STREAM INVENTORY REPORT

Right Bank Tributary Two to Alder Creek

INTRODUCTION

A stream inventory was conducted beginning August 12 and ending August 20, 2003 on Right Bank Tributary Two to Alder Creek. The survey began at the confluence with Alder Creek and extended upstream 7,643 feet.

The Right Bank Tributary Two inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Right Bank Tributary Two. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

WATERSHED OVERVIEW

Right Bank Tributary Two is a tributary to Alder Creek, a tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). Right Bank Tributary Two's legal description at the confluence with Alder Creek is T13N R15W S7. Its location is 38°59′56″ north latitude and 123°33′18″ west longitude. Right Bank Tributary Two is a first order stream and has approximately 6,494 feet of solid blue line stream and 1,574 feet of dashed blue line stream according to the USGS Cold Spring 7.5 minute quadrangle. Right Bank Tributary Two drains a watershed of approximately 1.20 square miles. Elevations range from about 600 feet at the mouth of the creek to 2,202 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production and rangeland. Vehicle access exists via Piper Ranch logging roads.

METHODS

The habitat inventory conducted in Right Bank Tributary Two follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998). The California Department of Fish and Game field crew and 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 Right Bank Tributary Two 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". Right Bank Tributary Two 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 Right Bank Tributary Two, 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 Right Bank Tributary Two, 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.

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 Right Bank Tributary Two, 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 Right Bank Tributary Two, 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.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Right Bank Tributary Two. Sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

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 seven 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 Right Bank Tributary Two 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

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HABITAT INVENTORY RESULTS

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

The habitat inventory of August 12 to 20, 2003, was conducted by B. Budnick (DFG) and G. Trousdale (WSP/Americorps). The total length of the stream surveyed was 7,643 feet with an additional 15 feet of side channel.

Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.23 cfs on October 21, 2003.

Right Bank Tributary Two is an F4 channel type for 710 feet, a B4 for 5,310 feet, and an A4 for 1,768 feet of the stream surveyed. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. B4 channels are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools; very stable plan and profile with stable banks and gravel-dominant substrates. A4 channels are steep, narrow, cascading, step-pool streams with high energy/debris transport associated with depositional soils and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 56° to 61° Fahrenheit. Air temperatures ranged from 59° to 83° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 44% riffle units, 44% pool units, and 8% flatwater units (Graph 1). Based on total length of Level II habitat types there were 76% riffle units, 14% pool units, and 7% flatwater units (Graph 2).

Sixteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low-gradient riffles, 43%; mid-channel pools, 19%; and plunge pools, 11% (Graph 3). Based on percent total length, low-gradient rifles made up 75%, runs 6%, and mid-channel pools 5%.

A total of 60 pools were identified (Table 3). Scour pools were the most frequently encountered, at 50%, and comprised 55% 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. Ten of the 60 measured pools (17%) 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, 1 had a value of 1 (2%); 17 had a value of 2 (28%); 27 had a value of 3 (45%); 7 had a value of 4 (12%); and 8 had a value of 5 (13%) (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 32, flatwater habitat types had a mean shelter rating of 19, and pool habitats had a mean shelter rating of 51 (Table 1). Of the pool types, the

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Backwater pools had the highest mean shelter rating at 60. Scour pools had a mean shelter rating of 53 and main-channel pools had a mean shelter rating of 48 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks are the dominant cover types in Right Bank Tributary Two. Graph 7 describes the pool cover in Right Bank Tributary Two. Undercut banks are the dominant pool cover types followed by large woody debris.

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 78% of pool tail-outs while boulders were the next most frequently observed substrate type, at 12%.

The mean percent canopy density for the surveyed length of Right Bank Tributary Two was 94%. The mean percentages of evergreen and deciduous trees were 75% and 19%, respectively with 6% of the canopy open. Graph 9 describes the mean percent canopy in Right Bank Tributary Two.

For the stream reach surveyed, the mean percent right bank vegetated was 53%. The mean percent left bank vegetated was 53%. The dominant elements composing the structure of the stream banks consisted of 2% boulder and 98% sand/silt/clay (Graph 10). Coniferous trees were the dominant vegetation type observed in 79% of the units surveyed. Additionally, 12% of the units surveyed had deciduous trees as the dominant vegetation type, 8% had brush, and 1% had grass as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

No biological inventory was conducted on Right Bank Tributary Two.

DISCUSSION

Right Bank Tributary Two is an F4 channel type for 710 feet, a B4 channel type for 5,130 feet, and an A4 for 1,768 feet of stream surveyed. The suitability of F4, B4, and A4 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, and channel constrictors. B4 channel types are excellent for low-stage plunge weirs, boulder clusters, bank-placed boulders, single and opposing wing-deflectors, and log cover. A4 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded during the survey ranged from 56° to 61° Fahrenheit. Air temperatures ranged from 59° to 83° Fahrenheit. Recorded water temperatures below 60° Fahrenheit are suitable 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.

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Riffle habitat types comprised 76% of the total length of this survey, pools 14%, and flatwater 7%. The pools are relatively shallow, with only 9 of the 60 (15%) 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Eighteen of the 60 pool tail-outs measured had embeddedness ratings of 1 or 2. Thirty-four of the pool tail-outs had embeddedness ratings of 3 or 4. Eight 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 Right Bank Tributary Two should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Fifty-one of the 60 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 19. The mean shelter rating for pools was 51. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in all habitat types. Additionally, large woody debris contributes 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 94%. Reach 1 had a canopy density of 91% while Reaches 2 and 3 had canopy densities of 95% and 97%, respectively.

The percentage of right and left bank covered with vegetation was moderate at 53% and 53%, 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) Right Bank Tributary Two should be managed as an anadromous, natural production stream.

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) There are several log debris accumulations present on Right Bank Tributary Two 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.

4) 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.

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

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) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives should be explored with the grazier and developed if possible.

8) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem. Fish passage should be monitored and improved where possible.

9) 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.

COMMENTS AND LANDMARKS

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

Position (ft):	Habitat unit #:	Comments:
0	0001	Start of survey at confluence with Alder Creek. Old logs low over creek from 50' to 70' into the unit and 20' into the next unit. The new bridge is high over the old bridge.
117	0004	New water hose runs from Alder Creek along this tributary.
130	0005	Salmonids observed.
207	0008	Left bank erosion.

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234	0010	Right and left bank erosion. Large debris accumulation (LDA) measures 20' long x 20' wide x 5' high, retaining 4' sediment, >10 pieces of large woody debris (LWD), rootmass, and small woody debris (SWD).
254	0011	Riparian vegetation: tan oak, alder, maple, redwood, madrone, Douglas fir. Left and right bank erosion ends in this unit. Young alder trees fallen over creek.
342	0014	Bank full width (BFW) measured.
443	0015	"Fish 2000" flag
474	0017	Channel type is an F4.
592	0022	Still observing young-of-the-year (YOY) salmonids. LDA consists of four pieces of LWD and SWD, water flows under.
670	0026	Dry tributary on left bank. Small log jam, more that four pieces of LWD, on side of channel.
710	0028	Channel type changes to a B4.
782	0031	Gradient increasing.
1134	0038.01	Pool is along side a riffle, divider between pool and riffle is without permanent vegetation.
1228	0044	Dry tributary.
1347	0047	Gradient decreasing.
1414	0049	LDA, approximately 10 logs, not a barrier.
1652	0055	LDA at end of unit, retaining sediment.
1845	0057	Salmonids observed.
1934	0060	LDA at end of unit, retaining sediment.
2005	0063	LDA retaining sediment.
2209	0068	Right bank tributary.
2292	0069	Left bank tributary.

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2424	0073	Eight frogs and more than four fish with lateral black stripe (salmonids) observed above culvert. Instream culvert, 18" diameter, loose dirt pushed over culvert to make a road is adding fine sediment to creek, very recent construction, no vegetation.
2440	0074	Pool is dammed by new road. YOY salmonids observed. LDA measures 3' high x 2' long x 10' wide, not a barrier.
2565	0078	YOY salmonids observed below LDA. LDA measures eight pieces of LWD and SWD, 5'-10' high x 20' wide x 10' long, retaining 5' sediment, scour under jam.
2901	0080	Gradient very low after jam, wide flat forest on both sides of creek. Trail high on left bank leads to road crossing in unit 073.
2941	0081	Salmonid YOY observed.
3062	0084	Dry tributary on right bank.
3090	0085	Right bank tributary: "Fork of Right Bank Tributary One". LDA at 76', large rootmass with dirt from uprooted redwood clump, creek goes under rootmass.
3176	0086	Pool formed by scour behind root mass.
3191	0087	Gradient increasing (still <4%). At 100', channel narrow and entrenched, brushy.
3526	0089	Steep eroding banks. Salmonid YOY observed and/or possibly another unidentified fish, and a juvenile salamander.
3690	0091	Impassable brush in channel, willow and dogwood, length measured from bank.
3901	0094	Periodic evidence of cattle, raccoon, and other animals on banks and road. Dry left bank tributary.
3910	0095	LDA end of unit, rootmass which water flows through.
3976	0096	LDA two large, old logs 4' high across creek.
3986	0097	Pieces of culvert on banks. LDA.
4459	0101	Impassable brush in channel.
4587	0103	LDA at 15', water flows under several large logs <2' high.

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4685	0106	Plunge 1.5', flat 1.5', plunge 1.5' (like big stairs) over a log. Right bank is steep. 2"-4" unidentified fish.
4714	0107	Creek bends to the east and a right bank tributary enters from north.
5090	0108	Old road crossing over pool.
5360	0114	Right bank tributary.
5435	0117	Old foundation over creek, three large logs placed about 15' apart.
5840	0118	Channel type changes to an A4, begin fully sampling.
5961	0120	Culvert with 3' diameter, 4' high plunge from culvert to pool, water not flowing through culvert, but through a hollowed out hold under road. Culvert needs maintenance.
6018	0121	Right bank erosion.
6588	0127	Right bank spring.
6975	0129	Right bank spring. LDA retaining sediment.
7608	0133	End of survey. Channel narrow, low water flow, last fish observed in unit 106. LDA lying parallel within creek.

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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: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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
2	0	CULVERT	1.5	36	73	1.0									
11	4	FLATWATER	8.1	47	517	6.8	5.5	0.4	0.9	282	3097	109	1194		19
2	0	NOSURVEY	1.5	90	180	2.4									
60	60	POOL	44.4	18	1054	13.9	7.6	0.7	1.5	132	7902	118	7079	89	51
60	13	RIFFLE	44.4	97	5809	76.0	5.1	0.3	0.7	268	16089	89	5332		32

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
135	77	7643	27087.9	13605.33

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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 (%)
58	11	LGR	43.0	99	5769	75.5	5	0.3	1	298	17269	101	5837		31	93
1	1	HGR	0.7	13	13	0.2	3	0.4	0.6	31	31	12	12		60	92
1	1	BRS	0.7	27	27	0.4	7	0.2	0.7	180	180	36	36		15	95
1	1	GLD	0.7	40	40	0.5	6	0.2	0.9	240	240	48	48		5	94
10	3	RUN	7.4	48	477	6.2	5	0.5	1	295	2953	129	1288		23	97
26	26	MCP	19.3	15	402	5.3	8	0.7	3.1	127	3292	127	3306	100	48	95
3	3	STP	2.2	21	62	0.8	6	0.7	1.9	109	326	103	310	79	50	96
5	5	CRP	3.7	17	86	1.1	8	0.5	1.6	126	632	87	435	66	52	93
4	4	LSL	3.0	15	59	0.8	7	0.5	1.1	109	437	77	307	41	75	89
2	2	LSR	1.5	26	51	0.7	8	0.6	1.5	193	385	135	270	116	10	92
2	2	LSBk	1.5	33	66	0.9	6	0.8	2.5	194	388	197	393	148	20	97
2	2	LSBo	1.5	16	32	0.4	8	0.5	1.5	124	249	91	183	53	45	95
15	15	PLP	11.1	19	291	3.8	8	0.6	2.8	140	2104	121	1811	89	58	96
1	1	SCP	0.7	15	15	0.2	6	0.7	1.5	90	90	63	63	63	60	94
2	0	CUL	1.5	36	73	1.0										71
2	0	NS	1.5	90	180	2.4										94

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
135	77	7643	28575.72	14299.38

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Table 3 - Summary of Pool Types

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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
29	29	MAIN	48	16	464	44	7.8	0.7	125	3618	98	2843	48
30	30	SCOUR	50	20	585	55	7.5	0.6	140	4195	82	2457	53
1	1	BACKWATER	2	15	15	1	6.0	0.7	90	90	63	63	60

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
60	60	1064	7902.4	5363.545

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

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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
26	MCP	43	2	8	18	69	5	19	1	4	0	0
3	STP	5	0	0	3	100	0	0	0	0	0	0
5	CRP	8	0	0	5	100	0	0	0	0	0	0
4	LSL	7	0	0	4	100	0	0	0	0	0	0
2	LSR	3	0	0	2	100	0	0	0	0	0	0
2	LSBk	3	0	0	1	50	1	50	0	0	0	0
2	LSBo	3	0	0	2	100	0	0	0	0	0	0
15	PLP	25	2	13	11	73	2	13	0	0	0	0
1	SCP	2	0	0	1	100	0	0	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
60	4	7	47	78	8	13	1	2	0	0

Mean Maximum Residual Pool Depth (ft.): 1.5

Right Bank Tributary Two to Alder Creek

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003 Dry Units: 0

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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
58	11	LGR	13	32	15	10	6	0	9	15	0
1	1	HGR	0	30	30	10	0	0	20	10	0
1	1	BRS	0	30	0	0	0	0	0	70	0
60	13	TOTAL RIFFLE	11	32	15	9	5	0	9	19	0
1	1	GLD	90	10	0	0	0	0	0	0	0
10	3	RUN	55	22	0	0	20	2	2	0	0
11	4	TOTAL FLAT	64	19	0	0	15	1	1	0	0
26	26	MCP	25	30	26	8	4	0	1	6	0
3	3	STP	18	17	23	0	0	0	15	27	0
5	5	CRP	62	13	8	0	9	0	0	8	0
4	4	LSL	8	24	56	0	0	0	5	8	0
2	2	LSR	0	0	0	100	0	0	0	0	0
2	2	LSBk	80	20	0	0	0	0	0	0	0
2	2	LSBo	15	0	15	0	0	0	5	65	0
15	15	PLP	16	16	23	6	2	0	21	15	1
1	1	SCP	60	0	0	0	40	0	0	0	0
60	60	TOTAL POOL	26	21	23	8	4	0	7	11	0
2	0	CUL									
2	0	NS									
135	77	TOTAL	25	23	20	8	4	0	7	12	0

Right Bank Tributary Two to Alder Creek

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003 Dry Units: 0

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

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
58	11	LGR	0	9	91	0	0	0	0
1	1	HGR	0	0	0	0	0	100	0
1	1	BRS	0	0	0	0	0	0	100
1	1	GLD	0	0	100	0	0	0	0
10	3	RUN	0	33	67	0	0	0	0
26	26	MCP	4	12	81	0	0	4	0
3	3	STP	0	0	33	0	0	67	0
5	5	CRP	0	20	80	0	0	0	0
4	4	LSL	0	50	25	25	0	0	0
2	2	LSR	0	0	100	0	0	0	0
2	2	LSBk	0	100	0	0	0	0	0
2	2	LSBo	0	0	50	0	0	0	50
15	15	PLP	0	0	80	7	7	0	7
1	1	SCP	0	100	0	0	0	0	0

Right Bank Tributary Two to Alder Creek

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Alder, RB Trib 2 Drainage: Point Arena

Survey Dates: 8/12/2003 to 8/20/2003 Survey Length (ft.): 7643 Main Channel (ft.): 7608 Side Channel (ft.): 35

Confluence Location: Quad: COLD SPRING Legal Description: T13NR15WS07 Latitude: 38:59:56.0N Longitude: 123:33:18.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4
Reach Length (ft.): 710
Riffle/Flatwater Mean Width (ft.): 4.2
BFW:
Range (ft.): 0 to 15
Mean (ft.): 15
Std. Dev.: 0
Base Flow (cfs.): 0.0
Water (F): 56 - 61 Air (F): 70 - 83
Dry Channel (ft): 0

Canopy Density (%): 91
Coniferous Component (%): 72
Deciduous Component (%): 28
Dominant Bank Vegetation: Evergreen Trees
Vegetative Cover (%): 69
Dominant Shelter: Small Woody Debris
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 11
LWD per 100 ft.:
Riffles: 2
Pools: 6
Flat: 0

Pools by Stream Length (%): 24
Pool Frequency (%): 44
Residual Pool Depth (%):
< 2 Feet Deep: 100
2 to 2.9 Feet Deep: 0
3 to 3.9 Feet Deep: 0
>= 4 Feet Deep: 0
Mean Max Residual Pool Depth (ft.): 1.4
Mean Pool Shelter Rating: 30

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 83 Sm Cobble: 0 Lg Cobble: 0 Boulder: 17 Bedrock: 0
Embeddedness Values (%): 1. 0 2. 42 3. 42 4. 0 5. 17

STREAM REACH: 2

Channel Type: B4
Reach Length (ft.): 5130
Riffle/Flatwater Mean Width (ft.): 5.8
BFW:
Range (ft.): 0 to 15
Mean (ft.): 11
Std. Dev.: 2
Base Flow (cfs.): 0.0
Water (F): 56 - 61 Air (F): 59 - 83
Dry Channel (ft): 0

Canopy Density (%): 95
Coniferous Component (%): 79
Deciduous Component (%): 21
Dominant Bank Vegetation: Evergreen Trees
Vegetative Cover (%): 69
Dominant Shelter: Undercut Banks
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 22
LWD per 100 ft.:
Riffles: 2
Pools: 7
Flat: 0

Pools by Stream Length (%): 16
Pool Frequency (%): 44
Residual Pool Depth (%):
< 2 Feet Deep: 78
2 to 2.9 Feet Deep: 20
3 to 3.9 Feet Deep: 2
>= 4 Feet Deep: 0
Mean Max Residual Pool Depth (ft.): 1.6
Mean Pool Shelter Rating: 56

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 2 Gravel: 76 Sm Cobble: 10 Lg Cobble: 0 Boulder: 12 Bedrock: 0
Embeddedness Values (%): 1. 2 2. 24 3. 46 4. 15 5. 12

Right Bank Tributary Two to Alder Creek

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

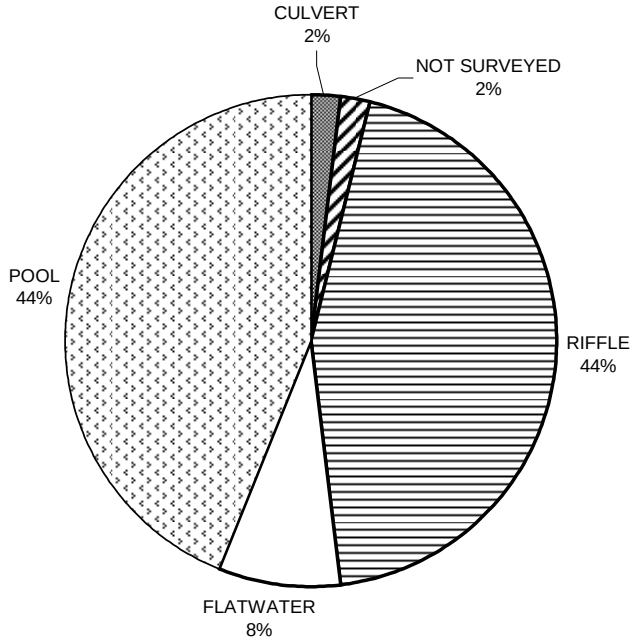
Channel Type: A4	Canopy Density (%): 97	Pools by Stream Length (%): 4
Reach Length (ft.): 1768	Coniferous Component (%): 99	Pool Frequency (%): 41
Riffle/Flatwater Mean Width (ft.): 4.0	Deciduous Component (%): 1	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Evergreen Trees	< 2 Feet Deep: 100
Range (ft.): 6 to 6	Vegetative Cover (%): 63	2 to 2.9 Feet Deep: 0
Mean (ft.): 6	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 0
Std. Dev.: 0	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 29	Mean Max Residual Pool Depth (ft.): 1.1
Water (F): 58 - 59 Air (F): 66 - 74	LWD per 100 ft.:	Mean Pool Shelter Rating: 51
Dry Channel (ft): 0	Riffles: 3	
	Pools: 8	
	Flat:	

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 86 Sm Cobble: 0 Lg Cobble: 14 Boulder: 0 Bedrock: 0

Embeddedness Values (%): 1. 0 2. 29 3. 43 4. 14 5. 14

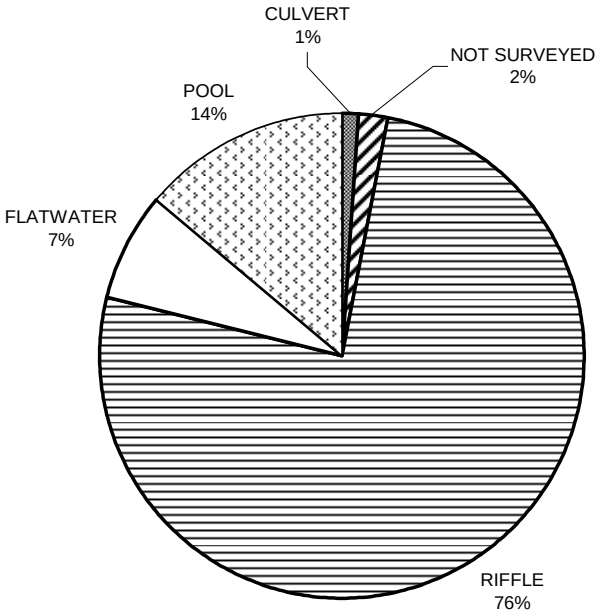
ALDER CREEK, RIGHT BANK TRIBUTARY TWO

HABITAT TYPES BY PERCENT OCCURRENCE



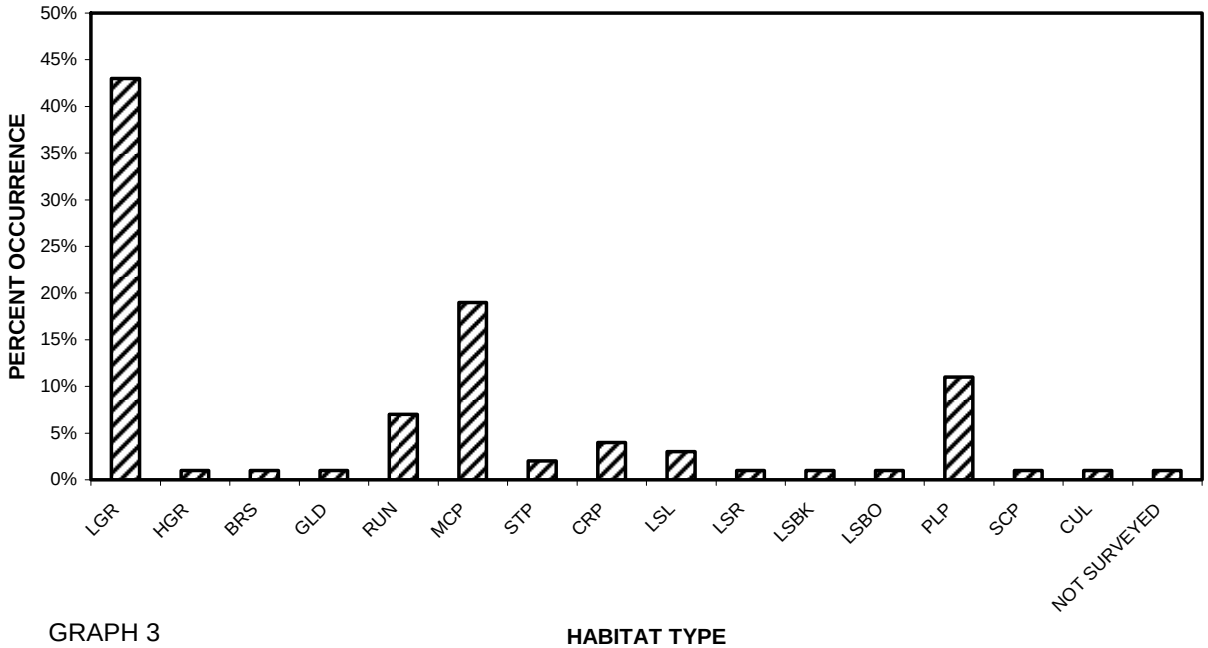
GRAPH 1

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
HABITAT TYPES BY PERCENT TOTAL LENGTH



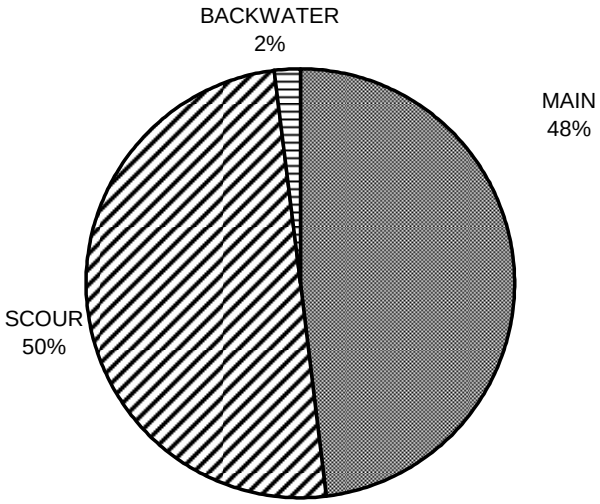
GRAPH 2

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



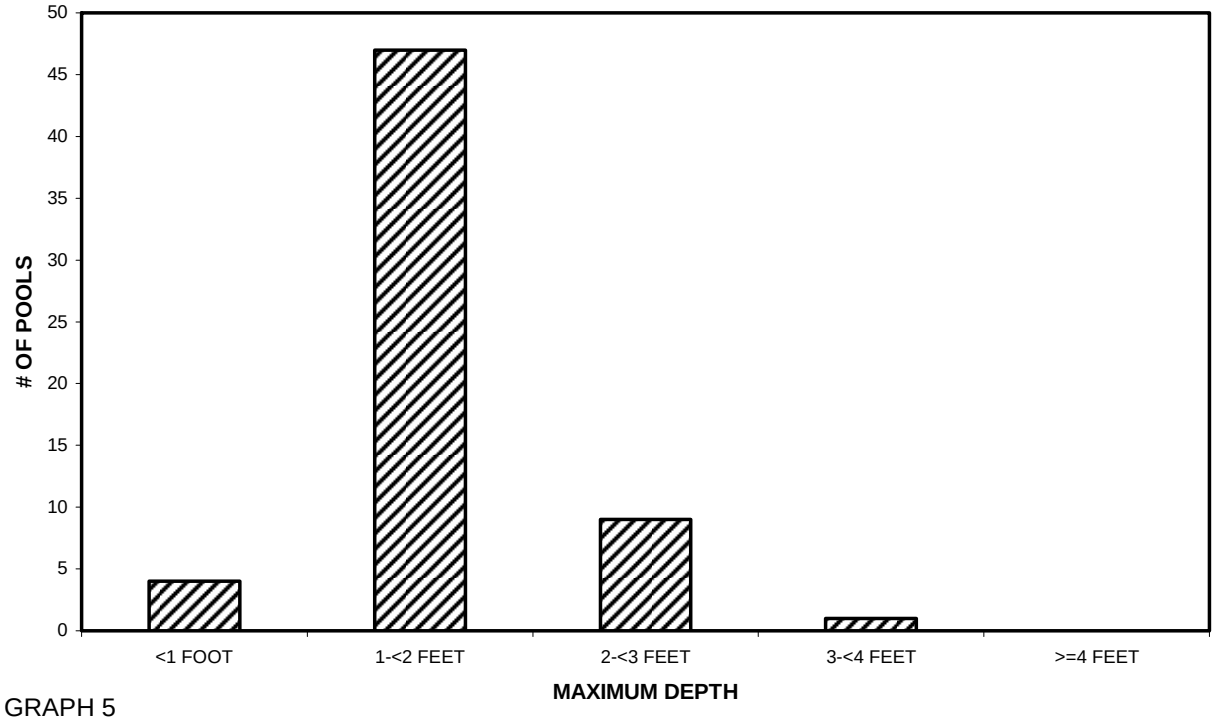
GRAPH 3

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
POOL HABITAT TYPES BY PERCENT OCCURRENCE



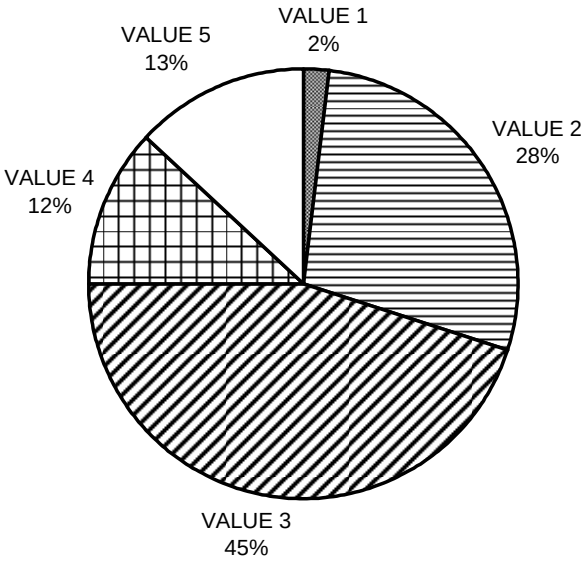
GRAPH 4

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
MAXIMUM DEPTH IN POOLS



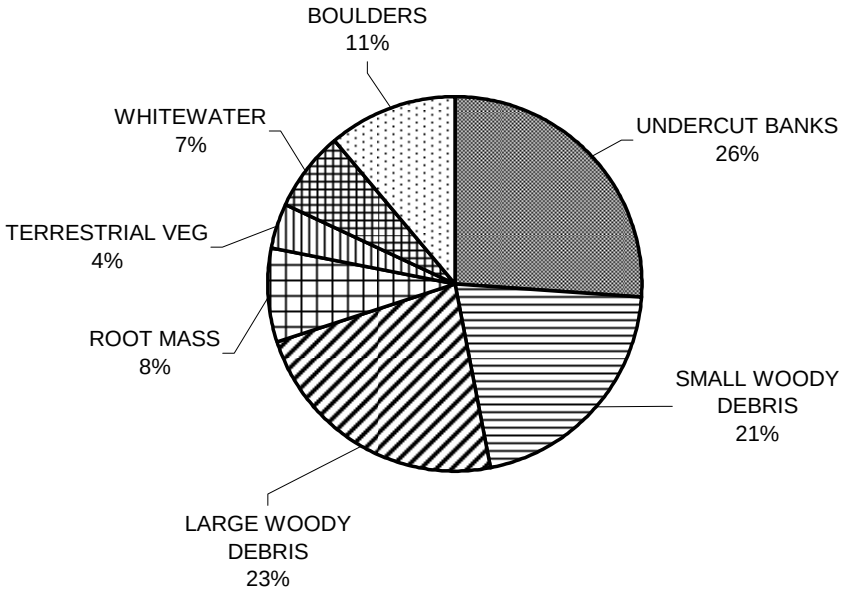
GRAPH 5

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
PERCENT EMBEDDEDNESS



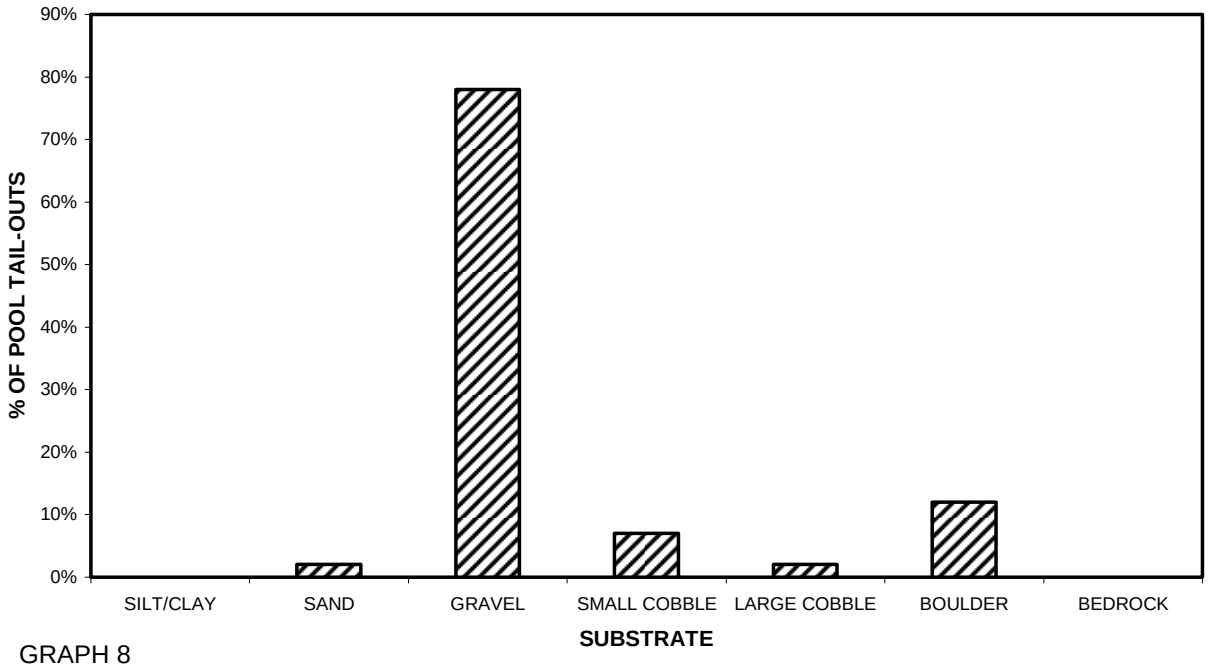
GRAPH 6

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
MEAN PERCENT COVER TYPES IN POOLS



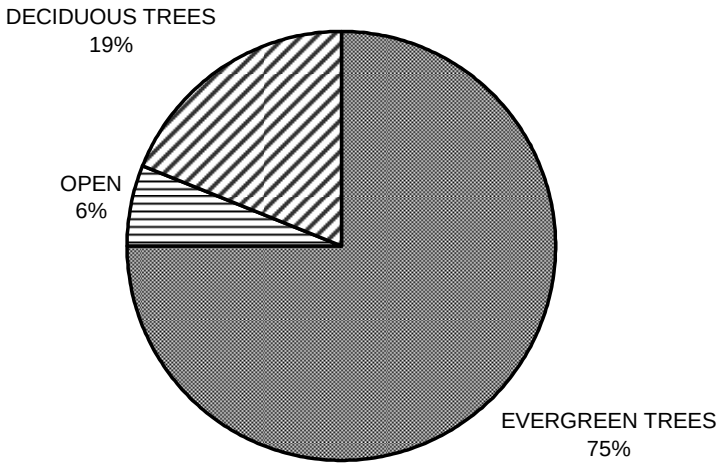
GRAPH 7

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



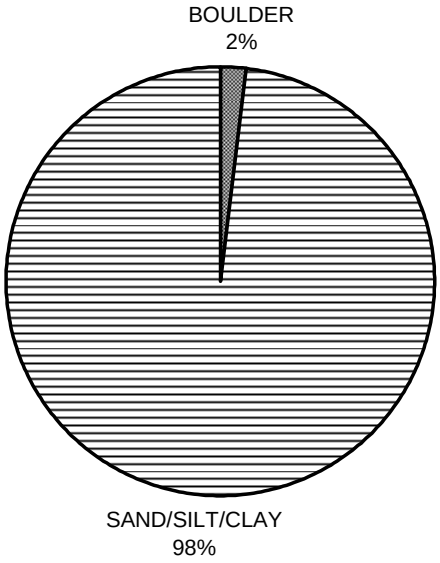
GRAPH 8

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
MEAN PERCENT CANOPY



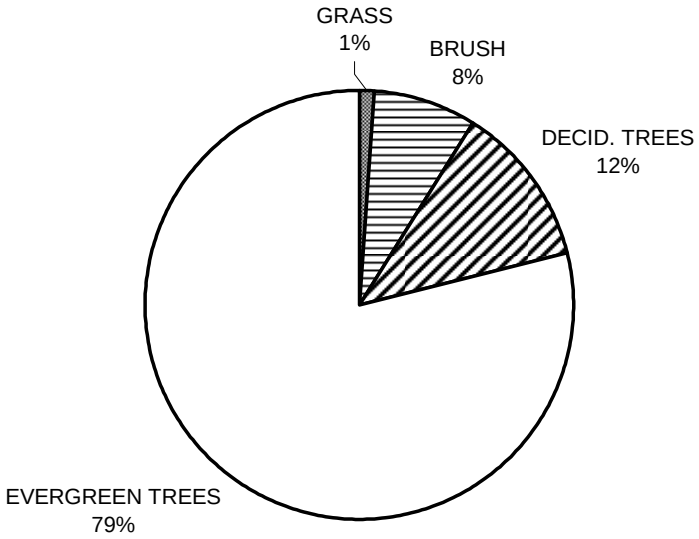
GRAPH 9

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
DOMINANT BANK COMPOSITION IN SURVEY REACH



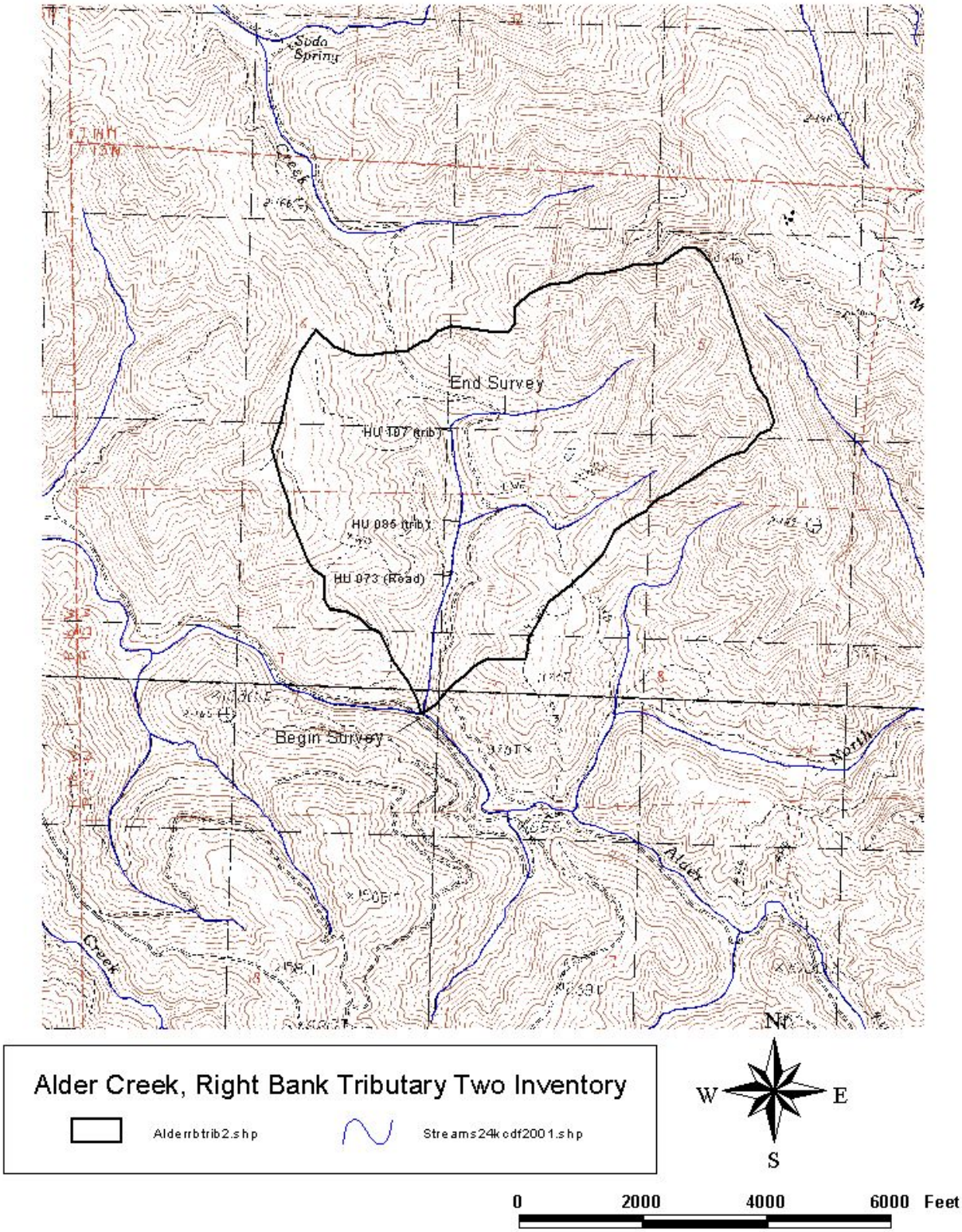
GRAPH 10

ALDER CREEK, RIGHT BANK TRIBUTARY TWO
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Right Bank Tributary Two to Alder Creek



MAP 1. Map of Alder Creek, Right Bank Tributary Two showing the stream habitat inventory reach and watershed boundary.

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.