MARIA YGNACIO
STREAM INVENTORY REPORT
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MARIA YGNACIO CREEK

INTRODUCTION

A stream inventory of Maria Ygnacio Creek watershed and its associated tributaries was conducted by California Department of Fish and Game (CDFG) and Pacific States Marine Fisheries Commission (PSMFC) staff from November 26, 2009 to February 11, 2010. The mainstem of Maria Ygnacio Creek was surveyed from November 26 to December 3, 2009; the East Fork Maria Ygnacio was surveyed from December 3, 2009 to February 11, 2010; the mainstem of the San Antonio Creek tributary was surveyed from December 4 to December 22, 2009; and the East Fork San Antonio was surveyed from December 16 to December 17, 2009. The habitat inventory surveyed a total of 10.97 stream miles throughout the Maria Ygnacio watershed.

The survey began at the confluence of Maria Ygnacio Creek with Atascadero Creek, 1.11 stream miles upstream from Atascadero Creek's confluence with San Pedro Creek, and 1.56 stream miles upstream from San Pedro Creek's confluence with the Pacific Ocean (Map 1). The survey terminated 4.72 miles upstream within Bjorklund Ranch at a waterfall deemed impassable to adult steelhead.

The East Fork Maria Ygnacio confluence entered the mainstem of Maria Ygnacio Creek from the left bank approximately 2.88 stream miles upstream of the Atascadero confluence. The East Fork Maria Ygnacio survey continued approximately 0.86 stream miles upstream until the end of anadromy resulting from a waterfall deemed impassable to adult steelhead.

The San Antonio Creek confluence entered the mainstem of Maria Ygnacio Creek from the left bank approximately 1.26 stream miles upstream of the Atascadero confluence near the 101 and Calle Real bridges. The survey of San Antonio Creek continued approximately 4.30 stream miles upstream until the end of anadromy resulting from a waterfall deemed impassable to adult steelhead.

The East Fork San Antonio confluence entered the mainstem of San Antonio Creek from the left bank approximately 3.66 stream miles upstream of the San Antonio confluence with Maria Ygnacio. The East Fork San Antonio survey continued approximately 1.10 miles upstream until the survey reached a parcel that was denied access by the landowner.

Oncorhynchus mykiss (*O. mykiss*), commonly known as Coastal Rainbow/Steelhead Trout, has evolved two life history strategies (resident and anadromous) to protect against catastrophic events that occasionally occur in freshwater creeks and in the ocean. For the purposes of this report, *O. mykiss* will be used to refer to both forms. However where appropriate, the term resident trout or steelhead will be used to distinguish which form is being discussed.

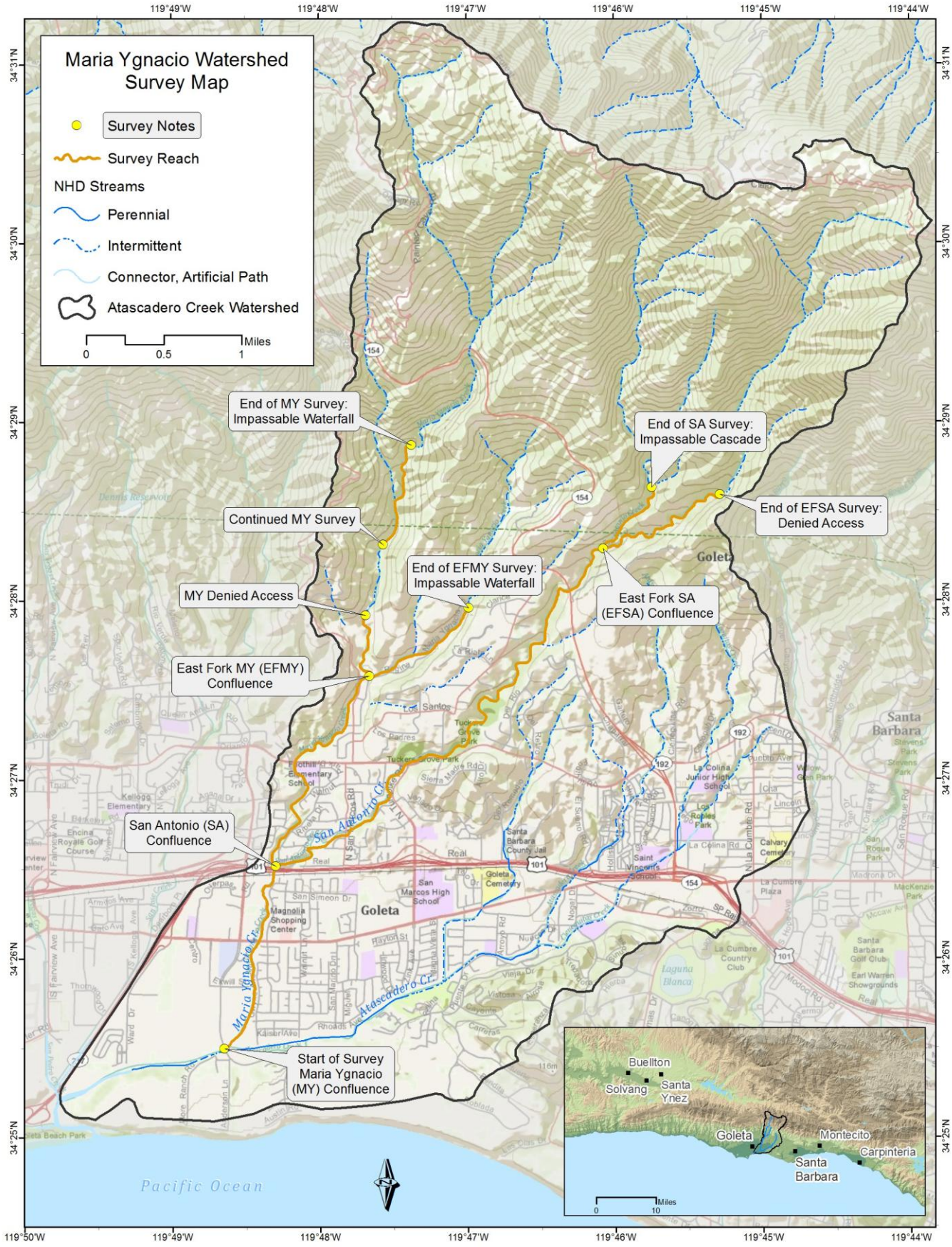
Steelhead, the anadromous form of the salmonid, *O. mykiss*, populate waters that extend up the Pacific coast of North America and into Asia, and whose southern range terminates in southern California. The National Marine Fisheries Service (NMFS) federally listed the Southern California Steelhead Evolutionary Significant Unit (ESU) as Endangered from Point Conception south to Malibu Creek in 1997 and expanded the range of the ESU to include all coastal creeks and rivers to the Mexican border in 2002. NMFS determined that the ESU designation of steelhead was not appropriate and reclassified the steelhead populations within the State as Distinct Population Segments in 2006. These actions did not alter the listing status of endangered for southern steelhead.

Southern steelhead are winter-run steelhead that typically enter the streams from December to April to spawn with high winter flows. Post-spawn steelhead, known as kelts, rejuvenate after spawning and, if conditions permit, return to the ocean to spawn again the following year. The offspring can remain in the freshwater stream of their birth as residents, or become anadromous and thus migrate to the ocean to mature. A single stream can have both resident and migratory forms and often have some interbreeding between the two (Swift 2003). The anadromous form can vary in the amount of time spent in freshwater, but usually spend one to two years rearing in the freshwater stream before going to the ocean. Adult fish may return to the stream they originated, or they may stray and re-colonize other streams that have been extirpated for some years due to prolonged drought, devastating fires, or other adverse effects (Swift 2003).

Southern steelhead were once abundant in the small coastal streams in Santa Barbara County, but due to loss of access to habitat that stems mostly from the construction of migration barriers, the population has dwindled. After the expansion of Highway 101 in the 1960's and 1970's and the urbanization of Goleta, access to upstream spawning grounds and juvenile rearing habitat in the Maria Ygnacio watershed had been blocked by a number of impassable manmade structures thus rendering much of the watershed inaccessible to steelhead returning from the ocean.

The Maria Ygnacio inventory was conducted in two parts: the habitat inventory and the biological inventory. The objective of the biological inventory survey was to determine the observable current status of fish populations in the watershed. The objective of the habitat inventory survey, and this stream inventory report was to document the current habitat conditions, determine suitability of steelhead habitat and recommend options for the potential enhancement of habitat in the Maria Ygnacio watershed for steelhead. The survey continued through the first rains of the new water year, which had a noticeable impact and influenced results. In addition, riverine and riparian habitat had been tremendously altered by the recent Jesusita Fire, which occurred on May 5, 2009. Observations of fire-related impacts throughout the watershed are noted throughout the report. Recommendations for habitat improvement activities were based on target habitat values suitable for southern steelhead (*O. mykiss*) in California's south coast streams.

MAP 1


Maria Ygnacio Watershed
Survey Map
Survey Notes
Survey Reach
NHD Streams
Perennial
Intermittent
Connector, Artificial Path
Atascadero Creek Watershed
0
0.5
1
Miles
End of MY Survey:
Impassable Waterfall
End of SA Survey:
Impassable Cascade
End of EFSA Survey:
Denied Access
Continued MY Survey
End of EFMY Survey:
Impassable Waterfall
East Fork SA
(EFSA) Confluence
MY Denied Access
East Fork MY (EFMY)
Confluence
San Antonio (SA)
Confluence
Start of Survey
Maria Ygnacio
(MY) Confluence
Goleta
Santa
Barbara
Pacific Ocean
San Antonio Cr.
Maria Ygnacio Cr.
Atascadero Cr.
Buellton
Solvang
Santa
Ynez
Goleta
Montecito
Carpinteria
Santa
Barbara
0
10
Miles
119°50'W
119°49'W
119°48'W
119°47'W
119°46'W
119°45'W
119°44'W
34°31'N
34°30'N
34°29'N
34°28'N
34°27'N
34°26'N
34°25'N

WATERSHED OVERVIEW

Maria Ygnacio Creek is a tributary to Atascadero Creek, which is a tributary to San Pedro Creek, which is a tributary to the Pacific Ocean, located in the city of Goleta, in Santa Barbara County, California (Map 2). Maria Ygnacio's legal description at the confluence of Atascadero Creek is T04N R28W S16. Its location is 34:25:30.0N and 119:48:34.0W, LLID number 1198094344251. As seen in Map 2, the Maria Ygnacio drainage area encompasses the Upper, Middle, Lower, and East Fork Maria Ygnacio sections, as well as the San Antonio watershed. According to the United State Geological Service (USGS) *Santa Ynez* 7.5 minute quadrangle, Maria Ygnacio is an ephemeral stream that has approximately 34.88 miles of perennial and intermittent stream, with only 0.92 miles being perennial, and drains a watershed of approximately 12.04 square miles. Elevations range from 22 feet at the confluence with Atascadero to 3,617 feet in the Maria Ygnacio headwaters; however, the San Antonio headwaters reach 3,734 feet. The habitat inventory surveyed a total of 10.97 stream miles throughout the Maria Ygnacio watershed. The Maria Ygnacio confluence with Atascadero is located at the Patterson Bridge, approximately 1.10 miles upstream from the Atascadero confluence with San Pedro, and approximately 1.54 miles upstream from the San Pedro confluence with the Pacific Ocean. Maria Ygnacio runs through urban and residential areas for approximately 2.90 miles, and then continues through agricultural and horse ranches for approximately 0.98 miles until the debris basin. A section from 3.28 miles to 3.83 miles upstream on Maria Ygnacio right before the debris basin was unsurveyable due to lack of access from the land owners. After the debris basin, Maria Ygnacio runs through county land and the private campground, Bjorklund Ranch, for approximately 0.64 miles. Vehicle access exists via a number of paved roads and stream crossings as Maria Ygnacio runs through Goleta, however upstream access is limited to a final private access flood control road shortly before the debris basin, approximately 3.87 miles up from the confluence, although the creek could be accessed through fire roads and the Bjorklund Ranch approximately 0.3 miles upstream. The end of anadromy occurs at a 35 foot waterfall approximately 4.72 miles upstream from the Maria Ygnacio confluence with Atascadero.

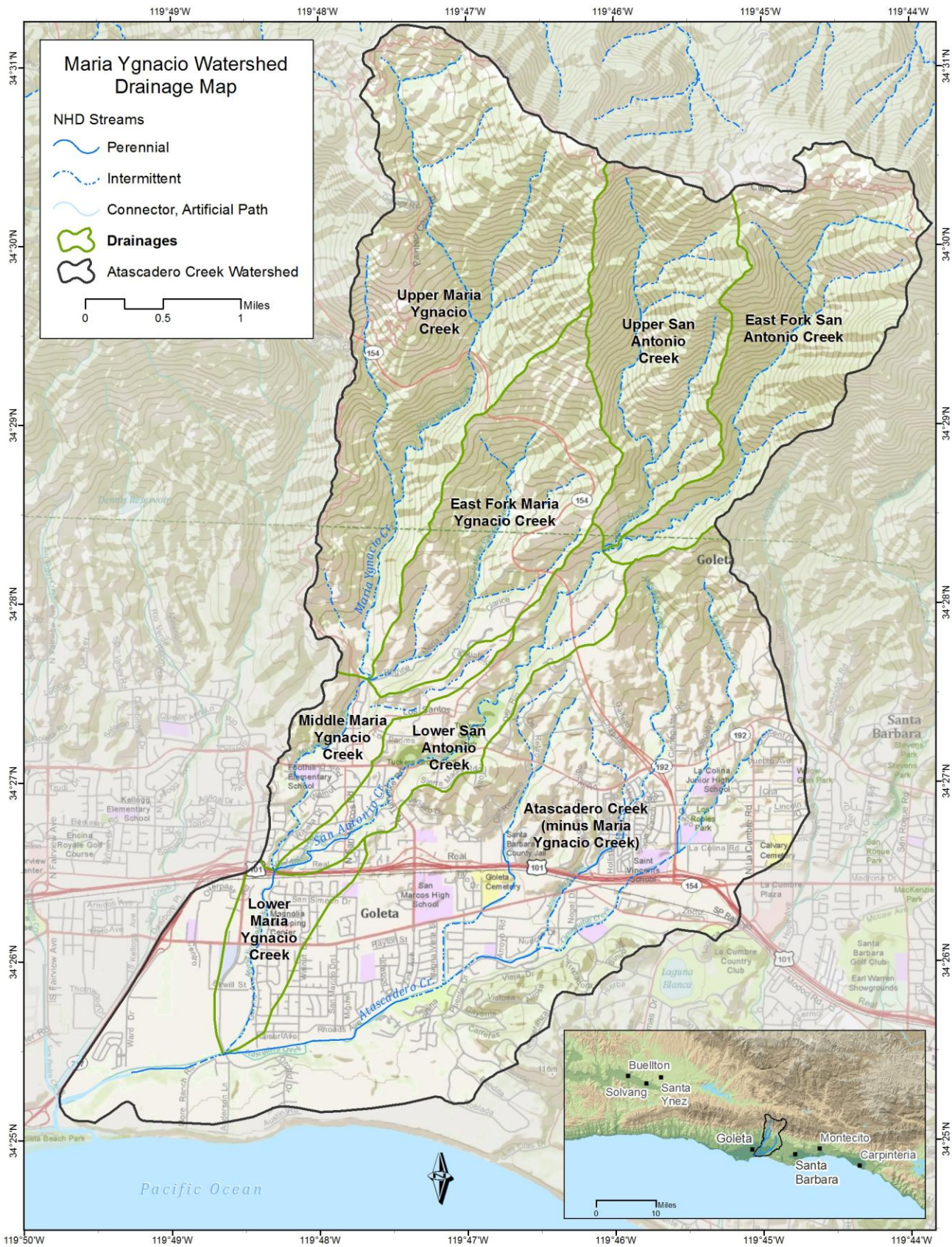
The legal description of the East Fork Maria Ygnacio is T04N R28W S03. Its location is 34:27:35.0N and 119:47:36.0W, LLID number 1197934344597. According to the USGS *Santa Ynez* 7.5 minute quadrangle, the East Fork Maria Ygnacio is an ephemeral stream with approximately 4.34 miles of intermittent stream only and drains a watershed of approximately 1.81 square miles. The elevations range from 153 feet at the confluence with the mainstem to 2,466 feet in the headwater areas. It enters the left bank of the mainstem of Maria Ygnacio Creek approximately 2.88 miles up from the Maria Ygnacio confluence with Atascadero. The East Fork Maria Ygnacio runs through residential zones and a plant nursery. A debris basin is located approximately 0.2 miles upstream from the confluence. Vehicle access is limited to one crossing structure approximately 0.71 miles upstream at La Riata Lane. The end of anadromy occurs at a 30-35 foot waterfall approximately 0.86 miles upstream.

The legal description of the San Antonio Creek is T04N R28W S10. Its location is 34:26:31.0N and 119:48:15.0W, LLID number 1198042344420. As seen in Map 2, the San Antonio drainage area encompasses the Upper, Lower, and East Fork San Antonio sections. According to the USGS *Santa Ynez* 7.5 minute quadrangle, San Antonio Creek is an ephemeral stream with approximately 15.69 miles of intermittent and perennial stream, with only 0.71 miles being

perennial, and drains a watershed of approximately 4.94 square miles. The elevations range from 53 feet at the confluence with the mainstem to 3,734 feet in the headwater areas. It enters the left bank of the mainstem of Maria Ygnacio Creek approximately 1.26 miles up from the confluence with Atascadero. San Antonio Creek runs through residential zones for approximately 1.25 miles before entering Tuckers Grove Park and moving upstream through relatively natural vegetation. A debris basin is located inside Tuckers Grove Park approximately 2.78 miles upstream. After the San Marcos Bridge 3.24 miles upstream, San Antonio Creek runs through relatively natural vegetation and agricultural private land until the anadromy limit, a 15 foot waterfall approximately 4.30 miles upstream.

The legal description of the East Fork San Antonio is T05N R28W S36. Its location is 34:28:21.0N and 119:45:53.0W, LLID number 1197648344726. According to the USGS *Santa Ynez* 7.5 minute quadrangle, the East Fork San Antonio is an ephemeral stream with approximately 5.61 miles of intermittent stream only and drains a watershed of approximately 2.11 square miles. The elevations range from 587 feet at the confluence with the mainstem to 3734 feet in the headwater areas. The East Fork San Antonio enters the left bank of the mainstem of San Antonio Creek approximately 3.66 miles up from the San Antonio confluence with Maria Ygnacio and runs through relatively natural vegetated private land. The survey was terminated after 1.10 miles due to access restrictions before the anadromy limit could be discovered.

MAP 2


Maria Ygnacio Watershed
Drainage Map
NHD Streams
Perennial
Intermittent
Connector, Artificial Path
Drainages
Atascadero Creek Watershed
Miles
0
0.5
1
Upper Maria Ygnacio Creek
Upper San Antonio Creek
East Fork San Antonio Creek
East Fork Maria Ygnacio Creek
Middle Maria Ygnacio Creek
Lower San Antonio Creek
Atascadero Creek (minus Maria Ygnacio Creek)
Lower Maria Ygnacio Creek
Goleta
Santa Barbara
Pacific Ocean
Buellton
Solvang
Santa Ynez
Montecito
Carpinteria
119°49'W
119°48'W
119°47'W
119°46'W
119°45'W
119°44'W
34°31'N
34°30'N
34°29'N
34°28'N
34°27'N
34°26'N
34°25'N

METHODS

The habitat inventory conducted in the Maria Ygnacio Creek Watershed follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The PSMFC biologist and fisheries technician that conducted the inventory were trained in standardized habitat inventory methods designed by the CDFG.

Sampling Strategy

The inventory used a method that sampled approximately 10% of the habitat units within the survey reach. All habitat units included in the survey were classified according to habitat type and their lengths were measured. All pool units were measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time were measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one was randomly selected for complete measurement.

Habitat Inventory Components

A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the *California Salmonid Stream Habitat Restoration Manual*. This form was used in Maria Ygnacio Creek to record measurements and observations. There were nine components to the inventory form.

1. Flow:

Flow was estimated in cubic feet per second (cfs) near the bottom of the stream survey reach. This estimate was derived by taking the average of three measurements of surface flow, and then extrapolating an estimate based on previous experience of survey members with stream flow measurements.

2. Channel Type:

Channel typing was conducted according to the classification system developed and revised by David Rosgen (1994). This methodology is described in the *California Salmonid Stream Habitat Restoration Manual*. Channel typing was conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There were five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics were measured using a hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures were measured and recorded at every tenth habitat unit. The time of the measurement was also recorded. Both temperatures were taken in degrees Fahrenheit

in shade. The water temperature was always recorded in flowing water.

4. Habitat Type:

Habitat typing used the 24 habitat classification types defined by McCain and others (1990). Habitat units were numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Four additional habitat classification types were added for dry units, manmade culverts, unsurveyed units, and unsurveyed units due to marshes. Maria Ygnacio Creek habitat typing used standard basin level measurement criteria. These parameters required that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements were in feet to the nearest tenth. Habitat characteristics were measured using a hip chain, tape measure, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas was measured by the percent of the cobble that was surrounded or buried by fine sediment. In Maria Ygnacio Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:
Instream shelter was composed of those elements within a stream channel that provide juvenile salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition for prey. All cover was classified according to a list of nine cover types. In Maria Ygnacio Creek, standard qualitative shelter values of 0 (none), 1 (low), 2 (medium), or 3 (high) were assigned according to the complexity of the cover, as follows:

Instream Shelter Complexity Value	
Value	**Instream Shelter Complexity Value Examples**
0	No shelter
1	One to five boulders; Bare undercut bank or bedrock ledge; Single piece of large wood (>12" diameter and 6' long) defined as large woody debris (LWD).
2	One or two pieces of LWD associated with any amount of small wood (<12" diameter) defined as small woody debris (SWD); Six or more boulders per 50 feet; Stable undercut bank with root mass, and less than 12" undercut; A single root wad lacking complexity; Branches in or near the water; Limited submersed vegetative fish cover; Bubble curtain.
3	Combinations of (must have at least two cover types): LWD/boulders/root wads; Three or more pieces of LWD combined with SWD; Three or more boulders combined with LWD/SWD; Bubble curtain combined with LWD or boulders; Stable undercut bank with greater than 12" undercut, associated with root mass or LWD; Extensive submersed vegetative fish cover.

Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered was made. The shelter rating was then calculated for each fully-described habitat unit by multiplying shelter value and percent cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream. For example, a pool with 45% of the overhead surface area of the habitat unit covered via boulders, a bubble curtain, and large woody debris, would be given a shelter value of 3 and a total shelter rating of 135.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs was recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Maria Ygnacio Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. Only hardwood trees were observed throughout the survey.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Maria Ygnacio Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

10. Comments and Landmarks:

In order to better describe the current conditions of the stream channel and riparian corridor, notes on landmarks, vegetation, animal species observed, erosion sites, potential migration impediments, land use, erosion sites, water diversions and influences, water quality, and any other observable characteristics of note were recorded.

Biological Inventory

Various methods of biological sampling can be employed during a stream inventory to determine fish species and their distribution in the stream. Fish sampling methods were limited to visual observations and dip net sampling while conducting the habitat inventory of the creek. Further presence/absence studies should be conducted to determine the current status of fish populations

in the system. Focused surveys were not performed for reptiles, amphibians, mammals, or birds but observations were noted and, if possible, fauna was identified to species.

DATA ANALYSIS

Data from the habitat inventory forms was entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. This program processed and summarized the data, and produced the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics were produced from the tables using Microsoft Excel. Graphics developed for Maria Ygnacio Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

Habitat Inventory Results

The habitat inventory of the entire Maria Ygnacio watershed was conducted by Aaron Francis (PSMFC) and Kris Nipple (PSMFC) with assistance from Andrew Raaf and Seth Shank of Santa Barbara County Flood Control and Water Conservation District. The survey was conducted from November 26, 2009 to February 11, 2010 over four separate systems: the mainstem of Maria Ygnacio Creek, the East Fork Maria Ygnacio, the mainstem of San Antonio Creek, and the East

Fork San Antonio. Maria Ygnacio Creek was surveyed from 11/16/2009 to 12/3/2009, the East Fork Maria Ygnacio was surveyed from 12/3/2009 to 2/11/2009, San Antonio Creek was surveyed from 12/4/2009 to 12/22/2009, and the East Fork San Antonio was surveyed from 12/16/2009 to 12/17/2009.

For the entire Maria Ygnacio Watershed, the total surveyed length was 10.97 stream miles consisting of 857 main channel habitat units. The total surveyed length of the mainstem of Maria Ygnacio Creek was 24,927 feet (4.72 miles) consisting of 248 main channel habitat units, and an additional 39 feet of side channel with 1 side channel unit. For the East Fork Maria Ygnacio, the total length of stream surveyed was 4,544 feet (0.86 miles) with the entire length consisting of 82 main channel habitat units. For San Antonio Creek, the total length of stream surveyed was 22,686 (4.30 miles) feet consisting of 392 main channel habitat units, and an additional 125 feet of side channel with 3 side channel units. For the East Fork San Antonio, the total length of stream surveyed was 5,785 feet (1.10 miles) consisting of 135 main channel habitat units, and an additional 97 feet of side channel with 3 side channel units.

Stream Flow:

Stream flow in the Maria Ygnacio watershed was estimated to be between 0.75-1.25 CFS on the mainstem of Maria Ygnacio Creek, less than 0.5 CFS on the East Fork Maria Ygnacio, and between 0.5-1.25 CFS in the mainstem of San Antonio Creek and the East Fork San Antonio.

It should be noted, however, that stream flow in the Maria Ygnacio watershed varied tremendously during the survey due to precipitation events and long dry sections. Subsurface flow was observed in the mainstem of Maria Ygnacio Creek, the East Fork Maria Ygnacio, and the mainstem of San Antonio Creek.

In the mainstem of Maria Ygnacio Creek, non-flowing surface water was observed for 1,699 ft. (0.32 mi.) upstream of the Atascadero confluence at the Patterson bridge. Flow then went completely subsurface as the survey moved upstream for approximately 11,209 ft. (2.12 mi.) before becoming continuous upstream of the Cathedral Oaks bridge, 12,908 ft (2.44 mi) upstream from the start of the survey. From that point, surface flow was observed for the next 12,019 ft (2.28 mi) until the end of the survey at a waterfall, which was located 24,927 ft (4.72 mi.) from the start of the survey. This waterfall was considered the limit of anadromy.

The East Fork Maria Ygnacio survey began on 12/03/2009 directly upstream of the third East Fork Maria Ygnacio grade control structure. Subsurface flow was observed for approximately 1,604 ft. (0.30 mi.). Subsurface flow was also observed from the debris basin up to the third East Fork Maria Ygnacio grade control structure; however, the sections above the debris basin were not surveyed until after significant storm events, after which surface flow was observed above the debris basin in sections where it had previously been absent.

The San Antonio Creek survey began on 12/04/2009 directly above the confluence with Maria Ygnacio Creek, subsurface flow was recorded for approximately 0.96 miles up until the San Antonio Vala Road footbridge. On 12/04/2009, subsurface flow was observed upstream of the San Antonio Vala Road footbridge; however, when the survey continued on 12/15/2009 after a

series of precipitation events, flow was observed both upstream and downstream of the bridge in sections that were previously dry.

Due to the number of precipitation events that occurred during the survey, accurately estimating stream flow was difficult as post-storm flow would quickly rise and fall, typical of southern California coastal streams.

Channel Type:

Maria Ygnacio Creek was a B5 channel type in Reach 1 for 11,638 feet (2.19 miles) and 28 habitat units, a G2 channel type in Reach 2 for 9,266 feet (1.75 miles) and 118 habitat units, and an A2 channel type in Reach 3 for 4,023 feet (0.80 miles) and 102 habitat units.

B5 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks on moderate gradients with low width /depth ratios and sand dominant substrates; G2 channels are entrenched gullies with low/depth ratios on moderate gradients and with boulder dominant substrates; and A2 channels are steep, narrow, cascading, step-pool streams with high energy/debris transport associated with depositional soils and boulder-dominant substrates.

The East Fork Maria Ygnacio was a B5 channel type for the entire surveyed section.

Both San Antonio Creek and the East Fork San Antonio were recorded as B2 channel types. B2 channels differ from B5 channels in that the dominant substrate is boulder, as opposed to sand.

Water Temperatures:

Water temperatures for the entire Maria Ygnacio watershed recorded during the survey period ranged from 47ºF to 58ºF, with the mean water temperature being 52.5ºF and the median being 52ºF. Air temperatures ranged from 45ºF to 67ºF, with the mean air temperature being 55.4ºF.

Water temperatures for the mainstem of Maria Ygnacio Creek recorded during the survey period ranged from 50ºF to 56ºF, with the mean water temperature being 52.1ºF and the median being 52ºF. Air temperatures ranged from 50ºF to 67ºF, with the mean air temperature being 56.9ºF.

Water temperatures for the East Fork Maria Ygnacio recorded during the survey period ranged from 47ºF to 58ºF, with the mean water temperature being 53.3ºF and the median being 55ºF. Air temperatures ranged from 47ºF to 65ºF, with the mean air temperature being 56.9ºF.

Water temperatures for San Antonio Creek recorded during the survey period ranged from 49ºF to 52ºF, with the mean water temperature being 50.3ºF and the median being 50ºF. Air temperatures ranged from 45ºF to 62ºF, with the mean air temperature being 54.0ºF.

Water temperatures for East Fork San Antonio recorded during the survey period ranged from 50ºF to 56ºF, with the mean water temperature being 53.1ºF and the median being 53ºF. Air temperatures ranged from 51ºF to 59ºF, with the mean air temperature being 55.7ºF.

Summary of Habitat Types:

The surveyed section of the mainstem of Maria Ygnacio was 24,927 feet long with 248 total units. Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36.9% riffle units, 26.5% flatwater units, 21.7% pool units, 8.0 % culvert units, 6.4% dry units (Graph 1). There was also one unit that couldn't be surveyed. Based on Level II habitat types, the total length was comprised of 43.6% dry units, 17.7% flatwater units, 14.6% riffle units, 11.4% non-surveyable, 8.5% pool units, and 4.2% culvert units (Graph 5). All dry units were observed in the lower sections of the creek and the non-surveyable unit was in Reach 2 before the debris basin.

The surveyed section of the East Fork Maria Ygnacio was 4,544 feet long with 82 total units. Table 2 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40.2% riffle units, 29.3% flatwater units, 23.2% pool units, 6.1% culvert units, 1.2% dry units (Graph 2). There was also one unit that couldn't be surveyed. Based on Level II habitat types, the total length was comprised of 35.3% dry units, 25.0% riffle units, 21.8% flatwater units, 13.1% pool units, and 4.8% culvert units (Graph 6). All dry units were located in one section upstream of the second grade control structure above the debris basin.

The surveyed section of the mainstem of San Antonio was 22,686 feet long with 392 total units. Table 3 summarizes the Level II riffle, flatwater, and pool habitat. Based on frequency of occurrence there were 48.4% riffle units, 32.7% flatwater units, 17.2% pool units, 1.0 % culvert units, 0.8% dry units (Graph 3). There was also one unit that couldn't be surveyed. Based on Level II habitat types, the total length was comprised of 43.1% riffle units, 24.2% flatwater units, 22.2% dry units, 9.4% pool units, and 1.1% culvert units (Graph 7). All dry units were observed in the lower section of the creek above the confluence with Maria Ygnacio.

The surveyed section of the East Fork San Antonio was 5,785 feet long with 135 total units. Table 4 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 60.1% riffle units, 34.8% flatwater units, 3.6% pool units, 0.7% culvert units, 0.7% dry units (Graph 4). There was also one unit that couldn't be surveyed. Based on Level II habitat types, the total length was comprised of 67.7% riffle units, 30.1% flatwater units, 1.9% pool units, 0.3% dry units, and 0.1% culvert units (Graph 8).

Sixteen Level IV habitat types were identified in the mainstem of Maria Ygnacio Creek (Table 5). The most frequent habitat types by percent occurrence were low gradient riffle units at 26.5%, run units at 17.3%, and mid channel pools at 11.2% (Graph 9). Based on percent total length, the most dominant habitat types were low gradient riffle units at 11.1%, run units at 7.8%, and glide units 7.3%. However, dry units comprised 43.6% and the non-surveyable unit comprised 11.5% of the total length.

Ten Level IV habitat types were identified in the East Fork Maria Ygnacio (Table 6). The most frequent habitat types by percent occurrence were low gradient riffle units at 36.6%, run units at 18.3%, and mid-channel pools and step runs at 11.0% (Graph 6). Based on percent total length, the most dominant habitat types were low gradient riffle units at 22.2%, step run units at 11.7%,

and run units 10.7%. However, dry units comprised 35.3% of the total length.

Thirteen Level IV habitat types were identified in the mainstem of San Antonio Creek (Table 7). The most frequent habitat types by percent occurrence were low gradient riffle units at 31.65%, step run units at 17.72%, and run units at 14.94% (Graph 11). Based on percent total length, the most dominant habitat types were low gradient riffle units at 33.7%, step run units at 17.6%, and glide units 8.7%. However, dry units comprised 22.2% of the total length.

Nine Level IV habitat types were identified in the East Fork San Antonio (Table 8). The most frequent habitat types by percent occurrence were low gradient riffle units at 35.5%, run units at 23.9%, and high gradient riffles at 21.7% (Graph 12). Based on percent total length, the most dominant habitat types were low gradient riffle units at 47.5%, high gradient riffle units at 18.9%, and run units 16.7%.

Summary of Pools:

In the mainstem of Maria Ygnacio Creek, a total of 54 pools were identified (Table 9). Main channel pools were the most frequently encountered at 57.4% (Graph 13), and comprised 60% of the total length of all pools (Table 9). Table 13 is a summary of maximum residual pool depths by pool habitat types in Maria Ygnacio Creek. Pool quality for salmonids increases with depth. Thirty-four of the 54 pools measured had a residual depth of two feet or greater (Graph 17).

In the East Fork Maria Ygnacio, a total of 19 pools were identified (Table 10). Main channel pools were the most frequently encountered at 57.9% (Graph 14), and comprised 59% of the total length of all pools (Table 10). Table 14 is a summary of maximum residual pool depths by pool habitat types in the East Fork Maria Ygnacio. Seven of the19 pools measured had a residual depth of two feet or greater (Graph 18).

In the mainstem of San Antonio Creek, a total of 68 pools were identified (Table 11). Main channel pools were the most frequently encountered at 32.0% (Graph 13), and comprised 48% of the total length of all pools (Table 11). Table 15 is a summary of maximum residual pool depths by pool habitat types in mainstem of San Antonio Creek. Sixteen of the 68 pools measured had a residual depth of two feet or greater (Graph 19).

In the East Fork San Antonio, a total of 5 pools were identified (Table 9). Scour pools were the most frequently encountered at 60% (Graph 16), and comprised 57% of the total length of all pools (Table 12). Table 16 is a summary of maximum residual pool depths by pool habitat types in the East Fork San Antonio. Two of the 5 pools measured had a residual depth of two feet or greater (Graph 20).

Embeddedness:

The depth of cobble embeddedness was estimated at pool tail-outs. In the mainstem of Maria Ygnacio Creek of the 54 pool tail-outs measured, 11 had a value of 1 (20.4%), 17 had a value of 2 (31.5%), 4 had a value of 3 (7.5%), and 22 had a value of 5 (40.7%) (Graph 21). On this scale, a value of 1 indicates the best spawning conditions with a value of 4 being the worst.

Additionally, a value of 5 was assigned to tail-outs deemed unsuitable for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

In the East Fork Maria Ygnacio of the 19 pool tail-outs measured, 1 had a value of 1 (5.3%), 2 had a value of 2 (10.5%), 6 had a value of 3 (31.6%), 3 had a value of 4 (15.8%), and 7 had a value of 5 (36.8%) (Graph 22).

In the mainstem of San Antonio Creek of the 68 pool tail-outs measured, 0 had a value of 1 (0%), 7 had a value of 2 (10.3%), 6 had a value of 3 (8.8%), 2 had a value of 4 (2.9%), and 53 had a value of 5 (77.9%) (Graph 23).

In the East Fork San Antonio of the 5 pool tail-outs measured, all 5 had a value of 5 (100%) (Graph 24).

Shelter Rating:

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300, with 0 being the lowest rating and 300 being the highest. In the mainstem of Maria Ygnacio Creek, riffle habitat types had a mean shelter rating of 98, flatwater habitat types had a mean shelter rating of 27, and pool habitats had a mean shelter rating of 64 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 54, scour pools had a mean shelter rating of 66, and the one backwater pool had a mean shelter rating of 105 (Table 9).

In the East Fork Maria Ygnacio Creek, riffle habitat types had a mean shelter rating of 40, flatwater habitat types had a mean shelter rating of 32, and pool habitats had a mean shelter rating of 60 (Table 2). Of the pool types, the main channel pools had a mean shelter rating of 78, and scour pools had a mean shelter rating of 42 (Table 10).

In the mainstem of San Antonio Creek, riffle habitat types had a mean shelter rating of 166, flatwater habitat types had a mean shelter rating of 61, and pool habitats had a mean shelter rating of 73 (Table 3). Of the pool types, the main channel pools had a mean shelter rating of 69, and scour pools had a mean shelter rating of 78 (Table 11).

In the East Fork San Antonio Creek, riffle habitat types had a mean shelter rating of 190, flatwater habitat types had a mean shelter rating of 37, and pool habitats had a mean shelter rating of 30 (Table 4). Of the pool types, one main channel pool fully measured had a mean shelter rating of 30, and no scour pools were fully measured (Table 12).

Summary of Habitat Cover:

For the mainstem of Maria Ygnacio Creek, Table 17 summarizes mean percent cover by habitat type and displays boulders as the predominantly dominant cover type. Graph 25 describes the pool cover with boulders as the dominant cover type followed by undercut banks.

For the East Fork Maria Ygnacio, Table 18 summarizes mean percent cover by habitat type.

Graph 26 describes the pool cover with undercut banks as the dominant cover type followed by terrestrial vegetation, whitewater, and bedrock ledges all tied for second most dominant cover.

For the mainstem of San Antonio Creek, Table 19 summarizes mean percent cover by habitat type and displays boulders as the predominantly dominant cover type. Graph 27 describes the pool cover with boulders as the dominant cover type followed by whitewater.

For the East Fork San Antonio, Table 20 summarizes mean percent cover by habitat type and displays boulders as the dominant cover type. Graph 28 describes the pool cover with both boulders and whitewater as the dominant cover type.

Substrate:

Table 21 summarizes the dominant substrate by habitat type in the mainstem of Maria Ygnacio and, for a majority of habitat units, boulders appeared to be the dominant substrate followed by sand. Graph 29 depicts the dominant substrate observed in pool tail-outs. Gravel was the most dominant and observed in 31.5% of all pool tail-outs while sand and boulders were each observed in 20.1% of all pool tail-outs.

Table 22 summarizes the dominant substrate by habitat type in the East Fork Maria Ygnacio and, for a majority of habitat units, boulders appeared to be the dominant substrate followed by sand. Graph 30 depicts the dominant substrate observed in pool tail-outs. Gravel was the most dominant and observed in 63.2% of all pool tail-outs while sand was observed in 26.3% of all pool tail-outs.

Table 23 summarizes the dominant substrate by habitat type in the mainstem of San Antonio and, for a majority of habitat units, boulders appeared to be the dominant substrate followed by silt and sand. Graph 31 depicts the dominant substrate observed in pool tail-outs. Boulders were the most dominant and observed in 58.8% of all pool tail-outs while silt was observed in 16.2% of all pool tail-outs. The increase in silt observed throughout San Antonio Creek could most likely be attributed to the Jesusita Fire.

Table 24 summarizes the dominant substrate by habitat type in the East Fork San Antonio and, for a majority of habitat units, boulders appeared to be the dominant substrate followed by silt and sand. Graph 32 depicts the dominant substrate observed in pool tail-outs. Silt was the most dominant and observed in 60% of all pool tail-outs while sand and boulders were each observed in 20% of all pool tail-outs. As with the mainstem, the increase in silt observed throughout the East Fork San Antonio could most likely be attributed to the Jesusita Fire.

Canopy:

The canopy throughout the entirety Maria Ygnacio watershed consisted of hardwood trees. The mean percent canopy density for the surveyed length of the mainstem of Maria Ygnacio Creek was 92.8%, meaning 7.2% of the canopy was open (Graph 33).

The mean percent canopy density for the surveyed length of the East Fork Maria Ygnacio was

83.8%, meaning 16.2% of the canopy was open (Graph 34).

The mean percent canopy density for the surveyed length of the mainstem of San Antonio Creek was 82.7%, meaning 17.3% of the canopy was open (Graph 35).

The mean percent canopy density for the surveyed length of the East Fork San Antonio was 84.1%, meaning 15.9% of the canopy was open (Graph 36).

Bank Vegetation and Composition:

For the mainstem of Maria Ygnacio Creek, the mean percent right bank vegetated was 44%, and the mean percent left bank vegetated was 37% (Table 25). The dominant elements composing the structure of the stream banks consisted of 12.5% bedrock, 31.7% boulder, 0% cobble/gravel, and 54.8% sand/silt/clay (Graph 37). Trees were the dominant vegetation type observed in 91.3% of the units surveyed (Graph 41). Additionally, 4.8% of the units surveyed had brush as the dominant vegetation type, and 1% had grass as the dominant vegetation while 1% had no vegetation (Graph 41).

For the East Fork Maria Ygnacio Creek, both the mean percent right and left bank vegetated was 38% (Table 26). The dominant elements composing the structure of the stream banks consisted of 19.0% bedrock, 16.7% boulder, 0% cobble/gravel, and 64.3% sand/silt/clay (Graph 38). Trees were the dominant vegetation type observed in 71.4% of the units surveyed (Graph 42). Additionally, 26.2% of the units surveyed had brush as the dominant vegetation type, and 2.4% had grass as the dominant vegetation (Graph 42).

For the mainstem of San Antonio Creek, the mean percent right bank vegetated was 42%, and the mean percent left bank vegetated was 48% (Table 27). The dominant elements composing the structure of the stream banks consisted of 2.4% bedrock, 87.3% boulder, 0.8% cobble/gravel, and 9.5% sand/silt/clay (Graph 39). Trees were the dominant vegetation type observed in 89.7% of the units surveyed (Graph 43). Additionally, 6.3% of the units surveyed had brush as the dominant vegetation type, and 3.2% had grass as the dominant vegetation while 0.8% had no vegetation (Graph 43).

For the East Fork San Antonio, the mean percent right bank vegetated was 23%, and the mean percent left bank vegetated was 25% (Table 28). The dominant elements composing the structure of the stream banks consisted of 12.5% bedrock, 60% boulder, 0% cobble/gravel, and 27.5% sand/silt/clay (Graph 40). Trees were the dominant vegetation type observed in 87.5% of the units surveyed (Graph 44). Additionally, 7.5% of the units surveyed had brush as the dominant vegetation type, and 2.5% had grass as the dominant vegetation while 2.5% had no vegetation (Graph 41).

Biological Inventory Results

For the Maria Ygnacio habitat survey, presence/absence was conducted using dip nets and via bankside observations. Observations of species in past surveys were also noted.

In regards to fish species, two species were observed: arroyo chub (*Gila orcuttii*), and southern steelhead (*Oncorhynchus mykiss*). The first fish in Maria Ygnacio were observed in Reach 2, approximately 2.63 miles upstream from the confluence. Dip nets were used to capture and identify species in this vicinity. The lone fish species captured was identified as arroyo chub (*Gila orcuttii*) and was observed throughout Reach 2. One *O. mykiss* was observed in Reach 3, above the Bjorklund campground. In addition, *O. mykiss* have been observed in the area and both alive and dead specimens were observed beneath the waterfall in Reach 3 after the Jesusita Fire.

Fish were also observed in the East Fork Maria Ygnacio above the debris basin after the rains and beneath the waterfall. It was assumed that these fish were arroyo chub.

No fish species were observed in the San Antonio watershed.

Few other wildlife species were observed throughout the survey. Of the other species observed, California tree frogs (*Pseudacris cadaverina*) and Pacific tree frogs (*Pseudacris regilla*) were heard throughout the watershed. Pacific tree frogs and tadpoles were observed in the East Fork Maria Ygnacio above the debris basin. In addition, a California newt (*Taricha torosa*) was observed in San Antonio Creek. Mammals observed included rabbit (*Sylvilagus s.*) and mule deer (*Odocoileus hemionus*).

Some listed species and species of concern known to inhabit the Maria Ygnacio Watershed include the arroyo toad (*Bufo Californicus*), coast range newt (*Taricha torosa*), Belding's savannah sparrow (*Passerculus sandwichensis*), Nuttall's scrub oak (*Quercus dumosa*), two-striped garter snake (*Thamnophis hammondii*), and least Bell's vireo (*Vireo bellii*), along with the southern steelhead (*Oncorhynchus mykiss*) (Southern California Wetlands Recovery Project, 2006).

Although not abundant, aquatic macro-invertebrates were present throughout the surveyed area in Maria Ygnacio watershed where continuous flow was observed, such as water boatman, water striders and midge larva. Macro-invertebrates would provide a food source for rearing juvenile *O. mykiss*. A more focused survey could provide greater insight into the abundance of macro-invertebrates and water quality conditions.

Numerous populations of non-native vegetative species were observed throughout the watershed; most notably through the urban sections. Non-native species included castor bean (*Ricinus communis*), pampas grass (*Cortaderia selloana*), arundo (*Arundo donax*), vinca (*Vinca s.*), English ivy (*Hedera helix*), cape ivy (*Delairea odorata*), umbrella sedge (*Cyperus s.*), eucalyptus (*Eucalyptus s.*), and nasturtium (*Tropaeolum s.*), among others. There were large stands of problem invasives such as arundo, eucalyptus, cape ivy, and English ivy.

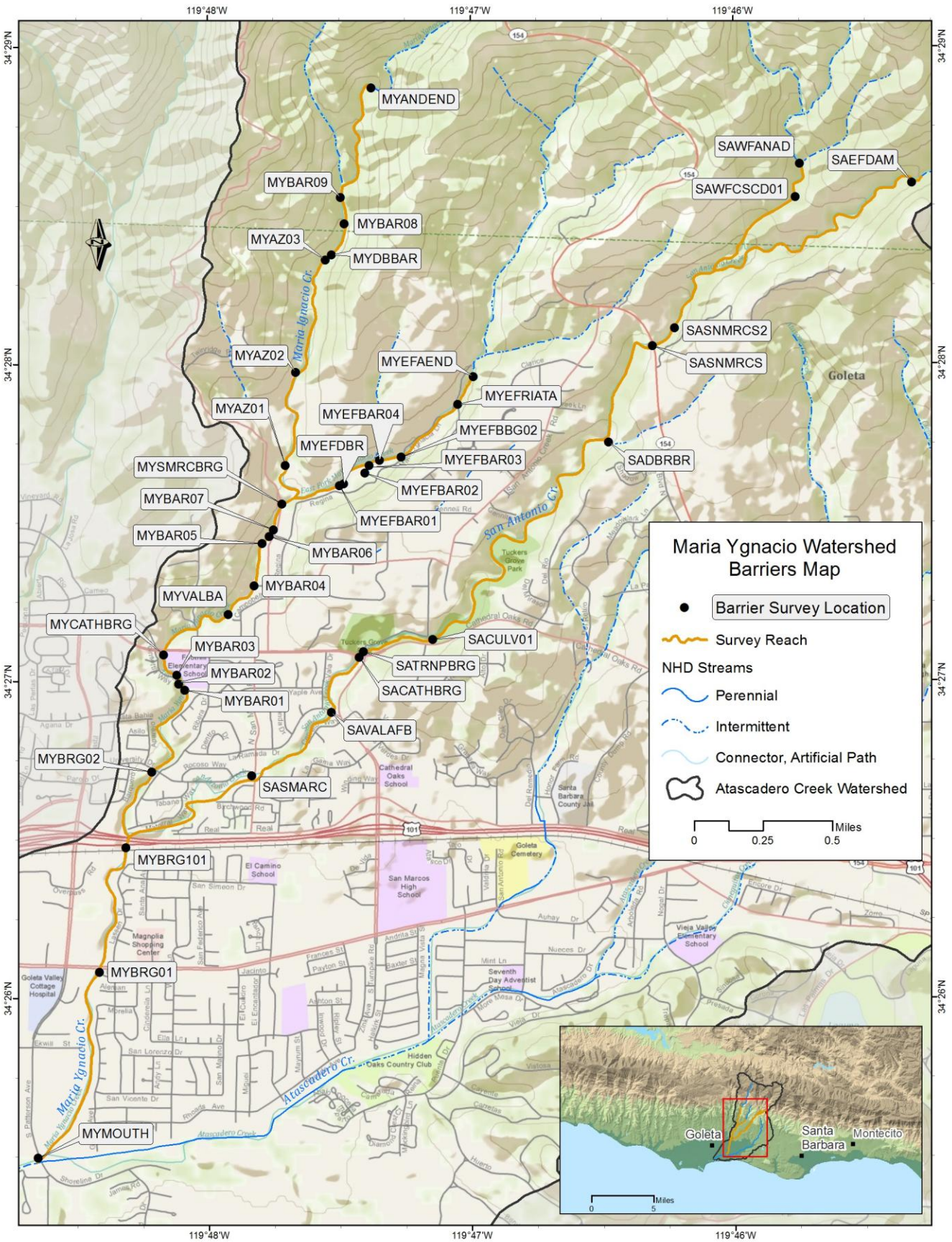
Arundo, a known problem invasive, was observed throughout Reach 1 in the mainstem of Maria Ygnacio with the last noted observation slightly above the Cathedral Oaks bridge, approximately 12,440 ft. (2.34 mi.) upstream from the confluence. Multiple stands were observed in the lower reach and have out-competed all other plant species. These populations should be removed.

Numerous populations of both species of ivy were observed throughout the surveyed area. In the mainstem of Maria Ygnacio Creek, populations of both species were observed until approximately 14,866 ft. (2.82 mi) upstream from the confluence. Ivy was also observed in the mainstem of San Antonio Creek with the last population being observed approximately 21,754 ft. (4.12 mi) upstream from the San Antonio confluence with Maria Ygnacio.

Most of the invasives were observed in the urban sections, although, many eucalyptus were observed along the banks in Reach 3 of the mainstem of Maria Ygnacio near the Bjorklund campground. There was noticeable erosion associated with the trees including many fallen trees, in and across the stream, and significant bank erosion which has exposed the root systems.

In the upper sections, the native vegetation was quite prolific and diverse. Alders (*Alnus rhombifolia*), willows (*Salix sp.*), western sycamores (*Platanus racemosa*), coast live oak (*Quercus agrifolia*) and cottonwood (*Populus trichocarpa*) composed the upper canopy of the surveyed reaches, while the under story was dominated by poison oak (*Toxicodendron diversilobum*), and blackberry species.

MAP 3


119°48'W
119°47'W
119°46'W
34°29'N
34°28'N
34°27'N
34°26'N
MYANDEND
SAWFANAD
SAEFDAM
SAWFCSCD01
MYBAR09
MYBAR08
MYAZ03
MYDBBAR
Maria Ignacio Cr.
SASNMRCS2
SASNMRCS
MYAZ02
MYEFAEND
MYEFRIATA
MYAZ01
MYEFBAR04
MYEFBBG02
MYEFDBR
MYEFBAR03
SADBRBR
MYSMRCBRG
MYEFBAR02
MYBAR07
MYEFBAR01
San Antonio Cr.
MYBAR05
MYBAR06
MYBAR04
MYVALBA
MYCATHBRG
SACULV01
MYBAR03
SATRNPBRG
MYBAR02
SACATHBRG
MYBAR01
SAVALAFB
MYBRG02
SASMARC
MYBRG101
MYBRG01
Atascadero Cr.
MYMOUTH
Goleta
Maria Ygnacio Watershed Barriers Map
Barrier Survey Location
Survey Reach
NHD Streams
Perennial
Intermittent
Connector, Artificial Path
Atascadero Creek Watershed
Miles
0
0.25
0.5
Goleta
Santa Barbara
Montecito
Miles
0
5

MARIA YGNACIO WATERSHED CULVERTS, BRIDGES, CROSSINGS, AND BARRIERS

Throughout the Maria Ygnacio watershed, there were a number of manmade crossing and gradient control structures as the watershed ran through the urbanized areas of Goleta (see Map 3). There were a total of 16 bridges for vehicular traffic, as well as additional footbridges, Arizona crossings, and gradient control structures that altered the natural stream bed. In addition, there were four debris basins, all deemed impassable to steelhead, in each of the four creeks. Three natural barriers were also observed: two impassable waterfalls in the mainstem and East Fork Maria Ygnacio and one possibly impassable waterfall in the mainstem of San Antonio.

MARIA YGNACIO MAIN FORK BARRIERS

NAME: MY PATTERSON BRIDGE
GPS: MYMOUTH **Stoecker ID: BR_AO_MY_1**
Barrier Type: Bridge/concrete grade control structure **Location:** 34º25.497' N, 119º48.651' W
Description: Maria Ygnacio's confluence with Atascadero occurs at the Patterson Bridge where the two creeks converge at the drop off directly downstream of the bridge structure. At the time of the survey, the structure measured 132 ft across the stream channel and 71 ft from the middle division on the Maria Ygnacio side. There was a 3.7 ft plunge from the lip of the drop off to the surface of the pool with pool depth beneath the drop off measuring 6.3 ft. The structure is 76.5 ft long through the stream channel on the Maria Ygnacio side and composed of concrete boulder riprap. Due to velocity breaks, this structure would be passable for steelhead with good flow conditions.


MY Patterson Bridge, Maria Ygnacio/Atascadero, RB


MY Patterson Bridge, Maria Ygnacio, looking DS

NAME: None
GPS: None **Stoecker ID: BR_AO_MY_2**
Barrier Type: Grade Control **Location:** None
Description: This grade control structure mentioned in the Stoecker report had been silted in and was negligible as a migration barrier.

NAME: MY HOLLISTER BRIDGE
GPS: MYBRG01 **Stoecker ID: BR_AO_MY_3**
Barrier Type: Concrete channelization/box culvert crossing **Location:** 34º26.083' N, 119º48.416' W
Description: The Hollister bridge structure contains concrete boulder riprap channelization with a box culvert beneath the bridge for a flat footpath. The riprap apron is 33 ft long (0.4 ft jump into the channel) to the bridge

and 76 ft from the end of the apron to the footpath box culvert. The entire length, including the apron, is 147 ft from the upstream edge of the bridge structure. The bridge itself is 115 ft long and 54 ft wide. The footpath box culvert is 30 ft long, 4 ft tall, and 5.5 ft wide, and contains a smoothed concrete bottom. This structure imposes a moderate degree of difficulty to swim into the channel, and a high degree of difficulty to pass through box culvert due to the lack of velocity breaks.

MY Hollister Bridge, looking US

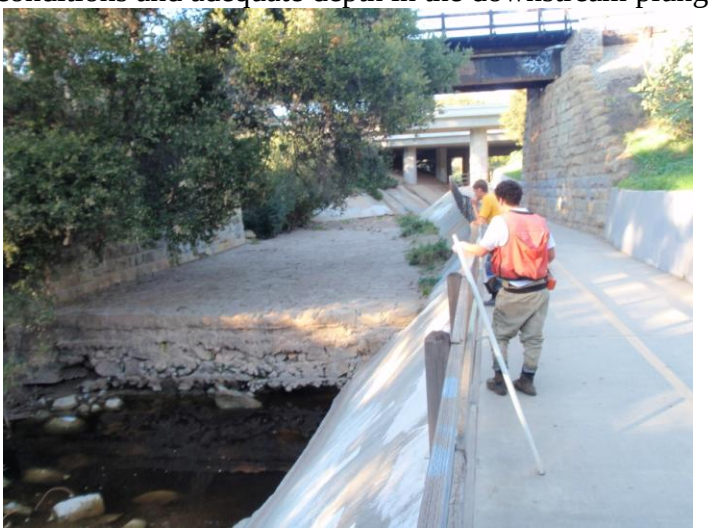
MY Beneath Hollister Bridge, looking DS

NAME: MY 101 BRIDGE & RAILROAD CROSSING

GPS: MYBRG101 **Stoecker ID: BR_AO_MY_4**

Barrier Type: Concrete channelization **Location:** 34º26.475' N, 119º48.314' W

Description: The structure beneath the USRR bridge was constructed of corroded riprap substrate and created a substantial downstream jump. The plunge pool had a 2 ft depth beneath the lip with a 6.5 ft jump from the water surface to the lip of the plunge. The structure was 104 ft long and 33 ft wide with a brick wall on the right bank and a sloped concrete bank on the left. For steelhead, there would be a high degree of difficulty for passing the structure due to the lack of resting pools and velocity breaks over the flat surface; however, with ideal flow conditions and adequate depth in the downstream plunge pool, the structure could be passable.



MY Beneath the USRR Crossing, LB looking US

MY Beneath the 101 bridge, , looking US

NAME: MY UNIVERSITY AVE. BRIDGE

GPS: MYBRG02 **Stoecker ID: BR_AO_MY_5**

Barrier Type: Concrete apron grade control structure **Location:** 34º26.714' N, 119º48.216' W

Description: Just downstream of the University bridge, there was a riprap concrete apron constructed through the stream channel. The apron was 21 ft lengthwise through the channel and 38 ft across with a 1.5 ft average lip height and a negligible pool beneath the plunge. The structure would be passable with adequate flow.

MY University Ave Bridge Grade Control Structure

NAME: MY GRADE CONTROL 1
GPS: MYBAR01 **Stoecker ID: BR_AO_MY_6**
Barrier Type: Concrete grade control structure **Location:** 34º26.972' N, 119º48.090' W
Description: This structure was the first downstream structure in a series of three concrete grade control structure. The structure was 16 ft long and 25 ft wide across the channel with a 2.3 ft deep scour beneath the lip and a slope of approximately 15 degrees. The structure could present migration problems but should be passable with adequate flow.

MY Concrete Grade Control Structure 1

NAME: MY GRADE CONTROL 2
GPS: MYBAR02 **Stoecker ID: BR_AO_MY_7**
Barrier Type: Concrete grade control structure **Location:** 34º26.991 N, 119º48.112' W

Description: The structure was 17ft long, 25 ft wide across the stream, with 2.6 ft deep scour beneath the lip and a slope of approximately 15 degrees. The structure should be passable with a moderate degree of difficulty during good flow conditions.

MY Concrete Grade Control Structure 2

NAME: MY GRADE CONTROL 3

GPS: MYBAR03 **Stoecker ID:** No Stoecker ID

Barrier Type: Concrete grade control structure **Location:** 34º27.020' N, 119º48.119' W

Description: This structure was broken in the middle and would present negligible migration difficulties. It spanned 48 ft across the stream channel and, at its longest, it was 10 ft.

MY Concrete Grade Control Structure 3, looking US

NAME: MY CATHERDRAL OAKS BRIDGE

GPS: MYCATHBRG **Stoecker ID: BR_AO_MY_8**

Barrier Type: Double box culvert **Location:** 34º27.083' N, 119º48.169' W

Description: The Cathedral Oaks bridge was comprised of a concrete bifurcated box culvert, 186 ft long with each tunnel measuring 12 ft wide. The outlet apron was 24 ft wide at the lip, and 21 ft long with sloped concrete wing walls. The curved inlet apron was 45 ft long w/ sloped inlet wing walls and narrows to 3.8 ft at the base. The plunge was 10 ft max deep from the downstream lip to the creek bed. With adequate pool depth, the jump would be passable; however, migration through the culvert would be difficult due to the flat surface, the lack of velocity breaks, and the narrow inlet. Overall, migration of steelhead through the culvert would be challenging.

MY Cathedral Oaks Bridge, looking US

NAME: MY VALBA ST.

GPS: MYVALBA **Stoecker ID: BR_AO_MY_9**

Barrier Type: Concrete Arizona crossing **Location:** 34º27.211' N, 119º47.924' W

Descriptions: Valba street contained an instream concrete Arizona Crossing. The structure spanned the entire length of the stream channel, and included an outlet apron that was 13 ft long while the whole stream length of the structure was 25 ft. With adequate flow, this structure should be passable.

MY Valva Street Arizona Crossing, looking US

BARRIER: MY GRADE CONTROL 4

GPS: MYBAR04 **Stoecker ID: BR_AO_MY_10**

Barrier Type: Concrete apron under footbridge **Location:** 34º27.301' N, 119º47.825' W

Description: This grade control structure spanned the channel beneath a footbridge and involved a concrete apron and inlet wing walls. The structure was 25.5 ft wide with a 19ft apron and 35 ft of total length. Beneath the downstream plunge, the pool had a depth of 1.8 ft with a 2.2 ft jump onto the apron. With appropriate flow, this structure would be passable to steelhead; however, due to the lack of velocity breaks the structure would only be passable during ideal flows.

MY Concrete Grade Control Structure 4

NAME: MY GRADE CONTROL 5

GPS: MYBARO5 **Stoecker ID: BR_AO_MY_11**

Barrier Type: Concrete grade control structure **Location:** 34º27.434' N, 119º47.795 S

Description: This concrete gradient structure was 25 ft wide and 6.5 ft long with a 1 ft. pool depth beneath the plunge and a jump height of 2.5 ft. It would easily passable with sufficient flow.

MY Concrete Grade Control Structure 5

NAME: MY GRADE CONTROL 6

GPS: MYBAR06 **Stoecker ID: BR_AO_MY_12**

Barrier Type: Concrete channelization **Location:** 34º27.456' N, 119º47.768' W

Descriptions: This V-shaped concrete channel was 49 ft long, 19 ft wide and enclosed between two erosion fences. There was a 1.7 ft plunge from the downstream lip to the water surface and a pool depth of 0.6 ft, although, the pool dropped to a 3.8 ft depth 2 ft in front of the structure. The wetted section was 2.2 ft wide and 0.2 ft deep. Overall, the structure would present a high degree of difficulty for migrating steelhead due to the lack of velocity breaks. With ideal flow conditions, however, the structure would be passable.

MY Concrete Grade Control Structure 6

NAME: MY GRADE CONTROL 7

GPS: MYBAR07 **Stoecker ID:** No Stoecker ID

Barrier Type: Concrete channelization **Location:** 34º27.477' N, 119º47.751' W

Description: This concrete channelization was similar to MY Grade Control 6; however, the structure ended w/o a pool but instead a riffle. It was 41ft long (width was not measured) and enclosed by two erosion fences. Overall, the structure would present a high degree of difficulty for migrating steelhead due to the lack of velocity breaks. With ideal flow conditions, however, the structure would be passable.

MY Concrete Grade Control Structure 7

NAME: MY SAN MARCOS BRIDGE

GPS: MYSMRCBRG **Stoecker ID: BR_AO_MY_13**

Barrier Type: Bridge/concrete apron **Location:** 34º27.559' N, 119º47.719' W

Description: Downstream of the natural bottom San Marcos bridge was an outlet concrete apron that was 42 ft wide and 46 ft long. Its length extended into a pool with 21ft of concrete outside of the pool with a slope of approximately 15 degrees and a height of 3.5 ft. At the time of the survey, the wetted width was 12ft with a depth of 0.1 ft. The max depth of the downstream pool was 2.5 ft. The structure would be difficult to migrate past for steelhead due to its slope, width, and lack of velocity breaks. During seasons of extremely high flow, it may be possible for steelhead to migrate past this barrier. Beneath the bridge, the natural bottom stream channel width was ~28 ft with boulder erosion control on the RB and 2 concrete suspensions.

MY San Marcos Bridge, looking US

NAME: MY ARIZONA CROSSING 1

GPS: MYAZ01 **Stoecker ID: BR_AO_MY_14**

Barrier Type: Concrete Arizona crossing **Location:** 34º27.681' N, 119º47.706' W

Description: This concrete Arizona crossing spanned the entire stream channel and was 12 ft long. There was a pipe running beneath the structure allowing for water flow. This structure would be passable with suitable flow.

MY Arizona Crossing 1, LB looking US

NAME: MY ARIZONA CROSSING 2

GPS: MYAZ02 **Stoecker ID: BR_AO_MY_15**

Barrier Type: Concrete Arizona crossing **Location:** 34º27.974' N, 119º47.665' W

Description: This concrete Arizona crossing passed through the unsurveyed unit. There was a scoured plunge pool created downstream of the structure that had a water depth of 1.6 ft beneath the flow (max pool depth was 2.0 ft) and a jump height of 4.2 ft from the lip to the water surface. The road was measured to be 15 ft long. Depending on downstream pool formation and depth, the jump should be manageable; however, there would be a high degree of difficulty for steelhead to cross the structure itself for lack of velocity breaks.

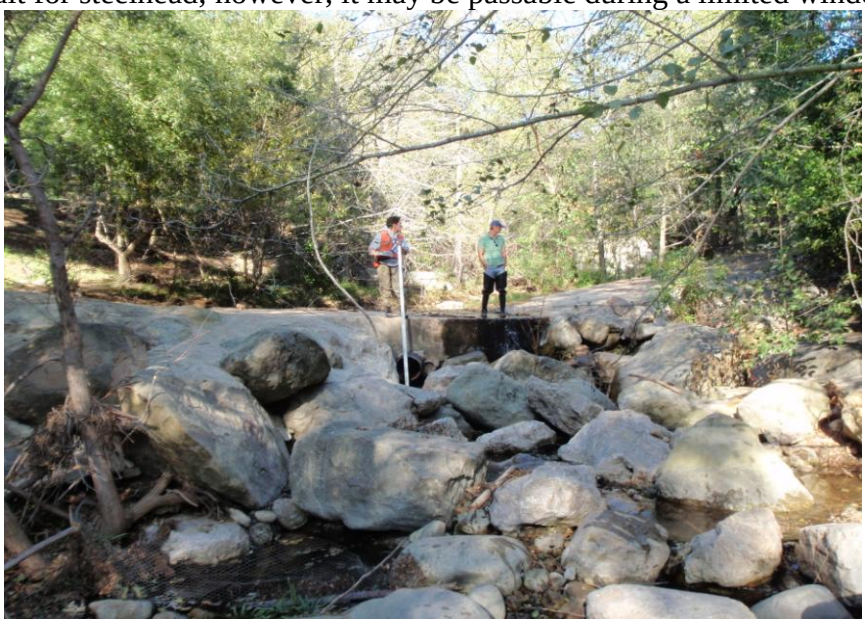
MY Arizona Crossing 2, looking US

NAME: MY ARIZONA CROSSING 3

GPS: MYAZ03 **Stoecker ID: BR_AO_MY_16**

Barrier Type: Concrete Arizona crossing **Location:** 34º28.329' N, 119º47.552' W

Description: This concrete Arizona crossing was 15 ft long with a 4.4 ft downstream plunge into a boulder cascade with negligible pool depths. The lack of a plunge pool and the smooth surface across the structure would make migration difficult for steelhead; however, it may be passable during a limited window with ideal flows.



MY Arizona Crossing 3, looking US

NAME: MY DEBRIS BASIN

GPS: MYDBBAR **Stoecker ID: BR_AO_MY_17**

Barrier Type: Debris Basin **Location:** 34º28.345' N, 119º47.528' W

Description: The Maria Ygnacio debris basin was built in 1990 after the Painted Caves Fire and was constructed using a massive concrete riprap dam with a 136 ft pipe (4.5 ft diameter) that runs beneath allowing for water passage. A plunge pool (max depth of 3.5 ft) was scoured beneath the downstream outlet with a 1.8 ft depth beneath the pipe and a 1.7 ft jump from the water to the lip of the pipe. With flow, entrance into the pipe would be possible but migrating through the 136 ft long pipe would be extremely difficult due to the force of the flow through such a smooth and narrow channel. Migration through the barrier might not be possible for steelhead.

MY Debris Basin, looking US

MY Debris Basin, LB, looking US

NAME: MY GRADE CONTROL 8

GPS: MYBAR08 **Stoecker ID: BR_AO_MY_18**

Barrier Type: Riprap grade control structure **Location:** 34º28.442' N, 119º47.480' W

Description: This boulder, riprap gradient structure was constructed above the debris basin to provide an inlet into the debris basin. The structure was approximately 8 ft high, 41 ft long, and had a slope of approximately 12 degrees. The height and steepness of the structure appear to prevent all upstream migration for steelhead; however, with suitable flow it may be possible for *O. mykiss* to migrate over this barrier.

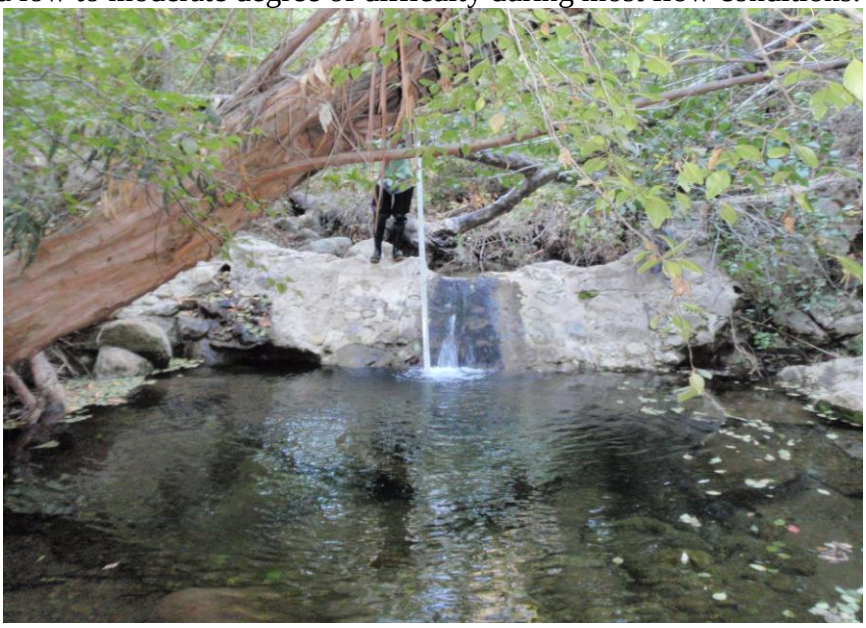
MY Grade Control 8

NAME: MY GRADE CONTROL 9

GPS: MYBAR09 **Stoecker ID: BR_AO_MY_19**

Barrier Type: Concrete Grade Control Structure **Location:** 34º28.526' N, 119º47.493' W

Description: This concrete dam structure was 18 ft wide with a 3.4 ft jump from a 4 ft deep section of pool beneath the plunge (max depth in the pool was 5.8 ft). Sufficient depth in the downstream pool should be enough to allow passage with a low to moderate degree of difficulty during most flow conditions.



MY Grade Control 9

NAME: MY WATERFALL

GPS: MYANDEND **Stoecker ID: BR_AO_MY_20**

Barrier Type: Bedrock waterfall **Location:** 34º28.871' N, 119º47.376' W

Description: This natural waterfall was approximately 40ft. The height of the waterfall prevents migration during all flow conditions, thus making this the natural anadromy barrier for steelhead in Maria Ygnacio.

MY Anadromy Barrier Waterfall

EAST FORK MARIA YGNACIO BARRIERS

NAME: ME GRADE CONTROL 1
GPS: MYEFBAR01 **Stoecker ID:** No Stoecker ID
Barrier Type: Riprap grade control barrier **Location:** 34º27.616 N, 119º47.499 W
Description: This riprap grade control structure created a plunge pool with a 2.5 ft depth below the structure and a 3.5 ft jump with a 5 ft total length. The wetted width was 11 ft, whereas the total width was 19 ft. With sufficient flow, the plunge pool should be deep enough to make the structure passable with minimum difficulty.

MYEF Grade Control, looking US

NAME: ME DEBRIS BASIN
GPS: MYEFDBR **Stoecker ID: BR_AO_MY_EF_1**
Barrier Type: Debris Basin **Location:** 34º27.622’ N, 119º47.483’ W
Description: The East Fork Maria Ygnacio debris basin was built in 1990 after the Painted Hills fire. It was constructed using concrete riprap with a 4.5 ft diameter, 144 ft long pipe with an additional 6.5 ft of pipe at the inlet. At the time of the survey, there wasn’t flow running through the debris basin and, from the downstream pool to the top of the barrier, was a 3.2 ft length. With flow, it should be manageable for steelhead to enter the pipe culvert; however, due to the length of the pipe, migration should be extremely difficult.

MYEF Debris Basin, looking US

NAME: ME GRADE CONTROL 2
GPS: MYEFBAR02 **Stoecker ID:** No Stoecker ID
Barrier Type: Concrete grade control **Location:** 34º27.656' N, 119º47.402' W
Description: This concrete grade control structure was 35 ft wide and 19 ft of total length with a height of approximately 3.2 ft. At the base, the water depth was 0.1 ft with a 1.0 ft jump to the lip. At the time of the survey, the wetted width was 4.0 ft and the wetted depth was 0.2 ft. With sufficient flow, this structure would be passable; however, its width and smoothness would create a lack of velocity breaks that would make migration difficult for steelhead during low flow conditions.

MYEF Grade Control 2

NAME: ME GRADE CONTROL 3
GPS: MYEFBAR03 **Stoecker ID:** No Stoecker ID

Barrier Type: Riprap grade control **Location:** 34º27.680’ N, 119º47.386’ W

Description: This grade control structure contained two sections: a 31 ft riprap embankment and a small concrete outlet apron separated by 15 ft of shallow pool that had been silted in. The concrete outlet apron was approximately 5 ft in length and created a 2 ft plunge followed by a downstream pool with a depth of 2 ft beneath the apron (max pool depth = 2.4 ft). The riprap bank was 31 ft long and 9.2 ft high, indicating a slope of approximately 17 degrees. The lack of flow and steepness and length of the bank would make it extremely difficult for steelhead to migrate past this structure.

MYEF Grade Control 3

NAME: ME GRADE CONTROL 4

GPS: MYEFBAR04 **Stoecker ID:** No Stoecker ID

Barrier Type: Metal pipe check structure & debris **Location:** 34º27.696’ N, 119º47.348’ W

Description: Beneath a footbridge inside the nursery, there was a metal pipe check structure that stood 4 ft tall with debris entrapped behind it and negligible downstream scour. The lack of scour pool would make migration difficult unless a sufficient pool was formed to jump past the pipe structure. There was another metal pipe check structure approximately 50 ft downstream from the footbridge pipe check structure; however, this barrier would be easily passable with sufficient flow.

Metal Pipe Check Structure

US Metal Pipe Check Structure

NAME: ME FOOT BRIDGE

GPS: MYEFBBG02 **Stoecker ID:** No Stoecker ID

Barrier Type: Natural Bottom Bridge **Location:** 34º27.707' N, 119º47.265' W

Description: There was a second bridge observed in the nursery. This bridge contained a natural bottom; however, there was considerable erosion observed underneath the left bank buttress. This structure would not pose a threat to steelhead migration.

MYEF Footbridge, looking US

NAME: LA RIATA BRIDGE

GPS: MYEFRIATA **Stoecker ID:** No Stoecker ID

Barrier Type: LWD & concrete debris **Location:** 34º27.872' N, 119º47.050' W

Description: The La Riata bridge was a natural bottom bridge with a downstream concrete apron. Right and left bank erosion and debris of concrete and fallen trees blocked the stream channel where it narrowed on the downstream concrete apron. If the debris were cleared, migration would once again be possible.

La Riata Bridge, looking US

NAME: ME WATERFALL

GPS: MYEFAEND **Stoecker ID: BR_AO_MY_EF_2**

Barrier Type: Bedrock waterfall **Location:** 34º27.960’ N, 119º46.990’ W

Description: The East Fork Maria Ygnacio ended at a 30-35ft waterfall that impeded all upstream fish migration and was determined to be the anadromy barrier.

MYEF Anadromy Waterfall

SAN ANTONIO BARRIERS

NAME: SA 101 BRIDGE & FOOT BRIDGE
GPS: MYBRG101 **Stoecker ID:** No Stoecker ID
Barrier Type: Natural Bottom Bridges **Location:** 34º26.475' N, 119º48.314' W
Description: The San Antonio Creek confluence entered Maria Ygnacio just upstream of the Calle Real and 101 bridges. There was a footbridge with a natural bottom that crossed over San Antonio right after the confluence.

San Antonio Footbridge, looking DS towards the Highway 101 and Calle Real bridges

NAME: SAN MARCOS BRIDGE
GPS: SASMARC **Stoecker ID: BR_AO_MY_SA_1**
Barrier Type: Bridge and riprap apron **Location:** 34º36.701' N, 119º47.835' W
Description: San Antonio Creek curved right at the San Marcos bridge culvert. There was a downstream concrete riprap apron: 23ft long and 27 ft wide with a slight slope. Inside the culvert, the smooth concrete bottom was 26.5 ft wide and 47 ft long. Migrating up the apron was made easier due to the presence of boulders; however, accelerated stream velocities falling from the upstream concrete channel and lack of velocity breaks underneath the bridge would make migration difficult. Overall, passage has high degree of difficulty and limited window of opportunity but with ideal flow conditions, migration may be possible.

DS of San Marcos bridge, looking US

US of San Marcos bridge, looking DS

NAME: SA VALA FOOTBRIDGE

GPS: SAVALAFB **Stoecker ID:** No Stoecker ID

Barrier Type: Natural Bottom Bridge **Location:** 34º26.902' N, 119º47.532' W

Description: The natural bottom footbridge between Vala and Turnpike would be passable under all conditions. On the downstream right bank, there was considerable erosion beneath a stand of eucalyptus.

Vala Footbridge, looking US

NAME: SA CATHEDRAL OAKS BRIDGE

GPS: SACATHBRG **Stoecker ID: BR_AO_MY_SA_2**

Barrier Type: Natural bottom bridge and concrete lip **Location:** 34º27.074' N, 119º47.426' W

Description: The Cathedral Oaks bridge was a natural bottom bridge with a downstream concrete lip. The concrete lip was 26 ft wide across the stream, 2 ft long and 2 ft with a 1.2 ft water depth beneath the lip. At the time of the survey, the wetted width was 19 ft. Beneath the bridge there was one middle buttress but the rest of the stream bed was natural.

Concrete lip DS of Cathedral Oaks bridge

NAME: TURNPIKE BRIDGE

GPS: SATRNPBRG **Stoecker ID: BR_AO_MY_SA_3**

Barrier Type: Natural Bottom Bridge **Location:** 34º27.093' N, 119º47.410' W

Description: The Turnpike bridge had concrete riprap embankments on both banks beneath the bridge but was primarily natural bottomed. There would be no migration impediments.

Turnpike bridge, looking US

NAME: TUCKER'S GROVE CROSSING

GPS: SACULV01 **Stoecker ID: BR_AO_MY_SA_4**

Barrier Type: Road crossing and 2-pipe culvert **Location:** 34º27.131' N, 119º47.147' W

Description: The Tucker Grove crossing structure connected parking lots within the park. The two-pipe culvert (the pipes were 2.5 ft in diameter) was 29 ft wide and 42 ft long. At the time of the survey in front of the right pipe, the water depth was 1.4 ft deep and the plunge was approximately 1.8 from the pipe to the water surface. In front of the left pipe, the water depth was 0.4 ft and the plunge was 2.0 ft from the pipe. During high flow, the culverts could potentially be blocked with debris, and, during low flow, the water depth would not be adequate, thus making the culvert extremely difficult to pass.

Tucker Grove Culvert, Looking US

Downstream Instream Debris Guard

NAME: SA DEBRIS BARRIER
GPS: SADBRBR **Stoecker ID: BR_AO_MY_SA_5**
Barrier Type: Debris dam and culvert **Location:** 34º27.752' N, 119º46.476' W
Description: The San Antonio debris basin was constructed in 1964 after the Coyote Fire. The culvert was a massive concrete structure with one pipe (2.8 ft diameter) running beneath the structure for flow. The corrugated metal pipe was approximately 77.5 ft in length. The jump into the pipe was negligible; however, passage through the debris basin would be extremely difficult due to shallow depths during low flow or high velocities with increased flow.

San Antonio Debris Basin, looking US

Debris Basin Pool Created US of Debris Basin Dam

NAME: SA SAN MARCOS PASS BRIDGE
GPS: SASNMRCS **Stoecker ID:** No Stoecker ID
Barrier Type: Large natural bottom bridge **Location:** 34º28.056' N, 119º46.308' W
Description: This large natural bottom bridge would not impede steelhead migration. No pic.

NAME: SA SAN MARCOS PASS BRIDGE 2
GPS: SASNMRCS2 **Stoecker ID:** No Stoecker ID
Location: 34º28.112' N, 119º46.223' W **Barrier Type:** Natural Bottom Bridge
Description: This large natural bottom bridge would not create a barrier for steelhead.

Private bridge upstream San Marcos Pass, looking US

NAME: SA WATERFALL
GPS: SAWFANAD **Stoecker ID: BR_AO_MY_SA_WF_1**
Barrier Type: Waterfall **Location:** 34º28.631' N, 119º45.748'W
Description: This natural waterfall was approximately 15 ft tall and was deemed the anadromy barrier; however, it might be possible that this barrier could be passed with sufficient flow. Due to land access limitations, we were not allowed to continue the survey above this point.

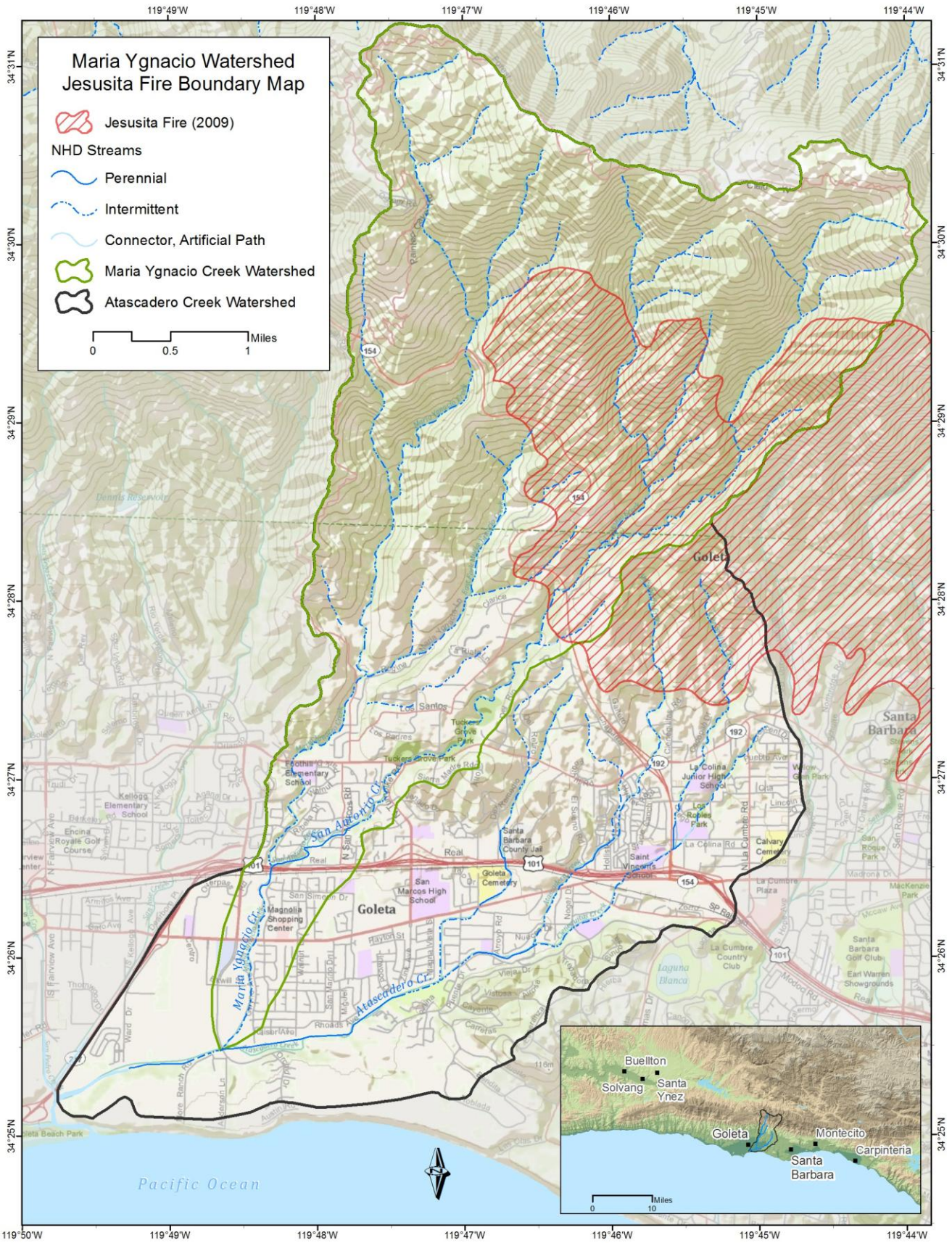
San Antonio Anadromy Waterfall

EAST FORK SAN ANTONIO BARRIERS

NAME: SA DAM
GPS: SAEFDAM **Stoecker ID: BR_AO_MY_SA_EF_1**
Barrier Type: Stone and concrete dam **Location:** 34 28.57 N, 119 45.32 W
Description: This concrete and stone dam was 22ft wide across the channel, 3.2 ft long, and filled with sediment to the lip, as well as in the pool beneath plunge. The plunge pool was 0.8 ft deep and the plunge from the water's surface to the lip was 6.7 ft, while the wetted width was 2.5 ft. Due to the lack of a fully formed plunge pool, migration would most likely be prevented unless a more fully defined pool were scoured out beneath the plunge, thus making the jump possible for steelhead.

SAEF Dam

MAP 4


Maria Ygnacio Watershed
Jesusita Fire Boundary Map
Jesusita Fire (2009)
NHD Streams
Perennial
Intermittent
Connector, Artificial Path
Maria Ygnacio Creek Watershed
Atascadero Creek Watershed
Miles
0
0.5
1
119°49'W
119°48'W
119°47'W
119°46'W
119°45'W
119°44'W
34°31'N
34°30'N
34°29'N
34°28'N
34°27'N
34°26'N
34°25'N
Goleta
Santa Barbara
Pacific Ocean
San Antonio Cr.
Maria Ygnacio Cr.
Atascadero Cr.
Buellton
Solvang
Santa Ynez
Goleta
Montecito
Carpinteria
Santa Barbara
Miles
0
10

THE JESUSITA FIRE

The Jesusita Fire was a wildfire that began on May 5, 2009 and burned 8,733 acres, including portions of the Maria Ygnacio watershed (see Map 4). Just downstream of the San Marcos Pass bridge and approximately 2.76 miles up from the San Antonio-Maria Ygnacio confluence, the San Antonio Creek survey moved upstream through areas within the Jesusita Fire burn perimeter. Closer to the perimeter, the San Antonio riparian corridor remained intact and only the upper hillsides were burned. As the survey moved further upstream, the impacts of the burn were observed closer to the stream channel with the riparian corridor burned on both banks in same sections. The most extensive burned areas were observed on the mainstem close to the anadromy barrier, and throughout majority of the East Fork San Antonio where the hillsides were almost entirely denuded as a result of the fire including vegetation on the stream banks directly beside the stream (see Picture 1).

Picture 1: Burned hillside in the East Fork San Antonio

In addition to the burned bank vegetation, a considerable amount of deposited sand and silt sediment was observed through both the Maria Ygnacio and San Antonio watersheds. It should be noted that for both the B5 channel types for the East Fork Maria Ygnacio and Reach 1 of Maria Ygnacio Creek, there was a considerable amount of sand, which could have been deposited in the lower reaches due to loosened bank sediment and ash from the Jesusita Fire. Beneath the sand deposition, the dominant substrate was boulder. It's possible that following significant storm events with suitable flushing flows, the sand deposit will be flushed downstream and the dominant channel substrate would return to boulder and the channel types would transition for B5 to B2.

In San Antonio Creek and East Fork San Antonio, silt and sand were observed in large quantities throughout the system with more silt observed in the lower watershed, but the silt transitioned to predominately sand substrate in the upper watershed. In addition, there was top soil observed on the banks and floating on the surface of pools (see Picture 2). Much of this silt and sand

deposition filled habitat units that normally would have been pools (see Picture 3). Sand and silt deposited in the stream as a result of the Jesusita Fire should be flushed out after future storm events most likely reverting the dominant substrates to pre-fire conditions. The banks of San Antonio Creek and the East Fork San Antonio were also denuded by the burn with entire hillsides burned in some areas and sections of erosion. In the East Fork San Antonio towards the end of the survey, the use of hydromulch was observed on the hillsides to prevent erosion. With time, there should be a natural recruitment of native vegetation that will repopulate the riparian corridor, revitalizing the canopy and bank vegetation.

Picture 2: Instream topsoil on pool surface

Picture 3: Silt & sand filled pool

In Reach 3 of the mainstem of Maria Ygnacio from upstream of the Bjorklund campground to the waterfall, a fish kill of *O. mykiss* was observed on May 14, 2009, after the Jesusita Fire. An analysis of water samples taken displayed elevated concentrations of ammonia, phosphate, and nitrate. It was assumed that flame retardants dropped during the Jesusita Fire seems likely to have elevated toxicity levels resulting in the fish kill.

DISCUSSION

The Maria Ygnacio watershed survey began at the creek's confluence with Atascadero Creek at the Patterson Bridge, above the Goleta Slough. For the majority of the downstream sections of the survey, the Maria Ygnacio watershed flowed through the urbanized sections of Goleta, and the stream channel was highly altered by grade and erosion control measures, roads, bridges, culverts, and crossing structures. As the watershed moved further upstream, the habitat gradually became less urbanized, flowing through residential and agricultural zones and finally park land with increasing naturally vegetated habitat. The uppermost sections of the surveyed watershed were characterized by mostly undeveloped private land with native vegetation, while the headwaters stem from the Los Padres National Forest.

As the survey moved upstream from the confluence of Atascadero, Maria Ygnacio Creek was characterized by non-flowing glide and run units between interspersed dry units before flow went completely subsurface approximately 1,549 feet upstream. Reach 1 was dry for the rest of the survey and continuous surface flow was not observed until after the Cathedral Oaks bridge near the beginning of Reach 2, 11,638 feet (2.19 miles) upstream of the confluence. From that point, surface flow remained continuous until the end of the survey. Reach 1 was determined to be a B5 channel and was characterized by numerous erosion control measures, including concrete channelization, riprap, erosion fencing, gabion, and concrete grade control structures. There were also a number of invasive non-native plant populations observed throughout Reach 1, including castor bean (*Ricinus communis*), pampas grass (*Cortaderia selloana*), arundo (*Arundo donax*), vinca (*Vinca s.*), English ivy (*Hedera helix*), cape ivy (*Delairea odorata*), umbrella sedge (*Cyperus s.*), eucalyptus (*Eucalyptus s.*), and nasturtium (*Tropaeolum s.*), among others. There were seven vehicular crossing structures observed in Reach 1, including a large channelized section beneath the Union Pacific Railroad, the 101 Highway, and Calle Real.

The mainstem of Maria Ygnacio Creek entered Reach 2 shortly upstream from the Cathedral Oaks bridge and 11,638 feet (2.19 miles) upstream from the confluence. In Reach 2, the stream channel transitioned from a B5 channel to a G2 channel. Reach 2 ran through predominantly residential zones, orchards, and horse stables. The stream bed was partially managed by erosion control structures and grade control structures and sections of the stream were littered with concrete rubble. As the survey moved upstream of the San Marcos bridge crossing, there was a persistent odor of manure where the stream ran through stables and livestock areas. Due to lack of landowner access, there was an unsurveyed section in Reach 2 that was 2,852 feet long and ran through agricultural lands. This unsurveyed unit was deemed the last unit of Reach 2. There were two bridges and two Arizona Crossings observed in Reach 2, along with additional erosion control structures including two extended channelized sections, which could create migration difficulties for steelhead.

As Maria Ygnacio Creek entered Reach 3 20,844 feet (3.95 miles) upstream, the stream channel transitioned from a G2 channel to an A2 channel. Reach 3 started upstream of the unsurveyed unit, and just downstream of the debris basin. There was one Arizona structure that crossed the stream in between the debris basin and the unsurveyed unit. Reach 3 then continued through the Bjornlund campground before it entered naturally vegetated private land. The survey ended

24,927 feet (4.72 miles) upstream at a 35 foot waterfall utilized as a swimming hole by Bjornlund campers. The waterfall was determined to be the anadromy limit and a complete barrier to upstream steelhead migration.

An *O. mykiss* approximately 5 inches in length was observed in Reach 3 while hiking downstream on November 19, 2009. Both live and dead specimens of *O. mykiss* were observed in this Reach as early as May 14, 2009 during a survey performed by Steve Cooper and Sheila Wiseman to examine the effects of the Jesusita Fire and the release of flame retardants (Cooper, 2009).

The East Fork Maria Ygnacio confluence entered the mainstem of Maria Ygnacio Creek approximately 15,219 feet (2.9 miles) upstream from the Maria Ygnacio confluence with Atascadero and was determined to be B5 channel type. Due to land access issues, the survey was not conducted continuous but in various sections of the creek on separate days. On December 3, 2009, the survey began above the second gradient control structure where land ownership changed from Santa Barbara County Flood Control to private land. On this day, the creek was dry, both upstream and downstream, where the survey began 1,752 feet (0.33 mi.) upstream from the East Fork Maria Ygnacio confluence, just upstream of the third East Fork MY grade control structure. There had been flow at the confluence but it was not determined where flow went subsurface. The dry unit continued for an additional 1,604 feet (0.30 mi) above the third East Fork MY grade control structure before continuous flow was observed. A small section above the debris basin went unsurveyed until February 11, 2010, following a number storm events that increased the water table. When the survey commenced, continuous surface flow was observed above the East Fork MY debris basin and ran upstream until the third East Fork MY grade control structure where subsurface flow was previously observed.

From the confluence, the East Fork Maria Ygnacio ran upstream through relatively naturally vegetated residential land for approximately 1,063 feet (0.20 miles) until the debris basin. There were two concrete gradient structures (one providing a potential barrier for steelhead) observed above the debris basin before the creek ran upstream through a plant nursery that was heavily modified by erosion control fencing and gradient fencing, along with two footbridges. Upstream from the nursery, the East Fork Maria Ygnacio entered more naturally vegetated private land. At the La Riata bridge structure, fallen trees, concrete, and debris had clogged the mainstem just beneath the bridge. The bridge also appeared in need of maintenance. Shortly downstream from the anadromy limit, there was runoff from a holding pond approximately 75 feet up the right bank. The East Fork Maria Ygnacio continued until the anadromy limit, a 30-35 foot waterfall approximately 4,474 feet (0.85) upstream.

The San Antonio Creek confluence entered the mainstem of Maria Ygnacio Creek just upstream of the Highway 101 channelization approximately 6,642 feet (1.26 miles) upstream from the Maria Ygnacio Creek confluence with Atascadero. San Antonio Creek was dry for the first 5,090 feet of the survey and it wasn't until a storm event occurred preceding December 15, 2009, that surface flow was observed at a foot bridge between Vala Dr. and Turnpike Rd. Following the storm event, surface flow was observed until the end of the survey. The creek was determined to be a B2 channel for the entire survey, although there were B5 sections with considerable

amounts of sand and/or silt on top of boulder substrate in the stream channel brought on by sediment deposited after storm events following the Jesusita Fire.

In the lower section of San Antonio Creek, from the confluence to the Tucker Grove crossing structure, the channel was similarly modified like Reach 1 of Maria Ygnacio Creek and there were numerous erosion controls, such as erosion fencing and grade control structures. There were also small populations of non-native plants such as ivy and eucalyptus in this section. As San Antonio Creek moved upstream through San Antonio Canyon Park, the habitat was relatively natural and the stream channel remained unaltered aside from occasional trail crossings. The San Antonio debris basin lay 14,671 feet (2.78 miles) upstream from the confluence and created a complete migration barrier for steelhead.

As San Antonio Creek moved upstream of the debris basin, the first areas that burned during the Jesusita Fire were observed on the hillsides but not directly through the riparian corridor. Impacts of the Jesusita Fire became more prevalent as the survey continued upstream. When the creek moved upstream beneath the San Marcos Pass bridge, land ownership transitioned from park land to private land. The habitat was naturally vegetated and relatively undisturbed aside from occasional trail crossings. The San Antonio debris basin was installed approximately 14,671 feet (2.78 miles) upstream, shortly before the San Marcos Pass bridge. After the San Marcos bridge, San Antonio Creek entered private land with a naturally vegetated riparian corridor. The anadromy barrier was a 15-ft waterfall. With high flows, this barrier may be passable, however, due to lack of land owner access, the survey was terminated. Therefore, the survey did not evaluate habitat potential above the barrier. There were six vehicular crossings observed on San Antonio Creek, in addition to three footbridges and the debris basin. The first San Marcos bridge, the Tucker's Grove pipe culvert, and the debris basin all presented potential migration barriers.

The East Fork San Antonio Creek entered the mainstem 19,350 feet (3.66 miles) up from the San Antonio/Maria Ygnacio confluence. As the East Fork San Antonio proceeded upstream, the impacts of the Jesusita Fire were immediately observed with the riparian corridor burned on both banks to the edges of the stream channel. The creek itself was also heavily silted in with bank sediment and topsoil.

The East Fork San Antonio Creek was crossed twice by Arizona crossings. Near the second Arizona crossing, approximately 5,331 feet (1.01 mi.) upstream of the confluence, the left bank was terraced with two structures that appeared to be house of powerbox and a pumphouse. Approximately 5,525 feet (1.05 mi.), there was a silted in concrete dam with a negligible pool that could present a potential migration barrier for steelhead. The survey ended 5,781 feet (1.09 mi.) upstream due to land access restrictions from the property owner.

Current Conditions

In the mainstem of Maria Ygnacio Creek, flatwater habitat types comprised 17.7% of the total length of this survey, riffles were 14.6%, and pools were 11.4%, while dry units comprised 43.6% with most of the flow in Reach 1 being subsurface. In addition, there was an extended section of the creek that wasn't able to be surveyed due to land access restrictions. This section

of the creek comprised 11.4% of the total length of the survey. There were also culvert units that comprised 4.2% of the total length. The pools observed in Maria Ygnacio were fairly deep, with 34 of the 54 (63%) pools having a maximum residual depth greater than 2 feet.

In the East Fork Maria Ygnacio, riffle habitat types comprised 25.0% of the total length of this survey, pools were 13.1%, and flatwater were 21.8%. Dry units also took up 35.3% of the total length while culverts took up 4.8%. The pools were relatively shallow, with only 7 of the 19 (37%) pools having a maximum residual depth greater than 2 feet.

In San Antonio Creek, riffle habitat types comprised 43.1% of the total length of this survey, pools were 9.4%, and flatwater were 24.2%. Dry units also took up 22.2% of the total length while culverts took up 1.1%. The pools were relatively shallow, with only 16 of the 68 (24%) pools having a maximum residual depth greater than 2 feet.

In the East Fork San Antonio Creek, riffle habitat types comprised 67.7% of the total length of this survey, pools were 1.9%, and flatwater were 30.1%. Dry units also took up 0.3% of the total length while culverts took up 0.1%. The pools were relatively few and shallow, with only 2 of the 5 (40%) pools having a maximum residual depth greater than 2 feet.

It should also be noted that considerable amounts of sediment were deposited into the pools after the Jesusita Fire, especially in San Antonio Creek and East Fork San Antonio. This decreased the number of pools observed, as well as decreasing the overall depth. With sufficient flushing storm events, overall pool frequency and depth should increase.

In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy.

In the mainstem of Maria Ygnacio, 28 of the 54 pool tail-outs measured had embeddedness ratings of 1 or 2. Four of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-two of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Pool tail-outs with gravel or small cobble as the dominant substrate are generally considered good for spawning salmonids. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for steelhead.

In the East Fork Maria Ygnacio, 3 of the 19 pool tail-outs had embeddedness ratings of 1 or 2, and 9 pool tail-outs had embeddedness ratings of 3 or 4. Seven of the pool tail-outs had a rating of 5.

In the mainstem of San Antonio Creek, 7 of the 68 pool tail-outs had embeddedness ratings of 2, while zero pool tail-outs had a rating of 1. Eight pool tail-outs had embeddeness ratings of 3 or 4. Meanwhile, 53 pool tail-outs had a rating of 5.

In the East Fork San Antonio, all 5 pool tail-outs had a rating of 5.

Sediment sources in the Maria Ygnacio watershed should be mapped and rated according to their potential sediment yields, and efforts to implement control measures should be taken.

For the mainstem of Maria Ygnacio Creek, the mean shelter rating for pools was 64. The shelter rating in flatwater habitats was 27, and in riffle habitats it was 98. A pool shelter rating of approximately 100 is desirable. Boulders were the most dominant cover type in pools followed by undercut banks. Log and root wad cover structures in the pool habitats would enhance both summer and winter salmonid habitat. Cover structures provide rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

For the East Fork Maria Ygnacio Creek, the mean shelter rating for pools was 60. The shelter rating in the flatwater habitats was 32, and in riffle habitats it was 40. Undercut banks were the dominant cover type in pools followed equally by terrestrial vegetation, whitewater, and bedrock ledges.

For the mainstem of San Antonio Creek, the mean shelter rating for pools was 73. The shelter rating in the flatwater habitats was 61, and in riffle habitats it was 166. Boulders were the dominant cover type in pools followed by whitewater.

For the East Fork San Antonio, the mean shelter rating for pools was 30. The shelter rating in the flatwater habitats was 37, and in riffle habitats it was 190. Boulders and whitewater were the dominant cover types in the 5 pools, followed by small woody debris.

For the mainstem of Maria Ygnacio Creek, the mean percent canopy density was high at 93% while the percentage of right and left bank covered with vegetation was moderate at 44% and 37%, respectively.

For the East Fork Maria Ygnacio, the mean percent canopy density was high at 84% while the percentage of right and left bank covered with vegetation was low at 38% and 38%, respectively.

For the mainstem of San Antonio Creek, the mean percent canopy density was high at 83% while the percentage of right and left bank covered with vegetation was low at 42% and 48%, respectively.

For the East Fork San Antonio, the mean percent canopy density was high at 84% while the percentage of right and left bank covered with vegetation was low at 23% and 25%, restectively.

It should be noted that moderate and low bank cover vegetation in San Antonio Creek and the East Fork San Antonio could be attributed to steep banks and banks composed of bedrock or large boulders observed in the upper reaches, as well as denuded banks contained via erosion control structures, such as erosion fencing, rip-rap, and concrete banks. In addition, the Jesusita Fire burned much of the vegetation on the banks observed in San Antonio Creek and the East Fork San Antonio.

Water and Air Temperatures

Throughout the entire watershed, the water temperatures recorded between 11/16/2009 to 2/11/2010 ranged from 47ºF to 58ºF with a mean temperature of 52.5ºF, and air temperatures ranged from 45ºF to 67ºF with a mean temperature of 55.4ºF. In the mainstem of Maria Ygnacio, water temperatures ranged from 50ºF to 56ºF with a mean of 52.1ºF, and air temperatures ranged from 50ºF to 67ºF with a mean temperature of 56.9ºF. In the East Fork Maria Ygnacio, water temperatures ranged from 47ºF to 58ºF with a mean temperature of 53.3ºF, and air temperatures ranged from 47ºF to 65ºF with a mean temperature of 56.9ºF. In the mainstem of San Antonio, water temperatures ranged from 49ºF to 52ºF with a mean temperature of 50.3ºF, and air temperatures ranged from 45ºF to 62ºF with a mean temperature of 54ºF. In the East Fork San Antonio, water temperatures ranged from 50ºF to 56ºF with a mean temperature of 53ºF, and air temperatures ranged from 51ºF to 59ºF with a mean temperature of 55.7ºF. Water temperatures recorded throughout the Maria Ygnacio watershed were considered good for southern California steelhead growth and development according to the *Guide to the reference values used in south-central/southern California coast steelhead conservation action planning (CAP) workbooks* (NMFS and Keir and Associates 2008).

MWAT Range	Description
< 62.6ºF (17ºC)	Very Good
62.6-72.6ºF (17-22.5ºC)	Good
72.5-77.0ºF (22.5-25ºC)	Fair
≥ 77ºF	Poor

However, to make any further conclusions, temperatures need to be monitored throughout the warm summer months to determine if they reach levels that would impede or deter steelhead spawning, growth, and development.

Historical Conditions

Few studies have been conducted in the Maria Ygnacio watershed to determine habitat suitability for steelhead, although historic accounts and documentation do indicate that southern steelhead and resident trout previously populated the watershed. The following reports contain information on studies conducted in the Maria Ygnacio watershed:

Location	Date	Notes	Source
Atascadero		Fax from Ed Henke notes having documentation of steelhead and resident trout occurring in Atascadero through his historical research.	Stoecker, 2002
Atascadero	1969 or 1970	Phil Beguhl "caught and kept a 8-9 pound female steelhead with row in late February of 1969 or 1970". The fish was caught directly beneath the Patterson Ave. road crossing at the Maria Ygnacio Creek confluence with Atascadero.	Stoecker, 2002
Atascadero, Maria Ygnacio	1982	A Santa Barbara news article reports that a "Maria Ygnacio Creek" steelhead was "landed with a shovel by a SBCFCD [Santa Barbara County Flood Control Department] employee where the tributary empties into the Goleta Slough". This may have occurred on Atascadero Creek, which empties into the slough downstream from the confluence with Maria Ygnacio Creek.	Stoecker, 2002

Atascadero	2000	Brian Trautwein reported that CDFG biologist, Maurice Cardenas, observed approximately a dozen trout, all approximately 12 inches in length, downstream of the confluence with Cieneguitas Creek.	Stoecker, 2002
Maria Ygnacio		Fax from Ed Henke notes having documentation of steelhead and resident trout occurring in Maria Ygnacio through his historical research.	Stoecker, 2002
Maria Ygnacio	1957-1964	Phil Beguhl of the California Fish and Game Commission reported that "Many rainbow trout and good habitat conditions were observed (0.5 miles upstream from the East Fork confluence until the waterfall anadromy barrier) throughout this period, until a major fire of 1964."	Stoecker 2002,
Maria Ygnacio	1974	A 1974 letter to the RWQCB discusses steelhead in Santa Barbara County streams. The letter includes Maria Ygnacio Creek in a list of streams "having historical runs of anadromous trout.	Grantt, 1974 (Becker, 2008)
Maria Ygnacio	1980s, 1990s	In the 1980's or 1990's, a UCSB student working in Scott Cooper's biology lab reportedly observed rainbow trout in Maria Ygnacio upstream of the East Fork.	Stoecker, 2002
Maria Ygnacio	1982	In a S.B. News-Press article dated March 23, 1982, two So. Cal Gas employees, Maria Armann and Marge Woodruff, took a deceased adult steelhead by hand under the bike bridge near Lassen Road.	Stoecker, 2002
Maria Ygnacio	1999	Brian Trautwein (Environmental Defense Center) reported observing one rainbow trout, approximately 12 inches, near the San Marcos Road crossing.	Stoecker, 2002
Maria Ygnacio	2000	On June 16, 2000, an adult steelhead was observed in the pool beneath the Highway 101 and Railroad channelization structure by Natasha Lohmus (CDFG), Maurice Cardenas (CDFG), and Craig Fusaro (Cal Trout).	SCBDPW, 2001
Maria Ygnacio	2000	Maureen Spence and Karl Treiberg of SBCFCD observed a rainbow trout between 8-10 inches upstream of the Cathedral Oaks Road crossing structure. Trout were also observed in a pool created beneath the concrete channelization structure [MYBAR06] downstream of the San Marcos Road crossing, as well as a larger trout in the pool directly beneath San Marcos Road crossing and upstream toward the Debris Dam.	Stoecker, 2002
Maria Ygnacio	2001	Ten *O. mykiss* ranging from 2-5 inches were observed by Matt Stoecker and Shaw Allen on June 2, 2001, on the mainstem of Maria Ygnacio Creek between the San Antonio-Maria Ygnacio Confluence and the Cathedral Oaks Road crossing. Two *O. mykiss* between 3-4 inches were seen in an isolated pool beneath the San Antonio Creek confluence with Maria Ygnacio Creek. Five *O. mykiss* between 2-5 inches were observed in the pool beneath the concrete grade control structure [MYBAR01]. Two *O. mykiss* between 3-4 inches were observed in the pool created by the concrete grade control structure [MYBAR02]. One *O. mykiss* measuring approximately 5 inches was observed in the pool directly pool the Cathedral Oaks Road crossing structure. It was not indicated whether observations were made above or below this section of the Creek.	Stoecker, 2002
Maria Ygnacio	2002	Over twenty *O. mykiss* were observed in Maria Ygnacio between an elevation of 200 feet to the first stream crossing beneath the debris basin dam [elevation approximately 296 ft, stream length approximately 0.55 miles]. Observations were made without land access authorization by an anonymous biologist. The current survey was also denied access to this section of the stream. Fish presence was not observed between the debris basin and Highway 154.	Stoecker, 2002
Maria Ygnacio	2009	Steve Cooper (UCSB) and Sheila Wiseman documented observations made in Maria Ygnacio Creek on May 14, 2009, following the Jesusita Fire and reported fish kill. During a field survey on May 11, 2009, between 1900 San Marcos Pass Road and the upper waterfall, Mark Capelli observed dead *O. mykiss* in virtually every deep hole, collecting approximately a dozen fish for examination. On May 14, 2009, Steve	Cooper, 2009

		Cooper and Sheila Wiseman hiked 0.75 miles from the Bjorklund picnic area to the waterfall anadromy barrier and observed 5 *O. mykiss* between 4-6 inches in the first large pool upstream from the Bjorklund picnic area. In the next two pools upstream, live *O. mykiss* were also observed with one in the upper pool measuring approximately 5 inches. Between this pool and the waterfall, no live *O. mykiss* were observed; however, 6 dead *O. mykiss* were observed at the base of the waterfall and 4 dead *O. mykiss* were observed in the creek from the waterfall to approximately 0.5 miles downstream. One California newt was also observed. Water samples were also taken and concentrations of total ammonia and phosphate found in the samples were approximately two orders of magnitude higher than samples taken from 11 other Santa Barbara County coastal streams in late March, while nitrate concentrations were approximately 5-6 times higher. The report goes on to state that the Phos Chek dropped as flame retardant during the Jesusita Fire seems likely to have elevated ammonia levels resulting in the fish kill.	
San Antonio		Fax from Ed Henke notes having documentation of steelhead and resident trout occurring in San Antonio through his historical research.	Stoecker, 2002
San Antonio	1969	A historical account and documentation review was conducted by Matt Stoecker as part of the Conception Coast project on steelhead migration barriers in Santa Barbara. Steel	Stoecker, 2002
San Antonio	1970	Simon Utley reported to Brian Trautwein that he observed some large trout between 12-17 inches immediately downstream of the San Antonio debris basin.	Stoecker, 2002
San Antonio	1970s-1980s	Brian Trautwein reported an 18 inch steelhead having been seen downstream from the debris basin in the late 1970s or early 1980s.	Becker 2008
San Antonio	1974	A 1974 letter to the RWQCB includes San Antonio Creek in a list of streams that had historical runs of anadromous trout.	Gantt 1974, Becker 2008
San Antonio	1984	Brian Trautwein reported seeing a “handful” of *O. mykiss* between 4-7 inches in San Antonio Creek in 1984.	Becker 2008
San Antonio	1984	Brian Trautwein (EDC) reported that six Rainbow trout between 4-6 inches were observed 200 yards upstream of Highway 154 in 1984.	Stoecker, 2002
East Fork San Antonio	1996	Matt Stoecker interviewed an angler who described catching rainbow trout on the East Fork San Antonio up until 1996 where he lived.	Stoecker, 2002

CONCLUSION

Habitat surveys were conducted in the Maria Ygnacio watershed, which included Maria Ygnacio Creek, the East Fork Maria Ygnacio, San Antonio Creek, and the East Fork San Antonio. The objective of the habitat surveys and this stream inventory report was to document the current habitat conditions, determine habitat suitability for southern steelhead and recommend options for the potential enhancement of habitat in the Maria Ygnacio watershed. While the surveys focused on habitat parameters associated with southern steelhead, additional observations in relation to flora, fauna, habitat alterations, manmade stream channel alterations, and historical surveys of note were also included.

It is likely that a population of *O. mykiss* is supported in the upper sections of the mainstem of Maria Ygnacio Creek due to the *O. mykiss* fish kill observed following the Jesusita Fire, and the observation of one live *O. mykiss* during the survey. Based on overall observed habitat conditions and the results of the habitat typing survey, the Maria Ygnacio watershed could support a small population of *O. mykiss* and has historically supported populations. Adequate flow regimes appear to exist in the upper portions of the surveyed area, and both Maria Ygnacio and San Antonio offered moderate to good instream habitat conditions for spawning and rearing *O. mykiss* and other native fish species. In diminishing order, the most adequate habitat throughout the watershed was observed in: Maria Ygnacio Creek, San Antonio Creek, East Fork Maria Ygnacio, and East Fork San Antonio. However, the survey of San Antonio Creek and the East Fork San Antonio was terminated prematurely due to land access issues. Although current riparian vegetation was somewhat sparse and much of the stream habitat was filled with deposited silt and sand as a result of the Jesusita Fire, San Antonio Creek does show promise for steelhead repopulation once the creek recovers from the fire event.

Additional studies to provide further insight into the viability of Maria Ygnacio watershed as a southern steelhead stream should include water temperature monitoring during the summer months to determine if temperatures remain suitable, a bioassessment to determine relative health of the watershed in relation to macroinvertebrate population numbers and diversity, and water quality sampling for measurements such as pH, dissolved oxygen, salinity and nutrient levels to determine if conditions are suitable for the needs of *O. mykiss*.

RECOMMENDATIONS

1) Maria Ygnacio supports a resident *O. mykiss* population and most likely supported a southern steelhead population in the past; therefore, it should be managed as an anadromous, natural production stream.

2) Historically present, only one southern steelhead was observed during the survey in the upper mainstem of Maria Ygnacio. The survey, however, did not include all means of determining the presence of *O. mykiss*, such as seining, snorkeling, and electrofishing. In order to ascertain the presence/absence of *O. mykiss*, as well as other native fish species in Maria Ygnacio, it would be advised to conduct more formal surveys throughout sections of creek with suitable habitat. Additionally, setting up a remote sensing device that records migrating steelhead would be helpful.

3) The limited water temperature data available suggests that maximum temperatures were within/above the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring should be performed for 3 to 5 years during the temperature extreme period between May and October.

4) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with appropriate stream bank protection to prevent erosion.

5) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools was from boulders. Adding high quality complexity with woody cover in the pools is desirable.

6) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

7) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

8) Suitable size spawning substrate on Maria Ygnacio was limited to relatively few locations. Projects should be designed at suitable sites to trap and sort spawning gravel.

9) There were several log debris accumulations present on Maria Ygnacio that were retaining large quantities of fine sediment. The modification of these debris accumulations is desirable, but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.

10) Water quality sampling should also be conducted in Maria Ygnacio Creek to determine if

water quality measurements for pH, dissolved oxygen, salinity, electrical conductivity, and nutrient loads are suitable for Southern California Coast Steelhead throughout the year. Special attention should be given to sections of Maria Ygnacio and San Antonio Creeks that run through urban zones in Goleta and may be contaminated by urban runoff. Above the East Fork Maria Ygnacio/Maria Ygnacio Creek confluence, there was also the strong smell of manure as the creek ran upstream through the horse ranches. It is possible that agricultural runoff could be affecting water quality in these areas.

12) Numerous migration barriers were observed throughout the entire watershed. The removal or modification of all manmade structures should be considered.

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APPENDIX 1: COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0001	0	MYMOUTH. Rip rap dry. Mouth @ Patterson Ave bridge. Substrate is rip rap & sand.
0002	16.5	Sycamore, willow, pampas grass on RB.
0003	90	Footbridge with natural bottom ~130 ft up unit. Arundo on LB near bridge. California tree frog heard. California blackberry on both banks. 220 ft, Arundo on RB. 264 ft, gravel/small cobble bar, surface algae growth. 500 ft, Arundo RB.570 ft, castor bean on RB, pampas grass.
0004	670	Narrow wetted width. ~55 ft, castor bean on RB. ~90 ft, ivy on RB. Algae growth throughout.
0005	876	Castor bean and arundo @ start of unit. Arundo all along RB of unit.
0006	929	Cobble & gravel with sand at start of unit. ~86 ft, vinca on LB. ~100 ft, lots of ivy on both banks (but mostly on RB).
0007	1150	Castor bean & ivy on RB @ 121 ft
0008	1272	Arundo on RB @ 39 ft.
0009	1353	Umbrella sedge @ start of unit. Cobble and gravel. Erosion control fence @ 58 ft (pic) through 0010. Ivy on RB @ 60 ft.
0010	1459	Heavily silted.
0011	1639	MYHU011 Erosion fence on LB. Arundo on RB @ 30 ft, castor bean on LB. 124 ft, ivy on RB. Erosion fence stops at some point. 400 ft, castor bean & ivy on RB. 650 ft, erosion fence on RB. 700 ft, drainage ditch on LB. 705 ft, drainage pipe on RB (pic). 863 ft, umbrella sedge until 1084 ft. Buildings on RB. 1084 ft, buildings on LB. 1386 ft, arundo & pampas grass on LB. Sycamore & willow on banks. 1533 ft, umbrella sedge on RB. 1574 ft, erosion fence @ RB in stream bed. 1674 ft, arundo on LB. 1690 ft, big patch of arundo on RB (30 ft). 1745 ft, drainage pipe through fence on RB, erosion fence on LB. 1906 ft, arundo patch on LB. 1959 ft, drainage pipe on RB. 2036 ft, erosion fence on RB stops. 2100 ft, erosion fence on RB starts again. 2290 ft, drainage pipe on RB.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0012	3976	Hollister Bridge (MYBRG01)Rip rap bottom trench with additional walkway culvert.33 ft rip rap apron (0.4 ft high @ trench). 76 ft from end of apron to culvert walkway. 147 ft from beginning of culvert to end of apron. Bridge is 115 ft long, 54 ft wide. Walkway under bridge culvert is 30 ft long, 4 ft high, and 5.5 ft wide. North drainage pipe on RB (downstream), 3.5 ft diameter. South drainage pipe on LB (upstream), 4.25 ft diameter. Inlet is partially scoured.
0013	4114	Instream erosion fence on RB ends @ 62 ft. 180 ft, erosion fence starts on LB. Stream bed entirely sand. 254 ft, English ivy on LB and other ivy on RB until 340 ft. Nasturtium on LB. 439 ft, erosion fence on RB. 501 ft, drainage pipe on RB, arundo on LB, scattered oak. 580 ft, erosion fence instream @ LB. 677 ft, erosion fence on RB ends, scoured out pool. Substrate changes from sand to cobble. Pics of upstream & downstream.
0014	4913	MYHU014 Eroded under erosion fence on LB. Pipe through pool; Nasturtium on LB.
0015	4940	Erosion fence begins on RB, fence eroded out in places. 19 ft between erosion fences. 428 ft, Erosion fence on RB ends. Concrete chunks through stream bed. 606 ft, Erosion fence on LB ends, erosion fence on RB begins. 750 ft, tree tobacco, eucalyptus 822 ft, foot bridge over creek, erosion pipes on RB (1.8 ft) 1044 ft, drainage pipe on RB. 1081 ft, broken rip rap on RB until 1120. 1120 ft, erosion fence begins on LB, fence on RB ends. 1277 ft, drainage pipe on LB (~3.5 ft), eroded fence is falling apart. 1409 ft, concrete bank and bike path on LB.
0016	6510	Concrete bank on RB; 8.5 ft to the lip, 2 ft depth, 6.5 ft jump.
0017	6538	MYBRG101; 104 ft, corroded rip rap substrate under railroad. Drainage pipe on LB (2 ft). Concrete on LB, brick on RB. Substrate is concrete.
0018	6642	Confluence pool under Hwy 101. Concrete banks getting scoured out underneath (San Antonio meets Maria Ygnacio) Ended unit at confluence.
0019	6870	Drainage pipe on RB @ 53 ft. Concrete bank. Erosion fence on LB starts, drainage pipe also. Concrete instream. 468 ft, remnants of bridge concrete on LB, erosion fence starts on RB. Huge stand of eucalyptus on both banks. 1122 ft, eroded LB, eucalyptus (pic). 1262 ft, erosion fence starts on LB.
0020	8322	Bridge @ University (MYBRG02). Bridge is 54 ft wide, 20 ft width

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		under bridge. 38 ft wide channel, rip rap lip, 21 ft long rip rap apron, outlet apron lip 1.7 ft, 2.0 ft max/1.5 ft avg height. Gabion erosion control on both banks.
0021	8418	Sand with boulder/cobble. Concrete chunks. Eucalyptus on both banks. Unit starts right upstream of University bridge and goes to MYBAR01. English ivy and vinca on RB, no vegetation on LB. ~200 ft, cobble substrate MYTRB02: Unnamed trib on LB. Approx. 30 -130 ft downstream of trib there is erosion on LB and concrete in channel. In trib: Narrow "F" type channel, sand with boulder sections, English ivy & nasturtium, trib narrows, heavy vegetation, no gravel (pics). Stopped at MYTRB02STP. Upstream trib has cape ivy on RB (~150 ft), sand substrate.
0022	10530	MYBAR01: Grade control structure concrete apron. 25 ft wide, 16 ft long, creates plunge with 2.3 ft jump up 20 degree slope. Erosion fences on both banks. Substrate is concrete.
0023	10546	Starts at MYBAR01 & ends at MYBAR02. Erosion on RB beneath erosion fence/drainage pipe/gabion (20 ft). Drainage pipe on RB (2.5 ft), eucalyptus on LB.
0024	10702	MYBAR02: Similar to MYBAR01. Concrete apron, 20 degree slope, 25 ft wide, 17 ft long, less of a jump since a pool would form right beneath apron with flow (2.6 ft jump). Substrate is concrete.
0025	10719	Starts at MYBAR02. Erosion on RB under oak, erosion fence continues on LB. Erosion downstream of sack wall under erosion fence, scoured under sack wall.
0026	10909	MYBAR03: Concrete apron broken in middle, 5 degree slope, ~10ft, 48 feet wide. Substrate is concrete.
0027	10919	Starts at MYBAR03 and ends at MYCATHBRG. Small erosion fence on RB ~30 ft upstream; Erosion ~200 ft from habitat unit 0026 on RB above fence pool. Erosion on LB near Cathedral Oaks. 10 ft max from deepest point to plunge, during wet season jump is negligible, gravel/cobble crest with sand. Rip rap on LB (~150 ft) eroded underneath, erosion fence on LB eroded out.
0028	11392	MYCATHBRG: Total length is 186 ft, bifurcated tunnels 12 ft wide. Outlet apron is 24 ft wide at lip, 21 feet long, and has sloped concrete wing walls. Inlet apron is 45 ft and has sloped inlet wing walls. Substrate

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		is concrete.
0029	11578	Begins at MYHU029 and ends at MYHUCATH. Eucalyptus on both banks, castor bean on RB, rip rap on LB,landscaping on RB, English & cape ivy on LB. Erosion under eucalyptus (~150 ft up from habitat unit 0028). RB eroded until erosion fence (~100 ft upstream.) Erosion fence continues until sack wall on LB, scour under sack wall.
0030	11768	MYHU030: Natural bottom bridge/bike path.
0031	11784	Starts at MYHU030 and ends at MYHU032 (~16 ft bridge) * UNIT STARTS 16 FT ABOVE BRIDGE? Arundo on RB, erosion underneath (GPS=MYARUN02). Alternating sand and boulder sections. Erosion on LB (~200 ft up from arundo), badly eroded behind erosion fence. Water observed above where LB erosion fence ends.
0032	12298	Partial boulder erosion control on LB. Patch of water, boulder erosion control on LB with cape ivy, willow trees on RB & magnolia tree on LB.
0033	12358	Boulder erosion control on LB.
0034	12415	Arizona crossing structure at Via Alba (GPS=MYVALBA). Apron is 13 ft, whole structure is 25 ft.
0035	12440	Starts at MYVALBA and ends at MYHU036. Arundo on LB near where erosion fence on RB begins. Heavy erosion behind RB fence, small pool of water. 2 drainage pipes on RB behind fence. Cut cattails instream, heavy sediment behind RB erosion fence. Erosion fences on both banks for 50 ft until RB fence stops. Erosion under LB fence (pic) right before HU036.
0036	12848	Erosion fence on LB holding boulders and cobble, eroded in parts. When returning in the afternoon, water flow had increased and had filled dry areas, moving approx. 250 ft downstream.
0037	12956	Drainage pipe (4 ft diameter) on LB in erosion fence. Concrete in channel.
0040	13107	Erosion fence on LB.
0041	13132	Drainage pipe (1.5 ft diameter) on RB. Erosion fence on LB holding debris & vegetation.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0042	13149	Erosion fence turns into stacked wall, corroded rip rap. Rip rap substrate bridge with riffled surface. 1.8 ft max depth, 4 ft to lip, 2.2 ft jump, 19 ft apron, 35 ft total length, 25 ft wide, inlet wing walls. MYBAR04, broken willow in structure.
0045	13270	Erosion fence on RB partway through unit. Erosion on RB.
0046	13392	MYHU046 Cottonwood fallen over unit. Cape ivy on RB.
0047	13428	140 ft into unit, eroded under LB erosion fence. Cape & English ivy on LB; Erosion fence through entire unit.
0048	13614	English ivy on LB.
0049	13627	Erosion fence on LB ends.
0051	13715	Concrete in unit.
0054	13908	Fish observed (1-2 inches long). Eroded oak on LB near end of unit.
0055	14053	Erosion boulders on LB. Pool created by plunge from gradient structure. Excessive sand at pool crest.
0056	14077	MYBAR05 Gradient structure with 1 ft pool depth, 3.5 ft total height, 2.5 ft jump, 45 degree slope, 25 ft wide. Boulder erosion control on LB.
0057	14084	Boulder erosion control on LB. Erosion fence on LB. PVC drainage pipe on LB. Willow, sycamore
0058	14148	Erosion fence on LB. Concrete. Umbrella sedge.
0059	14161	Erosion fence on LB.
0060	14182	Plunge pool created by concrete gradient structure.Cobble and gravel crest with sand. Erosion fence on LB through 3/4 of unit to 4 ft drainage pipe with broken concrete apron. Erosion fence begins on RB (broken & eroded and inside pool).
0061	14252	MYBAR06; U-shaped structure: 2.3 ft total, 0.6 ft depth, 1.7 ft jump (but pool drops to 3.8 ft depth 2 ft in front of barrier), 19 ft wide, 49 ft long. Wetted width on concrete slope is 2.2 ft & depth is 0.2 ft. Concrete rip rap and erosion fence on RB. Erosion fence on LB.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0063	14334	Brown surface algae. Eroded willow rootwad & sycamore.
0064	14392	Boulder erosion control on LB.
0065	14437	Gabion & concrete erosion control on LB.
0066	14478	MYHU066; Gabion on LB.
0068	14542	Cobble crest. Brown bacteria surface growth.
0072	14793	Rip rap on LB eroded underneath. Concrete lip of gradient structure is inside pool.
0073	14844	Outlet apron is 42 ft wide and 46 ft long (extends into pool, 21 dry ft outside of pool). Wetted width is 12 ft, depth is 0.1 ft. 15 degree slope for 21 ft, height is 3.5 ft. Rip rap on LB.
0074	14866	MYSMRCBRG; Underneath San Marcos bridge, width is ~28 ft. Bridge has natural bottom, with boulder erosion control on RB and 2 concrete suspensions. Cape ivy under bridge on LB, castor bean on RB. Giant palm on RB as well. Rusted, iron sewer pipe on LB, 0.5 ft in diameter, in unit.
0077	15219	MYEFCFL
0079	15274	MYBRGEF; Bridge with natural bottom right above East Fork Maria Ygnacio. Rip rap on LB.
0081	15363	Concrete in unit.
0082	15388	max depth estimated
0083	15440	Concrete rubble in unit. Fallen tree on RB over unit.
0084	15482	Unit runs through horse stable on both banks.
0085	15520	Horse stables. Concrete in unit.
0086	15637	MYHU086; Giant boulder on RB. Pool partially filled with sand. Concrete rubble.
0087	15707	Eroded LB. Concrete rubble.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0093	15858	Fallen willow trees through unit.
0094	15929	Crest is mixed sand and gravel.
0095	15962	Broken concrete in unit on RB.
0096	15972	MYHU096 Concrete on RB eroded into creekbed.
0097	15992	Strong smell of manure. Fallen willow.
0099	16087	Eroded bank (pics). Fallen trees & concrete on LB through entire unit.
0100	16171	Brown surface algae.
0104	16287	MYACR01: Arizona crossing, water flows underneath. Substrate is concrete.
0106	16369	Road @ LB.
0107	16400	Road @ LB. Willow tree in unit.
0108	16443	Eroded concrete wall instream.
0111	16646	Two LB root wad pools put together. Not too sandy, pool tail crest has spawning potential.
0115	16856	MYHU116 is possible property barrier. Fish observed.
0116	16909	MYHU116; Animal smell. Road & horses on LB, field on RB.
0118	16948	Old concrete structure that's notched and funnels water, creates pool. Loose, sandy gravel.
0119	16983	Trees through unit. Dry side channel @ LB.
0123	17139	Pool created by log holding fence.
0125	17181	Eroded LB.
0126	17227	MYHU126
0128	17262	Large broken metal pipe at top of unit.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0129	17289	Trees through unit & wood planks.
0130	17305	Trees at tail end of unit.
0131	17336	Road @ LB. Drainage pipe on LB @ base of unit.
0132	17392	Large concrete block instream @ LB. Fallen sycamore on RB.
0133	17441	Strong smell of horses.
0135	17537	Eroded LB. Concrete on LB. Pipe in unit
0136	17554	MYHU136. Three rusted metal pipes in unit.
0137	17582	Rootwad & boulder on RB. Fence entangled in rootwad.
0138	17620	Concrete chunks in unit.
0140	17698	Erosion fence starts on RB.
0141	17733	Little riffle step. House & fence on RB. House on LB.
0142	17800	Concrete in unit.
0144	17873	Eroded LB. Houses on LB.
0146	17992	Un-serviceable unit (restricted access to property). MYAZ03: Arizona crossing; Total height = 5.8 ft, water depth = 1.6, jump = 4.2 ft. Max pool depth = 2.0 ft.
0147	20844	Rip rap on RB.
0148	20896	MYACRS03; 4.4 ft jump, no pool beneath plunge. Very difficult to pass. Substrate is concrete.
0149	20908	Nice spawning cobble.
0150	20959	depth and crest measurements estimated via pics.
0151	21037	4.5 ft diameter pipe, 3.5 ft depth to lip, 1.7 ft to water, 1.8 ft jump. Rip rap on both banks. Substrate is concrete.
0152	21173	Good cobble & gravel. Channel type change.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
Pg 18		Manipulated system due to debris barrier.
0157	21381	MYBHU157
0158	21399	Alder, cottonwood, willow, oak
0159	21439	Erosion/bedrock.
0164	21700	MYBBAR07; Barrier is ~8ft high, 41 ft long, ~20 degree slope. Rip rap surface.
0167	21865	MYBHU167
0168	21925	Road & trail on LB. Bedrock, trail on RB.
0170	22005	Trail on RB
0171	22029	Eucalyptus on both banks.
0174	22182	Eucalyptus through unit.
0175	22212	MYBBAR08; 18 ft wide, 7.4 ft tall, 4 ft deep, 3.4 ft jump; Substrate is concrete.
0176	22216	Sycamore through unit.
Pg 20		Steelhead resident observed near campground on RB. Dead *O. mykiss* came down this section, observed by Stan Glowacki (NOAA) and campground owner.
0177	22249	Sycamore through unit
0179	22345	Campground “Bjornland” on RB.
0182	22452	Erosion under eucalyptus on RB.
0183	22482	Eucalyptus on both banks.
0184	22500	Erosion on RB. 4 fallen eucalyptus. Bedrock on LB.
0185	22664	Fallen eucalyptus in unit. Sand in pool crest.

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
Pg 21		Rubber hose running through all units on this page.
0186	22690	MYBHU186
0187	22708	Eucalyptus through unit
0188	22728	Eroded eucalyptus on RB.
0189	22748	Eroded eucalyptus on RB.
0191	22798	Erosion/landslide on LB.
0194	22912	Remnants of concrete dam.Sand in crest with gravel.
0195	22943	Good place for channel typing.
0196	23003	MYBHU196
0197	23053	Sand in crest.
0199	23124	Rubber hose running through some of the previous units (began approximately at unit 0186) ends here.
0200	23146	Pampas grass on RB.Huge boulder on RB creating plunge. Embeddedness unknown but entered as 5/boulder due to surrounding substrate.
0204	23303	Bedrock on LB.
0206	23375	MYBHU206
0209	23502	Bedrock on RB
0210	23544	Fairly steep but passable with flow.
0211	23566	Sand in crest.
0212	23606	Sand in crest.
0215	23675	LB eroded at top of unit.
0216	23775	MYBHU216

MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0218	23826	Extremely narrow. Bedrock on RB.
0221	23903	Pic of cascade.
0222	23953	Sand bar @ LB. Some gravel in pool tail crest.
0223	23991	Some steep riffles in unit.
0226	24092	MYBHU226; Pic looking upstream
0227	24118	Pic
0229	24167	Alder trees.
0230	24194	Lots of sand filling pool.
0233	24323	Large cobble @ crest with small
0234	24358	Bedrock on RB.
0235	24405	Steep riffle at tail of unit.
0236	24443	MYBHU236; Narrow channel. Two pool step pool (pic). Barrier at small bottom pool is 5 ft total, 2.3 ft depth, 2.7 ft jump. Bedrock on LB.
0238	24496	Mostly boulder crest. Cascade in middle of unit (pic).
0240	24600	Backwater pool @ RB. Sandy crest. Bedrock sheet on RB (pic)
0241	24612	Riffle @ LB.
0242	24672	More of a run than a pool.
0243	24701	0.7 depth beneath cascade (pic).
Pg 27		Air temperature is estimated for this page (none collected in the field), used temperature from previous page.
0246	24766	Bedrock on LB.
0247	24797	MYANDEND; Deep pool beneath waterfall is ~10-15 ft deep (max depth recorded was 7 ft). Waterfall is ~35 ft high.

EAST FORK MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0001	0	MYEFCFL
0004	110	Concrete on RB.
0008	250	Gravel & sand in crest.
0010	359	Concrete in unit.
0011	440	MYEFHU011
0013	570	Lots of sand in crest.
0017	688	Gravel bar is sandy.
0018	716	2 pools created by bedrock structure (pic).
0020	748	Unit in between bedrock. Sandy crest.
0021	793	MYEFHU021; Sandy gravel bar at head of riffle.
0022	846	Sandy crest.
0025	922	Small cobble & sandy crest. 2 pools connected.
0026	953	Sandy crest.
0027	973	MYEFGRDBR; Rip rap grade control structure: 2.5 ft depth below structure, 6 ft to lip, 3.5 ft jump, 5 ft long. Wetted width = 11 ft, total width = 19ft. Substrate is concrete/rip rap.
0029	1017	Very sandy crest. Sludge on surface.
0030	1063	MYEFDBR; 4.5 ft diameter pipe, concrete rip rap debris basin. 144 ft long barrier with 6.5 ft long concrete outlet hole.
Pg 4		Inside debris basin.
0032	1242.5	Some OK spawning gravel.
0036	1436	Fish sighted, possibly Arroyo chub.
0038	1526.5	MYEFGRDB04; ft water depth, 1.0 ft lip. 3.2 ft to top of barrier, 2.2 ft barrier base. 7 ft long rip rap outlet, 12 feet of flat, 19 ft total length. 35 ft

EAST FORK MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		wide, 4.0 ft wetted width, 0.2 wetted depth. Inflow from standing water pooled up above LB (in debris basin) creates a 2nd wetted area on lip of barrier. Pacific tree frogs & tadpoles observed in standing water in debris basin.
0041	1701	MYEFDBAR; Rip rap lip of grade control barrier. Max pool depth = 2.9 ft. Depth in front of lip = 2.0, height from water to lip = 2.0 ft.
0042	1706	Rip rap on both banks.
0043	1721	Steep rip rap grade control barrier. Length = 31 ft, height = 9.2 ft.
0044	1752	MEFBHU044; Metal pipe structure passable. Construction equipment on both banks. 2nd check structure 50 ft up from 1st check structure. Possible barrier, metal pipe check structure 4 ft tall, under bridge. Passable with flow. MEFBAR01. After erosion fence, eroded RB. Nursery landscaping LB. Chunks of concrete & debris instream for ~1000 ft. Bridge. Castor bean observed LB. MEFBBG02: Bridge with natural bottom underneath. Concrete wing on LB. Boulder substrate above & below bridge. MEFEF02: RB erosion fence starts. Large concrete instream ~100 ft up from fence. Construction occurring on LB. Fence above channel, continues for a long time (~900 ft ?). Channel overgrown with vegetation. Stables on LB after construction. Substrate more cobble. Erosion on RB (pic) continues for a long time (GPS point MEFER01).
0045	3356	MEFBHU045
0050	3487	Eroded instream on RB (pic).
0052	3547	Fence posts on LB.
0054	3664	MEFBHU054; Fallen sycamores in unit, huge trees obstructing stream. 30 ft into unit, drainage culvert on LB. Boulder erosion control on LB & RB.
0055	3713	Fallen tree in unit. Boulder erosion control eroded into unit. Concrete erosion RB.
0056	3745	RB eroded, metal drainage pipe. LB concrete slab erosion control, erosion under sycamore. Fallen trees in unit. Plunge created by concrete apron of structure. ~ 2 ft high, passable with flow.
0057	3761	MEFRIATA; La Riata bridge. Natural bottom substrate bridge with

EAST FORK MARIA YGNACIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		concrete grade control in outlet. Bridge = 18.5 ft long, 14.5 ft wide. Trees & debris in outlet are blocking flow and obstructing passage.
0064	3966	MEFBHU064
0069	4051	Tiny bedrock cascade & plunge.
0070	4072	Bedrock on RB.
0072	4181	Tiny bedrock plunge @ inlet.
0074	4246	MEFBHU074
0076	4314	Very narrow channel.
0078	4351	MEFBTRB01; runoff on RB; Holding pond at top of RB.
0081	4474	MEFAEND: 30-35 ft waterfall. Fish observed in pool beneath plunge (1-2 inches long). Possible confluence of 2 tribs.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0001	0	PAGE 1: Air temperature estimated for this page (none collected in the field), used from following page. SACONFL Under Hwy 101. Foot bridge parallel to Hwy 101. Concrete pipe overhead on LB ~600 ft. Erosion on LB under oak, ~200 ft up from pipe bridge. SAERF01: Erosion fence & concrete erosion control on LB. After ~150 ft, RB fence begins and LB fence fails. SACCRT01: Concrete embankment on RB forming scour pool. LB fence begins above embankment. English ivy, drainage pipe in erosion fence ~100 ft. SADCLV01: Drainage culvert on RB, RB erosion fence begins. field & path above RB. Drainage pipe on LB ~50 ft up. Concrete grade control ~200 ft up, not a barrier (pic). Foot path ~500 ft up, erosion fence on both banks still.
0002	3003	SASMARC: San Marcos bridge, erosion fence & rip rap on both banks. Bridge: Apron = 23 ft long, 27 ft wide, rip rap, slight slope. Inside = 26.5 ft wide, 47 ft long, culvert. Inlet = Creek curves right, rip rap on RB. Outside of structure = Cape ivy & castor bean. Drainage pipes.
0003	3083	Concrete erosion control on LB ~150 ft up from bridge. Greater stream variation, riffle/pool diversity. SA03EF: Erosion fence on LB, houses on

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		LB, park on RB, foot bridge a little way up. Boulder erosion control on RB, 75 ft up from foot bridge. Erosion fence begins on RB - SA03EF2 (both banks fenced). Fallen oak tree across creek, castor bean, RB fence stops, LB fence eroded underneath ~150 ft, eucalyptus. SA03FB near Vala Dr & La Ramada Dr, bad erosion beneath bridge under eucalyptus on RB (will be worked on).
0004	5090	SA03FB: Foot bridge @ Vala Dr & La Ramada Dr. After rain, dry area now wet (pics).
0005	5110	Turbid water.
0009	5187	Dead toyon tree in unit. Erosion on RB. Lots of silt.
0010	5244	Lots of silt/mud.
0014	5395	SAHU014
0015	5424	Heavily silted.
0017	5506	Pipe across stream over unit.
0019	5549	Drainage pipe on RB.
0024	5662	PAGE 4: Through residential neighborhood SAHU024; Side channel @ LB, island in the middle. Heavily muddied.
0026	5714	Sycamore on RB, eroded beneath roots.
0027	5741	Transverse riffle.
0028	5756	3 ft drain pipe on RB creating pool (pic).
0034	6043	SAHU034; Pool curves around right bend.
0035	6096	LB landscaped & denuded.
0036	6138	Church on LB.
0037	6170	Eroded beneath oak on LB. Parking lot & Turnpike Rd @ LB.
0039	6256	Restoration site on LB. Drainage pipe on LB.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0040	6434	Cathedral Oaks plunge pool. Substrate is large & small cobble and boulder.
0041	6456	SACATHBRG; Total width = 26 ft, wetted width = 19 ft, concrete lip = 2 ft wide & 2 ft high, water depth beneath lip = 1.2 ft.
0042	6481	Natural bottom bridge, riffle underneath.
0043	6563	Rip rap on LB.
0044	6623	SATPBRG; Tuckers Grove bridge. Rip rap on both banks under bridge, natural bottom.
0045	6651	Rip rap bank.
0048	6825	Concrete on both banks. Parking lot on RB, road on LB.
0050	7152	Lots of woody debris. Drainage ditch @ 113 ft on RB.
0052	7359	Woody debris.
0054	7450	SAHU054; Guy wire through unit.
0055	7493	Sandy gravel bar @ LB. Frogs heard. Pepper tree on LB.
0056	7514	Silt in pool.
0060	7763	Gravel bar.
0061	7780	Erosion & grade control. Road @ LB, parking lot @ RB.
0062	7791	8 ft long concrete lip, 5 ft wetted width, total = 23 ft, 0.8 ft jump (slope is negligible) but no pool in front (~0.7 ft deep). Concrete erosion control & drainage pipe on LB.
0063	7799	Debris guard instream.
0064	7856	SAHU064
0066	7941	Pool created by culvert.
0067	7977	SACULV01; diagram, pics. Concrete barrier is 29 ft wide and 42 ft long. 2 pipe culvert, both are 2.5 ft in diameter. Right pipe = 1.4 ft depth & 2.7

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		ft to lip. Slight slope: ~2 ft in front of pipe depth = 1.8 ft, ~3 ft in front of pipe depth = 2.4 ft. Left pipe = 0.4 ft depth, 1.7 ft to lip.
0071	8394	Heavily silted in.
0072	8460	SATRB01; Trib dry, too steep.
0074	8546	SAHU074; Parking lot @ LB. Small woody debris in middle of unit.
0078	8734	Restoration on LB.
0079	8860	Downed tree over pool. Topsoil floating on surface of pool.
0082	9095	Some sort of grass, non-native.
0084	9153	SAHU084; Pampas grass on LB.
0088	9298	Trail runs through unit. Field @ LB.
0093	9695	Stumps, LWD
0094	9737	SAHU094; Boulder island in middle of unit.
0096	9880	Pool wider than long. Pampas grass on RB.
0101	10044	Trail on LB.
0103	10121	Slight plunge but more mid-channel pool.
0104	10144	SAHU104; LWD, stumps in unit.
0105	10162	Sycamore on RB falling into creek.
0107	10241	Dry side channel to the right.
0109	10423	Large undercut boulder on RB creating plunge.
0114	10695	SAHU114
0116	10790	Trail on LB crosses creek. Drainage structure on RB.
0120	11144	Fallen tree across unit.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0124	11347	SAHU124
0130	11558	Fairly steep boulder riffle (pic), passable with flow.
0131	11625	Some deep, poolish sections. Some algae on rocks.
0132	11730	More aquatic plant growth
0134	11884	SAHU134; Possible channel type, narrower BFW.
0135	11954	Pool created by large boulder. Sand in crest.
0140	12076	Sandy crest.
0143	12282	Some small run sections.
0144	12381	SAHU144
0148	12554	Crest a mixture of sand, boulder, and cobble.
0149	12605	Riffle plunge included in crest.
0151	12690	Possible channel type, BFW = 15 ft
0152	12705	Some runnish sections.
0154	13025	SAHU154
0156	13096	Lots of SWD.
0159	13229	Trail runs through unit.
0162	13461	Fallen tree at head of unit. Run sections.
0164	13686	SAHU164
0167	13771	Trail through unit.
0169	13889	Stacked logs & LWD on both banks.
0174	14148	SAHU174
0175	14196	PVC pipe on RB.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0180	14391	Deep pockets almost pools.
0183	14558	Fallen tree through head of unit.
0184	14582	SAHU184
0186	14646	PAGE 20: Water extremely turbid, Lots of topsoil floating on water surface, Lots of SWD. Wider than long pool formed by plunge from debris basin.
0187	14671	SADBRBR; Debris basin. Culvert = 2.8 ft in diameter. Length (100ft) is approximate.
0188	14771	Giant dammed pool above debris basin, denuded banks. Length (150 ft)is approximate.
0189	14921	Riffle is 1.2 in front where it goes into pool.
0194	15208	SAHU194
0195	15234	PAGE 21: Water turbid, lots of topsoil. Lots of sand also, possibly silt previously. Lots of SWD.
0196	15277	Blue capped pipe in unit.
0204	15586	SAHU204
0206	15618	Short 1.2 crest. Crest is silted in.
0210	15776	Gravel showing through silt.
0212	15868	Very silty crest.
0213	15918	Bedrock riffles.
0214	15979	SAHU214
0220	16185	Pool almost completely silted in.
0224	16319	SAHU224

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0226	16425	Heavily silted crest.
0229	16504	Silted in small cobble.
0234	16646	SAHU234
0237	16809	Fallen trees.
0238	16857	Fallen trees through unit
0239	16877	Fallen trees through unit.
0240	16901	Fallen trees.
0242	16981	max depth in middle of pool inaccessible
0245	17101	Under HWY 154. Trees through unit in burn area.
0246	17179	SABHU246
0252	17317	Giant undercut boulder on RB.
0253	17337	Trees through unit.
0255	17431	SABHU255
0256	17450	Unit through bedrock.
0257	17470	Pool after bedrock strip.
0258	17483	Eroded RB under oak, through bedrock.
0259	17523	Carved boulder on LB. Lots of ash.
0260	17555	Burned logs & trees on RB. Unit through bedrock sheet, low slope.
0261	17603	Landscaped avocado trees on RB. Bedrock on RB. Lots of ash.
0262	17623	Eroded tree on RB hanging over to LB (pic).
0263	17635	Pool filled with silt.
0264	17664	Very short unit.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0265	17670	SABHU265
0266	17680	Natural Bottom Bridge (pic)
0267	17699	Tree through unit
0268	17714	Unit through low slope bedrock.
0269	17788	Pool full of silt/ash.
0270	17825	Small boulder cascade before pool. Silt crest.
0273	17874	Boulder cascade (pic). Initial 2 ft jump, but then passable. Burned trees on RB.
0275	17907	SACASC01; Boulder cascade with 3 ft jump (no pool), but side channel access with flow.
0275.1	17907	Side channel @ RB around boulder.
0277	17946	Approx. 1.5 ft jump, 1.5 ft pool depth.
0279	17988	Burned trees on both banks.
0283	18163	Distance for mean width is estimated.
0284	18173	SABHU284; Burned on RB.
0285	18221	Burned on RB
0286	18301	Pool filled with silt.
0287	18313	Tree in unit.
0289	18396	Fallen willow in unit.
0290	18437	Fallen willow in unit.
0291	18467	Fallen trees in unit.
0294	18557	SABHU294; Some gravel. Burned LB.
0297	18686	Boulder on LB.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0301	18760	Bedrock on RB.
0304	18862	SABHU304; Cascade passable (pic). Cascade: depth in front = 2.2ft, height to lip = 5.5 ft, jump = 2.3 ft.
0306	18940	Fallen trees all through unit.
0311	19106	Cascade: depth in front = 2.1 ft, height to lip = 7 ft, jump = 5 ft. Short, silted run between pool and 1.2. Huge boulder on LB.
0314	19245	SABHU314
0315	19350	East Fork confluence.
0316	19375	PAGE 34 Note for survey after rain: top soil in river & on banks. SAWSTFRK
0317	19389	Sand & silt.
0321	19476	Silted in with sand.
0323	19572	Bedrock on RB.
0326	19670	SAWFHU326; Side channel starts near the middle of unit.
0326.1	19670	Erosion on RB (pic). Pipe on RB. Burned trees on LB.
0326.2	19670	Would be step run with one large step.
0329	19728	One bedrock riffle section where side channel starts.
0333	19934	Bedrock on LB.
0334	19967	SAWFHU334
0335	20033	Old drainage pipe instream.
0336	20049	Pampas gras on LB. Pipe running above unit.
0337	20129	Pool filled with silt.
0340	20235	Lots of SWD in unit.

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0344	20493	SAWFHU344
0352	20839	Bedrock on LB.
0353	20871	Pipe in unit. Lone 1.2 section in middle of unit.
0354	20972	SAWFHU354
0358	21074	SAWFTRB01; Trib @ RB, impassable.
0359	21104	Trees & SWD in unit. Bedrock on LB.
0360	21192	Trees & SWD in unit.
0361	21215	More sand than silt now.
0362	21373	Bedrock on RB.
0363	21393	Cape ivy.
0364	21417	SAWFHU364
0366	21504	Cape ivy on LB. Boulder cascade passable with flow, 3.6 ft height to lip & 0.1 ft pool depth.
0367	21518	SAWFCHTYP
0371	21709	Lots of fallen trees.
0372	21765	Banks eroding. Cape ivy.
0373	21785	Lots of SWD in units.
0374	21801	SAWFCSCD01; Bedrock sheet passable (pics): 0.5 ft depth below cascade, 3 ft to top, 2.5 ft jump (to a bedrock riffle). Uprooted trees & boulders on RB, bedrock on LB.
0376	21906	Erosion on RB, burned hillside. Run sections in riffle. Sand & gravel substrate.
0379	22121	Partially through bedrock (LB).

SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0380	22185	With more flow unit would be 3.3. Bedrock on LB.
0381	22204	Erosion on both banks resulting from fire. Lots of debris in unit. At head of unit, flow runs beneath boulder & debris. Creek partially dammed.
0382	22273	Tobacco tree on LB.
0383	22308	Erosion into creek on LB.
0384	22347	SAWFHU384; Lots of woody debris (pic).
0385	22383	Erosion on RB. Small 1.2 step.
0390	22635	SAWFTRB02; Dry trib on LB.
0392	22671	SAWFANAD; 15 ft waterfall.

EAST FORK SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0001	0	Starts near SAWSTFRK
0002	54	For entire survey after rain: topsoil in river & on banks.
0003	103	Burned trees on both banks in unit.
0005	202	Filled in 5.6 pool, boulder drop at top.
0009	294	SAEFHU009
0010	324	Completely silted in in some spots.
0012	397	Downed burned oaks in unit (pic).
0013	537	Unit starts in downed oak.
0016	655	At end of unit, there is a road with brown runoff flowing into the creek from the LB (pic). Flow has noticeably discolored the creek.
0017	723	Gravel in road. Silted in pool.
0019	785	SAEFHU019

EAST FORK SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0020	813	Fallen trees through unit.
0021	885	Fallen trees through unit from right bank.
0022	915	Fallen trees in unit. Some run sections.
0023	1018	One short boulder cascade to filled in pool.
0026	1075	Silted in pool.
0029	1163	SAEFHU029; Burned oaks on LB. Bedrock on RB.
0031	1208	2 boulder drops in unit (small).
0034	1442	Burned trees over unit (pic).
0035	1462	Top soil in unit. Fallen & burned trees.
0036	1534	Trees through unit.
0037	1563	Trees through unit.
0039	1694	SAEFHU039
0041	1746	Erosion on RB.
0042	1802	Erosion on RB.
0046	1927	Dammed cascade @ head of unit, blocked by trees.
0049	2051	SAEFHU049
Pg 6		Creek bed more open, less embedded.
0052	2220	Burned hillside on both banks.
0056	2523	2 short boulder cascades.
0057	2618	Fence on RB.
0059	2712	SAEFHU059; Burned out hillsides, no leaves on trees.

EAST FORK SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0060	2773	Possible channel type.
0061	2814	One high-grade jump midway through unit.
0065	2938	Erosion on both banks. BFW taken.
0067	2978	Erosion.
0069	3055	SAEFHU069; High boulder drop @ head of unit, but easily passable with flow.
Pg 8		Silt has turned mostly to sand.
0071	3156	Creek takes a hard bend.
0073	3202	Bedrock sheet = riffle.
0074	3235	Passable bedrock & boulder cascade (pic).
0077	3328	Burned out banks.
0079	3477	SAEFHU079
0080	3511	Bedrock on LB. 2 short run sections in unit.
0081	3641	3 steep boulder cascades interspersed by 1.1's. Trees in unit.
0083	3733	Between a 1.2 and a 1.1.
0084	3810	Erosion on LB.
0085	3869	Bedrock on LB.
0089	4061	SAEFHU089; SWD cascade is passable.
0093.1	4183	Not much flow, canopy is dead trees.
0093.2	4183	Dead trees. Eroded banks on RB.
0093.3	4183	Connects @ unit 0095.
0094	4183	Bedrock cascade to boulder cascade.

EAST FORK SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
0095	4219	Between 1.1 & 1.2. Lots of downed logs & trees.
0096	4282	SAEFHU096
0100	4459	Filled in pool (sand). Pipe over unit.
0101	4488	Depth = 0.5, Height to lip = 5.5 ft, jump = 5 ft (passable with flow).
0102	4495	Fire road SABFIRERD @ LB. Recent vegetation clearing from fire.
0106	4581	SAEFHU106
0110	4713	3 boulder step riffles in between.
0111	4757	Possible channel type.
0112	4773	Road @ LB, paved terrace.
0115	4899	Powerbox/shed on LB. Road @ LB.
0116	4922	SAEFHU116
0117	4968	Hydro mulch on LB (burned hillside).
0119	5038	Gravel covered by sand.
0120	5061	Pipes in unit.
0123	5222	Pipe on LB. Road @ LB.
0124	5250	Erosion on LB.
0126	5331	SAEFHU126; Arizona crossing, natural bottom.
0127	5351	Riffle sections in runs, but negligible.
0128	5475	Pumphouse on LB.
0129	5507	Plunge pool filled in completely with sand.
0130	5525	SABDAM (pics) Dam: Depth = 0.8 ft, Height to lip = 7.5 ft, Jump = 6.7 ft, Width = 3.2 ft, Length = 22 ft, Wetted width = 2.5 ft. Dam filled with sediment to the lip. Terraced area with foundation of old building/house

EAST FORK SAN ANTONIO CREEK COMMENTS

Habitat Unit	Position (ft.)	Comments:
		on LB.
0132	5604	Burned area/erosion on LB. More gravel exposed through sand.
0134	5741	Like a run in sections.
0135	5781	Small boulder cascade is passable.

APPENDIX 2: LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE			
Low Gradient Riffle	(LGR)	[1.1]	{ 1}
High Gradient Riffle	(HGR)	[1.2]	{ 2}
CASCADE			
Cascade	(CAS)	[2.1]	{ 3}
Bedrock Sheet	(BRS)	[2.2]	{24}
FLATWATER			
Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}
MAIN CHANNEL POOLS			
Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}
SCOUR POOLS			
Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }
BACKWATER POOLS			
Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}
ADDITIONAL UNIT DESIGNATIONS			
Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	

APPENDIX 3: TABLES

Table 1: Maria Ygnacio Creek; Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
20	1	CULVERT	8.0	53	1052	4.2	39.0		0.2	3744	74880				
16	0	DRY	6.4	680	10878	43.6									
66	19	FLATWATER	26.5	67	4428	17.7	9.6	0.7	1.2	1078	71129	1047	69084		27
1	1	NOSURVEY	0.4	2852	2852	11.4									
54	13	POOL	21.7	39	2116	8.5	13.8	1.5	2.6	510	27541	1130	60997	956	64
92	17	RIFFLE	36.9	40	3640	14.6	7.7	0.5	0.8	120	11016	52	4807		98

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
249	51	24966	184565	134888

Table 2: East Fork Maria Ygnacio; Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: East Fork Maria Ygnacio Creek **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
5	0	CULVERT	6.1	44	218	4.8									
1	0	DRY	1.2	1604	1604	35.3									
24	7	FLATWATER	29.3	41	992	21.8	5.4	0.4	0.8	228	5478	101	2422		32
19	7	POOL	23.2	31	594	13.1	9.2	0.8	1.7	233	4429	281	5334	209	60
33	7	RIFFLE	40.2	34	1136	25.0	4.0	0.3	0.5	127	4184	46	1525		40

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
82	21	4544	14091	9281

Table 3: San Antonio Creek; Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
4	0	CULVERT	1.0	63	253	1.1									
3	0	DRY	0.8	1690	5070	22.2									
129	19	FLATWATER	32.7	43	5511	24.2	8.2	0.6	1.1	368	47412	245	31599		61
68	17	POOL	17.2	32	2155	9.4	10.9	0.9	1.7	359	24439	498	33886	356	73
191	24	RIFFLE	48.4	51	9822	43.1	8.0	0.4	0.8	238	45418	105	20030		166

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
395	60	22811	117270	85515

Table 4: East Fork San Antonio; Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
1	0	CULVERT	0.7	3	3	0.1									
1	0	DRY	0.7	20	20	0.3									
48	7	FLATWATER	34.8	37	1770	30.1	6.4	0.3	0.7	235	11284	66	3147		37
5	1	POOL	3.6	22	109	1.9	6.5	0.3	1.4	216	1081	151	756	65	30
83	12	RIFFLE	60.1	48	3980	67.7	4.5	0.3	0.6	111	9216	34	2575		190

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
138	20	5882	21581	6478

Table 5: Maria Ygnacio Creek; Summary of Habitat Types and Measured Parameters

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Units	Habitat Measured	Units Fully Type	Habitat Occurrence (%)	Habitat Length (ft.)	Mean Length (ft.)	Total Length (%)	Total Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Mean Total Area (sq.ft.)	Estimated Volume (cu.ft.)	Mean Total Volume (cu.ft.)	Estimated Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)	Mean
66	12	LGR	26.5	42	2769	11.1	7.0	0.4	1.4	132	8698	53	3492		87	96	
20	4	HGR	8.0	36	710	2.8	10.0	0.6	1.2	106	2117	59	1174		114	87	
6	1	CAS	2.4	27	161	0.6	7.0	0.6	1.0	31	185	18	111		150	97	
12	7	GLD	4.8	152	1830	7.3	11.0	0.7	2.5	2244	26927	2484	29813		27	88	
43	8	RUN	17.3	45	1937	7.8	10.0	0.6	2.0	397	17087	195	8402		21	96	
11	4	SRN	4.4	60	661	2.6	8.0	0.6	1.5	398	4373	233	2568		40	98	
28	3	MCP	11.2	40	1124	4.5	13.0	1.6	3.6	498	13957	1074	30084	873	38	85	
3	1	STP	1.2	45	136	0.5	7.0	1.0	1.8	95	286	143	428	95	120	87	
3	1	CRP	1.2	55	166	0.7	9.0	1.0	2.3	539	1616	808	2424	539	45	88	
1	1	LSL	0.4	13	13	0.1	11.0	0.7	2.1	143	143	143	143	100	100	99	
2	2	LSBo	0.8	44	87	0.3	15.0	1.9	3.4	632	1264	1567	3133	1352	53	99	
16	4	PLP	6.4	36	578	2.3	19.0	1.8	14.5	744	11898	1763	28215	1559	69	85	
1	1	BPB	0.4	12	12	0.0	10.0	1.1	1.6	120	120	180	180	132	105	100	
16	0	DRY	6.4	680	10878	43.6										94	
20	1	CUL	8.0	53	1052	4.2	39.0		0.2	3744	74880					98	
1	1	NS	0.4	2852	2852	11.4	0.0			0	0						

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
249	51	24966	163549	110169

Table 6: East Fork Maria Ygnacio; Summary of Habitat Types and Measured Parameters

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
30	6	LGR	36.6	34	1007	22.2	4.0	0.2	0.7	100	2998	20	610		35	81
2	1	HGR	2.4	50	99	2.2	6.0	0.7	1.1	288	576	202	403		70	87
1	0	CAS	1.2	30	30	0.7										
15	4	RUN	18.3	31	461	10.1	5.0	0.4	1.2	205	3078	87	1299		33	79
9	3	SRN	11.0	59	531	11.7	6.0	0.5	1.3	259	2330	120	1079		30	76
9	2	MCP	11.0	33	297	6.5	6.0	0.5	1.6	168	1512	106	950	65	20	100
2	2	STP	2.4	28	56	1.2	9.0	0.9	2.1	218	436	247	493	195	195	88
8	3	PLP	9.8	30	241	5.3	12.0	1.0	4.3	287	2292	420	3362	315	42	97
1	0	DRY	1.2	1604	1604	35.3										
5	0	CUL	6.1	44	218	4.8										

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
82	21	4544	13223	8198

Table 7: San Antonio Creek; Summary of Habitat Types and Measured Parameters

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
125	17	LGR	31.6	61	7685	33.7	9.0	0.4	1.5	309	38678	135	16896		144	85
58	5	HGR	14.7	34	1994	8.7	6.0	0.6	1.3	65	3782	38	2217		204	82
8	2	CAS	2.0	18	143	0.6	5.0	0.3	1.0	60	483	14	111		225	91
59	7	RUN	14.9	25	1504	6.6	8.0	0.6	1.5	314	18523	203	11979		27	86
70	12	SRN	17.7	57	4007	17.6	8.0	0.6	2.0	399	27916	269	18858		87	79
31	8	MCP	7.8	32	1001	4.4	11.0	0.8	4.2	404	12520	594	18418	455	68	85
1	1	CCP	0.3	25	25	0.1	9.0	0.4	1.4	214	214	171	171	86	75	62
1	0	LSBk	0.3	45	45	0.2			1.5							
1	1	LSBo	0.3	17	17	0.1	10.0	1.3	2.2	162	162	258	258	210	75	80
33	7	PLP	8.4	28	917	4.0	11.0	0.9	4.5	358	11802	470	15506	303	78	80
1	0	DPL	0.3	150	150	0.7			4.7							
3	0	DRY	0.8	1690	5070	22.2										
4	0	CUL	1.0	63	253	1.1										0

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
395	60	22811	114079	84415

Table 8: East Fork San Antonio; Summary of Habitat Types and Measured Parameters

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
49	5	LGR	35.5	57	2796	47.5	4.0	0.3	0.8	125	6112	37	1813		141	88
30	5	HGR	21.7	37	1112	18.9	4.0	0.2	0.8	110	3313	28	843		219	85
4	2	CAS	2.9	18	72	1.2	6.0	0.5	0.9	78	314	47	94		240	80
33	4	RUN	23.9	30	985	16.7	6.0	0.3	1.0	241	7946	56	1847		36	84
15	3	SRN	10.9	52	785	13.3	7.0	0.3	1.3	227	3412	78	1175		38	74
2	1	MCP	1.4	24	49	0.8	6.0	0.3	1.5	216	432	151	303	65	30	86
3	0	PLP	2.2	20	60	1.0			2.0							93
1	0	DRY	0.7	20	20	0.3										
1	0	CUL	0.7	3	3	0.1										

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
138	20	5882	21528	6074

Table 9: Maria Ygnacio Creek; Summary of Pools

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol (cu.ft.)	Mean Shelter Rating
31	4	MAIN	57	41	1260	60	11.4	1.5	398	12327	679	21042	54
22	8	SCOUR	41	38	844	40	15.5	1.6	615	13529	1197	26339	66
1	1	BACKWATER	2	12	12	1	10.0	1.1	120	120	132	132	105

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
54	13	2116	25976	47513

Table 10: East Fork Maria Ygnacio; Summary of Pools

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol (cu.ft.)	Mean Shelter Rating
11	4	MAIN	58	32	353	59	7.4	0.6	193	2123	130	1431	78
8	3	SCOUR	42	30	241	41	11.7	1.0	287	2292	315	2521	42

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
19	7	594	4415	3952

Table 11: San Antonio Creek; Summary of Pools

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol (cu.ft.)	Mean Shelter Rating
32	9	MAIN	32	32	1026	48	10.9	0.8	383	12248	414	13247	69
35	8	SCOUR	35	28	979	45	10.9	1.0	333	11660	291	10193	78
1	0	BACKWATER	1	150	150	7							

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
68	17	2155	23908	23440

Table 12: East Fork San Antonio; Summary of Pools

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol (cu.ft.)	Mean Shelter Rating
2	1	MAIN	40	25	49	46	6.5	0.3	216	432	65	130	30
3	0	SCOUR	60	20	60	57							

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
5	1	109	432	130

Table 13: Maria Ygnacio Creek; Summary of Max Residual Pool Depths

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
28	MCP	52	0	0	11	39	12	43	5	18	0	0
16	PLP	30	0	0	3	19	5	31	4	25	4	25
3	CRP	6	0	0	2	67	1	33	0	0	0	0
1	LSL	2	0	0	0	0	1	100	0	0	0	0
2	LSBo	4	0	0	0	0	1	50	1	50	0	0
3	STP	6	0	0	3	100	0	0	0	0	0	0
1	BPB	2	0	0	1	100	0	0	0	0	0	0

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Feet Max Resid. Depth	Total 1< 2 Feet % Occurrence	Total 2< 3 Feet Max Resid. Depth	Total 2< 3 Feet % Occurrence	Total 3< 4 Feet Max Resid. Depth	Total 3< 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
54	0	0	20	37	20	37	10	19	4	7

Mean Maximum Residual Pool Depth (ft.): 3

Table 14: East Fork Maria Ygnacio; Summary of Max Residual Pool Depths

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
9	MCP	47	2	22	7	78	0	0	0	0	0	0
2	STP	11	0	0	1	50	1	50	0	0	0	0
8	PLP	42	1	13	1	13	5	63	0	0	1	13

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Feet Max Resid. Depth	Total 1< 2 Feet % Occurrence	Total 2< 3 Feet Max Resid. Depth	Total 2< 3 Feet % Occurrence	Total 3< 4 Feet Max Resid. Depth	Total 3< 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
19	3	16	9	47	6	32	0	0	1	5

Mean Maximum Residual Pool Depth (ft.): 2

Table 15: San Antonio Creek; Summary of Max Residual Pool Depths

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
31	MCP	46	2	6	23	74	4	13	1	3	1	3
33	PLP	49	0	0	25	76	4	12	3	9	1	3
1	LSBo	1	0	0	0	0	1	100	0	0	0	0
1	LSBk	1	0	0	1	100	0	0	0	0	0	0
1	DPL	1	0	0	0	0	0	0	0	0	1	100
1	CCP	1	0	0	1	100	0	0	0	0	0	0

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Feet Max Resid. Depth	Total 1< 2 Feet % Occurrence	Total 2< 3 Feet Max Resid. Depth	Total 2< 3 Feet % Occurrence	Total 3< 4 Feet Max Resid. Depth	Total 3< 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
68	2	3	50	74	9	13	4	6	3	4

Mean Maximum Residual Pool Depth (ft.): 2

Table 16: East Fork San Antonio; Summary of Max Residual Pool Depths

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
2	MCP	40	1	50	1	50	0	0	0	0	0	0
3	PLP	60	1	33	0	0	2	67	0	0	0	0

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Feet Max Resid. Depth	Total 1< 2 Feet % Occurrence	Total 2< 3 Feet Max Resid. Depth	Total 2< 3 Feet % Occurrence	Total 3< 4 Feet Max Resid. Depth	Total 3< 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
5	2	40	1	20	2	40	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1

Table 17: Maria Ygnacio Creek; Summary of Mean Percent Cover By Habitat Type

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
66	12	LGR	0	12	4	0	22	8	12	42	0
20	5	HGR	0	15	0	0	15	2	30	38	0
6	1	CAS	0	20	0	0	20	0	30	30	0
12	7	GLD	19	8	0	0	34	36	0	4	0
43	8	RUN	0	10	0	3	22	18	1	47	0
11	4	SRN	0	16	3	0	34	5	13	30	0
28	4	MCP	19	0	0	5	21	5	15	35	0
3	1	STP	0	10	0	0	10	0	40	40	0
3	1	CRP	35	0	0	35	15	0	0	15	0
1	1	LSL	20	30	20	0	30	0	0	0	0
2	2	LSBo	20	10	0	20	10	5	5	30	0
16	4	PLP	23	3	0	3	13	8	31	15	6
1	1	BPB	40	0	0	0	20	0	0	40	0
20	0	CUL									
1	0	NS									

Table 18: East Fork Maria Ygnacio; Summary of Mean Percent Cover By Habitat Type

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
30	6	LGR	0	13	7	0	15	27	12	27	0
2	1	HGR	0	0	0	0	30	30	10	30	0
1	0	CAS									
15	4	RUN	0	21	15	0	20	0	6	38	0
9	2	SRN	10	15	0	0	30	5	35	5	0
9	2	MCP	0	18	0	18	23	0	18	5	20
2	1	STP	35	5	0	10	5	0	35	10	0
8	3	PLP	27	0	0	8	13	13	7	15	17
5	0	CUL									

Table 19: San Antonio Creek; Summary of Mean Percent Cover By Habitat Type

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
125	17	LGR	0	21	3	0	9	1	28	39	0
58	5	HGR	0	21	6	0	7	0	33	33	0
8	3	CAS	0	17	0	0	8	0	25	42	8
59	9	RUN	0	18	0	0	13	2	19	47	0
70	12	SRN	0	22	1	0	9	2	29	38	0
31	8	MCP	9	16	2	5	9	0	15	44	0
1	1	CCP	40	10	0	0	0	0	30	20	0
1	0	LSBk									
1	1	LSBo	40	10	0	0	5	5	0	40	0
33	7	PLP	11	15	4	4	6	1	21	34	4
1	0	DPL									
4	0	CUL									

Table 20: East Fork San Antonio; Summary of Mean Percent Cover By Habitat Type

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
49	5	LGR	0	15	0	0	4	0	33	48	0
30	5	HGR	0	20	0	2	6	0	32	40	0
4	2	CAS	0	15	0	3	0	0	45	38	0
33	4	RUN	0	25	0	0	9	0	25	41	0
15	3	SRN	5	30	0	0	12	0	20	33	0
2	1	MCP	15	20	0	0	15	0	25	25	0
3	0	PLP									
1	0	CUL									

Table 21: Maria Ygnacio Creek; Summary of Dominant Substrates By Habitat

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
66	64	LGR	0	5	3	22	30	39	2
20	19	HGR	0	0	0	0	5	89	5
6	6	CAS	0	0	0	0	0	67	33
12	12	GLD	0	100	0	0	0	0	0
43	41	RUN	0	22	20	12	20	24	2
11	11	SRN	0	9	0	9	18	55	9
28	28	MCP	0	54	4	0	4	25	14
3	3	STP	0	0	0	0	0	100	0
3	3	CRP	0	100	0	0	0	0	0
1	1	LSL	0	100	0	0	0	0	0
2	2	LSBo	0	0	0	0	0	100	0
16	15	PLP	0	53	7	0	0	27	13
1	1	BPB	0	0	0	0	0	100	0
20	3	CUL	0	67	0	33	0	0	0
1	0	NS	0	0	0	0	0	0	0

Table 22: East Fork Maria Ygnacio; Summary of Dominant Substrates By Habitat

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
30	28	LGR	0	21	32	7	4	32	4
2	2	HGR	0	0	0	0	0	100	0
1	1	CAS	0	0	0	0	0	0	100
15	15	RUN	0	73	7	0	0	7	13
9	9	SRN	0	33	56	0	0	11	0
9	9	MCP	0	89	0	0	0	0	11
2	2	STP	0	0	0	0	0	50	50
8	8	PLP	0	50	13	0	0	13	25
5	0	CUL	0	0	0	0	0	0	0

Table 23: San Antonio Creek; Summary of Dominant Substrates By Habitat

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
125	122	LGR	2	6	0	3	13	71	4
58	58	HGR	2	0	0	0	0	93	5
8	8	CAS	0	0	0	0	0	75	25
59	59	RUN	36	5	2	3	17	36	2
70	69	SRN	26	13	0	0	0	61	0
31	31	MCP	29	16	0	0	0	48	6
1	1	CCP	100	0	0	0	0	0	0
1	1	LSBk	0	0	0	0	0	0	100
1	1	LSBo	0	100	0	0	0	0	0
33	33	PLP	27	9	3	0	0	61	0
1	1	DPL	0	100	0	0	0	0	0
4	1	CUL	0	0	0	0	0	0	100

Table 24: East Fork San Antonio; Summary of Dominant Substrates By Habitat

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
49	49	LGR	6	35	0	0	6	51	2
30	28	HGR	0	4	0	0	0	96	0
4	4	CAS	0	0	0	0	0	75	25
33	31	RUN	42	58	0	0	0	0	0
15	15	SRN	33	67	0	0	0	0	0
2	2	MCP	100	0	0	0	0	0	0
3	3	PLP	67	33	0	0	0	0	0
1	0	CUL	0	0	0	0	0	0	0

Table 25: Maria Ygnacio Creek; Summary of Mean Percent Canopy

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
93	0	100	0	44	37

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 26: East Fork Maria Ygnacio; Summary of Mean Percent Canopy

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
84	0	100	0	38	38

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 27: San Antonio Creek; Summary of Mean Percent Canopy

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
83	0	100	1	42	48

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 28: East Fork San Antonio; Summary of Mean Percent Canopy

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
84	0	100	0	23	25

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 29: Maria Ygnacio Creek; Fish Habitat Inventory Data

Stream Name: Maria Ygnacio Creek LLID: 1198094344251 Drainage: South Coast
Survey Dates: 11/16/2009 to 12/3/2009 Survey Length (ft.): 24965. Main Channel (ft.): 24926. Side Channel (ft.): 39
Confluence Location: Quad: SAN MARCOS Legal T04NR28WS16 Latitude 34:25:30.0N Longitude: 119:48:34.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B5
Reach Length (ft.): 11638
Riffle/Flatwater Mean Width (ft.): 10.0
BFW:
Range (ft.): 30 to 30
Mean (ft.): 30
Std. Dev.: 0
Base Flow (cfs): 0
Water (F): 52 - 52 Air (F): 54 - 67
Dry Channel (ft.): 9708.5

Canopy Density (%): 77.6
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 62.0
Dominant Shelter: Aquatic Vegetation
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 0.0
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 0.5
Pool Frequency (%): 7.1
Residual Pool Depth (%):
< 2 Feet Deep: 0.0
2 to 2.9 Feet Deep: 50.0
3 to 3.9 Feet Deep: 50.0
>= 4 Feet Deep: 0.0
Mean Max Residual Pool Depth (ft.): 2.5
Mean Pool Shelter Rating: 15

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 100. Gravel: 0.0 Sm Cobble: 0.0 Lg Cobble: 0.0 Boulder: 0.0 Bedrock: 0.0
Embeddedness Values (%): 1. 0.0 2. 0.0 3. 0.0 4. 0.0 5. 100.0

STREAM REACH: 2

Channel Type: G2
Reach Length (ft.): 9265.5
Riffle/Flatwater Mean Width (ft.): 8.2
BFW:
Range (ft.): 29 to 29
Mean (ft.): 29
Std. Dev.: 0
Base Flow (cfs): 0
Water (F): 50 - 54 Air (F): 53 - 67
Dry Channel (ft.): 1169

Canopy Density (%): 96.0
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 49.8
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 1.2
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 11.2
Pool Frequency (%): 19.5
Residual Pool Depth (%):
< 2 Feet Deep: 52.2
2 to 2.9 Feet Deep: 34.8
3 to 3.9 Feet Deep: 8.7
>= 4 Feet Deep: 4.3
Mean Max Residual Pool Depth (ft.): 2.14
Mean Pool Shelter Rating: 77

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 26.1 Gravel: 30.4 Sm Cobble: 30.4 Lg Cobble: 0.0 Boulder: 13.0 Bedrock: 0.0
Embeddedness Values (%): 1. 8.7 2. 39.1 3. 13.0 4. 0.0 5. 39.1

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: A2
Reach Length (ft.): 4023
Riffle/Flatwater Mean Width (ft.): 9.1
BFW:
Range (ft.): 23 to 27
Mean (ft.): 23.5825242718447
Std. Dev.: 1.1866921623765
Base Flow (cfs): 0
Water (F): 50 - 56 Air (F): 50 - 63
Dry Channel (ft.): 0

Canopy Density (%): 91.8
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 24.0
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Boulder
Occurrence of LWD (%): 2.5
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 25.2
Pool Frequency (%): 28.2
Residual Pool Depth (%):
< 2 Feet Deep: 27.6
2 to 2.9 Feet Deep: 37.9
3 to 3.9 Feet Deep: 24.1
>= 4 Feet Deep: 10.3
Mean Max Residual Pool Depth (ft.): 3
Mean Pool Shelter Rating: 66

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 10.3 Gravel: 34.5 Sm Cobble: 20.7 Lg Cobble: 6.9 Boulder: 27.6 Bedrock: 0.0
Embeddedness Values (%): 1. 31.0 2. 27.6 3. 3.4 4. 0.0 5. 37.9

Table 30: East Fork Maria Ygnacio; Fish Habitat Inventory Data

Stream Name: East Fork Maria Ygnacio LLID: 1197934344597 Drainage: South Coast
Survey Dates: 12/3/2009 to 2/11/2010 Survey Length (ft.): 4543.5 Main Channel (ft.): 4543.5 Side Channel (ft.): 0
Confluence Location: Quad: GOLETA Legal T04NR28WS03 Latitude 34:27:35.0N Longitude: 119:47:36.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B5
Reach Length (ft.): 4543.5
Riffle/Flatwater Mean Width (ft.): 4.7
BFW:
Range (ft.): 15 to 15
Mean (ft.): 15
Std. Dev.: 0
Base Flow (cfs): 0.7
Water (F): 47 - 58 Air (F): 47 - 65
Dry Channel (ft.): 1604

Canopy Density (%): 83.8
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 38.2
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 4.8
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 13.1
Pool Frequency (%): 23.2
Residual Pool Depth (%):
< 2 Feet Deep: 63.2
2 to 2.9 Feet Deep: 31.6
3 to 3.9 Feet Deep: 0.0
>= 4 Feet Deep: 5.3
Mean Max Residual Pool Depth (ft.): 1.68
Mean Pool Shelter Rating: 60

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 26.3 Gravel: 63.2 Sm Cobble: 0.0 Lg Cobble: 0.0 Boulder: 5.3 Bedrock: 5.3
Embeddedness Values (%): 1. 5.3 2. 10.5 3. 31.6 4. 15.8 5. 36.8

Table 31: San Antonio Creek; Fish Habitat Inventory Data

Stream Name: San Antonio Creek LLID: 1198042344420 Drainage: South Coast
Survey Dates: 12/4/2009 to 12/22/2009 Survey Length (ft.): 22811 Main Channel (ft.): 22686 Side Channel (ft.): 125
Confluence Location: Quad: SAN MARCOS Legal T04NR28WS10 Latitude 34:26:31.0N Longitude: 119:48:15.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B5
Reach Length (ft.): 22686
Riffle/Flatwater Mean Width (ft.): 8.1
BFW:
Range (ft.): 1 to 31
Mean (ft.): 20.6784810126582
Std. Dev.: 6.76208100105504
Base Flow (cfs):
Water (F): 0 - 55 Air (F): 45 - 62
Dry Channel (ft.): 5070

Canopy Density (%): 82.7
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 44.7
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Boulder
Occurrence of LWD (%): 2.2
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 9.4
Pool Frequency (%): 17.2
Residual Pool Depth (%):
< 2 Feet Deep: 76.5
2 to 2.9 Feet Deep: 13.2
3 to 3.9 Feet Deep: 5.9
>= 4 Feet Deep: 4.4
Mean Max Residual Pool Depth (ft.): 1.74
Mean Pool Shelter Rating: 73

Pool Tail Substrate (%): Silt/Clay: 16.2 Sand: 1.5 Gravel: 5.9 Sm Cobble: 4.4 Lg Cobble: 10.3 Boulder: 58.8 Bedrock: 2.9
Embeddedness Values (%): 1. 0.0 2. 10.3 3. 8.8 4. 2.9 5. 77.9

Table 32: East Fork San Antonio; Fish Habitat Inventory Data

Stream Name: East Fork San Antonio LLID: 1197648344726 Drainage: South Coast
Survey Dates: 12/16/2009 to 12/17/2009 Survey Length (ft.): 5882.2 Main Channel (ft.): 5785.2 Side Channel (ft.): 97
Confluence Location: Quad: LITTLE PINE MTN. Legal T05NR28WS36 Latitude 34:28:21.0N Longitude: 119:45:53.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B2
Reach Length (ft.): 5785.2
Riffle/Flatwater Mean Width (ft.): 5.2
BFW:
Range (ft.): 15 to 27
Mean (ft.): 21.9565217391304
Std. Dev.: 5.92326482293093
Base Flow (cfs): 0
Water (F): 50 - 56 Air (F): 51 - 59
Dry Channel (ft.): 20

Canopy Density (%): 84.1
Coniferous Component (%): 0.0
Hardwood Component (%): 100.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 24.1
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Boulder
Occurrence of LWD (%): 0.0
LWD per 100 ft.:
Riffles:
Pools:
Flat:

Pools by Stream Length (%): 1.9
Pool Frequency (%): 3.6
Residual Pool Depth (%):
< 2 Feet Deep: 60.0
2 to 2.9 Feet Deep: 40.0
3 to 3.9 Feet Deep: 0.0
>= 4 Feet Deep: 0.0
Mean Max Residual Pool Depth (ft.): 1.4
Mean Pool Shelter Rating: 30

Pool Tail Substrate (%): Silt/Clay: 60.0 Sand: 20.0 Gravel: 0.0 Sm Cobble: 0.0 Lg Cobble: 0.0 Boulder: 20.0 Bedrock: 0.0
Embeddedness Values (%): 1. 0.0 2. 0.0 3. 0.0 4. 0.0 5. 100.0

Table 33: Maria Ygnacio Creek; Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

Mean Percentage of Dominant Stream Bank

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	7	6	12.5
Boulder	11	22	31.7
Cobble/Gravel	0	0	0.0
Sand/Silt/Cla	34	23	54.8

Mean Percentage of Dominant Stream Bank

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	0	1	1.0
Brush	2	3	4.8
Hardwood Trees	49	46	91.3
Coniferous	0	0	0.0
No	0	1	1.0

Total Stream Cobble Embeddedness 3

Table 34: East Fork Maria Ygnacio; Mean Percentage of Dominant Substrate and Vegetation

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

Mean Percentage of Dominant Stream Bank

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	4	4	19.0
Boulder	3	4	16.7
Cobble/Gravel	0	0	0.0
Sand/Silt/Cla	14	13	64.3

Mean Percentage of Dominant Stream Bank

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	0	1	2.4
Brush	6	5	26.2
Hardwood Trees	15	15	71.4
Coniferous	0	0	0.0
No	0	0	0.0

Total Stream Cobble Embeddedness 4

Table 35: San Antonio Creek; Mean Percentage of Dominant Substrate and Vegetation

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

Mean Percentage of Dominant Stream Bank

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	1	2	2.4
Boulder	54	56	87.3
Cobble/Gravel	1	0	0.8
Sand/Silt/Cla	7	5	9.5

Mean Percentage of Dominant Stream Bank

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	2	2	3.2
Brush	3	5	6.3
Hardwood Trees	58	55	89.7
Coniferous	0	0	0.0
No	0	1	0.8

Total Stream Cobble Embeddedness 4

Table 36: East Fork San Antonio; Mean Percentage of Dominant Substrate and Vegetation

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

Mean Percentage of Dominant Stream Bank

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	3	2	12.5
Boulder	14	10	60.0
Cobble/Gravel	0	0	0.0
Sand/Silt/Cla	3	8	27.5

Mean Percentage of Dominant Stream Bank

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	0	1	2.5
Brush	2	1	7.5
Hardwood Trees	17	18	87.5
Coniferous	0	0	0.0
No	1	0	2.5

Total Stream Cobble Embeddedness 5

Table 37: Maria Ygnacio Creek; Mean Percent of Shelter Cover Types

Stream Name: Maria Ygnacio Creek **LLID:** 1198094344251 **Drainage:** South Coast

Survey Dates: 11/16/2009 to 12/3/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS16 **Latitude:** 34:25:30.0N **Longitude:** 119:48:34.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	7	21
SMALL WOODY DEBRIS (%)	13	11	5
LARGE WOODY DEBRIS (%)	3	1	1
ROOT MASS (%)	0	1	8
TERRESTRIAL VEGETATION (%)	20	29	16
AQUATIC VEGETATION (%)	6	22	4
WHITEWATER (%)	18	3	17
BOULDERS (%)	40	27	25
BEDROCK LEDGES (%)	0	0	2

Table 38: East Fork Maria Ygnacio; Mean Percent of Shelter Cover Types

Stream Name: East Fork Maria Ygnacio **LLID:** 1197934344597 **Drainage:** South Coast

Survey Dates: 12/3/2009 to 2/11/2010

Confluence **Quad:** GOLETA **Legal** T04NR28WS03 **Latitude:** 34:27:35.0N **Longitude:** 119:47:36.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	3	19
SMALL WOODY DEBRIS (%)	11	19	7
LARGE WOODY DEBRIS (%)	6	10	0
ROOT MASS (%)	0	0	12
TERRESTRIAL VEGETATION (%)	17	23	15
AQUATIC VEGETATION (%)	27	2	7
WHITEWATER (%)	11	16	15
BOULDERS (%)	27	27	11
BEDROCK LEDGES (%)	0	0	15

Table 39: San Antonio Creek; Mean Percent of Shelter Cover Types

Stream Name: San Antonio Creek **LLID:** 1198042344420 **Drainage:** South Coast

Survey Dates: 12/4/2009 to 12/22/2009

Confluence **Quad:** SAN MARCOS PASS **Legal** T04NR28WS10 **Latitude:** 34:26:31.0N **Longitude:** 119:48:15.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	14
SMALL WOODY DEBRIS (%)	20	20	15
LARGE WOODY DEBRIS (%)	3	0	3
ROOT MASS (%)	0	0	4
TERRESTRIAL VEGETATION (%)	9	11	7
AQUATIC VEGETATION (%)	0	2	1
WHITEWATER (%)	29	25	17
BOULDERS (%)	38	42	39
BEDROCK LEDGES (%)	1	0	1

Table 40: East Fork San Antonio; Mean Percent of Shelter Cover Types

Stream Name: East Fork San Antonio **LLID:** 1197648344726 **Drainage:** South Coast

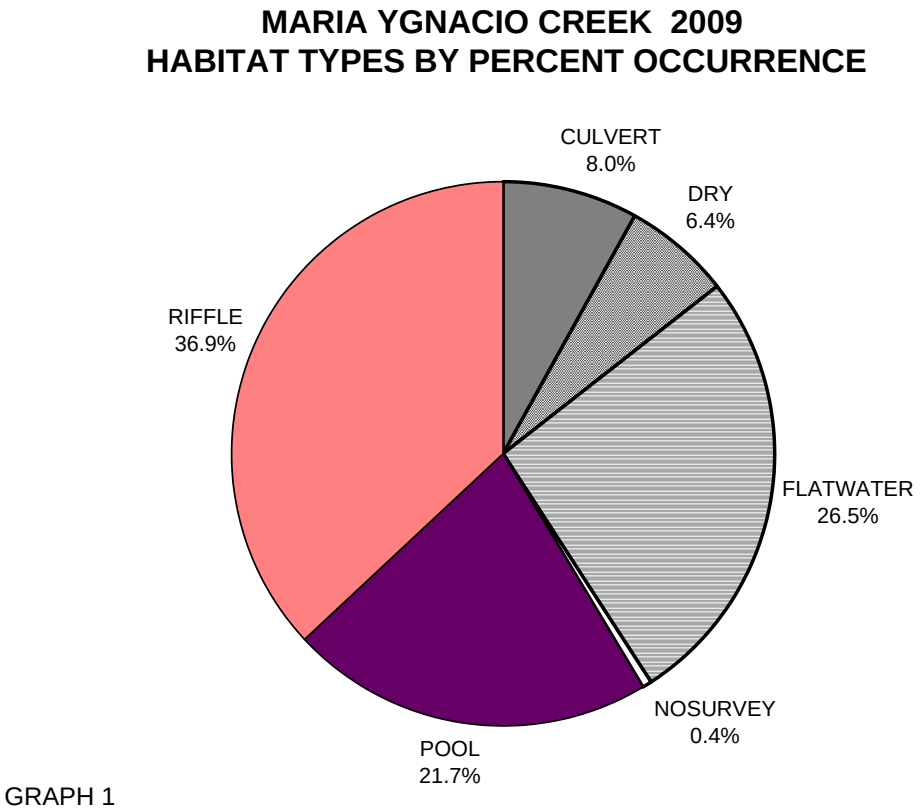
Survey Dates: 12/16/2009 to 12/17/2009

Confluence **Quad:** LITTLE PINE MTN. **Legal** T05NR28WS36 **Latitude:** 34:28:21.0N **Longitude:** 119:45:53.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	2	15
SMALL WOODY DEBRIS (%)	17	27	20
LARGE WOODY DEBRIS (%)	0	0	0
ROOT MASS (%)	1	0	0
TERRESTRIAL VEGETATION (%)	4	10	15
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	35	23	25
BOULDERS (%)	43	38	25
BEDROCK LEDGES (%)	0	0	0

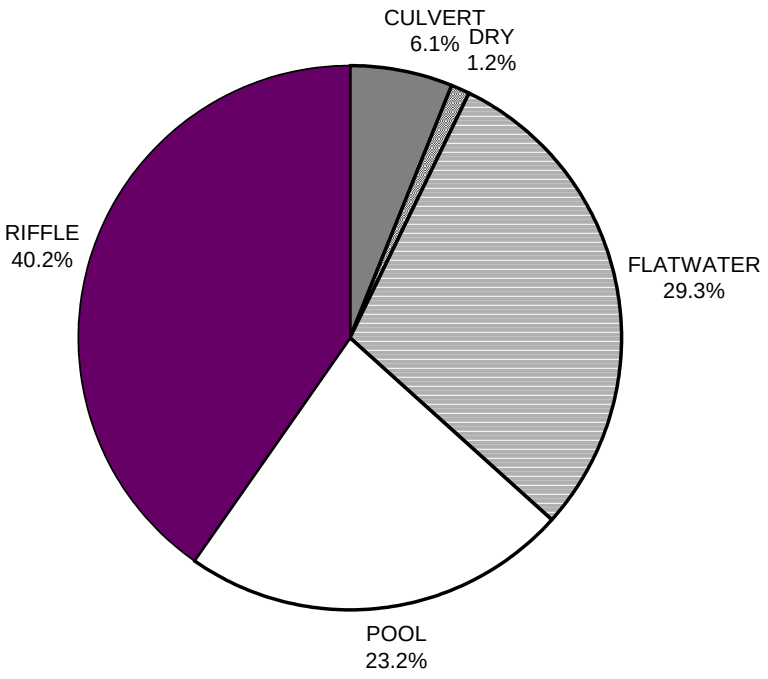
APPENDIX 4: GRAPHS

Graph 1: Maria Ygnacio Creek, Habitat Types by Percent Occurrence



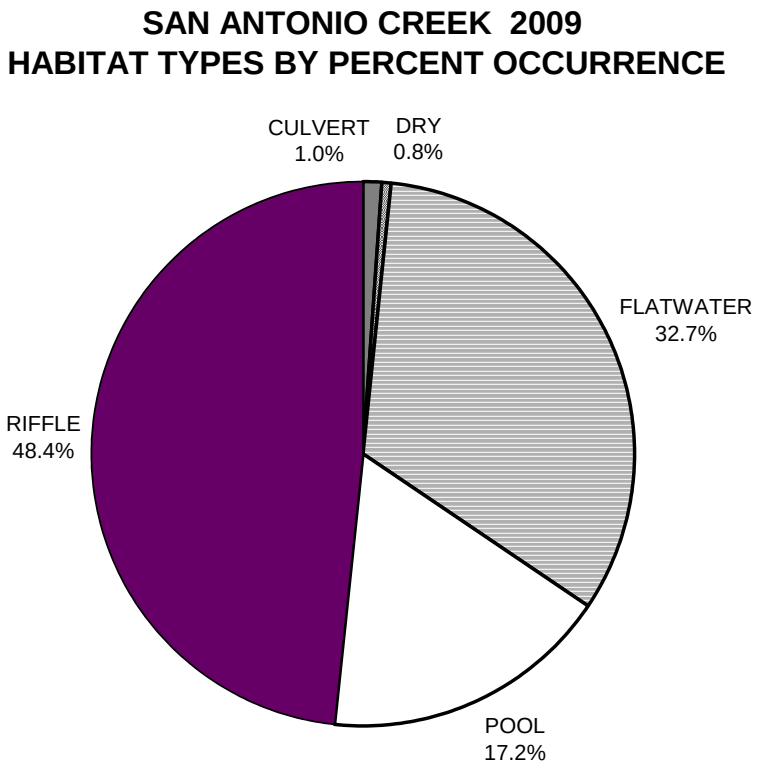
GRAPH 1

Graph 2: East Fork Maria Ygnacio, Habitat Types by Percent Occurrence



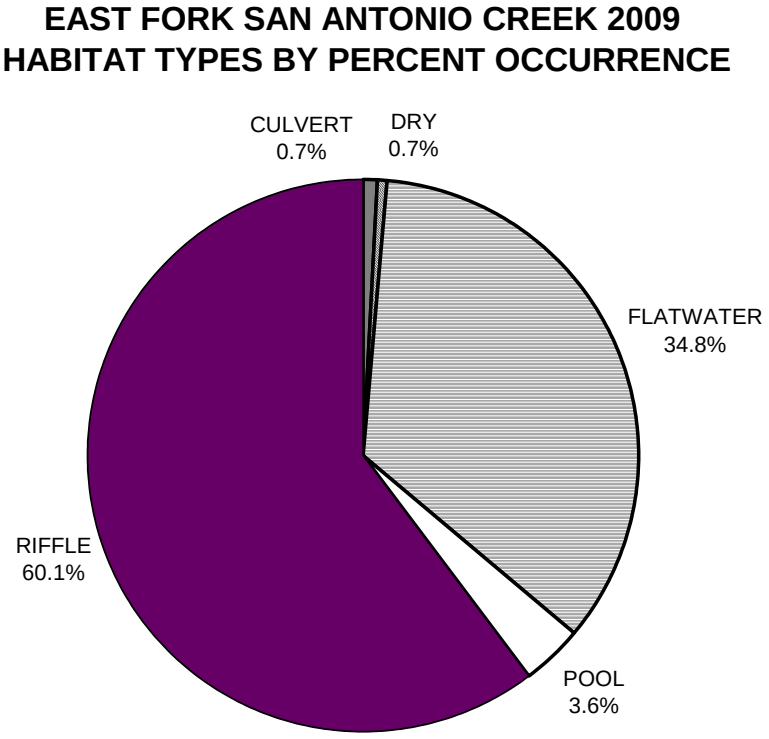
GRAPH 2

Graph 3: San Antonio Creek, Habitat Types by Percent Occurrence



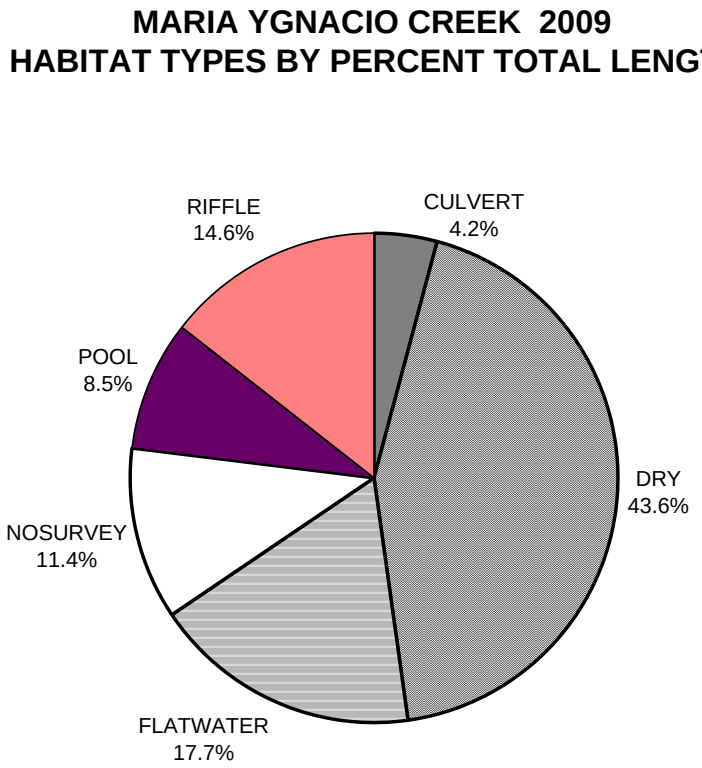
GRAPH 3

Graph 4: East Fork San Antonio, Habitat Types by Percent Occurrence



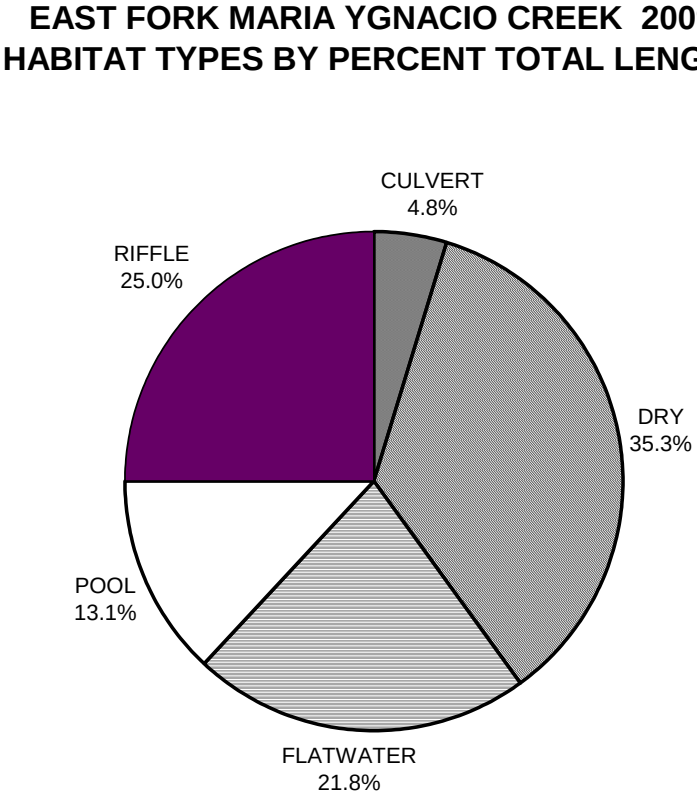
GRAPH 4

Graph 5: Maria Ygnacio Creek, Habitat Types by Percent Total Length



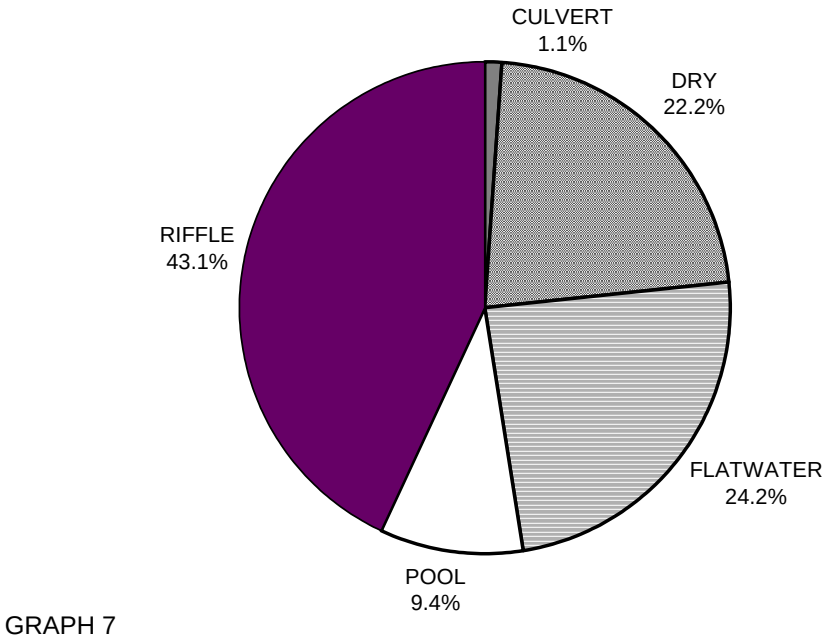
GRAPH 5

Graph 6: East Fork Maria Ygnacio, Habitat Types by Percent Total Length



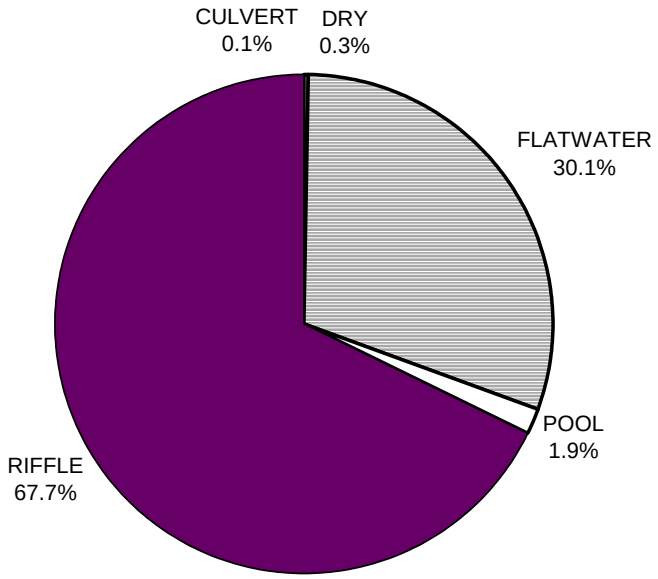
GRAPH 6

Graph 7: San Antonio Creek, Habitat Types by Percent Total Length



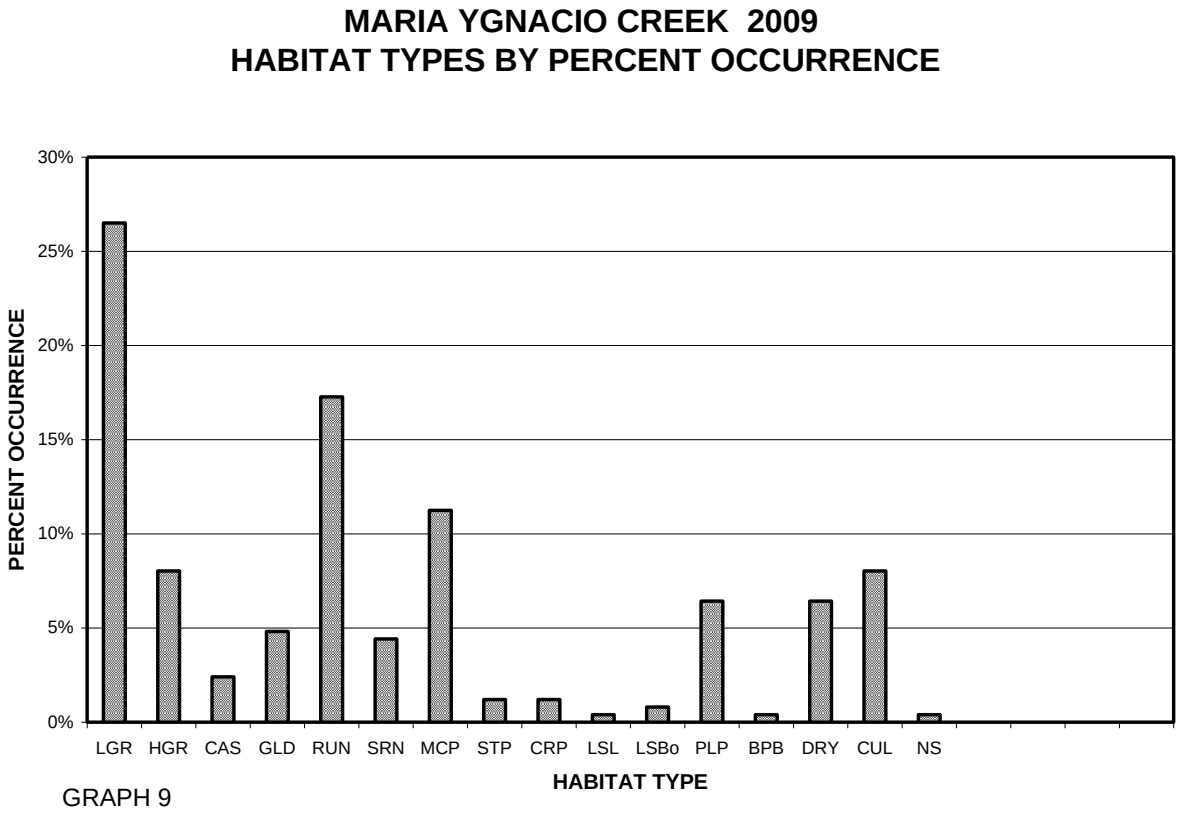
GRAPH 7

Graph 8: East Fork San Antonio, Habitat Types by Percent Total Length



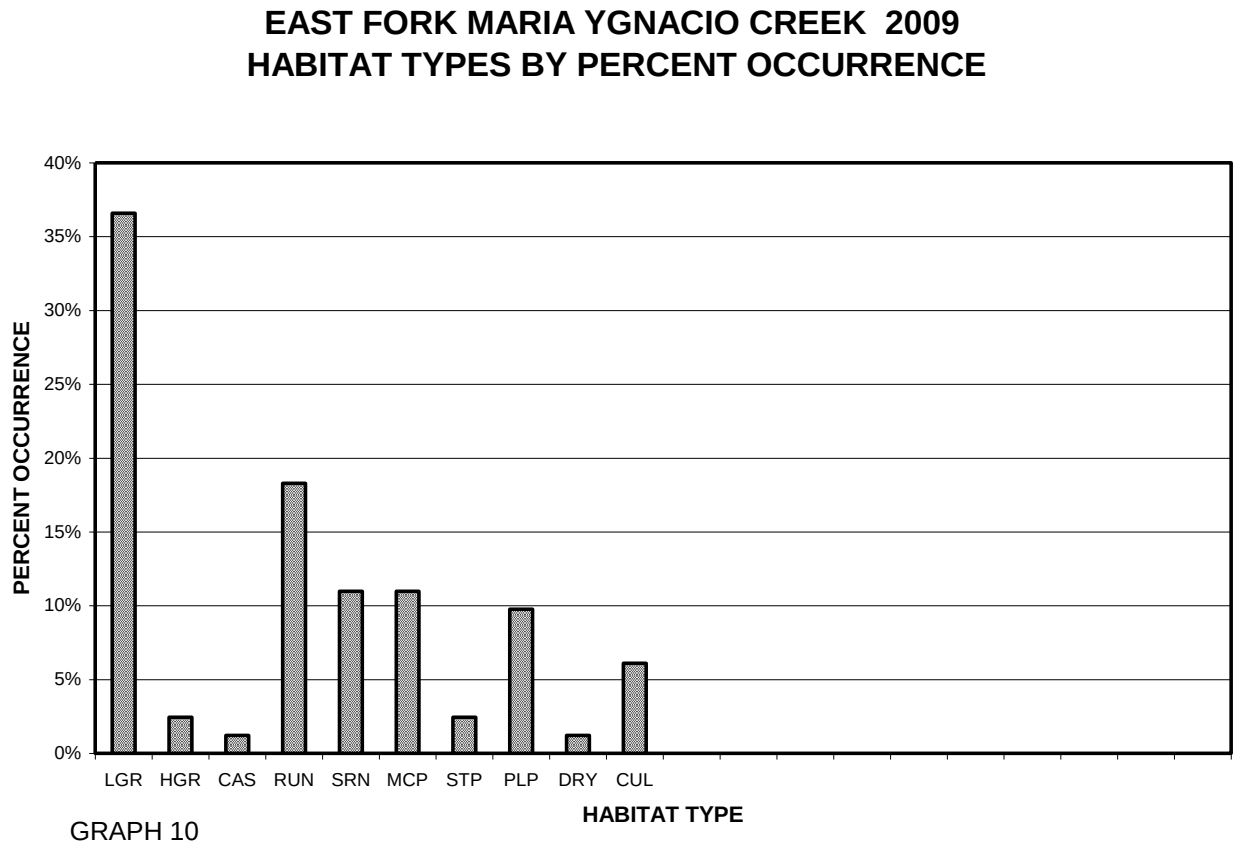
GRAPH 2

Graph 9: Maria Ygnacio Creek, Habitat Types by Percent Occurrence



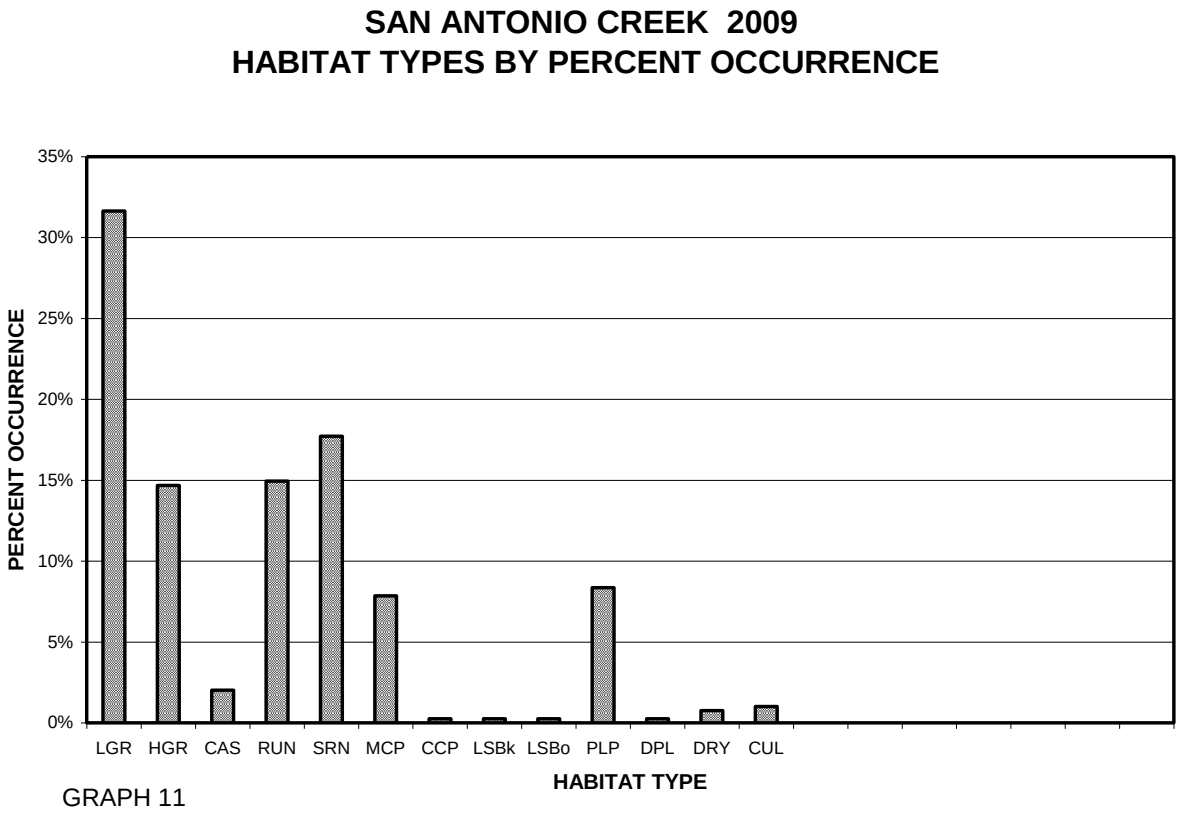
GRAPH 9

Graph 10: East Fork Maria Ygnacio, Habitat Types by Percent Occurrence



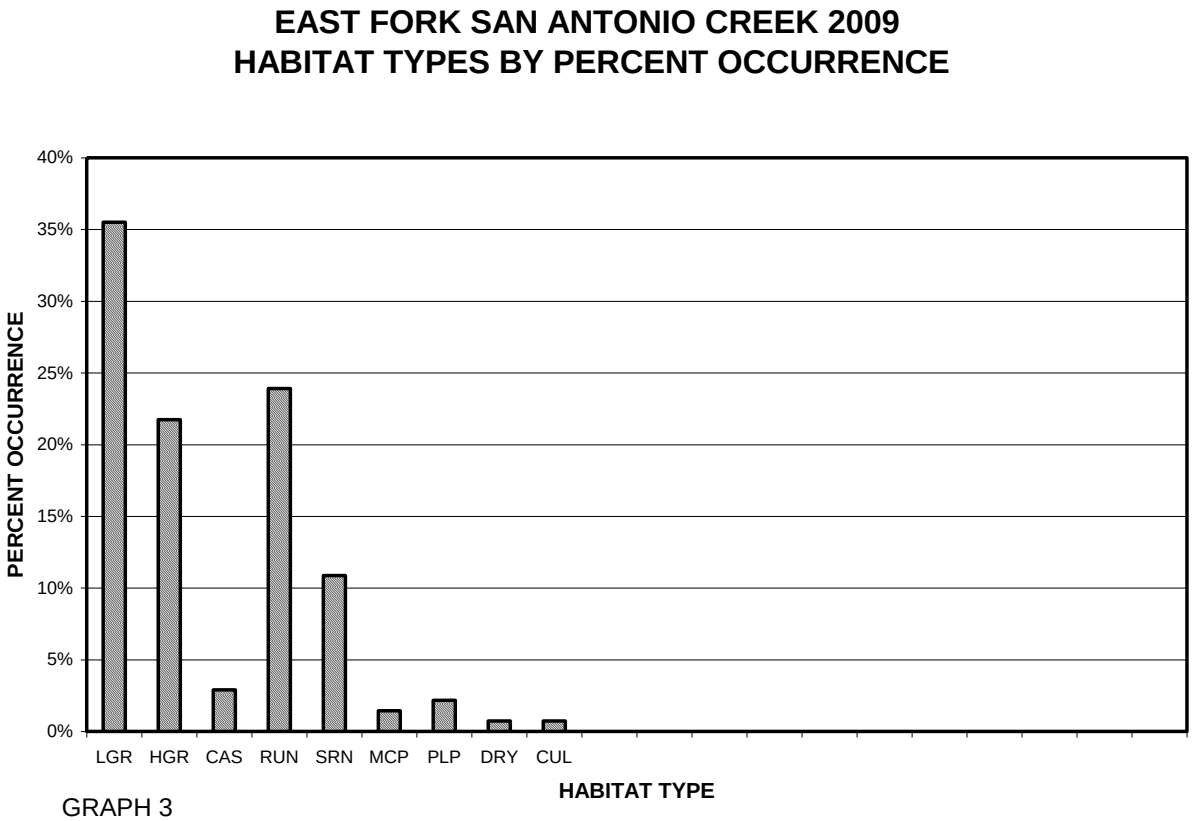
GRAPH 10

Graph 11: San Antonio Creek, Habitat Types by Percent Occurrence



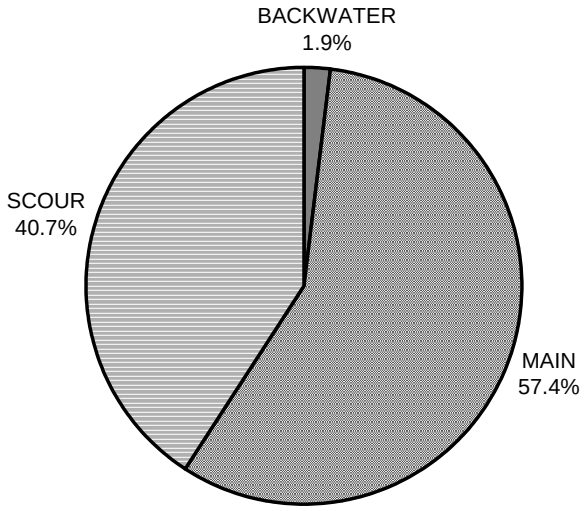
GRAPH 11

Graph 12: East Fork San Antonio, Habitat Types by Percent Occurrence



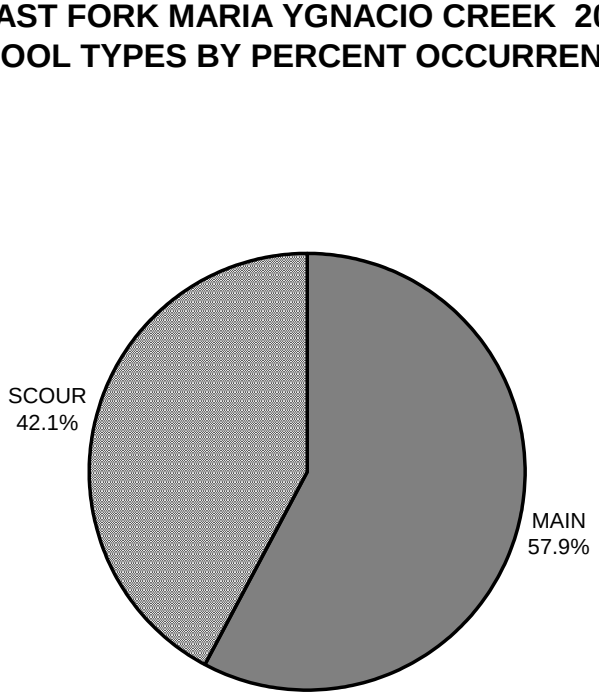
GRAPH 3

Graph 13: Maria Ygnacio Creek, Pool Types by Percent Occurrence



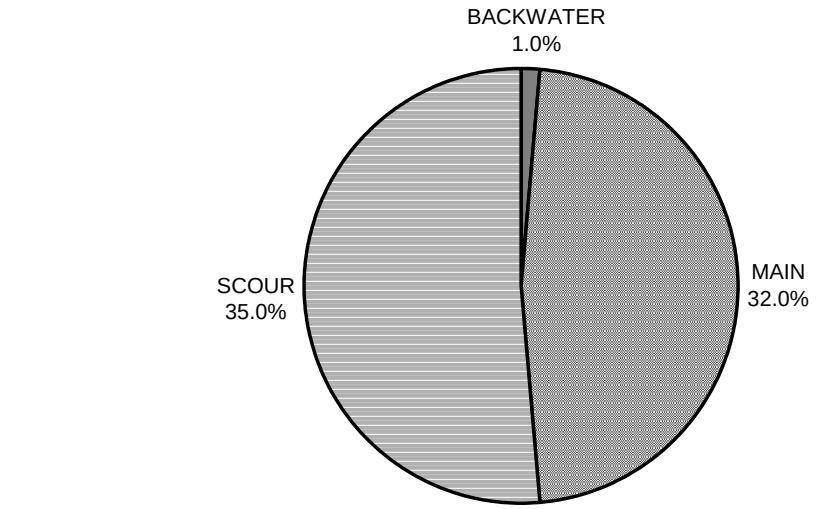
GRAPH 13

Graph 14: East Fork Maria Ygnacio, Pool Types by Percent Occurrence



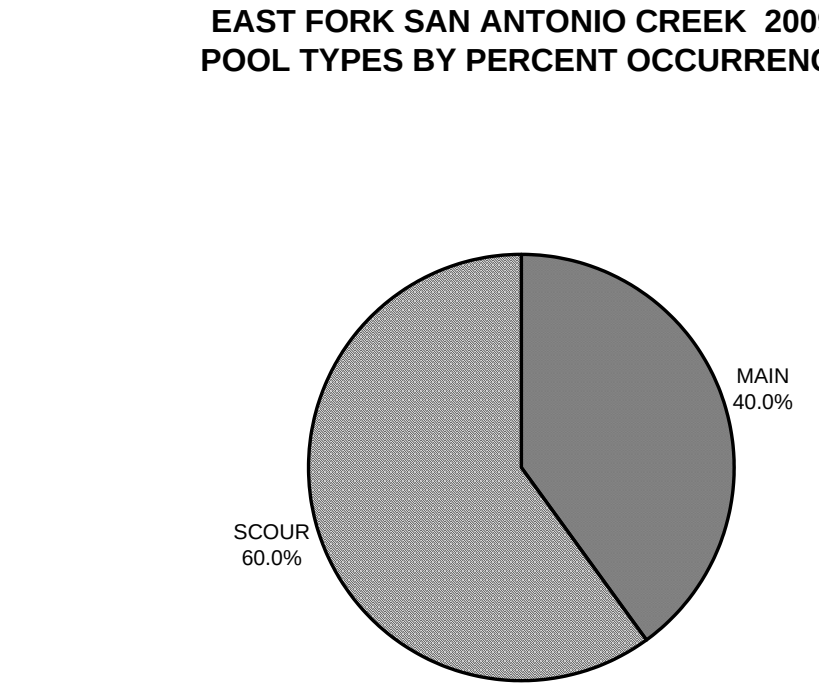
GRAPH 14

Graph 15: San Antonio Creek, Pool Types by Percent Occurrence



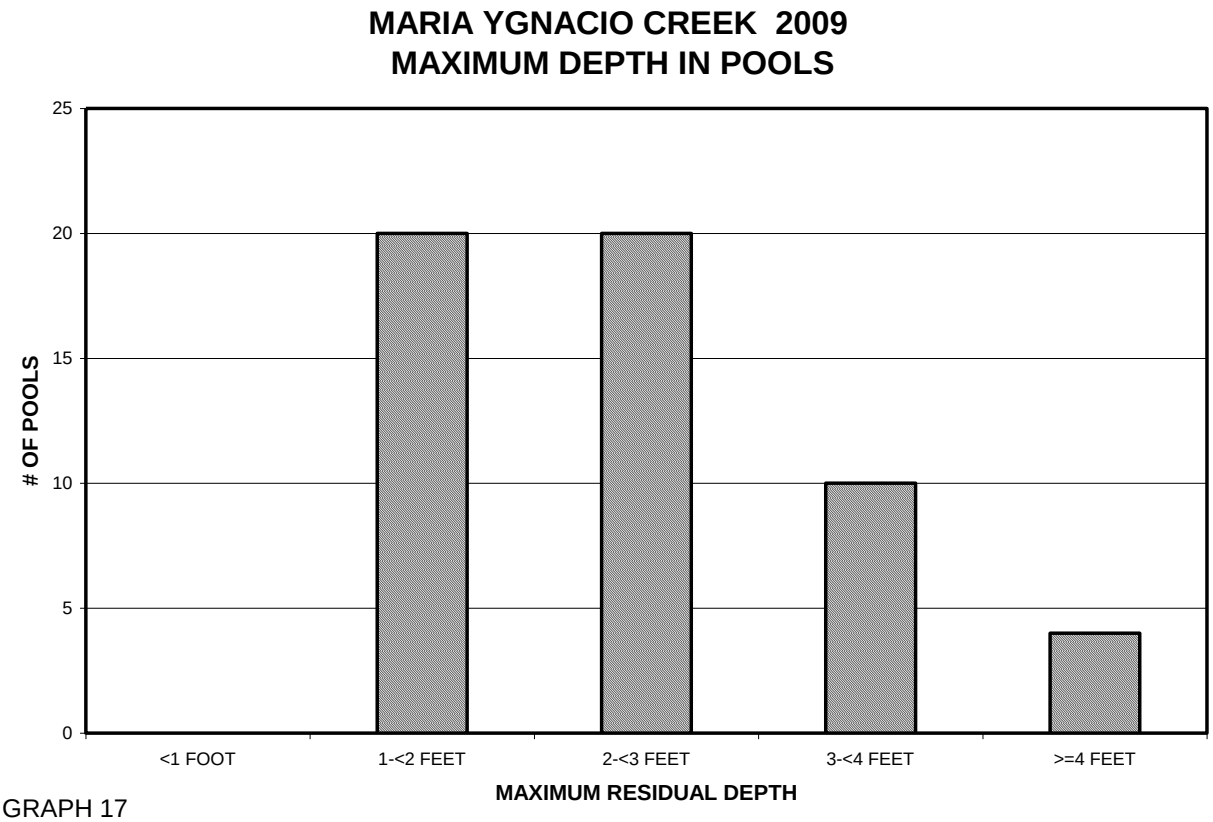
GRAPH 15

Graph 16: East Fork San Antonio, Pool Types by Percent Occurrence



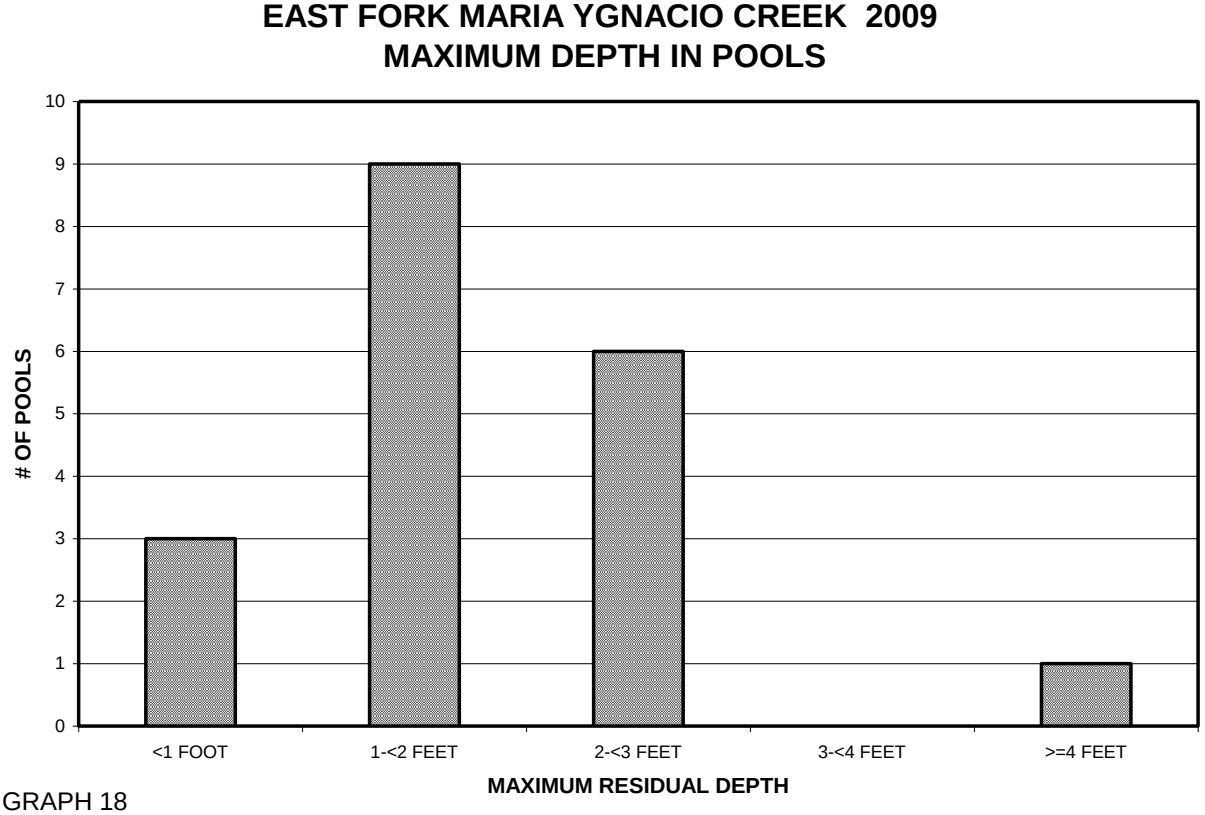
GRAPH 16

Graph 17: Maria Ygnacio Creek, Maximum Depth in Pools



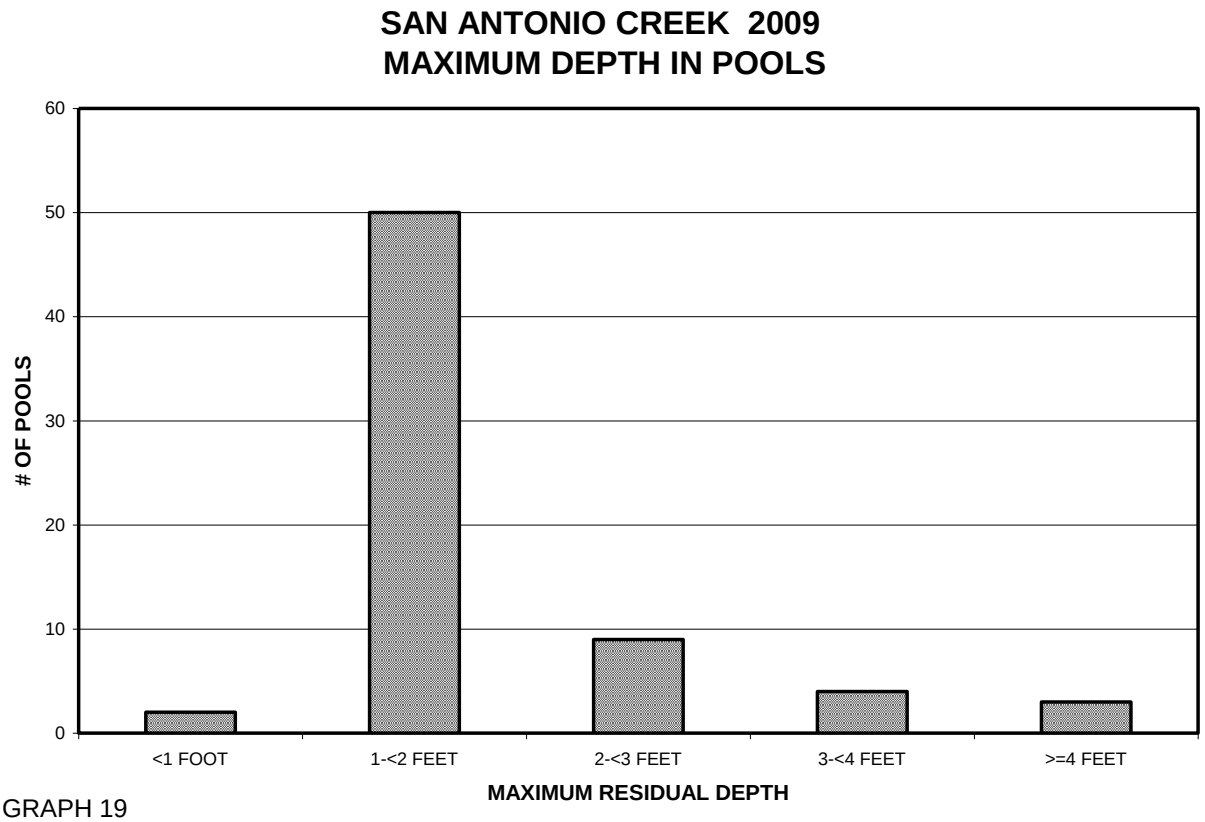
GRAPH 17

Graph 18: East Fork Maria Ygnacio, Maximum Depth in Pools



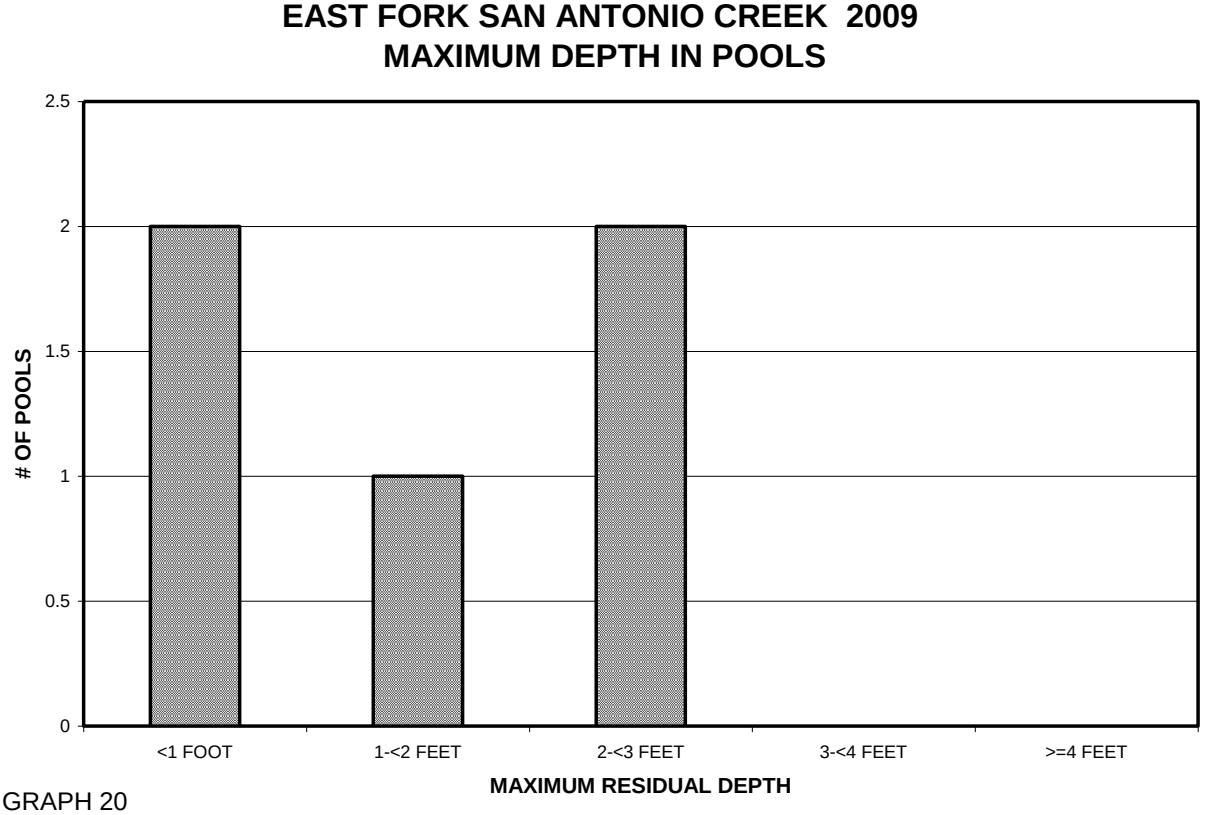
GRAPH 18

Graph 19: San Antonio Creek, Maximum Depth in Pools



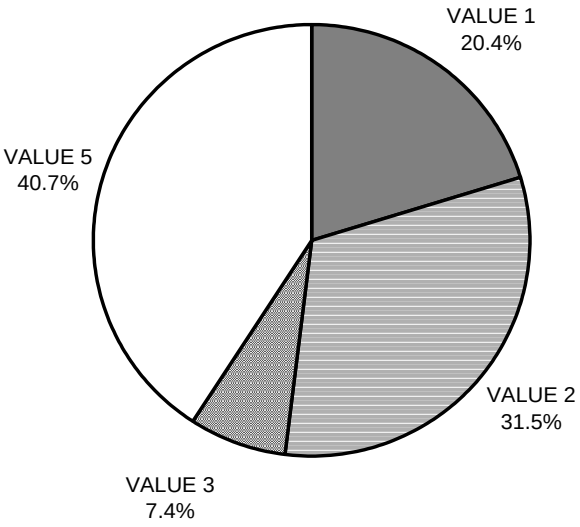
GRAPH 19

Graph 20: East Fork San Antonio, Maximum Depth in Pools



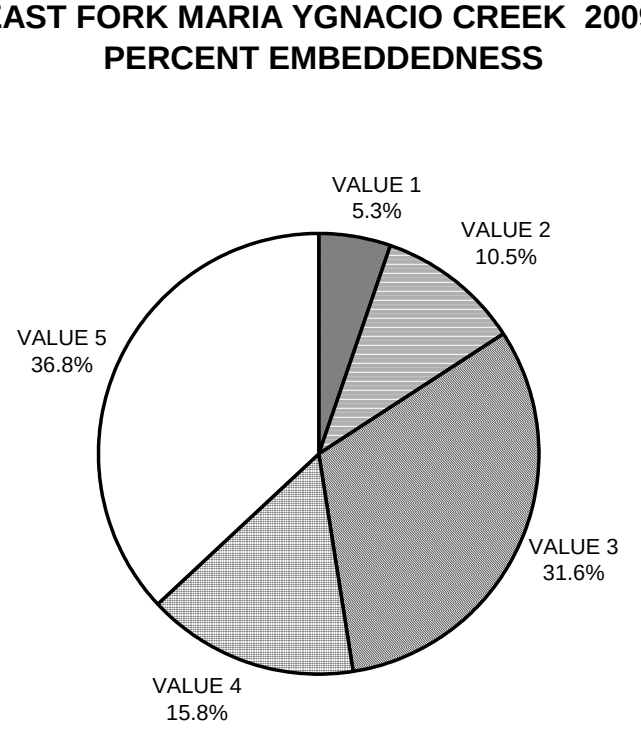
GRAPH 20

Graph 21: Maria Ygnacio Creek, Percent Embeddedness



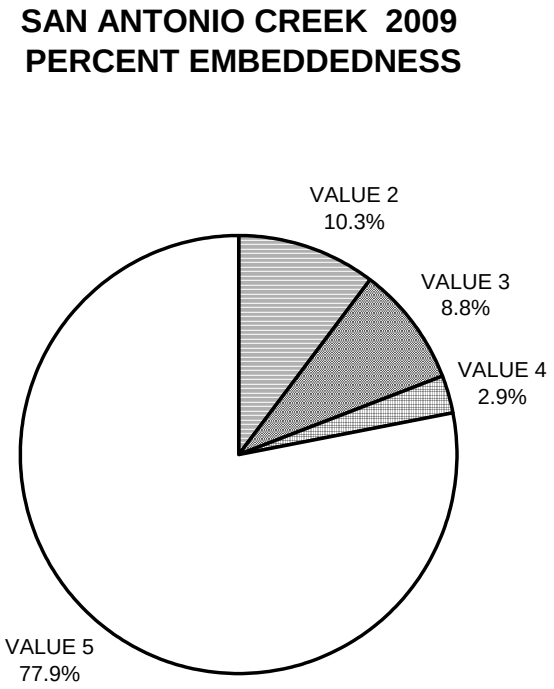
GRAPH 21

Graph 22: East Fork Maria Ygnacio, Percent Embeddedness



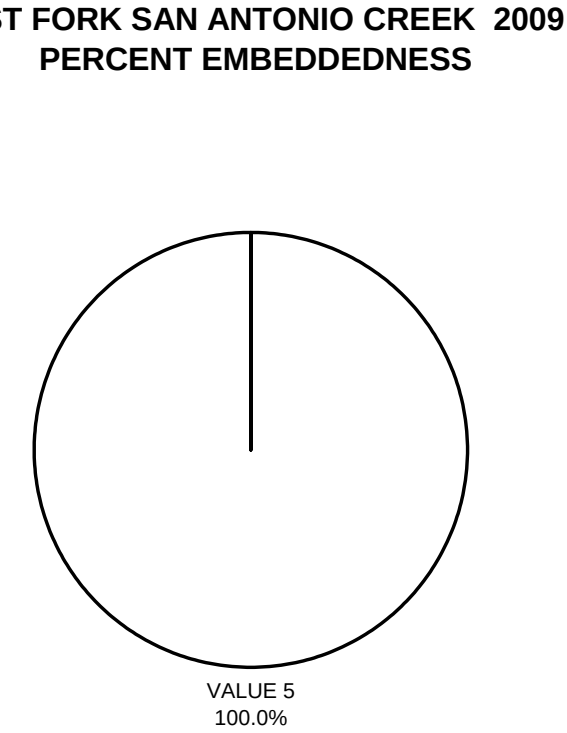
GRAPH 22

Graph 23: San Antonio Creek, Percent Embeddedness



GRAPH 23

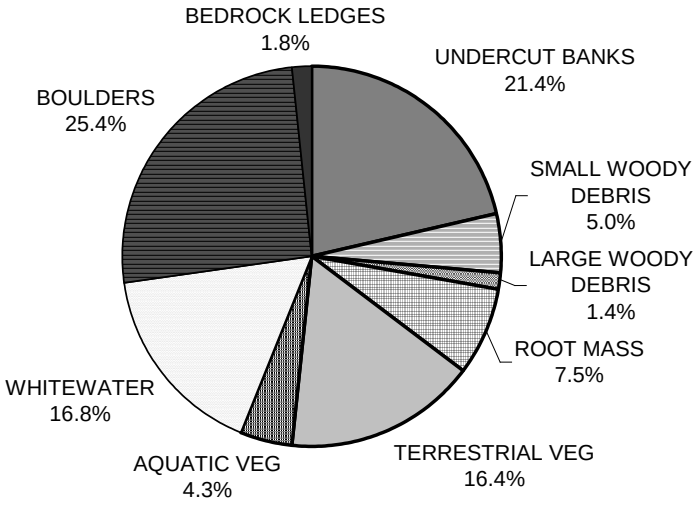
Graph 24: East Fork San Antonio, Percent Embeddedness



GRAPH 24

Graph 25: Maria Ygnacio Creek, Mean Percent Cover Types in Pools

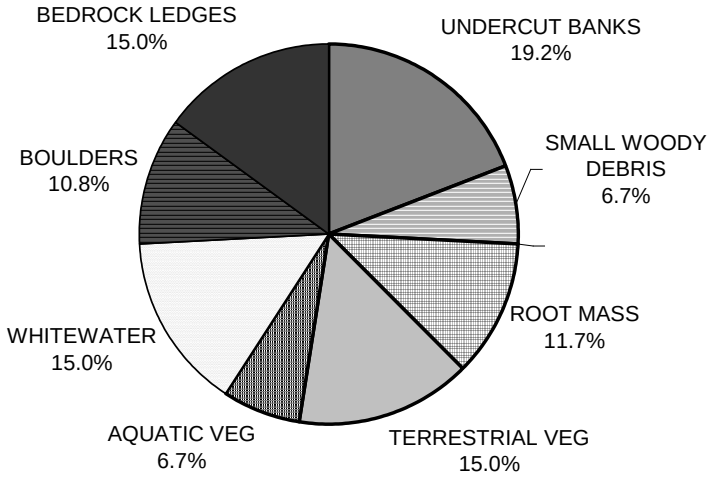
MARIA YGNACIO CREEK 2009
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 25

Graph 26: East Fork Maria Ygnacio Mean Percent Cover Types in Pools

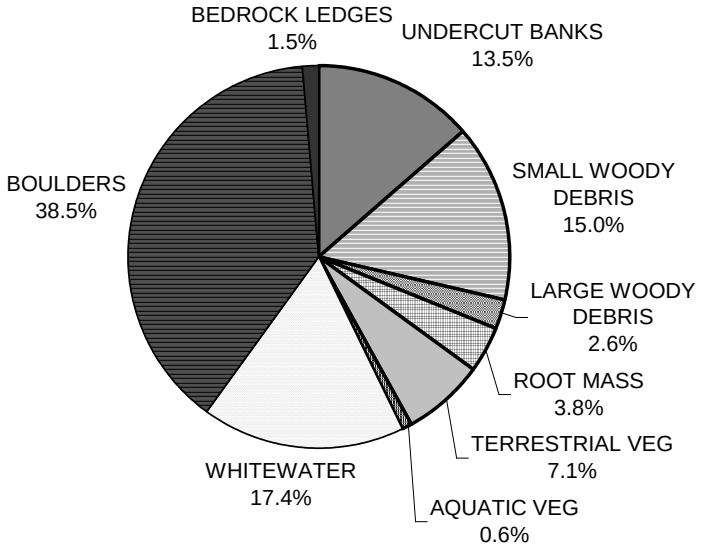
EAST FORK MARIA YGNACIO CREEK 2009
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 26

Graph 27: San Antonio Creek, Mean Percent Cover Types in Pools

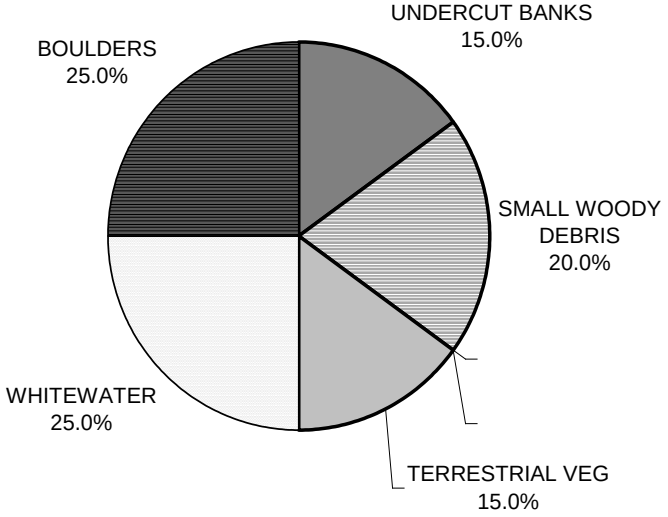
SAN ANTONIO CREEK 2009
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 27

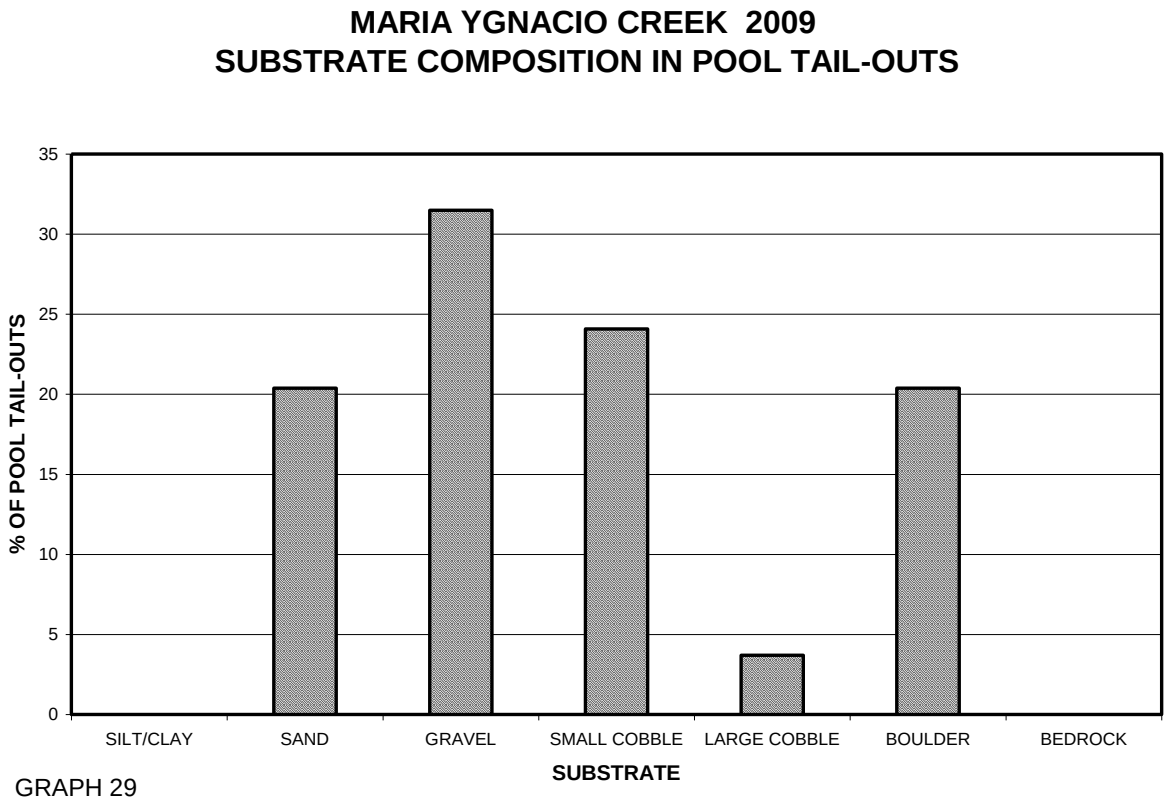
Graph 28: East Fork San Antonio, Mean Percent Cover Types in Pools

EAST FORK SAN ANTONIO CREEK 2009
MEAN PERCENT COVER TYPES IN POOLS



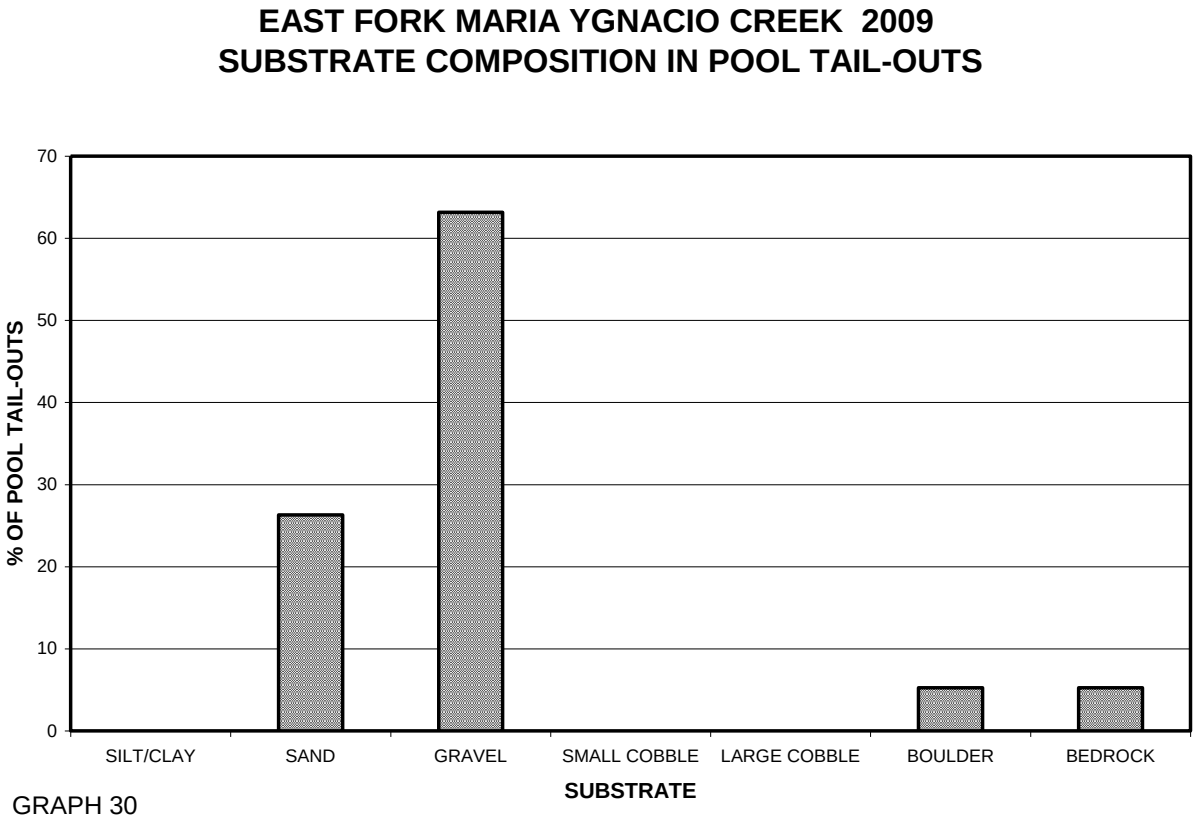
GRAPH 28

Graph 29: Maria Ygnacio Creek, Substrate Composition in Pool Tail-Outs



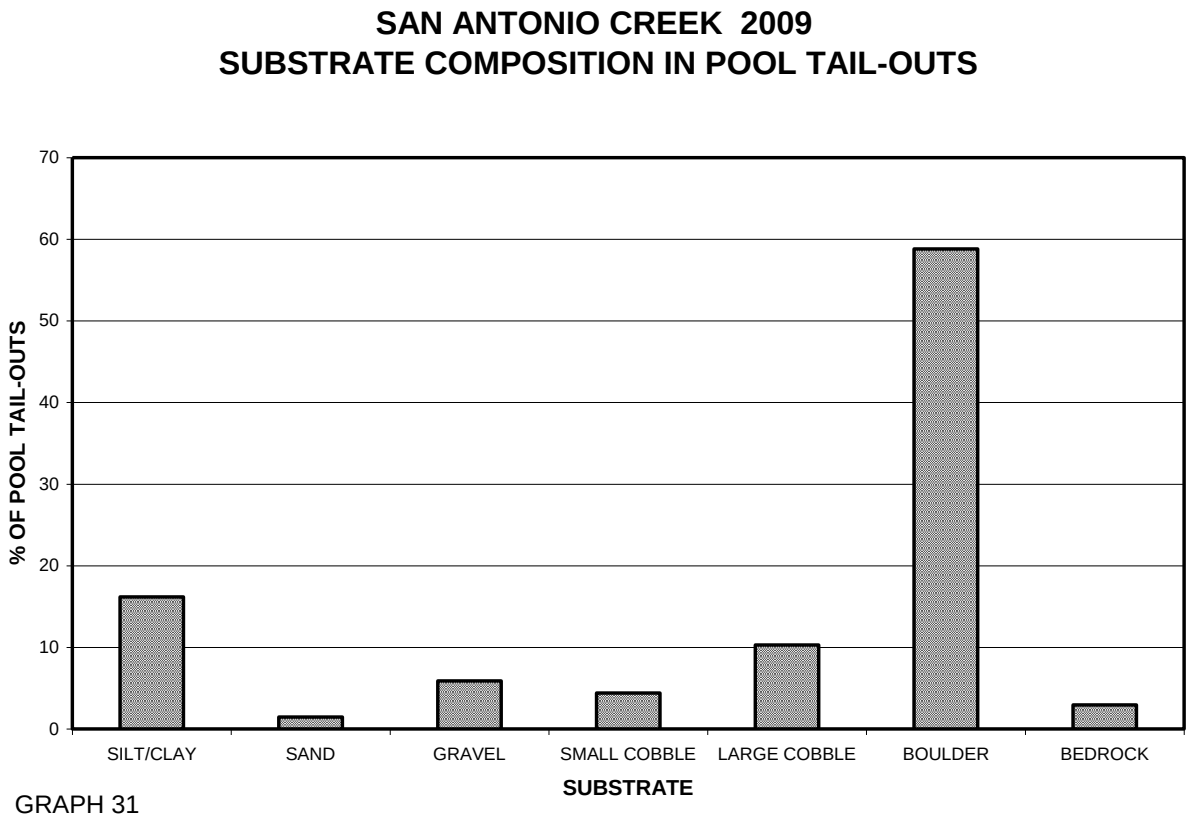
GRAPH 29

Graph 30: East Fork Maria Ygnacio, Substrate Composition in Pool Tail-Outs



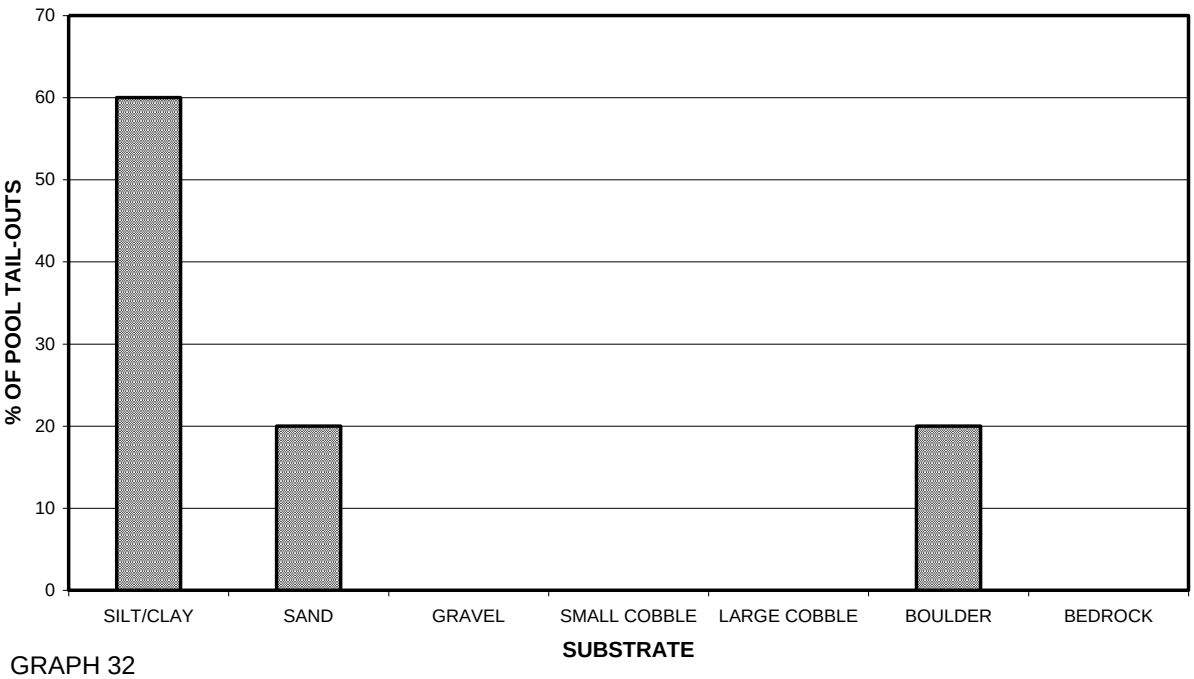
GRAPH 30

Graph 31: San Antonio Creek, Substrate Composition in Pool Tail-Outs



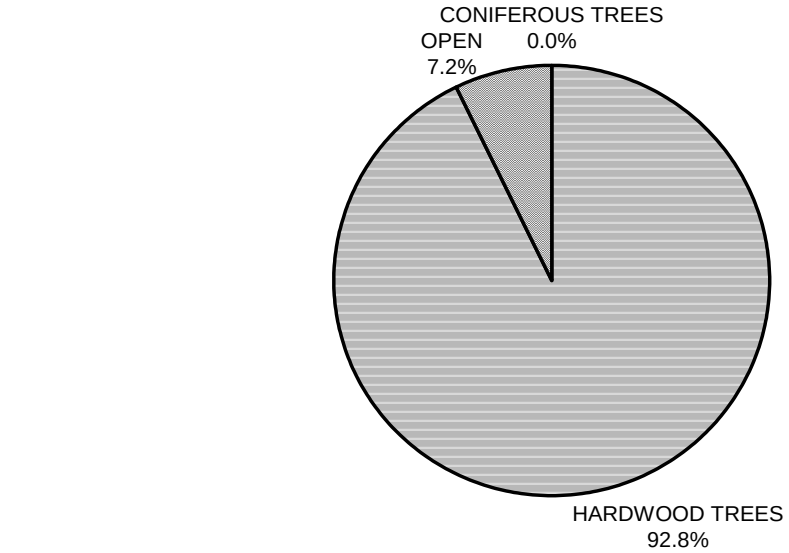
GRAPH 31

Graph 32: East Fork San Antonio, Substrate Composition in Pool Tail-Outs



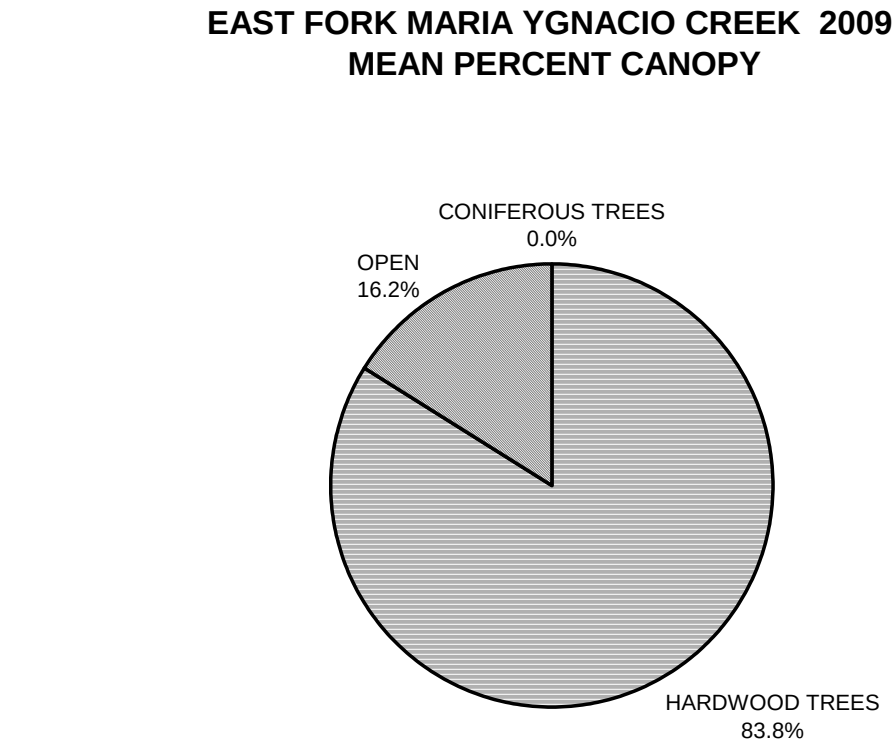
GRAPH 32

Graph 33: Maria Ygnacio Creek, Mean Percent Canopy



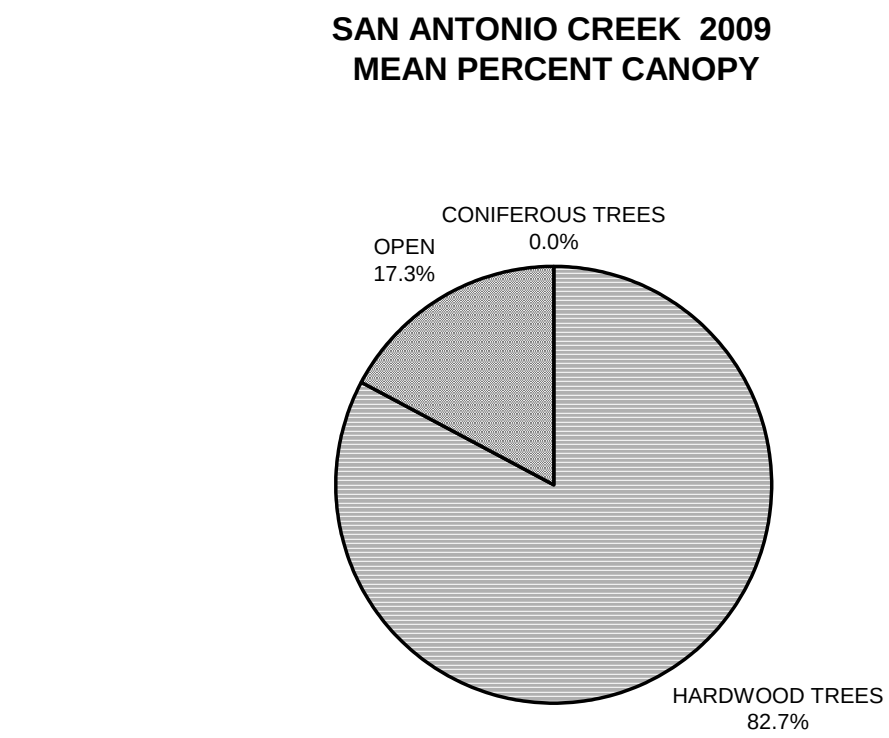
GRAPH 33

Graph 34: East Fork Maria Ygnacio, Mean Percent Canopy



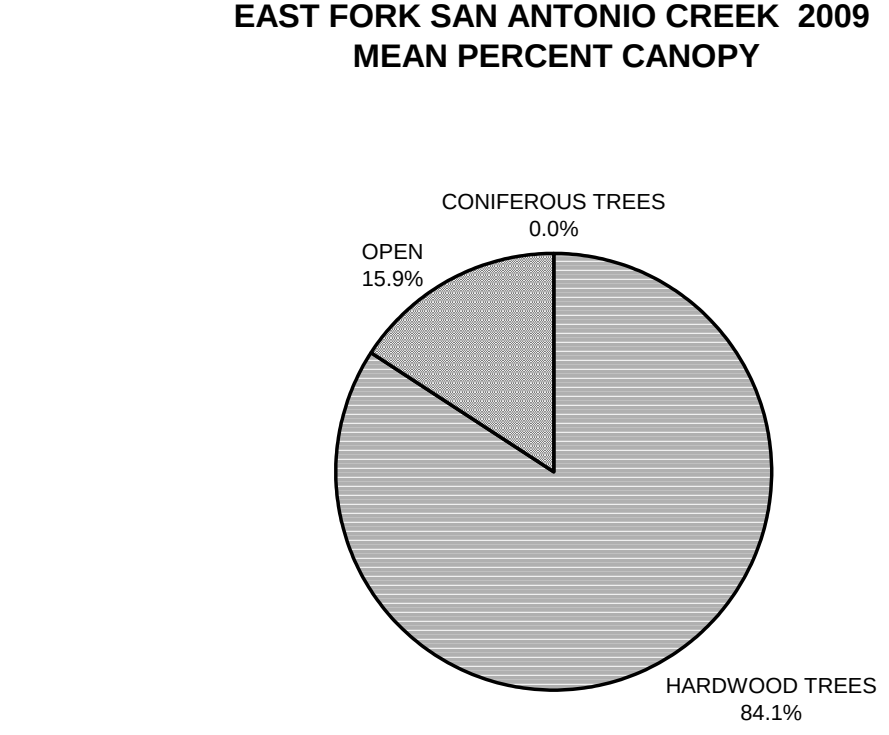
GRAPH 34

Graph 35: San Antonio Creek, Mean Percent Canopy



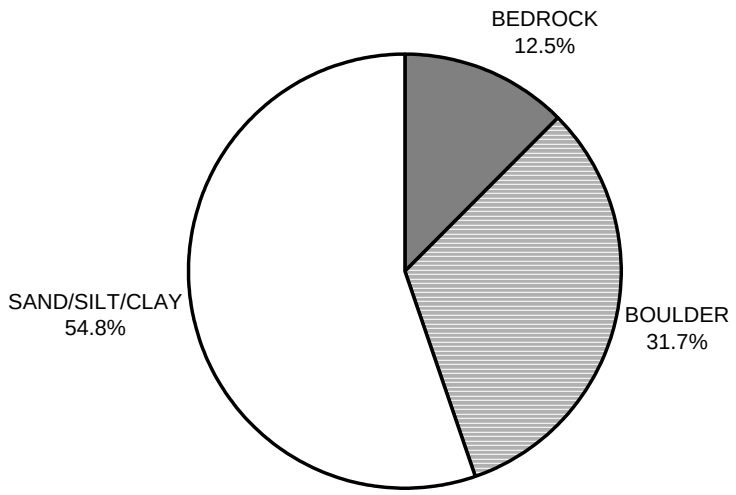
GRAPH 35

Graph 36: East Fork San Antonio, Mean Percent Canopy



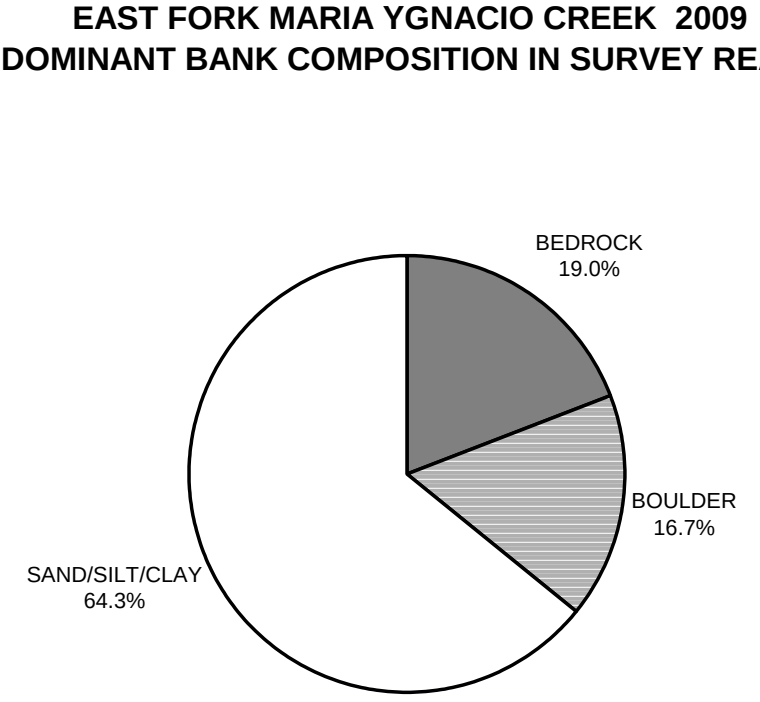
GRAPH 36

Graph 37: Maria Ygnacio Creek, Dominant Bank Composition in Survey Reach



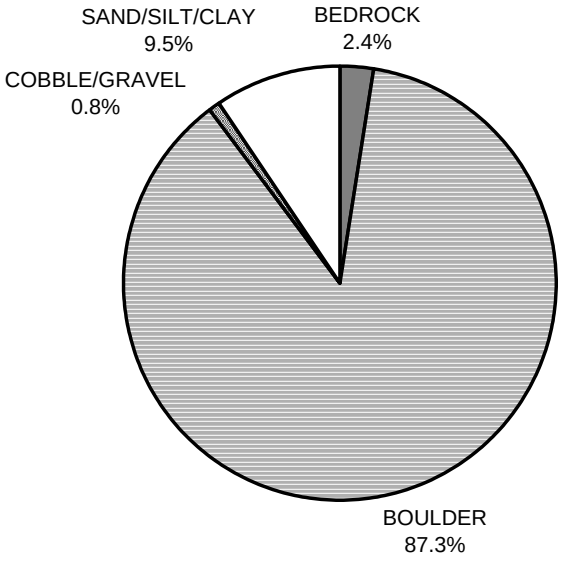
GRAPH 37

Graph 38: East Fork Maria Ygnacio, Dominant Bank Composition in Survey Reach



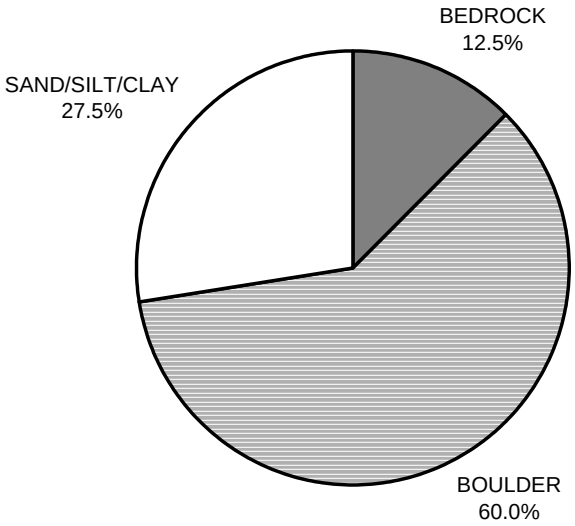
GRAPH 38

Graph 39: San Antonio Creek, Dominant Bank Composition in Survey Reach



GRAPH 39

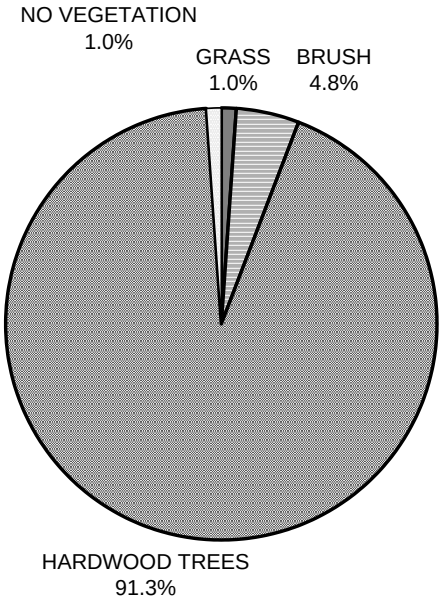
Graph 40: East Fork San Antonio, Dominant Bank Composition in Survey Reach



GRAPH 40

Graph 41: Maria Ygnacio Creek, Dominant Bank Vegetation in Survey Reach

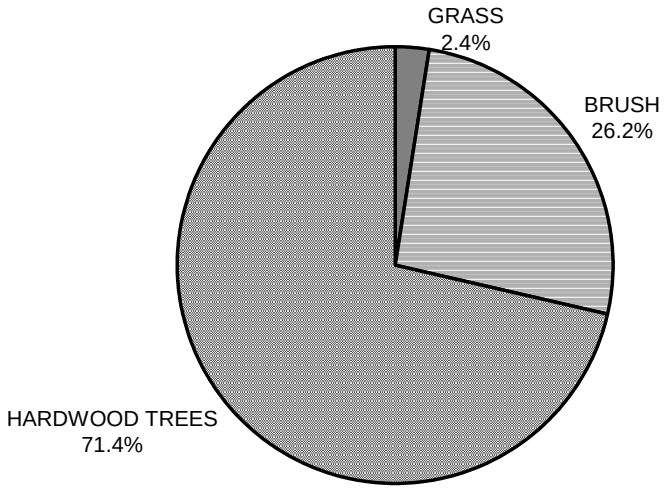
MARIA YGNACIO CREEK 2009
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Graph 42: East Fork Maria Ygnacio, Dominant Bank Vegetation in Survey Reach

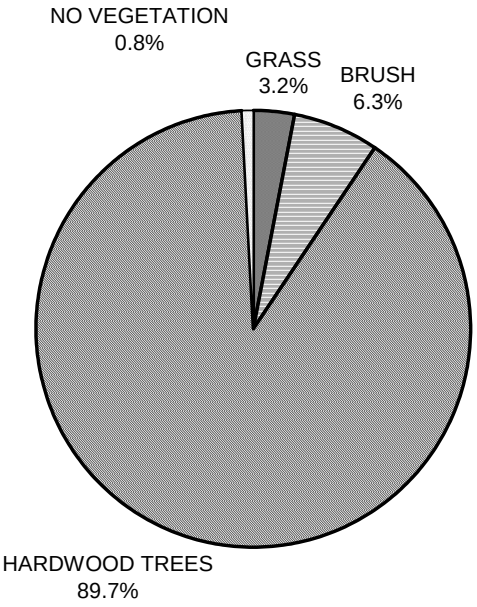
EAST FORK MARIA YGNACIO CREEK 2009
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 42

Graph 43: San Antonio Creek, Dominant Bank Vegetation in Survey Reach

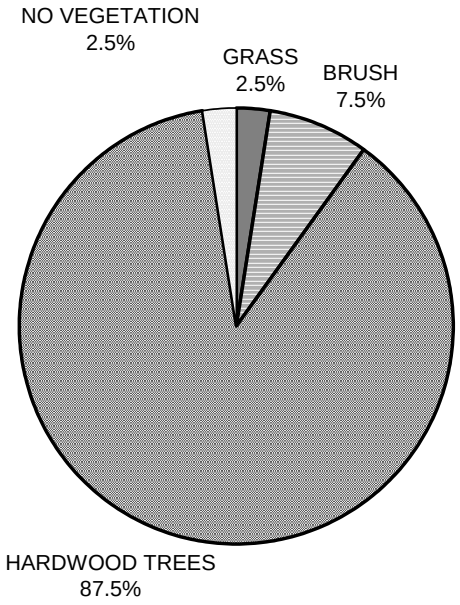
SAN ANTONIO CREEK 2009
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 43

Graph 44: East Fork San Antonio, Dominant Bank Vegetation in Survey Reach

EAST FORK SAN ANTONIO CREEK 2009
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 44