

Ventura River Watershed Redd Surveys 2015

Prepared by:

Terra, Dressler, Patrick Saldaña, and Sam Bankston

Pacific States Marine Fisheries Commission, 1933 Cliff Drive, Suite 9 Santa Barbara, CA 93109

Introduction

In 1997, southern California steelhead (*Oncorhynchus mykiss*) were listed as endangered under the Federal Endangered Species Act (ESA). The National Marine Fisheries Service (NMFS) has created a recovery plan outlining objectives for the species' recovery. This plan outlines five biogeographic population groups (BPGs), adjacent areas with broadly similar geographical and hydrological characteristics, throughout the southern California region. Each BPG will require a minimum number of viable populations within each group before the species can be delisted (NMFS, 2011). Watersheds are classified throughout each BPG in relation to their priority for recovery as Core 1, 2 and 3 populations; with Core 1 populations being the highest priority for recovery (NMFS, 2011).

In recent years the California Department of Fish and Wildlife (CDFW), in cooperation with the Pacific States Marine Fisheries Commission (PSMFC), has focused monitoring efforts on the Ventura River watershed as part of the California Coastal Salmonid Monitoring Program (CMP). Staff and field crew members have conducted habitat surveys, presence/absence snorkel surveys fixed-station migrant counts using dual-frequency identification sonar (DIDSON), and redd surveys. Redd surveys are a relatively cost effective method for monitoring the trends in the number of spawning female steelhead in an area. In addition, information on redd size can assist in determining whether a redd was created by anadromous steelhead or resident rainbow trout since steelhead tend to create bigger redds that contain larger substrate (Zimmerman and Reeves, 2000). Redd surveys also contribute information on the spatial distribution of both anadromous and resident *O. mykiss*.

Obtaining data on population trends over time is crucial for documenting *O. mykiss* recovery. Combined with counts of migrants through DIDSON and distribution data from snorkel surveys, redd surveys can assist management in understanding the status of steelhead populations. This accumulated dataset that will allow us to detect trends in steelhead populations and make informed management decisions.

Survey protocols and reach designations were developed by NMFS (Bush 2012). NMFS staff completed redd surveys through the Ventura basin from 2010 to 2012. In 2013 CDFW, with assistance from PSMFC, adopted these protocols and continued spawner surveys of the Ventura River watershed from 2013 to 2015. This report details the results of the spawner surveys conducted by CDFW and PSMFC during the 2015 spawning season.

Methods

Redd surveys were conducted from December 10, 2014 through June 1, 2015 in the Ventura River watershed using protocols and reach designations developed by NMFS (Table 1; Figure 1 [in present paper]; Bush 2012). Reaches were surveyed every month until the first redd was observed. Thereafter, crews surveyed every reach biweekly.

During redd surveys, teams of two or more walked stream reaches looking for new and old redds, live *O. mykiss*, *O. mykiss* carcasses and other species of interest. Crews also recorded GPS points of intermittent and dry stretches of the surveyed reaches to monitor seasonal variations in wettedness and potential drought effects. All data was collected using paper data forms. The summaries of these protocols are presented below.

Survey Header Data

Date, watershed, stream name, reach, method (e.g., walking), weather (e.g., sunny, cloudy, etc.), air temperature, water temperature, water visibility, and surveyors' names were recorded prior to the beginning of any survey.

Redd Counting Protocol

Because no other redd forming species exist in southern California, all observed redds can be assumed to be a product of *O. mykiss* (Adams et al. 2011). All newly observed redds were flagged and measured for pot length (P_L), pot width (P_w), pot depth (D), pot substrate (P_s), tail spill length (TS_L), tail spill widths (TS_w ; taken from 1/3 and 2/3 the distance from the top of the tail spill) and tail spill substrate (Figure 2).

GPS data was collected using a handheld Garmin Rino 655t unit. Flagging tape indicating the date, redd record number, bearing and distance from the flag to the center of the redd, the total redd length (the combined pot and tail spill lengths of the redd), the redd age and the year was attached downstream of each newly detected redd. This flagging was used to avoid double counting redds and to track any change in redd dimensions between subsequent surveys. Redd age was assigned according to the following rubric:

- 1= New since last survey
- 2= Previously identified and still measurable
- 3= No longer measurable but still visible
- 4= No redd apparent, only flag
- 5= Poor conditions, cannot see substrate

Figure 1. Ventura River watershed redd survey reaches and corresponding location codes.



Table 1. List of redd survey reaches with location codes and GPS points for the Ventura River basin. Reach abbreviations that are used throughout this report are noted here.

Results

Redd Survey Results:

A total of 24 redds were observed during the 2015 survey season in five reaches throughout the Ventura River watershed. Redds were observed in Upper Matilija reach 2, North Fork Matilija reaches 1, 2, and 4 (Bear Creek), and Upper North Fork. However, only two of the surveyed reaches in which redds were observed are considered anadromous. These are North Fork Matilija reaches 1, 2, and 4 (Bear Creek). All redds found in Matilija Creek and Upper North Fork Matilija Creek are assumed to be products of freshwater resident *O. mykiss* due to the Matilija Dam's prevention of anadromous migration to these reaches. All new redds were observed between February 12, 2015 and April 14, 2015. Table 2 displays each new redd observation by date and stream reach. The average total length (average pot length plus average tail spill length) for observed redds in the Ventura River watershed was 74.5 cm (29.3 in). Tables 3A and 3B outline the average measurements for redds in the surveyed reaches as well as the averages for the watershed as a whole.

It is important to note that two potential redds were observed during a routine spot check on Ventura River Reach 2 on February 26, 2015. These potential redds were located just upstream of the Ventura River Levee Pool and had been flagged by Casitas Municipal Water District personnel. However, when PSMFC crew members returned for an official survey, a man known to frequent this area had raked the gravel and any redds that may have been there were destroyed. These were the only potential redds observed in the Ventura River main stem this season. They have not been included in our results tables since they were not assessed on an official spawner survey.

Oncorhynchus mykiss Observation Results

Bankside *O. mykiss* observations were recorded opportunistically during each redd survey. Individual fish were potentially recorded more than once with repeat surveys of the same reaches on different days. *O. mykiss* were observed on 7 of the 17 surveyed reaches: San Antonio 1, North Fork Matilija reaches 1, 2, and 4, Upper Matilija Reaches 1 and 2, and Upper North Fork. The reaches of Matilija Creek located above the Matilija Dam had the most *O. mykiss* observations with 108 individuals recorded between the three reaches. The North Fork Matilija reaches had 75 individuals recorded between four survey reaches. Only one fish was observed in San Antonio Creek, most likely due to a combination of poor water visibility and large sections of dry creek. No *O. mykiss* were observed in the Ventura main stem reaches. This can most likely be attributed to poor water visibility and excessive vegetative cover in the lower reaches (Ventura 1 and 2) and large dry sections throughout the Ventura main stem. It is important to stress that these numbers are based on opportunistic bankside observations only, and that no other methods were employed to assess fish presence during redd surveys.

Other Species Observations Results

Southern Western Pond Turtles

Southern Western Pond Turtles (*Actinemys pallida*) were observed in most surveyed reaches, with the largest concentration in San Antonio Creek during the entirety of the survey season from early December to early June (Table 7). It is likely that some double-counting occurred as individuals were never marked or tagged. When possible, carapace length and sex were recorded.

California Red-Legged Frogs

California Red-legged Frogs (*Rana draytonii*) (CRLF) are a federally threatened species and opportunistic sightings of adult individuals (Figure 6), and egg masses (Figure 7) were recorded during surveys. CRLF adults and egg masses were observed in Upper Matilija Creek and San Antonio Creek (Table 8). Crew members were not trained to differentiate CRLF tadpoles from other species, so tadpole observations were not recorded.

Two-striped Gartersnake Observations

Observations of Two-striped Gartersnakes (*Thamnophis hammondi*) (TSGS) (Figure 8) were recorded when individuals could be positively identified. TSGS were observed from early March to the end of the survey season in the Ventura River main stem, Upper Matilija Creek, and North Fork Matilija Creek (Table 9).

Discussion

Since 2010, California has experienced a considerable lack of precipitation causing a severe drought throughout most of the state. These conditions caused streams in Ventura country, including most of the Ventura River Basin, to exhibit low flows and increased seasonal drying during the 2015 water year. From October 1, 2014 to September 30, 2015, downtown Ventura (city hall station) received 7.93 inches of rain. Based on rainfall averages from October 1957 through September 1992 (the most representative 35-year period for long term average in Ventura county), this station receives 14.71 inches of rain during a year of average rainfall (VCWPD 2015). As this was the fifth consecutive year of insufficient rainfall, some reaches in the Ventura River Basin remained dry throughout the entirety of the spawning season and others were wetted only briefly. There were few opportunities for steelhead to migrate during the 2015 spawning season, as southern California steelhead require flow events capable of maintaining migration corridors in order to travel upstream to spawn. Discharge measured by the USGS gauge in the Ventura River main stem for this time period never exceeded 4.5 cubic feet per second. During the previous water year, a single storm event generating flows in excess of 3,000 ft³/s represented the only opportunity for steelhead migration into and throughout the Ventura River watershed. It is likely that stream flow in the Ventura River main stem never entered a high enough range to support upstream *O. mykiss* migration during the 2015 spawning season.

With sparse rainfall, the berm at the mouth of the Ventura River breached only briefly with associated flows insufficient to prompt steelhead migration. Even if steelhead made it into the river during this time, channel-spanning invasive vegetation in four different locations in the lowest survey reach (Ventura 1) would have prevented them from migrating into the upper reaches to spawn (Figure 9, Figure 10). Furthermore, the largest observed redd in an anadromous reach had a total length of 140 cm. Most of the observed redds were much smaller, with an average total length of 74.5 cm. Steelhead redds are typically much larger than this. A study conducted throughout Mendocino County, California found the average observed steelhead redd length to be 224 cm (Gallagher 2003). Due to the small size

of the observed redds and the lack of suitable conditions to support migration, we can infer that redds observed in anadromous reaches were most likely the result of resident *O. mykiss* and that no anadromous steelhead spawned in the Ventura River Basin during the 2015 spawning season.

Due to increased staffing, seven additional reaches were surveyed during the 2015 spawning season that were not covered during 2014. Three of these reaches (Upper Matilija Reaches 1 and 2, Upper North Fork) are located above a man-made total barrier (the Matilija Dam) and are currently non-anadromous. Should this barrier be removed, the *O. mykiss* populations behind them would gain the ability to interact with anadromous populations. 42% of the observed redds were located upstream of the Matilija Dam. This is not surprising, as these reaches contain a significant amount of high quality spawning habitat and experience much less water diversion, human waste input, and exposure to invasive species compared to lower reaches in the Ventura River Basin.

Although 11 more redds were observed this season compared to last season, most of the 2015 redds were observed in reaches that were not surveyed the previous spawning season. Seven total redds were observed in reaches surveyed the year before (Ventura River main stem, San Antonio Reaches 1 and 2, North Fork Matilija Reaches 1 and 2) whereas 13 redds were seen in these areas during the 2014 season. No redds were observed in San Antonio Creek this year, while three redds were observed in this stream in 2014. One redd was observed in Ventura River reach 5 in 2014, while none were observed in 2015. Seven redds were observed in North Fork Matilija in 2015 (excluding Bear Creek), while nine were observed in this creek in 2014.

One potential source of error in redd counts is that poor water clarity and extensive invasive vegetation (mostly primrose) made it impossible for crew members to see the river bottom throughout most of the lower Ventura River. However, it is also important to note that these lower sections are typically dominated by silt and cobble substrate, and viable spawning gravel was rarely observed in these river reaches. There is generally a greater amount of spawning habitat present in the upper reaches, hence the increased redd observations in these areas (Figure 9). However, it will be important to continue to

survey these lower reaches in consecutive years since substrate composition can change with streamflow.

During the 2013 spawning season, 23 redds were recorded in the Ventura River Basin (surveyed reaches included Ventura River main stem reaches 1 through 5, San Antonio reaches 1 and 2, and North Fork Matilija reaches 1 and 2). In 2014, 13 redds were observed in these reaches. In 2015, only 7 redds were observed in these reaches. This decline in redd observations as drought conditions persist suggests that both resident and anadromous have been impacted. Further research on the effects of drought conditions on *O. mykiss* in southern California may prove especially useful in determining the role of climate change on partial migration strategies within the species' population groups. While data suggests that no southern California steelhead migrated up the Ventura River this year, we must also consider the possibility that steelhead in the ocean that originated from the Ventura River could have migrated and spawned elsewhere. The ongoing drought in California is making it increasingly difficult for fish to access their natal spawning grounds and so it is possible that Ventura River fish are straying into other streams exhibiting connectivity with the ocean. The data from this survey gives us no information on the number of steelhead currently in the ocean. Until rainfall increases and access between the river and ocean improves significantly, this number will remain difficult to estimate.

Description	Location Code	Latitude Downstream	Longitude Downstream	Latitude Upstream	Longitude Upstream	Distance (mi)
Ventura River Reach 1	1	34.28189	119.30885	34.33662	119.29708	4.04
Ventura River Reach 2	2	34.33662	119.29708	34.37942	119.30752	3.48
Ventura River Reach 3	3	34.37942	119.30752	34.42503	119.30159	3.48
Ventura River Reach 4	4	34.42503	119.30159	34.46509	119.2895	3.36
Ventura River Reach 5	5	34.46509	119.2895	34.48456	119.30843	1.68
Ventura / Matilija Reach	5.1	34.485269	119.300042	34.484413	119.30853	0.65
Matilija Creek Reach 1	6	34.49466	119.33091	34.50217	119.37057	2.80
Matilija Creek Reach 2	7	34.50217	119.37057	34.51756	119.40476	2.49
San Antonio Crk Reach 1	8	34.37942	119.30752	34.4221	119.26424	4.66
San Antonio Crk Reach 2	9	34.4221	119.26424	34.45434	119.22169	3.85
San Antonio Crk Reach 3	10	34.45434	119.22169	34.46603	119.20564	1.43
San Antonio (Lion) Reach 4	11, 11.1	34.4221	119.26424	34.441936	119.24276	1.58
North Fork Matilija Reach 1	12	34.4853	119.29973	34.50691	119.29518	2.17
North Fork Matilija Reach 2	13	34.50691	119.29518	34.5129	119.27386	2.11
North Fork Matilija Reach 3	14, 14.1, 14.2	34.5129	119.27386	34.51854	119.2814	1.40
NF Matilija (Bear) Reach 4	15	34.5129	119.27386	34.51152	119.25447	1.24
Matilija Creek (UNF) Reach 3	16	34.509104	119.383623	34.515639	119.372944	1.24

Figure 2. Redd measurement locations

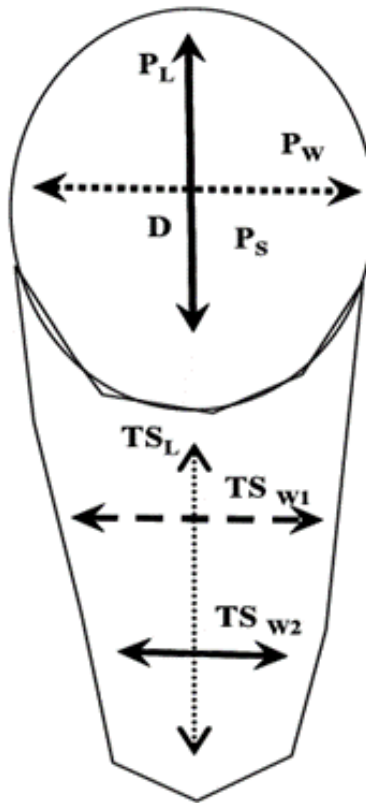


Table 2. New redd observations by stream reach. Redd observations are listed for each survey date and stream reach. The number of redds seen on the survey is shown in red. When a survey was complete but no new redds were found a black 0 is used. Blank cells indicate days where no survey occurred on the reach in question. The total number of redd observations for each reach are in bold.

Survey Date	Stream Reach																
	VR1	VR2	VR3	VR4	VR5	VR5.1	MAT1	MAT2	MAT3 (UNF)	SA1	SA2	SA3	SA4 (Lion)	NF1	NF2	NF3	NF4 (Bear)
12/10/2014	0																
12/15/2014										0							
12/16/2014														0			
12/20/2014			0														
12/22/2014															0		
12/29/2014		0															
12/30/2014											0						
1/2/2015																	0
1/5/2015						0											
1/7/2015				0	0												
1/8/2015							0	0									
1/12/2015																	0
1/13/2015	0	0															
1/20/2015									0								
1/21/2015													0				
1/22/2015										0	0						
1/28/2015															0		
2/2/2015				0	0							0					
2/4/2015							0	0									
2/10/2015						0											
2/12/2015																	1
2/18/2015									0				0				
2/23/2015	0	0															
2/25/2015										0	0						
2/26/2015				0	0												
3/2/2015							0										
3/3/2015														2	3		
3/4/2015								0									
3/5/2015																	1
3/9/2015	0																
3/10/2015		0															
3/11/2015										0	0						
3/12/2015				0	0												
3/16/2015																	3
3/17/2015								0									
3/18/2015														1	1		
3/19/2015									4								
3/23/2015	0	0															
3/24/2015													0				
3/25/2015										0	0						
3/26/2015				0	0												
3/30/2015							0	1									
4/1/2015														0	0		
4/2/2015									3								1
4/6/2015	0	0															
4/7/2015										0	0						
4/9/2015					0												
4/13/2015									1								
4/14/2015								1									
4/15/2015														0	0		
4/16/2015																	1
4/20/2015	0	0															
4/21/2015			0										0				
4/22/2015										0	0						
4/27/2015								0									
4/28/2015									0								
4/29/2015															0		0
5/4/2015		0															
5/5/2015											0						
5/6/2015					0					0							
5/12/2015								0	0								
5/13/2015														0	0		
5/18/2015																	0
5/19/2015							0										
5/20/2015													0				
5/21/2015	0	0															
5/27/2015														0	0		
5/28/2015										0	0						
5/29/2015																	0
6/1/2015								0	0								
Total	0	0	0	0	0	0	0	0	2	8	0	0	0	0	3	4	0

Table 3A: Average redd survey measurements for each surveyed reach and averages for all the surveyed reaches within the watershed (centimeters).

Reach	Number of Redds	Average Pot Length	Average Pot Width	Average Pot Depth	Average Pot Substrate Size	Average Pot Area	Average Tail Spill Length	Average Tail Spill Width	Average Tail Substrate Size	Average Tail Spill Area	Average Total Length
VR1	0	-	-	-	-	-	-	-	-	-	-
VR2	0	-	-	-	-	-	-	-	-	-	-
VR3	0	-	-	-	-	-	-	-	-	-	-
VR4	0	-	-	-	-	-	-	-	-	-	-
VR5	0	-	-	-	-	-	-	-	-	-	-
VR5.1	0	-	-	-	-	-	-	-	-	-	-
MAT1	0	-	-	-	-	-	-	-	-	-	-
MAT2	2	26.0	25.0	2.7	2.5	530.4	39.0	18.7	1.1	733.2	65.0
SA1	0	-	-	-	-	-	-	-	-	-	-
SA2	0	-	-	-	-	-	-	-	-	-	-
SA3	0	-	-	-	-	-	-	-	-	-	-
SA4	0	-	-	-	-	-	-	-	-	-	-
NFM1	3	43.8	41.0	4.5	2.5	1428.4	81.3	32.4	1.4	2700.6	125.0
NFM2	4	25.0	26.5	3.3	1.5	529.3	44.8	20.9	0.6	1094.4	69.8
NFM3	0	-	-	-	-	-	-	-	-	-	-
NFM4	7	21.1	19.7	3.7	1.0	331.8	31.9	19.7	0.4	678.9	53.0
UNF	8	22.6	22.8	3.4	1.3	442.0	37.1	18.6	0.7	778.8	59.7
Watershed Total	24	27.7	27.0	3.5	1.8	652.4	46.8	22.0	0.8	1197.2	74.5

Table 3B. Average redd measurements for each surveyed reach and averages for all the surveyed reaches within the watershed (inches).

Reach	Number of Redds	Average Pot Length	Average Pot Width	Average Pot Depth	Average Pot Substrate Size	Average Pot Area	Average Tail Spill Length	Average Tail Spill Width	Average Tail Substrate Size	Average Tail Spill Area	Average Total Length
VR1	0	-	-	-	-	-	-	-	-	-	-
VR2	0	-	-	-	-	-	-	-	-	-	-
VR3	0	-	-	-	-	-	-	-	-	-	-
VR4	0	-	-	-	-	-	-	-	-	-	-
VR5	0	-	-	-	-	-	-	-	-	-	-
VR5.1	0	-	-	-	-	-	-	-	-	-	-
MAT1	0	-	-	-	-	-	-	-	-	-	-
MAT2	2	10.2	9.8	1.0	1.0	208.8	15.4	7.3	0.4	288.6	25.6
SA1	0	-	-	-	-	-	-	-	-	-	-
SA2	0	-	-	-	-	-	-	-	-	-	-
SA3	0	-	-	-	-	-	-	-	-	-	-
SA4	0	-	-	-	-	-	-	-	-	-	-
NFM1	3	17.2	16.1	1.8	1.0	562.4	32.0	12.8	0.5	1063.2	49.2
NFM2	4	9.8	10.4	1.3	0.6	208.4	17.6	8.2	0.2	430.8	27.5
NFM3	0	-	-	-	-	-	-	-	-	-	-
NFM4	7	8.3	7.8	1.4	0.4	130.6	12.6	7.7	0.2	267.3	20.9
UNF	8	8.9	9.0	1.3	0.5	174.0	14.6	7.3	0.3	306.6	23.5
Watershed Total	24	10.9	10.6	1.4	0.7	256.8	18.4	8.7	0.3	471.3	29.3

Figure 3. A redd observed at Upper North Fork Matilija Creek on April 2nd, 2015.

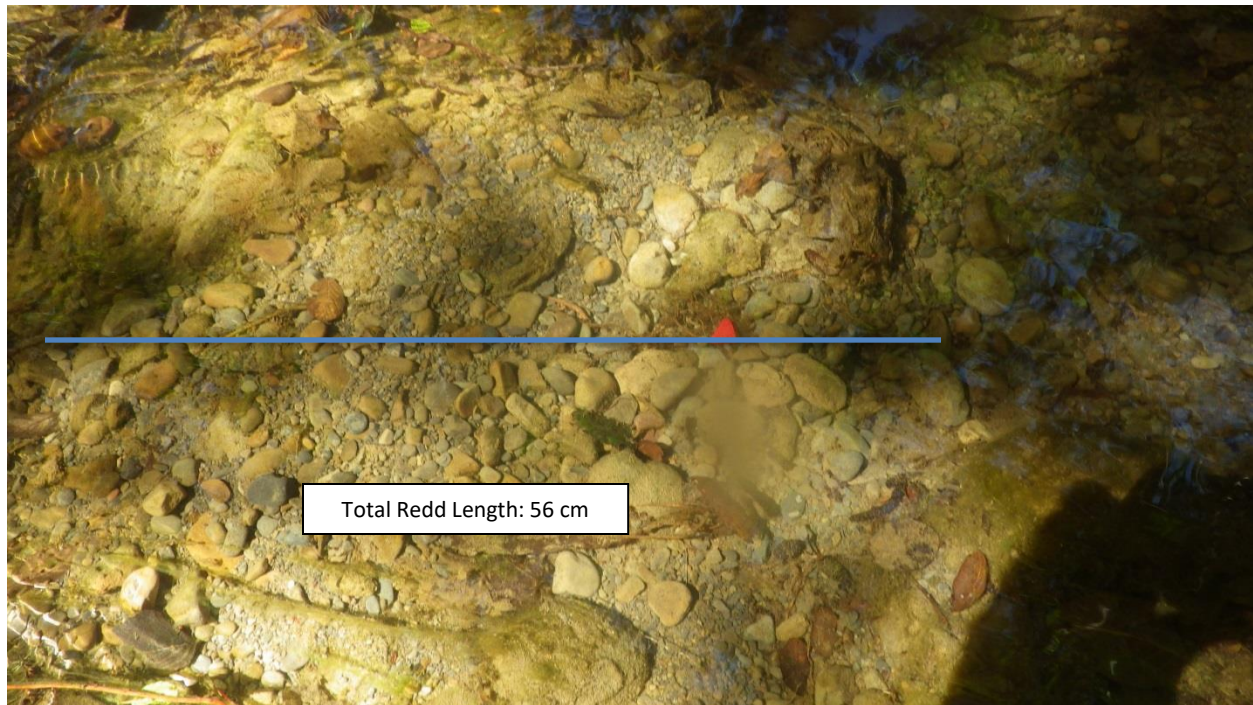


Table 4. *O. mykiss* observations in San Antonio Creek by reach and survey date. The number of *O. mykiss* observed during each survey is indicated in red. A black zero signifies that a survey was carried out but no *O. mykiss* were observed. Blank cells indicate days where no survey occurred on the reach in question. Total observations for each reach are in bold.

Survey Date	SA1	SA2	SA3	SA4 (LION)
12/15/2014	0			
12/30/2014		0		
1/21/2015				0
1/22/2015	0	0		
2/2/2015			0	
2/18/2015				0
2/25/2015	0	0		
3/11/2015	0	0		
3/24/2015				0
3/25/2015	0	0		
4/7/2015	0	0		
4/21/2015				0
4/22/2015	1	0		
5/5/2015		0		
5/6/2015	0			
5/20/2015				0
Total	1	0	0	0

Table 5. *O. mykiss* observations in North Fork Matilija Creek by reach and survey date. The number of *O. mykiss* observed during each survey is indicated in red. A black zero signifies that a survey was carried out but no *O. mykiss* were observed. Blank cells indicate days where no survey occurred on the reach in question. Total observations for each reach are in bold.

Survey Date	NFM1	NFM2	NFM3	NFM4 (Bear)
12/16/2014	3			
12/22/2014		0		
1/2/2015			0	
1/12/2015				1
1/21/2015	0			
1/28/2015		0		
2/12/2015				4
3/3/2015	0	6		
3/5/2015				0
3/16/2015				1
3/18/2015	3	13		
4/1/2015	2	4		
4/2/2015				1
Survey Date	MAT1	MAT2	MAT3 (UNF)	
1/8/2015	0	1		7
4/2/2015	6	2	0	4
2/4/2015	0	4		
5/19/2015			13	3
3/2/2015	0			
Total	18	36	0	21
3/4/2015		8		
3/17/2015		6		
3/19/2015			27	
3/30/2015	0	9		
4/2/2015			8	
4/13/2015			3	
4/14/2015		3		
4/27/2015		2		
4/28/2015	1		12	
5/12/2015		1	7	
5/19/2015	0			
6/1/2015		0	3	
Total	1	34	73	

Table 6. *O. mykiss* Matilija Creek above the Matilija *mykiss* observed indicated in red. A survey was carried observed. Blank cells

observations in reaches located Dam. The number of *O.* during each survey is black zero signifies that a out but no *O. mykiss* were indicate days where no

survey occurred on the reach in question. Total observations for each reach are in bold.

Figure 4. Juvenile *O. mykiss* observed in North Fork Matilija Creek on April 15, 2015.



Figure 5. Southern Western Pond Turtle observed in Upper Matilija Creek on March 2nd, 2015.



Table 7. Observations of Southern Western Pond Turtles in surveyed reaches. Individual counts are indicated by red numbers. Black zeros indicate that no Southern Western Pond Turtles were observed during a completed survey. Blank cells represent days when no survey was completed. Total observations for each reach are in bold.

Survey Date	Stream Reach																
	VR1	VR2	VR3	VR4	VR5	VR5.1	MAT1	MAT2	MAT3 (UNF)	SA1	SA2	SA3	SA4 (Lion)	NF1	NF2	NF3	NF4 (Bear)
12/10/2014	0																
12/15/2014										1							
12/16/2014														0			
12/20/2014			0														
12/22/2014															0		
12/29/2014		0															
12/30/2014											0						
1/2/2015																0	
1/5/2015						0											
1/7/2015				0	0												
1/8/2015							0	0									
1/12/2015																	0
1/13/2015	0																
1/20/2015									0								
1/21/2015													5	0			
1/22/2015										2	0						
1/28/2015															0		
2/2/2015				0	0								0				
2/4/2015							0	0									
2/10/2015						1											
2/12/2015																	0
2/18/2015									1				8				
2/23/2015	4	0			2												
2/25/2015										0	0						
2/26/2015				0	1												
3/2/2015							3										
3/3/2015														0	0		
3/4/2015								1									
3/5/2015																	0
3/9/2015	5																
3/10/2015		4															
3/11/2015										21	3						
3/12/2015				0	3												
3/16/2015																	0
3/17/2015								6									
3/18/2015														3	0		
3/19/2015									3								
3/23/2015	1	2											7				
3/24/2015																	
3/25/2015										8	3						
3/26/2015				0	3												
3/30/2015							0	2									
4/1/2015														0	0		
4/2/2015										3							1
4/6/2015	0	1															
4/7/2015										3	0						
4/9/2015					1												
4/13/2015									0								
4/14/2015								2									
4/15/2015														1	0		
4/16/2015																	1
4/20/2015	0	0															
4/21/2015			1										6				
4/22/2015										4	0						
4/27/2015								2									
4/28/2015							8		1								
4/29/2015														1	2		
5/4/2015		0															
5/5/2015											0						
5/6/2015					1					3	7						
5/12/2015								0	1								
5/13/2015														0	0		
5/18/2015																	1
5/19/2015							4										
5/20/2015													11				
5/21/2015	1	1															
5/27/2015														0	0		
5/28/2015										4	1						
5/29/2015																	0
6/1/2015								2	1								
Total	11	8	1	0	11	1	15	15	10	45	14	0	37	5	2	0	3

Figure 6. California Red-legged Frog observed in Upper Matilija Creek on March 4th, 2015.



Figure 7. CRLF egg mass observed in San Antonio Creek on March 11, 2015.



Table 8. California Red-legged Frog (CRLF) observations in all surveyed reaches. Blue numbers represent CRLF egg masses while red numbers indicate the number of adult frogs. A black zero signifies that a survey was carried out but no CRLF were observed. Blank cells indicate days where no survey occurred on the reach in question. Total observations for each reach are in bold.

Survey Date	Stream Reach																
	VR1	VR2	VR3	VR4	VR5	VR5.1	MAT1	MAT2	MAT3 (UNF)	SA1	SA2	SA3	SA4 (Lion)	NF1	NF2	NF3	NF4 (Bear)
12/10/2014	0																
12/15/2014										0							
12/16/2014														0			
12/20/2014			0														
12/22/2014															0		
12/29/2014		0															
12/30/2014											0						
1/2/2015																0	
1/5/2015						0											
1/7/2015				0	0												
1/8/2015							0	0									
1/12/2015																	0
1/13/2015	0																
1/20/2015									0								
1/21/2015													0	0			
1/22/2015										0	0						
1/28/2015															0		
2/2/2015				0	0			0				0					
2/4/2015									0								
2/10/2015						0											
2/12/2015																	0
2/18/2015									0				0				
2/23/2015	0	0			0												
2/25/2015										0	0						
2/26/2015				0	0												
3/2/2015							5										
3/3/2015														0	0		
3/4/2015									1								
3/5/2015																	0
3/9/2015	0																
3/10/2015		0															
3/11/2015										1	12						
3/12/2015				0	0												
3/16/2015																	0
3/17/2015								9, 2									
3/18/2015														0	0		
3/19/2015									0								
3/23/2015	0	0															
3/24/2015													0				
3/25/2015										2	0						
3/26/2015				0	0												
3/30/2015								0	2								
4/1/2015														0	0		
4/2/2015									0								0
4/6/2015	0	0															
4/7/2015										1	0						
4/9/2015					0												
4/13/2015									0								
4/14/2015								2, 1									
4/15/2015														0	0		
4/16/2015																	0
4/20/2015	0	0															
4/21/2015			0										0				
4/22/2015										1	2						
4/27/2015								2									
4/28/2015							3		1								
4/29/2015														0	0		0
5/4/2015		0															
5/5/2015											1						
5/6/2015					0					0							
5/12/2015								2	2								
5/13/2015														0	0		
5/18/2015																	0
5/19/2015							0										
5/20/2015													0				
5/21/2015	0	0															
5/27/2015														0	0		
5/28/2015										0	0						
5/29/2015																	0
6/1/2015									2	0							
Total	0	0	0	0	0	0	0 5, 3	11, 12	3 1, 4	12, 3	0	0	0	0	0	0	0

Figure 8. TSGS observed at Upper Matilija Creek on March 30, 2015.



Table 9. Observations of Two-striped Gartersnakes in surveyed reaches are indicated by red numbers. Black zeros indicate a completed survey with no TSGS observations. Blank cells indicate days when no survey was completed. Total observations for each reach are in bold.

Survey Date	Stream Reach																
	VR1	VR2	VR3	VR4	VR5	VR5.1	MAT1	MAT2	MAT3 (UNF)	SA1	SA2	SA3	SA4 (Lion)	NF1	NF2	NF3	NF4 (Bear)
12/10/2014	0																
12/15/2014										0							
12/16/2014														0			
12/20/2014			0														
12/22/2014															0		
12/29/2014		0															
12/30/2014											0						
1/2/2015																0	
1/5/2015						0											
1/7/2015				0	0												
1/8/2015							0	0									
1/12/2015																	0
1/13/2015	0																
1/20/2015									0								
1/21/2015													0	0			
1/22/2015										0	0						
1/28/2015															0		
2/2/2015				0	0		0					0					
2/4/2015								0									
2/10/2015						0											
2/12/2015																	0
2/18/2015									0				0				
2/23/2015	0	0			0												
2/25/2015										0	0						
2/26/2015				0	0												
3/2/2015							0										
3/3/2015														0	0		
3/4/2015								1									
3/5/2015																	0
3/9/2015	0																
3/10/2015		0															
3/11/2015										0	0						
3/12/2015				0	0												
3/16/2015																	0
3/17/2015								1									
3/18/2015														1	0		
3/19/2015									0								
3/23/2015	0	1															
3/24/2015													0				
3/25/2015										0	0						
3/26/2015				0	0												
3/30/2015							1	1									
4/1/2015														0	0		
4/2/2015									0								0
4/6/2015	0	0															
4/7/2015										0	0						
4/9/2015					0												
4/13/2015									0								
4/14/2015								2									
4/15/2015														0	2		
4/16/2015																	0
4/20/2015	0	0															
4/21/2015			0										0				
4/22/2015										0	0						
4/27/2015								1									
4/28/2015							3		1								
4/29/2015														1	0		0
5/4/2015		0															
5/5/2015											0						
5/6/2015					0					0							
5/12/2015								0	1								
5/13/2015														2	0		
5/18/2015																	0
5/19/2015							1										
5/20/2015													0				
5/21/2015	0	0															
5/27/2015														1	2		
5/28/2015										0	0						
5/29/2015																	0
6/1/2015								3	0								
Total	0	1	0	0	0	0	5	9	2	0	0	0	0	5	4	0	

Figure 9. Invasive primrose formed barrier observed on the lower Ventura River main stem on January 13, 2015. This barrier was 1 m in height and spanned the entire wetted channel.



Literature Cited

VCWPD (Ventura County Watershed Protection District). <http://pwa.ventura.org/watershed-protection-district/watershed-protection-district>