

STREAM INVENTORY REPORT

Soda Spring Creek

INTRODUCTION

A stream inventory was conducted from July 29 to October 11, 2002 on Soda Spring Creek. The survey began at the confluence with North Fork Albion River and extended upstream 0.87 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Soda Spring 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 Spring Creek is a tributary to the North Fork Albion River, tributary to the Albion River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Soda Spring Creek's legal description at the confluence with Albion River North Fork is T17N R16W S35. Its location is 39°16'59" north latitude and 123°36'21" west longitude. Soda Spring Creek is an ephemeral stream for approximately 1.54 miles of dashed blue line stream according to the USGS Comptche 7.5 minute quadrangle. Soda Spring Creek drains a watershed of approximately 1.35 square miles. Elevations range from about 400 feet at the mouth of the creek to 605 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is privately owned for residential and cattle grazing. Vehicle access exists via Comptche Ukiah Road to the confluence of Albion River North Fork and Albion River at Docker Hill Road. Foot access is approximately 1.7 miles to the confluence of Soda Spring Creek and Albion River North Fork.

A stream habitat inventory was conducted on Soda Spring Creek on August 19, 1996 by Coastal Land Trust employees. Coho salmon and steelhead were observed from the stream banks.

An electrofishing inventory was conducted on September 25, 1996 by DFG. Coho salmon, steelhead, and sticklebacks were captured and measured for fork lengths. Bullfrogs and yellow legged frogs were also identified.

METHODS

The habitat inventory conducted in Soda Spring Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Game Scientific Aides and Pacific States Marine Fisheries members that conducted the inventory were trained in standardized habitat inventory methods by the California

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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 Spring 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 Spring Creek habitat typing used standard basin level measurement criteria. These parameters require that the

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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 Spring Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate 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 Spring 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 Spring 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 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 Spring Creek, the dominant composition type and the dominant

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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 Habitat 8.4, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following six tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Graphics are produced from the tables using Excel. Graphics developed for Soda Spring Creek include:

- Riffle, flatwater, pool habitats by percent occurrence
- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence
- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Mean percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

HABITAT INVENTORY RESULTS

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

The habitat inventory of July 7 to October 11, 2002, was conducted by Andy Pothast (Fish and Game) and John Richardson (PSMFC). The total length of the stream surveyed was 4,568 feet. Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.057 cfs on July 29, 2002.

Soda Spring Creek is an F4 channel type for 908 feet of the stream surveyed; an F1 channel type for 198 feet (Reach 2), and an F5 channel type 3,462 feet of the stream surveyed (Reach 3). F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. F1 channels are entrenched, meandering,

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riffle/pool channels on low gradients with high width/depth ratios and very stable if bedrock controlled channel. F5 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and sand-dominant substrates.

Water temperatures taken during the survey period ranged from 51 to 63 degrees Fahrenheit. Air temperatures ranged from 62 to 74 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 43% pool units, 24% flatwater units, 23% riffle units, and 10% dry units (Graph 1). Based on total length of Level II habitat types there were 41% pool units, 35% dry units, 13% flatwater units, and 11% riffle units (Graph 2).

Six Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid channel pool units, 42%; run units, 24%; and low gradient riffle units, 13% (Graph 3). Based on percent total length, mid channel pool units made up 42%, dry channel units made up 34%, and run units made up 13%.

A total of 61 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 98%, and comprised 99.7% 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. Twenty-seven of the 61 pools (44%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 60 pool tail-outs measured, 3 had a value of 2 (5%); 1 had a value of 4 (2%); and 56 had a value of 5 (93%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate. 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. Pool habitats had a mean shelter rating of 22, flatwater habitat types had a mean shelter rating of 12, and riffle habitat types had a mean shelter rating of 3 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 22. Scour pools had a mean shelter rating of 5 (Table 3).

In Reach 1, Soda Spring Creek had an average of 0.3 pieces of LWD per 100'; in reach two, 5.6 pieces per 100'; and in reach three 1.1 pieces per 100'.

Table 5 summarizes mean percent cover by habitat type. Small woody debris is the dominant cover type in Soda Spring Creek. Graph 7 describes the pool cover in Soda Spring Creek. Small woody debris is the dominant pool cover type followed by undercut banks.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Bedrock was the dominant substrate observed in 50% of pool the tail-outs. Sand was the next most frequently observed dominant substrate type and occurred in 25% of the pool tail-outs.

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The mean percent canopy density for the surveyed length of Soda Spring Creek was 97%. The mean percentages of deciduous and coniferous trees were 15% and 82%, respectively. Graph 9 describes the mean percent canopy in Soda Spring Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 83%. The mean percent left bank vegetated was 82%. The dominant elements composing the structure of the stream banks consisted of 72% sand/silt/clay, 24% bedrock, and 4% cobble/gravel (Graph 10). Coniferous trees were the dominant vegetation type observed in 81% of the units surveyed. Additionally, 10% of the units surveyed had deciduous trees as the dominant vegetation type, 8% had brush as the dominant vegetation, and 1% had grass as the dominant vegetation (Graph 11).

DISCUSSION

Soda Spring Creek is an F4 channel type for the first 908 feet of stream surveyed, an F1 channel type for the next 198 feet, and an F5 channel type for the remaining 3,462 feet of stream surveyed. The suitability of F4, F1 and F5 channel types for fish habitat improvement structures are as follows: F4 channels are good for bank-placed boulders, single and opposing wing-deflectors, channel constrictors and log cover. F1 channels are good for bank-placed boulders, fair for single wing-deflectors and log cover. F5 channels are good for bank-placed boulders, fair for plunge weirs, single and opposing wing-deflectors, channel constrictors and log cover.

The water temperatures recorded on the survey days July 29 through October 11, 2002, ranged from 51 to 63 degrees Fahrenheit. Air temperatures ranged from 62 to 74 degrees Fahrenheit. This is a good water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Pool habitat types comprised 40% of the total length of this survey, dry channels 35%, flatwater 13%, and riffles 11%. The pools are relatively deep, with 27 of the 61 (44%) 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. Three of the 60 pool tail-outs measured had embeddedness ratings of 1 or 2. One of the pool tail-outs had embeddedness ratings of 3 or 4. Fifty-six 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 Spring Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Fifty-nine of the 60 pool tail-outs had silt or sand, large cobble, boulders, or bedrock as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

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The mean shelter rating for pools was 22. The shelter rating in the flatwater habitats was 12. 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, undercut banks 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.

The mean percent canopy density for the stream was 97%. Reach 1 had a canopy density of 97%, Reach 2 canopy density of 100%, and Reach 3 had a canopy density of 97%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was high at 83% and 82%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Soda Spring Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggests 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) 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 mass cover is desirable.
- 4) 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.
- 5) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.
- 6) Suitable size spawning substrate on Soda Spring Creek is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.
- 7) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives should be explored with the grazer and developed if possible.

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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): Comments:

0'	Begin survey at North Fork Albion River.
189'	There is a dam measuring 1' high x 3' wide.
208'	There is a dam at top of unit that measures 5' high x 16' wide. The dam is not holding water.
296'	N39 degrees 17.023 min. W123 degrees 36.368 min.
380'	There is a foot bridge and a spring at top of unit.
497'	Coho young-of-the-year.
724'	Channel change to F1.
1413'	Bedrock with perpendicular fissure.
1731'	There is a 1+ plus steelhead.
1822'	High voltage lines crossing creek at this unit.
3051'	Bridge crossing stream measures 6' high x 10' long x 50' wide. N39deg 17.384min W123deg 36.382''.
3496'	Salmonid observed. Confluence with Portuguese Gulch N39deg17.451minW123deg 36.401min.
4563'	End of survey at a plunge pool. Southside Road coordinates are N39deg17.581min W123deg 36.327min.

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.

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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 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Soda Spring Creek
SAMPLE DATES: 07/29/02 to 10/11/02
STREAM LENGTH: 4568 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Comptche Latitude: 39°16'59"
Legal Description: T17NR16WS35 Longitude: 123°36'21"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: F4	Canopy Density: 97%
Channel Length: 908 ft.	Coniferous Component: 94%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 6%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 35%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 60 - 61 °F Air: 64 -68 °F	Mean Pool Shelter Rtn: 21
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Small Woody Debris
Vegetative Cover: 87%	Occurrence of LOD: 7%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 0% 2.38% 3. 0% 4. 0% 5. 63%

STREAM REACH 2

Channel Type: F1	Canopy Density: 100%
Channel Length: 198 ft.	Coniferous Component: 96%
Riffle/flatwater Mean Width: 6 ft.	Deciduous Component: 4%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 75%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 60 - 60 °F Air: 69 -69 °F	Mean Pool Shelter Rtn: 27
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Bedrock Ledges
Vegetative Cover: 94%	Occurrence of LOD: 11%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 0% 2.0% 3. 0% 4. 0% 5. 100%

STREAM REACH 3

Channel Type: F5	Canopy Density: 97%
Channel Length: 3462 ft.	Coniferous Component: 80%
Riffle/flatwater Mean Width: 6 ft.	Deciduous Component: 20%
Total Pool Mean Depth: 1.5 ft.	Pools by Stream Length: 40%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 24%
Water: 051- 60 °F Air: 062-70 °F	Mean Pool Shelter Rtn: 21
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Small Woody Debris
Vegetative Cover: 81%	Occurrence of LOD: 9%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 1617 ft.

Embeddness Value: 1. 0% 2.0% 3. 0% 4. 2% 5. 98%

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Drainage: Albion River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES

Survey Dates: 07/29/02 to 10/11/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T17NR16WS35 LATITUDE:39°16'59" LONGITUDE:123°36'21"

HABITAT UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA (sq.ft.)	MEAN ESTIMATED VOLUME (cu.ft.)	TOTAL ESTIMATED VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING	
33	5	RIFFLE	23	15	509	11	6.0	0.1	27	906	5	157	0	3
35	5	FLATWATER	24	17	594	13	4.4	0.3	59	2048	19	663	0	12
61	59	POOL	42	30	1848	40	5.9	1.4	201	12237	276	16853	161	22
15	0	DRY	10	108	1617	35	0.0	0.0	0	0	0	0	0	0

TOTAL
UNITS
144

TOTAL LENGTH
(ft.)
4568

TOTAL AREA
(sq. ft.)
15191

TOTAL VOL.
(cu. ft.)
17673

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Drainage:

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 07/29/03 to 10/11/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T17NR16WS35 LATITUDE:39°16'59" LONGITUDE:123°36'21"

#	HABITAT UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE	TOTAL LENGTH		MEAN WIDTH		MEAN MAXIMUM DEPTH		MEAN TOTAL AREA		TOTAL VOLUME		MEAN RESIDUAL SHELTER CANOPY		
				ft.	%	ft.	%	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	%	%		
19	2	LGR	13	14	269	6	4	0.1	0.4	13	239	1	25	0	5	98
14	3	BRS	10	17	240	5	7	0.1	2.4	37	523	7	99	0	2	94
35	5	RUN	24	17	594	13	4	0.3	0.7	59	2048	19	663	0	12	98
60	58	MCP	42	31	1843	40	6	1.4	6.2	204	12234	281	16845	164	22	97
1	1	PLP	1	5	5	0	2	1.7	2.5	10	10	17	17	0	5	100
15	0	DRY	10	108	1617	35	0	0.0	0.0	0	0	0	0	0	0	100

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
144	69	4568	15054	17648

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Soda Spring Creek		Drainage:										
Table 3 - SUMMARY OF POOL TYPES		Survey Dates: 07/29/02 to 10/11/02										
Confluence Location: QUAD: Comptche		LEGAL DESCRIPTION: T17N R16W S35										
		LATITUDE: 39°16'59" LONGITUDE: 121°36'21"										
HABITAT UNITS	HABITAT FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	MEAN VOLUME EST. (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL SHELTER RATING
60	60	MAIN	98	31	6.1	1.3	212	1843	12714	271	16283	21
1	1	SCOUR	2	5	2.0	1.7	10	5	10	17	17	5
TOTAL UNITS	TOTAL UNITS			TOTAL LENGTH (ft.)			TOTAL AREA (sq.ft.)		TOTAL AREA (sq.ft.)		TOTAL VOL. (cu.ft.)	
61	61			1848			12724		12724		16300	

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Soda Spring Creek Drainage:

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 07/29/02 to 10/11/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T17NR16WS35 LATITUDE:39°16'59" LONGITUDE:123°36'21"

UNITS MEASURED	HABITAT TYPE	<1 FOOT		1-<2 FT.		2-<3 FT.		3-<4 FT.		3-<4 FOOT		>=4 FEET		>=4 FEET	
		PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH
60	MCP	98	4	7	30	50	15	25	12	7	12	4	7	4	7
1	PLP	2	0	0	0	0	1	100	0	0	0	0	0	0	0

TOTAL UNITS 61

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Drainage: Albion River

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE

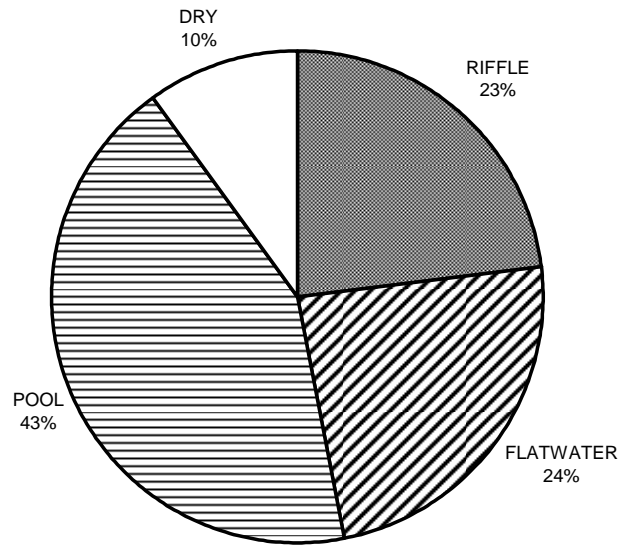
Survey Dates: 07/29/02 to 10/11/02

Confluence Location: QUAD: Compctche LEGAL DESCRIPTION: T17NR16WS35 LATITUDE:39°16'59" LONGITUDE:123°36'21"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS VEGETATION	MEAN % TFR.	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
19	1	LGR	0	100	0	0	0	0	0	0	0
14	1	BRS	0	80	0	0	0	0	0	0	20
35	5	RUN	5	54	19	7	4	12	0	0	0
60	57	MCP	26	30	8	9	1	0	0	3	22
1	1	PLP	35	45	0	20	0	0	0	0	0
15	0	DRY	0	0	0	0	0	0	0	0	0

Soda Spring Creek

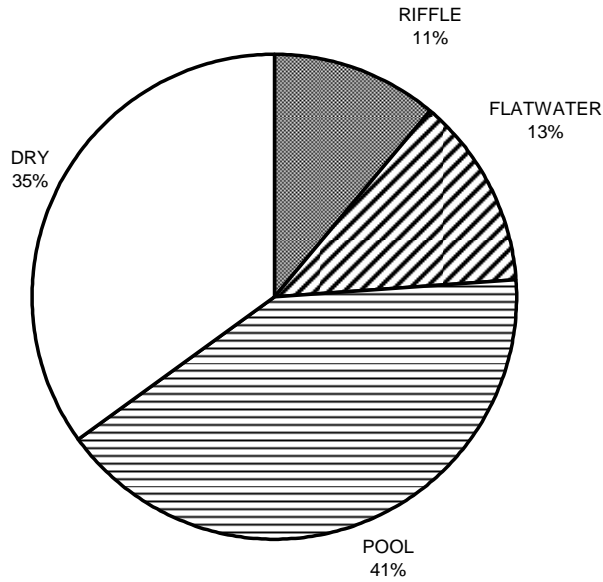
Soda Spring Creek HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

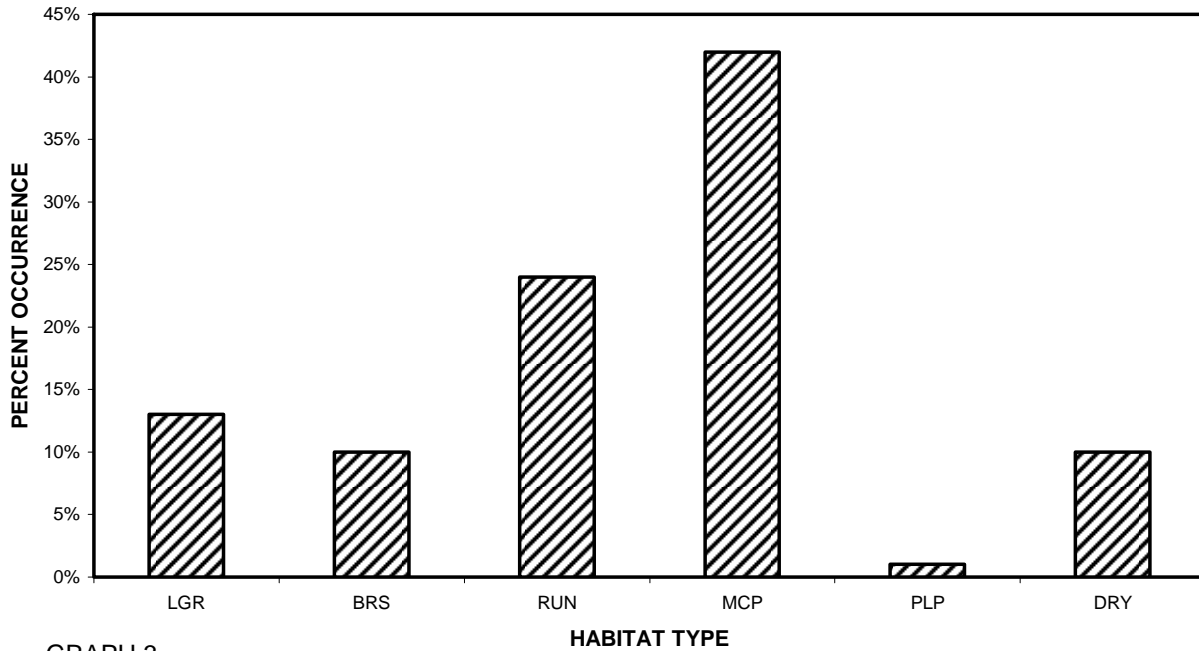
Soda Spring Creek

Soda Spring Creek
HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

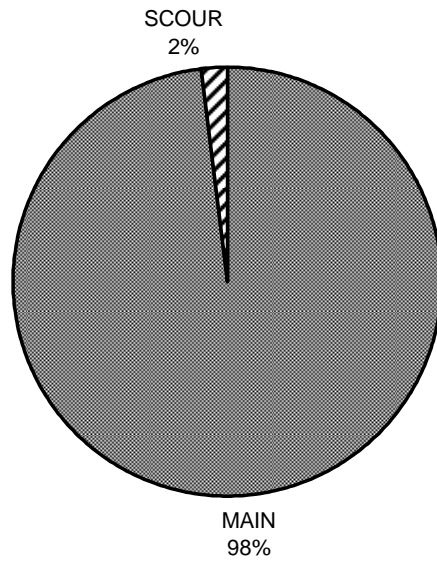
Soda Spring Creek
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



GRAPH 3

Soda Spring Creek

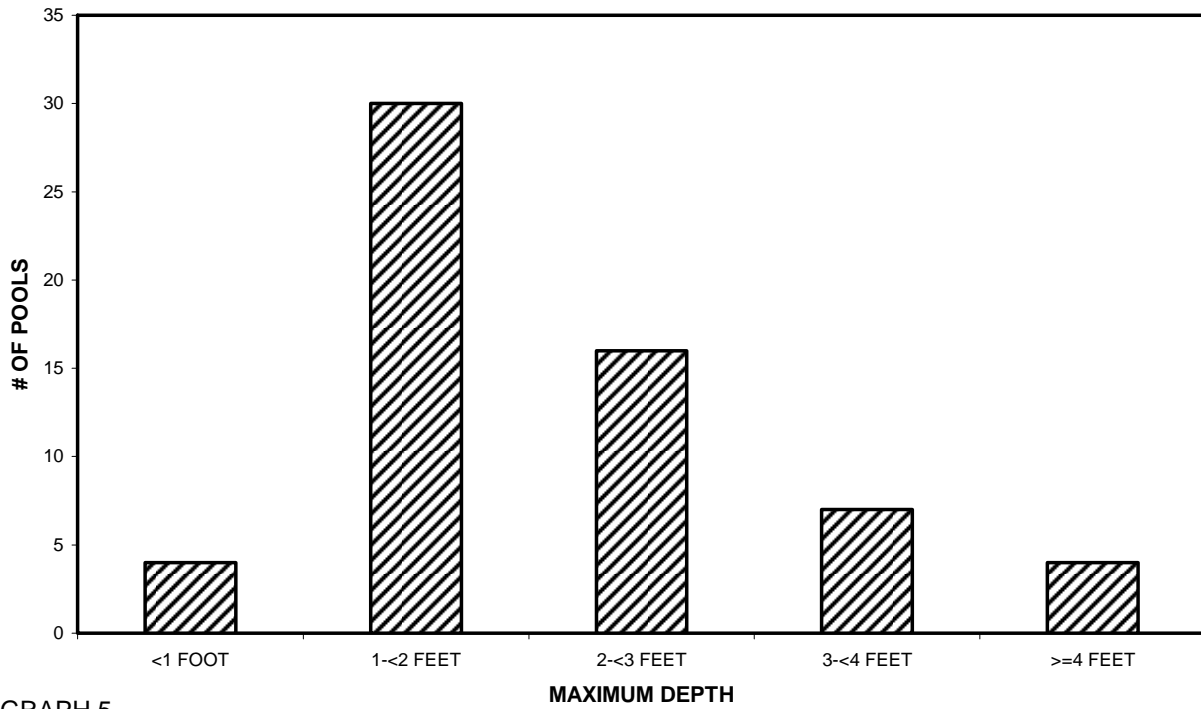
Soda Spring Creek
POOL HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 4

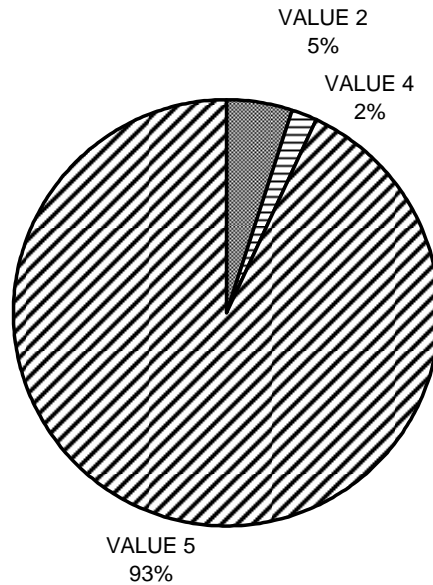
Soda Spring Creek

**Soda Spring Creek
MAXIMUM DEPTH IN POOLS**



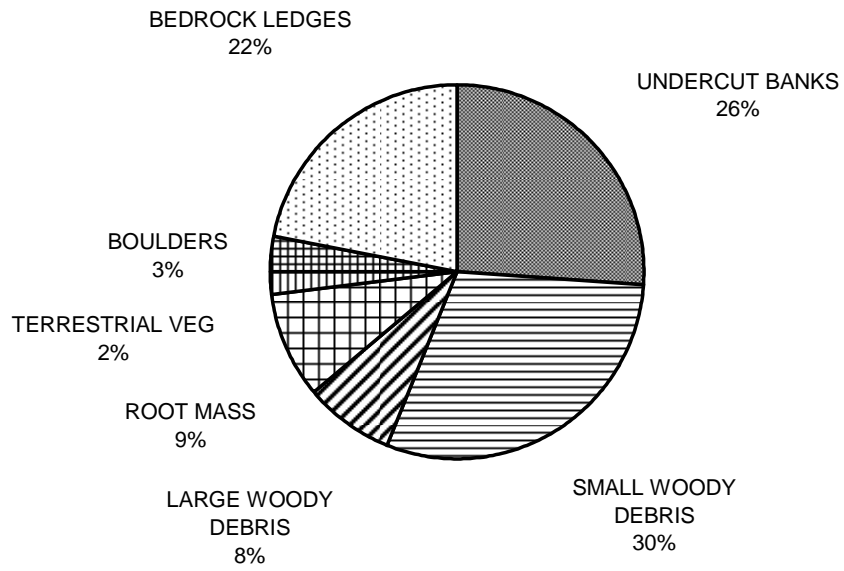
GRAPH 5

**Soda Spring Creek
PERCENT EMBEDDEDNESS**



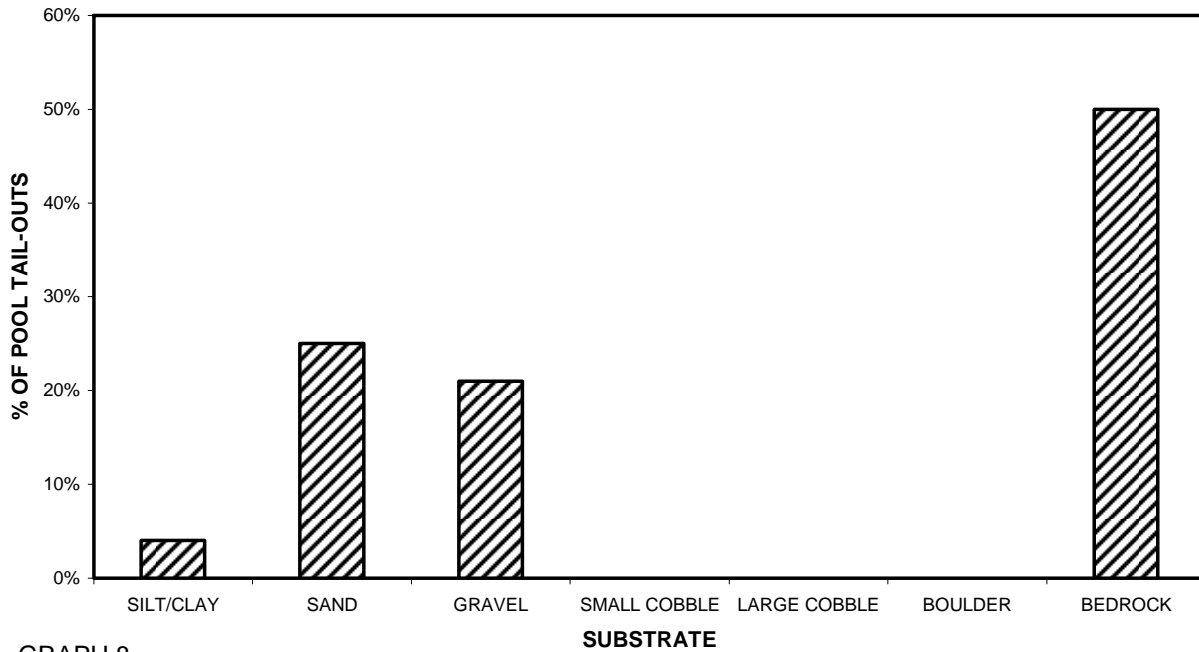
GRAPH 6

Soda Spring Creek MEAN PERCENT COVER TYPES IN POOLS



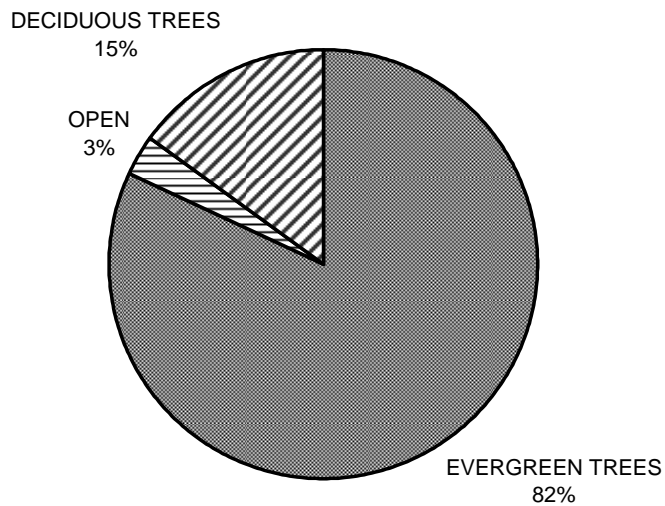
GRAPH 7

Soda Spring Creek SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



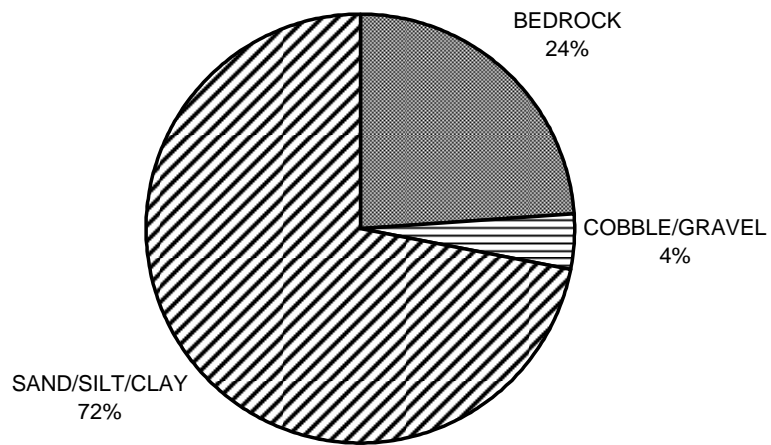
GRAPH 8

Soda Spring Creek MEAN PERCENT CANOPY



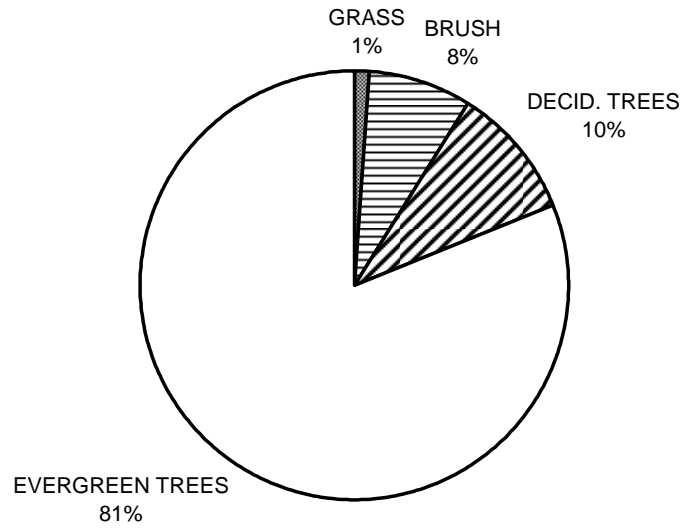
GRAPH 9

Soda Spring Creek DOMINANT BANK COMPOSITION IN SURVEY REACH



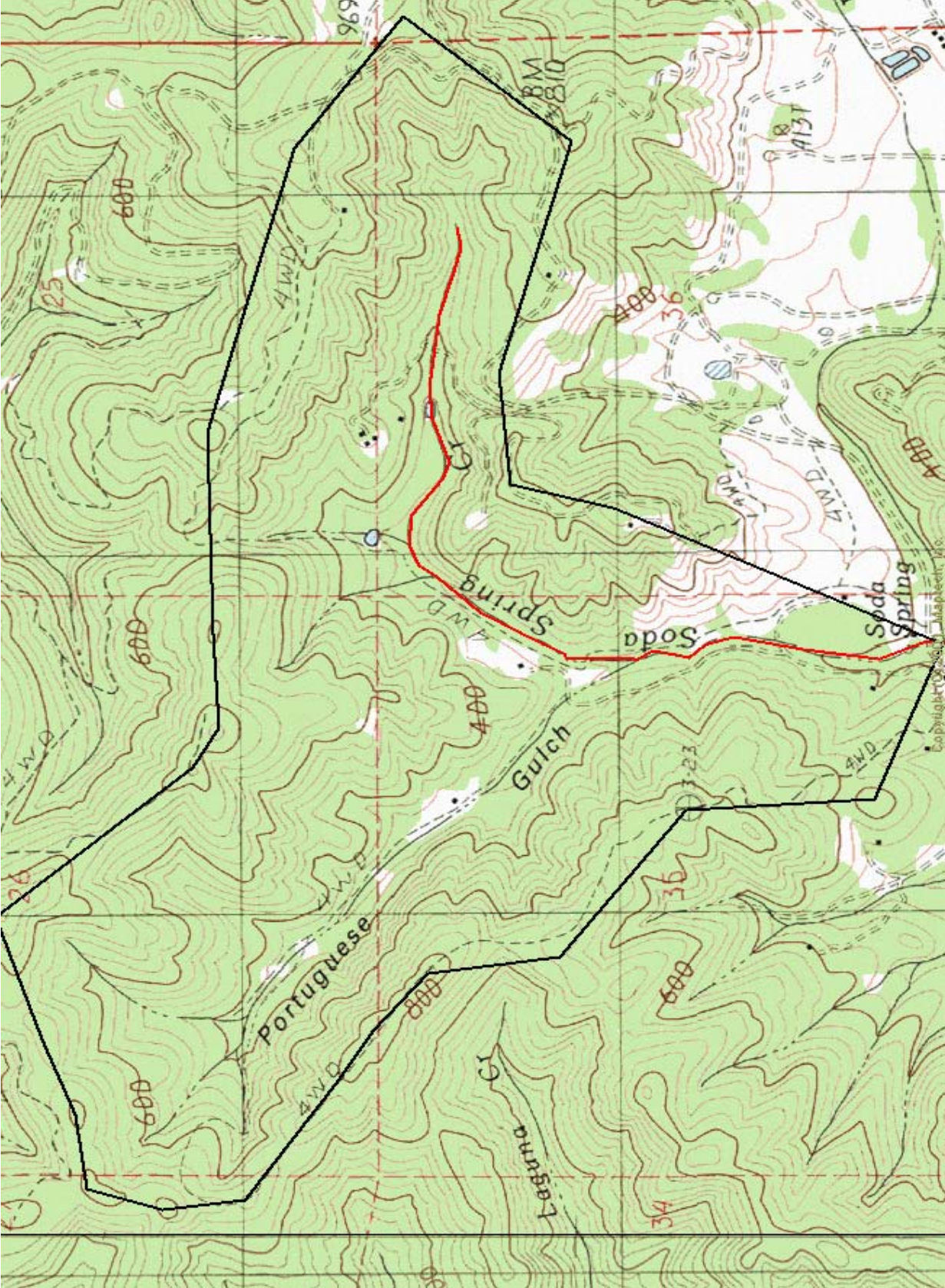
GRAPH 10

Soda Spring Creek DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Soda Spring Creek



MAP 1. Soda Spring Creek.