California Department of Fish and Wildlife
Santa Cruz County
Big Basin Coastal Watershed
Stream Habitat Assessment Reports

San Vicente Creek

Surveyed 2010

Report Completed in 2013

STREAM INVENTORY REPORT

San Vicente Creek

INTRODUCTION

A stream inventory was conducted 6/14/2010 to 6/21/2010 on San Vicente Creek. The survey began at the confluence with Pacific Ocean and extended upstream 3.4 miles.

The San Vicente Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in San Vicente Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for coho salmon and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

San Vicente Creek is located in Santa Cruz County, California (Map 1). It flows into the Pacific Ocean. San Vicente Creek's legal description at the confluence with Pacific Ocean is T10S R03W S33. Its location is 37.0093 north latitude and 122.1931 west longitude, LLID number 1221931370093. San Vicente Creek is a third order stream and has approximately 9.2 miles of blue line stream according to the USGS National Hydrology Dataset (NHD). San Vicente Creek drains a watershed of approximately 11.3 square miles. Elevations range from about sea level at the mouth of the creek to 2,648 feet in the headwater areas. Evergreen forest dominates the watershed. The watershed is entirely privately owned, which accounts for 99% of the land area. Ninety-five percent of the land is considered natural, 2% is resource ext, 2% is urban, and less than 1% is agricultural. Vehicle access to the lower reaches exists via Bonny Doon Road to the east of Highway 1; more extensive access to the headwater of San Vicente Creek exist via San Vicente Street and San Vicente Avenue located east of the town of Davenport, California.

METHODS

The habitat inventory conducted in San Vicente Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Wildlife (CDFW). This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are fully measured. All other habitat unit types encountered for the first time in each reach are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is 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 San Vicente Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is 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 is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are 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 are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees Fahrenheit at the middle of the habitat unit and within one foot of the water surface. Additionally, a recording thermograph was deployed in San Vicente Creek from July 14 to July 22, 2010 to record temperatures on a 24 hour basis during warm summer months.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1990). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". San Vicente Creek habitat

typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In San Vicente 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 such as bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

Instream shelter is 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. The shelter rating is calculated for each fully-described habitat unit by multiplying shelter value and percent cover. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. In San Vicente Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

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 is 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 San Vicente 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. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood trees.

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 San Vicente 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. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests (velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in San Vicente Creek. In addition, 1 site was electrofished using a Smith-Root Model 12 electrofisher. These sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.18, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Wildlife. This program processes and summarizes the data, and produces 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 (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for San Vicente 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

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of 6/14/2010 to 6/21/2010, was conducted by A. Griffin and C. Bell (CCC/WSP). The total length of the stream surveyed was 18,127 feet with an additional 536 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 6.06 cfs on June 24, 2010.

San Vicente Creek is a F3 channel type for 5,932 feet of the stream surveyed (Reach 1), a C3 channel type for 1,628 feet of the stream surveyed (Reach 2), a B3 channel type for 4,888 feet of the stream surveyed (Reach 3), a F4 channel type for 3,532 feet of the stream surveyed (Reach 4), a A5 channel type for 2,683 feet of the stream surveyed (Reach 5). F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width to depth ratios, and cobble-dominant substrates. C3 channels are meandering point-bar, riffle/pool, alluvial channels with broad well-defined floodplain on low gradients, and cobble-dominant substrates. B3 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks, and cobble-dominant substrates. F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width to depth ratios, and gravel-dominant substrates. A5 channels are steep, narrow,

cascading, step-pool, high energy debris transporting channels with depositional soils, and sand-dominant substrates.

Water temperatures taken during the survey period ranged from 53 to 60 degrees Fahrenheit. Air temperatures ranged from 50 to 66 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36% pool units, 35% riffle units, 27% flatwater units, 2% culvert units, and 0% dry units (Graph 1). Based on total length of Level II habitat types, there were 37% riffle units, 32% flatwater units, 28% pool units, 3% culvert units, and 0% dry units (Graph 2).

Eighteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 19% low gradient riffle units, 19% run units, 15% mid-channel pool units (Graph 3). Based on percent total length, there were 21% run units, 18% low gradient riffle units, 16% high gradient riffle units.

A total of 123 pools were identified (Table 3). Scour pools were the most frequently encountered at 53% (Graph 4), and comprised 51% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirteen of the 123 pools (11%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 123 pool tail-outs measured, 13 had a value of 1 (11%), 78 had a value of 2 (63%), 8 had a value of 3 (7%), 24 had a value of 5 (20%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

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. Riffle habitat types had a mean shelter rating of 10, flatwater habitat types had a mean shelter rating of 9, and pool habitats had a mean shelter rating of 35 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 28, and scour pools had a mean shelter rating of 41 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in San Vicente Creek. Graph 7 describes the pool cover in San Vicente Creek. Terrestrial vegetation is the dominant pool cover type, followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel substrate was observed in 34% of pool tail-outs; and small cobble substrate was observed in 31% of pool tail-outs.

The mean percent canopy density for the surveyed length of San Vicente Creek was 92%. Of the canopy present, the mean percentages of hardwood and coniferous trees were 85% and 15%,

respectively. Eight percent of the canopy was open. Graph 9 describes the mean percent canopy in San Vicente Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 77%. The mean percent left bank vegetated was 80% (Table 7). The dominant elements composing the structure of the stream banks consisted of 65% sand/silt/clay, 22% cobble/gravel, 9% bedrock, 4% boulder (Graph 10). Deciduous trees were the dominant vegetation type observed in 83% of the units surveyed. Additionally, 9% of the units surveyed had coniferous trees as the dominant vegetation type, and 6% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted an electrofishing survey at 1 site for species composition and distribution in San Vicente Creek on October 20, 2010. Water temperature taken during the electrofishing was 56 degrees Fahrenheit. Air temperature was 60 degrees Fahrenheit. The sites were sampled by D. Acomb, D. Resnik (CDFW); and J. Hanson, D. Dela Vega (WSP).

A presence survey was conducted at 1 site. The reach site yielded 20 young-of-the-year steelhead/rainbow trout (SH/RT), 10 age 1+ SH/RT, 6 age 2+ SH/RT, and 11 coast range sculpin.

The following chart displays the information yielded from these sites:

2010 San Vicente Creek electrofishing observations.

Date	Site #	Reference Point	Distance From Reference Point (ft.)	Steelhead/ Rainbow Trout			Non Salmonids Name species
				0+	1+	2+	
10/20/2010	1	Entrance of Cemex	300 feet downstream	20	10	6	11 coast range sculpin

DISCUSSION

San Vicente Creek is a F3 channel type for 5,932 feet of the stream surveyed, a C3 channel type for 1,628 feet of the stream surveyed, a B3 channel type for 4,888 feet of the stream surveyed, a F4 channel type for 3,532 feet of the stream surveyed, a A5 channel type for 2,683 feet of the stream surveyed. The suitability of F3, C3, B3, F4, and A5 channel types for fish habitat improvement structures are as follows: F3 channel types are good for bank-placed boulders, single and opposing wing-deflectors and fair for plunge weirs, boulder clusters, channel constrictors and log cover; C3 channel types are excellent for bank-placed boulders and good for plunge weirs, boulder clusters, single and opposing wing-deflectors and log cover; B3 channel types are excellent for plunge weirs, boulder clusters and bank-placed boulders, single and opposing wing-deflectors, and log cover; F4 channel types are good for bank-placed boulders

and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover; and A5 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors and log cover.

The water temperatures recorded on the survey days June 14 to June 21, 2010, ranged from 53 to 60 degrees Fahrenheit. Air temperatures ranged from 50 to 66 degrees Fahrenheit. This is a suitable water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 32% of the total length of this survey, riffles 37%, and pools 28%. The pools are relatively shallow, with 13 of the 123 (11%) pools having a maximum residual depth greater than three feet. 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 three 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, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Ninety-one of the 123 pool tail-outs measured had embeddedness ratings of 1 or 2. Eight of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-four of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in San Vicente Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Eighty of the 123 pool tail-outs measured had gravel and small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools is 35. The shelter rating in the flatwater habitats is 9. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in San Vicente Creek. Terrestrial vegetation is the dominant cover type in pools, followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 92%. Reach 1 had a canopy density of 90.8%, Reach 2 had a canopy density of 93.5%, Reach 3 had a canopy density of 91.4%, Reach 4 had a canopy density of 91.8%, and Reach 5 had a canopy density of 94%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 77% and 80%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

GENERAL RECOMMENDATIONS

San Vicente Creek should be managed as an anadromous, natural production stream.

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

RECOMMENDATIONS

1) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from terrestrial vegetation. Adding high quality complexity with woody cover in the pools is desirable.

2) Access for migrating salmonids should be assessed at all road crossings and dams. Sites of particular concern include the in-stream culvert located upstream of the privately owned pond on San Vicente Street. All fish passage assessments should be done according to Part 9 of the California Salmonid Stream Habitat Restoration Manual (Flosi et al, 1998). Where needed, crossings should be replaced or modified to improve fish passage.

3) Inventory and map sources of stream bank erosion particularly in Reach 5, 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. 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.

4) San Vicente Creek would benefit from utilizing bio-technical vegetative techniques to re-establish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.

5) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

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.

Position	Habitat Unit #	Memo
0	0001.00	The start of survey is confluence with Pacific Ocean.
38	0002.00	There is a culvert serving as a railroad tunnel. It is made of blasted bedrock and has the following dimensions: height (H) = 15', width (W) =14', and length (L) = 280'. There is a plunge height of 2.5'. The maximum depth of water within 5' of the opening of the culvert is 2.5' and the culvert has a slope of 0%. It is in good condition and is not a barrier to adult or juvenile salmonids.
318	0003.00	There was an unidentified fish observed.
403	0004.00	There was a culvert observed under highway 1. It is made of concrete and has the following dimensions: H = 12', W = 12', and L =141'. There was a plunge height of 0' and the maximum depth of water within 5' of the opening was 0.9'. The culvert had a slope of 0% and was in good condition. It is not a barrier to juvenile or adult salmonids.
763	0011.00	There is a tributary on the left bank that leads to an off channel pond.
763	0011.00	There is a flowing, unnamed tributary on the left bank with a discharge of less than 1CFS. It contributes 5% of the flow to the stream. The water downstream was 56F, up stream it was 56F & the tributary was 61F. The tributary was checked 150' up and is accessible to fish. It has a slope of 1% and minnows were observed.
1,059	0017.00	There are concrete footings from old bridge crossing at top of unit with the following dimensions: W= 2', L=18', H=4'. These are not a barrier to salmonids.
1,085	0018.00	There was an unidentified fish observed.
1,118	0019.00	There is a right bank retaining wall and yard waste in the creek.
1,156	0020.00	There was a salmonid young of the year observed.
1,209	0021.00	There is an unnamed, flowing tributary on the left bank. It has a discharge of <1CFS and contributes 5% of flow to stream. The water temperature downstream was 57F, upstream 57F and the tributary had a temperature of 56F. This tributary is not

Position	Habitat Unit #	Memo
		accessible to fish and the slope is unknown. There were no fish observed.
1,267	0022.00	There is a rock weir that creates a one foot plunge at top of unit.
1,281	0023.00	Several salmonid young of the year were observed.
1,658	0029.00	There is rip rap on the right bank.
1,684	0030.00	There is rip rap on the right bank.
1,755	0031.00	There is rip rap on the right bank on the bottom half of the unit.
2,064	0038.00	There was a salmonid young of the year observed.
2,293	0041.00	A 2+ salmonid was observed.
2,496	0046.00	A California red-legged frog was observed.
3,116	0056.00	On the left bank there are two large alders that were recently cut down with an axe. These are blocking the stream channel.
3,378	0061.00	A salmonid young of the year was observed.
3,690	0068.00	A 1+ salmonid was observed.
3,718	0069.00	There is small wood accumulation at the top of the unit that is retaining sand.
4,454	0077.00	There is a concrete slab on the right bank with the following dimensions: L=9', W=5', and H=12'.
4,624	0078.03	There is an unnamed, flowing tributary on the left bank with a discharge of <1CFS. It contributes <5% of flow to the stream. The water temperatures downstream were 55F, upstream 55F and the temperature of the tributary was 54F. It was checked 100' up and is accessible to fish. It has a slope of 5% and there were no fish observed.
4,624	0078.03	Several California red-legged frogs were observed.
4,624	0078.05	There is a culverted road crossing that is made of corrugated metal pipe with the following dimensions: H=3', W=3' and L=36'. The diameter was 3' and there was a plunge height of 0'. The maximum depth of water within 5' of the opening was dry. The culvert had a slope of 0%. It was crushed at the top and is a possible barrier to juvenile or adult salmonids.
5,164	0087.00	There was a salmonid young of the year observed.
6,365	0107.00	There was a salmonid young of the year observed.

Position	Habitat Unit #	Memo
6,542	0111.00	There is a private cemex conyeyor belt bridge with the following dimensions: L=10', H=25' and W=40'. It is made of steel and is not retaining gravel. It is not downcutting and is not a barrier to salmonids.
6,552	0112.00	There is a boulder cluster at the top of the unit.
7,022	0122.00	There was a 1+ salmonid observed.
7,255	0126.00	There is a private road for Cemex with the following dimensions: L=14', H=6' and W=27'. It is made of cement/wood/steel and is not retaining gravel. It is not downcutting and is not a barrier.
7,269	0127.00	There are 3 redwood logs cabled to the right bank.
7,491	0132.00	There are 4 redwood logs cabled to the left bank.
7,491	0132.00	There was a salmonid young of the year observed.
8,044	0141.00	There are 2 redwood logs cabled to the right bank.
8,329	0147.00	There were logs and boulders cabled onto the left bank to protect the road.
8,552	0150.00	There was a root wad, large woody debris and boulders cabled to the right bank.
8,622	0152.00	There was a salmonid young of the year observed.
8,691	0154.00	There is large woody debris and boulders cabled onto the left bank.
8,884	0158.00	There is large woody debris cabled onto the left bank.
8,949	0159.00	On the left bank there is a cement retaining wall protecting the road with the following dimensions: L=45' and H=8'.
8,994	0160.00	There are 2 large woody debris structures cabled/bolted into the left bank.
8,994	0160.00	There was a salmonid young of the year observed.
9,161	0163.00	There was a large woody debris/root mass cabled/bolted into the left bank.
9,161	0163.00	There was a newt observed.
9,179	0164.00	There is an unnamed flowing tributary on the left bank with a discharge of <1 cfs. It contributes <5% of the flow to the stream. The water temperature downstream was 55F, up stream the temperature was unknown and the tributary was dry. It was checked 100' up and is accessible to fish. The slope is unknown and no fish were observed.
9,352	0166.00	There was large woody debris/boulders placed on the

Position	Habitat Unit #	Memo
		left bank to protect the road.
9,395	0167.00	On the left bank there is a cement retaining wall at the bottom of the unit that is protecting road. It has the following dimensions: L=20' and H=8'.
9,453	0168.00	There are boulders/large woody debris cabled onto the left bank. It is not causing much scour.
9,576	0170.00	There are boulders/large woody debris cabled onto the left bank.
9,623	0171.00	There is a portion of the old cement dam on both of the banks. It is not a barrier
10,142	0179.00	A salmonid young of the year was observed.
10,250	0181.00	There are boulders/large woody debris cabled onto both of the banks.
10,319	0183.00	There are boulders/large woody debris cabled onto the left bank.
10,409	0185.00	There are boulders/root wad cabled onto the left bank.
10,494	0187.00	There are boulders/root wad cabled onto the right bank.
10,581	0190.00	There are boulders/root wad cabled onto the right bank.
10,641	0192.00	A salmonid young of the year was observed.
10,789	0195.00	GPS Note: calibration WP 44 N37.03124 W122.18230 37.0312 122.1823
11,951	0216.00	A salmonid young of the year was observed.
12,001	0217.00	There is a bridge on the Cemex road with the following dimensions: L=12', H=11' and W=36'. It is made of steel and wood and is not retaining gravel. It is not downcutting and is not a barrier.
12,394	0223.00	There was a salmonid young of the year obsesrved.
13,471	0250.00	There was possible large debris accumulation.
13,817	0255.00	There was a vertical sand/silt wall which is very erosive on the right bank that was 15' X 30'.
14,199	0262.01	There was a salmonid young of the year observed.
14,224	0264.00	There is a 1.5' diameter culvert pipe in the creek which is providing shelter
14,319	0266.00	There are old concrete slabs which are possibly from an old dam/weir. They have the following dimensions: 20' X 4' X 5'.

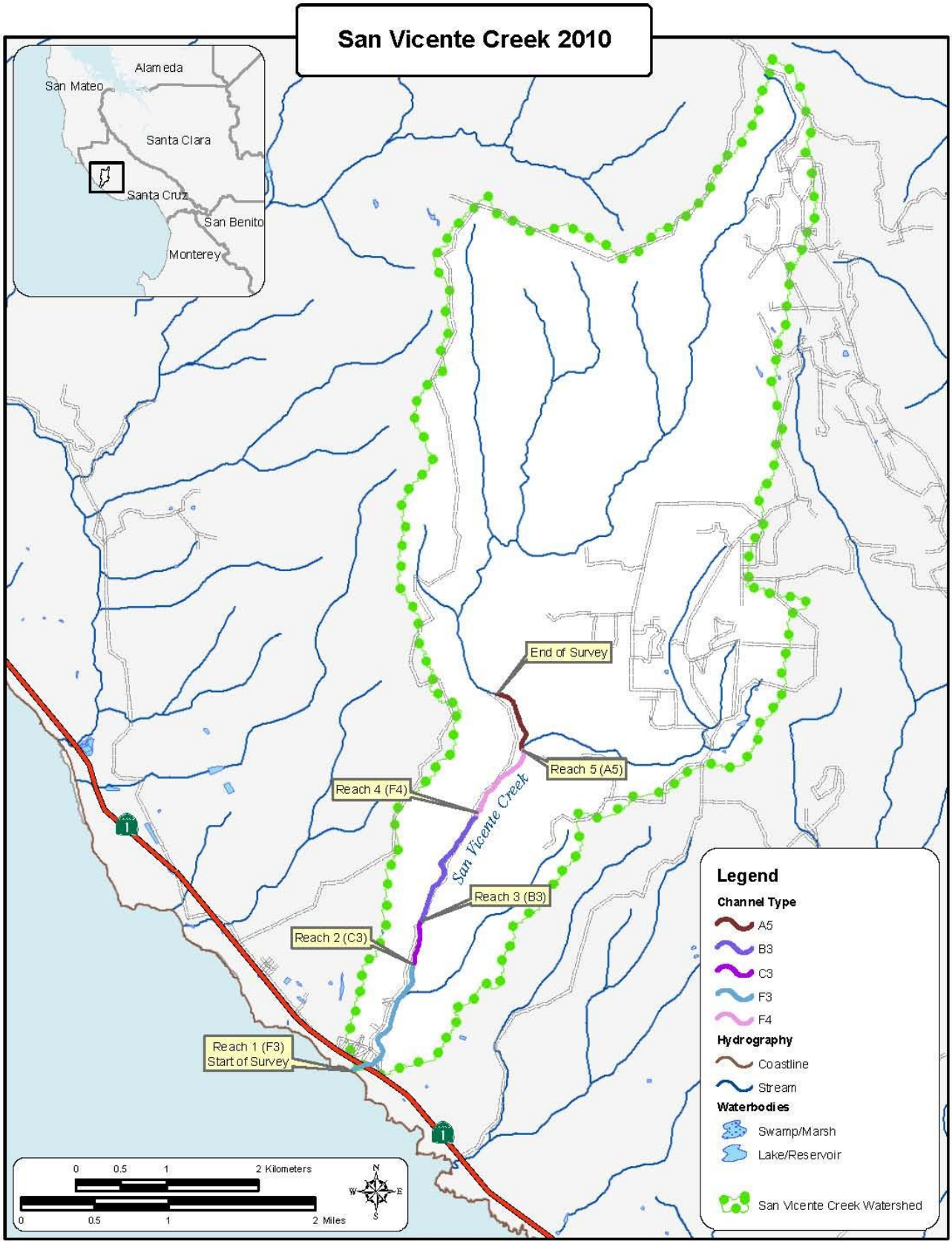
Position	Habitat Unit #	Memo
14,751	0274.00	There is an unnamed tributary on the left bank that is not flowing. The water temperature downstream was 54F, up stream 54F and the tributary was dry. It was checked 150' up and is not accessible to fish. It has a slope >5% and no fish were observed.
14,751	0274.00	A salmonid young of the year was observed.
15,217	0283.00	There is a 2' plunge at the top of the unit.
15,356	0286.00	Mill Creek is a tributary on the left bank that enters San Vicente. It was flowing with a discharge of approximately 1cfs. It contributes 25% of the flow to the stream. The water temperature downstream was 55F, upstream 55F and the temperature of the tributary was 55F. It was checked 200' up and is accessible to fish. It has a slope of <5%. There were no fish observed. See the Mill Creek habitat inventory report for more information on this creek.
15,434	0288.00	There was a Cemex ford crossing with the following dimensions: L=10' and W=23'. It is not retaining gravel and is not a barrier.
15,444	0289.00	A salmonid young of the year was observed.
15,869	0299.00	A 1+ salmonid was observed.
17,583	0323.00	There is an unnamed tributary on the left bank with a <1cfs. It contributes <1%. The temperature down and upstream was 56F and the temperature in the tributary was 58F. It was checked 100' up and is not accessible to fish. It has a 10% slope.
17,798	0326.00	At the top of the unit there is a 15' high retaining wall that begins on the right bank.
17,938	0328.00	There is a Quarry building 50' high on the right bank.
17,938	0328.00	A 1+ salmonid was observed.
18,071	0332.00	The stream emerges from a tunnel under the quarry. It is 10' X 30' and there is no plunge.

REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

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 marsh	(MAR)	[9.1]	



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Prepared by: Scott Webb, December 2010

Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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
7	0	CULVERT	2.1	72	503	2.7									
1	0	DRY	0.3	74	74	0.4									
91	91	FLATWATER	26.8	65	5944	31.8	15.4	0.7	1.2	958	87208	714	64988		9
123	123	POOL	36.2	43	5259	28.2	14.5	0.7	1.8	635	78127	930	114399	545	35
118	118	RIFFLE	34.7	58	6883	36.9	16.5	0.6	1.0	838	98882	497	58588		10

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
340	332	18663	264218	237975

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: Quad: DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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 (%)
64	64	LGR	18.8	51	3283	17.6	18.0	0.5	1.2	841	53854	439	28083		4	93
43	43	HGR	12.6	72	3079	16.5	16.0	0.6	2.0	945	40656	629	27038		15	91
4	4	CAS	1.2	25	101	0.5	11.0	0.5	1.0	259	1038	142	569		63	97
7	7	BRS	2.1	60	420	2.3	9.0	1.1	3.5	476	3334	414	2897		10	80
16	16	GLD	4.7	51	817	4.4	17.0	0.8	2.2	856	13691	684	10952		8	96
63	63	RUN	18.5	62	3887	20.8	15.0	0.7	1.8	877	55232	657	41415		10	90
12	12	SRN	3.5	103	1240	6.6	15.0	0.7	1.8	1524	18285	1052	12621		10	95
50	50	MCP	14.7	45	2235	12.0	14.0	0.7	5.3	660	33017	991	49540	608	28	90
1	1	CCP	0.3	24	24	0.1	13.0	0.0	1.4	312	312	343	343		20	95
7	7	STP	2.1	49	343	1.8	12.0	0.7	3.4	655	4584	850	5948	393	26	89
2	2	CRP	0.6	58	117	0.6	16.0	0.3	2.6	1001	2002	907	1814	347	55	95
23	23	LSL	6.8	44	1008	5.4	16.0	0.9	4.0	703	16176	1134	26082	720	61	93
8	8	LSR	2.4	41	331	1.8	13.0	0.6	2.8	553	4423	713	5704	328	30	96
15	15	LSBk	4.4	44	655	3.5	14.0	0.4	3.0	641	9621	817	12256	383	15	93
4	4	LSBo	1.2	45	179	1.0	16.0	0.7	3.0	719	2876	942	3767	384	60	92
13	13	PLP	3.8	28	367	2.0	13.0	0.9	4.0	394	5116	688	8946	482	37	92
1	0	DRY	0.3	74	74	0.4										100
7	0	CUL	2.1	72	503	2.7										100

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume
340	332	18663	264218	237975

Table 3 - Summary of Pool Habitat Types

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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
58	58	MAIN	47	45	2602	49	14.0	0.7	654	37913	581	32536	28
65	65	SCOUR	53	41	2657	51	15.0	0.7	619	40214	512	30730	41

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
123	123	5259	78127	63266

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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
50	MCP	41	4	8	33	66	9	18	3	6	1	2
1	CCP	1	0	0	1	100	0	0	0	0	0	0
7	STP	6	0	0	5	71	1	14	1	14	0	0
2	CRP	2	0	0	1	50	1	50	0	0	0	0
23	LSL	19	2	9	6	26	12	52	2	9	1	4
8	LSR	7	1	13	3	38	4	50	0	0	0	0
15	LSBk	12	3	20	7	47	4	27	1	7	0	0
4	LSBo	3	0	0	1	25	2	50	1	25	0	0
13	PLP	11	1	8	6	46	3	23	2	15	1	8

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
123	11	9	63	51	36	29	10	8	3	2

Mean Maximum Residual Pool Depth (ft.): 2

Table 5 - Summary of Mean Percent Cover By Habitat

Stream Name: San Vicente Creek **Dry Units:** 1 **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: Quad: DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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
64	64	LGR	2	2	8	0	8	0	1	29	0
43	43	HGR	0	6	9	0	2	0	14	35	0
4	4	CAS	0	20	5	0	0	0	33	18	0
7	7	BRS	0	0	0	0	0	0	40	3	0
118	118	TOTAL RIFFLE	1	4	8	0	5	0	9	29	0
16	16	GLD	0	11	21	1	12	0	0	0	0
63	63	RUN	1	7	4	2	16	0	2	33	1
12	12	SRN	0	16	15	14	6	0	10	31	0
91	91	TOTAL FLAT	1	9	8	3	14	0	2	27	1
50	50	MCP	8	17	9	20	26	2	4	13	0
1	1	CCP	0	0	70	30	0	0	0	0	0
7	7	STP	0	10	7	0	0	0	19	37	13
2	2	CRP	0	35	10	10	30	0	0	15	0
23	23	LSL	0	28	40	2	19	0	3	7	0
8	8	LSR	20	10	10	45	3	0	0	0	0
15	15	LSBk	5	8	16	2	6	0	0	13	31
4	4	LSBo	0	13	8	8	18	0	8	48	0
13	13	PLP	0	11	6	3	5	0	55	18	2
123	123	TOTAL POOL	5	16	16	13	17	1	9	14	5
7	0	CUL									
340	332	TOTAL	2	10	11	6	12	0	7	23	2

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: San Vicente Creek **Dry Units:** 1 **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

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
64	64	LGR	0	0	19	56	25	0	0
43	43	HGR	0	5	7	44	35	7	2
4	4	CAS	0	0	0	0	0	75	25
7	7	BRS	0	0	0	0	0	0	100
16	16	GLD	0	75	13	0	6	0	6
63	63	RUN	2	6	32	44	14	2	0
12	12	SRN	0	8	17	33	42	0	0
50	50	MCP	10	66	18	4	0	0	2
1	1	CCP	0	0	100	0	0	0	0
7	7	STP	0	86	0	14	0	0	0
2	2	CRP	0	100	0	0	0	0	0
23	23	LSL	26	65	4	4	0	0	0
8	8	LSR	13	50	38	0	0	0	0
15	15	LSBk	13	80	0	7	0	0	0
4	4	LSBo	0	75	0	0	25	0	0
13	13	PLP	0	77	8	8	0	8	0
7	0	CUL	0	0	0	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
92	15	85	1	77	80

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 8 - Fish Habitat Inventory Data Summary

Stream San Vicente Creek LLID: 1221931370093 Drainage Santa Cruz

Survey Dates: 6/14/2010 to 6/21/2010 Survey Length (ft.): 18663 Main Channel (ft.): 18127 Side Channel (ft.): 536

Confluence Location: Quad DAVENPORT Legal Description: T10SR03WS33 Latitude: 37:00:33.0N Longitude: 122:11:35.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F3
Reach Length (ft.): 5627
Riffle/Flatwater Mean Width (ft.): 16.1
BFW:
Range (ft.): 16.00 to 29.00
Mean (ft.): 22.90
Std. Dev.: 3.67
Base Flow (cfs): 6.06
Water (F): 56 - 60 Air (F): 54 - 64
Dry Channel (ft.): 74

Canopy Density (%): 90.8
Coniferous Component (%): 0.3
Hardwood Component 99.7
Dominant Bank Hardwood Trees
Vegetative Cover (%): 85.2
Dominant Terrestrial Veg.
Dominant Bank Substrate Sand/Silt/Clay
Occurrence of LWD (%): 5.8
LWD per 100 ft.:
Riffles: 0
Pools: 1
Flat: 0

Pools by Stream Length 30.5
Pool Frequency (%): 40.0
Residual Pool Depth (%):
< 2 Feet Deep: 57.5
2 to 2.9 Feet Deep: 22.5
3 to 3.9 Feet Deep: 15.0
>= 4 Feet Deep: 5.0
Mean Max Residual Pool Depth 2.035
Mean Pool Shelter 39

Pool Tail Substrate (%): Silt/Clay: 7.5 Sand: 15.0 Gravel: 47.5 Sm Cobble: 20.0 Lg Cobble: 10.0 Boulder 0.0 Bedrock: 0.0
Embeddedness Values (%): 1. 10.0 2. 60.0 3. 10.0 4. 0.0 5. 20.0

STREAM REACH: 2

Channel Type: C3
Reach Length (ft.): 1628
Riffle/Flatwater Mean Width (ft.): 16.7
BFW:
Range (ft.): 22.00 to 30.00
Mean (ft.): 27.00
Std. Dev.: 3.56
Base Flow (cfs): 6.06
Water (F): 56 - 58 Air (F): 61 - 62
Dry Channel (ft.): 0

Canopy Density (%): 93.5
Coniferous Component (%): 1.6
Hardwood Component 98.4
Dominant Bank Hardwood Trees
Vegetative Cover (%): 92.9
Dominant Root masses
Dominant Bank Substrate Sand/Silt/Clay
Occurrence of LWD (%): 2.4
LWD per 100 ft.:
Riffles: 0
Pools: 1
Flat: 1

Pools by Stream Length 30.5
Pool Frequency (%): 40.0
Residual Pool Depth (%):
< 2 Feet Deep: 75.0
2 to 2.9 Feet Deep: 16.7
3 to 3.9 Feet Deep: 8.3
>= 4 Feet Deep: 0.0
Mean Max Residual Pool Depth 1.675
Mean Pool Shelter 23

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 8.3 Gravel: 25.0 Sm Cobble: 50.0 Lg Cobble: 16.7 Boulder 0.0 Bedrock: 0.0
Embeddedness Values (%): 1. 16.7 2. 75.0 3. 8.3 4. 0.0 5. 0.0

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: B3
Reach Length (ft.): 4888
Riffle/Flatwater Mean Width (ft.): 17.7
BFW:
Range (ft.): 17.00 to 32.00
Mean (ft.): 22.11
Std. Dev.: 2.70
Base Flow (cfs): 6.06
Water (F): 54 - 58 Air (F): 54 - 66
Dry Channel (ft.): 0

Canopy Density (%): 91.4
Coniferous Component (%): 26.0
Hardwood Component 74.0
Dominant Bank Hardwood Trees
Vegetative Cover (%): 70.4
Dominant Boulders
Dominant Bank Substrate Sand/Silt/Clay
Occurrence of LWD (%): 16.6
LWD per 100 ft.:
Riffles: 1
Pools: 6
Flat: 1

Pools by Stream Length 30.9
Pool Frequency (%): 35.5
Residual Pool Depth (%):
< 2 Feet Deep: 57.6
2 to 2.9 Feet Deep: 39.4
3 to 3.9 Feet Deep: 0.0
>= 4 Feet Deep: 3.0
Mean Max Residual Pool Depth 1.67
Mean Pool Shelter 35

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 12.1 Gravel: 36.4 Sm Cobble: 36.4 Lg Cobble: 12.1 Boulder 0.0 Bedrock: 3.0
Embeddedness Values (%): 1. 6.1 2. 72.7 3. 6.1 4. 0.0 5. 15.2

STREAM REACH: 4

Channel Type: F4
Reach Length (ft.): 3301
Riffle/Flatwater Mean Width (ft.): 15.5
BFW:
Range (ft.): 19.00 to 32.00
Mean (ft.): 23.67
Std. Dev.: 4.38
Base Flow (cfs): 6.06
Water (F): 53 - 57 Air (F): 50 - 63
Dry Channel (ft.): 0

Canopy Density (%): 91.8
Coniferous Component (%): 23.5
Hardwood Component 76.5
Dominant Bank Hardwood Trees
Vegetative Cover (%): 80.8
Dominant Boulders
Dominant Bank Substrate Sand/Silt/Clay
Occurrence of LWD (%): 14.8
LWD per 100 ft.:
Riffles: 1
Pools: 4
Flat: 1

Pools by Stream Length 28.5
Pool Frequency (%): 34.2
Residual Pool Depth (%):
< 2 Feet Deep: 56.0
2 to 2.9 Feet Deep: 32.0
3 to 3.9 Feet Deep: 12.0
>= 4 Feet Deep: 0.0
Mean Max Residual Pool Depth 1.936
Mean Pool Shelter 43

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 12.0 Gravel: 24.0 Sm Cobble: 44.0 Lg Cobble: 16.0 Boulder 4.0 Bedrock: 0.0
Embeddedness Values (%): 1. 16.0 2. 76.0 3. 4.0 4. 0.0 5. 4.0

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 5

Channel Type: A5
Reach Length (ft.): 2683
Riffle/Flatwater Mean Width (ft.): 13.0
BFW:
Range (ft.): 17.00 to 23.00
Mean (ft.): 19.73
Std. Dev.: 2.30
Base Flow (cfs): 6.06
Water (F): 54 - 56 Air (F): 58 - 64
Dry Channel (ft.): 0

Canopy Density (%): 94.0
Coniferous Component (%): 20.0
Hardwood Component 80.0
Dominant Bank Hardwood Trees
Vegetative Cover (%): 66.8
Dominant Boulders
Dominant Bank Substrate Cobble/Gravel
Occurrence of LWD (%): 8.6
LWD per 100 ft.:
Riffles: 0
Pools: 1
Flat: 1

Pools by Stream Length 16.2
Pool Frequency (%): 29.5
Residual Pool Depth (%):
< 2 Feet Deep: 69.2
2 to 2.9 Feet Deep: 30.8
3 to 3.9 Feet Deep: 0.0
>= 4 Feet Deep: 0.0
Mean Max Residual Pool Depth 1.69
Mean Pool Shelter 21

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 53.8 Gravel: 15.4 Sm Cobble: 7.7 Lg Cobble: 0.0 Boulder 23.1 Bedrock: 0.0
Embeddedness Values (%): 1. 7.7 2. 15.4 3. 0.0 4. 0.0 5. 76.9

Table 9 -Mean Percentage of Dominant Substrate and Vegetation

Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	27	34	9.2
Boulder	17	9	3.9
Cobble/Gravel	80	65	21.8
Sand/Silt/Clay	208	224	65.1

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	5	7	1.8
Brush	20	23	6.5
Hardwood	272	278	82.8
Coniferous	34	23	8.6
No Vegetation	1	1	0.3

Total Stream Cobble Embeddedness Values: 2

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

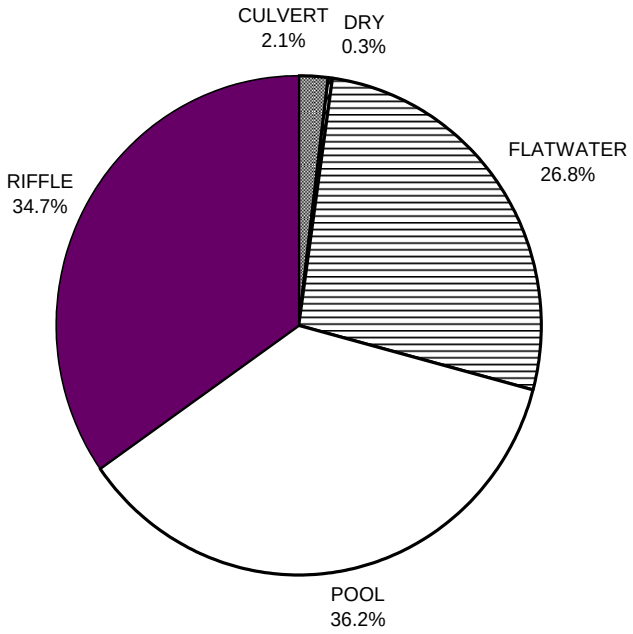
Stream Name: San Vicente Creek **LLID:** 1221931370093 **Drainage:** Santa Cruz

Survey 6/14/2010 to 6/21/2010

Confluence Location: **Quad:** DAVENPORT **Legal Description:** T10SR03WS33 **Latitude:** 37:00:33.0N **Longitude:** 122:11:35.0W

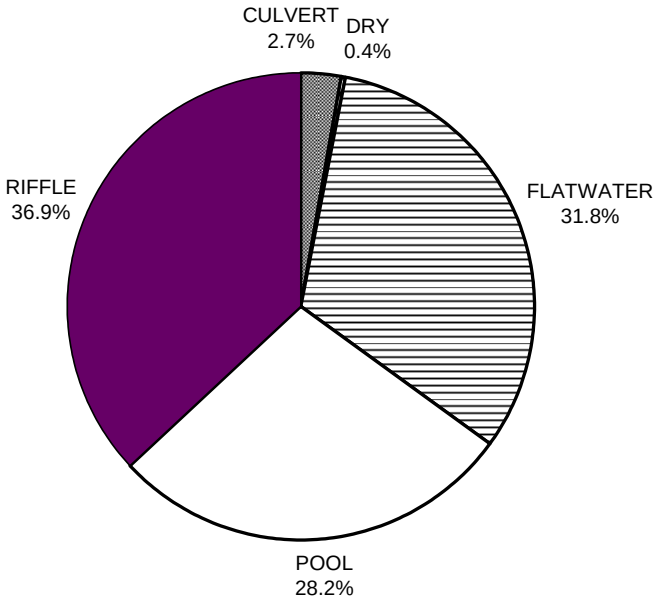
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	1	1	5
SMALL WOODY DEBRIS (%)	4	9	16
LARGE WOODY DEBRIS (%)	8	8	16
ROOT MASS (%)	0	3	13
TERRESTRIAL VEGETATION	5	14	17
AQUATIC VEGETATION (%)	0	0	1
WHITEWATER (%)	9	2	9
BOULDERS (%)	29	27	14
BEDROCK LEDGES (%)	0	1	5

SAN VICENTE CREEK 2010
HABITAT TYPES BY PERCENT OCCURRENCE



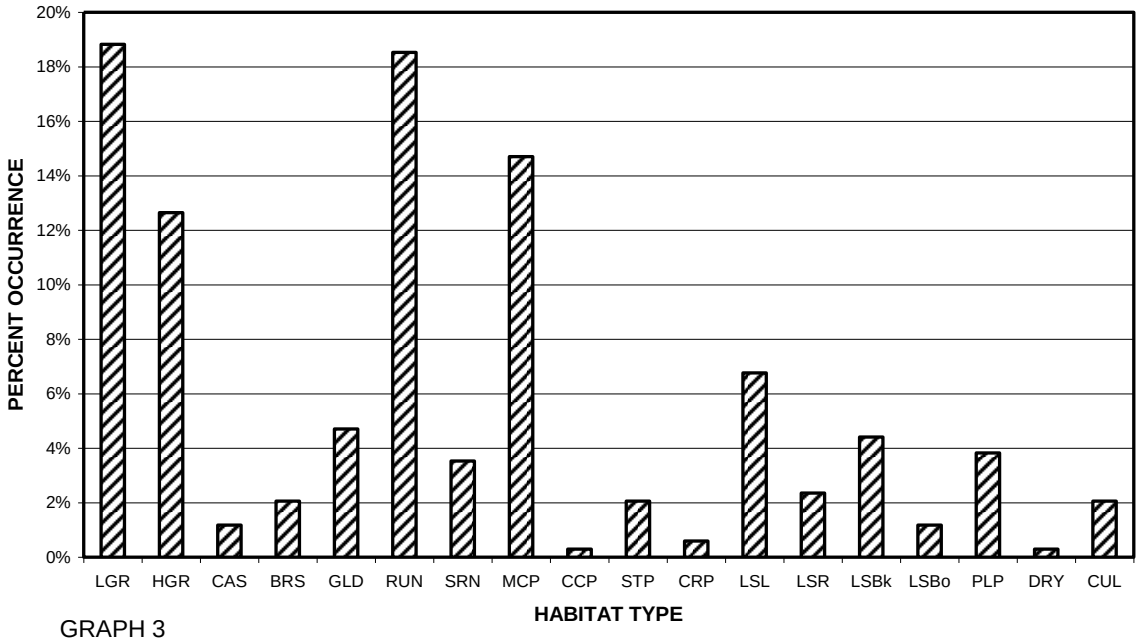
GRAPH 1

SAN VICENTE CREEK 2010
HABITAT TYPES BY PERCENT TOTAL LENGTH



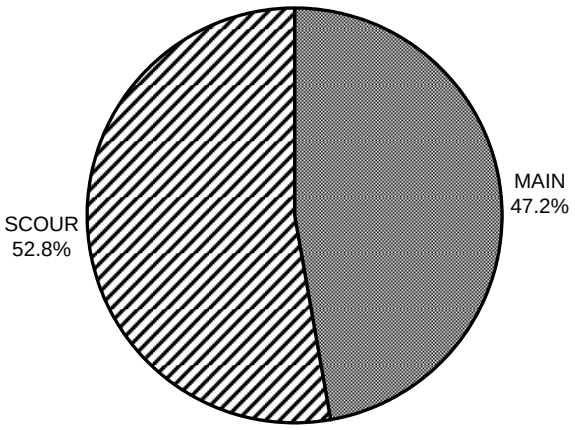
GRAPH 2

SAN VICENTE CREEK 2010
HABITAT TYPES BY PERCENT OCCURRENCE

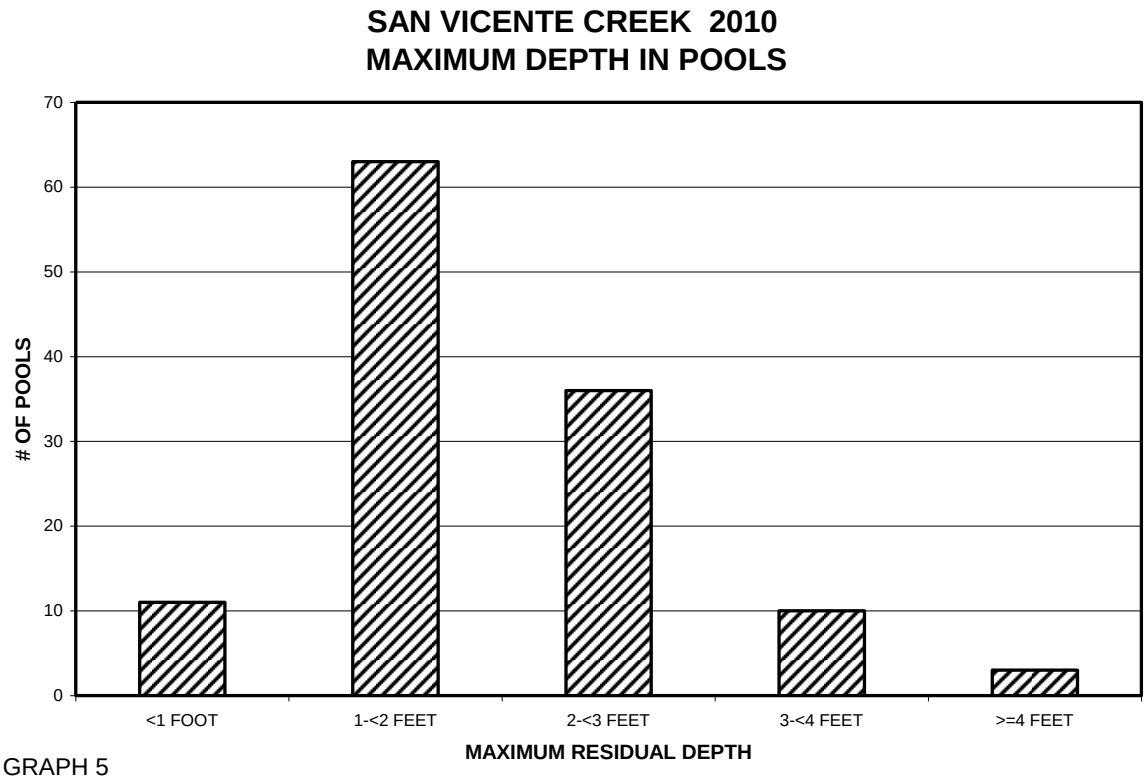


GRAPH 3

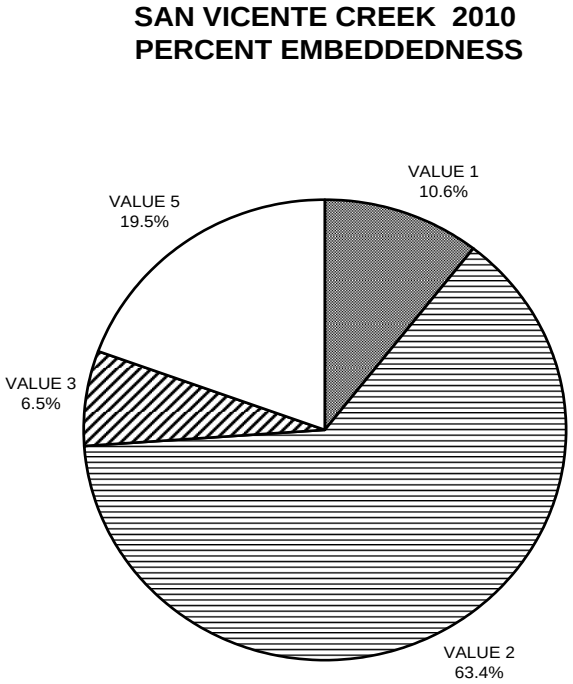
SAN VICENTE CREEK 2010
POOL TYPES BY PERCENT OCCURRENCE



GRAPH 4

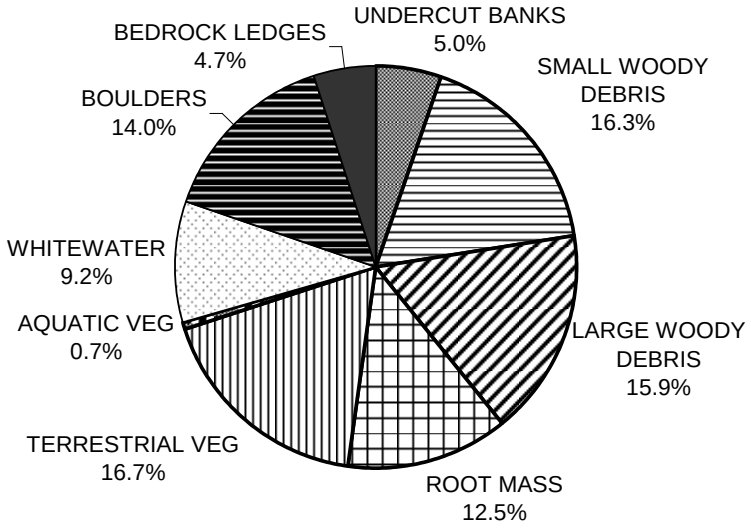


GRAPH 5



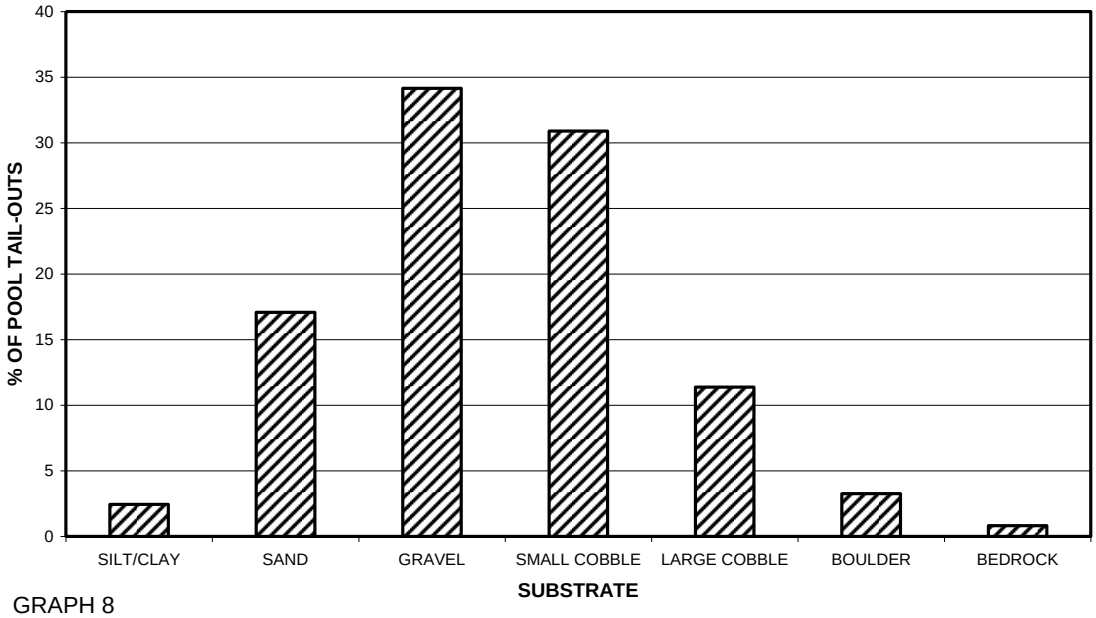
GRAPH 6

SAN VICENTE CREEK 2010
MEAN PERCENT COVER TYPES IN POOLS



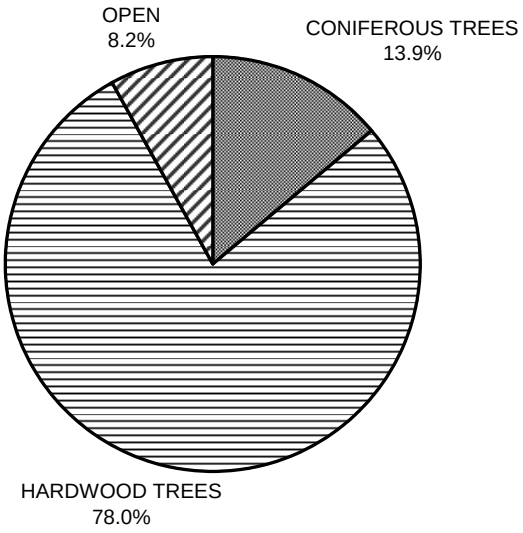
GRAPH 7

SAN VICENTE CREEK 2010
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



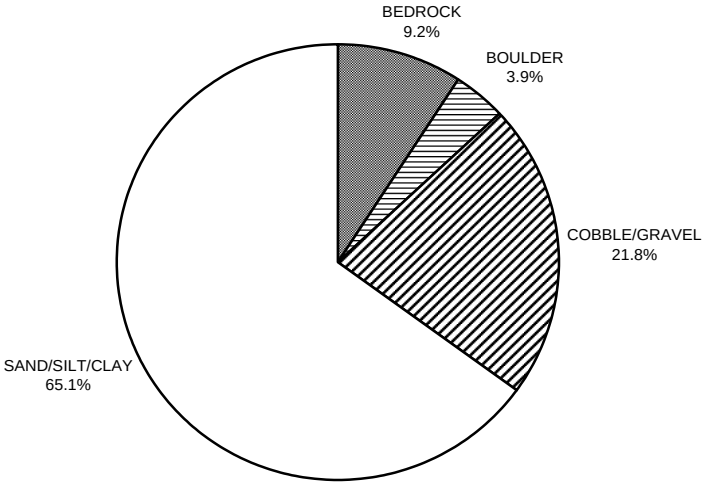
GRAPH 8

SAN VICENTE CREEK 2010
MEAN PERCENT CANOPY



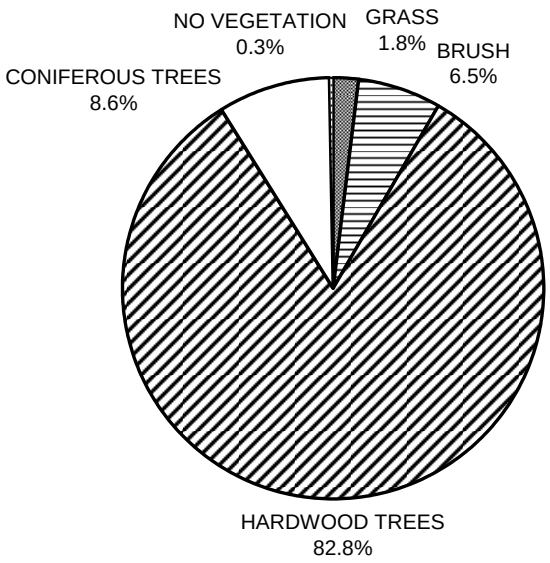
GRAPH 9

SAN VICENTE CREEK 2010
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

SAN VICENTE CREEK 2010
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11