CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT

Walker Creek
Report Revised April 14, 2006
Report Completed 2002
Assessment Completed 1999

INTRODUCTION

A stream inventory was conducted during the summer of 1999 on Walker Creek. The inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the amount and condition of available habitat to fish and other aquatic species with an emphasis on anadromous salmonids in Walker Creek. The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution.

The objective of this report is to document the current habitat conditions, and recommend options for the potential enhancement of habitat for Chinook salmon, 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

Walker Creek is a tributary to Forsythe Creek, a tributary of the Russian River, located in Mendocino County, California (see Walker Creek map, page 2). The legal description at the confluence with Forsythe Creek is T17N, R13W, S21. Its location is 039°18'52.9" N. latitude and 123°18'52.9" W. longitude. Year round vehicle access exists from Highway 101 near Calpella, via the private road owned by Golden Rule Church directly off of the freeway.

Walker Creek and its tributaries drain a basin of approximately 8.3 square miles. Walker Creek is a second order stream and has approximately 4.9 miles of blue line stream, according to the USGS Laughlin Range and Greenough Ridge 7.5 minute quadrangles. Elevations range from about 1198 feet at the mouth of the creek to 2600 feet in the headwaters. Oak woodland and zones of grassland dominate the watershed, along with areas of redwood forest. The watershed is owned primarily by private landowners and some land within the watershed is managed for timber production, agricultural production and livestock grazing.

The only sensitive species listed from the CNPS Inventory and DFG's Natural Diversity Database within Walker Creek watershed was showy Indian clover (*Trifolium amoenum*), which has a federal status of endangered but no listing by the state of California. In 1999, surveyors also observed steelhead (*Onchorynchus mykiss*), which are federally listed as threatened, and yellow-legged frogs (*Rana boylii*), which are considered sensitive by the U.S. Forest Service.

METHODS

The habitat inventory conducted in Walker Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998). The AmeriCorps Volunteers 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 and was supervised by Bob Coey, Russian River Basin Planner (DFG).

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 Walker Creek to record measurements and observations. There are nine components to the inventory form: flow, channel type, temperatures, habitat type, embeddedness, shelter rating, substrate composition, canopy, and bank composition.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using standard flow measuring equipment, if available. In some cases flows are estimated. Flows are also measured or estimated at major tributary confluences.

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 (1998). 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.

3. Temperatures:

Water and air temperatures, and time, are measured by crew members with hand-held thermometers and recorded at each tenth unit typed. Temperatures are measured in Fahrenheit at the middle of the habitat unit and within one foot of the water surface. Temperatures are also recorded using remote temperature recorders which log temperature every two hours, 24 hours/day.

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". Walker 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 unit lengths were measured. The first occurrence of each unit type and a randomly selected 10% subset of all units were completely sampled (Length, Mean Width, Mean Depth, Maximum Depth and Pool Tail Crest Depth). All measurements are in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Walker Creek, embeddedness was visually estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), 76 - 100% (value 4). "Not suitable" (value 5) is assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, absence of particulate substrate (e.g. 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. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All shelter is then classified according to a list of nine shelter types. In Walker Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the shelter. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent covered. Thus, shelter ratings can range from 0-300, and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

In all fully measured habitat units, dominant and sub-dominant substrate elements are visually estimated using a list of seven size classes: Silt/Clay, Sand, Gravel, Small Cobble, Large Cobble, Boulder, and Bedrock.

8. Canopy:

Stream canopy density is estimated using modified handheld spherical densiometers as described in the California Salmonid Stream Habitat Restoration Manual (1998). Canopy density relates to the amount of stream shaded from the sun. In Walker 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. Finally, the total canopy over each habitat unit is visually divided into evergreen and deciduous, and the estimated percentages are recorded.

9. Bank Composition and Vegetation:

Banks may be composed primarily of (1) Bedrock, (2) Boulders, (3) Cobble/Gravel, or (4) Silt/Clay/Sand, and may be covered predominantly with (5) Grass, (6) Brush, (7) Deciduous Trees, (8) Coniferous Trees, or (9) No Vegetation at all. These factors influence the ability of stream banks to withstand winter flows. For each fully measured habitat unit in Walker Creek, the dominant Bank Composition Type and Vegetation Type of both the right and left banks were chosen from the options above. Additionally, the percentage of vegetal coverage was estimated and recorded for each bank

BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream. Biological inventory is conducted using one or more of three basic methods: 1) stream bank observation, 2) underwater observation, 3) electrofishing. These sampling techniques are discussed in the California Salmonid Stream Habitat Restoration Manual.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat, a dBASE IV data entry program developed by CDFG. This program processes and summarizes the data, and produces the following tables and appendices:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Shelter by habitat types
- Dominant substrates by habitat types
- Vegetative cover and dominant bank composition
- Fish habitat elements by stream reach

Graphics are produced from the tables using Lotus 1,2,3. Graphics developed for Little Sulphur Creek include:

- Level II Habitat Types by % Occurrence and % Total Length
- Level IV Habitat Types by % Occurrence
- Pool Habitat Types by % Occurrence
- Maximum Depth in Pools
- Pool Shelter Types by % Area
- Substrate Composition in Low Gradient Riffles
- Percent Cobble Embeddedness by Reach
- Mean Percent Canopy

- Mean Percent Canopy
- Percent Bank Composition and Bank Vegetation

HISTORICAL STREAM SURVEYS

In a survey of Forsythe Creek conducted by the CDFG in July 1963 it was noted that a dam was located on Walker Creek, with no summer flow released.

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 17-18, 1999 was conducted by Ethan Jankowski and Sean Higgins (AmeriCorps Interns) with supervision and analysis by CDFG. The survey began at the confluence with Forsythe Creek and extended up Walker Creek to the end of anadromous fish passage at the dam at the base of Walker Lake. The total length of stream surveyed was 9,397 feet.

Flows were not measured on Walker Creek, as there was no water at the mouth.

This section of Walker Creek has 2 channel types: from the mouth to 5,916 feet a B4 and the upper 3,481 feet an F4.

B4 channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated channels, with infrequently spaced pools, a very stable plan and profile, stable banks and have a predominantly gravel substrate.
F4 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate.

Water temperatures on the survey dates ranged from 61°F to 72°F. Air temperatures ranged from 64°F to 91°F. Summer water temperatures were also measured using a remote temperature recorder placed in a pool (see Temperature Summary graph at end of report). A recorder in Reach 1 at the first road crossing above the redwood grove logged temperatures every 2 hours from June 29-July 12, 1999. The highest temperature recorded was 73°F in June and the lowest was 59°F in July.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 59% pool units, 26% dry streambed units, 9% riffle units, and 5% flatwater units. Based on total **length** there were 58% dry streambed units, 32% pool units, 5% riffle units, and 5% flatwater units.

Ninety-nine habitat units were measured and 12% were completely sampled. Eight Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by

percent occurrence were mid-channel pools at 30%, dry streambed at 26%, root wad scour pools at 23% and low gradient riffles at 9%. By percent total length, dry streambed made up 58%, mid-channel pools 20%, root wad scour pools 9%, and low gradient riffles 5%.

Fifty-eight pools were identified (Table 3). Main Channel pools were most often encountered at 52%, and comprised 63% of the total length of pools.

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirty four of the 58 pools (59%) had a depth of two feet or greater. These deeper pools comprised 22% of the total length of stream habitat.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle types had the highest shelter rating at 75. Flatwater had the lowest rating with 5 and pools rated 69 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 77, main channel pools rated 60, and backwater pools rated 0 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were root masses at 27%, small woody debris at 20%, large woody debris at 20%, and terrestrial vegetation at 19%.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 1 of the 2 low gradient riffles measured. Small cobble was dominant in none of the low gradient riffles.

No mechanical gravel sampling was conducted in 1999 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 51 pool tail-outs measured, 4 had a value of 1(8%); 13 had a value of 2 (25%); 12 had a value of 3 (24%); and 17 had a value of 4 (33%). Five (10%) pool tail-outs rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 67%. The mean percentages of deciduous and evergreen trees were 49% and 51%, respectively.

For the entire stream reach surveyed, the mean percent right bank vegetated was 29% and the mean percent left bank vegetated was 20%. For the habitat units measured, the dominant vegetation types for the stream banks were: 65% grass, 23% evergreen trees, and 12% deciduous trees. The dominant substrate for the stream banks were: 50% silt/clay/sand, 46% cobble/gravel, and 4% bedrock

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

On September 1, 1999 a biological inventory was conducted in Walker Creek at five sites in Reach 1 to document the fish species composition and distribution. Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. A random sample of fish was selected from each reach and tissues were taken for genetic analysis. The air temperature was 76° and the water temperature was 62°. The observers were Sean Higgins (AmeriCorps), and Bryan Freele (DFG). At the time the biological sampling was conducted, Walker Creek had intermittent flow, with residual pools and glides separated by stretches of completely dry streambed with subterranean flow.

The inventory of the first site in Reach 1 started at habitat unit #11 and ended approximately 62 feet upstream. In pool habitat types, 13 steelhead (ranging from 2.25 to 6.25 inches in length) were observed, along with 4 green sunfish. It was noted that water levels had dropped significantly over the previous two weeks (approximately 6 inches).

The inventory of the second site in Reach 1 started at habitat unit #13 and ended approximately 62 feet upstream. In pool habitat types, 8 steelhead (ranging from 2.5 to 3.37 inches in length) were observed, along with 4 green sunfish. Three Pacific lamprey larvae were also present.

The inventory of the third site in Reach 1 started at habitat unit #22 and ended approximately 135 feet upstream. In pool habitat types, 20 steelhead (ranging from 2.37 to 3.5 inches in length) were observed, along with 3 green sunfish. Two Pacific lamprey larvae were also present.

The inventory of the fourth site in Reach 1 started at habitat unit #33 and ended approximately 63 feet upstream. In riffle habitat types, 7 steelhead (ranging from 2.75 to 3.25 inches in length) were observed, along with 1 yellow-legged frog.

The inventory of the fifth site in Reach 1 started at habitat unit #40 and ended approximately 78 feet upstream. In pool habitat types, 4 steelhead (ranging from 2.5 to 3.5 inches in length) were observed, along with 1 green sunfish. Three sticklebacks measuring 1 inch in length were observed, along with approximately 50 sticklebacks under 1 inch in length.

A summary of data collected appears in the table below. The sticklebacks and sunfish were presumed to be escapees from Walker Lake.

Table 1. Species Observed in Historical and Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced

Table 1. Species Observed in Historical and Recent Surveys			
YEARS	SPECIES	SOURCE	Native/Introduced
1999	Steelhead	DFG	N
1999	Three-spine Stickleback	DFG	N
1999	California Newt	DFG	N
1999	Yellow-legged Frog	DFG	N
1999	Pacific Lamprey	DFG	N
1999	Green Sunfish	DFG	N

Historical records reflect that fish transfer operations into Walker Creek occurred in 1915, 1958 and 1984.

Table 2. Summary of fish hatchery stocking into Walker Creek				
YEAR	SOURCE	SPECIES	#	SIZE
1915	Upper Eel River	SH	?	?
1958	Howard Creek	SH	1,440	FING
1984	Dry Creek	SH	10,000	FING

SH = steelhead

ADULT SURVEYS:

No carcass/spawning surveys were conducted on Walker Creek in 1999 due to inadequate staffing levels.

DISCUSSION

Walker Creek has 2 channel types: B4 (5,916 ft.) and F4 (3,481 ft.).

According to the DFG Salmonid Stream Habitat Restoration Manual, B4 channel types are excellent

for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. They are also good for medium-stage plunge weirs. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and shelter. This channel type has suitable gradients and the stable stream banks that are necessary for the installation of instream structures designed to increase pool habitat, trap spawning gravels, and provide protective shelter for fish.

F3 channel types are good for bank-placed boulders as well as single and opposing wing-deflectors. They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and shelter. Any work considered will require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days, August 17-18, 1999, ranged from 61°F to 72°F. Air temperatures ranged from 64°F to 91°F. The warmer water temperatures were recorded in Reach 1. The higher temperatures, if sustained, are above the threshold stress level (65°F) for salmonids.

Summer temperatures measured using a remote temperature recorder placed in a pool ranged from 59° to 73°F for Reach 2. The Temperature Summary graph shows that for much of the summer (June through July) Walker Creek exhibited temperatures above the optimal for salmonids.

Pools comprised 32% of the total length of this survey. 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. In Walker Creek, the pools are relatively deep with 59% having a maximum depth of at least 2 feet. These pools comprised 22% of the total length of stream habitat. However, in coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length.

The mean shelter rating for pools was 69. However, a pool shelter rating of approximately 80 is desirable. The fair amount of pool shelter that now exists is being provided primarily by root masses (27%), small woody debris (20%), large woody debris (20%), and terrestrial vegetation (19%). Log and root wad cover in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

One of the 2 low gradient riffles measured (50%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

Fifty-seven of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 8% had a rating of 1. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In a reach comparison, Reach 1 had the poorest ratings.

The mean percent canopy for the survey was 67%. This is a fair percentage of canopy, since 80 percent is generally considered desirable. Cooler water temperatures are desirable in Walker Creek.

Elevated water temperatures could be reduced by increasing stream canopy. The large trees required for adequate stream canopy would also eventually provide a long term source of large woody debris needed for instream shelter and bank stability.

Both Reach 1 and 2 had numerous bank erosion problems. Many sites along Walker Creek could benefit from bio-technical re-vegetation techniques using native species.

GENERAL MANAGEMENT RECOMMENDATIONS

Walker Creek should be managed as an anadromous, natural production stream.

Winter storms bring down many large trees and other woody debris into the stream, which increase the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Efforts to increase flood protection or improve fish access in the short run, have led to long term problems in the system. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1) Both reaches of Walker Creek would benefit from the utilization of bio-technical vegetative techniques to reestablish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.

2) Map sources of upslope and in-channel 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. Near-stream riparian planting along any portion of the stream should be encouraged to provide bank stability and a buffering against agricultural, grazing and urban runoff.

3) In Walker Creek, active and potential sediment sources related to the road system need to be mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

4) Where feasible, design and engineer pool enhancement structures to increase the number of pools throughout the stream. This must be done only where the banks are stable.

5) Increase the canopy on Walker Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels (portions of Reach 1). The non-anadromous reach above the survey section should be assessed for planting and treated as well, since water temperatures throughout are effected from upstream. In many cases,

planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

6) Increase cool water releases from the dam at the base of Walker Lake.

APPENDIX B. PROBLEM SITES AND LANDMARKS: WALKER CREEK SURVEY COMMENTS

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

HABITAT UNIT #	DISTANCE UPSTREAM	COMMENTS
1.00	652	EQUIP WILLOW MATTRESS PROJECT ONGOING
2.00	663	0+ SH, ROACH, NEWTS, H2O USED FOR WILLOW MATTRESS
4.00	1452	0+ SH, ROACH
5.00	1504	TRASHED CULVERT IN CREEK
8.00	1660	LOW FLOW
9.00	1683	MANY SH AND ROACH
10.00	1725	20 0+ SH
11.00	1787	CAT TAILS
12.00	1819	ROAD CROSSING
13.00	1891	0+ SH, BLUEGILL -HOBO
14.00	1946	0+ SH, BLUEGILL
17.00	2137	OLD WASHED OUT ROAD -BRIDGE SITE, SHOT
18.00	2220	CAT TAILS, SH
21.00	2337	BANK EROSION UBIQUITOUS ACROSS REACH
22.00	2461	0+, 1+ SH/ BLUEGILL
23.00	2669	0+ SH
24.00	2728	SH, GREAT CANOPY OF BAY TREES
26.00	2870	NO FISH
27.00	3019	30-40 0+ SH
33.00	3441	STICKLEBACK, ROACH, SH, BLUEGILL, BULLFROGS
37.00	3631	RIGHT BANK EROSION AND SLIDE-GOOD WILLOW PLANTING SITE
41.00	3851	GOOD CANOPY, GOOD COVER
43.00	3901	0+ SH
46.00	4016	SH
48.00	4099	RIGHT BANK EROSION-GOOD SITE FOR WILLOW

		AND RIPARIAN RESTORATION
50.00	4185	HUGE POOL-40', BULLFROGS, SH
54.00	4353	RIGHT BANK EROSION 15' UP FROM STREAM
60.00	4844	RIGHT BANK-DRY TRIB WITH OLD WASHED OUT CULVERT
62.00	5099	TRIB LEFT BANK
64.00	5411	0+ SH, BLUEGILL
69.00	5674	REDWOODS MORE ABUNDANT HERE
70.00	5704	SH
73.00	5828	MAJOR EROSION RIGHT BANK-NEED TO STABILIZE TO PROTECT REDWOOD GROVE
74.00	5870	ROACH, 0+ SH
76.00	5951	CHANNEL CHANGE TO F4 SH
77.00	6080	TRACTOR CROSSING
85.00	6466	SH: 0+, 1+
86.00	6503	CULVERT ON RIGHT BANK 0+ SH
88.00	6590	LEFT BANK EROSION-GOOD BANK RESTORATION SITE
91.00	6655	0+ SH, STICKLEBACK
94.00	6778	SH 1+, 0+
96.00	6939	SH 1+, 0+
98.00	9397	RIGHT BANK TRIB AT 520'. DRY FOR ALMOST 3500 FEET BELOW DAM. WALKER LAKE DAM, AT END OF UNIT, IS 200 FEET LONG X 15FEET WIDE @18% GRADIENT. DRY CEMENT SPILLWAY. WALKER LAKE CONTAINS SUNFISH, BASS AND RAINBOW TROUT.

FIELD NOTES:

-BANK EROSION PRESENT ON BOTH RIGHT AND LEFT BANKS FROM CONFLUENCE UP TO WALKER LAKE

-MANY GOOD SITES FOR WILLOW MATTRESS AND RIPARIAN RESTORATION WORK, ESPECIALLY ON WILDERNESS UNLIMITED LAND

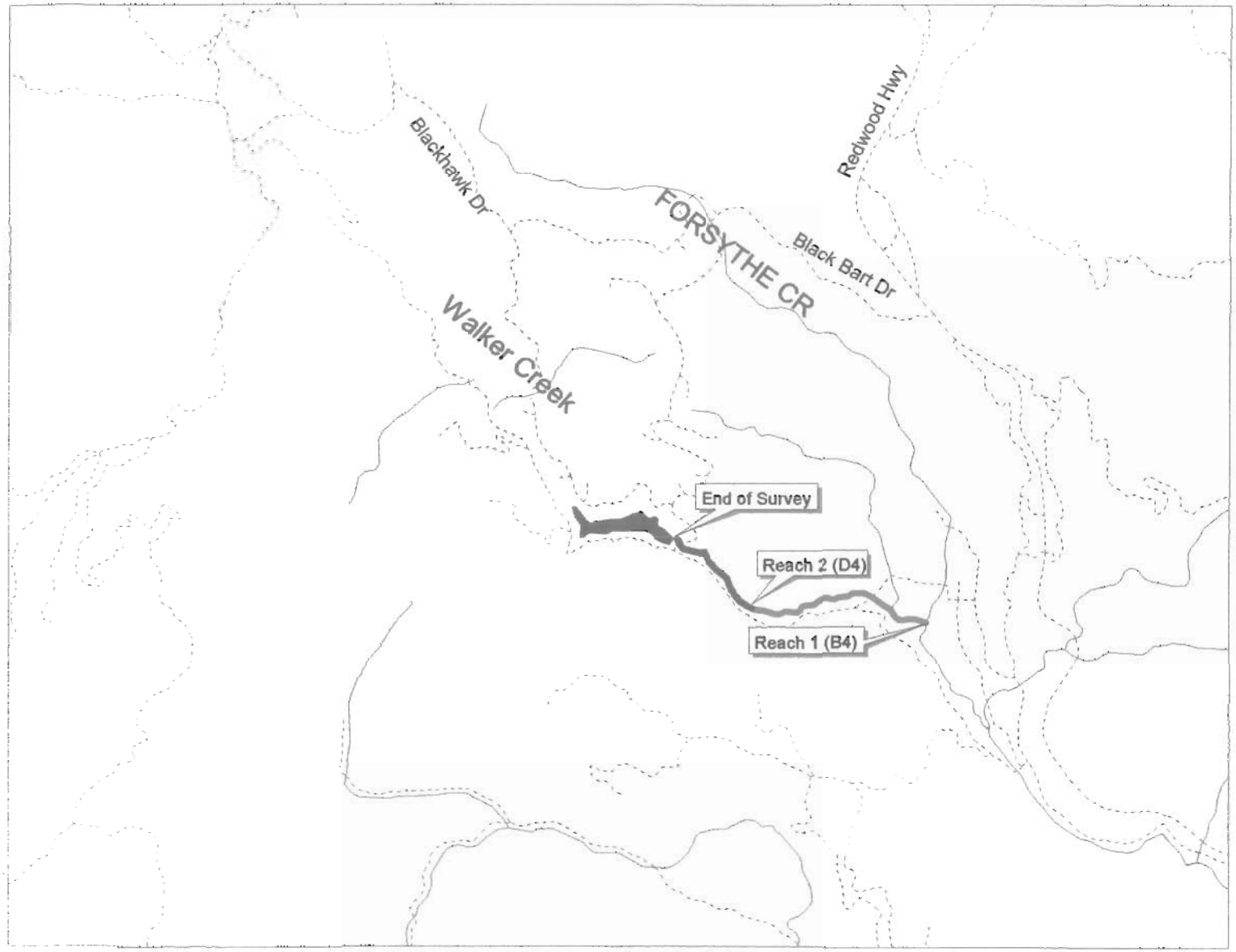
-ONGOING RESTORATION (EQUIP PROJECT) AT H.U. #002-WILLOW MATTRESS BEING BUILT TO DIRECT STREAM AWAY FROM AN ISOLATED REDWOOD GROVE.

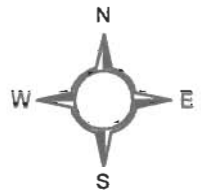
-CAT TAILS PRESENT ACROSS MUCH OF CREEK

-WATER IS VERY STAGNANT ACROSS ENTIRE SURVEYED SECTION. MANY POOLS (4.2) ARE

	POSSIBLY RUNS AT HIGHER FLOWS. -ALGAE SEEN THROUGHOUT SURVEYED SECTION -AQUATIC SPECIES OBSERVED: ROACH, STICKLEBACK, STEELHEAD 0+, 1+, BLUEGILL/ SUNFISH, NEWTS, BULLFROG, YELLOW LEGGED FROG -WALKER LAKE HAS BEEN FILLING UP WITH SEDIMENT RECENTLY DUE TO DEVELOPMENT UPSTREAM ACCORDING TO ONE LANDOWNER -RAINBOW TROUT AND BASS ARE PRESENT IN THE LAKE ACCORDING TO LANDOWNER -SURVEY ENDED AT WALKER LAKE DAM DIMENSIONS OF DAM: 200' LONG @ 18% GRADIENT 15'WIDE CEMENT SPILLWAY -CATTLE HAVE BEEN FENCED OUT OF THE CREEK RECENTLY WITH ELECTRICAL FENCING. -TREE PLANTING ALONG THE RIGHT BANK FROM H.U. #012 TO WALKER LAKE IS RECOMMENDED.
END OF SURVEY	SURVEY ENDED AT THE END OF ANADROMOUS FISH PASSAGE AT WALKER LAKE DAM.

Walker Creek





May 16, 2001
I:/mondo3/data/stream-projects/walker.apr
Prepared by: S.Popek

Walker Creek Tables Graphs Map
Assessment Completed 1999
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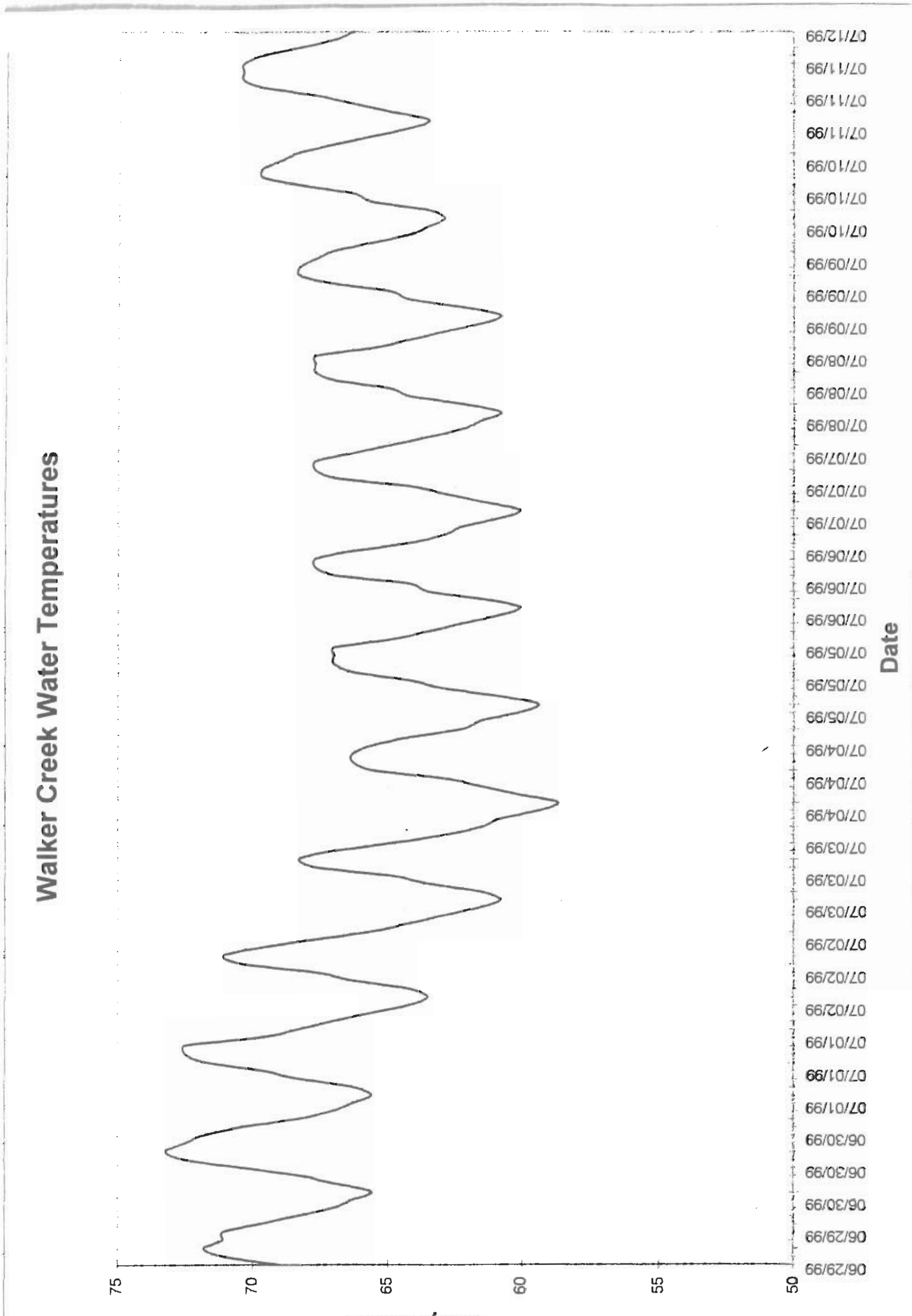
Walker1999.shp
B4
D4
Roads, Mendocino Co. (mendords-alb)
Waterbodies (nhd-alb region.wb)
Streams, routed (russ-routed)
Streams, Reach File 3 (russ11)

1 0 1 2 Kilometers

1 0 1 Miles

Scale = 1:55,000

Central Coast Region
Department of Fish and Game


Walker Creek Water Temperatures
Temperature F
75
70
65
60
55
50
Date
06/29/99
06/30/99
07/01/99
07/02/99
07/03/99
07/04/99
07/05/99
07/06/99
07/07/99
07/08/99
07/09/99
07/10/99
07/11/99
07/12/99

WALKER CREEK Drainage: Forsythe Creek; Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

HABITAT UNITS	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.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
1	0		1	0	0	0	0.0	0.0	0	0	0	0	0	0
9	2	RIFFLE	9	55	496	5	5.0	0.3	356	3200	121	1088	0	75
5	3	FLATWATER	5	86	428	5	6.0	0.4	410	2048	206	1029	0	5
58	7	POOL	59	52	3018	32	11.3	1.2	455	26383	716	41519	1567	69
26	0	DRY	26	210	5455	58	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
12	9397	31631	43635

WALKER CREEK

Drainage: Forsythe Creek; Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE	MEAN LENGTH	TOTAL LENGTH	TOTAL LENGTH	MEAN WIDTH	MEAN DEPTH	MAXIMUM DEPTH	MEAN AREA	TOTAL AREA EST.	MEAN VOLUME	TOTAL VOLUME EST.	MEAN RESIDUAL POOL VOL	MEAN SHELTER RATING	MEAN CANOPY
#			%	ft.	ft.	%	ft.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	cu.ft.		%
1	0		1	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0
9	2	LGR	9	55	496	5	5	0.3	1.3	356	3200	121	1088	0	75	69
4	2	GLD	4	83	331	4	5	0.3	0.8	200	799	60	240	0	3	56
1	1	RUN	1	97	97	1	9	0.6	1.7	829	829	498	498	0	10	95
30	3	MCP	30	64	1905	20	13	0.8	5.9	408	12250	368	11032	0	60	64
23	3	LSR	23	38	883	9	10	1.6	4.6	590	13578	1234	28390	1567	88	66
4	1	LSBk	4	48	193	2	8	1.0	2.9	88	352	88	352	0	3	77
1	0	PLP	1	37	37	0	15	1.5	2.8	555	555	833	833	0	60	0
26	0	DRY	26	210	5455	58	0	0.0	0.0	0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
99	12	9397	31564	42431

WALKER CREEK

Drainage: Forsythe Creek; Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

HABITAT UNITS	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 EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
1	0		2	0	0	0	0.0	0.0	0	0	0	0	0	0
30	3	MAIN	51	64	1905	63	12.7	0.8	408	12250	368	11032	0	60
28	4	SCOUR	47	40	1113	37	10.4	1.5	483	13518	925	25892	1567	77

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
59	7	3018	25768	36924

WALKER CREEK Drainage: Forsythe Creek; Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

UNITS MAX DPTH MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
0	XXXXXXXXX	0	0	0	0	0	0	0	0	0	0	0
30	MCP	51	2	7	13	43	6	20	3	10	6	20
21	LSR	36	0	0	6	29	12	57	2	10	1	5
4	LSBk	7	0	0	1	25	3	75	0	0	0	0
1	PLP	2	0	0	0	0	1	100	0	0	0	0

TOTAL UNITS 56

WALKER CREEK . Drainage: Forsythe Creek; Russian River

Table 5 - Summary of Shelter by Habitat Type Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	% TOTAL UNDERCUT BANKS	% TOTAL SWD	% TOTAL LWD	% TOTAL ROOT MASS	% TOTAL TERR. VEGETATION	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
1	0		0	0	0	0	0	0	0	0	0
9	2	LGR	0	0	0	0	50	50	0	0	0
4	2	GLD	0	50	0	0	50	0	0	0	0
1	1	RUN	20	0	0	80	0	0	0	0	0
30	27	MCP	0	32	32	0	36	0	0	0	0
23	23	LSR	20	9	9	62	0	0	0	0	0
4	3	LSBk	0	0	0	0	0	0	0	0	0
1	1	PLP	50	0	0	50	0	0	0	0	0
26	0	DRY	0	0	0	0	0	0	0	0	0
99	59		10	15	15	22	26	12	0	0	0
58	54		13	20	20	27	19	0	0	0	0

WALKER CREEK

Drainage: Forsythe Creek; Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 08/17/99 to 08/18/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS21 LATITUDE: 39°18'53" LONGITUDE: 123°18'45"

TOTAL HABITAT UNITS	UNITS SUBSTRATE MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
1	0		0	0	0	0	0	0	0
9	2	LGR	50	0	50	0	0	0	0
4	2	GLD	0	0	100	0	0	0	0
1	1	RUN	0	0	100	0	0	0	0
3	3	MCP	0	33	67	0	0	0	0
3	3	LSR	0	33	33	33	0	0	0
1	1	LSBk	0	0	100	0	0	0	0
1	1	PLP	0	0	0	100	0	0	0
6	0	DRY	0	0	0	0	0	0	0

WALKER CREEK

APPENDIX A. Summary of Mean Percent Vegetative Cover for Entire Stream

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Deciduous	Mean Right bank % Cover	Mean Left Bank % Cover
67.00	51.21	48.79	29.23	19.62

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	1	0	3.85
Boulder	0	0	0
Cobble/Gravel	5	7	46.15
Silt/clay	7	6	50

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	8	9	65.38
Brush	0	0	0
Deciduous Trees	2	1	11.54
Evergreen Trees	3	3	23.08
No Vegetation	0	0	0