and *Taraxacum officinale*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent herbaceous layer of *Carex lenticularis* and sparse *Achillea millefolium*. The overall herbaceous cover ranges from 20 to 85 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm), Likely Tableland (M261Gh)

## **Associations**

*Carex aquatilis* – *Carex lenticularis* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1595 m, Range 1553 – 1641 m

Aspect: Flat (2), NE (1), NW (1)

Slope: Mean 2.25 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (2), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 0.2%

Herb Cover: Mean 47.5%, Range 20 – 85%

Large Rock: Mean 0.4%, Range 0 – 1.2%

Small Rock: Mean 2.3%, Range 0 – 7%

Fines Cover: Mean 63.8%, Range 2 – 94%

Litter Cover: Mean 30.0%, Range 3 – 95%

Soil Texture (field assessed): Fine silty clay (2), Moderately fine clay loam (1), Peat (1)

Geology (map data): Basalt (1), Clayey alluvium (1)

**Environment:** Stands of this alliance are found in wet meadows in basins, shallow lakes and margins, floodplains; montane fens; and along streams in narrow riparian ecotones.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 20 to 85 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Carex lenticularis* and other characteristic herbs include *Achillea millefolium*. Those often present are *Epilobium ciliatum*, *Juncus arcticus*, *Phleum pratense*, *Poa pratensis*, *Poa secunda*, *Rumex crispus*, and *Taraxacum officinale*. The shrub layer is sparse.

**Species of Interest:** None.

### **Classification Comments**

The placement of stands dominated by *Carex aquatilis* and *C. lenticularis* in montane settings on the west coast is still being reviewed with ecologists from outside of California. More sampling analysis may need to occur to resolve this.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G5    **State:** S3

### **References**

Potter 2005

**Total Sample Size Used for Description:** N=4

### **Alliance Stand Table**

#### ***Carex (aquatilis, lenticularis) Alliance***

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achillea millefolium</i>	75	0.2	0.2	0.2
<i>Carex lenticularis</i>	75	18.67	9	35
<i>Epilobium ciliatum</i>	50	0.2	0.2	0.2
<i>Taraxacum officinale</i>	50	1.5	1	2
<i>Poa secunda</i>	50	0.2	0.2	0.2
<i>Poa pratensis</i>	50	0.6	0.2	1
<i>Juncus arcticus</i>	50	3	3	3
<i>Rumex crispus</i>	50	0.6	0.2	1
<i>Phleum pratense</i>	50	1.1	0.2	2
<i>Trifolium longipes</i>	25	0.2	0.2	0.2
<i>Poa bulbosa</i>	25	0.2	0.2	0.2
<i>Verbascum thapsus</i>	25	0.2	0.2	0.2
<i>Trifolium variegatum</i>	25	1	1	1
<i>Microsteris gracilis</i>	25	0.2	0.2	0.2
<i>Cirsium vulgare</i>	25	0.2	0.2	0.2
<i>Deschampsia danthonioides</i>	25	1	1	1
<i>Stellaria longipes</i>	25	0.2	0.2	0.2
<i>Eleocharis macrostachya</i>	25	2	2	2
<i>Collomia linearis</i>	25	0.2	0.2	0.2
<i>Collinsia parviflora</i>	25	0.2	0.2	0.2
<i>Alopecurus pratensis</i>	25	2	2	2

**Alliance Stand Table continued**

***Carex (aquatilis, lenticularis)* Alliance**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Iris missouriensis</i>	25	3	3	3
<i>Juncus</i>	25	3	3	3
<i>Lactuca serriola</i>	25	0.2	0.2	0.2
<i>Hordeum brachyantherum</i>	25	0.2	0.2	0.2
<i>Potentilla gracilis</i>	25	2	2	2
<i>Melilotus indica</i>	25	0.2	0.2	0.2
<i>Deschampsia elongata</i>	25	0.2	0.2	0.2
<i>Mimulus</i>	25	0.2	0.2	0.2
<i>Montia linearis</i>	25	0.2	0.2	0.2
<i>Galium aparine</i>	25	0.2	0.2	0.2
<i>Poa cusickii</i>	25	7	7	7
<i>Festuca idahoensis</i>	25	1	1	1
<i>Epilobium densiflorum</i>	25	0.2	0.2	0.2
<i>Aster</i>	25	1	1	1
<i>Camassia quamash</i>	25	0.2	0.2	0.2
<i>Carex aquatilis</i>	25	80	80	80
<i>Carex aurea</i>	25	0.2	0.2	0.2
<i>Carex praegracilis</i>	25	10	10	10
<i>Ranunculus</i>	25	0.2	0.2	0.2
<i>Lotus tenuis</i>	25	0.2	0.2	0.2
<i>Solidago</i>	25	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	25	1	1	1

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## ***Carex aquatilis* – *Carex lenticularis* Association**

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**Common Name:** Water sedge - Lakeshore sedge

**NVC Association Code:** None.

**Alliance:** *Carex (aquatilis, lenticularis)* Alliance

### **Association Concept**

The *Carex aquatilis* – *Carex lenticularis* Association forms an open to continuous herbaceous layer. The alliance is found primarily at the bottom or lower third of northeast or northwest-facing slopes or in flat or low-gradient areas. Soils are derived from a variety of substrates but primarily basalt or clayey alluvium and textures include fine silty clay, moderately fine clay loam, and peat. Elevations range from approximately 1553 to 1641 meters. *Carex lenticularis* and *Achillea millefolium* are characteristic herbs.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Carex lenticularis* with *Achillea millefolium* at sparse cover. The overall herbaceous cover ranges from 20 to 85 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1595 m, Range 1553 – 1641 m

Aspect: Flat (2), NE (1), NW (1)

Slope: Mean 2.3 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (2), Bottom to Lower 1/3 of slope (1), Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 0.2%

Herb Cover: Mean 47.5%, Range 20 – 85%

Large Rock: Mean 0.4%, Range 0 – 1.2%

Small Rock: Mean 2.3%, Range 0 – 7%

Fines Cover: Mean 63.8%, Range 2 – 94%

Litter Cover: Mean 30%, Range 3 – 95%

Soil Texture (field assessed): Fine silty clay (2), Moderately fine clay loam (1), Peat (1)

Geology (map data): Basalt (1), Clayey alluvium (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 20 to 85 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** *Carex lenticularis* and *Achillea millefolium* are characteristic in the herb layer.

**Species of Interest:** None.

**Classification Comments**

None.

**Classification Confidence:** Moderate

**References**

Potter 2005

**Conservation Status Rank**

**Global:** GNR **State:** Y

**Total Sample Size Used for Description:** N=4

**Association Stand Table**

***Carex aquatilis* – *Carex lenticularis* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achillea millefolium</i>	75	0.2	0.2	0.2
<i>Carex lenticularis</i>	75	18.67	9	35
<i>Poa secunda</i>	50	0.2	0.2	0.2
<i>Poa pratensis</i>	50	0.6	0.2	1
<i>Rumex crispus</i>	50	0.6	0.2	1
<i>Juncus arcticus</i>	50	3	3	3
<i>Epilobium ciliatum</i>	50	0.2	0.2	0.2
<i>Phleum pratense</i>	50	1.1	0.2	2
<i>Taraxacum officinale</i>	50	1.5	1	2
<i>Ranunculus</i>	25	0.2	0.2	0.2
<i>Lotus tenuis</i>	25	0.2	0.2	0.2
<i>Melilotus indica</i>	25	0.2	0.2	0.2
<i>Verbascum thapsus</i>	25	0.2	0.2	0.2
<i>Microsteris gracilis</i>	25	0.2	0.2	0.2
<i>Mimulus</i>	25	0.2	0.2	0.2
<i>Montia linearis</i>	25	0.2	0.2	0.2
<i>Poa bulbosa</i>	25	0.2	0.2	0.2
<i>Potentilla gracilis</i>	25	2	2	2
<i>Ranunculus occidentalis</i>	25	1	1	1



## Association Stand Table continued

### ***Carex aquatilis* – *Carex lenticularis* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Solidago</i>	25	0.2	0.2	0.2
<i>Stellaria longipes</i>	25	0.2	0.2	0.2
<i>Trifolium longipes</i>	25	0.2	0.2	0.2
<i>Trifolium variegatum</i>	25	1	1	1
<i>Lactuca serriola</i>	25	0.2	0.2	0.2
<i>Eleocharis macrostachya</i>	25	2	2	2
<i>Poa cusickii</i>	25	7	7	7
<i>Camassia quamash</i>	25	0.2	0.2	0.2
<i>Festuca idahoensis</i>	25	1	1	1
<i>Aster</i>	25	1	1	1
<i>Juncus</i>	25	3	3	3
<i>Carex aquatilis</i>	25	80	80	80
<i>Carex aurea</i>	25	0.2	0.2	0.2
<i>Carex praegracilis</i>	25	10	10	10
<i>Cirsium vulgare</i>	25	0.2	0.2	0.2
<i>Collomia linearis</i>	25	0.2	0.2	0.2
<i>Deschampsia danthonioides</i>	25	1	1	1
<i>Deschampsia elongata</i>	25	0.2	0.2	0.2
<i>Epilobium densiflorum</i>	25	0.2	0.2	0.2
<i>Galium aparine</i>	25	0.2	0.2	0.2
<i>Hordeum brachyantherum</i>	25	0.2	0.2	0.2
<i>Iris missouriensis</i>	25	3	3	3
<i>Collinsia parviflora</i>	25	0.2	0.2	0.2
<i>Alopecurus pratensis</i>	25	2	2	2

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## ***Carex (pansa, praegracilis)* Alliance**

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**Common Name:** Sand dune sedge swaths Alliance

**NVC Alliance Code:** A4243. *Carex pansa* - *Carex praegracilis* Wet Meadow Alliance

### **Alliance Concept**

The *Carex (pansa, praegracilis)* Alliance forms an open to intermittent herbaceous layer. It is found at the bottom to lower third of northwest or southeast-facing slopes. Soils are derived from gravelly alluvium or igneous substrates and textures include moderately fine clay loam and peat. Elevation range is approximately 1511 – 1545 m. The dominant herb is *Carex praegracilis*. *Achillea millefolium*, *Alopecurus pratensis*, *Carex* spp., *Cirsium*, *Deschampsia cespitosa*, *Epilobium brachycarpum*, *Epilobium ciliatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Juncus nevadensis*, *Lotus denticulatus*, *Mimulus guttatus*, *Phleum pratense*, *Poa pratensis*, *Potentilla* spp., *Sidalcea* spp., *Stellaria longipes*, *Trifolium* spp., and *Trifolium longipes* are often present.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Carex praegracilis*. The overall herbaceous cover ranges from 30 to 55 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Eagle Lake - Observation Peak (M261Gm)

### **Associations**

*Carex praegracilis* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1528 m, Range 1511 – 1545 m

Aspect: NW (1), SE (1)

Slope: Mean 1.5 degrees, Range 1 – 2 degrees

Macro Topography: Bottom to Lower 1/3 of slope (2)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 42.5%, Range 30 – 55%

Large Rock: Mean 0%, Range 0 – 0%

Small Rock: Mean 0%, Range 0 – 0%

Fines Cover: Mean 12%, Range 2 – 22%

Litter Cover: Mean 83.5%, Range 71 – 96%

Soil Texture (field assessed): Moderately fine clay loam (1), Peat (1)

Geology (map data): Gravelly alluvium (1), Igneous (type unknown) (1)

**Environment:** Stands of this alliance are typically found on moist, well-draining soils.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 30 to 55 percent. Tree and shrub layers are typically absent.

**Vegetation Floristics:** The dominant herb is *Carex praegracilis*. Herbs that are often present include *Achillea millefolium*, *Alopecurus pratensis*, *Carex* spp., *Cirsium*, *Deschampsia cespitosa*, *Epilobium brachycarpum*, *Epilobium ciliatum*, *Hordeum brachyantherum*, *Juncus arcticus*, *Juncus nevadensis*, *Lotus denticulatus*, *Mimulus guttatus*, *Phleum pratense*, *Poa pratensis*, *Potentilla* spp., *Sidalcea* spp., *Stellaria longipes*, *Trifolium* spp., and *Trifolium longipes*.

**Species of Interest:** None

### **Classification Comments**

For California, we have merged *C. pansa* and *C. praegracilis* associations into this one alliance, but only stands dominated by *C. praegracilis* were found within the study area. With more herbland-directed sampling and additional analysis the full variability of this alliance within the study area would be clearer.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G4? **State:** S3?

### **References**

Klein et al. 2015, Rodriguez et al. 2017

**Total Sample Size Used for Description:** N=2

### **Alliance Stand Table**

#### ***Carex (pansa, praegracilis)* Alliance**

n =2

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Carex praegracilis</i>	100	19	10	28
	<i>Lotus denticulatus</i>	50	1	1	1
	<i>Achillea millefolium</i>	50	0.2	0.2	0.2
	<i>Alopecurus pratensis</i>	50	10	10	10
	<i>Carex</i>	50	2	2	2
	<i>Cirsium</i>	50	0.2	0.2	0.2
	<i>Deschampsia cespitosa</i>	50	10	10	10
	<i>Epilobium brachycarpum</i>	50	0.4	0.4	0.4
	<i>Epilobium ciliatum</i>	50	0.2	0.2	0.2
	<i>Hordeum brachyantherum</i>	50	5	5	5
	<i>Juncus nevadensis</i>	50	15	15	15
	<i>Mimulus guttatus</i>	50	10	10	10
	<i>Phleum pratense</i>	50	0.2	0.2	0.2
	<i>Poa pratensis</i>	50	1	1	1
	<i>Potentilla</i>	50	5	5	5
	<i>Sidalcea</i>	50	1	1	1
	<i>Stellaria longipes</i>	50	0.2	0.2	0.2
	<i>Trifolium</i>	50	0.2	0.2	0.2
	<i>Trifolium longipes</i>	50	0.2	0.2	0.2
	<i>Juncus arcticus</i>	50	0.2	0.2	0.2



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## ***Carex nebrascensis* Alliance**

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**Common Name:** Nebraska sedge meadows Alliance

**NVC Alliance Code:** A3805. *Carex nebrascensis* - *Carex vesicaria* - *Carex pellita* Wet Meadow Alliance

### **Alliance Concept**

The *Carex nebrascensis* Alliance forms an open to continuous herbaceous layer. It is found primarily in flat or low-gradient areas. Soils are derived from a variety of substrates but primarily basalt, and textures include fine clay, moderately coarse, sandy loam, moderately fine clay loam, and muck. Elevation range is approximately 1401 – 1659 m. The dominant herb is *Carex nebrascensis*, *Juncus arcticus* is characteristic, and *Poa pratensis* is often present.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent herbaceous layer of *Carex nebrascensis* with *Juncus arcticus* at low cover. The overall herbaceous cover ranges from 30 to 75 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Devil's Garden (M261Gb), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

## **Associations**

*Carex nebrascensis* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1532 m, Range 1401 – 1659 m

Aspect: Flat (2), NE (1), NW (1), SW (1)

Slope: Mean 2 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (3), Bottom to Lower 1/3 of slope (1)

Tree Cover: Mean 0.2%, Range 0 – 1%

Shrub Cover: Mean 0%, Range 0 – 0.2%

Herb Cover: Mean 49.6%, Range 30 – 75%

Large Rock: Mean 1%, Range 0 – 2%

Small Rock: Mean 0.6%, Range 0.2 – 1%

Fines Cover: Mean 32%, Range 4 – 89%

Litter Cover: Mean 60.2%, Range 3 – 93%

Soil Texture (field assessed): Fine clay (1), Moderately coarse, sandy loam (1), Moderately fine clay loam (1), Muck (1)

Geology (map data): Basalt (4)

**Environment:** Stands throughout the Modoc Plateau (S. Smith 1998b) occupy streamside meadow systems and montane cirque basins mostly above 1500 m.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 30 to 75 percent. The tree and shrub layers are typically sparse or absent.

**Vegetation Floristics:** The dominant herb is *Carex nebrascensis*, *Juncus arcticus* is characteristic, and *Poa pratensis* is often present. *Juniperus occidentalis* is sometimes present in the tree layer and *Rosa woodsii* is sometimes present in the shrub layer.

**Dynamics:** *Carex nebrascensis* stands are associated with other meadow types including those of the *Hordeum brachyantherum*, *Poa pratensis*, *Poa secunda* and *Veratrum californicum* alliances, and associated shrublands include the *Salix bebbiana* or *Salix lemmonii* alliances

**Species of Interest:** None.

### **Classification Comments**

With more herbland-directed sampling and additional analysis the full variability of this alliance and its relationship to other alliances within meadow complexes would be clearer.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G5    **State:** S4

### **References**

Beguín and Major 1975, Burke 1987, Cooper and Wolf 2006, Keeler-Wolf et al. 2003b, Manning and Padgett 1995, Potter 2005, Ratliff 1982, Smith 1998b, Weixelman et al. 1999

**Total Sample Size Used for Description:** N=5

### **Alliance Stand Table**

#### ***Carex nebrascensis* Alliance**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Tree</b>				
<i>Juniperus occidentalis</i>	20	1	1	1
<b>Shrub</b>				
<i>Rosa woodsii</i>	20	0.2	0.2	0.2
<b>Herb</b>				
<i>Carex nebrascensis</i>	100	20.2	5	36
<i>Juncus arcticus</i>	80	2.35	0.2	7
<i>Poa pratensis</i>	60	5	1	12
<i>Mimulus guttatus</i>	40	1.1	0.2	2
<i>Ventenata dubia</i>	40	1.6	0.2	3
<i>Rumex crispus</i>	40	0.2	0.2	0.2
<i>Phleum pratense</i>	40	1.1	0.2	2
<i>Juncus bufonius</i>	40	22.6	0.2	45
<i>Bromus arvensis</i>	40	10.1	0.2	20
<i>Ranunculus uncinatus</i>	40	1	1	1
<i>Viola</i>	20	1	1	1
<i>Potentilla gracilis</i>	20	1	1	1
<i>Ranunculus occidentalis</i>	20	1	1	1
<i>Stellaria longipes</i>	20	0.2	0.2	0.2
<i>Symphyotrichum</i>	20	0.2	0.2	0.2

## Alliance Stand Table continued

### **Carex nebrascensis Alliance**

n =5

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Elymus caput-medusae</i>	20	2	2	2
<i>Taraxacum officinale</i>	20	0.2	0.2	0.2
<i>Tragopogon dubius</i>	20	0.2	0.2	0.2
<i>Trifolium longipes</i>	20	2	2	2
<i>Trifolium variegatum</i>	20	8	8	8
<i>Triteleia hyacinthina</i>	20	0.2	0.2	0.2
<i>Lotus corniculatus</i>	20	0.2	0.2	0.2
<i>Zigadenus venenosus</i>	20	0.2	0.2	0.2
<i>Trifolium wormskioldii</i>	20	1	1	1
<i>Carex lenticularis</i>	20	1	1	1
<i>Achillea millefolium</i>	20	1	1	1
<i>Agrostis gigantea</i>	20	3	3	3
<i>Artemisia ludoviciana</i>	20	0.2	0.2	0.2
<i>Bromus tectorum</i>	20	1	1	1
<i>Carex</i>	20	15	15	15
<i>Nemophila</i>	20	0.2	0.2	0.2
<i>Carex hoodii</i>	20	0.2	0.2	0.2
<i>Carex praegracilis</i>	20	9	9	9
<i>Castilleja lacera</i>	20	0.2	0.2	0.2
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	20	0.2	0.2	0.2
<i>Delphinium</i>	20	0.2	0.2	0.2
<i>Downingia bacigalupii</i>	20	0.2	0.2	0.2
<i>Draba verna</i>	20	0.2	0.2	0.2
<i>Lactuca serriola</i>	20	0.2	0.2	0.2
<i>Carex capitata</i>	20	1	1	1
<i>Eleocharis macrostachya</i>	20	0.2	0.2	0.2
<i>Poa bulbosa</i>	20	0.2	0.2	0.2
<i>Plectritis</i>	20	0.2	0.2	0.2
<i>Montia linearis</i>	20	0.2	0.2	0.2
<i>Hordeum brachyantherum</i>	20	12	12	12
<i>Gayophytum diffusum</i>	20	0.2	0.2	0.2
<i>Galium</i>	20	0.2	0.2	0.2
<i>Festuca pratensis</i>	20	2	2	2
<i>Epilobium densiflorum</i>	20	0.2	0.2	0.2
<i>Epilobium ciliatum</i>	20	0.2	0.2	0.2
<i>Orthocarpus</i>	20	1	1	1



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## ***Carex scopulorum* Alliance**

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PHOTO FROM DANA PLATEAU, YOSEMITE NP

**Common Name:** Sierra alpine sedge turf Alliance

**NVC Alliance Code:** A3806. *Carex praeegracilis* - *Carex scopulorum* - *Eleocharis quinqueflora* Wet Meadow Alliance

### **Alliance Concept**

The *Carex scopulorum* Alliance forms a continuous herbaceous layer. It is found on the upper third of northwest-facing slopes. Elevation is approximately 2550 m. The dominant herb is *Carex scopulorum* var. *bracteosa* and characteristic herbs include *Arnica* sp., *Carex luzulina*, *Epilobium anagallidifolium*, *Juncus drummondii*, *Juncus longistylis*, *Muhlenbergia filiformis*, and *Trifolium longipes*.

**Diagnostic Criteria:** This alliance is characterized by a continuous herbaceous layer of *Carex scopulorum* var. *bracteosa*, *Arnica*, *Carex luzulina*, *Epilobium anagallidifolium*, *Juncus drummondii*, *Juncus longistylis*, *Muhlenbergia filiformis*, and *Trifolium longipes*. The overall herbaceous cover is 67 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Warner Mountains (M261Gf)

## **Associations**

*Carex scopulorum* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 2550 m

Aspect: NW (1)

Slope: 9 degrees

Macro Topography: Upper 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 67%

Large Rock: None recorded.

Small Rock: None recorded.

Fines Cover: 3%

Litter Cover: 0%

Soil Texture (field assessed): None recorded.

Geology (map data): None recorded.

**Environment:** Stands of this alliance are found at margins of channels, lakes, ponds, overflow areas, wet meadows and, in this study area, was only sampled once within the Warner Mountains.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms a continuous herbaceous layer, and the overall herbaceous cover is 67 percent. The tree and shrub layers are absent.

**Vegetation Floristics:** The dominant herb is *Carex scopulorum* var. *bracteosa*, and characteristic herbs include *Arnica* sp., *Carex luzulina*, *Epilobium anagallidifolium*, *Juncus drummondii*, *Juncus longistylis*, *Muhlenbergia filiformis*, and *Trifolium longipes*. No trees or shrubs are present.

**Species of Interest:** None.

## **Classification Comments**

With more herbland-directed sampling and additional analysis the full variability of this alliance and its relationship to other alliances within meadow complexes would be

clearer. This type was only sampled once within the study area but is a well described type in California.

**Classification Confidence:** High

**Conservation Status Rank**

**Global:** G4    **State:** S3

**References**

Keeler-Wolf et al. 2003b, Major and Taylor 1977, Manning and Padgett 1995, Ratliff, R.D. 1985, Weixelman et al. 1999

**Total Sample Size Used for Description:** N=1

**Alliance Stand Table**

***Carex scopulorum* Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Carex scopulorum</i> var. <i>bracteosa</i>	100	29	29	29
<i>Juncus longistylis</i>	100	8	8	8
<i>Epilobium anagallidifolium</i>	100	3	3	3
<i>Carex luzulina</i>	100	3	3	3
<i>Trifolium longipes</i>	100	3	3	3
<i>Arnica</i>	100	2	2	2
<i>Muhlenbergia filiformis</i>	100	2	2	2
<i>Juncus drummondii</i>	100	1	1	1



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## ***Carex simulata* Alliance**

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**Common Name:** Short-beaked sedge fens Alliance

**NVC Alliance Code:** A3806. *Carex praegracilis* - *Carex scopulorum* - *Eleocharis quinqueflora* Wet Meadow Alliance

### **Alliance Concept**

The *Carex simulata* Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse. It is found primarily at the bottom to middle of northwest- or southeast-facing slopes. Soils are derived from a variety of substrates but primarily volcanic extrusives and are generally fine-textured, sometimes silty, clays. Elevation range is approximately 1397 – 1719 m. The dominant herb is *Carex simulata*. *Juncus arcticus* and *Scirpus microcarpus* are often present.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Carex simulata*. The overall herbaceous cover ranges from 27 to 62 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk)

## **Associations**

*Carex simulata* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1586 m, Range 1397 – 1719 m

Aspect: NW (2), SE (1)

Slope: Mean 6 degrees, Range 1 – 10 degrees

Macro Topography: Bottom to Lower 1/3 of slope (1), Middle 1/3 of slope (1), Bottom (1)

Tree Cover: 0%

Shrub Cover: Mean 0.3%, Range 0 – 1%

Herb Cover: Mean 48%, Range 27 – 62%

Large Rock: Mean 1.7%, Range 0 – 3%

Small Rock: Mean 0.7%, Range 0 – 2%

Fines Cover: Mean 26.7%, Range 1 – 70%

Litter Cover: Mean 36.7%, Range 15 – 80%

Soil Texture (field assessed): Fine clay (1), Fine silty clay (1)

Geology (map data): General volcanic extrusives (2), Mixed alluvium (1)

**Environment:** Stands of this alliance are found in basins or riparian meadows, seeps, fens, and on stream banks.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 27 to 62 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** The dominant herb is *Carex simulata*. *Juncus arcticus* and *Scirpus microcarpus* are often present. Emergent shrubs at very low cover may include *Amelanchier pallida*, *Rosa woodsii*, or *Salix lasiolepis*.

**Species of Interest:** None.

## **Classification Comments**

The high cover and constancy of *Carex nebrascensis* in stands of northeastern California and the Sierra Nevada (Manning and Padgett 1995, S. Smith 1998, Potter 2005), suggest that the *C. simulata* and *C. nebrascensis* alliances are closely allied

ecologically. With more herbland-directed sampling and additional analysis the full variability of this alliance and its relationship to other alliances within meadow complexes would be clearer.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G4    **State:** S3

### **References**

Cooper and Wolf 2006, Manning and Padgett 1995, Nachlinger 1985, Potter 2005, Smith 1998b

**Total Sample Size Used for Description:** N=3

### **Alliance Stand Table**

#### ***Carex simulata* Alliance**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Amelanchier pallida</i>	33	0.2	0.2	0.2
	<i>Rosa woodsii</i>	33	1	1	1
	<i>Salix lasiolepis</i>	33	0.2	0.2	0.2
<b>Herb</b>					
	<i>Carex simulata</i>	100	26	18	30
	<i>Juncus arcticus</i>	67	1	1	1
	<i>Scirpus microcarpus</i>	67	0.2	0.2	0.2
	<i>Platanthera leucostachys</i>	33	0.2	0.2	0.2
	<i>Achillea millefolium</i>	33	0.2	0.2	0.2
	<i>Rumex salicifolius</i>	33	0.2	0.2	0.2
	<i>Mimulus guttatus</i>	33	0.2	0.2	0.2
	<i>Arnica</i>	33	0.2	0.2	0.2
	<i>Viola glabella</i>	33	0.2	0.2	0.2
	<i>Viola</i>	33	1	1	1
	<i>Trifolium monanthum</i>	33	2	2	2
	<i>Trifolium longipes</i>	33	0.2	0.2	0.2
	<i>Tragopogon</i>	33	0.2	0.2	0.2
	<i>Thinopyrum intermedium</i>	33	0.2	0.2	0.2
	<i>Taraxacum officinale</i>	33	0.2	0.2	0.2
	<i>Stellaria longipes</i>	33	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	33	0.2	0.2	0.2
	<i>Poa pratensis</i>	33	2	2	2
	<i>Poa palustris</i>	33	3	3	3

## Alliance Stand Table continued

### **Carex simulata Alliance**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	33	1	1	1
	<i>Artemisia douglasiana</i>	33	0.2	0.2	0.2
	<i>Carex aurea</i>	33	0.2	0.2	0.2
	<i>Symphyotrichum</i>	33	0.4	0.4	0.4
	<i>Carex praegracilis</i>	33	0.2	0.2	0.2
	<i>Muhlenbergia filiformis</i>	33	10	10	10
	<i>Eleocharis pauciflora</i>	33	0.2	0.2	0.2
	<i>Epilobium ciliatum</i>	33	0.2	0.2	0.2
	<i>Equisetum arvense</i>	33	13	13	13
	<i>Maianthemum</i>	33	1	1	1
	<i>Carex nebrascensis</i>	33	12	12	12
	<i>Juncus orthophyllus</i>	33	12	12	12
	<i>Elymus triticoides</i>	33	0.2	0.2	0.2
	<i>Lotus corniculatus</i>	33	0.2	0.2	0.2
	<i>Euthamia occidentalis</i>	33	20	20	20



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## ***Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Alliance**

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**Common Name:** Sand-aster and perennial buckwheat fields Alliance

**NVC Alliance Code:** A4238.

### **Alliance Concept**

The *Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Alliance forms an open herbaceous layer. The shrub and tree layers are sparse. It is found primarily on the upper portions of slopes. Soils are derived primarily from basalt. Elevation is approximately 1831 m. Characteristic herbs include *Bromus arvensis*, *Bromus tectorum*, *Calystegia occidentalis*, *Elymus elymoides*, *Erigeron inornatus*, *Eriogonum nudum*, *Festuca idahoensis*, *Galium* sp., *Lagophylla ramosissima*, *Lepidium* sp., *Madia* sp., *Mentzelia* sp., *Phacelia* sp., *Phacelia heterophylla*, *Poa secunda*, *Pseudoroegneria spicata*, *Rigiopappus* sp., *Streptanthus cordatus*, and *Thelypodium* sp. Commonly associated emergent trees at sparse cover include *Juniperus occidentalis*. Commonly associated emergent shrubs at sparse cover include *Artemisia tridentata*.



**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Bromus arvensis*, *Bromus tectorum*, *Calystegia occidentalis*, *Elymus elymoides*, *Erigeron inornatus*, *Eriogonum nudum*, *Festuca idahoensis*, *Galium* sp., *Lagophylla ramosissima*, *Lepidium* sp., *Madia* sp., *Mentzelia* sp., *Phacelia* sp., *Phacelia heterophylla*, *Poa secunda*, *Pseudoroegneria spicata*, *Rigiopappus* sp., *Streptanthus cordatus*, and *Thelypodium* sp. The overall herbaceous cover is 3 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Horsehead Mountain (M261Gk)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1831 m

Aspect: SSW

Slope: 5-25 degrees.

Macro Topography: Upper 1/3 of slope (1)

Tree Cover: 2%

Shrub Cover: 0.2%

Herb Cover: 3%

Large Rock: 90%

Small Rock: 9%

Fines Cover: 0.2%

Litter Cover: 1%

Soil Texture (field assessed): None recorded.

Geology (map data): Basalt (1)

**Environment:** Stands of this alliance are found on upland slopes, hills, and flats on well-draining soils. The only stands in this study occurred at the bases of rock outcrops on hot southerly exposures.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 3 percent. The tree and shrub layers are sparse.

**Vegetation Floristics:** Characteristic herbs include *Bromus arvensis*, *Bromus tectorum*, *Calystegia occidentalis*, *Elymus elymoides*, *Erigeron inornatus*, *Eriogonum nudum*, *Festuca idahoensis*, *Galium* sp., *Lagophylla ramosissima*, *Lepidium* sp., *Madia* sp., *Mentzelia* sp., *Phacelia* sp., *Phacelia heterophylla*, *Poa secunda*, *Pseudoroegneria spicata*, *Rigiopappus* sp., *Streptanthus cordatus*, and *Thelypodium* sp. The tree layer is

emergent and typically or often includes *Juniperus occidentalis*. The shrub layer is emergent and typically or often includes *Artemisia tridentata*.

**Species of Interest:** None.

### **Classification Comments**

Though this alliance is well described for California, it was only sampled once within the study area and therefore the variability and extent of this type throughout this region of California is not well understood. Additional data collection and analysis would improve understand of this type for this region of California.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G4    **State:** S4

### **References**

None.

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	100	2	2	2
<b>Shrub</b>					
	<i>Artemisia tridentata</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Festuca idahoensis</i>	100	0.2	0.2	0.2
	<i>Mentzelia</i>	100	0.2	0.2	0.2
	<i>Streptanthus cordatus</i>	100	0.2	0.2	0.2
	<i>Rigiopappus</i>	100	0.2	0.2	0.2
	<i>Pseudoroegneria spicata</i>	100	0.2	0.2	0.2
	<i>Poa secunda</i>	100	0.2	0.2	0.2
	<i>Phacelia heterophylla</i>	100	0.2	0.2	0.2
	<i>Phacelia</i>	100	0.2	0.2	0.2
	<i>Thelypodium</i>	100	0.2	0.2	0.2
	<i>Elymus elymoides</i>	100	0.2	0.2	0.2
	<i>Madia</i>	100	0.2	0.2	0.2
	<i>Lagophylla ramosissima</i>	100	0.2	0.2	0.2

**Alliance Stand Table continued**

***Corethrogyne filaginifolia* – *Eriogonum (elongatum, nudum)* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Calystegia occidentalis</i>	100	0.2	0.2	0.2
	<i>Erigeron inornatus</i>	100	0.2	0.2	0.2
	<i>Eriogonum nudum</i>	100	0.2	0.2	0.2
	<i>Galium</i>	100	0.2	0.2	0.2
	<i>Bromus arvensis</i>	100	0.2	0.2	0.2
	<i>Lepidium</i>	100	0.2	0.2	0.2
	<i>Bromus tectorum</i>	100	0.2	0.2	0.2

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***Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance**

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**Common Name:** Oatgrass - Camas wet meadow Alliance

**NVC Alliance Code:** A3814. *Danthonia* spp. - *Camassia* spp. Wet Meadow Alliance

**Alliance Concept**

The *Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse to open. It is found throughout the landscape at all aspects. Soils are derived from a variety of substrates but primarily basalt and andesite and are primarily fine- to moderately fine-textured clays or clay loams. Elevation range is approximately 1383 – 1885 m. *Poa secunda* (likely *P. secunda* ssp *juncifolia*), *Danthonia unispicata*, *Deschampsia cespitosa*, and *Hordeum brachyantherum* are characteristic herbs and *Bromus arvensis*, and *Lomatium bicolor* are often present.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Poa secunda* (likely *P. secunda* ssp *juncifolia*), *Danthonia unispicata*, *Deschampsia cespitosa*, and/or *Hordeum brachyantherum*. The overall herbaceous cover ranges from 5 to 95 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

## **Associations**

*Danthonia unispicata* – *Poa secunda* Association

*Deschampsia cespitosa* Association

*Hordeum brachyantherum* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1618 m, Range 1383 – 1885 m

Aspect: NE (15), SW (7), Flat (4), NW (3), SE (3)

Slope: Mean 1.1 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (9), Other (9), Lower 1/3 of slope (5), Middle 1/3 of slope (3), Ridge top (2), Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (2), Middle to Upper 1/3 of slope (1), Bottom to Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.4%, Range 0 – 3%

Herb Cover: Mean 39.1%, Range 5 – 95%

Large Rock: Mean 5.8%, Range 0 – 45%

Small Rock: Mean 28.5%, Range 0 – 78%

Fines Cover: Mean 26.9%, Range 1 – 87%

Litter Cover: Mean 24.2%, Range 0.2 – 87%

Soil Texture (field assessed): Fine clay (7), Moderately fine clay loam (4), Fine silty clay (3), Clay, (class unknown) (2), Muck (1), Moderately fine silty clay loam (1), Moderately fine sandy clay loam (1), Moderately coarse, sandy loam (1), Fine sandy clay (1), Medium loam (1)

Geology (map data): Basalt (15), Andesite (11), General volcanic extrusives (5)

**Environment:** Stands of this alliance are found in montane to alpine seasonally wet meadows. Stands were sampled near the base of Five Springs Mountain and near Sworinger Reservoir. Stands dominated by *Deschampsia cespitosa* occur in moist alluvial meadows in the Warner Mountains (S. Smith 1998b) and occasionally in other higher parts of the Modoc Plateau. A variety of stands were sampled throughout the Modoc Plateau, including ones from the *Danthonia unispicata* – *Poa secunda* association found in Pine and Fitzhugh Creek Wildlife Area (Hickson et al 2008); around

Kellogg Road, near Crowder Flat Rd. by Timbered Mountain, near Snowstorm Mountain and in Secret Valley (VegCAMP 2020).

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 5 to 95 percent. The tree layer is typically sparse, and the shrub layer is sparse to open.

**Vegetation Floristics:** Characteristic herbs include *Poa secunda* (likely *P. secunda* ssp *juncifolia*), *Danthonia unispicata*, *Deschampsia cespitosa*, and/or *Hordeum brachyantherum* and those often present are *Bromus arvensis*, *Danthonia unispicata*, and *Lomatium bicolor*.

**Species of Interest:** *Lupinus uncialis*, *Lupinus uncialis*

### **Classification Comments**

This alliance describes montane meadow settings that are characterized by the presence of *Danthonia californica*, *D. unispicata*, *Deschampsia cespitosa*, *Hordeum brachyantherum*, and/or *Camassia quamash*.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S4

### **References**

Buck-Diaz et al. 2011, Buck-Diaz et al. 2012, Buck-Diaz et al. 2013, Hickson et al. 2008, Kittel et al. 2012, Klein et al. 2015, Manning and Padgett 1995, Rodriguez et al. 2017, Smith 1998b

**Total Sample Size Used for Description:** N=34

### **Alliance Stand Table**

#### ***Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance**

n =34

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Artemisia arbuscula</i>	38	1	0.2	3

# Alliance Stand Table continued

## ***Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance**

n =34

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Poa secunda</i>	82	7.61	0.2	25
	<i>Lomatium bicolor</i>	56	1.58	0.2	8
	<i>Bromus arvensis</i>	56	1.75	0.2	8
	<i>Danthonia unispicata</i>	56	8.17	0.2	40
	<i>Blepharipappus scaber</i>	41	0.87	0.2	3
	<i>Epilobium minutum</i>	41	0.89	0.2	3
	<i>Elymus elymoides</i>	32	1.11	0.2	3
	<i>Festuca idahoensis</i>	29	0.78	0.2	2
	<i>Elymus caput-medusae</i>	29	3.02	0.2	20
	<i>Trifolium macrocephalum</i>	29	0.8	0.2	3
	<i>Ventenata dubia</i>	26	7.36	0.2	23
	<i>Camassia quamash</i>	26	1.49	0.2	3
	<i>Hordeum brachyantherum</i>	26	9.33	1	20
	<i>Juncus arcticus</i>	26	14.22	1	45
	<i>Polygonum polygaloides</i>	26	0.96	0.2	3
	<i>Castilleja tenuis</i>	24	0.75	0.2	2
	<i>Triteleia hyacinthina</i>	24	7.43	0.2	30
	<i>Navarretia</i>	24	1.7	0.2	8
	<i>Epilobium brachycarpum</i>	24	1.03	0.2	2
	<i>Deschampsia danthonioides</i>	24	2.78	0.2	6
	<i>Nothocalais troximoides</i>	21	1.03	0.2	2
	<i>Perideridia</i>	18	0.6	0.2	1
	<i>Allium</i>	18	2	0.2	11
	<i>Arenaria congesta</i>	18	0.87	0.2	1
	<i>Sidalcea oregana</i>	15	1.64	0.2	5
	<i>Bromus tectorum</i>	15	4.28	0.2	19
	<i>Penstemon roezlii</i>	15	0.68	0.2	1
	<i>Perideridia oregana</i>	15	3.2	1	10
	<i>Sidalcea oregana</i>	15	1.64	0.2	5
	<i>Antennaria rosea</i>	15	4.48	0.2	20
	<i>Aster ascendens</i>	12	1.5	1	3
	<i>Achillea millefolium</i>	12	0.2	0.2	0.2
	<i>Arenaria kingii</i>	12	1.8	0.2	3
	<i>Rumex crispus</i>	12	0.4	0.2	1

**Alliance Stand Table continued**

***Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash*  
Alliance**

n =34

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Lomatium</i>	12	0.85	0.2	2
	<i>Microsteris gracilis</i>	12	0.6	0.2	1
	<i>Phleum pratense</i>	12	5.85	0.2	20
	<i>Veronica peregrina</i>	12	1.1	0.2	2
	<i>Erigeron bloomeri</i>	12	0.2	0.2	0.2
	<i>Rumex crispus</i>	12	0.4	0.2	1
	<i>Veronica peregrina</i>	12	1.1	0.2	2



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## ***Danthonia unispicata* – *Poa secunda* Association**

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**Common Name:** Onespike oatgrass - One sided blue grass wet meadow

**NVC Association Code:** CEG001783, *Danthonia unispicata* - *Poa secunda* Wet Meadow

**Alliance:** *Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance

### **Association Concept**

The *Danthonia unispicata* – *Poa secunda* Association forms an open to intermittent herbaceous layer. The shrub layer is sparse. The alliance is found primarily at the bottom and lower portions of slopes at primarily northeastern aspects. Soils are derived from a variety of substrates but primarily basalt, and fine clay is the most commonly occurring texture. Elevations range from approximately 1383 to 1829 meters. *Danthonia unispicata* and *Poa secunda* are characteristic herbs, those often present are *Blepharipappus scaber*, *Bromus arvensis*, *Epilobium minutum*, and *Lomatium bicolor*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Danthonia unispicata* and *Poa secunda*. The overall herbaceous cover ranges from 5 to 62 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1610 m, Range 1383 – 1829 m

Aspect: NE (10), SW (4), Flat (3), NW (3), SE (3)

Slope: Mean 1.2 degrees, Range 0 – 7 degrees

Macro Topography: Bottom (6), Other (5), Lower 1/3 of slope (4), Middle 1/3 of slope (3), Ridge top (2), Upper 1/3 of slope (2), Lower to Middle 1/3 of slope (1), Middle to Upper 1/3 of slope (1), Bottom to Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.4%, Range 0 – 2%

Herb Cover: Mean 31.4%, Range 5 – 62%

Large Rock: Mean 6.8%, Range 0 – 45%

Small Rock: Mean 34.2%, Range 1.2 – 78%

Fines Cover: Mean 27.3%, Range 1 – 87%

Litter Cover: Mean 18.1%, Range 0.2 – 84%

Soil Texture (field assessed): Fine clay (7), Moderately fine clay loam (3), Fine silty clay (2), Clay, (class unknown) (2), Medium loam (1), Moderately coarse, sandy loam

(1), Fine sandy clay (1), Moderately fine sandy clay loam (1), Moderately fine silty clay loam (1)

Geology (map data): Basalt (13), Andesite (6), General volcanic extrusives (5)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 5 to 62 percent. The tree and shrub layers are typically sparse.

**Vegetation Floristics:** *Danthonia unispicata* and *Poa secunda* are characteristic herbs, and those often present are *Blepharipappus scaber*, *Bromus arvensis*, *Epilobium minutum*, and *Lomatium bicolor*.

**Species of Interest:** *Lupinus uncialis*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** S3

### **References**

Hickson et al. 2008

**Total Sample Size Used for Description:** N=25

### **Association Stand Table**

#### ***Danthonia unispicata* – *Poa secunda* Association**

n =25

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Artemisia arbuscula</i>	48	0.83	0.2	2
<i>Eriogonum umbellatum</i>	12	1	1	1
<b>Herb</b>				
<i>Poa secunda</i>	96	6.59	0.2	18
<i>Danthonia unispicata</i>	76	8.17	0.2	40
<i>Bromus arvensis</i>	64	1.26	0.2	4
<i>Lomatium bicolor</i>	64	1.38	0.2	8
<i>Blepharipappus scaber</i>	52	0.78	0.2	3

## Association Stand Table continued

### ***Danthonia unispicata* – *Poa secunda* Association**

n =25

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Epilobium minutum</i>	52	0.88	0.2	3
<i>Festuca idahoensis</i>	40	0.78	0.2	2
<i>Trifolium macrocephalum</i>	40	0.8	0.2	3
<i>Elymus elymoides</i>	36	1.13	0.2	3
<i>Taeniatherum caput-medusae</i>	36	3.33	0.2	20
<i>Ventenata dubia</i>	36	7.36	0.2	23
<i>Polygonum polygaloides</i>	32	0.95	0.2	3
<i>Castilleja tenuis</i>	32	0.75	0.2	2
<i>Allium</i>	24	2	0.2	11
<i>Navarretia</i>	24	1.93	0.2	8
<i>Perideridia</i>	24	0.6	0.2	1
<i>Nothocalais troximoides</i>	20	0.84	0.2	1
<i>Penstemon roezlii</i>	20	0.68	0.2	1
<i>Deschampsia danthonioides</i>	20	2.24	0.2	6
<i>Bromus tectorum</i>	20	4.28	0.2	19
<i>Arenaria congesta</i>	20	0.84	0.2	1
<i>Antennaria rosea</i>	20	4.48	0.2	20
<i>Triteleia hyacinthina</i>	20	11.44	0.2	30
<i>Erigeron bloomeri</i>	16	0.2	0.2	0.2
<i>Arenaria kingii</i>	16	1.8	0.2	3
<i>Epilobium brachycarpum</i>	16	0.8	0.2	1
<i>Lotus denticulatus</i>	12	2.33	2	3
<i>Pyrrocoma carthamoides</i> var. <i>cusickii</i>	12	0.73	0.2	1
<i>Perideridia oregana</i>	12	4.67	1	10
<i>Navarretia intertexta</i>	12	1	1	1
<i>Microsteris gracilis</i>	12	0.47	0.2	1
<i>Microseris laciniata</i>	12	5.67	2	10
<i>Lomatium triternatum</i>	12	1	1	1
<i>Lomatium</i>	12	0.8	0.2	2
<i>Juncus tenuis</i>	12	1.4	0.2	3
<i>Idaho scapigera</i>	12	0.47	0.2	1
<i>Agoseris heterophylla</i>	12	1.33	1	2
<i>Ranunculus uncinatus</i>	12	4.67	1	12
<i>Camassia quamash</i>	12	1.73	0.2	3

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## ***Deschampsia cespitosa* Association**

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**Common Name:** Tufted Hairgrass

**NVC Association Code:** CEGJ001599, *Deschampsia cespitosa* Wet Meadow

**Alliance:** *Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash*  
Alliance

### **Association Concept**

The *Deschampsia cespitosa* Association forms a continuous herbaceous layer. The alliance is found primarily at the bottom or lower third of northeast-facing slopes or at the edge of basins or wetlands. Soils are derived from a variety of substrates but primarily andesite or basalt and have mucky textures. Elevations range from approximately 1585 to 1885 meters. *Juncus arcticus* is the dominant herb and characteristic herbs include *Deschampsia cespitosa*, *Hordeum brachyantherum*, and *Sidalcea oregana*. Those often present are *Alopecurus geniculatus*, *Claytonia lanceolata*, *Eleocharis macrostachya*, *Juncus nevadensis*, and *Mimulus guttatus*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Juncus arcticus*, *Deschampsia cespitosa*, *Hordeum brachyantherum*, and *Sidalcea oregana*. The overall herbaceous cover ranges from 60 to 95 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1756 m, Range 1585 – 1885 m

Aspect: NE (2), Flat (1)

Slope: Mean 0.3 degrees, Range 0 – 1 degree

Macro Topography: Lower 1/3 of slope (1), Bottom (1), Edge of basin or wetland (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 80%, Range 60 – 95%

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 18.3%, Range 10 – 30%

Litter Cover: Mean 58%, Range 5 – 87%

Soil Texture (field assessed): Muck (1), Not recorded (1)

Geology (map data): Andesite (1), Basalt (1), Not recorded (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent to continuous herbaceous layer, and the overall herbaceous cover ranges from 60 to 95 percent. The tree and layers are typically absent.

**Vegetation Floristics:** *Juncus arcticus* is the dominant herb and characteristic herbs include *Deschampsia cespitosa*, *Hordeum brachyantherum*, and *Sidalcea oregana*. Those often present are *Alopecurus geniculatus*, *Claytonia lanceolata*, *Eleocharis macrostachya*, *Juncus nevadensis*, and *Mimulus guttatus*.

**Species of Interest:** None.

## **Classification Comments**

This association is under sampled within the study area and additional sampling and analysis will need to occur to fully understand the variability of this type and its relationship to other similar communities.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** G4 **State:** Y

## **References**

Manning and Padgett 1995, Smith 1998b

**Total Sample Size Used for Description:** N=3

## **Association Stand Table**

### ***Deschampsia cespitosa* Association**

n =3

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Juncus arcticus</i>	100	33.67	14	45
<i>Sidalcea oregana</i>	100	2.07	0.2	5
<i>Deschampsia cespitosa</i>	100	9	5	12
<i>Hordeum brachyantherum</i>	100	5	1	10
<i>Alopecurus geniculatus</i>	67	10	10	10
<i>Claytonia lanceolata</i>	67	5.5	1	10
<i>Eleocharis macrostachya</i>	67	5.6	0.2	11
<i>Juncus nevadensis</i>	67	5	1	9
<i>Mimulus guttatus</i>	67	2.5	1	4
<i>Muhlenbergia filiformis</i>	33	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	33	2	2	2
<i>Potentilla gracilis</i>	33	1	1	1

## Association Stand Table continued

### ***Deschampsia cespitosa* Association**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Polygonum bistortoides</i>	33	0.2	0.2	0.2
	<i>Poa pratensis</i>	33	3	3	3
	<i>Poa cusickii</i>	33	1	1	1
	<i>Rumex crispus</i>	33	1	1	1
	<i>Perideridia bolanderi</i>	33	1	1	1
	<i>Trifolium cyathiferum</i>	33	0.2	0.2	0.2
	<i>Plagiobothrys tener</i> var. <i>tener</i>	33	0.2	0.2	0.2
	<i>Rumex occidentalis</i>	33	0.2	0.2	0.2
	<i>Senecio hydrophilus</i>	33	1	1	1
	<i>Taraxacum officinale</i>	33	0.2	0.2	0.2
	<i>Mentha arvensis</i>	33	5	5	5
	<i>Trifolium wormskioldii</i>	33	0.2	0.2	0.2
	<i>Triteleia hyacinthina</i>	33	0.2	0.2	0.2
	<i>Veronica peregrina</i>	33	0.2	0.2	0.2
	<i>Veronica scutellata</i>	33	1	1	1
	<i>Penstemon rydbergii</i>	33	0.2	0.2	0.2
	<i>Stellaria longipes</i>	33	0.2	0.2	0.2
	<i>Camassia quamash</i>	33	0.2	0.2	0.2
	<i>Phleum pratense</i>	33	3	3	3
	<i>Madia glomerata</i>	33	1	1	1
	<i>Apera interrupta</i>	33	4	4	4
	<i>Aster ascendens</i>	33	1	1	1
	<i>Bromus arvensis</i>	33	4	4	4
	<i>Carex</i>	33	1	1	1
	<i>Carex angustata</i>	33	0.2	0.2	0.2
	<i>Carex lenticularis</i>	33	1	1	1
	<i>Carex nebrascensis</i>	33	1	1	1
	<i>Cryptantha</i>	33	0.2	0.2	0.2
	<i>Epilobium densiflorum</i>	33	1	1	1
	<i>Epilobium glaberrimum</i>	33	1	1	1
	<i>Epilobium minutum</i>	33	1	1	1
	<i>Galium triflorum</i>	33	1	1	1
	<i>Lotus unifoliolatus</i>	33	0.2	0.2	0.2
	<i>Juncus</i>	33	0.2	0.2	0.2
	<i>Achillea millefolium</i>	33	0.2	0.2	0.2
	<i>Beckmannia syzigachne</i>	33	1	1	1

**Association Stand Table continued**

***Deschampsia cespitosa* Association**

n =3

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Ligusticum grayi</i>	33	2	2	2
<i>Deschampsia danthonioides</i>	33	4	4	4

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## ***Hordeum brachyantherum* Association**

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**Common Name:** Meadow barley

**NVC Association Code:** C EGL003430, *Hordeum brachyantherum* Lowland Wet Meadow

**Alliance:** *Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance

### **Association Concept**

The *Hordeum brachyantherum* Association forms an intermittent to continuous herbaceous layer. The shrub and tree layers are sparse. The alliance is found primarily on at the bottom of slopes at southwestern or northeastern aspects. Soils are derived from a variety of substrates but primarily andesite and have a moderately fine clay loam texture. Elevations range from approximately 1554 to 1615 meters. *Hordeum brachyantherum* and *Juncus arcticus* are characteristic herbs. Those often present are *Aster ascendens*, *Camassia quamash*, *Epilobium brachycarpum*, *Lomatium bicolor* and *Poa secunda*.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Hordeum brachyantherum* and *Juncus arcticus*. The overall herbaceous cover ranges from 38 to 81 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1587 m, Range 1554 – 1615 m

Aspect: SW (2), NE (2)

Slope: Mean 0.8 degrees, Range 0 – 2 degrees

Macro Topography: Other (3), Bottom (1)

Tree Cover: Mean 0.2%, Range 0 – 1%

Shrub Cover: Mean 1.3%, Range 0 – 3%

Herb Cover: Mean 59.8%, Range 38 – 81%

Large Rock: Not recorded.

Small Rock: Not recorded.

Fines Cover: Mean 38%, Range 22 – 50%

Litter Cover: Mean 41.3%, Range 20 – 75%

Soil Texture (field assessed): Moderately fine clay loam (1)

Geology (map data): Andesite (3), Basalt (1)



## **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent to continuous herbaceous layer, and the overall herbaceous cover ranges from 38 to 81 percent. The tree layer is typically sparse, and the shrub layer is sparse to open.

**Vegetation Floristics:** Characteristic herbs include *Hordeum brachyantherum* and *Juncus arcticus*. Those often present are *Aster ascendens*, *Camassia quamash*, *Epilobium brachycarpum*, *Lomatium bicolor*, and *Poa secunda*. The tree layer is emergent and sometimes includes *Juniperus occidentalis*. The shrub layer is emergent and sometimes includes *Artemisia arbuscula* and *Artemisia cana*.

**Dynamics:** *Hordeum brachyantherum*, and *Juncus arcticus* have similar moisture requirements. However, *J. arcticus* is less palatable and more tolerant of livestock grazing. This is one reason why meadow barley stands are relatively uncommon locally.

**Species of Interest:** None.

## **Classification Comments**

Stands of *Hordeum brachyantherum* were previously placed in their own alliance (Sawyer et al. 2009), but due to environmental similarities between several former alliances have been lumped into the *Danthonia californica* – *Deschampsia cespitosa* – *Camassia quamash* Alliance. This association is under sampled within the study area and additional sampling and analysis will need to occur to fully understand the variability of this type and its relationship to other similar communities.

**Classification Confidence:** Moderate

## **Conservation Status Rank**

**Global:** G2 **State:** Y

## **References**

Buck-Diaz et al. 2012, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Kittel et al. 2012, Klein et al. 2015, Manning and Padgett 1995, Rodriguez et al. 2017, Smith 1998b

**Total Sample Size Used for Description:** N=4

## **Association Stand Table**

### ***Hordeum brachyantherum* Association**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	25	1	1	1

**Association Stand Table continued**

***Hordeum brachyantherum* Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	25	1	1	1
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	25	3	3	3
	<i>Artemisia cana</i>	25	1	1	1
<b>Herb</b>					
	<i>Juncus arcticus</i>	100	5.75	1	18
	<i>Hordeum brachyantherum</i>	100	16.25	10	20
	<i>Aster ascendens</i>	75	1.67	1	3
	<i>Camassia quamash</i>	75	1	1	1
	<i>Epilobium brachycarpum</i>	75	1.33	1	2
	<i>Lomatium bicolor</i>	75	2.67	1	5
	<i>Poa secunda</i>	75	16	5	25
	<i>Nothocalais troximoides</i>	50	1.5	1	2
	<i>Bromus arvensis</i>	50	4.5	1	8
	<i>Elymus elymoides</i>	50	1	1	1
	<i>Phleum pratense</i>	50	10.1	0.2	20
	<i>Potentilla gracilis</i>	50	1	1	1
	<i>Sidalcea oregana</i>	50	1	1	1
	<i>Castilleja</i>	50	1	1	1
	<i>Achillea millefolium</i>	25	0.2	0.2	0.2
	<i>Rumex crispus</i>	25	0.2	0.2	0.2
	<i>Mimulus</i>	25	1	1	1
	<i>Montia linearis</i>	25	0.2	0.2	0.2
	<i>Nemophila pedunculata</i>	25	0.2	0.2	0.2
	<i>Perideridia oregana</i>	25	1	1	1
	<i>Plagiobothrys</i>	25	1	1	1
	<i>Poa nevadensis</i>	25	10	10	10
	<i>Microsteris gracilis</i>	25	1	1	1
	<i>Polygonum polygaloides</i>	25	1	1	1
	<i>Navarretia</i>	25	1	1	1
	<i>Stellaria longipes</i>	25	2	2	2
	<i>Taraxacum officinale</i>	25	0.2	0.2	0.2
	<i>Trifolium</i>	25	1	1	1
	<i>Triteleia hyacinthina</i>	25	1	1	1
	<i>Veronica peregrina</i>	25	2	2	2

## Association Stand Table continued

### ***Hordeum brachyantherum* Association**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Agrostis gigantea</i>	25	1	1	1
	<i>Polemonium micranthum</i>	25	2	2	2
	<i>Collinsia parviflora</i>	25	0.2	0.2	0.2
	<i>Agoseris retrorsa</i>	25	2	2	2
	<i>Arenaria congesta</i>	25	1	1	1
	<i>Blepharipappus scaber</i>	25	2	2	2
	<i>Camassia leichtlinii</i>	25	0.2	0.2	0.2
	<i>Perideridia bolanderi</i>	25	2	2	2
	<i>Claytonia rubra</i>	25	1	1	1
	<i>Lotus wrangelianus</i>	25	1	1	1
	<i>Delphinium</i>	25	0.2	0.2	0.2
	<i>Lactuca serriola</i>	25	1	1	1
	<i>Deschampsia elongata</i>	25	8	8	8
	<i>Draba verna</i>	25	2	2	2
	<i>Eleocharis macrostachya</i>	25	1	1	1
	<i>Elymus cinereus</i>	25	0.2	0.2	0.2
	<i>Epilobium ciliatum</i>	25	0.2	0.2	0.2
	<i>Carex</i>	25	25	25	25
	<i>Deschampsia danthonioides</i>	25	2	2	2

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## ***Distichlis spicata* Alliance**

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PHOTO FROM HORSE LAKE

**Common Name:** Salt grass flats Alliance

**NVC Alliance Code:** A1332. *Distichlis spicata* Alkaline Wet Meadow Alliance

### **Alliance Concept**

The *Distichlis spicata* Alliance forms an open herbaceous layer. The shrub layer is sparse. It is found primarily in flat or low-gradient areas. Soils are derived from a variety of substrates and textures include fine sand. Elevation range is approximately 1217 – 1543 m. *Distichlis spicata* is the dominant herb and *Elymus cinereus* is characteristic. *Bromus tectorum* and *Poa secunda* are often present.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Distichlis spicata* and *Elymus cinereus*. The overall herbaceous cover is 14 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm)

## **Associations**

None.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1302 m, Range 1217 – 1543 m

Aspect: Flat (1)

Slope: Mean 0.75 degrees, Range 0 – 1 degrees

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: Mean 0.3%, Range 0 – 1%

Herb Cover: 14%

Large Rock: 0%

Small Rock: Mean 8.3%, Range 0 – 22%

Fines Cover: Mean 70.8%, Range 45 – 96%

Litter Cover: 2%

Soil Texture (field assessed): Fine sand (1)

Geology (map data): None recorded.

**Environment:** Stands of this alliance are found on playas, swales, and terraces along washes that may be intermittently flooded. Soils are often deep, alkaline or saline, and poorly drained. When the soil is dry, the surface usually has salt accumulations. Stands are common in valleys such as at Klamath Basin National Refuge complex but are generally widespread in basins and in salty springs throughout the Modoc Plateau and the NW Basin and Range ecoregions.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 14 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Distichlis spicata* is the dominant herb and *Elymus cinereus* is characteristic. *Bromus tectorum* and *Poa secunda* are often present.

**Species of Interest:** None.

## **Classification Comments**

This alliance was under-sampled within the study area for this project but is generally well documented for this region and is a common alliance throughout most of California.

**Classification Confidence:** High

## Conservation Status Rank

Global: GNR State: S4

## References

None.

Total Sample Size Used for Description: N=4

## Alliance Stand Table

### ***Distichlis spicata* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Shrub					
	<i>Atriplex canescens</i>	25	1	1	1
Herb					
	<i>Distichlis spicata</i>	100	13.75	2	37
	<i>Elymus cinereus</i>	75	4	1	7
	<i>Poa secunda</i>	50	0.6	0.2	1
	<i>Bromus tectorum</i>	50	7	3	11
	<i>Poa bulbosa</i>	25	0.2	0.2	0.2
	<i>Ambrosia acanthicarpa</i>	25	1	1	1
	<i>Iva axillaris</i>	25	3	3	3
	<i>Bromus briziformis</i>	25	0.2	0.2	0.2
	<i>Elymus elymoides</i>	25	1	1	1
	<i>Achillea millefolium</i>	25	1	1	1
	<i>Bassia hyssopifolia</i>	25	6	6	6
	<i>Astragalus obscurus</i>	25	1	1	1



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## ***Eleocharis (acicularis, macrostachya) Alliance***

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**Common Name:** Needle spike rush and pale spike rush marshes Alliance

**NVC Alliance Code:** A3807. *Eleocharis palustris* - *Eleocharis acicularis* Marsh Alliance

### **Alliance Concept**

The *Eleocharis (acicularis, macrostachya)* Provisional Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. It is found primarily in flat or low-gradient areas, but occasionally on slopes and ridges at northeastern, northwestern, or southeastern aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, general volcanic extrusives, or clayey alluvium and textures include fine silty clay, fine clay, and moderately fine sandy clay loam. Elevation range is approximately 1379 – 1837 m. *Eleocharis macrostachya* is the dominant herb and *Eleocharis acicularis* is often present.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous herbaceous layer of *Eleocharis macrostachya*. The overall herbaceous cover ranges from 1 to 100 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

## **Associations**

*Eleocharis macrostachya* Provisional Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1547 m, Range 1379 – 1837 m

Aspect: Flat (15), NE (8), SE (2), NW (1)

Slope: Mean 0.5 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (21), Other (3), Ridge top (1), Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 1%

Herb Cover: Mean 37.2%, Range 1 – 100%

Large Rock: Mean 2.2%, Range 0 – 10%

Small Rock: Mean 4.3%, Range 0 – 45%

Fines Cover: Mean 57.3%, Range 0 – 99%

Litter Cover: Mean 9.9%, Range 0 – 91%

Soil Texture (field assessed): Fine silty clay (9), Fine clay (4), Moderately fine sandy clay loam (2), Peat (1), Medium to very fine, sandy loam (1), Fine sandy clay (1), Unknown (1), Moderately fine clay loam (1)

Geology (map data): Andesite (4), Basalt (4), General volcanic extrusives (4), Clayey alluvium (3), Sandy alluvium (most alluvial fans and washes) (1)

**Environment:** *Eleocharis macrostachya* often thought of as a vernal pool plant, grows in many habitats that are seasonally flooded. Habitats include ponds and vernal pools, shallow lakes, stream sides, and wet meadows. Similarly, the alliance exists throughout much of the western United States and central Great Plains at elevations from sea level to alpine in shallow wetlands with slowed water or in ponds (NatureServe 2007a, Smith et al. 2002).

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 1 to 100 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Eleocharis macrostachya* is the dominant herb and *Eleocharis acicularis* is often present.



**Species of Interest:** *Gratiola heterosepala*

**Classification Comments**

California stands of *E. macrostachya* are placed within the California vernal pool vegetation group by Sawyer et al (2009), but similar, *E macrostachya* stands range extensively outside of the State. There is still some debate whether to separate the vernal pool stands from the non-vernal pools stands into different alliances. In addition, the *Eleocharis (acicularis, macrostachya)* Alliance is a provisional type for California because the relationship between stands dominated by these two species is still not fully understood. Further analysis needs to be done to more clearly understand this type.

**Classification Confidence:** Moderate

**Conservation Status Rank**

**Global:** GNR     **State:** S3S4

**References**

Buck-Diaz et al. 2012, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Buck-Diaz et al. 2019, CNPS Vegetation Program 2015, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, NatureServe 2007a, Pickart 2006, Potter 2005, Smith 1998b

**Total Sample Size Used for Description:** N=26

**Alliance Stand Table**

***Eleocharis (acicularis, macrostachya) Alliance***

**n =26**

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Eleocharis macrostachya</i>	81	19.38	1	70
<i>Eleocharis acicularis</i>	50	6.62	0.2	32
<i>Juncus arcticus</i>	31	4.8	0.2	20
<i>Juncus nevadensis</i>	23	11.4	0.2	4
<i>Marsilea vestita</i>	23	7.53	0.2	30
<i>Plagiobothrys mollis</i>	19	4.48	0.2	10
<i>Poa bulbosa</i>	19	1.12	0.2	3
<i>Downingia bacigalupii</i>	19	1.04	0.2	2
<i>Psilocarphus brevissimus</i>	19	0.84	0.2	1
<i>Deschampsia danthonioides</i>	15	2.55	0.2	6
<i>Plagiobothrys</i>	15	1.48	0.2	5
<i>Ranunculus occidentalis</i>	15	1.18	0.2	2

*Eleocharis (acicularis, macrostachya)* Provisional Alliance

**Alliance Stand Table continued**

***Eleocharis (acicularis, macrostachya) Alliance***

n =26

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Potamogeton nodosus</i>	12	3.07	0.2	7
<i>Rumex</i>	12	0.2	0.2	0.2
<i>Veronica peregrina</i>	12	0.47	0.2	1
<i>Trifolium cyathiferum</i>	12	5.13	0.2	15
<i>Taraxacum officinale</i>	12	0.47	0.2	1
<i>Muhlenbergia richardsonis</i>	12	0.47	0.2	1
<i>Rumex crispus</i>	12	0.73	0.2	1
<i>Gratiola ebracteata</i>	12	0.2	0.2	0.2
<i>Bromus arvensis</i>	12	0.2	0.2	0.2
<i>Alopecurus geniculatus</i>	12	1.07	0.2	2
<i>Plagiobothrys bracteatus</i>	12	0.8	0.2	2

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## ***Eleocharis macrostachya* Provisional Association**

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**Common Name:** Common spikerush

**NVC Association Code:** CEG005303, *Eleocharis macrostachya* Marsh

**Alliance:** *Eleocharis (acicularis, macrostachya)* Alliance

### **Association Concept**

The *Eleocharis macrostachya* Provisional Association forms an open to continuous herbaceous layer. The alliance is found primarily in flat or low-gradient areas. Soils are derived from a variety of substrates but primarily general volcanic extrusives or basalt and primarily have a fine silty clay texture. Elevations range from approximately 1449 to 1655 meters. *Eleocharis macrostachya* is the dominant herb.

**Diagnostic Criteria:** This association is characterized by an open to continuous herbaceous layer of *Eleocharis macrostachya*. The overall herbaceous cover ranges from 1 to 78 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1534 m, Range 1449 – 1655 m

Aspect: Flat (9), NE (2), SE (1)

Slope: Mean 0.4 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (9), Lower 1/3 of slope (1), Other (1), Ridge top (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 35.9%, Range 1 – 78%

Large Rock: Mean 2.2%, Range 0 – 7.2%

Small Rock: Mean 4.8%, Range 0 – 45%

Fines Cover: Mean 41.4%, Range 0 – 99%

Litter Cover: Mean 13.9%, Range 0 – 91%

Soil Texture (field assessed): Fine silty clay (4), Peat (1), Medium to very fine, sandy loam (1), Unknown (1), Fine clay (1), Not recorded (1), Moderately fine sandy clay loam (1)

Geology (map data): General volcanic extrusives (4), Basalt (2), Sandy alluvium (most alluvial fans and washes) (1), Clayey alluvium (1), Andesite (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 1 to 78 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** Dominant herbs include *Eleocharis macrostachya*.

**Dynamics:** *Eleocharis macrostachya* is an amphibious wetland species and tends to dominate the deeper bottoms of seasonal pools. In dry years, many stands are devoid of surface water by mid- summer.

**Species of Interest:** *Gratiola heterosepala*

## **Classification Comments**

While the hierarchical placement of the alliance, and the associations within the alliance, is still being explored we have enough data for this association to be confident that it is a distinct vegetation community.

**Classification Confidence:** High

## **References**

Buck-Diaz et al. 2012, Buck-Diaz and Evens 2011b, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Buck-Diaz et al. 2019, CNPS Vegetation Program 2015, Kittel et al. 2012, Klein et al. 2007, Klein et al. 2015, Pickart 2006, Potter 2005, Smith 1998b

## **Conservation Status Rank**

**Global:** GNR    **State:** SNR

**Total Sample Size Used for Description:** N=12

## **Association Stand Table**

### **Eleocharis macrostachya Provisional Association**

n =12

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Eleocharis macrostachya</i>	100	19.83	1	70
<i>Eleocharis acicularis</i>	33	0.2	0.2	0.2
<i>Juncus arcticus</i>	33	3.25	1	5
<i>Poa bulbosa</i>	33	0.9	0.2	3
<i>Juncus nevadensis</i>	25	1.07	0.2	2
<i>Ranunculus occidentalis</i>	25	0.9	0.2	2
<i>Rumex</i>	25	0.2	0.2	0.2
<i>Taraxacum officinale</i>	25	0.47	0.2	1

## Association Stand Table continued

### **Eleocharis macrostachya Provisional Association**

n =12

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Sagittaria</i>	17	0.6	0.2	1
<i>Rumex crispus</i>	17	0.6	0.2	1
<i>Potamogeton nodosus</i>	17	3.6	0.2	7
<i>Phleum pratense</i>	17	1.6	0.2	3
<i>Plagiobothrys bracteatus</i>	17	1.1	0.2	2
<i>Downingia bacigalupii</i>	17	1.5	1	2
<i>Gratiola ebracteata</i>	17	0.2	0.2	0.2
<i>Bromus arvensis</i>	17	0.2	0.2	0.2
<i>Alopecurus geniculatus</i>	17	0.6	0.2	1
<i>Mimulus guttatus</i>	17	0.2	0.2	0.2
<i>Montia chamissoi</i>	17	35	35	35

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## ***Eleocharis (palustris, rostellata)* Alliance**

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**Common Name:** Common spike rush and beaked spike rush marshes Alliance

**NVC Alliance Code:** A3930. *Eleocharis palustris* - *Eleocharis rostellata* Alkaline-Saline Marsh Alliance

### **Alliance Concept**

The *Eleocharis (palustris, rostellata)* Alliance forms an intermittent herbaceous layer. It is found primarily on the lower third of slopes at northwestern aspects. Soils are derived from a variety of substrates and textures include muck. Elevation range is approximately 1477 m. *Eleocharis rostellata* is the dominant herb, and *Lemna* sp. is characteristic.

**Diagnostic Criteria:** This alliance is characterized by an intermittent herbaceous layer of *Eleocharis rostellata*. The overall herbaceous cover is 38 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Mountain (M261Gi)

## **Associations**

### *Eleocharis rostellata* Association

**Note:** Because this description is based on a single sample, the statistics of the above association are the same as the alliance. There will not be a separate description for the association.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1477 m

Aspect: NW (1)

Slope: 2 degrees

Macro Topography: Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 38%

Large Rock: 0%

Small Rock: 0%

Fines Cover: 0%

Litter Cover: 85%

Soil Texture (field assessed): Muck (1)

Geology (map data): None recorded.

**Environment:** Stands of this alliance are found in alkaline to saline spring-fed seeps and wet meadows. In northeastern California, stands of *E. rostellata* are rare and localized at mineralized springs.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an intermittent herbaceous layer, and the overall herbaceous cover is 38 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** Dominant herbs include *Eleocharis rostellata*, and characteristic herbs include *Lemna* sp.

**Dynamics:** The single stand sampled occurred on a small dome-shaped raised fen surrounding an alkaline seep. The depth of the quaking, saturated organic substrate was sufficient enough to deter cattle, actively grazing the surrounding landscape, from entering the core of the fen. *E. rostellata* culms were widely-spreading and the

characteristic “self-planting” of the ripe fruiting heads was evident in the late summer of 2019.

**Species of Interest:** None.

**Classification Comments**

Only one stand of this alliance was sampled for this project. With more herbland-directed sampling and additional analysis the full variability of this alliance in this region would be clearer.

**Classification Confidence:** Moderate

**Conservation Status Rank**

**Global:** GNR    **State:** S2S3

**References**

Evens et al. 2014, Menke et al. 2019, VegCAMP (Vegetation Classification and Mapping Program) 2014b

**Total Sample Size Used for Description:** N=1

**Alliance Stand Table**

***Eleocharis (palustris, rostellata) Alliance***

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Eleocharis rostellata</i>	100	38	38	38
<i>Lemna</i>	100	1	1	1



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## ***Eleocharis quinqueflora* Alliance**

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PHOTO FROM SAGEHEN FIELD STATION

**Common Name:** Few-flowered spike rush marshes Alliance

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Eleocharis quinqueflora* Alliance forms an intermittent herbaceous layer. It is found primarily in flat or low-gradient areas. Soils are derived from a variety of substrates but primarily basalt and textures include muck. Elevation is approximately 1657 m.

*Eleocharis pauciflora* and *Plagiobothrys* sp. are dominant, and characteristic herbs include *Alopecurus* sp., *Carex* sp., and *Rumex crispus*.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Eleocharis pauciflora*. The overall herbaceous cover is 37 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Tableland (M261Gh)

## **Associations**

None.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1657 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 37%

Large Rock: 0%

Small Rock: 0%

Fines Cover: 55%

Litter Cover: 37%

Soil Texture (field assessed): Muck (1)

Geology (map data): Basalt (1)

**Environment:** Stands of this alliance are found at margins of lakes, seeps, wet meadows, and fens. Stands exist at Pine and Fitzhugh Creek Wildlife areas (Hickson et al. 2008) and in wet meadows in the Warner Mountains.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an intermittent herbaceous layer, and the overall herbaceous cover is 37 percent cover. The tree and shrub layers are typically absent.

**Vegetation Floristics:** Dominant herbs include *Eleocharis pauciflora* and *Plagiobothrys* sp., and characteristic herbs include *Alopecurus* sp., *Carex* sp., and *Rumex crispus*.

**Species of Interest:** None.

## **Classification Comments**

Only one stand of this alliance was sampled for this project. With more herbland-directed sampling and additional analysis the full variability of this alliance in this region would be clearer.

**Classification Confidence:** Moderate

### Conservation Status Rank

Global: G4 State: S4

### References

None.

Total Sample Size Used for Description: N=1

### Alliance Stand Table

#### ***Eleocharis quinqueflora* Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Carex</i>	100	0.2	0.2	0.2
<i>Rumex crispus</i>	100	3	3	3
<i>Eleocharis pauciflora</i>	100	20	20	20
<i>Alopecurus</i>	100	2	2	2
<i>Plagiobothrys</i>	100	15	15	15



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## ***Elymus cinereus* – *Elymus triticoides* Alliance**

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**Common Name:** Ashy ryegrass – creeping ryegrass turfs Alliance

**NVC Alliance Code:** A1329. *Elymus cinereus* - *Elymus triticoides* Alkaline Wet Meadow Alliance

### **Alliance Concept**

The *Elymus cinereus* – *Elymus triticoides* Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse and the tree layer is absent. It is found primarily in flat areas and the lower portions of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt, and textures are variable but fine silty clay is most common. Elevation range is approximately 1241 – 2081 m. Characteristic herbs include *Bromus tectorum* and *Elymus cinereus*.

**Diagnostic Criteria:** This alliance is characterized by an open to intermittent herbaceous layer of *Bromus tectorum* and *Elymus cinereus*. The overall herbaceous cover ranges from 10 to 40 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Lower Klamath - Tule Lake Basins (M261Ga)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

## **Associations**

*Elymus cinereus* Provisional Association

*Elymus triticoides* – *Poa secunda* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1594 m, Range 1241 – 2081 m

Aspect: NE (8), Flat (4), SW (2), NW (2), SE (1)

Slope: Mean 9.5625 degrees, Range 0 – 65 degrees

Macro Topography: Bottom (9), Lower 1/3 of slope (4), Bottom to Lower 1/3 of slope (2), Middle 1/3 of slope (2), Not recorded (1)

Tree Cover: 0%

Shrub Cover: Mean 1.7%, Range 0 – 8%

Herb Cover: Mean 25.1%, Range 10 – 40%

Large Rock: Mean 0.5%, Range 0 – 2%

Small Rock: Mean 2.8%, Range 0 – 10%

Fines Cover: Mean 54.2%, Range 0.5 – 99%

Litter Cover: Mean 20.1%, Range 1 – 91%

Soil Texture (field assessed): Fine silty clay (5), Moderately fine silty clay loam (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Rock (1), Moderately fine clay loam (1), Loamy Sand (1), Fine clay (1), Silt Loam (1), Medium silt (1)

Geology (map data): Basalt (4), Andesite (1), General volcanic extrusives (1)

**Environment:** Stands of this alliance occur in the Pine and Fitzhugh Creek Wildlife Areas. Following the extensive Rush Fire (2012), a number of seral upland stands have grown on mesic slopes. The California Natural Diversity database (2008) has plot data on file for Modoc Co. from the Madeline Plain area and for Sheldon National Antelope Refuge in adjacent Nevada, where post-fire *Leymus cinereus* stands form a matrix with those of *Artemisia tridentata* on steep north-facing slopes.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 10 to 40 percent. The tree layer is typically absent, and the shrub layer is sparse to open.

**Vegetation Floristics:** Characteristic herbs include *Bromus tectorum* and *Elymus cinereus*. This mixed alliance is primarily represented in the study area by *Elymus cinereus* (89% constancy), with fewer stands characterized by *Elymus triticoides* (16% constancy).

**Dynamics:** Most stands of this alliance were sampled in upland settings. Stands appear to have increased as a result of reduction of shrub cover and proliferation of the diagnostic grass species, following fires within the past decade.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G3    **State:** S3

### **References**

Buck-Diaz et al. 2012, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Hickson et al. 2008, Odion et al. 1992a

**Total Sample Size Used for Description:** N=19

### **Alliance Stand Table**

#### ***Elymus cinereus* – *Elymus triticoides* Alliance**

n =19

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Chrysothamnus viscidiflorus</i>	21	2.8	0.2	8
	<i>Ericameria nauseosa</i>	21	2.43	0.2	3.5
	<i>Symphoricarpos rotundifolius</i>	16	1.33	1	2
	<i>Ribes velutinum</i>	11	1.85	0.2	3.5
	<i>Tetradymia canescens</i>	11	1.25	1	1.5
<b>Herb</b>					
	<i>Bromus tectorum</i>	84	14.98	0.2	68

## Alliance Stand Table continued

### ***Elymus cinereus* – *Elymus triticoides* Alliance**

n =19

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Elymus cinereus</i>	79	11.1	3	24
<i>Elymus elymoides</i>	47	2.29	0.2	11
<i>Poa secunda</i>	47	1.93	0.2	6
<i>Achillea millefolium</i>	32	0.33	0.2	1
<i>Descurainia sophia</i>	32	4.7	0.2	17.5
<i>Sisymbrium altissimum</i>	32	2.07	0.2	7
<i>Iva axillaris</i>	26	0.52	0.2	1
<i>Lactuca serriola</i>	26	1.16	0.2	5
<i>Lupinus argenteus</i>	26	2.04	0.2	5
<i>Microsteris gracilis</i>	21	0.4	0.2	1
<i>Bromus carinatus</i>	16	5	2	8
<i>Collinsia parviflora</i>	16	0.2	0.2	0.2
<i>Collomia grandiflora</i>	16	0.2	0.2	0.2
<i>Elymus triticoides</i>	16	15.33	9	22
<i>Descurainia pinnata</i>	11	2.25	1	3.5
<i>Pseudoroegneria spicata</i>	11	1.6	0.2	3
<i>Paeonia brownii</i>	11	0.2	0.2	0.2
<i>Crepis acuminata</i>	11	0.6	0.2	1
<i>Draba verna</i>	11	0.2	0.2	0.2
<i>Festuca idahoensis</i>	11	0.6	0.2	1
<i>Gayophytum diffusum</i>	11	2.5	1	4
<i>Juncus arcticus</i>	11	0.2	0.2	0.2
<i>Lomatium</i>	11	0.2	0.2	0.2
<i>Taraxacum officinale</i>	11	0.6	0.2	1
<i>Wyethia angustifolia</i>	11	2.1	0.2	4
<i>Lomatium triternatum</i>	11	0.2	0.2	0.2
<i>Blepharipappus scaber</i>	11	2.1	0.2	4

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## ***Elymus cinereus* Provisional Association**

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**Common Name:** Great Basin wild rye

**NVC Association Code:** CEG001480, *Elymus cinereus* Bottomland Wet Meadow

**Alliance:** *Elymus cinereus* – *Elymus triticoides* Alliance

### **Association Concept**

The *Elymus cinereus* Provisional Association forms an open to intermittent herbaceous layer. The shrub layer is sparse. The alliance is found primarily at the bottom and on the lower third of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt and textures include fine silty clay, moderately fine silty clay loam, and medium to very fine, sandy loam. Elevations range from approximately 1241 to 2081 meters. The dominant herbs are *Bromus tectorum* and *Elymus cinereus*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Bromus tectorum* and an open layer of *Elymus cinereus*. The overall herbaceous cover ranges from 11 to 40 percent cover.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1560 m, Range 1241 – 2081 m

Aspect: NE (7), Flat (2), NW (2), SW (2), SE (1)

Slope: Mean 12.2 degrees, Range 0 – 65 degrees

Macro Topography: Lower 1/3 of slope (4), Bottom (3), Bottom to Lower 1/3 of slope (2), Low level (2), Middle 1/3 of slope (1), Basin floor (1), Not recorded (1)

Tree Cover: 0%

Shrub Cover: Mean 1.9%, Range 0 – 8%

Herb Cover: Mean 28.5%, Range 11 – 40%

Large Rock: Mean 0.5%, Range 0 – 1.2%

Small Rock: Mean 2.9%, Range 0 – 7%

Fines Cover: Mean 47.2%, Range 0.5 – 96%

Litter Cover: Mean 24.9%, Range 1 – 91%

Soil Texture (field assessed): Fine silty clay (3), Moderately fine silty clay loam (2), Medium to very fine, sandy loam (2), Moderately fine clay loam (1), Rock (1), Silt Loam (1), Loamy Sand (1), Fine clay (1), Moderately coarse, sandy loam (1)

Geology (map data): Basalt (3), Andesite (1), General volcanic extrusives (1)

**Environment:** Most *E. cinereus* stands occur in uplands often on northerly-facing slopes, sometimes among basalt boulders, and often associated with recent fires.



However, other stands are on lower slopes or gently-sloping bottomlands adjacent to moist meadows.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 11 to 40 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Bromus tectorum* and *Elymus cinereus*, and *Poa secunda* is often present. The shrub layer is emergent and sometimes includes *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, or *Symphoricarpos rotundifolius*.

**Dynamics:** *Bromus tectorum*, Many *Elymus cinereus* stands occupy former *Artemisia tridentata* ssp. *vaseyana* - *Symphoricarpos rotundifolius* stands. The high constancy of seral shrubs such as *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, and *Tetradymia canescens* suggest post-fire affinities.

**Species of Interest:** None.

### **Classification Comments**

This association is listed as provisional based on the limited geographic range sampled, and the, as yet unclear ecological relationships between stands with upland and bottomland settings.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G2G3 **State:** S2?

### **References**

Buck-Diaz et al. 2012, Buck-Diaz et al. 2011, Buck-Diaz et al. 2013, Hickson et al. 2008

**Total Sample Size Used for Description:** N=14

### **Association Stand Table**

#### ***Elymus cinereus* Provisional Association**

n =14

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Chrysothamnus viscidiflorus</i>	29	2.8	0.2	8
<i>Ericameria nauseosa</i>	29	2.43	0.2	3.5
<i>Symphoricarpos rotundifolius</i>	21	1.33	1	2
<i>Ribes velutinum</i>	14	1.85	0.2	3.5
<i>Tetradymia canescens</i>	14	1.25	1	1.5

## Association Stand Table continued

### ***Elymus cinereus* Provisional Association**

n =14

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Elymus cinereus</i>	100	11.68	4	24
<i>Bromus tectorum</i>	93	13.12	1	62.5
<i>Poa secunda</i>	50	2.31	0.2	6
<i>Elymus elymoides</i>	43	1.23	0.2	2
<i>Achillea millefolium</i>	43	0.33	0.2	1
<i>Sisymbrium altissimum</i>	36	2.44	0.2	7
<i>Descurainia sophia</i>	29	5.5	1	17.5
<i>Lupinus argenteus</i>	29	1.8	0.2	5
<i>Microsteris gracilis</i>	29	0.4	0.2	1
<i>Collinsia parviflora</i>	21	0.2	0.2	0.2
<i>Collomia grandiflora</i>	21	0.2	0.2	0.2
<i>Iva axillaris</i>	21	0.73	0.2	1
<i>Lomatium</i>	14	0.2	0.2	0.2
<i>Wyethia angustifolia</i>	14	2.1	0.2	4
<i>Taraxacum officinale</i>	14	0.6	0.2	1
<i>Pseudoroegneria spicata</i>	14	1.6	0.2	3
<i>Lomatium triternatum</i>	14	0.2	0.2	0.2
<i>Juncus arcticus</i>	14	0.2	0.2	0.2
<i>Festuca idahoensis</i>	14	0.6	0.2	1
<i>Draba verna</i>	14	0.2	0.2	0.2
<i>Crepis acuminata</i>	14	0.6	0.2	1
<i>Lactuca serriola</i>	14	0.2	0.2	0.2

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## ***Elymus triticoides* – *Poa secunda* Association**

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**Common Name:** Beardless wild rye – pine bluegrass

**NVC Association Code:** CEGJ001572, *Elymus triticoides* - *Poa secunda* Wet Meadow

**Alliance:** *Elymus cinereus* – *Elymus triticoides* Alliance

### **Association Concept**

The *Elymus triticoides* – *Poa secunda* Association forms an open herbaceous layer. The shrub layer is sparse. The alliance is found primarily in flat or low-gradient areas. Soils are derived from a variety of substrates and generally have a fine silty clay texture. Elevations range from approximately 1350 to 1720 meters. *Elymus triticoides* is the dominant herb, and *Lactuca serriola* is characteristic. Herbs that are often present include *Bromus tectorum*, *Descurainia sophia*, and *Iva axillaris*.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Elymus triticoides* with sparse *Lactuca serriola*. The overall herbaceous cover ranges from 15 to 19 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1597 m, Range 1350 – 1720 m

Aspect: Flat (2)

Slope: Mean 0.7 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (2)

Tree Cover: 0%

Shrub Cover: Mean 1.3%, Range 0 – 4%

Herb Cover: Mean 17%, Range 15 – 19%

Large Rock: 0%

Small Rock: 0%

Fines Cover: Mean 63.7%, Range 2 – 95%

Litter Cover: Mean 4%, Range 3 – 5%

Soil Texture (field assessed): Fine silty clay (2)

Geology (map data): None recorded

**Environment:** Stands occur at edges of meadows and in shallow seasonally moist swales with soil moisture conditions slightly drier than most *Juncus arcticus* Alliance stands.

## **Vegetation Description**

**Vegetation Structure:** The association forms an open herbaceous layer, and the overall herbaceous cover ranges from 15 to 19 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Elymus triticoides* is the dominant herb, and *Lactuca serriola* is characteristic. *Bromus tectorum*, *Descurainia sophia*, and *Iva axillaris* are often present.

**Species of Interest:** None.

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** SNR

## **References**

Odion et al. 1992a

**Total Sample Size Used for Description:** N=3

## **Association Stand Table**

### ***Elymus triticoides* – *Poa secunda* Association**

n =3

<b>Lifeform Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Shrub</b>				
<i>Artemisia cana</i>	33	4	4	4
<b>Herb</b>				
<i>Lactuca serriola</i>	100	1.8	0.2	5
<i>Elymus triticoides</i>	100	15.33	9	22
<i>Bromus tectorum</i>	67	34.1	0.2	68
<i>Descurainia sophia</i>	67	3.1	0.2	6
<i>Iva axillaris</i>	67	0.2	0.2	0.2
<i>Phlox stansburyi</i>	33	3	3	3
<i>Sisymbrium altissimum</i>	33	0.2	0.2	0.2
<i>Poa secunda</i>	33	0.2	0.2	0.2
<i>Elymus cinereus</i>	33	3	3	3
<i>Elymus elymoides</i>	33	11	11	11
<i>Descurainia pinnata</i>	33	1	1	1
<i>Rumex lacustris</i>	33	0.2	0.2	0.2
<i>Persicaria amphibia</i>	33	0.2	0.2	0.2

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## ***Elymus smithii* Stands**

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**Common Name:** Western wheat grass

**NVC Alliance Code:** None.

### **Alliance Concept**

*Elymus smithii* Stands form an open herbaceous layer. The shrub layer is sparse and the tree layer is absent. It is found primarily on the lower to middle thirds of southwest-facing slopes. Soils are derived from a variety of substrates but primarily basalt and textures include medium to very fine sandy loam. Elevation is approximately 1950 m. Characteristic herbs include *Chaenactis douglasii*, *Crepis acuminata*, *Elymus smithii*, *Hordeum brachyantherum*, *Lupinus argenteus*, *Poa bulbosa*, and *Poa secunda*. Commonly associated emergent shrubs at sparse cover include *Purshia tridentata*.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Elymus smithii*. The overall herbaceous cover is 13 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm)

## **Associations**

*Elymus smithii* Stands

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1950 m

Aspect: SW (1)

Slope: 6 degrees

Macro Topography: Lower to Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0.2%

Herb Cover: 13%

Large Rock: 1.2%

Small Rock: 39%

Fines Cover: 10%

Litter Cover: 49%

Soil Texture (field assessed): Medium to very fine, sandy loam (1)

Geology (map data): Basalt (1)

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover ranges is 13 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Characteristic herbs include *Chaenactis douglasii*, *Crepis acuminata*, *Elymus smithii*, *Hordeum brachyantherum*, *Lupinus argenteus*, *Poa bulbosa*, and *Poa secunda*. The shrub layer is emergent and typically or often includes *Purshia tridentata*.

**Dynamics:** *Elymus smithii* is a perennial rhizomatous grass. Locally it forms a patchy sod on mesic slopes and gentle concavities between 1500 and 1900 m. The sampled stand and the few other stands observed are within the footprint of the summer 2012 Rush Fire. Many of the associated species (e.g., *Chaenactis douglasii*, *Crepis acuminata*, *Hordeum brachyantherum*, *Lupinus argenteus*, *Poa bulbosa*, and *Poa secunda*) are widespread in the study area and range from mesophytic to xerophytic. On the slopes of Shinn Mountain, *E. smithii* is the most abundant perennial grass forming either small stands in openings between patches of *Ericameria nauseosus* or *Purshia tridentata*, or an understory beneath these young post-fire regenerating shrubs. It is unclear how long the *E. smithii* stands will persist following the 2012 fire.

**Species of Interest:** *Elymus smithii* is also known as *Pascopyrum smithii* and *Elytrigia smithii* and is common through the Northern Great Basin east to the Northern Plains but is not widely collected in California. This taxon is thought to be of hybrid origin from *Elymus triticoides* and *E. lanceolata*. The local populations have variable glume lengths.

### **Classification Comments**

Only one stand of this type was sampled for this project and, in general, is not well sampled in California. For this reason, we will not accept this as an alliance or association until more sampling and analysis is done.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** GNR    **State:** SNR

### **References**

None.

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Elymus smithii* Stands**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Purshia tridentata</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Elymus smithii</i>	100	3	3	3
	<i>Hordeum brachyantherum</i>	100	2	2	2
	<i>Lupinus argenteus</i>	100	2	2	2
	<i>Poa bulbosa</i>	100	2	2	2
	<i>Poa secunda</i>	100	4	4	4
	<i>Crepis acuminata</i>	100	0.2	0.2	0.2
	<i>Chaenactis douglasii</i>	100	0.2	0.2	0.2



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***Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda*  
Alliance**

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**Common Name:** Idaho fescue – bluebunch wheat grass – pine bluegrass grassland Alliance

**NVC Alliance Code:** A3987. *Festuca idahoensis* - *Pseudoroegneria spicata* - *Poa secunda* Dry Grassland Alliance

**Alliance Concept**

The *Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda* Alliance forms an open to continuous herbaceous layer. The shrub layer is open and the tree layer is sparse. It is found primarily on slopes and ridges at all aspects. Soils are derived from a variety of substrates but primarily basalt or andesite and textures are widely variable. Elevation range is approximately 1077 – 2382 m. Characteristic herbs include *Pseudoroegneria spicata*, *Festuca idahoensis*, and *Poa secunda*. Those often present are *Elymus elymoides* and *Bromus tectorum*.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous herbaceous layer of *Poa secunda*, *Festuca idahoensis*, and/or *Pseudoroegneria spicata*



and may have significant cover of non-native grasses such as *Bromus tectorum*. The overall herbaceous cover ranges from 5 to 90 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Fall River Valley (M261Gp), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg)

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

*Festuca idahoensis* – *Pseudoroegneria spicata* Association

*Pseudoroegneria spicata* – *Poa secunda* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1633 m, Range 1077 – 2382 m

Aspect: NE (19), SW (16), NW (10), SE (9), Flat (3), Variable (1)

Slope: Mean 7 degrees, Range 0 – 35 degrees

Macro Topography: Middle 1/3 of slope (12), Lower 1/3 of slope (12), Upper 1/3 of slope (9), Other (7), Ridge top (6), Bottom (3), Interfluvium/Summit (3), Lower to Middle 1/3 of slope (2), Upper 1/3 of slope to Ridgetop (2), Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Tree Cover: Mean 0% Range 0 – 3%

Shrub Cover: Mean 1.6%, Range 0– 24%

Herb Cover: Mean 28.6%, Range 5– 90%

Large Rock: Mean 11.9%, Range 0 – 67%

Small Rock: Mean 31.7%, Range 0 – 99%

Fines Cover: Mean 21.5%, Range 0 – 96%

Litter Cover: Mean 15.4%, Range 0 – 89%

Soil Texture (field assessed): Moderately fine sandy clay loam (10), Fine clay (6), Moderately fine clay loam (3), Medium silt loam (3), Sandy Loam (3), Fine silty clay (3), Loamy Sand (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (2), Medium loam (2), Fine sandy clay (2), Silt Loam (1), Moderately fine silty clay loam (1), Medium sand (1), Coarse sand (1), Medium silt (1)

Geology (map data): Basalt (12), Andesite (11), General volcanic extrusives (8), Igneous (type unknown) (1)

**Environment:** Stands of this alliance occur on slopes of the Warner, Skedaddle, and other ranges in the central and eastern subsections of the Modoc Plateau (CNDDB 2008). They generally occupy rocky uplands and may be recently burned slopes, associated with *Artemisia* species or open *Juniperus occidentalis* and *Pinus jeffreyi* woodlands.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 5 to 90 percent. The emergent tree layer is typically sparse, and the shrub layer is sparse to open.

**Vegetation Floristics:** Characteristic herbs include *Pseudoroegneria spicata*, *Festuca idahoensis*, and *Poa secunda* and *Poa secunda*. Those often present are *Elymus elymoides* and *Bromus tectorum*.

**Species of Interest:** *Lomatium canbyi*

### **Classification Comments**

This is the most common native, upland, grassland in this region and can be highly variable in non-native grass cover and in general species composition/richness depending on disturbances.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S3

### **References**

CNDDB 2008, CVIS (California Vegetation Information System) 1995

**Total Sample Size Used for Description:** N=137

### **Alliance Stand Table**

#### ***Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda* Alliance**

n =137

Lifeform Botanical Name	Con	Avg	Min	Max
Shrub				
<i>Artemisia arbuscula</i>	16	2.3	0.2	19
<i>Ericameria nauseosa</i>	15	1.72	0.2	4
<i>Purshia tridentata</i>	12	1.09	0.2	3
<i>Artemisia tridentata</i>	10	1.67	0.2	4

**Alliance Stand Table continued**

***Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda*  
Alliance**

n =137

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Bromus tectorum</i>	89	18.3	0.2	78
	<i>Poa secunda</i>	85	6.28	0.2	27
	<i>Elymus elymoides</i>	63	3.05	0.2	17
	<i>Pseudoroegneria spicata</i>	58	8.98	0.2	43
	<i>Blepharipappus scaber</i>	34	3.16	0.2	16
	<i>Epilobium brachycarpum</i>	32	5.63	0.2	27
	<i>Achnatherum thurberianum</i>	28	1.61	0.2	9
	<i>Elymus caput-medusae</i>	28	9.67	0.2	52
	<i>Sisymbrium altissimum</i>	27	4.28	0.2	31
	<i>Lomatium</i>	23	3.45	0.2	20
	<i>Bromus arvensis</i>	23	6.36	0.2	39
	<i>Phlox longifolia</i>	21	1.69	1	6
	<i>Balsamorhiza hookeri</i>	19	3.93	0.2	20
	<i>Bromus briziformis</i>	19	1.65	0.2	6
	<i>Crepis</i>	19	1.48	0.2	7
	<i>Festuca idahoensis</i>	18	6.15	0.2	20
	<i>Microsteris gracilis</i>	17	0.85	0.2	4
	<i>Lupinus</i>	15	1.91	0.2	7
	<i>Eriophyllum lanatum</i>	15	1.22	0.2	8
	<i>Lactuca serriola</i>	15	1.11	0.2	6
	<i>Amsinckia</i>	14	3.21	1	11
	<i>Poa bulbosa</i>	13	4.67	0.2	49
	<i>Tragopogon dubius</i>	12	0.65	0.2	3
	<i>Erodium cicutarium</i>	12	4.62	0.2	29
	<i>Crepis acuminata</i>	12	1	0.2	3
	<i>Pleiacanthus spinosus</i>	12	1.4	0.2	5
	<i>Mentzelia albicaulis</i>	11	3	1	9

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## ***Festuca idahoensis* – *Pseudoroegneria spicata* Association**

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**Common Name:** Idaho fescue – bluebunch wheat grass

**NVC Association Code:** CEG001624, *Festuca idahoensis* - *Pseudoroegneria spicata* Grassland

**Alliance:** *Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda* Alliance

### **Association Concept**

The *Festuca idahoensis* – *Pseudoroegneria spicata* Association forms an open to intermittent herbaceous layer. The shrub and tree layers are sparse. The alliance is found primarily on northeast- or southwest-facing upper slopes or ridgetops. Soils are derived from a variety of substrates but primarily andesite and basalt and have a moderately coarse, sandy loam texture. Elevations range from approximately 1375 to 2216 meters. *Festuca idahoensis*, *Bromus tectorum*, and *Elymus elymoides*, are characteristic herbs, *Crepis acuminata*, *Epilobium brachycarpum*, and *Pseudoroegneria spicata* are often present. Commonly associated emergent shrubs at sparse cover include *Purshia tridentata*.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Festuca idahoensis* and *Elymus elymoides* with open to intermittent cover of *Bromus tectorum*. The overall herbaceous cover ranges from 24 to 50 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1674 m, Range 1375 – 2216 m

Aspect: NE (1), SW (1)

Slope: Mean 6.5 degrees, Range 0 – 15 degrees

Macro Topography: Ridge top (1), Upper 1/3 of slope (1)

Tree Cover: Mean 0.5%, Range 0 – 3%

Shrub Cover: Mean 1.7%, Range 0 – 3%

Herb Cover: Mean 37%, Range 24 – 50%

Large Rock: Mean 15.4%, Range 2.2 – 29%

Small Rock: Mean 31.6%, Range 15 – 45%

Fines Cover: Mean 14.8%, Range 0 – 64%

Litter Cover: Mean 7.5%, Range 5 – 10%

Soil Texture (field assessed): Moderately coarse, sandy loam (1)

Geology (map data): Andesite (1), Basalt (1)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 24 to 50 percent. The emergent tree and shrub layers are sparse.

**Vegetation Floristics:** Characteristic herbs include *Festuca idahoensis*, *Bromus tectorum*, and *Elymus elymoides*, and. Those often present are *Crepis acuminata*, *Epilobium brachycarpum*, and *Pseudoroegneria spicata*. The shrub layer is emergent and typically or often includes *Purshia tridentata*.

**Dynamics:** *Bromus tectorum*, *Elymus elymoides*, are indicative of recent fire or other disturbance. *Festuca idahoensis* is less tolerant of fire compared to *Poa secunda* and/or *Pseudoroegneria spicata*.

**Species of Interest:** *Lomatium canbyi*

## **Classification Comments**

None.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR    **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=6

## **Association Stand Table**

### ***Festuca idahoensis* – *Pseudoroegneria spicata* Association**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Tree				
<i>Juniperus occidentalis</i>	17	3	3	3
Shrub				
<i>Purshia tridentata</i>	67	1.25	1	2
<i>Chrysothamnus viscidiflorus</i>	33	1.5	1	2
<i>Artemisia arbuscula</i>	17	0.2	0.2	0.2
<i>Artemisia nova</i>	17	1	1	1
<i>Ericameria nauseosa</i>	17	1	1	1
<i>Symphoricarpos rotundifolius</i>	17	0.2	0.2	0.2
<i>Tetradymia canescens</i>	17	0.2	0.2	0.2

## Association Stand Table continued

### ***Festuca idahoensis* – *Pseudoroegneria spicata* Association**

n =6

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Festuca idahoensis</i>	100	14.33	7	20
<i>Bromus tectorum</i>	83	29.6	1	49
<i>Elymus elymoides</i>	83	4.8	1	13
<i>Crepis acuminata</i>	67	1.25	1	2
<i>Epilobium brachycarpum</i>	67	12	3	21
<i>Pseudoroegneria spicata</i>	67	10.25	1	18
<i>Achnatherum thurberianum</i>	50	1	1	1
<i>Bromus briziformis</i>	50	3	1	5
<i>Lomatium</i>	50	1.67	1	3
<i>Poa secunda</i>	33	5.1	0.2	10
<i>Bromus arvensis</i>	33	10	1	19
<i>Sisymbrium altissimum</i>	33	1	1	1
<i>Blepharipappus scaber</i>	33	2	1	3
<i>Eriophyllum lanatum</i>	33	1.5	1	2
<i>Microsteris gracilis</i>	33	1	1	1
<i>Lomatium canbyi</i>	17	1	1	1
<i>Lomatium triternatum</i>	17	1	1	1
<i>Lupinus arbustus</i>	17	1	1	1
<i>Lupinus argenteus</i>	17	2	2	2
<i>Penstemon speciosus</i>	17	1	1	1
<i>Phacelia heterophylla</i>	17	0.2	0.2	0.2
<i>Phlox hoodii</i>	17	3	3	3
<i>Phlox longifolia</i>	17	3	3	3
<i>Pleiocanthus spinosus</i>	17	1	1	1
<i>Lithophragma parviflorum</i>	17	1	1	1
<i>Poa bulbosa</i>	17	5	5	5
<i>Silene douglasii</i>	17	0.2	0.2	0.2
<i>Stephanomeria</i>	17	0.2	0.2	0.2
<i>Taeniatherum caput-medusae</i>	17	1	1	1
<i>Thinopyrum intermedium</i>	17	7	7	7
<i>Tragopogon dubius</i>	17	0.2	0.2	0.2
<i>Astragalus whitneyi</i>	17	0.2	0.2	0.2
<i>Trifolium macrocephalum</i>	17	1	1	1
<i>Bromus carinatus</i>	17	1	1	1
<i>Agropyron cristatum</i>	17	21	21	21
<i>Alyssum desertorum</i>	17	2	2	2

**Association Stand Table continued**

***Festuca idahoensis* – *Pseudoroegneria spicata* Association**

n =6

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Antennaria dimorpha</i>	17	3	3	3
<i>Antennaria rosea</i>	17	0.2	0.2	0.2
<i>Arabis sparsiflora</i>	17	0.2	0.2	0.2
<i>Balsamorhiza sagittata</i>	17	1	1	1
<i>Balsamorhiza hookeri</i>	17	6	6	6
<i>Linanthus pungens</i>	17	2	2	2
<i>Collinsia parviflora</i>	17	1	1	1
<i>Crepis</i>	17	0.4	0.4	0.4
<i>Crepis bakeri</i>	17	1	1	1
<i>Crepis occidentalis</i>	17	1	1	1
<i>Draba verna</i>	17	1	1	1
<i>Erigeron filifolius</i>	17	0.2	0.2	0.2
<i>Eriogonum ovalifolium</i>	17	1	1	1
<i>Eriogonum strictum</i>	17	0.2	0.2	0.2
<i>Astragalus purshii</i>	17	1	1	1

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## ***Pseudoroegneria spicata* – *Poa secunda* Association**

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**Common Name:** Bluebunch Wheatgrass - Sandberg Bluegrass

**NVC Association Code:** CEG001677, *Pseudoroegneria spicata* - *Poa secunda* Grassland

**Alliance:** *Festuca idahoensis* – *Pseudoroegneria spicata* – *Poa secunda* Alliance

### **Association Concept**

The *Pseudoroegneria spicata* – *Poa secunda* Association forms an open to continuous herbaceous layer. The shrub layer is sparse to intermittent and the tree layer is sparse. The alliance is found primarily on slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt or andesite and textures are variable but moderately fine sandy clay loam and fine clay are most common. Elevations range from approximately 1077 to 2382 meters. *Bromus tectorum* and *Poa secunda* are characteristic herbs, *Elymus elymoides* and *Pseudoroegneria spicata* are often present.

**Diagnostic Criteria:** This association is characterized by an herbaceous layer with sparse to continuous cover of *Bromus tectorum* and sparse to open cover of *Poa secunda*. The overall herbaceous cover ranges from 5 to 90 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1633 m, Range 1077 – 2382 m

Aspect: NE (18), SW (15), NW (10), SE (9), Flat (3), Variable (1)

Slope: Mean 7.2 degrees, Range 0 – 35 degrees

Macro Topography: Middle 1/3 of slope (11), Lower 1/3 of slope (9), Other (7), Upper 1/3 of slope (7), Ridge top (4), Interfluvium/Summit (3), Bottom (3), Upper 1/3 of slope to Ridgetop (2), Toeslope (2), Lower to Middle 1/3 of slope (2), Midslope (1), Ridge summit, crest (1), Lowslope (1), High slope (1), Bottom to Lower 1/3 of slope (1), Middle to Upper 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 1.6%, Range 0 – 24%

Herb Cover: Mean 28.2%, Range 5 – 90%

Large Rock: Mean 11.8%, Range 0 – 67%

Small Rock: Mean 31.3%, Range 0 – 99%

Fines Cover: Mean 21.8%, Range 0 – 96%

Litter Cover: Mean 15.7%, Range 0 – 89%

Soil Texture (field assessed): Moderately fine sandy clay loam (10), Fine clay (6), Fine silty clay (3), Sandy Loam (3), Moderately fine clay loam (3), Medium silt loam



(3), Medium to very fine, sandy loam (2), Medium loam (2), Fine sandy clay (2), Loamy Sand (2), Not recorded (1), Moderately fine silty clay loam (1), Silt Loam (1), Medium silt (1), Medium sand (1), Moderately coarse, sandy loam (1), Coarse sand (1)

Geology (map data): Basalt (11), Andesite (10), General volcanic extrusives (8), Igneous (type unknown) (1), Not recorded (1)

**Environment:** The *Pseudoroegneria spicata* – *Poa secunda* association is the most widespread native grassland type in the study area. It is more commonly distributed on the warmer rocky exposures of the southeastern portion. Following the 2012 Rush fire, this association replaced drier *Artemisia tridentata* stands across thousands of acres of the Skedaddle Mountains and adjacent uplands.

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 5 to 90 percent. The tree layer is typically absent, and the shrub layer is sparse to open.

**Vegetation Floristics:** Characteristic herbs include *Bromus tectorum* and *Poa secunda*. Those often present are *Elymus elymoides* and *Pseudoroegneria spicata*.

**Dynamics:** *Poa secunda* is shorter and shorter lived than *Pseudoroegneria spicata*. Long intervals between fire can initiate shrub colonization. This association is dryer than the *Festuca idahoensis* – *Pseudoroegneria spicata* association and tends to occur at lower elevations with higher summer temperatures.

**Species of Interest:** *Lomatium canbyi*, *Penstemon cinicola*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S2

### **References**

CVIS (California Vegetation Information System) 1995

**Total Sample Size Used for Description:** N=128

## Association Stand Table

### ***Pseudoroegneria spicata* – *Poa secunda* Association**

n =128

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Artemisia arbuscula</i>	16	2.4	0.2	19
	<i>Ericameria nauseosa</i>	15	1.76	0.2	4
	<i>Artemisia tridentata</i>	11	1.67	0.2	4
	<i>Purshia tridentata</i>	10	1.05	0.2	3
<b>Herb</b>					
	<i>Bromus tectorum</i>	89	17.78	0.2	78
	<i>Poa secunda</i>	89	6.3	0.2	27
	<i>Elymus elymoides</i>	63	2.94	0.2	17
	<i>Pseudoroegneria spicata</i>	59	8.91	0.2	43
	<i>Blepharipappus scaber</i>	33	3.22	0.2	16
	<i>Epilobium brachycarpum</i>	30	4.62	0.2	27
	<i>Taeniatherum caput-medusae</i>	28	10.16	0.2	52
	<i>Achnatherum thurberianum</i>	27	1.67	0.2	9
	<i>Sisymbrium altissimum</i>	27	4.46	0.2	31
	<i>Bromus arvensis</i>	21	6.08	0.2	39
	<i>Phlox longifolia</i>	21	1.59	1	6
	<i>Lomatium</i>	21	2.68	0.2	11
	<i>Balsamorhiza hookeri</i>	20	3.85	0.2	20
	<i>Crepis</i>	20	1.52	0.2	7
	<i>Bromus briziformis</i>	18	1.48	0.2	6
	<i>Lupinus</i>	16	1.91	0.2	7
	<i>Microsteris gracilis</i>	16	0.84	0.2	4
	<i>Lactuca serriola</i>	15	1.12	0.2	6
	<i>Eriophyllum lanatum</i>	14	1.19	0.2	8
	<i>Festuca idahoensis</i>	14	3.42	0.2	17.5
	<i>Amsinckia</i>	14	3.33	1	11
	<i>Erodium cicutarium</i>	13	4.62	0.2	29
	<i>Poa bulbosa</i>	13	4.65	0.2	49
	<i>Tragopogon dubius</i>	13	0.68	0.2	3
	<i>Mentzelia albicaulis</i>	11	3.14	1	9
	<i>Pleiacanthus spinosus</i>	11	1.46	0.2	5

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## ***Lolium perenne* Alliance**

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**Common Name:** Perennial rye grass fields Alliance

**NVC Alliance Code:** A3871. *Lolium perenne* Ruderal Grassland Alliance

### **Alliance Concept**

The *Lolium perenne* Alliance forms a continuous herbaceous layer. It is found primarily in flat areas on the lower portions of slopes. Soils are derived from a variety of substrates but primarily basalt and textures include moderately fine silty clay loam. Elevation is approximately 1326 m. *Lotus corniculatus* is the dominant herb, and characteristic herbs include *Achillea millefolium*, *Carex nebrascensis*, *Cirsium cymosum*, *Juncus arcticus*, *Lotus unifoliolatus*, *Lupinus*, *Phleum pratense*, *Poa secunda*, *Potentilla gracilis*, *Ranunculus occidentalis*, and *Verbascum thapsus*.

**Diagnostic Criteria:** This alliance is characterized by a continuous herbaceous layer of *Lotus corniculatus*. The overall herbaceous cover is 75 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Mountain (M261Gi)

## **Associations**

*Festuca perennis* – *Lotus corniculatus* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1326 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 75%

Large Rock: 0%

Small Rock: 0.2%

Fines Cover: 97%

Litter Cover: 1%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (map data): Basalt (1)

**Environment:** Generally, this type occurs in seasonally moist to wet environments that are regularly disturbed through grazing, fire, flooding, or mechanical means.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms a continuous herbaceous layer, and the overall herbaceous cover is 75 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** Dominant herbs include *Lotus corniculatus*, and characteristic herbs include *Achillea millefolium*, *Carex nebrascensis*, *Cirsium cymosum*, *Juncus arcticus*, *Lotus unifoliolatus*, *Lupinus*, *Phleum pratense*, *Poa secunda*, *Potentilla gracilis*, *Ranunculus occidentalis*, and *Verbascum thapsus*.

**Species of Interest:** None.

## **Classification Comments**

Stands of this alliance should have *Lolium perenne* as a strong dominant alone or with other non-natives, largely to the exclusion of native plants to be included in this type. Only one stand of this type was sampled for this project, but it is a well described alliance in California.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNA    **State:** SNA

## **References**

Keeler-Wolf and Vaghti 2000, Pickart 2006

**Total Sample Size Used for Description:** N=1

## **Alliance Stand Table**

### **Festuca perennis Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Phleum pratense</i>	100	0.2	0.2	0.2
<i>Verbascum thapsus</i>	100	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	100	0.2	0.2	0.2
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Potentilla gracilis</i>	100	0.2	0.2	0.2
<i>Poa secunda</i>	100	1	1	1
<i>Lupinus</i>	100	0.2	0.2	0.2
<i>Lotus unifoliolatus</i>	100	0.2	0.2	0.2
<i>Lotus corniculatus</i>	100	20	20	20
<i>Juncus arcticus</i>	100	0.2	0.2	0.2
<i>Carex nebrascensis</i>	100	1	1	1
<i>Cirsium cymosum</i>	100	0.2	0.2	0.2

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## ***Lolium perenne* – *Lotus corniculatus* Association**

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**Common Name:** Perennial rye grass – bird's foot trefoil

**NVC Association Code:** None.

**Alliance:** *Lolium perenne* Alliance

### **Association Concept**

The *Lolium perenne* – *Lotus corniculatus* Association forms a continuous herbaceous layer. The alliance is found primarily in flat areas on the lower third of slopes. Soils are derived from a variety of substrates but primarily basalt and have a moderately fine silty clay loam texture. Elevation is approximately 1326 meters. *Lotus corniculatus* is the dominant herb and *Achillea millefolium*, *Carex nebrascensis*, *Cirsium cymosum*, *Juncus arcticus*, *Lotus unifoliolatus*, *Lupinus*, *Phleum pratense*, *Poa secunda*, *Potentilla gracilis*, *Ranunculus occidentalis*, and *Verbascum thapsus* are characteristic.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Lotus corniculatus* with sparse cover of *Achillea millefolium*, *Carex nebrascensis*, *Cirsium cymosum*, *Juncus arcticus*, *Lotus unifoliolatus*, *Lupinus*, *Phleum pratense*, *Poa secunda*, *Potentilla gracilis*, *Ranunculus occidentalis*, and *Verbascum thapsus*. The overall herbaceous cover is 75 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1326 m

Aspect: Flat (1)

Slope: 0 degrees

Macro Topography: Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 75%

Large Rock: 0%

Small Rock: 0.2%

Fines Cover: 97%

Litter Cover: 1%

Soil Texture (field assessed): Moderately fine silty clay loam (1)

Geology (map data): Basalt (1)

**Environment:** Moist meadows with a history of livestock grazing. Both *Lolium perenne* and *Lotus corniculatus* are tolerant of heavy grazing.

### **Vegetation Description**

**Vegetation Structure:** The association forms a continuous herbaceous layer, and the overall herbaceous cover is 75 percent. The tree and shrub layers are typically absent

**Vegetation Floristics:** *Lotus corniculatus* is the dominant herb and *Achillea millefolium*, *Carex nebrascensis*, *Cirsium cymosum*, *Juncus arcticus*, *Lotus unifoliolatus*, *Lupinus*, *Phleum pratense*, *Poa secunda*, *Potentilla gracilis*, *Ranunculus occidentalis*, and *Verbascum thapsus* are characteristic.

**Species of Interest:** None.

### **Classification Comments**

Only one stand of this type was sampled for this project and is generally under sampled throughout its range.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** GNA    **State:** SNA

### **References**

Keeler-Wolf and Vaghti 2000, Pickart 2006

**Total Sample Size Used for Description:** N=1

### **Association Stand Table**

#### ***Lolium perenne* – *Lotus corniculatus* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Juncus arcticus</i>	100	0.2	0.2	0.2
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Lotus unifoliolatus</i>	100	0.2	0.2	0.2
<i>Cirsium cymosum</i>	100	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	100	0.2	0.2	0.2
<i>Lupinus</i>	100	0.2	0.2	0.2
<i>Lotus corniculatus</i>	100	20	20	20
<i>Phleum pratense</i>	100	0.2	0.2	0.2
<i>Verbascum thapsus</i>	100	0.2	0.2	0.2
<i>Poa secunda</i>	100	1	1	1
<i>Potentilla gracilis</i>	100	0.2	0.2	0.2
<i>Carex nebrascensis</i>	100	1	1	1



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## ***Lotus unifoliolatus* Provisional Alliance**

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**Common Name:** Spanish clover fields Alliance

**NVC Alliance Code:** A3850. *Bidens cernua* - *Euthamia occidentalis* - *Ludwigia palustris* Intertidal Mudflat Alliance

### **Alliance Concept**

The *Lotus unifoliolatus* Provisional Alliance forms an open to intermittent herbaceous layer. The shrub layer is sparse and the trees are generally not present. It is found primarily at the bottom or lower portions of south-facing slopes. Soils are derived from extrusive volcanics and are generally fine-textured clays or clay loams. Elevation range is approximately 1457 – 1714 m. Dominant herbs include *Lotus unifoliolatus*, and characteristic herbs include *Bromus arvensis*, *Epilobium brachycarpum*, *Elymus caput-medusae*, and *Ventenata dubia*. Those often present are *Navarretia* spp. and *Poa bulbosa*.



**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Lotus unifoliolatus*, *Bromus arvensis*, *Epilobium brachycarpum*, *Elymus caput-medusae*, and *Ventenata dubia*. The overall herbaceous cover ranges from 12 to 62 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1608 m, Range 1457 – 1714 m

Aspect: SW (2), Flat (1), SE (1)

Slope: Mean 1 degrees, Range 0 – 2 degrees

Macro Topography: Bottom to Lower 1/3 of slope (4)

Tree Cover: Mean 0%

Shrub Cover: Mean 0.1%, Range 0 – 0.2%

Herb Cover: Mean 34.3%, Range 12 – 62%

Large Rock: Mean 0.8%, Range 0.2 – 1%

Small Rock: Mean 13.9%, Range 0.4 – 35%

Fines Cover: Mean 49.8%, Range 10 – 94%

Litter Cover: Mean 34.3%, Range 4 – 75%

Soil Texture (field assessed): Moderately fine clay loam (1), Moderately fine sandy clay loam (1), Fine clay (1), Clay, (class unknown) (1)

Geology (map data): General volcanic extrusives (2), Basalt (1), Igneous (type unknown) (1)

**Environment:** Stands of this alliance occur on seasonally to intermittently flooded alluvial flats and stream terraces.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 12 to 62 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Lotus unifoliolatus*, and characteristic herbs include *Bromus arvensis*, *Epilobium brachycarpum*, *Elymus caput-medusae*, and *Ventenata dubia*. Those often present are *Navarretia* spp. and *Poa bulbosa*. The shrub layer is sparse and may include *Artemisia arbuscula*.

**Dynamics:** Stands of this type are strongly dominated by *Lotus unifoliolatus* and have no other diagnostic species. These stands may have low species diversity and have likely experienced disturbance.

**Species of Interest:** None

### **Classification Comments**

It is unclear if this alliance should be merged with the *Bidens cernua* - *Euthamia occidentalis* - *Ludwigia palustris* alliance; more sampling and analysis are needed in moist to wet habitats to fully elucidate relationships.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** G4? **State:** S4?

### **References**

None.

**Total Sample Size Used for Description:** N=4

### **Alliance Stand Table**

#### ***Lotus unifoliolatus* Provisional Alliance**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>				
<i>Artemisia arbuscula</i>	25	0.2	0.2	0.2
<i>Artemisia</i>	25	0.2	0.2	0.2
<b>Herb</b>				
<i>Lotus unifoliolatus</i>	100	13.75	3	32
<i>Epilobium brachycarpum</i>	75	0.2	0.2	0.2
<i>Elymus caput-medusae</i>	75	1.13	0.2	3
<i>Bromus arvensis</i>	75	3.07	0.2	7
<i>Ventenata dubia</i>	75	6.4	0.2	12
<i>Navarretia</i>	50	0.6	0.2	1
<i>Poa bulbosa</i>	50	7	7	7
<i>Lagophylla ramosissima</i>	25	1	1	1
<i>Lactuca</i>	25	0.2	0.2	0.2
<i>Juncus bufonius</i>	25	0.2	0.2	0.2
<i>Poa secunda</i>	25	6	6	6
<i>Juncus arcticus</i>	25	1	1	1
<i>Navarretia leucocephala</i>	25	0.2	0.2	0.2

## Alliance Stand Table continued

### **Lotus unifoliolatus Provisional Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Lomatium nudicaule</i>	25	0.2	0.2	0.2
	<i>Madia glomerata</i>	25	2	2	2
	<i>Madia gracilis</i>	25	0.2	0.2	0.2
	<i>Juncus</i>	25	0.2	0.2	0.2
	<i>Microseris laciniata</i>	25	0.2	0.2	0.2
	<i>Navarretia intertexta</i>	25	6	6	6
	<i>Triteleia hyacinthina</i>	25	0.2	0.2	0.2
	<i>Penstemon roezlii</i>	25	0.2	0.2	0.2
	<i>Penstemon rydbergii</i>	25	0.2	0.2	0.2
	<i>Poa pratensis</i>	25	0.2	0.2	0.2
	<i>Gnaphalium palustre</i>	25	0.2	0.2	0.2
	<i>Polygonum</i>	25	0.2	0.2	0.2
	<i>Polygonum aviculare</i>	25	0.2	0.2	0.2
	<i>Polygonum douglasii</i>	25	0.2	0.2	0.2
	<i>Polygonum majus</i>	25	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	25	0.2	0.2	0.2
	<i>Rumex crispus</i>	25	0.2	0.2	0.2
	<i>Perideridia bolanderi</i>	25	0.2	0.2	0.2
	<i>Danthonia unispicata</i>	25	1	1	1
	<i>Achillea millefolium</i>	25	1	1	1
	<i>Agoseris heterophylla</i>	25	0.2	0.2	0.2
	<i>Bromus tectorum</i>	25	0.2	0.2	0.2
	<i>Camissonia tanacetifolia</i>	25	0.2	0.2	0.2
	<i>Castilleja</i>	25	0.2	0.2	0.2
	<i>Trifolium</i>	25	0.4	0.4	0.4
	<i>Castilleja lacera</i>	25	1	1	1
	<i>Hordeum marinum</i>	25	0.2	0.2	0.2
	<i>Dichelostemma multiflorum</i>	25	0.2	0.2	0.2
	<i>Distichlis spicata</i>	25	0.2	0.2	0.2
	<i>Hordeum brachyantherum</i>	25	0.2	0.2	0.2
	<i>Castilleja campestris</i>	25	0.2	0.2	0.2
	<i>Trifolium cyathiferum</i>	25	20	20	20
	<i>Eryngium</i>	25	0.2	0.2	0.2
	<i>Erigeron philadelphicus</i>	25	0.2	0.2	0.2
	<i>Epilobium minutum</i>	25	0.2	0.2	0.2

**Alliance Stand Table** continued

***Lotus unifoliolatus* Provisional Alliance**

n =4

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Eleocharis palustris</i>	25	4	4	4
<i>Eleocharis</i>	25	0.2	0.2	0.2
<i>Tragopogon dubius</i>	25	0.2	0.2	0.2

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

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**Common Name:** Baltic and Mexican rush marshes Alliance

**NVC Alliance Code:** A1374. *Juncus arcticus* ssp. *littoralis* - *Juncus mexicanus* Wet Meadow Alliance

### **Alliance Concept**

The *Juncus arcticus* (var. *balticus*, *mexicanus*) Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse and the tree layer is absent. It is found primarily in flat areas to lower slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt and textures are variable but most commonly include silty or sandy fine clay, medium silt, and muck. Elevation range is approximately 1339 – 1980 m. *Juncus arcticus* is the dominant herb.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Juncus arcticus*. The overall herbaceous cover ranges from 12 to 80 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Bald Mountain - Dixie Valley (M261Gj), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Horsehead Mountain (M261Gk), Likely Mountain (M261Gi), Likely Tableland (M261Gh)

### **Associations**

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

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1571 m, Range 1339 – 1980 m

Aspect: NE (12), Flat (6), SW (5), NW (4), SE (2)

Slope: Mean 1.5 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (18), Bottom to Lower 1/3 of slope (7), Middle 1/3 of slope (2), Lower 1/3 of slope (1), Upper 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 1%

Herb Cover: Mean 41%, Range 12 – 80%

Large Rock: Mean 0.5%, Range 0 – 6%

Small Rock: Mean 3.5%, Range 0 – 33%

Fines Cover: Mean 46.8%, Range 0 – 97%

Litter Cover: Mean 32.4%, Range 0 – 96%

Soil Texture (field assessed): Fine silty clay (4), Medium silt (3), Muck (3), Fine clay (3), Fine sandy clay (3), Peat (2), Moderately fine sandy clay loam (2), Moderately fine clay loam (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (1), Moderately fine silty clay loam (1), Medium silt loam (1), Medium loam (1)

Geology (map data): Basalt (9), Silty alluvium (3), General volcanic extrusives (3), Igneous (type unknown) (2), Clayey alluvium (1), Mixed alluvium (1)

**Environment:** Moist to drier portions of meadows and riparian systems throughout the Modoc and NW Basin and Range ecoregions.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 12 to 80 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Juncus arcticus*.

**Dynamics:** *Juncus arcticus* (including *J. balticus* var *balticus* and *J. balticus* var *mexicanus*) is a common wetland indicator throughout much of North America. Stands are composed of interconnected rhizomes, forming a wirey turf which may be intermixed with a number of other wetland species. Stands are tolerant of moderately heavy grazing and withstand fluctuations in moisture from season to season, and from year to year. Stands often form the margins around edges of wet meadows and can spread into the meadow center with drying conditions. Rhizomes are heavy and tough and die back in drier years, or with dewatering of meadow, but expand rapidly under moister conditions.

**Species of Interest:** *Melica spectabilis*, *Senecio hydrophiloides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5 **State:** S4

### **References**

Buck-Diaz et al. 2012, Evens and San 2005, Evens et al. 2006, Evens et al. 2014, Keeler-Wolf et al. 2003b, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Manning and Padgett 1995, Menke et al. 2019, Rodriguez et al. 2017, Smith 1998b, Taylor 1984, Weixelman et al. 1999

**Total Sample Size Used for Description:** N=29

### **Alliance Stand Table**

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

n =29

Lifeform Botanical Name Herb	Con	Avg	Min	Max
<i>Juncus arcticus</i>	97	16.11	2	34
<i>Carex</i>	31	2.96	0.2	11
<i>Poa pratensis</i>	31	6.36	0.2	17
<i>Achillea millefolium</i>	28	0.65	0.2	3
<i>Navarretia intertexta</i>	28	0.9	0.2	5
<i>Poa secunda</i>	28	3.15	0.2	8
<i>Taraxacum officinale</i>	28	1.35	0.2	5
<i>Epilobium ciliatum</i>	24	2.09	0.2	5
<i>Mimulus guttatus</i>	24	4.09	0.2	14
<i>Poa bulbosa</i>	24	2.97	0.2	8

**Alliance Stand Table continued**

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

n =29

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Ventenata dubia</i>	24	3.06	0.2	8
	<i>Hordeum brachyantherum</i>	21	2.73	0.2	10
	<i>Mimulus</i>	21	0.8	0.2	3
	<i>Eleocharis</i>	21	10.57	0.2	26
	<i>Bromus arvensis</i>	21	2.27	0.2	6
	<i>Rumex crispus</i>	21	0.8	0.2	3
	<i>Bromus tectorum</i>	17	1.32	0.2	5
	<i>Carex nebrascensis</i>	17	6.24	0.2	13
	<i>Juncus</i>	17	4.2	0.4	12.2
	<i>Lactuca serriola</i>	17	0.2	0.2	0.2
	<i>Lotus unifoliolatus</i>	17	1.44	0.2	3
	<i>Montia linearis</i>	17	0.2	0.2	0.2
	<i>Phleum pratense</i>	17	0.72	0.2	2
	<i>Perideridia</i>	14	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	14	0.2	0.2	0.2
	<i>Trifolium</i>	14	2.8	1	5
	<i>Plagiobothrys</i>	14	1.95	0.2	7
	<i>Erigeron divergens</i>	14	1.4	0.2	5
	<i>Eleocharis macrostachya</i>	14	1.8	0.2	5
	<i>Camissonia tanacetifolia</i>	14	0.4	0.2	1
	<i>Deschampsia danthonioides</i>	14	1.1	0.2	2
	<i>Montia chamissoi</i>	14	1.85	0.2	5
	<i>Polygonum douglasii</i>	10	0.2	0.2	0.2
	<i>Veronica peregrina</i>	10	0.2	0.2	0.2
	<i>Potentilla gracilis</i>	10	2.4	0.2	5
	<i>Polygonum aviculare</i>	10	0.2	0.2	0.2
	<i>Poa</i>	10	1.47	0.2	3.2
	<i>Epilobium densiflorum</i>	10	0.2	0.2	0.2
	<i>Bromus</i>	10	1.8	0.2	5
	<i>Eleocharis acicularis</i>	10	3.07	0.2	8
	<i>Carex lenticularis</i>	10	3.07	0.2	7
	<i>Hordeum</i>	10	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	10	0.2	0.2	0.2



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

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**Common Name:** Baltic Rush - (Mexican Rush)

**NVC Association Code:** CEGJ003486, *Juncus arcticus* ssp. *littoralis* - (*Juncus mexicanus*) Wet Meadow

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

### **Association Concept**

The *Juncus arcticus* var. *balticus* – (var. *mexicanus*) Association forms an open to continuous herbaceous layer. The shrub layer is sparse. The alliance is found primarily on the bottom to lower third of slopes or in flat or low-gradient areas at all aspects. Soils are derived from a variety of substrates but primarily basalt and textures include fine silty clay, medium silt, fine sandy clay, muck, peat, and a variety of loams. Elevations range from approximately 1339 to 1980 meters. *Juncus arcticus* is the dominant herb.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Juncus arcticus*. The overall herbaceous cover ranges from 12 to 80 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1573 m, Range 1339 – 1980 m

Aspect: NE (12), SW (5), Flat (5), NW (3), SE (2)

Slope: Mean 1.6 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (16), Bottom to Lower 1/3 of slope (7), Middle 1/3 of slope (2), Upper 1/3 of slope (1), Lower 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.1%, Range 0 – 1%

Herb Cover: Mean 41.7%, Range 12 – 80%

Large Rock: Mean 0.6%, Range 0 – 6%

Small Rock: Mean 3.6%, Range 0 – 33%

Fines Cover: Mean 49.9%, Range 2 – 97%

Litter Cover: Mean 31.8%, Range 0.2 – 96%

Soil Texture (field assessed): Fine silty clay (4), Medium silt (3), Fine sandy clay (3), Muck (2), Peat (2), Moderately fine sandy clay loam (2), Moderately fine clay loam (2), Fine clay (2), Medium to very fine, sandy loam (2), Moderately coarse, sandy loam (1), Medium silt loam (1), Moderately fine silty clay loam (1), Medium loam (1)

Geology (map data): Basalt (9), General volcanic extrusives (3), Igneous (type unknown) (2), Silty alluvium (2), Mixed alluvium (1), Clayey alluvium (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 12 to 80 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Juncus arcticus* is the dominant herb.

**Species of Interest:** *Melica spectabilis*, *Senecio hydrophiloides*

### **Classification Comments**

None.

**Classification Confidence:** High

### **References**

Buck-Diaz et al. 2012, Evens and San 2005, Evens et al. 2006, Evens et al. 2014, Keeler-Wolf et al. 2003b, Keeler-Wolf and Vaghti 2000, Klein et al. 2007, Klein et al. 2015, Manning and Padgett 1995, Menke et al. 2019, Rodriguez et al. 2017, Smith 1998b, Taylor 1984, Weixelman et al. 1999

### **Conservation Status Rank**

**Global:** GNR **State:** N

**Total Sample Size Used for Description:** N=27

### **Association Stand Table**

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

n =27

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Juncus arcticus</i>	100	16.6	2	34
<i>Poa pratensis</i>	33	6.36	0.2	17
<i>Carex</i>	30	2.18	0.2	11
<i>Achillea millefolium</i>	30	0.65	0.2	3
<i>Ventenata dubia</i>	26	3.06	0.2	8
<i>Navarretia intertexta</i>	26	0.31	0.2	1
<i>Poa secunda</i>	26	3.31	0.2	8
<i>Taraxacum officinale</i>	26	1.4	0.2	5
<i>Bromus arvensis</i>	26	2.09	0.2	6
<i>Poa bulbosa</i>	22	2.13	0.2	8

## Association Stand Table continued

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

n =27

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Eleocharis</i>	22	10.57	0.2	26
<i>Epilobium ciliatum</i>	22	1.93	0.2	5
<i>Hordeum brachyantherum</i>	22	2.73	0.2	10
<i>Mimulus guttatus</i>	22	2.43	0.2	10
<i>Rumex crispus</i>	22	0.8	0.2	3
<i>Mimulus</i>	22	0.8	0.2	3
<i>Lactuca serriola</i>	19	0.2	0.2	0.2
<i>Juncus</i>	19	2.96	0.4	6
<i>Carex nebrascensis</i>	19	6.24	0.2	13
<i>Bromus tectorum</i>	19	1.32	0.2	5
<i>Montia linearis</i>	19	0.2	0.2	0.2
<i>Phleum pratense</i>	19	0.72	0.2	2
<i>Lotus unifoliolatus</i>	19	1.44	0.2	3
<i>Camissonia tanacetifolia</i>	15	0.4	0.2	1
<i>Montia chamissoi</i>	15	1.85	0.2	5
<i>Erigeron divergens</i>	15	1.4	0.2	5
<i>Plagiobothrys</i>	15	1.95	0.2	7
<i>Perideridia</i>	15	0.2	0.2	0.2
<i>Deschampsia danthonioides</i>	15	1.1	0.2	2
<i>Tragopogon dubius</i>	15	0.2	0.2	0.2
<i>Eleocharis macrostachya</i>	15	1.8	0.2	5
<i>Potentilla gracilis</i>	11	2.4	0.2	5
<i>Polygonum douglasii</i>	11	0.2	0.2	0.2
<i>Veronica peregrina</i>	11	0.2	0.2	0.2
<i>Trifolium</i>	11	2.73	1	5
<i>Ranunculus occidentalis</i>	11	0.2	0.2	0.2
<i>Poa</i>	11	1.47	0.2	3.2
<i>Hordeum</i>	11	0.2	0.2	0.2
<i>Epilobium densiflorum</i>	11	0.2	0.2	0.2
<i>Eleocharis acicularis</i>	11	0.47	0.2	1
<i>Polygonum aviculare</i>	11	0.2	0.2	0.2
<i>Carex lenticularis</i>	11	3.07	0.2	7

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## ***Juncus nevadensis* Alliance**

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**Common Name:** Sierra rush marshes Alliance

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Juncus nevadensis* Alliance forms an open to intermittent herbaceous layer. It is found primarily in flat or low-gradient areas and on the lower portions of northwest or southwest-facing slopes aspects. Soils are derived from a variety of substrates and textures include fine silty clay and peat. Elevation range is approximately 1528 – 1609 m. *Juncus nevadensis* is the dominant herb, and *Juncus arcticus* is often present.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Juncus nevadensis*. The overall herbaceous cover ranges from 18 to 60 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Devil's Garden (M261Gb), Likely Tableland (M261Gh)

## **Associations**

*Juncus nevadensis* Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1560 m, Range 1528 – 1609 m

Aspect: Flat (1), NW (1), SW (1)

Slope: Mean 1.7 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (2), Lower to Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 36%, Range 18 – 60%

Large Rock: Mean 0.7%, Range 0 – 2%

Small Rock: Mean 0.7%, Range 0 – 2%

Fines Cover: Mean 46%, Range 11 – 93%

Litter Cover: Mean 21.7%, Range 2 – 60%

Soil Texture (field assessed): Fine silty clay (2), Peat (1)

Geology (map data): None recorded.

**Environment:** Stands of this alliance are usually in wet meadows but not immediately adjacent to streams.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 18 to 60 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** *Juncus nevadensis* is the dominant herb, and *Juncus arcticus* is often present.

**Dynamics:** *Juncus nevadensis* is considered more susceptible to livestock grazing than *Phleum pratense* or *Agrostis gigantea* (Potter 2005). This suggests large stands of *Juncus nevadensis* have not experienced prolonged grazing pressure.

**Species of Interest:** None.

## **Classification Comments**

This alliance was not well sampled within the study area, but it is generally well described for California.

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** G3?    **State:** S3?

## **References**

Cooper and Wolf 2006, Potter 1998, Potter 2005

**Total Sample Size Used for Description:** N=3

## **Alliance Stand Table**

### ***Juncus nevadensis* Alliance**

**n =3**

<b>Lifeform Botanical Name</b>	<b>Con</b>	<b>Avg</b>	<b>Min</b>	<b>Max</b>
<b>Herb</b>				
<i>Juncus nevadensis</i>	100	21	7	33
<i>Juncus arcticus</i>	67	13	2	24
<i>Rumex crispus</i>	33	0.2	0.2	0.2
<i>Sonchus oleraceus</i>	33	0.2	0.2	0.2
<i>Stellaria longipes</i>	33	0.2	0.2	0.2
<i>Trifolium</i>	33	0.2	0.2	0.2
<i>Trifolium variegatum</i>	33	0.2	0.2	0.2
<i>Triteleia hyacinthina</i>	33	0.2	0.2	0.2
<i>Poa bolanderi</i>	33	2	2	2
<i>Plagiobothrys leptocladus</i>	33	0.2	0.2	0.2
<i>Trifolium wormskioldii</i>	33	7	7	7
<i>Mimulus primuloides</i>	33	6	6	6
<i>Mimulus guttatus</i>	33	2	2	2
<i>Hordeum brachyantherum</i>	33	0.2	0.2	0.2
<i>Eryngium alismifolium</i>	33	1	1	1
<i>Eleocharis acicularis</i>	33	6	6	6
<i>Castilleja tenuis</i>	33	0.2	0.2	0.2
<i>Carex lenticularis</i>	33	2	2	2
<i>Carex</i>	33	0.2	0.2	0.2
<i>Ranunculus occidentalis</i>	33	0.2	0.2	0.2

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## ***Juncus nevadensis* Association**

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**Common Name:** Sierra rush

**NVC Association Code:** None.

**Alliance:** *Juncus nevadensis* Alliance

### **Association Concept**

The *Juncus nevadensis* Association forms an open to intermittent herbaceous layer. The alliance is found primarily in flat or low gradient areas or on lower portions of west-facing slopes. Soils are derived from a variety of substrates and textures include fine silty clay and peat. Elevations range from approximately 1528 to 1609 meters. *Juncus nevadensis* is the dominant herb and *Juncus arcticus* is often present.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Juncus nevadensis*. The overall herbaceous cover ranges from 18 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1560 m, Range 1528 – 1609 m

Aspect: Flat (1), NW (1), SW (1)

Slope: Mean 1.7 degrees, Range 0 – 3 degrees

Macro Topography: Bottom (2), Lower to Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 36%, Range 18 – 60%

Large Rock: Mean 0.7%, Range 0 – 2%

Small Rock: Mean 0.7%, Range 0 – 2%

Fines Cover: Mean 46%, Range 11 – 93%

Litter Cover: Mean 21.7%, Range 2 – 60%

Soil Texture (field assessed): Fine silty clay (2), Peat (1)

Geology (map data): None recorded

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to intermittent herbaceous layer, and the overall herbaceous cover ranges from 18 to 60 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** *Juncus nevadensis* is the dominant herb and *Juncus arcticus* is often present.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** Y

### **References**

Cooper and Wolf 2006, Potter 1998, Potter 2005

**Total Sample Size Used for Description:** N=3

### **Association Stand Table**

#### ***Juncus nevadensis* Association**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Juncus nevadensis</i>	100	21	7	33
	<i>Juncus arcticus</i>	67	13	2	24
	<i>Stellaria longipes</i>	33	0.2	0.2	0.2
	<i>Poa bolanderi</i>	33	2	2	2
	<i>Triteleia hyacinthina</i>	33	0.2	0.2	0.2
	<i>Trifolium wormskioldii</i>	33	7	7	7
	<i>Rumex crispus</i>	33	0.2	0.2	0.2
	<i>Trifolium</i>	33	0.2	0.2	0.2
	<i>Sonchus oleraceus</i>	33	0.2	0.2	0.2
	<i>Trifolium variegatum</i>	33	0.2	0.2	0.2
	<i>Mimulus primuloides</i>	33	6	6	6
	<i>Carex</i>	33	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	33	0.2	0.2	0.2
	<i>Castilleja tenuis</i>	33	0.2	0.2	0.2
	<i>Eleocharis acicularis</i>	33	6	6	6
	<i>Eryngium alismifolium</i>	33	1	1	1
	<i>Hordeum brachyantherum</i>	33	0.2	0.2	0.2
	<i>Mimulus guttatus</i>	33	2	2	2
	<i>Plagiobothrys leptocladus</i>	33	0.2	0.2	0.2
	<i>Carex lenticularis</i>	33	2	2	2



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***Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* Alliance**

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**Common Name:** Little white navarretia - Cusick's popcorn flower vernal pools Alliance

**NVC Alliance Code:** None.

**Alliance Concept**

The *Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* Alliance forms an open to continuous herbaceous layer. The shrub layer is sparse. It is found primarily in flat or low-gradient areas and occasionally on the lower portions of slopes at all aspects. Soils are derived from a variety of substrates but primarily basalt and general volcanic extrusives and are generally fine to moderately fine-textured clays, silty clays, or silty clay loams. Elevation range is approximately 1224 – 1936 m. *Taraxia tanacetifolia* is often present in the herb layer.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Taraxia tanacetifolia*. The overall herbaceous cover ranges from 3 to 70 percent.

## **Local Alliance Distribution**

**Modoc Plateau:** Bald Mountain - Dixie Valley (M261Gj), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi), Likely Tableland (M261Gh), Pit River Valley (M261Gg)

## **Associations**

*Taraxia tanacetifolia* – *Iva axillaris* Provisional Association

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1504 m, Range 1224 – 1936 m

Aspect: Flat (14), NE (12), SW (8), SE (3), NW (2)

Slope: Mean 1.1 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (25), Bottom to Lower 1/3 of slope (7), Other (2), Lower 1/3 of slope (2), Middle 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: Mean 0.2%, Range 0 – 3%

Herb Cover: Mean 23%, Range 3 – 70%

Large Rock: Mean 0.9%, Range 0 – 8%

Small Rock: Mean 12.2%, Range 0 – 70%

Fines Cover: Mean 75.5%, Range 25 – 99%

Litter Cover: Mean 7.5%, Range 0 – 70%

Soil Texture (field assessed): Fine silty clay (13), Moderately fine silty clay loam (7), Fine clay (5), Fine sandy clay (3), Moderately fine sandy clay loam (2), Medium silt loam (2), Medium silt (2), Medium loam (1)

Geology (map data): Basalt (9), General volcanic extrusives (6), Andesite (4), Igneous (type unknown) (3), Silty alluvium (1), Clayey alluvium (1)

**Environment:** Some of the taxa found in the stands sampled in the study area are characteristic of disturbance from livestock or from tilling seasonally saturated soils, though these stands do contain many vernal pool endemic species, such as *Downingia bacagalugpi*, that are restricted to this region.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 3 to 70 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Taraxia tanacetifolia* is often present in the herb layer, *Bromus tectorum*, *Eleocharis macrostachya*, *Iva axillaris*, *Muhlenbergia richardsonis*, *Navarretia intertexta*, *Polygonum aviculare*, and *Psilocarphus brevissimus* are sometimes present.

**Species of Interest:** *Phacelia inundata*

### **Classification Comments**

This is a newly described alliance for California. These pools have a different suite of species than what is found in the central valley. Species such as *Downingia bacagalupii*, a vernal pool specialist that is for the most part only found in these ecoregions of CA. With the data available, we were unable to clearly distinguish other associations within this alliance. Solomeshch et al (2009) sampled vernal pools in the Sierra Valley subsection of the Sierra Nevada Section, about 50-100 miles south of our sampling area. There are enough similarities between stands in these two areas to propose membership of a new alliance. However, focused sampling on vernal pools throughout the remainder of the region and adjacent ecoregions in Oregon and Nevada will be necessary to clarify their breadth and relationships. Including a more complete understanding of these ephemeral wetlands and other ecologically similar stands now classified under the *Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR    **State:** S2

### **References**

Solomeshch 2009

**Total Sample Size Used for Description:** N=41

### **Alliance Stand Table**

#### ***Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* Alliance**

n = 41

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Camissonia tanacetifolia</i>	54	5.88	0.2	31
	<i>Psilocarphus brevissimus</i>	32	4.97	0.2	25
	<i>Muhlenbergia richardsonis</i>	29	7.18	0.2	20
	<i>Polygonum aviculare</i>	29	1.67	0.2	9
	<i>Bromus tectorum</i>	29	0.53	0.2	1
	<i>Iva axillaris</i>	27	3.4	0.2	9
	<i>Eleocharis macrostachya</i>	24	5.36	0.2	15
	<i>Navarretia intertexta</i>	22	1.44	0.2	7
	<i>Downingia bacigalupii</i>	17	2.29	0.2	12
	<i>Navarretia leucocephala</i>	17	1.69	0.2	5

**Alliance Stand Table continued**

***Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* Alliance**

n = 41

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Eleocharis acicularis</i>	15	3.07	0.2	7
	<i>Poa bulbosa</i>	15	1.93	0.2	5
	<i>Elymus elymoides</i>	12	0.36	0.2	1
	<i>Epilobium densiflorum</i>	12	0.36	0.2	1
	<i>Juncus bufonius</i>	12	1.36	0.2	6
	<i>Lythrum tribracteatum</i>	12	2.28	0.2	8
	<i>Poa secunda</i>	12	1.08	0.2	3

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## ***Taraxia tanacetifolia* – *Iva axillaris* Provisional Association**

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**Common Name:** Tansy Leaf Evening Primrose – povertyweed

**NVC Association Code:** None.

**Alliance:** *Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* Alliance

### **Association Concept**

The *Taraxia tanacetifolia* – *Iva axillaris* Provisional Association forms an open to continuous herbaceous layer. The shrub layer is typically sparse. The association is found primarily in flat to low gradient areas, or on lower slopes at northeastern, southwestern, and southeastern aspects. Soils are derived from a variety of substrates but primarily general volcanic extrusives, andesite, basalt, or igneous (type unknown) and textures include fine silty clay, fine clay, moderately fine silty clay loam, and fine sandy clay. Elevations range from approximately 1345 to 1936 meters. *Taraxia tanacetifolia* is often present in the herbaceous layer.

**Diagnostic Criteria:** This association is characterized by an open to continuous mixed herbaceous layer. The overall herbaceous cover ranges from 3 to 70 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1518 m, Range 1345 – 1936 m

Aspect: Flat (11), NE (7), SW (6), SE (1)

Slope: Mean 1.1 degrees, Range 0 – 6 degrees

Macro Topography: Bottom (17), Bottom to Lower 1/3 of slope (3), Lower 1/3 of slope (2), Other (2)

Tree Cover: 0%

Shrub Cover: Mean 0.3%, Range 0 – 3%

Herb Cover: Mean 18.4%, Range 3 – 70%

Large Rock: Mean 0.8%, Range 0 – 8%

Small Rock: Mean 8.7%, Range 0 – 38%

Fines Cover: Mean 76.8%, Range 26 – 99%

Litter Cover: Mean 8.5%, Range 0 – 70%

Soil Texture (field assessed): Fine silty clay (12), Fine clay (3), Moderately fine silty clay loam (3), Fine sandy clay (2), Medium loam (1), Medium silt (1)

Geology (map data): General volcanic extrusives (4), Andesite (3), Basalt (3), Igneous (type unknown) (2)

## **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 3 to 70 percent. The tree layer is typically absent, and the shrub layer is sparse or absent.

**Vegetation Floristics:** The herbaceous layer often includes *Taraxia tanacetifolia*.

**Dynamics:** *Taraxia tanacetifolia* and *Iva axillaris* are species of vernal moist pools, flats, and reservoir or pond margins. In addition to being tolerant of fluctuating moisture conditions, these two species are also tolerant of trampling and grazing by ungulates, and of moderately saline or alkaline conditions. *Iva axillaris* also grows along creeks and river terraces with regular fluvial disturbance. This association is only known from the study area but is likely to be more wide-ranging in E Oregon and NW Nevada. Its relationship to other stands in this alliance is indicated by the presence of *Psilocarphus brevissimus*, among others, but this appears to be the most widespread association of the large, somewhat alkaline, vernal flats and playas of the Modoc Plateau Ecoregion,

**Species of Interest:** *Downingia laeta*, *Gratiola heterosepala*, *Phacelia inundata*, *Rumex venosus*

## **Classification Comments**

None

**Classification Confidence:** High

## **Conservation Status Rank**

**Global:** GNR **State:** Y

## **References**

None.

**Total Sample Size Used for Description:** N=26

## **Association Stand Table**

### ***Taraxia tanacetifolia* – *Iva axillaris* Provisional Association**

n =26

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Camissonia tanacetifolia</i>	69	6.89	0.2	31
<i>Bromus tectorum</i>	35	0.47	0.2	1
<i>Iva axillaris</i>	35	3.38	0.2	9
<i>Polygonum aviculare</i>	27	2.26	0.2	9

## Association Stand Table continued

### ***Taraxia tanacetifolia* – *Iva axillaris* Provisional Association**

n =26

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Elymus elymoides</i>	19	0.36	0.2	1
<i>Muhlenbergia richardsonis</i>	19	6	1	17
<i>Navarretia intertexta</i>	19	0.92	0.2	3
<i>Psilocarphus brevissimus</i>	19	2.48	0.2	10
<i>Eleocharis macrostachya</i>	19	3.72	0.2	15
<i>Erodium cicutarium</i>	15	3	1	7
<i>Taeniatherum caput-medusae</i>	15	0.6	0.2	1
<i>Cuscuta</i>	12	1.8	0.2	5
<i>Epilobium minutum</i>	12	0.47	0.2	1
<i>Helianthus annuus</i>	12	4.4	0.2	7
<i>Juncus arcticus</i>	12	0.2	0.2	0.2
<i>Poa bulbosa</i>	12	3.07	0.2	5



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## ***Phalaris aquatica* – *Phalaris arundinacea* Alliance**

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**Common Name:** Harding grass – Reed Canary grass swards Alliance

**NVC Alliance Code:** A3846. *Phalaris arundinacea* Western Ruderal Marsh Alliance

### **Alliance Concept**

The *Phalaris aquatica* – *Phalaris arundinacea* Alliance forms an open herbaceous layer. It is found primarily in flat or low-gradient areas at northern aspects. Soils are derived from a variety of substrates but primarily basalt, and textures include fine sand and peat. Elevation range is approximately 1278 – 1454 m. *Phalaris arundinacea* is the dominant herb, and *Agrostis pallens*, *Artemisia douglasiana*, *Artemisia ludoviciana*, *Carex lenticularis*, *Equisetum*, *Euthamia occidentalis*, *Festuca pratensis*, *Juncus arcticus*, *Juncus saximontanus*, *Lepidium perfoliatum*, *Lotus corniculatus*, *Melilotus*, and *Xanthium strumarium* are often present. Commonly associated emergent shrubs at sparse cover include *Ericameria nauseosa* and *Rosa woodsii*.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Phalaris arundinacea*. The overall herbaceous cover ranges from 15 to 30 percent.



## **Local Alliance Distribution**

**Modoc Plateau:** Adin Mountains and Valleys (M261Gl), Pit River Valley (M261Gg)

## **Associations**

*Phalaris arundinacea* Association

**Note:** Because this description is based on only two samples, the statistics of the above association are the same as the alliance. There will not be a separate description for the association.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1366 m, Range 1278 – 1454 m

Aspect: NW (1), NE (1)

Slope: 3 degrees

Macro Topography: Bottom (2)

Tree Cover: Mean 0.1%, Range 0 – 0.2%

Shrub Cover: Mean 0.1%, Range 0 – 0.2%

Herb Cover: Mean 22.5%, Range 15 – 30%

Large Rock: Mean 25%, Range 25 – 25%

Small Rock: Mean 1.1%, Range 0 – 2.2%

Fines Cover: Mean 26.5%, Range 2 – 51%

Litter Cover: Mean 6%, Range 2 – 10%

Soil Texture (field assessed): Fine sand (1), Peat (1)

Geology (map data): Basalt (1)

**Environment:** Stands of this alliance occur in seasonally wet and alkaline sites.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover ranges from 15 to 30 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Dominant herbs include *Phalaris arundinacea*, and those often present are *Agrostis pallens*, *Artemisia douglasiana*, *Artemisia ludoviciana*, *Carex lenticularis*, *Equisetum*, *Euthamia occidentalis*, *Festuca pratensis*, *Juncus arcticus*, *Juncus saximontanus*, *Lepidium perfoliatum*, *Lotus corniculatus*, *Melilotus*, and *Xanthium strumarium*. The shrub layer is emergent and typically or often includes *Ericameria nauseosa* and *Rosa woodsii*.

**Dynamics:** *Phalaris arundinacea* is a perennial non native grass characteristic of moist-to-wet meadows and creek bottoms. Most local stands have a longer more persistent history of fluctuations in moisture availability, inundation, and livestock grazing pressure than those of the *Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance.

**Species of Interest:** None.

### **Classification Comments**

This alliance is under sampled in the study area, but it is well defined type for California.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** SNR

### **References**

Buck-Diaz et al. 2012

**Total Sample Size Used for Description:** N=2

### **Alliance Stand Table**

#### ***Phalaris aquatica* – *Phalaris arundinacea* Alliance**

n =2

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	50	0.2	0.2	0.2
	<i>Rosa woodsii</i>	50	0.2	0.2	0.2
<b>Herb</b>					
	<i>Phalaris arundinacea</i>	100	18	14	22
	<i>Melilotus</i>	50	4	4	4
	<i>Xanthium strumarium</i>	50	1	1	1
	<i>Lotus corniculatus</i>	50	2	2	2
	<i>Lepidium perfoliatum</i>	50	0.2	0.2	0.2
	<i>Juncus saximontanus</i>	50	0.2	0.2	0.2
	<i>Juncus arcticus</i>	50	1	1	1
	<i>Euthamia occidentalis</i>	50	3	3	3
	<i>Equisetum</i>	50	2	2	2
	<i>Carex lenticularis</i>	50	14	14	14
	<i>Artemisia ludoviciana</i>	50	3	3	3
	<i>Artemisia douglasiana</i>	50	0.2	0.2	0.2
	<i>Agrostis pallens</i>	50	2	2	2
	<i>Festuca pratensis</i>	50	0.2	0.2	0.2

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## ***Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance**

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**Common Name:** Kentucky Bluegrass – Redtop – Creeping Bentgrass Meadows Alliance

**NVC Alliance Code:** A3848. *Poa pratensis* - *Agrostis gigantea* - *Agrostis stolonifera* Ruderal Marsh Alliance

### **Alliance Concept**

The *Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance forms an intermittent herbaceous layer. It is found primarily in flat or low-gradient areas or at wetland edges at northern aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, sandy alluvium, or silty alluvium and textures include medium to very fine sandy loam and fine silty clay. Elevation range is approximately 1378 – 1608 m. *Phleum pratense* is the dominant herb, and characteristic herbs include *Potentilla gracilis*, *Sidalcea oregana*, and *Taraxacum officinale*. Those often present are *Achillea millefolium*, *Carex* spp., *Epilobium ciliatum*, *Juncus arcticus*, *Juncus orthophyllus*, *Plectritis macrocera*, *Poa pratensis*, and *Stachys ajugoides*.

**Diagnostic Criteria:** This alliance is characterized by an intermittent herbaceous layer of *Phleum pratense*, *Potentilla gracilis*, *Sidalcea oregana*, and *Taraxacum officinale*. The overall herbaceous cover ranges from 34 to 65 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Devil's Garden (M261Gb), Likely Tableland (M261Gh)

### **Associations**

*Agrostis (gigantea, stolonifera)* Association

*Phleum pratense* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1514 m, Range 1378 – 1608 m

Aspect: NE (2), NW (2)

Slope: Mean 0.75 degrees, Range 0 – 2 degrees

Macro Topography: Bottom (3), Edge of basin or wetland (1)

Tree Cover: 0%

Shrub Cover: Mean 0.2%, Range 0 – 1%

Herb Cover: Mean 52%, Range 34 – 65%

Large Rock: Mean 0.2%, Range 0.2 – 0.2%

Small Rock: Mean 0.4%, Range 0.4 – 0.4%

Fines Cover: Mean 21.3%, Range 5 – 60%

Litter Cover: Mean 72.8%, Range 25 – 94%

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Fine silty clay (1)

Geology (map data): Andesite (1), Basalt (1), Sandy alluvium (most alluvial fans and washes) (1), Silty alluvium (1)

**Environment:** Stands of this alliance are found in meadows, stream benches and terraces, wet pastures, and agricultural wetlands with a heavy layer of thatch.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an intermittent herbaceous layer, and the overall herbaceous cover ranges from 34 to 65 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** *Phleum pratense* is the dominant herb, and characteristic herbs include *Potentilla gracilis*, *Sidalcea oregana*, and *Taraxacum officinale*. Those often present are *Achillea millefolium*, *Carex* spp., *Epilobium ciliatum*, *Juncus arcticus*,

*Juncus orthophyllus*, *Plectritis macrocera*, *Poa pratensis*, and *Stachys ajugoides*. *Artemisia cana*, *Ericameria nauseosa*, *Rosa woodsii*, and *Salix lemmonii* are sometimes present in the shrub layer.

**Species of Interest:** *Carex lasiocarpa*

### **Classification Comments**

The National Vegetation Classification (NatureServe 2007a) recognizes a *Phleum pratense* semi-natural herbaceous alliance from the studies in eastern U.S. and the stands from this project that are dominated by *Poa pratensis* are similar in setting and species composition, so we have expanded the definition of this alliance to include *Phleum pratense* dominant stands as well.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNA    **State:** SNA

### **References**

Buck-Diaz et al. 2019, Keeler-Wolf et al. 2003b, Manning and Padgett 1995, NatureServe 2007a, Pickart 2006, Ratliff 1982, Smith 1998b, Weixelman et al. 1999

**Total Sample Size Used for Description:** N=4

### **Alliance Stand Table**

#### ***Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	25	0.2	0.2	0.2
<b>Shrub</b>					
	<i>Artemisia cana</i>	25	1	1	1
	<i>Rosa woodsii</i>	25	0.2	0.2	0.2
	<i>Ericameria nauseosa</i>	25	1	1	1
	<i>Salix lemmonii</i>	25	0.2	0.2	0.2
<b>Herb</b>					
	<i>Phleum pratense</i>	100	23	1	55
	<i>Potentilla gracilis</i>	75	4.4	1	8.2
	<i>Sidalcea oregana</i>	75	2.4	0.2	5
	<i>Taraxacum officinale</i>	75	3	2	5
	<i>Epilobium ciliatum</i>	50	0.2	0.2	0.2

**Alliance Stand Table continued**

***Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Poa pratensis</i>	50	6.5	3	10
	<i>Plectritis macrocera</i>	50	0.2	0.2	0.2
	<i>Stachys ajugoides</i>	50	0.2	0.2	0.2
	<i>Carex</i>	50	2.6	0.2	5
	<i>Achillea millefolium</i>	50	4.1	0.2	8
	<i>Juncus arcticus</i>	50	2.5	2	3
	<i>Juncus orthophyllus</i>	50	2.1	0.2	4
	<i>Symphyotrichum spathulatum</i>	25	9	9	9
	<i>Microsteris gracilis</i>	25	0.2	0.2	0.2
	<i>Montia chamissoi</i>	25	0.2	0.2	0.2
	<i>Penstemon rydbergii</i>	25	24	24	24
	<i>Plagiobothrys</i>	25	0.2	0.2	0.2
	<i>Poa bulbosa</i>	25	0.2	0.2	0.2
	<i>Prunella vulgaris</i>	25	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	25	0.2	0.2	0.2
	<i>Ranunculus uncinatus</i>	25	2	2	2
	<i>Rumex crispus</i>	25	0.2	0.2	0.2
	<i>Sisymbrium irio</i>	25	0.2	0.2	0.2
	<i>Stellaria longipes</i>	25	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	25	0.2	0.2	0.2
	<i>Trifolium repens</i>	25	1	1	1
	<i>Triteleia hyacinthina</i>	25	0.2	0.2	0.2
	<i>Verbascum thapsus</i>	25	0.2	0.2	0.2
	<i>Zigadenus venenosus</i>	25	0.2	0.2	0.2
	<i>Veronica peregrina</i>	25	0.2	0.2	0.2
	<i>Artemisia douglasiana</i>	25	4	4	4
	<i>Vicia americana</i>	25	0.2	0.2	0.2
	<i>Mentha spicata</i>	25	0.2	0.2	0.2
	<i>Sonchus oleraceus</i>	25	0.2	0.2	0.2
	<i>Collinsia parviflora</i>	25	0.2	0.2	0.2
	<i>Bromus tectorum</i>	25	0.2	0.2	0.2
	<i>Agrostis gigantea</i>	25	20	20	20
	<i>Bromus arvensis</i>	25	0.2	0.2	0.2
	<i>Camassia leichtlinii</i>	25	0.2	0.2	0.2
	<i>Carex densa</i>	25	0.2	0.2	0.2
	<i>Carex lasiocarpa</i>	25	0.2	0.2	0.2

**Alliance Stand Table continued**

***Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance**

n =4

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Carex nebrascensis</i>	25	0.2	0.2	0.2
	<i>Carex praegracilis</i>	25	0.2	0.2	0.2
	<i>Melilotus indicus</i>	25	1	1	1
	<i>Cirsium arvense</i>	25	3	3	3
	<i>Draba verna</i>	25	0.2	0.2	0.2
	<i>Elymus smithii</i>	25	1	1	1
	<i>Epilobium minutum</i>	25	1	1	1
	<i>Equisetum</i>	25	0.2	0.2	0.2
	<i>Equisetum hyemale</i>	25	0.2	0.2	0.2
	<i>Erigeron philadelphicus</i>	25	0.2	0.2	0.2
	<i>Juncus nevadensis</i>	25	0.2	0.2	0.2
	<i>Koeleria macrantha</i>	25	0.2	0.2	0.2
	<i>Lotus wrangelianus</i>	25	1	1	1
	<i>Medicago polymorpha</i>	25	1	1	1
	<i>Carex subfusca</i>	25	0.2	0.2	0.2

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## ***Agrostis (gigantea, stolonifera)* Association**

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**Common Name:** Creeping bentgrass/redtop

**NVC Association Code:** CEGLO01558, *Agrostis (gigantea, stolonifera)* Ruderal Marsh

**Alliance:** *Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance

### **Association Concept**

The *Agrostis (gigantea, stolonifera)* Association forms an intermittent, nearly continuous herbaceous layer. The alliance is found primarily on slope bottoms at northwestern aspects. Soils are derived from a variety of substrates but primarily sandy alluvium (most alluvial fans and washes). Elevation is approximately 1378 meters. *Penstemon rydbergii* is the dominant herb, and *Agrostis gigantea* is characteristic.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Penstemon rydbergii* and *Agrostis gigantea*. The overall herbaceous cover is 65 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1378 m

Aspect: NW (1)

Slope: 1 degrees

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 65%

Large Rock: 0.2%

Small Rock: 0.4%

Fines Cover: 5%

Litter Cover: 94%

Soil Texture (field assessed): None recorded

Geology (map data): Sandy alluvium (most alluvial fans and washes) (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent, nearly continuous herbaceous layer, and the overall herbaceous cover is 65 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** *Penstemon rydbergii* is the dominant herb, and *Agrostis gigantea* is characteristic.



**Dynamics:** The native herb *Penstemon rydbergii* and the non-native grass *Agrostis gigantea* are both indicators of moist meadow settings, with somewhat lower productivity than stands of the *Phleum pratense* association. The shorter stature of the plants and their rhizomatous nature, enables stands to tolerate trampling and grazing to a greater degree than the other association in this alliance. These stands also tolerate wider seasonal and annual shifts in moisture availability than those of the *Phleum pratense* association.

**Species of Interest:** *Carex lasiocarpa*

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNA **State:** SNA

### **References**

Buck-Diaz et al. 2019, Pickart 2006, Smith 1998b

**Total Sample Size Used for Description:** N=1

### **Association Stand Table**

#### ***Agrostis (gigantea, stolonifera) Association***

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Seedling</b>					
	<i>Juniperus occidentalis</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Carex praegracilis</i>	100	0.2	0.2	0.2
	<i>Tragopogon dubius</i>	100	0.2	0.2	0.2
	<i>Plectritis macrocera</i>	100	0.2	0.2	0.2
	<i>Potentilla gracilis</i>	100	8.2	8.2	8.2
	<i>Prunella vulgaris</i>	100	0.2	0.2	0.2
	<i>Ranunculus occidentalis</i>	100	0.2	0.2	0.2
	<i>Sidalcea oregana</i>	100	5	5	5
	<i>Sisymbrium irio</i>	100	0.2	0.2	0.2
	<i>Phleum pratense</i>	100	1	1	1
	<i>Stachys ajugoides</i>	100	0.2	0.2	0.2
	<i>Taraxacum officinale</i>	100	2	2	2
	<i>Triteleia hyacinthina</i>	100	0.2	0.2	0.2

## Association Stand Table continued

### ***Agrostis (gigantea, stolonifera)* Association**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Verbascum thapsus</i>	100	0.2	0.2	0.2
<i>Veronica peregrina</i>	100	0.2	0.2	0.2
<i>Vicia americana</i>	100	0.2	0.2	0.2
<i>Carex densa</i>	100	0.2	0.2	0.2
<i>Achillea millefolium</i>	100	0.2	0.2	0.2
<i>Sonchus oleraceus</i>	100	0.2	0.2	0.2
<i>Cirsium arvense</i>	100	3	3	3
<i>Bromus arvensis</i>	100	0.2	0.2	0.2
<i>Bromus tectorum</i>	100	0.2	0.2	0.2
<i>Carex</i>	100	0.2	0.2	0.2
<i>Carex lasiocarpa</i>	100	0.2	0.2	0.2
<i>Trifolium repens</i>	100	1	1	1
<i>Penstemon rydbergii</i>	100	24	24	24
<i>Agrostis gigantea</i>	100	20	20	20
<i>Equisetum hyemale</i>	100	0.2	0.2	0.2
<i>Erigeron philadelphicus</i>	100	0.2	0.2	0.2
<i>Juncus arcticus</i>	100	3	3	3
<i>Juncus nevadensis</i>	100	0.2	0.2	0.2
<i>Juncus orthophyllus</i>	100	0.2	0.2	0.2
<i>Melilotus indicus</i>	100	1	1	1
<i>Mentha spicata</i>	100	0.2	0.2	0.2
<i>Artemisia douglasiana</i>	100	4	4	4

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## ***Poa pratensis* Association**

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**Common Name:** Kentucky Bluegrass

**NVC Association Code:** CEG003159

**Alliance:** *Poa pratensis* – *Agrostis gigantea* – *Agrostis stolonifera* Alliance

### **Association Concept**

The *Phleum pratense* Association forms an intermittent herbaceous layer. The alliance is found primarily at the bottom of slopes or in wetlands at north-facing aspects. Soils are derived from a variety of substrates but primarily andesite, basalt, or silty alluvium and textures include medium to very fine sandy loam and fine silty clay. Elevations range from approximately 1500 to 1608 meters. *Phleum pratense* is the dominant herb, and those often present are *Epilobium ciliatum*, *Poa pratensis*, *Potentilla gracilis*, *Sidalcea oregana*, and *Taraxacum officinale*.

**Diagnostic Criteria:** This association is characterized by an open to intermittent herbaceous layer of *Phleum pratense*. The overall herbaceous cover ranges from 34 to 60 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1560 m, Range 1500 – 1608 m

Aspect: NE (2), NW (1)

Slope: Not recorded.

Macro Topography: Bottom (2), Edge of basin or wetland (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: Mean 47.7%, Range 34 – 60%

Large Rock: Not recorded.

Small Rock: Not recorded.

Fines Cover: Not recorded.

Litter Cover: Not recorded.

Soil Texture (field assessed): Medium to very fine, sandy loam (1), Fine silty clay (1)

Geology (map data): Andesite (1), Basalt (1), Silty alluvium (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an intermittent herbaceous layer, and the overall herbaceous cover ranges from 34 to 60 percent. The tree layer is typically absent, and the shrub layer is sparse when present.

**Vegetation Floristics:** *Phleum pratense* is the dominant herb, and those often present are *Epilobium ciliatum*, *Poa pratensis*, *Potentilla gracilis*, *Sidalcea oregana*, and *Taraxacum officinale*. The shrub layer is emergent and sometimes includes *Artemisia cana*, *Ericameria nauseosa*, *Rosa woodsia*, or *Salix lemmonii*

**Dynamics:** *Phleum pratense* is a medium to tall grass that occupies many moist to wet meadows with a history of livestock use over the past several decades. *P. pratense*, along with several other perennial grasses, was introduced from Europe to increase the forage value of meadows throughout much of Western North America. Stands dominated by *P. pratense* are somewhat wetter than the *Agrostis (gigantea, stolonifera)* Association, but share many of the same native species.

**Species of Interest:** None.

### Classification Comments

None.

**Classification Confidence:** High

### Conservation Status Rank

**Global:** GNA **State:** SNA

### References

Keeler-Wolf et al. 2003b, Manning and Padgett 1995, Ratliff 1982, Smith 1998b, Weixelman et al. 1999

**Total Sample Size Used for Description:** N=3

### Association Stand Table

***Phleum pratense* – *Poa pratense* – *Bromus* spp. Association**

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Rosa woodsii</i>	33	0.2	0.2	0.2
	<i>Salix lemmonii</i>	33	0.2	0.2	0.2
	<i>Artemisia cana</i>	33	1	1	1
	<i>Ericameria nauseosa</i>	33	1	1	1
<b>Herb</b>					
	<i>Phleum pratense</i>	100	30.33	6	55
	<i>Epilobium ciliatum</i>	67	0.2	0.2	0.2
	<i>Poa pratensis</i>	67	6.5	3	10
	<i>Potentilla gracilis</i>	67	2.5	1	4
	<i>Sidalcea oregana</i>	67	1.1	0.2	2

## Association Stand Table continued

### *Phleum pratense* – *Poa pratense* – *Bromus* spp. Association

n =3

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Taraxacum officinale</i>	67	3.5	2	5
	<i>Stellaria longipes</i>	33	0.2	0.2	0.2
	<i>Medicago polymorpha</i>	33	1	1	1
	<i>Microsteris gracilis</i>	33	0.2	0.2	0.2
	<i>Montia chamissoi</i>	33	0.2	0.2	0.2
	<i>Plagiobothrys</i>	33	0.2	0.2	0.2
	<i>Plectritis macrocera</i>	33	0.2	0.2	0.2
	<i>Poa bulbosa</i>	33	0.2	0.2	0.2
	<i>Ranunculus uncinatus</i>	33	2	2	2
	<i>Zigadenus venenosus</i>	33	0.2	0.2	0.2
	<i>Symphyotrichum spathulatum</i>	33	9	9	9
	<i>Lotus wrangelianus</i>	33	1	1	1
	<i>Rumex crispus</i>	33	0.2	0.2	0.2
	<i>Carex</i>	33	5	5	5
	<i>Stachys ajugoides</i>	33	0.2	0.2	0.2
	<i>Koeleria macrantha</i>	33	0.2	0.2	0.2
	<i>Camassia leichtlinii</i>	33	0.2	0.2	0.2
	<i>Carex nebrascensis</i>	33	0.2	0.2	0.2
	<i>Carex subfusca</i>	33	0.2	0.2	0.2
	<i>Collinsia parviflora</i>	33	0.2	0.2	0.2
	<i>Elymus smithii</i>	33	1	1	1
	<i>Epilobium minutum</i>	33	1	1	1
	<i>Juncus orthophyllus</i>	33	4	4	4
	<i>Equisetum</i>	33	0.2	0.2	0.2
	<i>Achillea millefolium</i>	33	8	8	8
	<i>Juncus arcticus</i>	33	2	2	2
	<i>Draba verna</i>	33	0.2	0.2	0.2

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## ***Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance**

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**Common Name:** Onesided bluegrass – mat muhly – Douglas' sedge moist meadow Alliance

**NVC Alliance Code:** A4165. *Poa secunda* - *Muhlenbergia richardsonis* - *Carex douglasii* Moist Meadow Alliance

### **Alliance Concept**

The *Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance forms an open to continuous herbaceous layer. The tree layer is sparse, and the shrub layer is open. It is found primarily in flat or low-gradient areas at northeastern aspects. Soils are derived from a variety of substrates but primarily ash, andesite, general volcanic extrusives, pumice, or silty alluvium and textures include fine silty clay and moderately fine clay loam. Elevation range is approximately 1283 – 1547 m. Herbs that are often present are *Achillea millefolium*, *Carex* spp., *Carex douglasii*, *Potentilla gracilis*, and *Taraxacum officinale*. Commonly associated emergent shrubs at sparse cover include *Artemisia tridentata*.

**Diagnostic Criteria:** This alliance is characterized by an open to continuous herbaceous layer, the overall herbaceous cover ranges from 16 to 70 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Crowder Flat (M261Gc), Devil's Garden (M261Gb), Eagle Lake - Observation Peak (M261Gm), Likely Mountain (M261Gi)

### **Associations**

*Carex douglasii* Association

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1441 m, Range 1283 – 1547 m

Aspect: NE (5), Flat (1)

Slope: Mean 0.8 degrees, Range 0 – 1 degree

Macro Topography: Other (3), Bottom (2)

Tree Cover: Mean 0.2%, Range 0 – 1%

Shrub Cover: Mean 3.7%, Range 0 – 20%

Herb Cover: Mean 44.7%, Range 16 – 70%

Large Rock: 0%

Small Rock: Mean 0.1%, Range 0 – 0.2%

Fines Cover: Mean 61.0%, Range 20 – 99%

Litter Cover: Mean 24.3%, Range 1 – 70%

Soil Texture (field assessed): Fine silty clay (1), Moderately fine clay loam (1)

Geology (map data): Ash (of any origin) (2), Andesite (1), General volcanic extrusives (1), Pumice (1), Silty alluvium (1)

**Environment:** Stands of this alliance are found at drier fringes of moist meadows, valley bottoms with shallow water tables, inactive floodplains, terraces, dry basins, in swales, on upland gentle slopes and drainage bottoms.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 16 to 70 percent. The tree layer is typically sparse, and the shrub layer is sparse to open.

**Vegetation Floristics:** Herbs that are often present are *Achillea millefolium*, *Carex* spp., *Carex douglasii*, *Potentilla gracilis*, and *Taraxacum officinale*. The shrub layer is emergent and typically or often includes *Artemisia tridentata*. The tree layer is emergent and *Juniperus occidentalis* is sometimes present.

**Species of Interest:** None.

### **Classification Comments**

Only one association was described for this alliance for this project, but it is likely that other associations under this alliance exist in the area. There is some floristic overlap with this alliance and the *Navarretia leucocephala* ssp. *minima* – *Plagiobothrys cusickii* vernal pool Alliance.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4? **State:** S3

### **References**

Evens et al. 2014, Smith 1998b

**Total Sample Size Used for Description:** N=6

### **Alliance Stand Table**

#### ***Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
Tree					
	<i>Juniperus occidentalis</i>	17	1	1	1
Shrub					
	<i>Artemisia tridentata</i>	50	1.67	1	3
	<i>Ericameria bloomeri</i>	17	20	20	20
Herb					
	<i>Carex douglasii</i>	67	21.5	6	30
	<i>Achillea millefolium</i>	50	1	1	1
	<i>Carex</i>	50	11.07	0.2	30
	<i>Potentilla gracilis</i>	50	1	1	1
	<i>Taraxacum officinale</i>	50	0.73	0.2	1
	<i>Poa</i>	33	6.5	3	10
	<i>Poa nevadensis</i>	33	30	30	30
	<i>Penstemon laetus</i>	33	1	1	1
	<i>Juncus arcticus</i>	33	4	3	5
	<i>Elymus elymoides</i>	33	2	1	3
	<i>Ranunculus</i>	33	1	1	1
	<i>Centaurium tenuiflorum</i>	17	6	6	6
	<i>Navarretia intertexta</i>	17	0.2	0.2	0.2
	<i>Lupinus</i>	17	1	1	1
	<i>Lomatium triternatum</i>	17	3	3	3



**Alliance Stand Table continued**

***Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance**

n =6

Lifeform	Botanical Name	Con	Avg	Min	Max
Herb					
	<i>Microseris</i>	17	3	3	3
	<i>Mimulus moschatus</i>	17	1	1	1
	<i>Muhlenbergia richardsonis</i>	17	3	3	3
	<i>Phlox hoodii</i>	17	1	1	1
	<i>Poa secunda</i>	17	18	18	18
	<i>Polygonum arenastrum</i>	17	1	1	1
	<i>Potentilla</i>	17	0.2	0.2	0.2
	<i>Sisyrinchium idahoense</i>	17	0.2	0.2	0.2
	<i>Juncus bufonius</i>	17	1	1	1
	<i>Ranunculus occidentalis</i>	17	10	10	10
	<i>Aster</i>	17	3	3	3
	<i>Juncus</i>	17	10	10	10
	<i>Agoseris</i>	17	1	1	1
	<i>Cirsium scariosum</i>	17	1	1	1
	<i>Antennaria rosea</i>	17	1	1	1
	<i>Bromus tectorum</i>	17	3	3	3
	<i>Castilleja</i>	17	0.2	0.2	0.2
	<i>Cirsium arvense</i>	17	1	1	1
	<i>Achnatherum thurberianum</i>	17	3	3	3
	<i>Eryngium</i>	17	1	1	1
	<i>Gnaphalium palustre</i>	17	0.2	0.2	0.2
	<i>Hordeum</i>	17	0.2	0.2	0.2
	<i>Agrostis exarata</i>	17	0.2	0.2	0.2

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## ***Carex douglasii* Association**

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**Common Name:** Douglas' sedge

**NVC Association Code:** CEGL001768, *Carex douglasii* Moist Meadow

**Alliance:** *Poa secunda* – *Muhlenbergia richardsonis* – *Carex douglasii* Alliance

### **Association Concept**

The *Carex douglasii* Association forms an open to continuous herbaceous layer. The tree layer is sparse and the shrub layer is open. The alliance is found primarily at the bottom of slopes or in flat or low-gradient areas at northeastern aspects. Soils are derived from a variety of substrates but primarily ash, silty alluvium, general volcanic extrusives, andesite, or pumice and textures include fine silty clay and moderately fine clay loam. Elevations range from approximately 1283 to 1547 meters. *Carex douglasii* is the dominant herb and *Taraxacum officinale* is often present.

**Diagnostic Criteria:** This association is characterized by an open herbaceous layer of *Carex douglasii*. The overall herbaceous cover ranges from 16 to 70 percent.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1433 m, Range 1283 – 1547 m

Aspect: NE (4), Flat (1)

Slope: Mean 0.8 degrees, Range 0 – 1 degrees

Macro Topography: Other (3), Bottom (2)

Tree Cover: Mean 0.2%, Range 0 – 1%

Shrub Cover: Mean 4.2%, Range 0 – 20%

Herb Cover: Mean 47.6%, Range 16 – 70%

Large Rock: 0%

Small Rock: Mean 0.1%, Range 0 – 0.2%

Fines Cover: Mean 55.2%, Range 20 – 99%

Litter Cover: Mean 28.6%, Range 1 – 70%

Soil Texture (field assessed): Fine silty clay (1), Moderately fine clay loam (1)

Geology (map data): Ash (of any origin) (1), Silty alluvium (1), General volcanic extrusives (1), Andesite (1), Pumice (1)

### **Vegetation Description**

**Vegetation Structure:** The association forms an open to continuous herbaceous layer, and the overall herbaceous cover ranges from 16 to 70 percent. The tree layer is typically sparse, and the shrub layer is sparse to open.

**Vegetation Floristics:** *Carex douglasii* is the dominant herb and *Taraxacum officinale* is often present. The tree layer is emergent and sometimes includes *Juniperus occidentalis*. The shrub layer is emergent and sometimes includes *Artemisia tridentata* and/or *Ericameria bloomeri*.

**Dynamics:** *Carex douglasii* is tolerant of yearly and annual shifts in soil moisture. Stands form an open to dense turf, resistant to regular cattle grazing and trampling. Ecologically these stands are similar in moisture regime to stands of *Danthonia unispicata* and *Juncus arcticus* (*balticus*, *mexicanus*) alliances, but are more tolerant of alkalinity.

**Species of Interest:** None.

### **Classification Comments**

None.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** GNR **State:** Y

### **References**

Evens et al. 2014, Smith 1998b

**Total Sample Size Used for Description:** N=5

### **Association Stand Table**

#### ***Carex douglasii* Association**

n =5

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	20	1	1	1
<b>Shrub</b>					
	<i>Artemisia tridentata</i>	40	2	1	3
	<i>Ericameria bloomeri</i>	20	20	20	20
<b>Herb</b>					
	<i>Carex douglasii</i>	80	21.5	6	30
	<i>Taraxacum officinale</i>	60	0.73	0.2	1
	<i>Penstemon laetus</i>	40	1	1	1
	<i>Ranunculus</i>	40	1	1	1
	<i>Potentilla gracilis</i>	40	1	1	1
	<i>Poa nevadensis</i>	40	30	30	30
	<i>Elymus elymoides</i>	40	2	1	3

## Association Stand Table continued

### ***Carex douglasii* Association**

n =5

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Achillea millefolium</i>	40	1	1	1
<i>Juncus arcticus</i>	40	4	3	5
<i>Carex</i>	40	15.1	0.2	30
<i>Phlox hoodii</i>	20	1	1	1
<i>Lomatium triternatum</i>	20	3	3	3
<i>Sisyrinchium idahoense</i>	20	0.2	0.2	0.2
<i>Lupinus</i>	20	1	1	1
<i>Melica</i>	20	18	18	18
<i>Microseris</i>	20	3	3	3
<i>Navarretia intertexta</i>	20	0.2	0.2	0.2
<i>Poa</i>	20	3	3	3
<i>Polygonum arenastrum</i>	20	1	1	1
<i>Potentilla</i>	20	0.2	0.2	0.2
<i>Eryngium</i>	20	1	1	1
<i>Mimulus moschatus</i>	20	1	1	1
<i>Agoseris</i>	20	1	1	1
<i>Hordeum</i>	20	0.2	0.2	0.2
<i>Juncus bufonius</i>	20	1	1	1
<i>Achnatherum thurberianum</i>	20	3	3	3
<i>Agrostis exarata</i>	20	0.2	0.2	0.2
<i>Antennaria rosea</i>	20	1	1	1
<i>Aster</i>	20	3	3	3
<i>Bromus tectorum</i>	20	3	3	3
<i>Castilleja</i>	20	0.2	0.2	0.2
<i>Centaurium tenuiflorum</i>	20	6	6	6
<i>Cirsium arvense</i>	20	1	1	1
<i>Gnaphalium palustre</i>	20	0.2	0.2	0.2

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## ***Scirpus microcarpus* Alliance**

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**Common Name:** Small-fruited bulrush marsh Alliance

**NVC Alliance Code:** A3808. *Glyceria grandis* - *Glyceria striata* - *Glyceria borealis* Wet Meadow Alliance

### **Alliance Concept**

The *Scirpus microcarpus* Alliance forms an open herbaceous layer. It is found primarily in flat or low-gradient areas at southwestern aspects. Soils are derived from a variety of substrates but primarily silty alluvium, and textures include muck. Elevation is approximately 1505 m. Characteristic herbs include *Agrostis gigantea*, *Artemisia douglasiana*, *Carex* sp., *Cicuta douglasii*, *Eleocharis acicularis*, *Epilobium ciliatum*, *Juncus* sp., *Juncus arcticus*, *Mimulus guttatus*, *Scirpus microcarpus*, *Trifolium longipes*, *Trifolium willdenovii*, and *Veronica scutellata*. Emergent shrubby *Salix* species are common.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Agrostis gigantea*, *Artemisia douglasiana*, *Carex*, *Cicuta douglasii*, *Eleocharis acicularis*,

*Epilobium ciliatum*, *Juncus*, *Juncus arcticus*, *Mimulus guttatus*, *Scirpus microcarpus*, *Trifolium longipes*, *Trifolium willdenovii*, and *Veronica scutellata*. The overall herbaceous cover is 35 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Mountain (M261Gi)

### **Associations**

*Scirpus microcarpus* Association

**Note:** Because this description is based on a single sample, the statistics of the above association are the same as the alliance. There will not be a separate description for the association.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1505 m

Aspect: SW (1)

Slope: 2 degrees

Macro Topography: Bottom (1)

Tree Cover: 1%

Shrub Cover: 0%

Herb Cover: 35%

Large Rock: 0%

Small Rock: 0.4%

Fines Cover: 53%

Litter Cover: 15%

Soil Texture (field assessed): Muck (1)

Geology (map data): Silty alluvium (1)

**Environment:** Stands of this alliance are usually less than 0.5 acres and limited to sites where saturated substrate persists through the growing season.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 35 percent. The tree layer is sparse, and the shrub layer is absent.

**Vegetation Floristics:** Characteristic herbs include *Agrostis gigantea*, *Artemisia douglasiana*, *Carex* sp., *Cicuta douglasii*, *Eleocharis acicularis*, *Epilobium ciliatum*, *Juncus* sp., *Juncus arcticus*, *Mimulus guttatus*, *Scirpus microcarpus*, *Trifolium longipes*,



*Trifolium willdenovii*, and *Veronica scutellata*. *Salix lucida* ssp. *lasiandra* saplings may be present.

**Dynamics:** *S. microcarpus* is usually the dominant species and averages about 1 m in height. The photograph above shows a recently grazed stand that occurs along a small perennial creek. . Note the emergent *Salix lucida* ssp. *lasiandra* and signs of hoof punch in the soggy substrate. Substrate is rich in organic material and some stands are classified as fens (Cooper and Wolf 2006).

**Species of Interest:** None.

### **Classification Comments**

Only one stand of this type was sampled for this project, but it is a well described alliance in California.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G4    **State:** S2

### **References**

Cooper and Wolf 2006, Keller-Wolf et al. 2003a, Klein et al. 2015, Pickart 2006, Smith 1998b

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Scirpus microcarpus* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Sapling</b>					
	<i>Salix lucida</i> ssp. <i>lasiandra</i>	100	1	1	1
<b>Herb</b>					
	<i>Veronica scutellata</i>	100	0.2	0.2	0.2
	<i>Eleocharis acicularis</i>	100	2	2	2
	<i>Trifolium willdenovii</i>	100	11	11	11
	<i>Trifolium longipes</i>	100	0.2	0.2	0.2
	<i>Scirpus microcarpus</i>	100	9	9	9
	<i>Mimulus guttatus</i>	100	3	3	3
	<i>Juncus arcticus</i>	100	1	1	1
	<i>Cicuta douglasii</i>	100	7	7	7

### **Alliance Stand Table continued**

## ***Scirpus microcarpus* Alliance**

n =1

Lifeform Botanical Name

Herb

Con

Avg

Min

Max

*Carex*

100

2

2

2

*Artemisia douglasiana*

100

0.2

0.2

0.2

*Agrostis gigantea*

100

0.2

0.2

0.2

*Epilobium ciliatum*

100

0.2

0.2

0.2

*Juncus*

100

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## ***Solidago canadensis* Provisional Alliance**

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PHOTO FROM MARIPOSA COUNTY

**Common Name:** Canada goldenrod patches Alliance

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Solidago canadensis* Provisional Alliance forms an intermittent herbaceous layer. The shrub and tree layers are sparse. It is found primarily on the middle third of southwest-facing slopes. Soils are derived from a variety of substrates but primarily basalt, and textures include medium sand. Elevation is approximately 1578 m. *Solidago canadensis* is the dominant herb, and characteristic herbs include *Aquilegia formosa*, *Bromus tectorum*, *Carex nebrascensis*, *Cerastium fontanum* ssp. *vulgare*, *Juncus arcticus*, *Poa pratensis*, *Rumex crispus*, *Taraxacum officinale*, and *Urtica dioica*. Commonly associated emergent trees at sparse cover include *Juniperus occidentalis*. Commonly associated emergent shrubs at sparse cover include *Prunus virginiana*, *Sambucus nigra*, *Cornus sericea*, and *Rosa woodsii*.

**Diagnostic Criteria:** This alliance is characterized by an intermittent herbaceous layer of *Solidago canadensis*. The overall herbaceous cover is 43 percent.

### **Local Alliance Distribution**

**Modoc Plateau:** Likely Tableland (M261Gh)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: 1578 m

Aspect: SW (1)

Slope: 20 degrees

Macro Topography: Middle 1/3 of slope (1)

Tree Cover: 1%

Shrub Cover: 2%

Herb Cover: 43%

Large Rock: None recorded.

Small Rock: None recorded.

Fines Cover: 5%

Litter Cover: 25%

Soil Texture (field assessed): Medium sand (1)

Geology (map data): Basalt (1)

**Environment:** Stands of this alliance occupy moist meadows and riparian terraces outside of the zone of permanent summer saturation.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an intermittent herbaceous layer, and the overall herbaceous cover is 43 percent. The tree and shrub layers are typically sparse.

**Vegetation Floristics:** Dominant herbs include *Solidago canadensis*, and characteristic herbs include *Aquilegia formosa*, *Bromus tectorum*, *Carex nebrascensis*, *Cerastium fontanum* ssp. *vulgare*, *Juncus arcticus*, *Poa pratensis*, *Rumex crispus*, *Taraxacum officinale*, and *Urtica dioica*. The tree layer is emergent and typically or often includes *Juniperus occidentalis*. The shrub layer is emergent and typically or often includes *Prunus virginiana*, *Sambucus nigra*, *Cornus sericea*, and *Rosa woodsii*.

**Dynamics:** *S. canadensis* is the dominant stoloniferous forb. Stands tend to have a somewhat patchy distribution of *S. canadensis*, interspersed with other lower growing graminoids, grasses, and herbs. Emergent shrubs are scattered throughout the stands.

**Species of Interest:** None.

### **Classification Comments**

This is considered a provisional type for California. Additional sampling and analysis for this type is necessary to fully understand its variability and relationship to other moist meadow types.

**Classification Confidence:** Moderate

### **Conservation Status Rank**

**Global:** G4?    **State:** S4?

### **References**

None.

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Solidago canadensis* Alliance**

n =1

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Tree</b>					
	<i>Juniperus occidentalis</i>	100	1	1	1
<b>Shrub</b>					
	<i>Cornus sericea</i>	100	0.2	0.2	0.2
	<i>Sambucus nigra</i>	100	1	1	1
	<i>Prunus virginiana</i>	100	1	1	1
	<i>Rosa woodsii</i>	100	0.2	0.2	0.2
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	0.2	0.2	0.2
	<i>Taraxacum officinale</i>	100	1	1	1
	<i>Poa pratensis</i>	100	1	1	1
	<i>Solidago canadensis</i>	100	25	25	25
	<i>Urtica dioica</i>	100	1	1	1
	<i>Rumex crispus</i>	100	0.2	0.2	0.2
	<i>Mimulus guttatus</i>	100	15	15	15
	<i>Juncus arcticus</i>	100	0.2	0.2	0.2
	<i>Carex nebrascensis</i>	100	1	1	1
	<i>Aquilegia formosa</i>	100	0.2	0.2	0.2
	<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	100	1	1	1



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## ***Stipa thurberiana* Unique Stand**

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**Common Name:** Thurber's needle grass

**NVC Alliance Code:** None.

### **Alliance Concept**

The *Stipa thurberiana* unique stand forms an open herbaceous layer. The shrub layer is sparse and the tree layer is absent. It is found primarily on southwest-facing middle to upper slopes and summits. Soils are derived from a variety of substrates but primarily general volcanic extrusives, and textures include loamy sand and moderately fine silty clay loam. Elevation range is approximately 1378 – 1729 m. Characteristic herbs include *Achnatherum thurberianum*, *Bromus tectorum*, and *Poa secunda*. Those often present include *Antennaria dimorpha*, *Cirsium occidentale*, *Draba verna*, *Elymus elymoides*, *Elymus multisetus*, *Epilobium brachycarpum*, *Eriogonum vimineum*, *Erodium cicutarium*, *Holosteum umbellatum*, *Lagophylla ramosissima*, *Lomatium macrocarpum*, *Phoenicaulis cheiranthoides*, *Pseudoroegneria spicata*, and *Vulpia myuros*. Commonly associated emergent shrubs at sparse cover include *Ericameria nauseosa*.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Achnatherum thurberianum*, *Bromus tectorum*, and *Poa secunda*. The overall herbaceous cover is 28 percent.

### **Local Alliance Distribution**

**Northwestern Basin and Range:** Medicine Lake Lava Flows (M261Dh)

**Southern Cascades:** Medicine Lake Lava Flows (M261Dh)

### **Associations**

None.

### **Environmental Description**

#### **Plot/Sample Data Environmental Summary:**

Elevation: Mean 1553 m, Range 1378 – 1729 m

Aspect: SW (2)

Slope: Mean 9.5 degrees, Range 3 – 16 degrees

Macro Topography: Interfluvial/Summit (1), Middle to Upper 1/3 of slope (1)

Tree Cover: 0%

Shrub Cover: 0.2%

Herb Cover: 28%

Large Rock: 1%

Small Rock: 89%

Fines Cover: Mean 9.5%, Range 3 – 16%

Litter Cover: Mean 3%, Range 1 – 5%

Soil Texture (field assessed): Loamy Sand (1), Moderately fine silty clay loam (1)

Geology (map data): General volcanic extrusives (1)

**Environment:** Stands of this alliance occur on moderately coarse gravelly to sandy soils adjacent to rock outcrops and at the base of slopes. Stands may occur in areas with recent fire or other disturbance history.

### **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 28 percent. The tree layer is typically absent, and the shrub layer is sparse.

**Vegetation Floristics:** Characteristic herbs include *Achnatherum thurberianum*, *Bromus tectorum*, and *Poa secunda*. Those often present are *Antennaria dimorpha*, *Cirsium occidentale*, *Draba verna*, *Elymus elymoides*, *Elymus multisetus*, *Epilobium brachycarpum*, *Eriogonum vimineum*, *Erodium cicutarium*, *Holosteum umbellatum*, *Lagophylla ramosissima*, *Lomatium macrocarpum*, *Phoenicautis cheiranthoides*,

*Pseudoroegneria spicata*, and *Vulpia myuros*. The shrub layer is emergent and typically or often includes *Ericameria nauseosa*.

**Dynamics:** Stand longevity may be relatively short, due to shifting fire intervals and competition from later seral and taller shrubs and/or *Juniperus occidentalis*.

**Species of Interest:** None.

### **Classification Comments**

Only two surveys were collected for this type within the study area and there has been very little additional data for is elsewhere in California. Therefore, more sampling and analysis of this type is necessary in order to accept this as a type for California and determining its relationship to other existing types.

**Classification Confidence:** Low

### **Conservation Status Rank**

**Global:** GNR    **State:** SNR

### **References**

None.

**Total Sample Size Used for Description:** N=2

### **Alliance Stand Table**

#### ***Stipa thurberiana* unique stand**

n =2

Lifeform	Botanical Name	Con	Avg	Min	Max
<b>Shrub</b>					
	<i>Ericameria nauseosa</i>	50	0.2	0.2	0.2
<b>Herb</b>					
	<i>Bromus tectorum</i>	100	1.75	1.5	2
	<i>Achnatherum thurberianum</i>	100	6.25	3.5	9
	<i>Poa secunda</i>	100	1.1	0.2	2
	<i>Elymus elymoides</i>	50	1.5	1.5	1.5
	<i>Holosteum umbellatum</i>	50	10	10	10
	<i>Vulpia myuros</i>	50	1	1	1
	<i>Pseudoroegneria spicata</i>	50	0.2	0.2	0.2
	<i>Phoenicaulis cheiranthoides</i>	50	0.2	0.2	0.2
	<i>Lomatium macrocarpum</i>	50	7.5	7.5	7.5
	<i>Lagophylla ramosissima</i>	50	0.2	0.2	0.2
	<i>Erodium cicutarium</i>	50	4	4	4
	<i>Eriogonum vimineum</i>	50	0.2	0.2	0.2
	<i>Elymus multisetus</i>	50	3	3	3

**Alliance Stand Table continued**

***Stipa thurberiana* unique stand**

n =2

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Draba verna</i>	50	0.2	0.2	0.2
<i>Cirsium occidentale</i>	50	0.2	0.2	0.2
<i>Antennaria dimorpha</i>	50	3.5	3.5	3.5
<i>Epilobium brachycarpum</i>	50	1	1	1



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## ***Typha domingensis* – *Typha latifolia* – *Typha angustifolia* Alliance**

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**Common Name:** Cattail marshes Alliance

**NVC Alliance Code:** A3896. *Typha domingensis* - *Typha latifolia* - *Phragmites australis* ssp. *americanus* Western Marsh Alliance

### **Alliance Concept**

The *Typha domingensis* – *Typha latifolia* – *Typha angustifolia* Alliance forms an open herbaceous layer. It is found primarily in flat or low-gradient areas at southwestern aspects. Elevation is approximately 1524 m. *Carex simulata* and *Typha domingensis* are the dominant herbs, and *Carex lenticularis*, *Epilobium ciliatum*, *Juncus ensifolius*, *Lotus tenuis*, *Mimulus* sp., *Poa* sp., *Rumex crispus* are characteristic.

**Diagnostic Criteria:** This alliance is characterized by an open herbaceous layer of *Carex simulata*, *Typha domingensis*, *Carex lenticularis*, *Epilobium ciliatum*, *Juncus ensifolius*, *Lotus tenuis*, *Mimulus* sp., *Poa* sp., and *Rumex crispus*. The overall herbaceous cover is 23 percent.



## **Local Alliance Distribution**

**Modoc Plateau:** Eagle Lake - Observation Peak (M261Gm)

## **Associations**

*Typha domingensis* Association

**Note:** Because this description is based on a single sample, the statistics of the above association are the same as the alliance. There will not be a separate description for the association.

## **Environmental Description**

### **Plot/Sample Data Environmental Summary:**

Elevation: 1524 m

Aspect: SW (1)

Slope: 1 degree

Macro Topography: Bottom (1)

Tree Cover: 0%

Shrub Cover: 0%

Herb Cover: 23%

Large Rock: 0%

Small Rock: 0%

Fines Cover: 91%

Litter Cover: 3%

Soil Texture (field assessed): Unknown (1)

Geology (map data): None recorded.

**Environment:** Stands occur throughout most of the Modoc Plateau and the NW Basin and Range ecoregions except for the higher and more mountainous areas. Stands of this alliance are found where there is semi-permanently flooded fresh or brackish water.

## **Vegetation Description**

**Vegetation Structure:** The alliance forms an open herbaceous layer, and the overall herbaceous cover is 23 percent. The tree and shrub layers are typically absent.

**Vegetation Floristics:** *Carex simulata* and *Typha domingensis* are co-dominant in the herb layer, and characteristic herbs include *Carex lenticularis*, *Epilobium ciliatum*, *Juncus ensifolius*, *Lotus tenuis*, *Mimulus* sp., *Poa* sp., and *Rumex crispus*.

**Dynamics:** *Typha* spp. stands often replace other wetland herbaceous stands as a result of enlarging, dredging, or clearing of a wetland area. *Typha* also tends to increase with increasing Nitrogen so may occur in ponds near livestock pastures. Many stands of

*Typha* in California are of hybrid origin. This includes taxa commonly called *T. domingensis*.

**Species of Interest:** None.

### **Classification Comments**

Only one stand of this type was sampled for this project, but it is a well described alliance in California.

**Classification Confidence:** High

### **Conservation Status Rank**

**Global:** G5    **State:** S5

### **References**

AECOM 2013, Buck and Evens 2010, Buck-Diaz et al. 2012, Evens et al. 2014, Junak et al. 2007, Klein et al. 2015, Menke et al. 2019, Rodriguez et al. 2017, Sproul et al. 2011

**Total Sample Size Used for Description:** N=1

### **Alliance Stand Table**

#### ***Typha domingensis* – *Typha latifolia* – *Typha angustifolia* Alliance**

n =1

Lifeform Botanical Name	Con	Avg	Min	Max
Herb				
<i>Lotus tenuis</i>	100	0.2	0.2	0.2
<i>Mimulus</i>	100	1	1	1
<i>Typha domingensis</i>	100	11	11	11
<i>Poa</i>	100	1	1	1
<i>Rumex crispus</i>	100	0.2	0.2	0.2
<i>Epilobium ciliatum</i>	100	0.2	0.2	0.2
<i>Juncus ensifolius</i>	100	0.2	0.2	0.2
<i>Carex simulata</i>	100	9	9	9
<i>Carex lenticularis</i>	100	1	1	1