STREAM INVENTORY REPORT

Big Pepperwood Creek

INTRODUCTION

A stream inventory was conducted beginning July 30 and ending August 5, 2003 on Big Pepperwood Creek. The survey began at the confluence with South Fork Gualala River and extended upstream 3,963 feet. A stream inventory and subsection to this report was also completed for Little Pepperwood Creek, a tributary to Big Pepperwood Creek.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Big Pepperwood Creek.

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

Big Pepperwood Creek is a tributary to the South Fork Gualala River, a tributary to the Gualala River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Big Pepperwood Creek's legal description at the confluence with South Fork Gualala River is T11N R15W S36. Its location is 38°45′46″ north latitude and 123°28′40″ west longitude. Big Pepperwood Creek is an intermittent stream according to the USGS McGuire Ridge 7.5 minute quadrangle. Big Pepperwood Creek drains a watershed of approximately 4.29 square miles. Elevations range from about 5 feet at the mouth of the creek to 1,850 feet in the headwater areas. Mixed hardwood forest dominates the watershed. Vehicle access exists approximately 2.3 miles east of Gualala on Gualala Redwood, Inc. (GRI) logging roads. The stream mouth is accessed approximately 1.7 miles from the junction of River Road, North Fork Road, Little Red Rock Road, Mountain Road and GRI's main haul road. Before reaching Buckeye Creek, follow a dirt road to the east. A bridge crosses over Big Pepperwood Creek.

METHODS

The habitat inventory conducted in Big Pepperwood Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998). The Watershed Stewards Project/AmeriCorps (WSP/AmeriCorps) 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 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 Big Pepperwood Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at 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 (1985 rev. 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 (1988). 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". Big Pepperwood 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 Big Pepperwood 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 not suitable for spawning due to inappropriate substrate particle size, bedrock, or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide 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. 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 Big Pepperwood 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 Big Pepperwood 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 evergreen or deciduous 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 Big Pepperwood 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.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 1.0.37, 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:

- Summary of riffle, flatwater, and pool habitat types
- Summary of habitat types and measured parameters
- Summary of pool types
- Summary of maximum pool depths by pool habitat types
- Summary of shelter by habitat types
- Summary of dominant substrates by habitat types
- Summary of fish habitat elements by stream reach

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Big Pepperwood Creek include:

- Level II habitat types by % occurrence
- Level II habitat types by % total length
- Level IV habitat types by % occurrence
- Level I pool habitat types by % occurrence
- Maximum depth in pools
- Percent embeddedness estimated in pool tail-outs
- Mean percent cover types in pools
- Substrate composition in pool tail-outs
- Mean percent canopy
- Dominant bank composition in survey reach
- Dominant bank vegetation in survey reach

HABITAT INVENTORY RESULTS

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

The habitat inventory of July 30 to August 5, 2003, was conducted by S. Thompson and H. Kleeb (WSP/AmeriCorps). The total length of the stream surveyed was 3,963 feet.

Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.33 cfs on November 5, 2003.

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Big Pepperwood Creek is a B3 channel type for the entire 3,963 feet of the stream surveyed. B3 channels are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools; very stable plan and profile with stable banks and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 58° to 60° Fahrenheit. Air temperatures ranged from 61° to 68° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 44% riffle units, 30% flatwater units, and 26% pool units (Graph 1). Based on total length of Level II habitat types there were 40% riffle units, 36% flatwater units, and 24% pool units (Graph 2).

Seven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low-gradient riffles, 38%; runs, 26%; and mid-channel pools, 22% (Graph 3). Based on percent total length, low-gradient riffles made up 36%, runs 26%, and mid-channel pools 21%.

A total of 18 pools were identified (Table 3). Main-channel pools were the most frequently encountered, at 83%, and comprised 87% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Seventeen of the 18 measured pools (94%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 18 pool tail-outs measured, 0 had a value of 1 (0%); 4 had a value of 2 (22%); 13 had a value of 3 (72%); 1 had a value of 4 (6%); and 0 had a value of 5 (0%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate.

Riffle habitat types had a mean shelter rating of 5, flatwater habitat types had a mean shelter rating of 33, and pool habitats had a mean shelter rating of 84 (Table 1). Of the pool types, the main-channel pools had the highest mean shelter rating at 92. Scour pools had a mean shelter rating of 52 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Small woody debris is the dominant cover type in Big Pepperwood Creek. Graph 7 describes the pool cover in Big Pepperwood Creek. Large woody 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. Small cobble was the dominant substrate observed in 50% of pool tail-outs while gravel was the next most frequently observed substrate type, at 44%.

The mean percent canopy density for the surveyed length of Big Pepperwood Creek was 85%. The mean percentages of evergreen and deciduous trees were 22% and 63%, respectively with 15% of the canopy open. Graph 9 describes the mean percent canopy in Big Pepperwood Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 44%. The mean percent left bank vegetated was 49%. The dominant elements composing the structure of the stream banks consisted of 2% bedrock, 2% boulder, 18% cobble/gravel, and 78% sand/silt/clay (Graph 10). Deciduous trees were the dominant vegetation type observed in 32% of the units surveyed. Additionally, 30% of the units surveyed had brush as the dominant vegetation type, and 26% had coniferous trees as the dominant vegetation (Graph 11).

DISCUSSION

Big Pepperwood Creek is a B3 channel type for the entire 3,963 feet of stream surveyed. The suitability of B3 channel types for fish habitat improvement structures is as follows: excellent for plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover.

The water temperatures recorded during the survey period ranged from 58° to 60° Fahrenheit. Air temperatures ranged from 61° to 68° Fahrenheit. Recorded water temperatures below 60° Fahrenheit were within the suitable range 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.

Riffle habitat types comprised 40% of the total length of this survey, flatwater 36%, and pools 24%. The pools are relatively deep, with 17 of the 18 (94%) measured pools having a maximum depth greater than 2 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 depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

Four of the 18 pool tail-outs measured had embeddedness ratings of 1 or 2. Fourteen of the pool tail-outs had embeddedness ratings of 3 or 4. None of the pool tail-outs had a rating of 5, which is considered not suitable 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 Big Pepperwood Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Seventeen of the 18 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter for flatwater was 33. The mean shelter rating for pools was 84. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by small woody debris in all habitat types. Additionally, large woody debris contributes a small amount.

The mean percent canopy density for the stream was 85%.

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The percentage of right and left bank covered with vegetation was low at 44% and 49%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic trees species, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

1) Big Pepperwood Creek should be managed as an anadromous, natural production stream.

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

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

4) The limited water temperature data available suggest that maximum temperatures are above 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.

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

6) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from small woody debris. Adding high quality complexity with log and root wad cover is desirable.

COMMENTS AND LANDMARKS

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

Position (ft.)	Habitat Unit #	Comments:
0	0001	Start of survey at confluence with South Fork Gualala River.
136	0003	Out of area of influence, begin fully sampling.
286	0005	Lots of large wood just out of water.
684	0014	Erosion site.

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743	0015	Trees falling in from bank. Small wood accumulation.
1189	0023	Right bank erosion site measures 10’ long x 10’ high.
1305	0025	Right bank erosion.
1661	0031	Small woody debris (SWD) accumulation above pool.
2115	0038	Right bank erosion. Large debris accumulation (LDA) measures 40’ long x 25’ wide x 8’ high. It is retaining cobble and gravel.
2538	0044	Erosion site.
2856	0049	Dry tributary on right bank with 75% slope.
3147	0055	SWD accumulation measures 10’ long x 30’ wide x 4’ high. It is retaining gravel and sand.
3584	0061	Erosion site on left bank. LDA measures 20’ long x 40’ wide x 8’ high and contains more than 25 pieces of large wood. It is retaining gravel and cobble.
3963	0069	End of survey due to high gradient and lack of suitable fish habitat. An erosion site on the left bank measures 30’ long x 30’ high. LDA contains 50 pieces of large wood and is retaining sand, gravel, and silt upstream. Water trickling through sediment accumulation, most flow is subterranean upstream of the LDA. Upstream there is another large LDA and channel becomes boulders with high gradient.

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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]	

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TABLES AND GRAPHS

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

Stream Name: Big Pepperwood Creek Drainage: Gualala River

Survey Dates: 7/30/2003 to 8/5/2003

Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Percent 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
21	4	FLATWATER	30.4	69	1444	36.4	9.0	0.5	1.0	317	6653	187	3920		33
18	18	POOL	26.1	52	933	23.5	13.8	1.6	2.7	671	12075	1270	22867	1126	84
30	3	RIFFLE	43.5	53	1586	40.0	9.7	0.3	0.8	532	15974	188	5643		5

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
69	25	3963	34701.82	32429.38

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Big Pepperwood Creek Drainage: Gualala River

Survey Dates: 7/30/2003 to 8/5/2003

Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

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 (%)
26	2	LGR	37.7	55	1435	36.2	8	0.2	0.5	391	10158	78	2032		5	81
4	1	HGR	5.8	38	151	3.8	12	0.5	1.3	816	3264	408	1632		5	88
18	4	RUN	26.1	58	1042	26.3	9	0.5	1.3	317	5702	187	3360		33	83
3	0	SRN	4.3	134	402	10.1										89
15	15	MCP	21.7	54	814	20.5	13	1.6	4	695	10421	1341	20111	1192	92	86
1	1	LSL	1.4	61	61	1.5	12	1.6	2.2	695	695	1252	1252	1113	60	91
2	2	PLP	2.9	29	58	1.5	18	1.4	3	479	959	752	1504	637	48	86

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
69	25	3963	31199.62	29890.24

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Table 3 - Summary of Pool Types

Stream Name: Big Pepperwood Creek Drainage: Gualala River

Survey Dates: 7/30/2003 to 8/5/2003

Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

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
15	15	MAIN	83	54	814	87	13.3	1.6	695	10421	1192	17878	92
3	3	SCOUR	17	40	119	13	16.3	1.5	551	1654	795	2386	52

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
18	18	933	12075.02	20263.48

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

Stream Name: Big Pepperwood Creek Drainage: Gualala River

Survey Dates: 7/30/2003 to 8/5/2003

Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

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
15	MCP	83	0	0	1	7	10	67	3	20	1	7
1	LSL	6	0	0	0	0	1	100	0	0	0	0
2	PLP	11	0	0	0	0	1	50	1	50	0	0

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
18	0	0	1	6	12	67	4	22	1	6

Mean Maximum Residual Pool Depth (ft.): 2.7

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Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Big Pepperwood Creek Drainage: Gualala River
Survey Dates: 7/30/2003 to 8/5/2003 Dry Units: 0
Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

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
26	1	LGR	0	50	50	0	0	0	0	0	0
4	1	HGR	0	10	0	0	0	0	0	90	0
30	2	TOTAL RIFFLE	0	30	25	0	0	0	0	45	0
18	4	RUN	8	18	13	0	8	0	0	30	0
3	0	SRN									
21	4	TOTAL FLAT	8	18	13	0	8	0	0	30	0
15	12	MCP	14	32	36	15	3	0	1	0	0
1	1	LSL	30	10	60	0	0	0	0	0	0
2	2	PLP	0	18	28	15	0	0	40	0	0
18	15	TOTAL POOL	13	28	37	14	2	0	6	0	0
69	21	TOTAL	11	26	31	10	3	0	4	10	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Big Pepperwood Creek Drainage: Gualala River
Survey Dates: 7/30/2003 to 8/5/2003 Dry Units: 0
Confluence Location: Quad: MCGUIRE RIDGE Legal Description: T11NR15WS36 Latitude: 38:45:46.0N Longitude: 123:28:40.0W

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
26	2	LGR	0	0	100	0	0	0	0
4	1	HGR	0	0	100	0	0	0	0
18	4	RUN	0	0	75	25	0	0	0
3	0	SRN	0	0	0	0	0	0	0
15	14	MCP	36	50	7	7	0	0	0
1	1	LSL	0	100	0	0	0	0	0
2	2	PLP	100	0	0	0	0	0	0

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Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Big Pepperwood Creek | Drainage: Gualala River

Survey Dates: 7/30/2003 to 8/5/2003 | Survey Length (ft.): 3963 | Main Channel (ft.): 3963 | Side Channel (ft.): 0

Confluence Location: Quad: MCGUIRE RIDGE | Legal Description: T11NR15WS36 | Latitude: 38:45:46.0N | Longitude: 123:28:40.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B3
Reach Length (ft.): 3963
Riffle/Flatwater Mean Width (ft.): 9.3
BFW:
Range (ft.): 19 to 39
Mean (ft.): 26
Std. Dev.: 7
Base Flow (cfs.): 0.3
Water (F): 58 - 60 Air (F): 61 - 68
Dry Channel (ft): 0

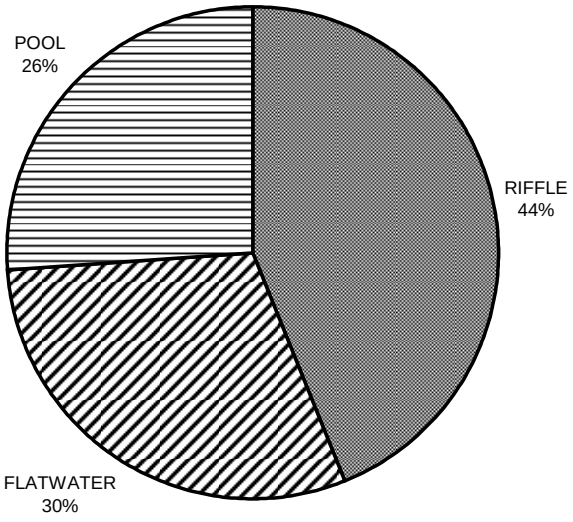
Canopy Density (%): 85
Coniferous Component (%): 26
Deciduous Component (%): 74
Dominant Bank Vegetation: Deciduous Trees
Vegetative Cover (%): 68
Dominant Shelter: Large Woody Debris
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 34
LWD per 100 ft.:
Riffles: 1
Pools: 7
Flat: 2

Pools by Stream Length (%): 24
Pool Frequency (%): 26
Residual Pool Depth (%):
< 2 Feet Deep: 6
2 to 2.9 Feet Deep: 67
3 to 3.9 Feet Deep: 22
>= 4 Feet Deep: 6
Mean Max Residual Pool Depth (ft.): 2.7
Mean Pool Shelter Rating: 84

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 44 Sm Cobble: 50 Lg Cobble: 6 Boulder: 0 Bedrock: 0

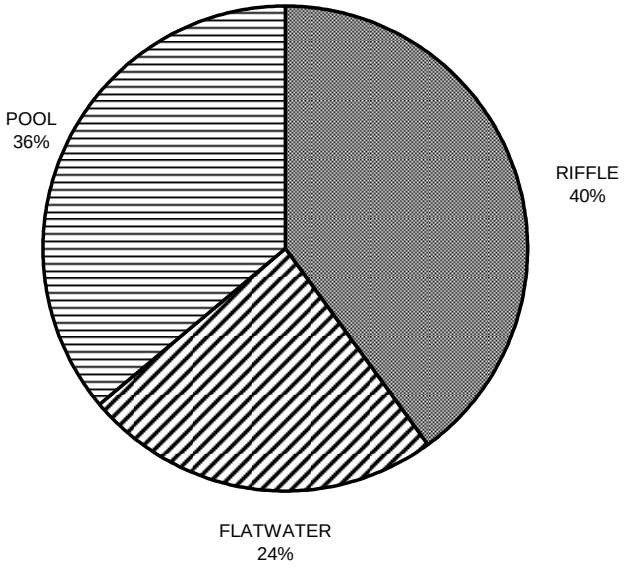
Embeddedness Values (%): 1. 0 2. 22 3. 72 4. 6 5. 0

BIG PEPPERWOOD CREEK
HABITAT TYPES BY PERCENT OCCURRENCE



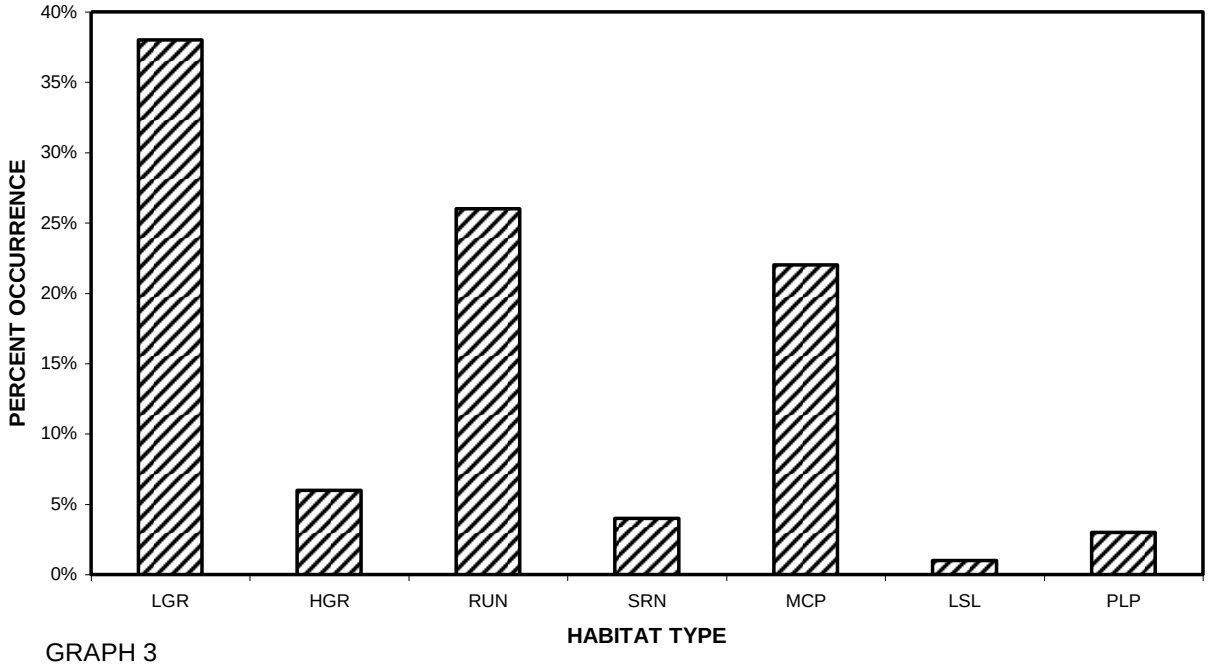
GRAPH 1

BIG PEPPERWOOD CREEK
HABITAT TYPES BY PERCENT TOTAL LENGTH



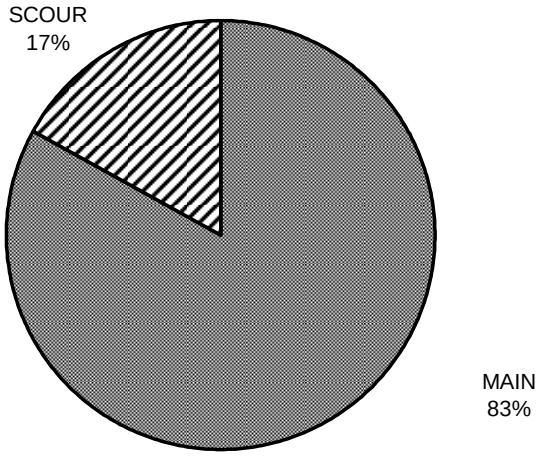
GRAPH 2

BIG PEPPERWOOD CREEK
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



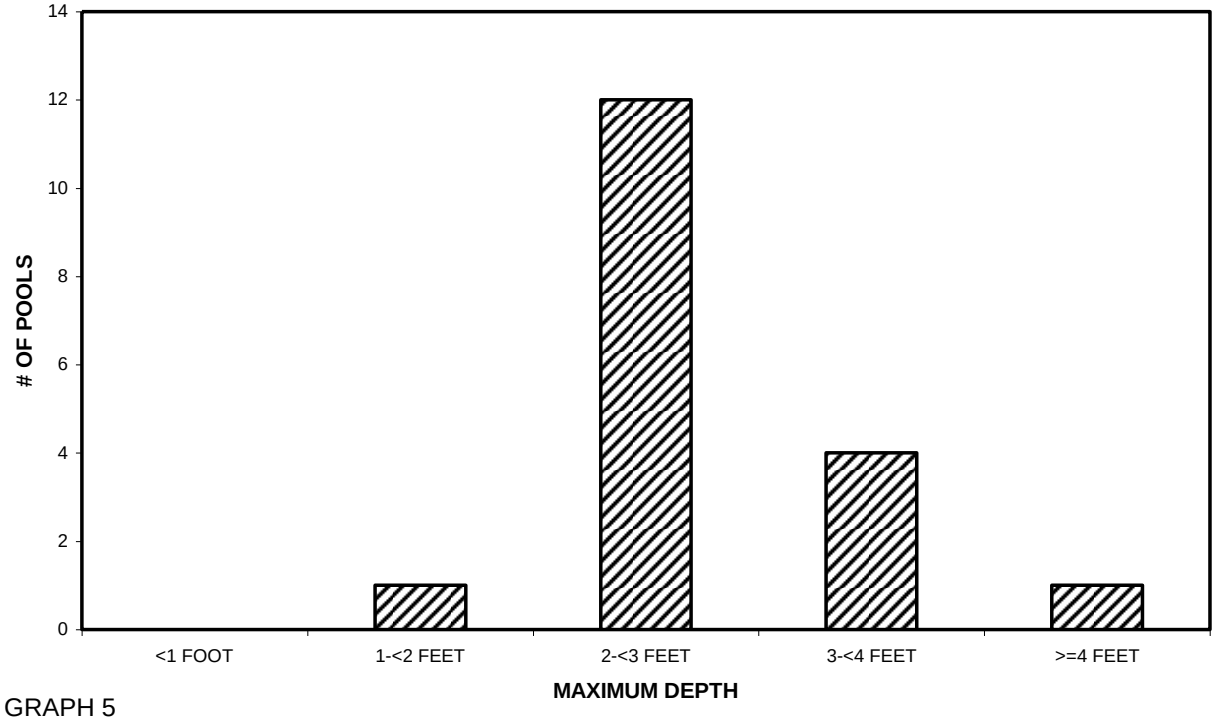
GRAPH 3

BIG PEPPERWOOD CREEK
POOL HABITAT TYPES BY PERCENT OCCURRENCE



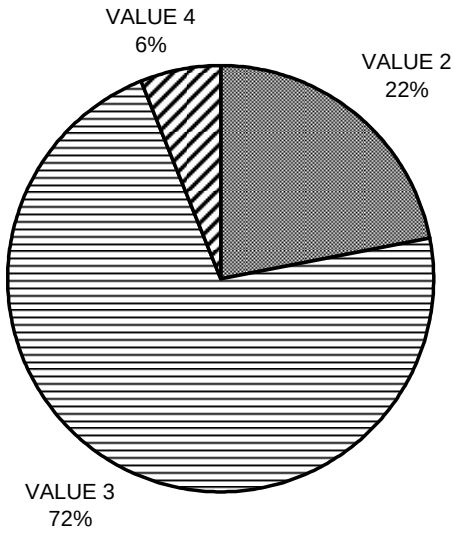
GRAPH 4

BIG PEPPERWOOD CREEK
MAXIMUM DEPTH IN POOLS



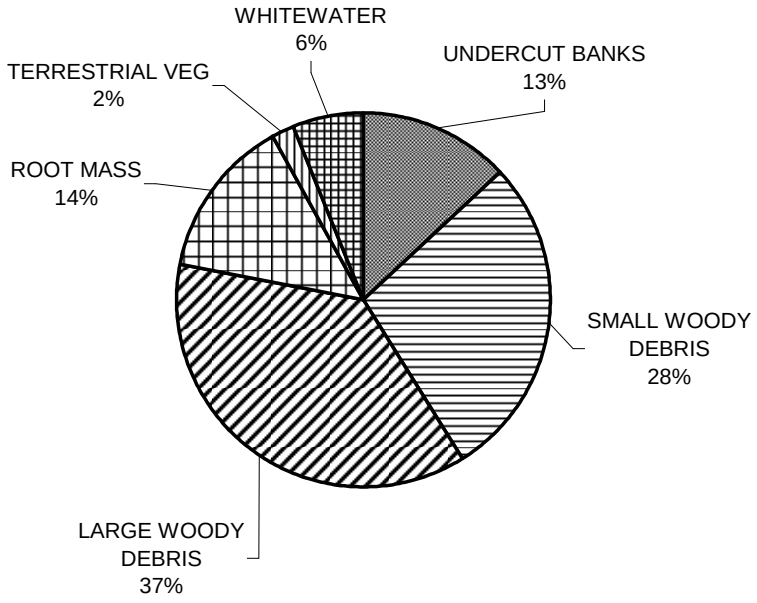
GRAPH 5

BIG PEPPERWOOD CREEK
PERCENT EMBEDDEDNESS



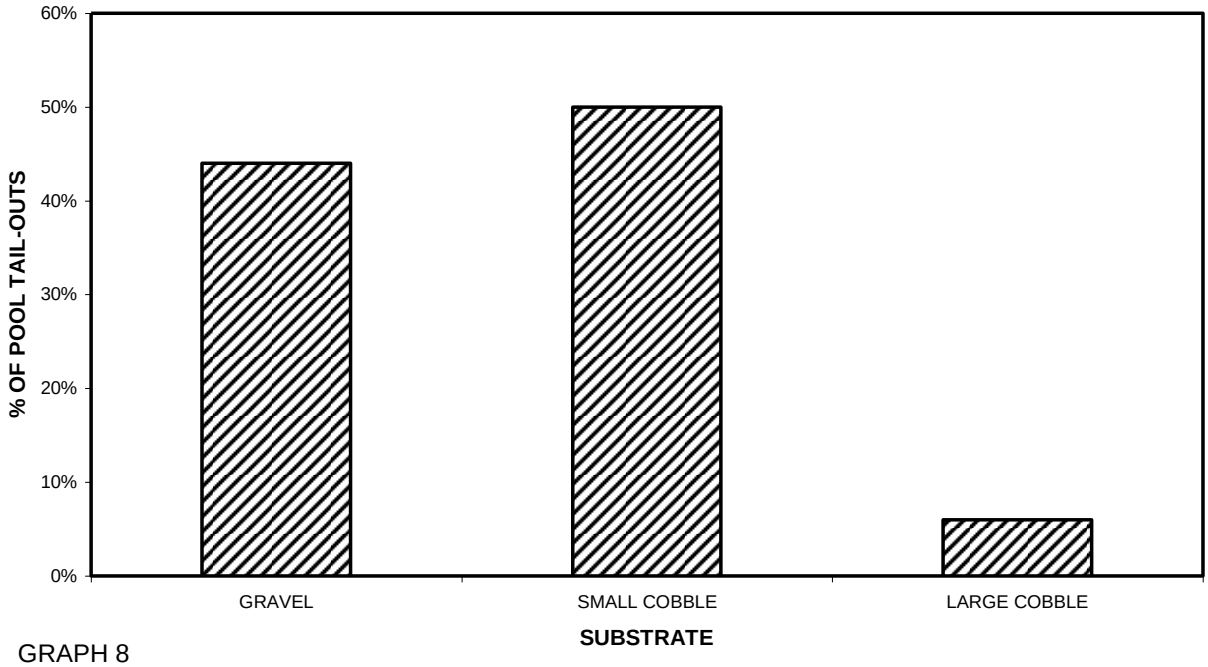
GRAPH 6

BIG PEPPERWOOD CREEK
MEAN PERCENT COVER TYPES IN POOLS



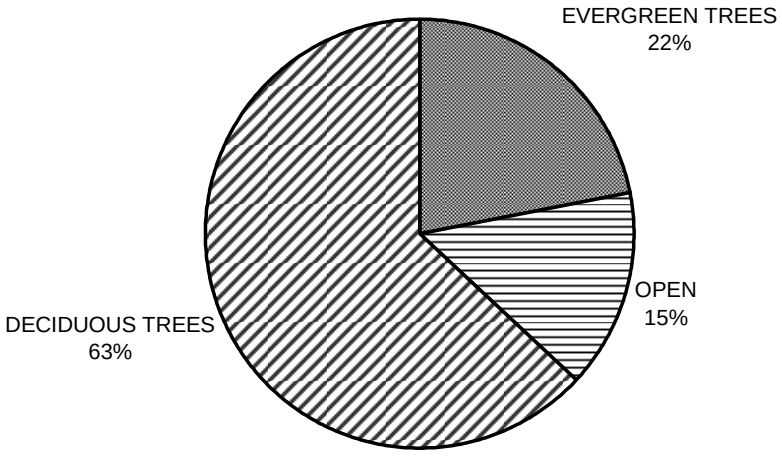
GRAPH 7

BIG PEPPERWOOD CREEK
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



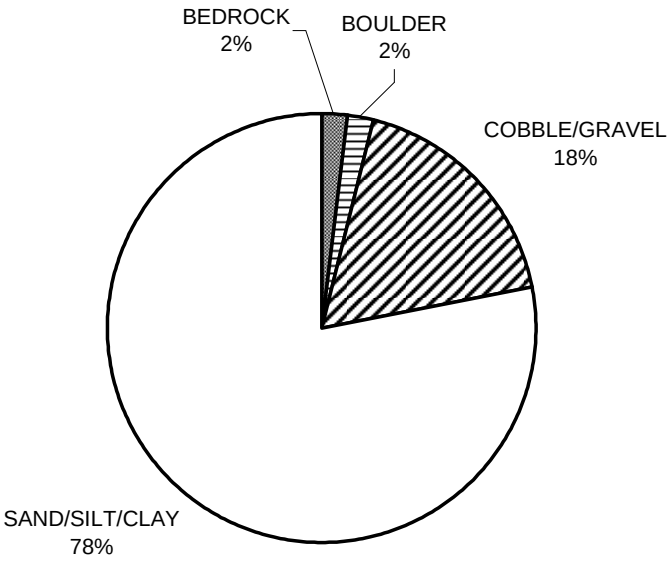
GRAPH 8

BIG PEPPERWOOD CREEK
MEAN PERCENT CANOPY



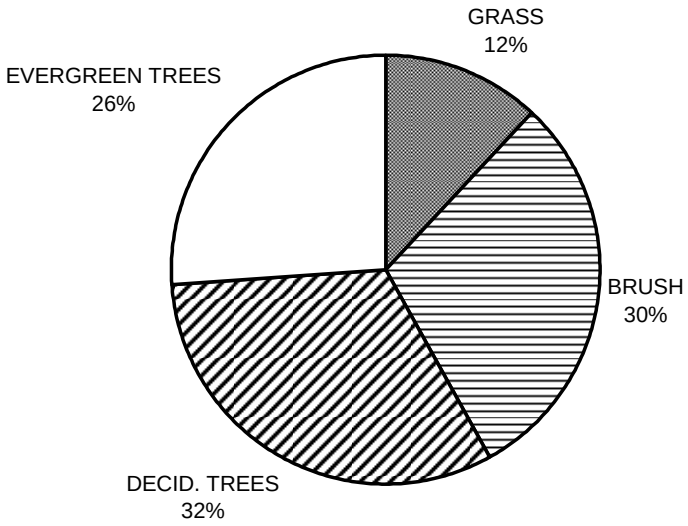
GRAPH 9

BIG PEPPERWOOD CREEK
DOMINANT BANK COMPOSITION IN SURVEY REACH



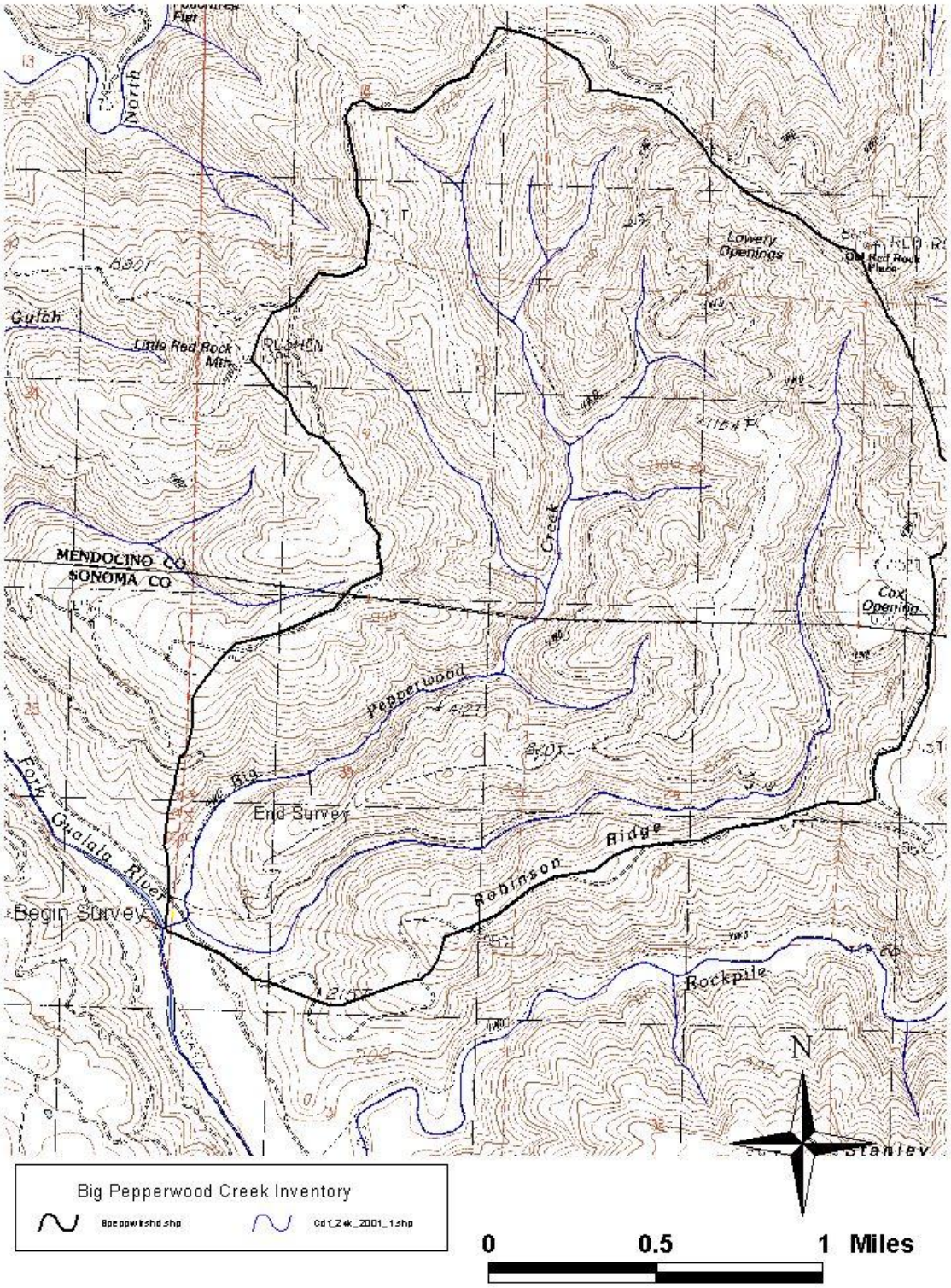
GRAPH 10

BIG PEPPERWOOD CREEK
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Big Pepperwood Creek



MAP 1. Map of Big Pepperwood Creek showing the stream habitat inventory reach and watershed boundary.

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