

Ventura River Watershed Spawner Surveys 2013

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Introduction:

In 1997 Southern California steelhead were listed as endangered under the Federal Endangered Species act. The National Marine Fisheries service has created a recovery plan that outlines necessary actions required before delisting can occur. This plan outlines 5 biogeographic population groups (BPGs) which will require a minimum number of viable populations within each group before delisting can occur. Within each BPG, watersheds are classified based on their intrinsic potential into Core 1, 2 or 3 populations, with Core 1 populations having the highest priority for recovery.

The Ventura River Watershed is listed as a Core 1 population for recovery in the Monte Airido Highlands BPG. To understand whether recovery actions are successful, it is important to have a clear idea of the steelhead population in this watershed. One way to help determine the size of the population is to look at the number of spawning individuals. One method of examining the spawning population in this watershed is to complete regular spawner surveys during the winter spawning season. The California Department of Fish and Wildlife began conducting spawner surveys throughout the Ventura River Watershed starting in January 2013. These surveys include counts and measurements of redds, counts of live fish, as well as counts of other aquatic and riparian organisms of concern.

This report covers results from the first season of spawner surveys conducted for the Department of Fish and Wildlife from January 2013 to June 2013. Surveys were conducted in eight reaches, four in the Ventura River, two in San Antonio Creek, and two in North Fork Matilija Creek (Figure 1).

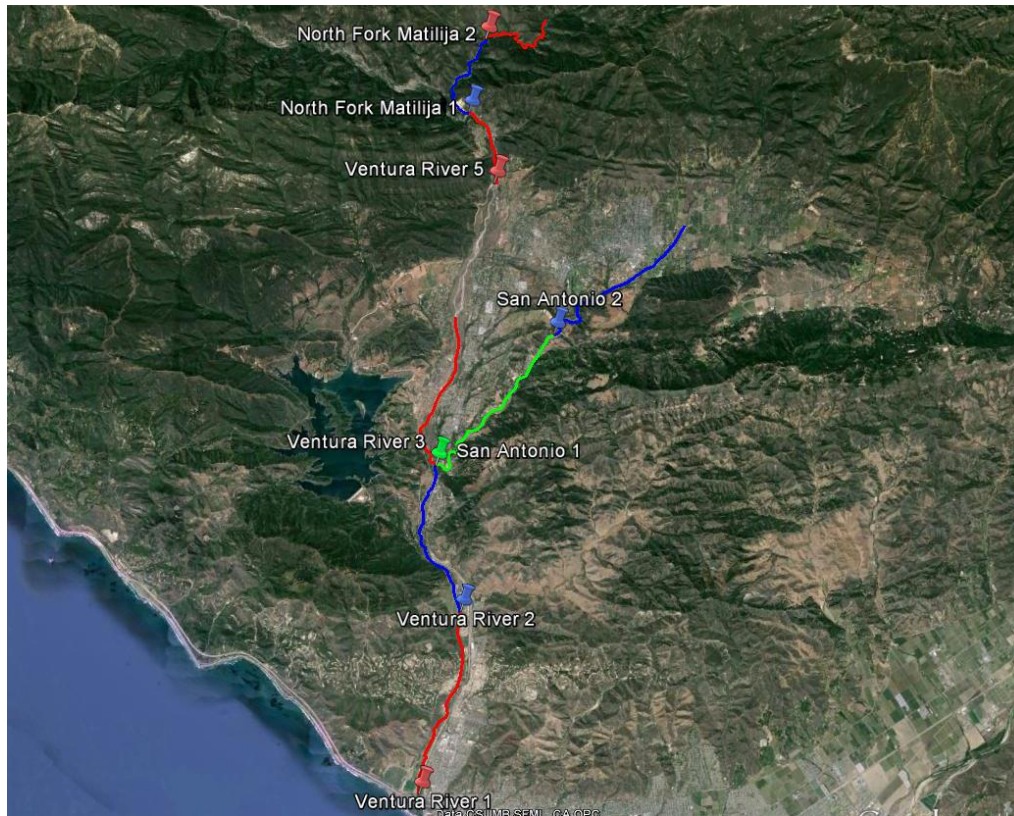


Figure 1. The surveyed portion of the Ventura River watershed showing all eight surveyed reaches.

Methods:

Spawner surveys were conducted from January 17th, 2013 through June 13th, 2013 in the Ventura River Watershed. Reaches were surveyed every two weeks following their initial survey date as staffing permitted. Teams of two or more walked stream reaches looking for new and old redds, live fish, carcasses and other species of interest. Surveys were conducted using the California Department of Fish and Wildlife Salmonid Spawning Survey Personal Digital Assistant Data Entry Protocol 2011-2012 and all data was entered into Palm PDA's using a custom Pendragon® forms database. Summaries of these protocols are presented below.

Survey Header Data

Prior to beginning any survey, the following data was collected and entered into the PDA; date, watershed, stream name, reach, method (walking), weather (sunny, cloudy, etc.), air temperature, water temperature, water visibility, and surveyors names.

Redd Counting Protocol

All newly observed redds were flagged and measured for pot length (P_L), pot width (P_W), pot depth (D), pot substrate (P), tail spill length (TS_L), tail spill width (TS) (taken from 1/3 and 2/3 the distance from the top of the tail spill) and tail spill substrate (Figure 1). GPS data was collected using a Garmin 60CSx. Flagging was accomplished by affixing flagging tape downstream of the red labeled with the date, redd record number, bearing and distance from the flag to the center of redd, the total redd length(the combined pot and tail spill lengths of the redds), the redd age, and the year. This served to keep from

double counting redds and to track if redds underwent any changes 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

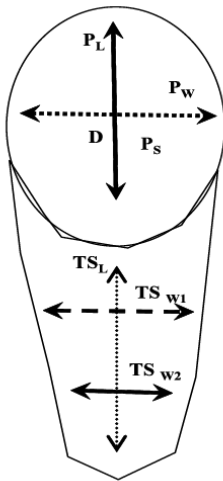


Figure 2: Redd measurement locations

Oncorhynchus mykiss Observations

Data was taken for all visual observations of *O. mykiss* on the Palm PDA. Observations were recorded as either an individual or as a batch count when multiple individuals were observed in the same habitat unit. In each instance data was taken for condition (live or dead, if dead level of decomposition), sex, length (total length), and GPS coordinates. When carcasses were encountered measurements were taken and the carcasses were collected for eventual transfer to the National Marine Fisheries Service for analysis.

Wildlife Observations

For the duration of the survey season, data was gathered for the federally threatened species (California red-legged frog, *Rana draytonii*) and California Fish and Wildlife species of special concern (Pacific Pond Turtle, *Actinemys marmorata*; and Two-striped Gartersnake, *Thamnophis hammondi*). Data taken for these observations followed the same protocol for individual *O. mykiss* observations outlined above.

Results:

Redd Survey Results

A total of 23 redds were observed during the 2013 spawner survey season. These redds were observed in 5 reaches, Ventura Reaches 2 and 3 (VR2 and VR3), San Antonio Reach 1 (SA1), and North Fork Matilija Reaches 1 and 2 (NFM1 and NFM2) (Table 1). North Fork Matilija 1 and 2 had the largest number of redds, with 9 and 8 redds respectively (Table 1). Redds were observed in this watershed between February 27, 2013 and May 23, 2013, with the majority observed in March and April.

The average total length of redds observed throughout the Ventura River watershed was 89.3 cm including the pot and tail spill. Table 2 outlines the average measurements for redds in the surveyed reaches, as well as the averages for the watershed as a whole.



Figure 3. Redd observed in NFM1 with a total length of 100 cm. Size and shape are representative of most observed redds.

Table 1: New redd observations by stream reach. Redd observations are given for each survey and stream reach. The number of redds seen on the survey is shown in red. When a survey was completed but no new redds were found a black 0 is used. Blank cells indicate days where no survey occurred.

Survey Date	Stream Reach							
	VR1	VR2	VR3	VR5	SA1	SA2	NFM1	NFM2
1/17/2013	0	0						
1/31/2013	0	0						
2/1/2013		0						
2/14/2013	0	0			0			
2/27/2013					1	0	1	
2/28/2013	0	2						
3/12/2013		0						
3/13/2013		0			1	0		
3/14/2013							4	1
3/26/2013					1	0	2	3
3/28/2013		0						
4/3/2013	0							
4/4/2013				0				
4/9/2013					0	0		
4/11/2013		0					2	1
4/18/2013	0		1					
4/22/2013		0			0	0		
4/23/2013							0	2
4/26/2013				0				
5/6/2013		0	0		0			
5/10/2013							0	0
5/21/2013		0						
5/23/2013							0	1
6/6/2013							0	0
6/13/2013		0						
TOTAL	0	2	1	0	3	0	9	8

Table 2: Average Redd Measurements. Average redd measurements are given for each surveyed reach and for the watershed as a whole.

Surveyed Reaches	# of Redds	Avg. Pot Length (cm)	Avg. Pot Width (cm)	Avg. Pot depth (cm)	Avg. Pot substrate Size (cm)	Avg. Tail spill length (cm)	Avg. Tail Spill Width 1 (cm)	Avg. Tail Spill Width 2 (cm)	Avg. Tail Spill Substrate size (cm)	Avg. Total Length (cm)
VR1	0	-	-	-	-	-	-	-	-	-
VR2	2	37.5	40.0	7.5	2.0	50.0	40.0	32.5	1.0	87.5
VR3	1	42.0	35.0	3.0	4.0	40.0	24.0	20.0	2.0	82.0
VR5	0	-	-	-	-	-	-	-	-	-
SA1	3	35.7	36.3	5.7	3.0	66.3	44.3	42.0	1.3	102.0
SA2	0	-	-	-	-	-	-	-	-	-
NFM1	9	34.0	33.3	4.4	1.9	57.8	33.4	26.3	0.9	91.8
NFM2	8	30.4	34.7	4.9	1.3	53.9	33.1	27.0	0.9	83.4
Watershed Total	23	33.8	34.9	5.0	2.0	56.1	34.9	28.9	1.0	89.3

Oncorhynchus mykiss Observation Results

O. mykiss observations were recorded during each of the spawner surveys. It is likely that with repeat surveys of the same reaches some of the same *O. mykiss* individuals were recorded. *O. mykiss* were observed in 5 reaches throughout the Ventura River watershed: Ventura Reach 2 (Figure 2), North Fork Matilija 1 and 2 (Figure 3), and San Antonio 1 and 2 (Figure 4).

For the most part, *O. mykiss* were recorded only when there was a positive sighting. This generally meant that fish were only recorded when they were over 3 inches in size. This size cut off is due to the fact that there are other fish species in these streams that overlap in size with young of the year *O. mykiss*. There were a few instances where young of the year *O. mykiss* were recorded, this was when large schools of fry were observed and confirmed as the correct species. These have not been included in the graphs as they were not consistently recorded by different survey groups.



Figure X. *O. mykiss* observed in VR2

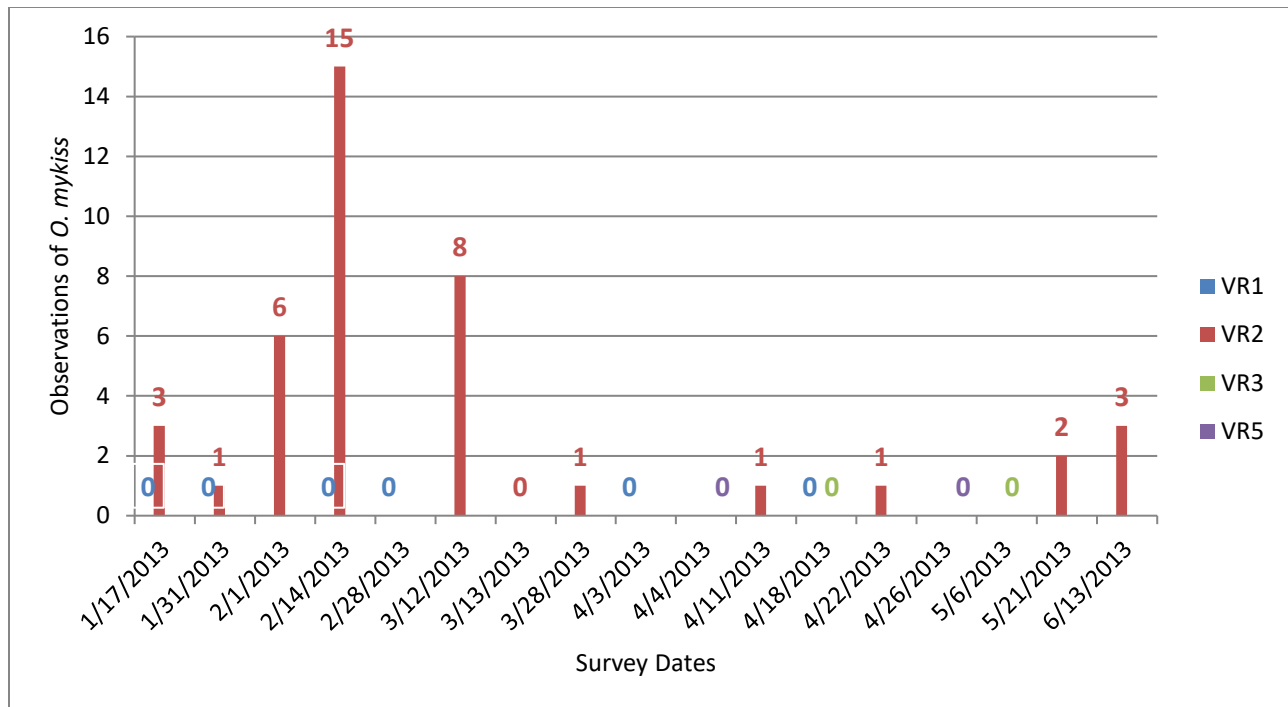


Figure 2: Observations of *O. mykiss* in the Ventura River. Each reach is represented by a different color. *O. mykiss* were only observed in reach 2 of the Ventura River. The colored zeros represent the dates where the other reaches were surveyed and no fish were observed.

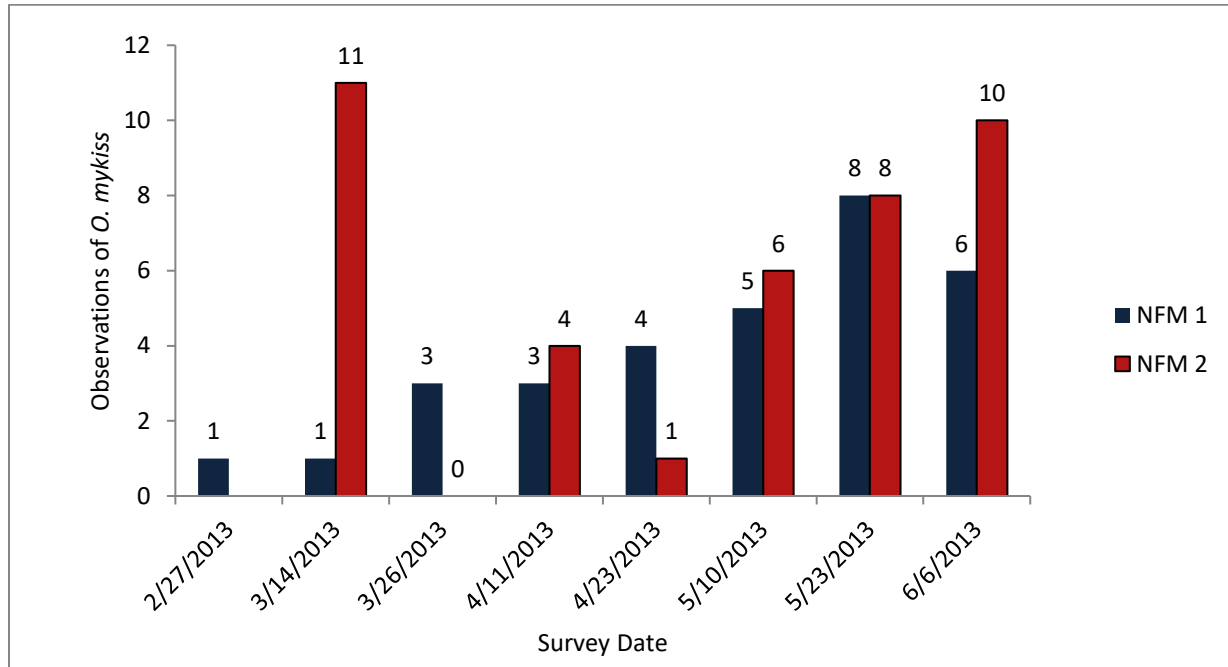


Figure 3: Observations of *O. mykiss* (>3in) in North Fork Matilija Creek. Observations are recorded by survey dates. Zeros indicate that a survey was completed but no fish were observed. North Fork Matilija Reach 1 is shown in blue and North Fork Matilija Reach 2 is in red. For this graph fish observations are included for individuals that were greater than 3 inches in length.

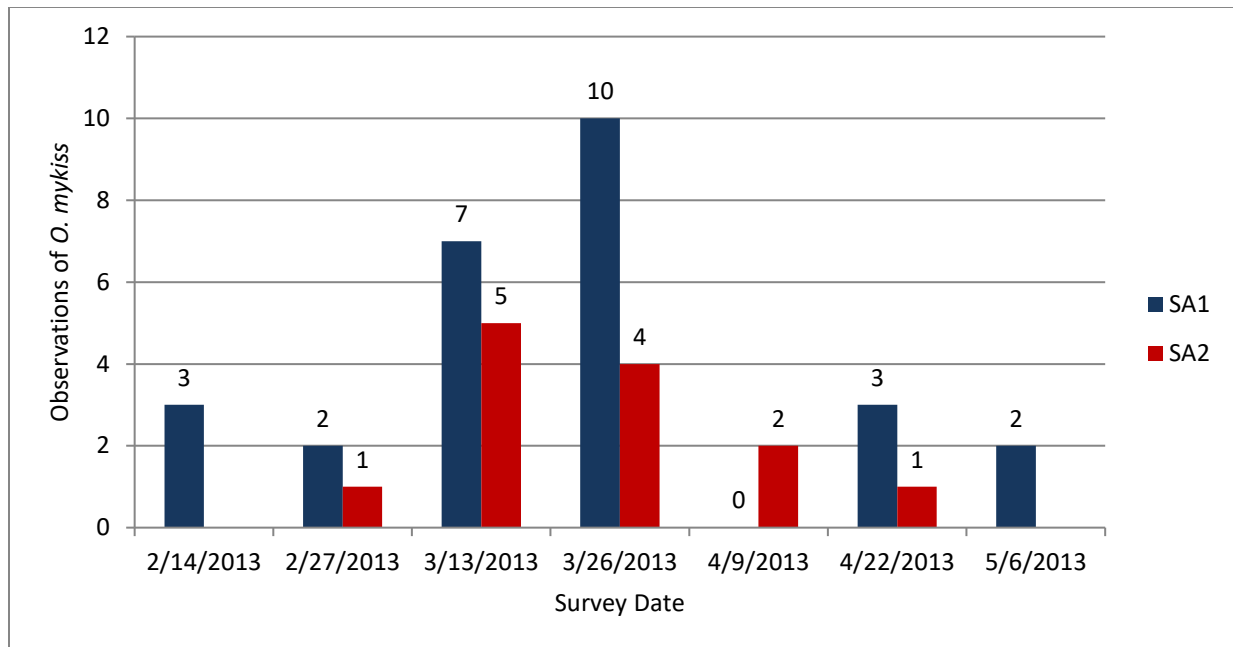


Figure 4: Observations of *O. mykiss* in San Antonio Creek. Survey dates are shown on the x-axis and observations of *O. mykiss* are shown on the y-axis. Zeros above the x-axis indicate that there was a survey completed on that survey date but no fish were observed. Observations from San Antonio Reach 1 are in blue and observations from Reach 2 are in red.

Other Species Observation Results

Observations of the federally threatened California Red-legged Frog and the California Department of Fish and Wildlife Species of Special Concern Pacific Pond Turtle and Two-striped Gartersnake were generally recorded for all surveys. Observations were made opportunistically without altering survey protocols or methodology.

California Red-legged Frogs

California Red-legged frog (CRLF) observations consisted only of egg masses with the exception of an 8 cm tadpole seen on June 13th. The absence of adult frog observations can likely be attributed to abundant cover combined with the fact that mature frogs are primarily nocturnal. Egg masses were observed from March to April with the majority being seen in San Antonio Creek (Table 3). Efforts were made to avoid double counting by referencing GPS data from previous surveys.

Table 3. New CRLF observations by stream reach. CRLF observations are given for each survey and stream reach. The number of CRLF seen on the survey is shown in red. The single tadpole observation is shown in blue. When a survey was completed but no new CRLF were observed a black 0 is used. Blank cells indicate days where no survey occurred.

Survey Date	Stream Reach							
	VR1	VR2	VR3	VR5	SA1	SA2	NFM1	NFM2
1/17/2013	0	0						
1/31/2013	0	0						
2/1/2013		0						
2/14/2013	0	0			0			
2/27/2013					0	0	0	
2/28/2013	0	0						
3/12/2013		0						
3/13/2013		0			0	0		
3/14/2013							0	0
3/26/2013					1	5	0	0
3/28/2013		1						
4/3/2013	0							
4/4/2013				0				
4/9/2013					0	3		
4/11/2013		0					0	0
4/18/2013	0		0					
4/22/2013		0			0	1		
4/23/2013							0	0
4/26/2013				0				
5/6/2013		0	0		0			
5/10/2013							0	0
5/21/2013		0						
5/23/2013							0	0
6/6/2013							0	0
6/13/2013		1						
TOTAL	0	2	0	0	1	9	0	0



Figure X. CRLF egg mass in San Antonio Creek.

Two-striped Gartersnake

Observations of Two-striped Gartersnakes (TSGS) were recorded only when an individual could be positively identified. In instances where snakes took cover before they could be thoroughly observed no data was taken. This was necessary to keep from including misidentified snakes of similar physical appearance in our counts. TSGSs were seen throughout the Ventura River watershed from late March to early June with the majority of observations taking place in reach 2 of North Fork Matilija (Table 4). Double counting may have occurred, as individuals were never marked or tagged.

Table 4. New TSGS observations by stream reach. TSGS observations are given for each survey and stream reach. The number of TSGS seen on the survey is shown in red. When a survey was completed but no new TSG were observed a black 0 is used. Blank cells indicate days where no survey occurred.

Survey Date	Stream Reach							
	VR1	VR2	VR3	VR5	SA1	SA2	NFM1	NFM2
1/17/2013	0	0						
1/31/2013	0	0						
2/1/2013		0						
2/14/2013	0	0			0			
2/27/2013					0	0	0	
2/28/2013	0	0						
3/12/2013		0						
3/13/2013		0			0	0		
3/14/2013							0	0
3/26/2013					0	0	0	1
3/28/2013		0						
4/3/2013	0							
4/4/2013				0				
4/9/2013					0	0		
4/11/2013		0					1	0
4/18/2013	1		0					
4/22/2013		0			0	0		
4/23/2013							0	1
4/26/2013				0				
5/6/2013		0	0		0			
5/10/2013							0	4
5/21/2013		1						
5/23/2013							1	1
6/6/2013							0	3
6/13/2013		0						
TOTAL	1	1	0	0	0	0	2	10



Figure X. TSGS in NFM 2

Pacific Pond Turtles

Pacific Pond Turtles (PPT), were seen in every reach surveyed. Observations were recorded from mid-March to mid-June. The greatest concentrations were seen in the Ventura River main stem (Table 5). PPT observations were only recorded when a turtle was positively identified. Double counting may have occurred, as individuals were never marked or tagged.

Table 5. New PPT observations by stream reach. PPT observations are given for each survey and stream reach. The number of PPT seen on the survey is shown in red. When a survey was completed but no new PPT were observed a black 0 is used. Blank cells indicate days where no survey occurred.

Survey Date	Stream Reach							
	VR1	VR2	VR3	VR5	SA1	SA2	NFM1	NFM2
1/17/2013	0	0						
1/31/2013	0	2						
2/1/2013		0						
2/14/2013	0	0			0			
2/27/2013					0	0	0	
2/28/2013	0	0						
3/12/2013		1						
3/13/2013		0			3	1		
3/14/2013							1	0
3/26/2013					2	0	0	1
3/28/2013		3						
4/3/2013	3							
4/4/2013				20				
4/9/2013					0	3		
4/11/2013		2					0	0
4/18/2013	5		0					
4/22/2013		4			3	2		
4/23/2013							0	1
4/26/2013				0				
5/6/2013		1	5		5			
5/10/2013							0	1
5/21/2013		1						
5/23/2013							1	1
6/6/2013							0	0
6/13/2013		4						
TOTAL	8	16	5	20	13	6	2	4

Discussion:

The entirety of this survey season was carried out under drought conditions, which have persisted in Southern California since 2010. Downtown Ventura received 8.86 inches of rain in the 2012 water year (60% of normal) and 6.46 inches in 2013 (44% of normal) (Ventura County Public Works website). The combined effect of these dry years was a dramatic reduction in flow throughout in the Ventura River watershed.

It is unlikely that any anadromous adults were able to travel beyond the Ventura River estuary due to low flow conditions and subsequent barriers to migration. As a result, all redds surveyed were almost certainly made by resident *O. mykiss*. This is reflected in the relatively short overall average redd length of 89.3 cm. Data on resident *O. mykiss* spawning behavior is useful for a variety of reasons. It provides

us with baseline data for comparison with steelhead redds, it cues us in to which sections of stream see the highest concentration of spawning activity and allows us to estimate current resident fish abundance. However; the primary objective of these surveys remains to gather data on Ventura River steelhead. The difficulty of obtaining this data will remain high until the area sees increased rainfall.

Staffing limitations were another source of additional challenges. Staff members were routinely reallocated to take part in other critically important monitoring work. None of the surveyed reaches were completed on a bi-weekly basis 100% of the time. Reaches were prioritized so that reaches with better spawning habitat and a higher likelihood of steelhead presence were surveyed the most often. This leads to inconsistency and potential false trends in the data.

Proficiency in identifying species other than *O. mykiss* varied among staff members. The ability of a survey group to positively identify these species was influenced by who participated. This should be taken into account when evaluating observation totals.