STREAM INVENTORY REPORT

Soda Springs Creek

INTRODUCTION

A stream inventory was conducted on August 6, 2003 on Soda Springs Creek. The survey began at the confluence with Buckeye Creek and extended upstream 1,539 feet.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Soda Springs 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

Soda Springs Creek is a tributary to Buckeye Creek, a tributary to South Fork Gualala River, a tributary to the Gualala River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Soda Springs Creek's legal description at the confluence with Buckeye Creek is T10N R13W S6. Its location is 38°44′49″ north latitude and 123°20′52″ west longitude. Soda Springs Creek is a second order stream and has approximately 8,131 feet of blue line stream according to the USGS Annapolis 7.5 minute quadrangle. Soda Springs Creek drains a watershed of approximately 1.52 square miles. Elevations range from about 355 feet at the mouth of the creek to 1,765 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists approximately 7.2 miles south of Gualala at Annapolis Road. The stream is accessed by following Annapolis Road from Sea Ranch, east to Soda Springs Road. Follow Soda Springs Road for approximately 1 mile to a gravel road. Follow gravel road and signs to "Soda Springs Reserve" for approximately 2.2 miles. Go into the reserve driveway and park at the bottom of the hill. Follow a path to Buckeye Creek and walk upstream to the mouth of Soda Springs Creek.

METHODS

The habitat inventory conducted in Soda Springs 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 Soda Springs 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". Soda Springs 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 Soda Springs 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 Soda Springs 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 Soda Springs 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 Soda Springs 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 Soda Springs 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 August 6, 2003, was conducted by S. Thompson and J. Kleeb (WSP/Americorp). The total length of the stream surveyed was 1,539.

Stream flow was measured on at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.014 cfs on November 5, 2003.

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Soda Springs Creek is an A1 channel type for the entire 1,539 feet of the stream surveyed. A1 channels are steep, narrow, cascading, step-pool channels with high energy/debris transport associated with depositional soils, and bedrock-dominant substrates.

Water temperatures taken during the survey period ranged from 60° to 68° Fahrenheit. Air temperatures ranged from 72° to 73° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 30% riffle units, 47% flatwater units, and 23% pool units (Graph 1). Based on total length of Level II habitat types there were 66% flatwater units, 17% riffle units, and 17% pool units (Graph 1).

Eight Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were runs, 30%; low-gradient riffles, 27%; and step runs, 17% (Graph 3). Based on percent total length, runs made up 39%, step runs 26%, and low-gradient riffles 15%.

A total of seven pools were identified (Table 3). Mid-channel pools were the most frequently encountered, at 71%, and comprised 80% 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. Six of the 7 measured pools (86%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 6 pool tail-outs measured, 0 had a value of 1 (0%); 1 had a value of 2 (17%); 2 had a value of 3 (33%); 0 had a value of 4 (0%); and 3 had a value of 5 (50%) (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 20, flatwater habitat types had a mean shelter rating of 18, and pool habitats had a mean shelter rating of 76 (Table 1). Of the pool types, the main-channel pools had the highest mean shelter rating at 98. Scour pools had a mean shelter rating of 10 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Small woody debris is the dominant cover types in Soda Springs Creek. Graph 7 describes the pool cover in Soda Springs Creek. Large woody debris is the dominant pool cover type followed by boulders.

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 50% of pool tail-outs while bedrock was the next most frequently observed substrate type, at 33%.

The mean percent canopy density for the surveyed length of Soda Springs Creek was 71%. The mean percentages of evergreen and deciduous trees were 21% and 50%, respectively with 29% of the canopy open. Graph 9 describes the mean percent canopy in Soda Springs Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 47%. The mean percent left bank vegetated was 43%. The dominant elements composing the structure of the stream banks consisted of 46% bedrock, 38% sand/silt/clay, and 17% cobble/gravel (Graph 10). Brush was the dominant vegetation type observed in 42% of the units surveyed. Additionally, 29% of the units surveyed had deciduous trees as the dominant vegetation type, 17% had no vegetation, 8% had grass, an 4% had coniferous trees as the dominant vegetation (Graph 11).

DISCUSSION

Soda Springs Creek is an A1 channel type for the entire 1,539 feet of stream surveyed. A1 channel types are generally not suitable for fish habitat improvement structures.

The water temperatures recorded on the survey ranged from 60° to 68° Fahrenheit. The recorded water temperatures were above 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.

Flatwater habitat types comprised 66% of the total length of this survey, riffles 17%, and pools 17%. The pools are relatively deep, with 6 of the 7 (86%) 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.

One of the 6 pool tail-outs measured had embeddedness ratings of 1 or 2. Two 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 Soda Springs Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Three of the 6 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. Although the other 3 pool tail-outs measured had boulders and bedrock as the dominant substrate. This is considered unsuitable for spawning salmonids.

The mean shelter for flatwater was 18. The mean shelter rating for pools was 76. 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, boulders contribute a small amount. 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.

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The mean percent canopy density for the stream was 71%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 47% and 43%, 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) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem.

2) 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.

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) 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.

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

6) 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.

7) Increase the canopy on Soda Springs Creek by planting 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.

8) Suitable size spawning substrate on Soda Springs Creek is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.

9) There are several log debris accumulations present on Soda Springs 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.

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	0001.00	Start of survey at confluence with Buckeye Creek.
131	0005.00	Out of influence of Buckeye Creek.
501	0013.00	Change in dominant substrate from bedrock to gravel.
554	0014.00	Possible old large debris accumulation (LDA).
580	0015.00	Right bank seep/spring.
641	0016.00	Dominant substrate returns to bedrock.
1001	0019.00	LDA consists of more than 30 pieces of large woody debris and measures 15' high x 30' wide x 25' long. It is retaining sediment; there is a 10' high jump from water surface to top of sediment above LDA. Barrier to juvenile/adult salmonids.
1539	0030.00	End of survey.

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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: Soda Springs Creek Drainage: Gualala River

Survey Dates: 8/6/2003 to 8/6/2003

Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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
14	3	FLATWATER	46.7	72	1009	65.6	6.3	0.3	1.0	210	2939	73	1026		18
7	6	POOL	23.3	38	264	17.2	11.3	1.3	2.4	361	2526	539	3770	496	76
9	3	RIFFLE	30.0	30	266	17.3	6.0	0.2	0.4	147	1325	35	317		20

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
30	12	1539	6789.542	5113.222

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Soda Springs Creek Drainage: Gualala River

Survey Dates: 8/6/2003 to 8/6/2003

Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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 (%)
8	2	LGR	26.7	28	225	14.6	6	0.2	0.4	135	1078	27	216		15	65
1	1	HGR	3.3	41	41	2.7	6	0.3	0.6	172	172	52	52		30	94
9	1	RUN	30.0	67	607	39.4	3	0.3	0.8	22	194	6	58		5	57
5	2	SRN	16.7	80	402	26.1	8	0.4	1.4	304	1520	107	534		30	82
3	3	MCP	10.0	24	71	4.6	12	1.1	2.3	255	765	329	986	298	98	79
2	1	STP	6.7	70	141	9.2	11	1.5	2.7	959	1918	1535	3069	1439		89
1	1	LSBk	3.3	36	36	2.3	7	1.1	2.7	239	239	287	287	263		32
1	1	PLP	3.3	16	16	1.0	14	1.9	2.7	202	202	423	423	383	10	94

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
30	12	1539	6089.2	5625.6

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Table 3 - Summary of Pool Types

Stream Name: Soda Springs Creek Drainage: Gualala River

Survey Dates: 8/6/2003 to 8/6/2003

Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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
5	4	MAIN	71	42	212	80	11.8	1.2	431	2155	583	2916	98
2	2	SCOUR	29	26	52	20	10.5	1.5	221	441	323	646	10

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
7	6	264	2595.688	3561.949

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

Stream Name: Soda Springs Creek Drainage: Gualala River

Survey Dates: 8/6/2003 to 8/6/2003

Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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
3	MCP	50	0	0	1	33	2	67	0	0	0	0
1	STP	17	0	0	0	0	1	100	0	0	0	0
1	LSBk	17	0	0	0	0	1	100	0	0	0	0
1	PLP	17	0	0	0	0	1	100	0	0	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
6	0	0	1	17	5	83	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 2.4

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Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Soda Springs Creek Drainage: Gualala River
Survey Dates: 8/6/2003 to 8/6/2003 Dry Units: 0
Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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
8	2	LGR	0	70	0	0	30	0	0	0	0
1	1	HGR	0	10	0	0	20	0	0	70	0
9	3	TOTAL RIFFLE	0	50	0	0	27	0	0	23	0
9	1	RUN	0	50	0	0	0	0	0	50	0
5	1	SRN	0	20	50	0	30	0	0	0	0
14	2	TOTAL FLAT	0	35	25	0	15	0	0	25	0
3	3	MCP	0	7	63	0	0	0	0	30	0
2	0	STP									
1	0	LSBk									
1	1	PLP	0	0	0	0	0	0	80	20	0
7	4	TOTAL POOL	0	5	48	0	0	0	20	28	0
30	9	TOTAL	0	27	27	0	12	0	9	26	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Soda Springs Creek Drainage: Gualala River
Survey Dates: 8/6/2003 to 8/6/2003 Dry Units: 0
Confluence Location: Quad: ANNAPOLIS Legal Description: T10NR13WS06 Latitude: 38:44:49.0N Longitude: 123:20:52.0W

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
8	2	LGR	0	0	100	0	0	0	0
1	1	HGR	0	0	100	0	0	0	0
9	1	RUN	0	0	0	0	0	0	100
5	2	SRN	0	0	50	0	0	0	50
3	3	MCP	33	33	33	0	0	0	0
2	1	STP	0	0	0	0	0	0	100
1	1	LSBk	0	100	0	0	0	0	0
1	1	PLP	0	100	0	0	0	0	0

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Soda Springs Creek | Drainage: Gualala River

Survey Dates: 8/6/2003 to 8/6/2003 | Survey Length (ft.): 1539 | Main Channel (ft.): 1539 | Side Channel (ft.): 0

Confluence Location: Quad: ANNAPOLIS | Legal Description: T10NR13WS06 | Latitude: 38:44:49.0N | Longitude: 123:20:52.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

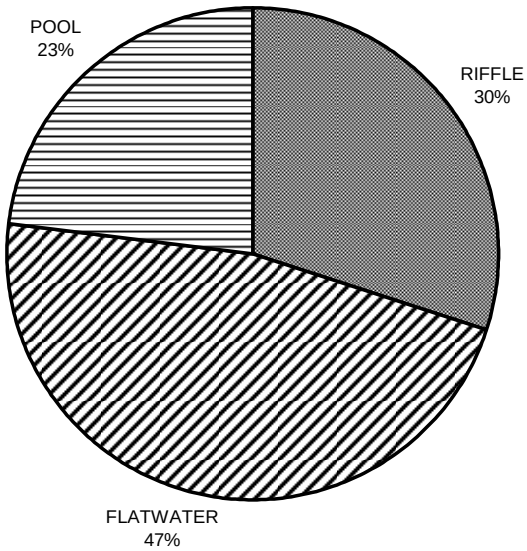
Channel Type: A1	Canopy Density (%): 71	Pools by Stream Length (%): 17
Reach Length (ft.): 1539	Coniferous Component (%): 30	Pool Frequency (%): 23
Riffle/Flatwater Mean Width (ft.): 6.2	Deciduous Component (%): 70	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Brush	< 2 Feet Deep: 17
Range (ft.): 0 to 22	Vegetative Cover (%): 64	2 to 2.9 Feet Deep: 83
Mean (ft.): 21	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 0
Std. Dev.: 1	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 20	Mean Max Residual Pool Depth (ft.): 2.4
Water (F): 60 - 68 Air (F): 72 - 73	LWD per 100 ft.:	Mean Pool Shelter Rating: 76
Dry Channel (ft): 0	Riffles: 0	
	Pools: 5	
	Flat: 2	

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 50 Sm Cobble: 0 Lg Cobble: 0 Boulder: 17 Bedrock: 33

Embeddedness Values (%): 1. 0 2. 17 3. 33 4. 0 5. 50

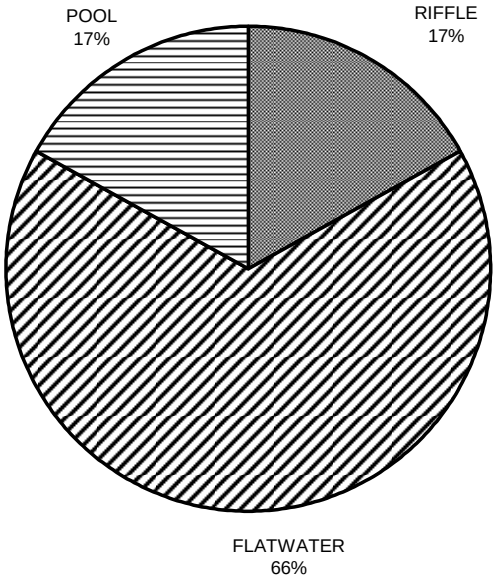
SODA SPRINGS CREEK

HABITAT TYPES BY PERCENT OCCURRENCE



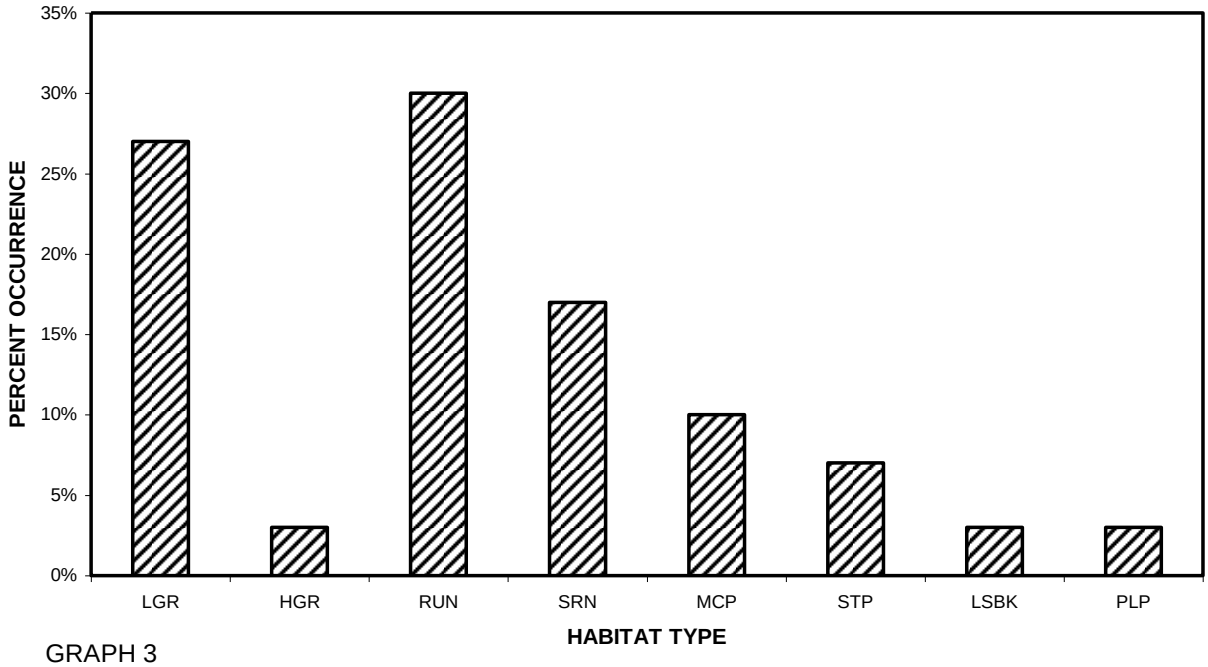
GRAPH 1

SODA SPRINGS CREEK
HABITAT TYPES BY PERCENT TOTAL LENGTH



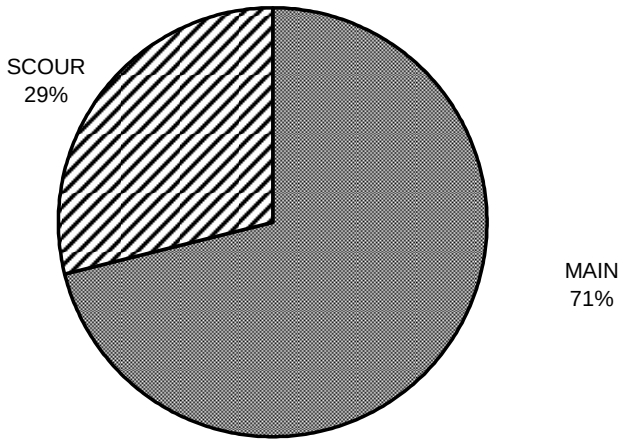
GRAPH 2

SODA SPRINGS CREEK
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



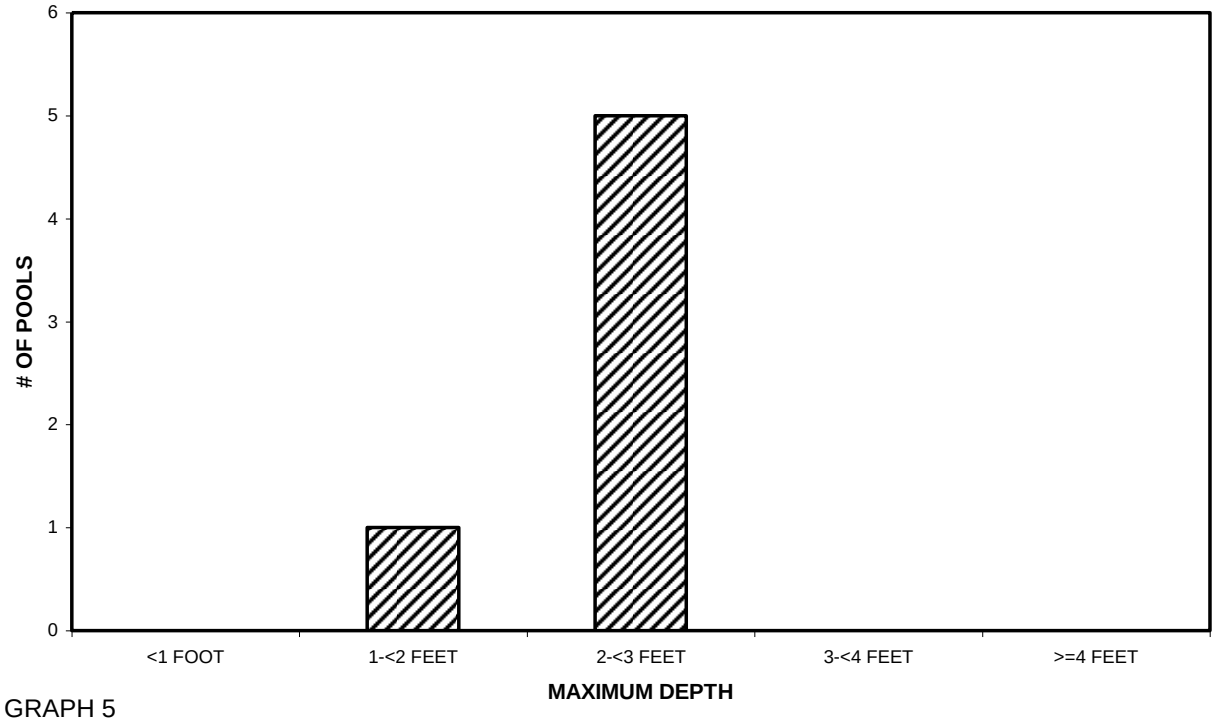
GRAPH 3

SODA SPRINGS CREEK
POOL HABITAT TYPES BY PERCENT OCCURRENCE



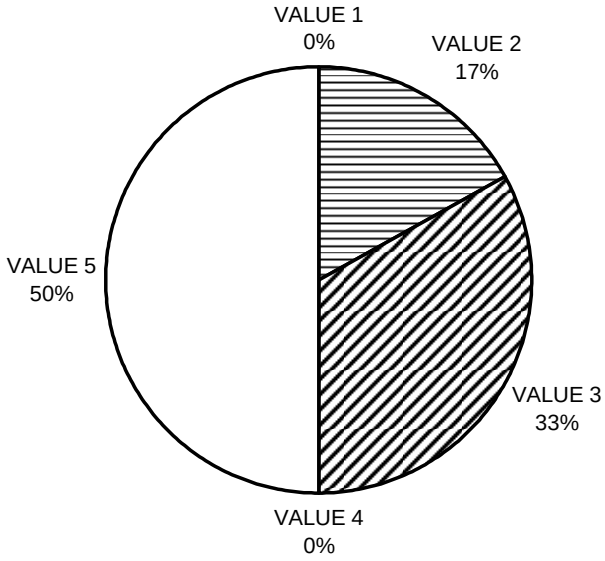
GRAPH 4

SODA SPRINGS CREEK
MAXIMUM DEPTH IN POOLS



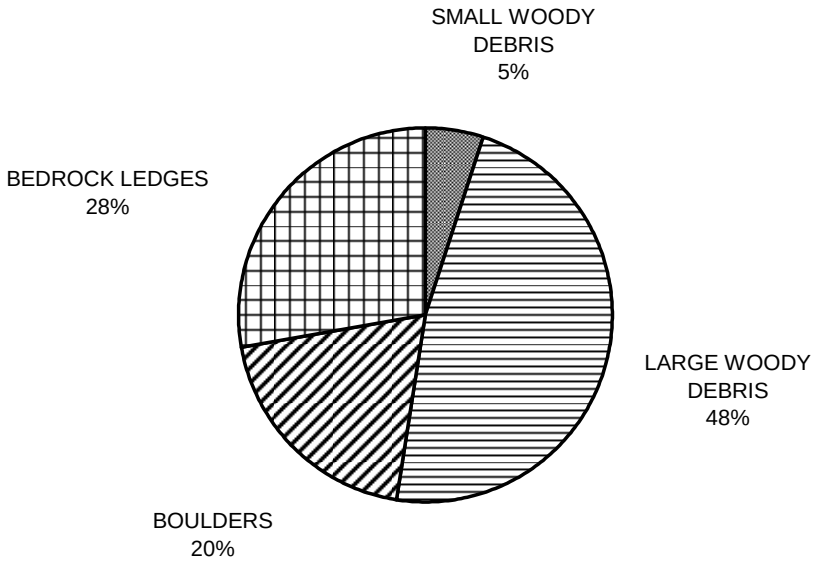
GRAPH 5

SODA SPRINGS CREEK
PERCENT EMBEDDEDNESS



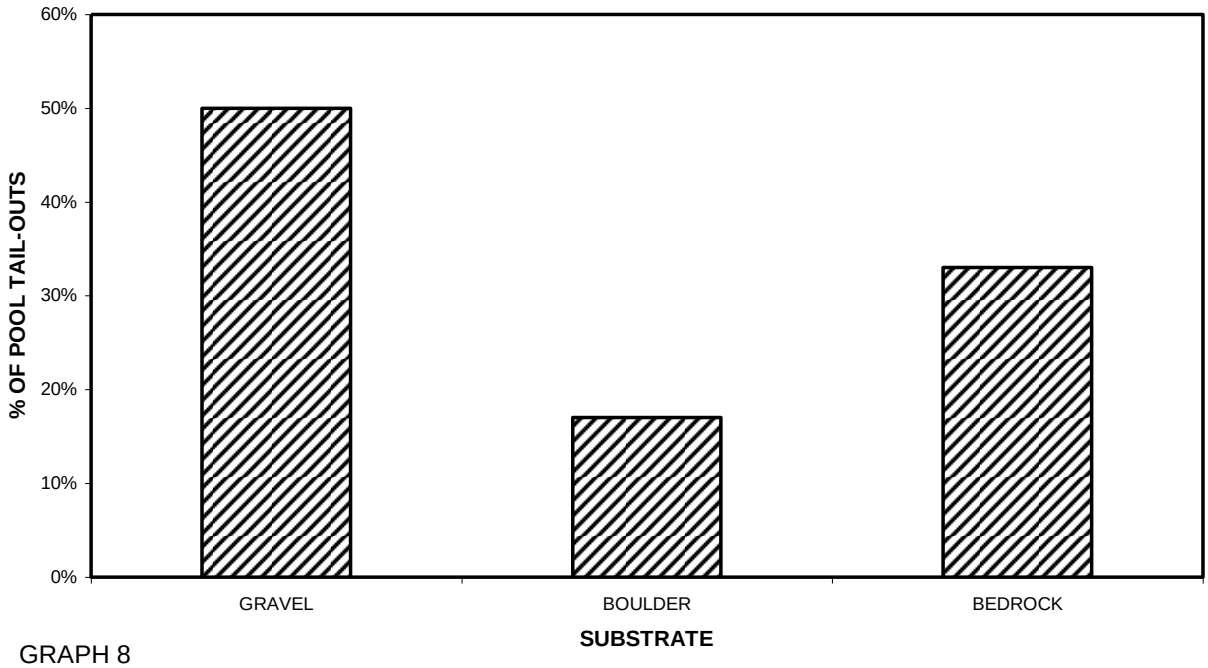
GRAPH 6

SODA SPRINGS CREEK
MEAN PERCENT COVER TYPES IN POOLS



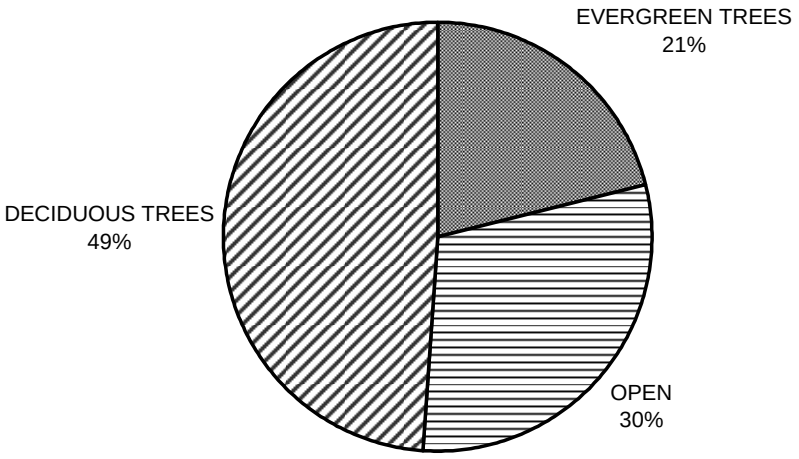
GRAPH 7

SODA SPRINGS CREEK
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



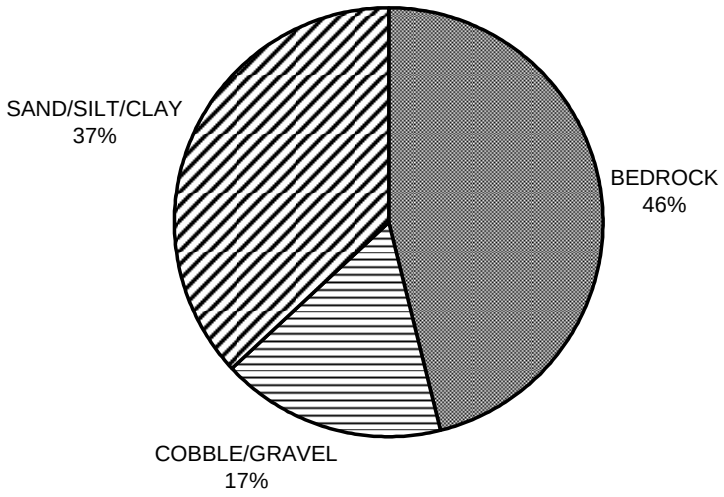
GRAPH 8

SODA SPRINGS CREEK
MEAN PERCENT CANOPY



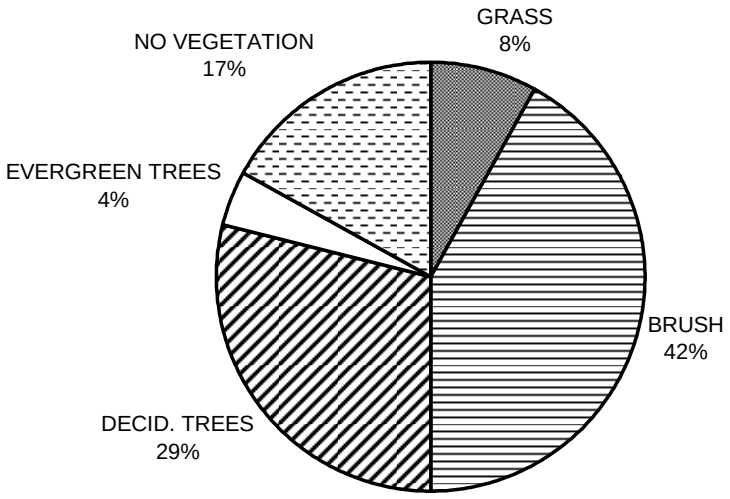
GRAPH 9

SODA SPRINGS CREEK
DOMINANT BANK COMPOSITION IN SURVEY REACH



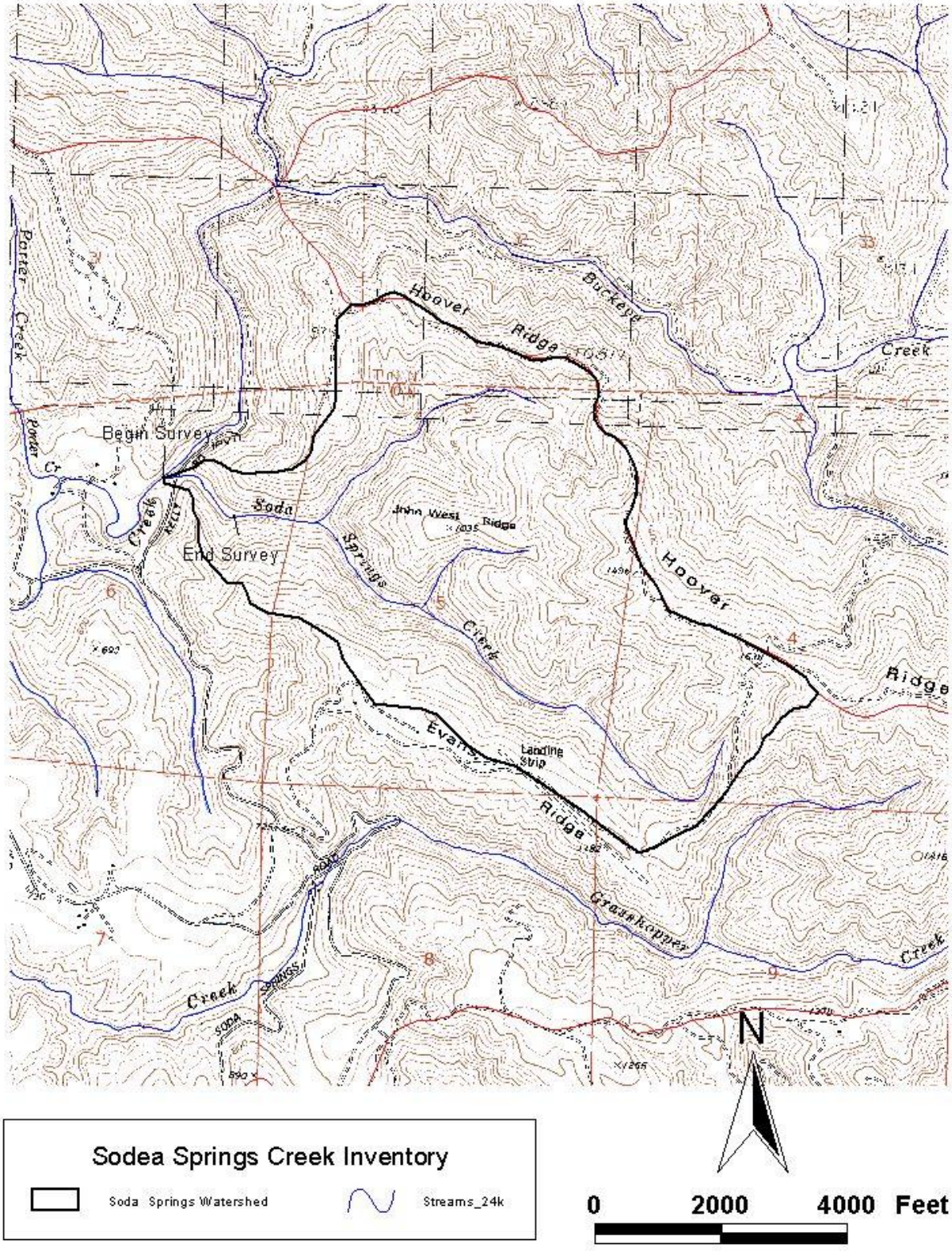
GRAPH 10

SODA SPRINGS CREEK
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Soda Springs Creek



MAP 1. Map of Soda Springs Creek showing the stream habitat inventory reach and watershed boundary.

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