

STREAM INVENTORY REPORT

Rancheria Creek

INTRODUCTION

A stream inventory was conducted from October 12 to October 19, 2010 on Rancheria Creek. The survey began at the confluence with Anderson Creek and extended upstream 10.5 miles.

The Rancheria 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 Rancheria 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

Rancheria Creek is a tributary to Navarro River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Rancheria Creek's legal description at the confluence with Anderson Creek is T14N R14W S19. Its location is 39.0535 north latitude and 123.4409 west longitude, LLID number 1234399390537. Rancheria Creek is a third order stream and has approximately 31.8 miles of blue line stream according to the USGS Philo 7.5 minute quadrangle. Rancheria Creek drains a watershed of approximately 91.2 square miles. Elevations range from about 170 feet at the mouth of the creek to 1,500 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is privately owned and is managed for timber production. Vehicle access exists via Highway 128 to Mountain View Road near Philo.

METHODS

The habitat inventory conducted in Rancheria 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 Game (DFG). 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 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 are measured for all the

Rancheria Creek

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 Rancheria 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.

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". Rancheria 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 Rancheria Creek, embeddedness

Rancheria Creek

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 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 Rancheria 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 densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Rancheria 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 Rancheria 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.

Rancheria Creek

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 Rancheria Creek. In addition, underwater observations were made at 12 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are 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 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

Rancheria Creek

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Rancheria 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 October 12 to October 19, 2010, was conducted by B. Williams, B. Leonard, M. Groff, and A. Glasgow (WSP). The total length of the stream surveyed was 55,417 feet. A section of Rancheria Creek from 25,704 feet to 38,972 feet was not surveyed due to lack of access. The data included in this report is for the 42,149 feet actually surveyed.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 1.39 cfs on October 18, 2010.

Rancheria Creek is an F4 channel type for 25,704 feet of the stream surveyed (Reach 1), an undetermined channel type for 13,268 feet of the stream not surveyed (Reach 2), and an F4 channel type for 16,445 feet of the stream surveyed (Reach 3). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and boulder-dominant substrates.

Water temperatures taken during the survey period ranged from 53 to 60 degrees Fahrenheit. Air temperatures ranged from 49 to 79 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 43% pool units, 36% flatwater units, and 20% riffle units (Graph 1). Based on total length of Level II habitat types there were 50% pool units, 41% flatwater units, and 8% riffle units (Graph 2).

Ten Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 37%; low gradient riffle units, 19%; run units, 18%; and step run units, 18% (Graph 3). Based on percent total length, mid-channel pool units made up 45%, step run units 27%, and run units 15%.

Rancheria Creek

A total of 109 pools were identified (Table 3). Main channel pools were the most frequently encountered at 86% (Graph 4), and comprised 91% 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. Sixty-six of the 109 pools (61%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 109 pool tail-outs measured, 24 had a value of 1 (22%); 56 had a value of 2 (51.4%); 26 had a value of 3 (23.9%); 3 had a value of 5 (2.8%) (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 6, flatwater habitat types had a mean shelter rating of 6, and pool habitats had a mean shelter rating of 13 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 13. Scour pools had a mean shelter rating of 11 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Rancheria Creek. Graph 7 describes the pool cover in Rancheria Creek. Boulders are the dominant pool cover type followed by bedrock ledges.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 69% of the pool tail-outs. Boulders were the next most frequently observed dominant substrate type and occurred in 10% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Rancheria Creek was 47%. Fifty-three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 61% and 39%, respectively. Graph 9 describes the mean percent canopy in Rancheria Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 98%. The mean percent left bank vegetated was 98%. The dominant elements composing the structure of the stream banks consisted of 36% bedrock, 30% cobble/gravel, 28% boulder, 7% sand/silt/clay (Graph 10). Deciduous trees were the dominant vegetation type observed in 89% of the units surveyed. Additionally, 8% of the units surveyed had coniferous trees as the dominant vegetation type, and 3% had grass as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 12 sites for species composition and distribution in Rancheria Creek on October 12, 2010. Water temperatures taken during the snorkel survey

Rancheria Creek

ranged from 58 to 64 degrees Fahrenheit. The sites were sampled by I. Mikus (DFG), and M. Groff (WSP).

In reach 1, which comprised the first 25,704 feet of stream, 6 sites were sampled. The reach sites yielded 8 young-of-the-year steelhead/rainbow trout (SH/RT), 10 age 1+ SH/RT, 6 age 2+ SH/RT, and 1,180 California roach.

In reach 3, 6 sites were sampled starting approximately 45,138 from the confluence with Navarro River and continuing upstream 2,194 feet. The reach sites yielded 47 young-of-the-year SH/RT, 50 age 1+ SH/RT, 13 age 2+ SH/RT, and 1,600 California roach.

The following chart displays the information yielded from these sites:

2010 Rancheria Creek underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
Reach 1: F4 Channel Type									
10/12/10	1	081	Pool	10,911	0	0	0	0	0
	2	083	Run	11,145	0	0	0	0	0
	3	087	Pool	11,633	0	0	0	0	0
	4	090	Pool	12,134	8	3	1	0	0
	5	095	Pool	13,107	0	5	1	0	0
	6	098	Run	13,342	0	2	3	0	0
Reach 3: F4 Channel Type									
10/12/10	7	187	Pool	45,378	0	6	1	0	0
	8	189	Pool	45,595	2	12	3	0	0
	9	191	Pool	45,829	26	10	6	0	0
	10	198	Pool	46,468	12	8	1	0	0
	11	201	Pool	46,884	1	5	0	0	0
	12	204	Pool	47,332	6	9	2	0	0

DISCUSSION

Rancheria Creek is an F4 channel type for the first 25,704 feet of stream surveyed, an undetermined channel type for the next 13,268 feet of the stream, and an F4 channel type for the remaining 16,445 feet of the stream surveyed. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

Rancheria Creek

The water temperatures recorded on the survey days October 12 to October 19, 2010, ranged from 53 to 60 degrees. Air temperatures ranged from 49 to 79 degrees Fahrenheit. This is a suitable water temperature range for salmonids. To make any 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 41% of the total length of this survey, riffles 8%, and pools 50%. Sixty-six of the 109 (61%) pools had a maximum residual depth greater than 3 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth 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.

Eighty of the 109 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty-six of the pool tail-outs had embeddedness ratings of 3 or 4. Three 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 Rancheria Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Eighty-four of the 109 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools is 13. The shelter rating in the flatwater habitats is 6. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Rancheria Creek. Boulders are the dominant cover type in pools followed by bedrock ledges. 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 47%. Reach 1 had a canopy density of 42%, Reach 3 had a canopy density of 51%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 98% and 98%, 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.

RECOMMENDATIONS

- 1) Rancheria Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and

Rancheria Creek

meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

- 3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from boulders. Adding high quality complexity with woody cover in the pools is desirable.
- 4) Increase the canopy on Rancheria Creek by planting appropriate native vegetation like willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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 (ft):	Habitat unit #:	Comments:
0	0001.00	Start of survey at the confluence with Navarro River. The channel is an F4.
6311	0048.00	Left bank seep.
6584	0050.00	Ham Canyon (Tributary #01) enters on the right bank. For more information see the 2010 Ham Canyon Stream Habitat Inventory Report.
8542	0066.00	Right bank seep.
8801	0068.00	Right bank seep. A landslide on the right bank measures 300' high x 350' long and is contributing fine sediment to the channel.
12344	0092.00	Tributary #02 enters on the right bank. It contributes to approximately 2% of Rancheria Creek's flow. The water temperature downstream and upstream of the tributary is 59 degrees Fahrenheit; the water temperature of the tributary is 55 degrees Fahrenheit. The slope of the tributary is approximately 20%. The tributary is not accessible to salmonids due to the high gradient and an 8' high bedrock waterfall 70' upstream from the mouth.
13312	0098.00	Right bank seep.

Rancheria Creek

16230	0111.00	Tributary #03 enters on the right bank. It contributes approximately 1% to Rancheria Creek's flow. The water temperature downstream of the tributary is 53 degrees Fahrenheit, the water temperature of the tributary is 53 degrees Fahrenheit, and the water temperature upstream of the confluence is 54 degrees Fahrenheit. The slope of the tributary is approximately 35%. The tributary is not accessible to fish due to its high gradient.
17382	0119.00	Left bank erosion is 100' high x 100' long. The area has been revegetated by grass.
20021	0137.00	Right bank seep.
22183	0148.00	Right bank seep.
23589	0150.00	A landslide on the right bank is 250' high x 150' long, contributing fine sediment to the channel.
25704	0158.00	Begin Reach 2. Reach 2 is unsurveyed due to lack of landowner permission. Reach 2 extends 13,268 feet upstream.
38972	0159.00	Begin Reach 3. The channel type is F4.
44423	0186.00	Tributary #04 enters on the left bank. It contributes to approximately 1% of Rancheria Creek's flow. The water temperature downstream of the tributary is 58 degrees Fahrenheit, the water temperature of the tributary is 54 degrees Fahrenheit, and the water temperature upstream of the tributary is 57 degrees Fahrenheit. The slope of the tributary is approximately 35%. The tributary is not accessible to salmonids due to its high gradient.
47700	0208.00	Horse Creek (Tributary #05) enters on the left bank. It contributes to approximately 5% of Rancheria Creek's flow. The water temperature downstream of the tributary is 57 degrees Fahrenheit, the water temperature of the tributary is 55 degrees Fahrenheit, and the water temperature upstream of the tributary is 60 degrees Fahrenheit. For more information, see the 2010 Horse Creek Stream Habitat Inventory Report.
48097	0209.00	Tributary #06 enters on the right bank. It contributes to approximately 1% of Rancheria Creek's flow. The water temperature downstream and upstream of the tributary is 60 degrees Fahrenheit; the water temperature of the tributary is 56 degrees Fahrenheit. The slope of the tributary is approximately 150%. The tributary is not accessible to salmonids due to its high gradient.

Rancheria Creek

- 53230 0237.00 Beartrap Creek (Tributary #07) enters on the left bank. It contributes to approximately 1% of Rancheria Creek's flow. The water temperature downstream of the tributary is 59 degrees Fahrenheit, the water temperature of the tributary is 54 degrees Fahrenheit, and the water temperature upstream of the tributary is 60 degrees Fahrenheit. For more information, see the 2010 Beartrap Creek Stream Habitat Inventory Report.
- 55417 0251.00 End of survey due to end of access.

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.

Rancheria Creek

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]	

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

Stream Name: Rancheria Creek

LLID: 1234399390537 Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

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
90	10	FLATWATER	35.9	196	17604	41.8	28.4	0.9	2.1	6010	540932	5285	475681		6
1	0	NO SURVEY		13268	13268										
109	109	POOL	43.4	195	21212	50.3	31.7	1.9	4.1	6054	659915	15637	1704397	12750	13
51	9	RIFFLE	20.3	65	3333	7.9	25.2	0.5	1.0	1313	66950	711	36246		6
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
251	128				55417					1267796			2216324		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	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 (%)
48	7	LGR	19.1	65	3123	7.4	22	0.4	1.4	1228	58920	563	27026		6	52
3	2	HGR	1.2	70	210	0.5	37	0.8	1.3	1611	4833	1228	3683		8	28
45	3	RUN	17.9	142	6408	15.2	35	0.9	3.1	5855	263492	5762	259291		3	43
45	7	SRN	17.9	249	11196	26.6	26	0.9	2.6	6077	273454	5081	228647		7	45
1	1	TRP	0.4	305	305	0.7	30	2.1	7.7	8693	8693	25208	25208	18254	20	73
93	93	MCP	37.1	204	18971	45.0	32	1.9	11.1	6442	599073	17043	1584980	13864	13	45
2	2	CRP	0.8	116	232	0.6	24	0.9	2.4	2929	5857	2684	5369	1479	8	74
2	2	LSR	0.8	120	241	0.6	34	1.1	3.2	3736	7473	5158	10316	4037	10	50
4	4	LSBk	1.6	116	466	1.1	22	1.9	5.4	2376	9506	4674	18697	3623	11	37
7	7	LSBo	2.8	142	997	2.4	33	1.4	6.8	4188	29314	8547	59827	7311	11	54
1	0	NS		13268	13268											

Total Units
251

Total Units Fully Measured
128

Total Length (ft.)
55417

Total Area (sq.ft.)
1260615

Total Volume (cu.ft.)
2223044

Table 3 - Summary of Pool Types

Stream Name: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

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
94	94	MAIN	86	205	19276	91	32.1	1.9	6466	607766	13911	1307606	13
15	15	SCOUR	14	129	1936	9	28.7	1.4	3477	52149	4956	69391	11

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
109	109	21212	659915	1376996

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

Stream Name: Rancheria Creek LLID: 1234399390537 Drainage: Navarro River
 Survey Dates: 10/12/2010 to 10/19/2010
 Confluence Location: Quad: PHILO Legal Description: T14NR14WS19 Latitude: 39:03:13.0N Longitude: 123:26:24.0W

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 Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
1	TRP	1	0	0	0	0	0	0	0	0	1	100
93	MCP	85	0	0	6	6	27	29	19	20	41	44
2	CRP	2	0	0	1	50	1	50	0	0	0	0
2	LSR	2	0	0	0	0	1	50	1	50	0	0
4	LSBk	4	0	0	0	0	2	50	1	25	1	25
7	LSBo	6	0	0	1	14	4	57	1	14	1	14

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Foot Max Resid. Depth	Total 1< 2 Foot % Occurrence	Total 2< 3 Foot Max Resid. Depth	Total 2< 3 Foot % Occurrence	Total 3< 4 Foot Max Resid. Depth	Total 3< 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
109	0	0	8	7	35	32	22	20	44	40

Mean Maximum Residual Pool Depth (ft.): 4.1

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Dry Units: 0

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

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
48	7	LGR	0	0	0	0	3	0	0	60	37
3	2	HGR	0	0	0	0	10	0	10	80	0
51	9	TOTAL RIFFLE	0	0	0	0	6	0	4	68	22
45	3	RUN	0	2	0	0	0	0	0	85	12
45	7	SRN	1	0	0	0	0	0	0	66	32
90	10	TOTAL FLAT	1	1	0	0	0	0	0	73	26
1	1	TRP	0	0	0	0	0	0	0	60	40
93	93	MCP	0	2	5	2	3	0	0	60	27
2	2	CRP	0	0	0	30	0	0	0	70	0
2	2	LSR	0	0	80	0	0	0	0	20	0
4	4	LSBk	0	5	0	0	0	0	5	20	70
7	7	LSBo	0	3	2	0	1	0	0	94	0
109	109	TOTAL POOL	0	2	6	3	3	0	0	60	25
1	0	NS									
251	128	TOTAL	0	2	5	2	3	0	1	61	25

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Rancheria Creek LLID: 1234399390537 Drainage: Navarro River
 Survey Dates: 10/12/2010 to 10/19/2010 Dry Units: 0
 Confluence Location: Quad: PHILO Legal Description: T14NR14WS19 Latitude: 39:03:13.0N Longitude: 123:26:24.0W

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
48	7	LGR	0	0	14	43	43	0	0
3	2	HGR	0	0	0	50	0	0	50
45	3	RUN	0	0	67	33	0	0	0
45	7	SRN	0	0	71	0	14	0	14
1	1	TRP	0	0	0	0	0	100	0
93	93	MCP	0	0	83	3	1	11	2
2	2	CRP	0	0	100	0	0	0	0
2	2	LSR	0	0	50	50	0	0	0
4	4	LSBk	0	0	25	50	0	25	0
7	7	LSBo	0	0	86	14	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
47	39	61	2	98	98

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 Name: Rancheria Creek LLID: 1234399390537 Drainage: Navarro River
 Survey Dates: 10/12/2010 to 10/19/2010 Survey Length (ft.): 55417 Main Channel (ft.): 55417 Side Channel (ft.): 0
 Confluence Location: Quad: PHILO Legal Description: T14NR14WS19 Latitude: 39:03:13.0N Longitude: 123:26:24.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4	Canopy Density (%): 42.4	Pools by Stream Length (%): 45.4
Reach Length (ft.): 25704	Coniferous Component (%): 41.6	Pool Frequency (%): 39.5
Riffle/Flatwater Mean Width (ft.): 27.0	Hardwood Component (%): 58.4	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 2
Range (ft.): 25 to 78	Vegetative Cover (%): 97.0	2 to 2.9 Feet Deep: 18
Mean (ft.): 58	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 21
Std. Dev.: 13	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 60
Base Flow (cfs.): 1.4	Occurrence of LWD (%): 2	Mean Max Residual Pool Depth (ft.): 4.9
Water (F): 53 - 60 Air (F): 52 - 79	LWD per 100 ft.:	Mean Pool Shelter Rating: 16
Dry Channel (ft): 0	Riffles: 0	
	Pools: 0	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 68 Sm Cobble: 8 Lg Cobble: 3 Boulder: 10 Bedrock: 11		
Embeddedness Values (%): 1. 33.9 2. 41.9 3. 19.4 4. 0.0 5. 4.8		

STREAM REACH: 2

Channel Type: NA	Canopy Density (%):	Pools by Stream Length (%): 0.0
Reach Length (ft.): 13268	Coniferous Component (%):	Pool Frequency (%): 0.0
Riffle/Flatwater Mean Width (ft.):	Hardwood Component (%):	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation:	< 2 Feet Deep:
Range (ft.): 51 to 51	Vegetative Cover (%): 0.0	2 to 2.9 Feet Deep:
Mean (ft.): 51	Dominant Shelter:	3 to 3.9 Feet Deep:
Std. Dev.: 0	Dominant Bank Substrate Type:	>= 4 Feet Deep:
Base Flow (cfs.): 1.4	Occurrence of LWD (%):	Mean Max Residual Pool Depth (ft.):
Water (F): 57 - 57 Air (F): 72 - 72	LWD per 100 ft.:	Mean Pool Shelter Rating:
Dry Channel (ft): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: Sand: Gravel: Sm Cobble: Lg Cobble: Boulder: Bedrock:		
Embeddedness Values (%): 1. 2. 3. 4. 5. 0.0		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: F4	Canopy Density (%): 51.9	Pools by Stream Length (%): 58.0
Reach Length (ft.): 16445	Coniferous Component (%): 35.2	Pool Frequency (%): 50.5
Riffle/Flatwater Mean Width (ft.): 26.8	Hardwood Component (%): 64.8	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 15
Range (ft.): 48 to 76	Vegetative Cover (%): 99.5	2 to 2.9 Feet Deep: 51
Mean (ft.): 61	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 19
Std. Dev.: 8	Dominant Bank Substrate Type: Cobble/Gravel	>= 4 Feet Deep: 15
Base Flow (cfs.): 1.4	Occurrence of LWD (%): 8	Mean Max Residual Pool Depth (ft.): 3.0
Water (F): 53 - 60 Air (F): 49 - 68	LWD per 100 ft.:	Mean Pool Shelter Rating: 8
Dry Channel (ft): 0	Riffles: 0	
	Pools: 0	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 70 Sm Cobble: 9 Lg Cobble: 11 Boulder: 11 Bedrock: 0		
Embeddedness Values (%): 1. 6.4 2. 63.8 3. 29.8 4. 0.0 5. 0.0		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

Legal Description: T14NR14WS19

Latitude: 39:03:13.0N

Longitude: 123:26:24.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	46	46	35.9
Boulder	34	37	27.7
Cobble / Gravel	40	36	29.7
Sand / Silt / Clay	8	9	6.6

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	2	6	3.1
Brush	0	0	0.0
Hardwood Trees	116	111	88.7
Coniferous Trees	10	11	8.2
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Rancheria Creek

LLID: 1234399390537

Drainage: Navarro River

Survey Dates: 10/12/2010 to 10/19/2010

Confluence Location: Quad: PHILO

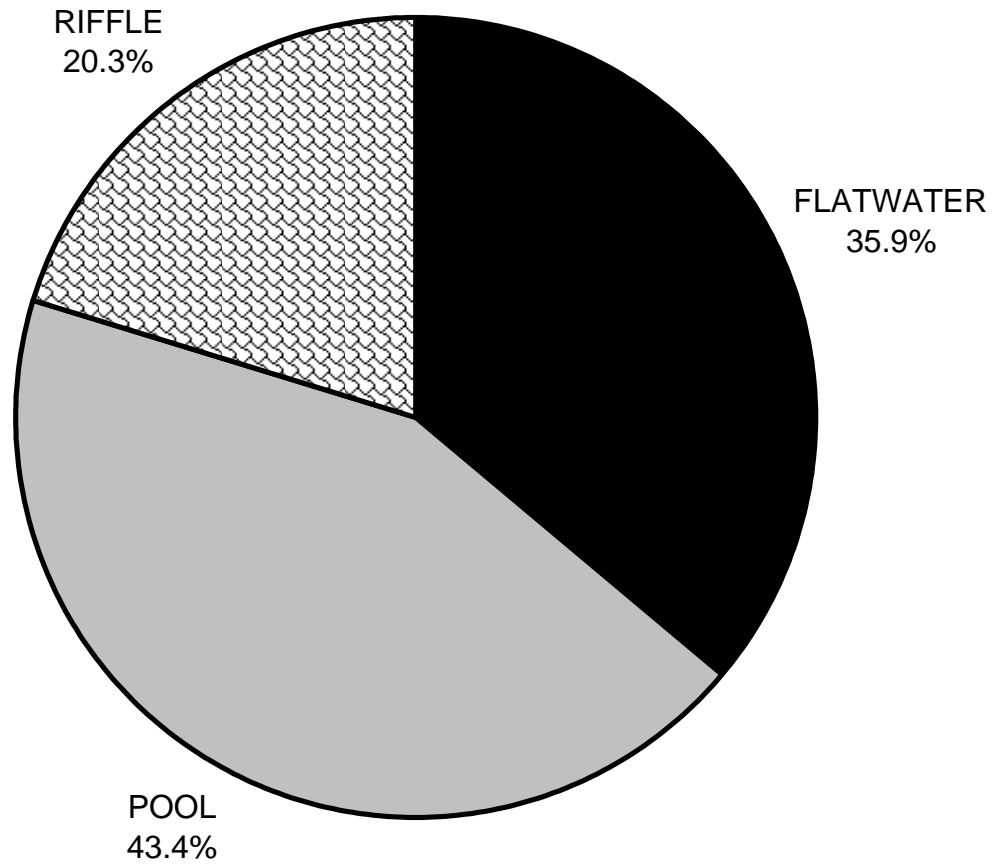
Legal Description: T14NR14WS19

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Longitude: 123:26:24.0W

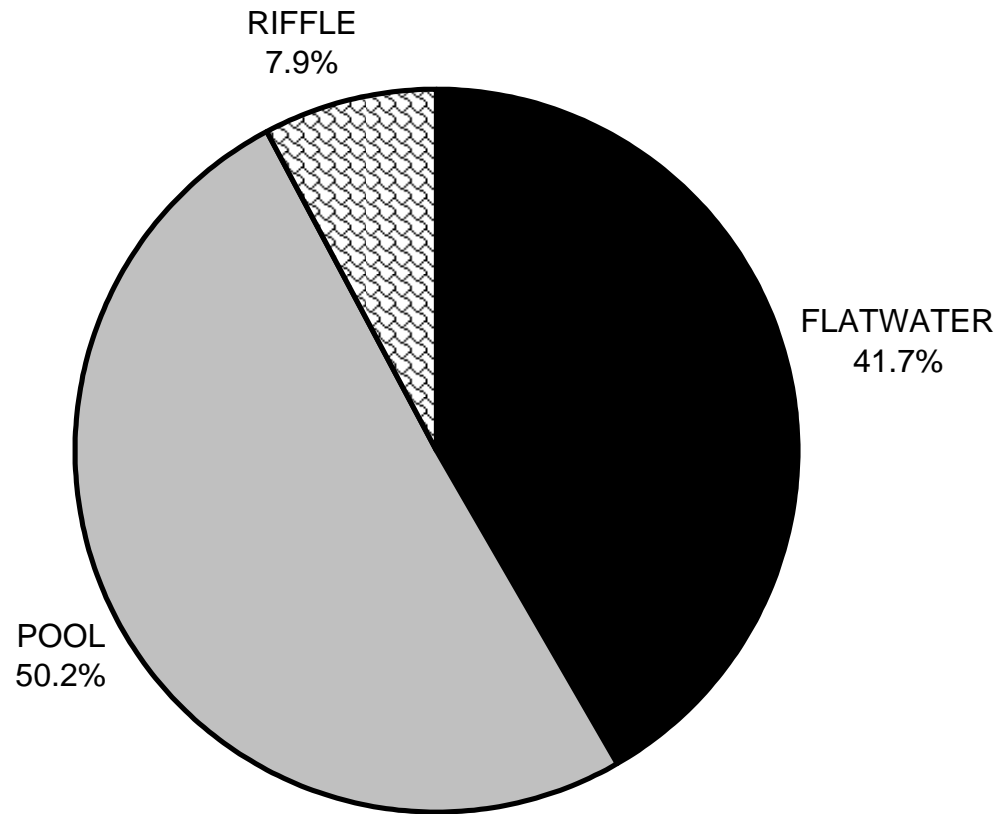
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	1	0
SMALL WOODY DEBRIS (%)	0	1	2
LARGE WOODY DEBRIS (%)	0	0	6
ROOT MASS (%)	0	0	3
TERRESTRIAL VEGETATION (%)	6	0	3
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	4	0	0
BOULDERS (%)	68	73	60
BEDROCK LEDGES (%)	22	26	25

RANCHERIA CREEK 2010 HABITAT TYPES BY PERCENT OCCURRENCE



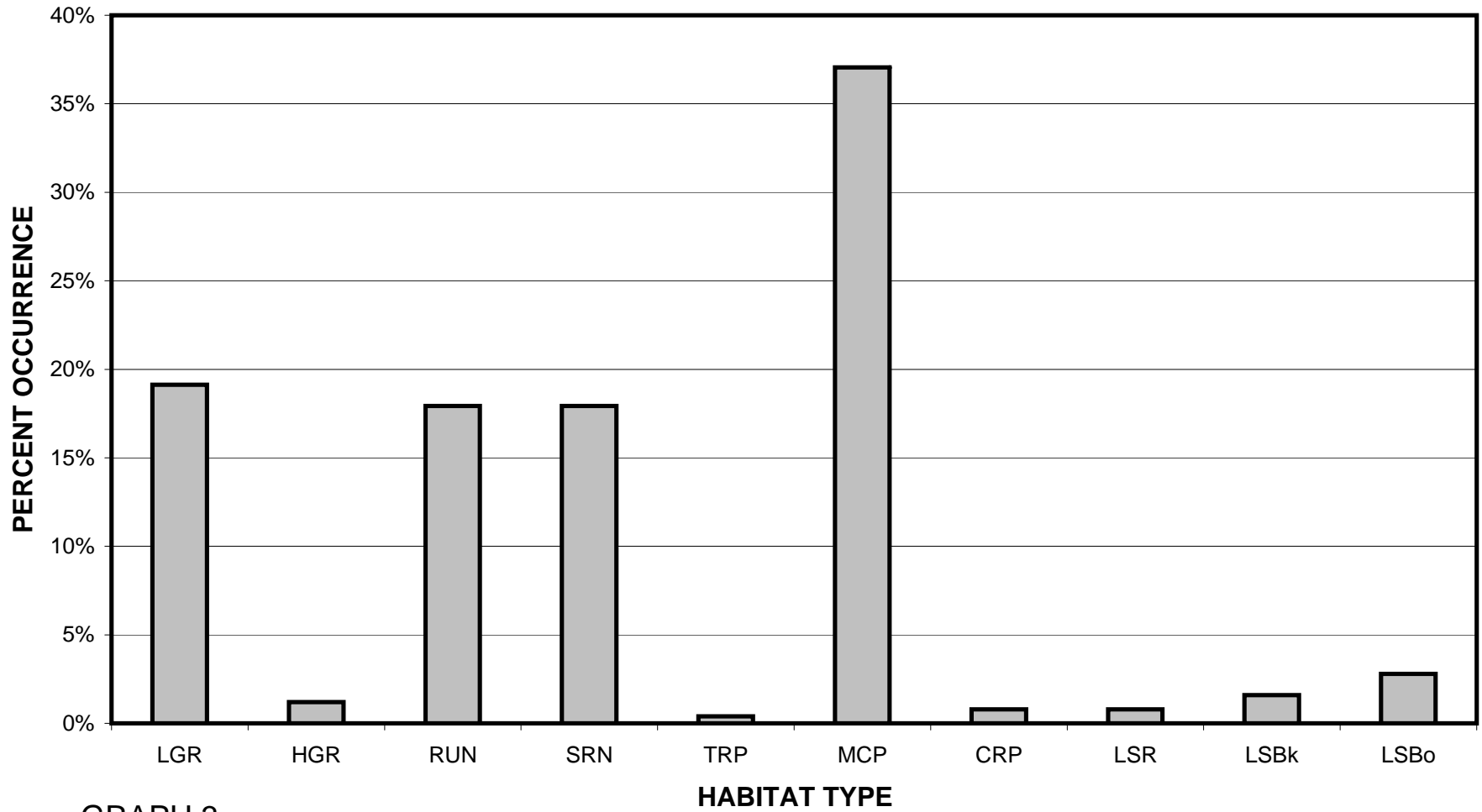
GRAPH 1

RANCHERIA CREEK 2010 HABITAT TYPES BY PERCENT TOTAL LENGTH



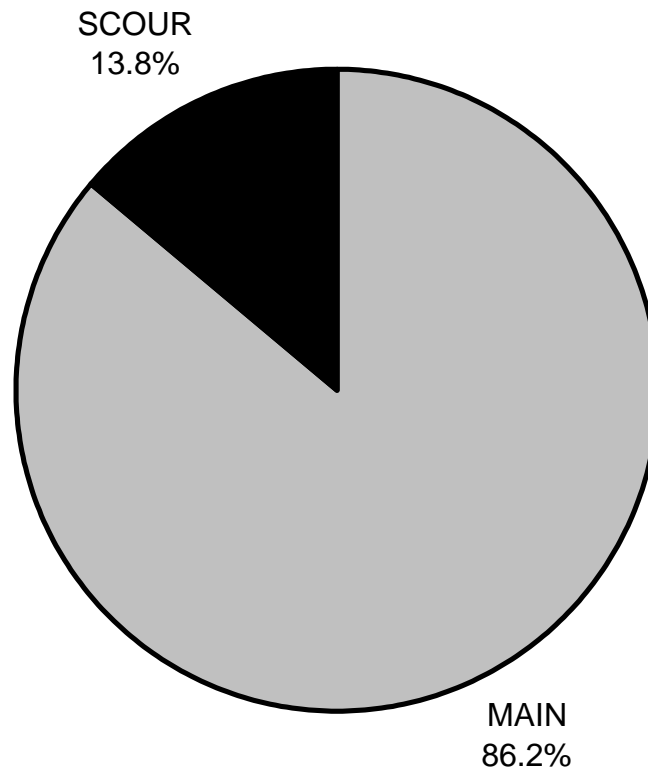
GRAPH 2

RANCHERIA CREEK 2010 HABITAT TYPES BY PERCENT OCCURRENCE



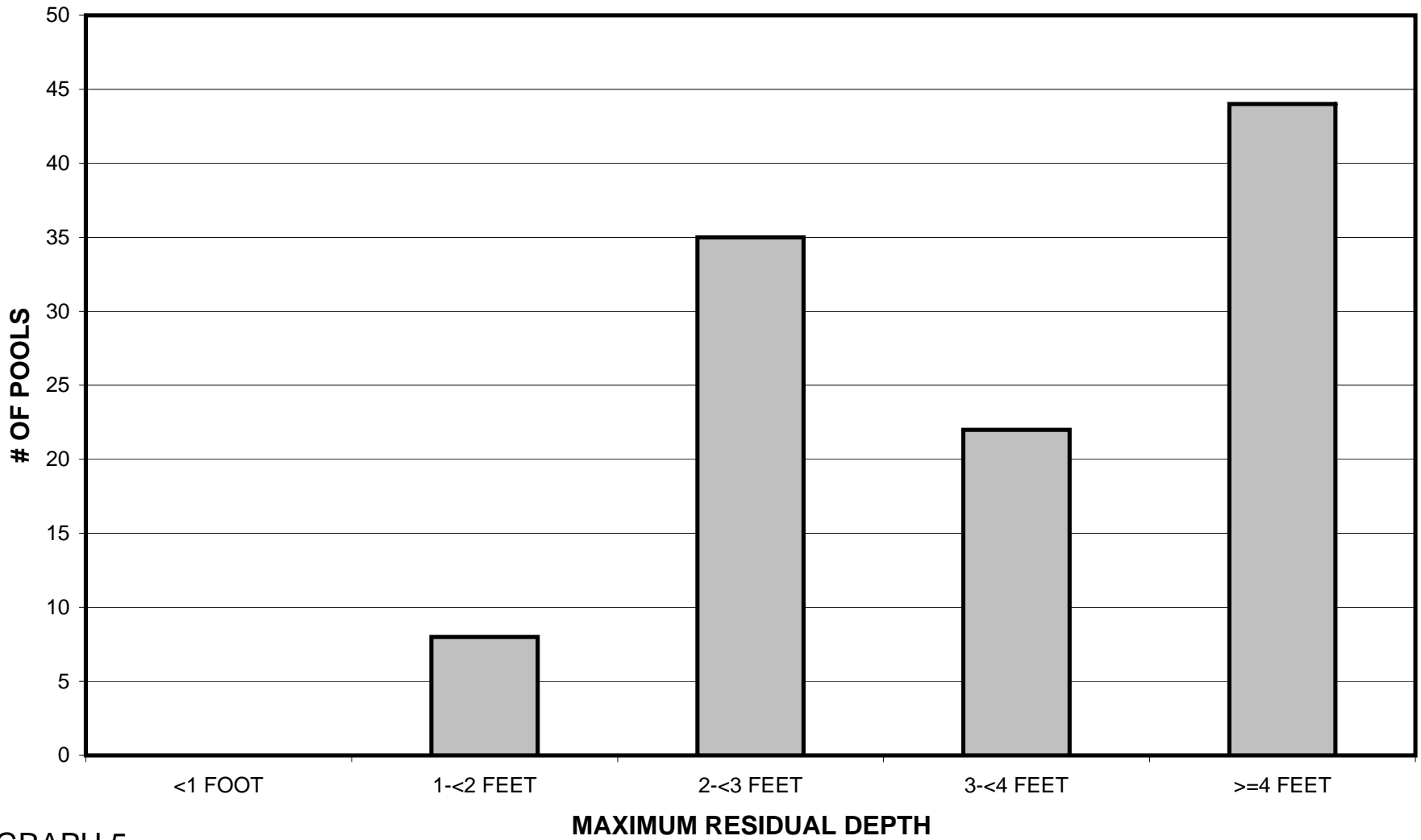
GRAPH 3

RANCHERIA CREEK 2010 POOL TYPES BY PERCENT OCCURRENCE



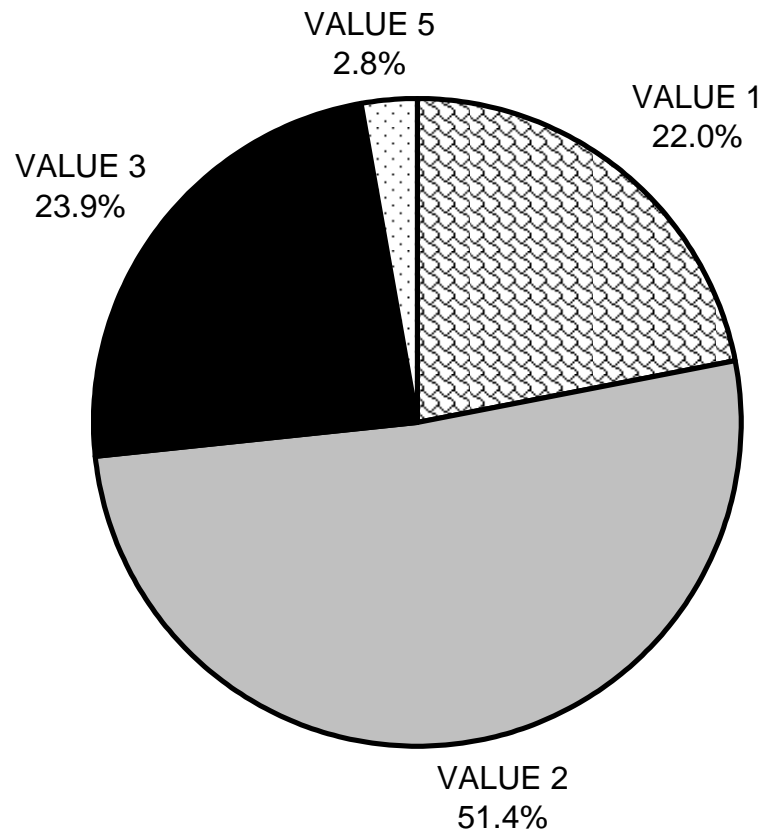
GRAPH 4

RANCHERIA CREEK 2010 MAXIMUM DEPTH IN POOLS



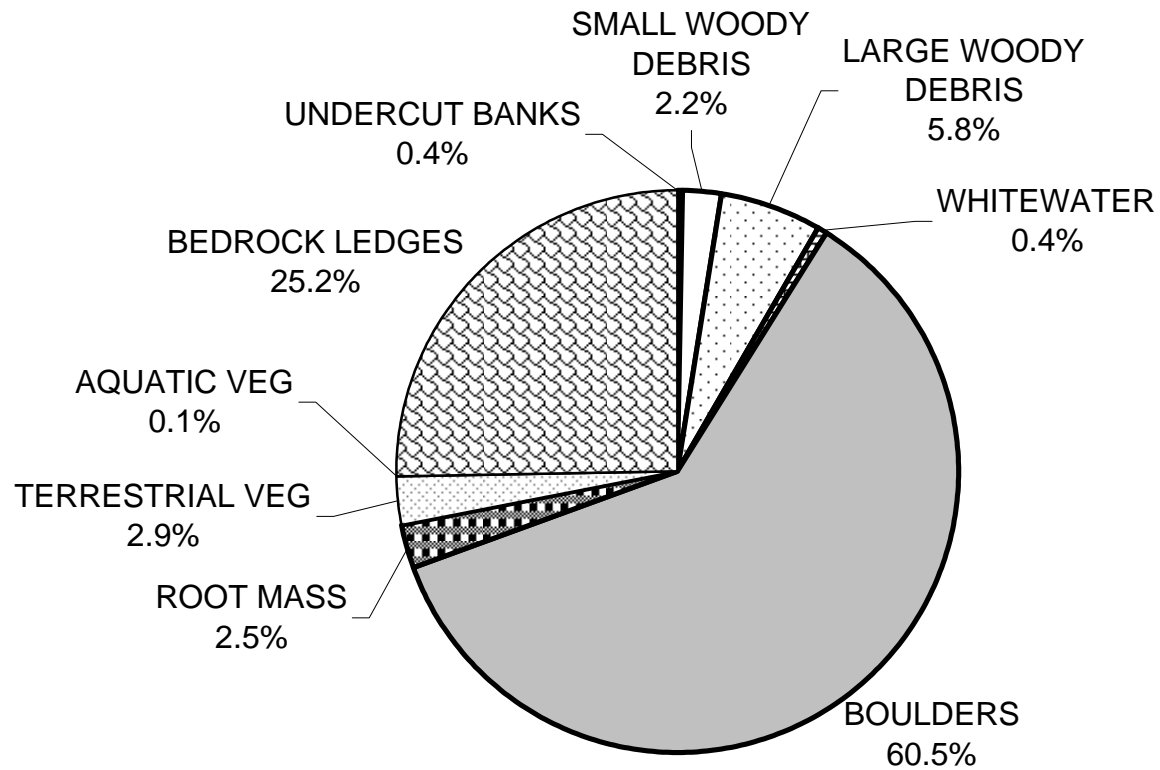
GRAPH 5

RANCHERIA CREEK 2010 PERCENT EMBEDDEDNESS



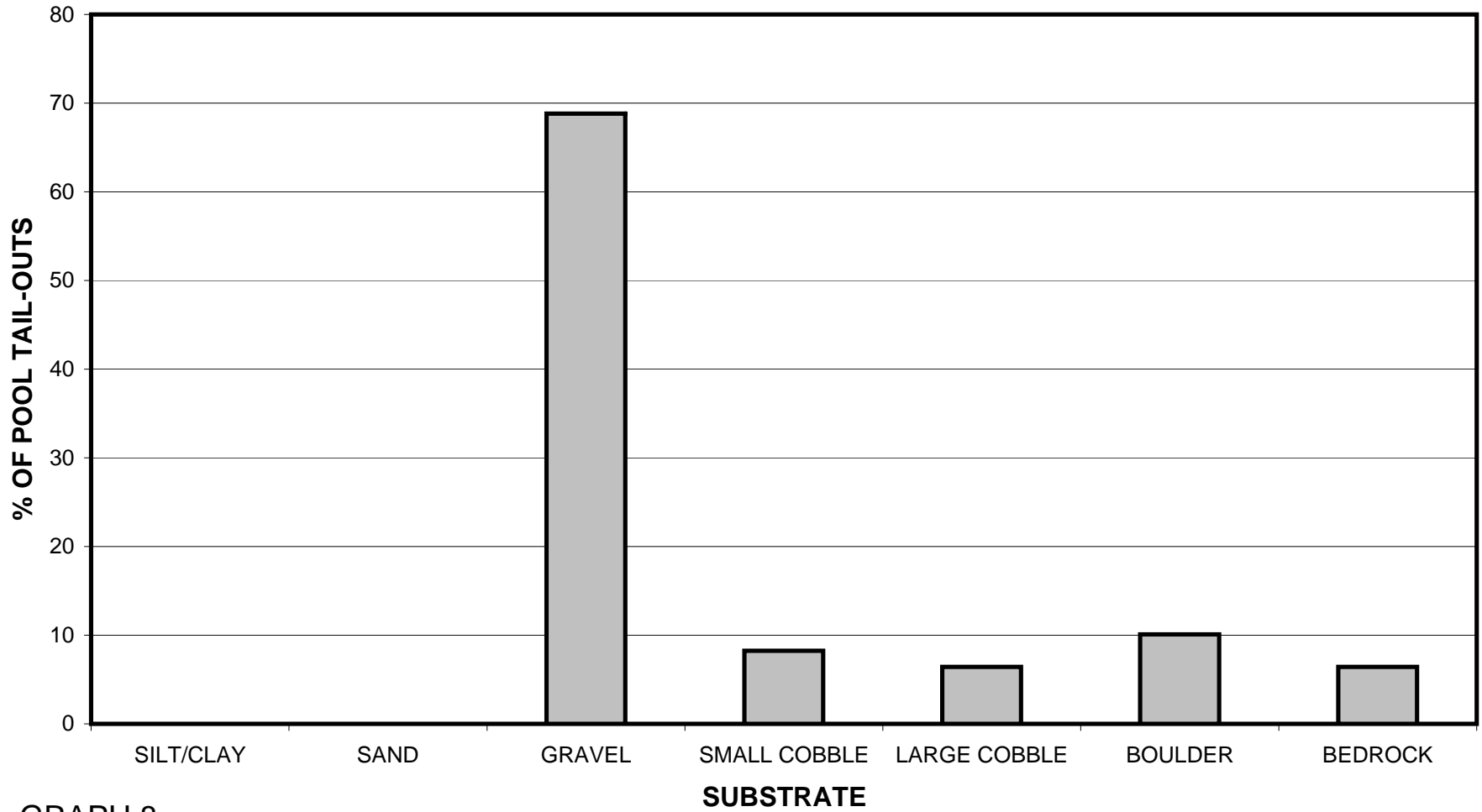
GRAPH 6

RANCHERIA CREEK 2010 MEAN PERCENT COVER TYPES IN POOLS



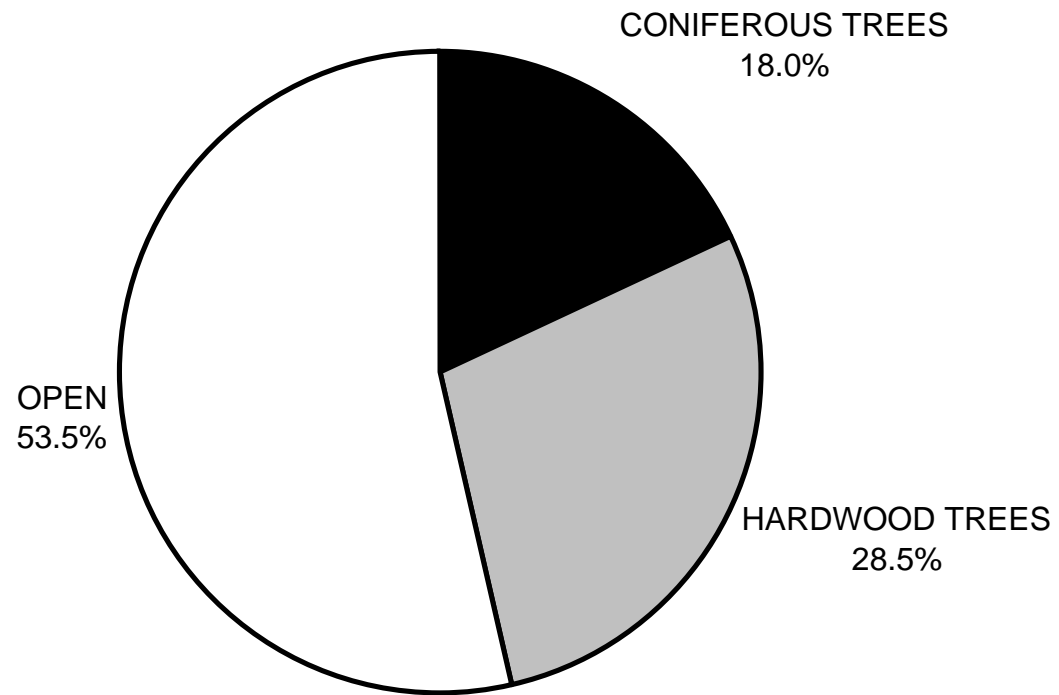
GRAPH 7

RANCHERIA CREEK 2010 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



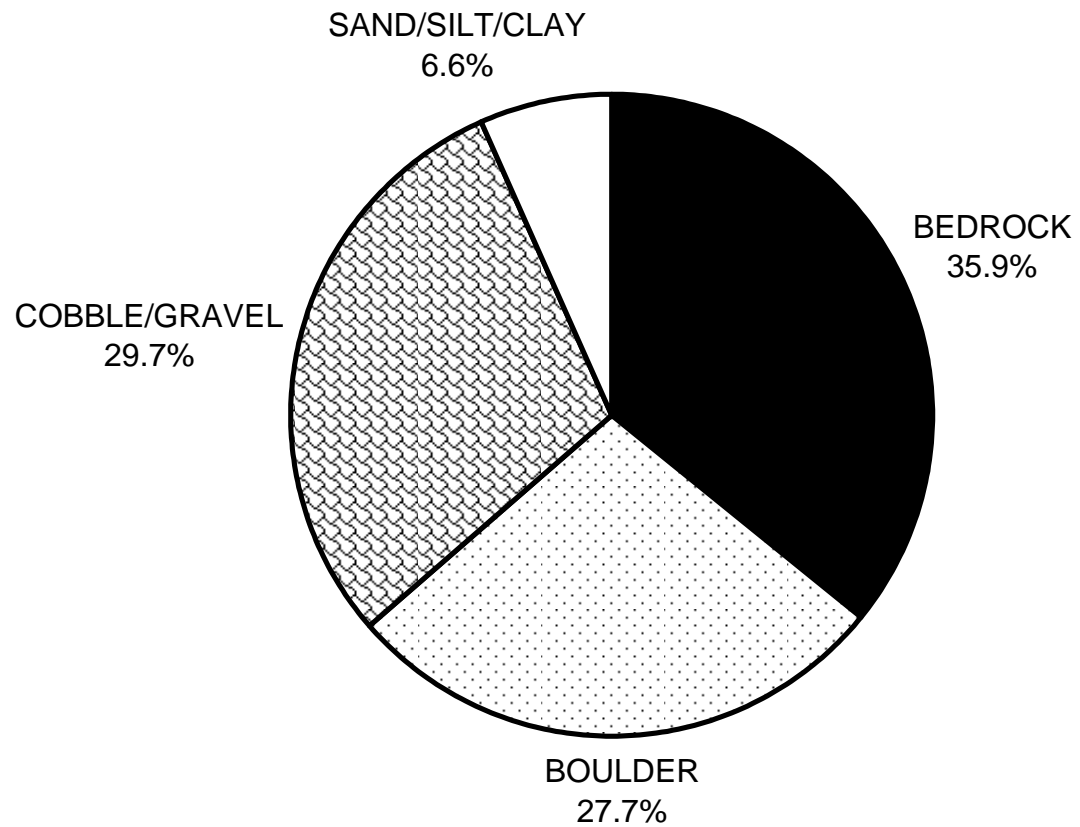
GRAPH 8

RANCHERIA CREEK 2010 MEAN PERCENT CANOPY



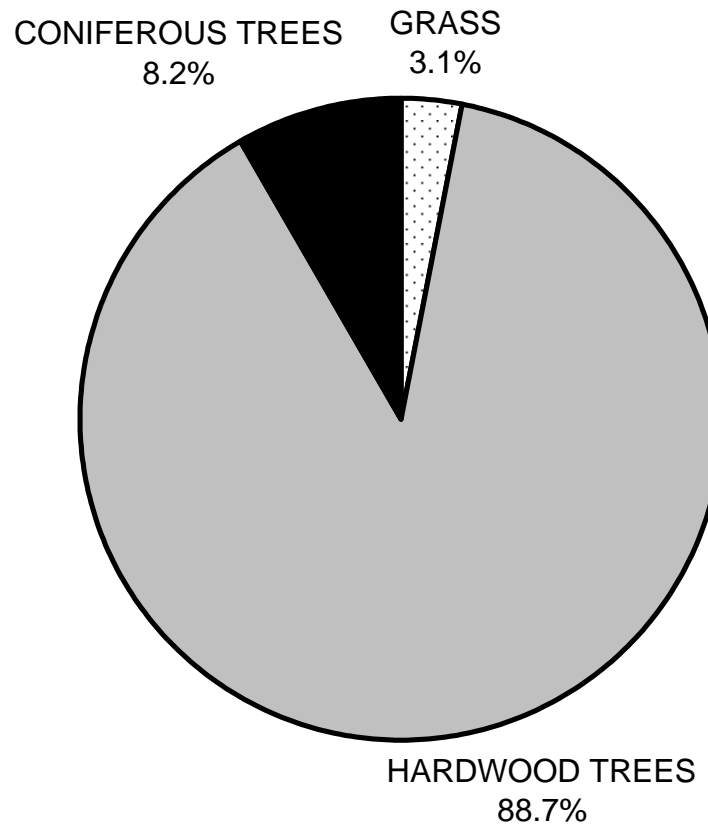
GRAPH 9

RANCHERIA CREEK 2010 DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

RANCHERIA CREEK 2010 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

