CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Briggs Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1996

INTRODUCTION

A stream inventory was conducted during the summer of 1996 on Briggs 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 Briggs 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.

WATERSHED OVERVIEW

Briggs Creek is a tributary to Maacama Creek, a tributary of the Russian River, located in Sonoma County, California (see Briggs Creek map, page 2). The legal description at the confluence with Maacama Creek is T10N, R8W, S33. Its location is 38°40'28" N. latitude and 11°44'31" W. longitude. Seasonal vehicle access exists from private roads via highway 128, near Calistoga and Healdsburg.

Briggs Creek and its tributaries drain a basin of approximately 12.3 square miles. Briggs Creek is a third order stream and has approximately 4.6 miles of blue line stream, according to the USGS Mt. St. Helena 7.5 minute quadrangle. Major tributaries include Little Briggs Creek and Coon Creek which are described in separate stream reports. Elevations range from about 340 feet at the mouth of the creek to 2200 feet in the headwaters. The lower section of Briggs Creek flows through a narrow valley sparsely vegetated with oak, alder, and fir. The upper section lies in a fairly steep V-shaped canyon with a heavy canopy of second growth redwood. The Northern Spotted Owl (*Strix occidentalis caurina*) and Snow Mountain Buckwheat (*Eriogonum nervulosum*) were listed in DFG's Natural Diversity Database for Briggs Creek Watershed. The watershed is entirely privately owned.

METHODS

The habitat inventory conducted in Briggs Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1994). 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 Briggs 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 were 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 (1996). 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.

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". Briggs 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, additionally, 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 were 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 Briggs 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). Additionally, a rating of "not suitable" (NS) was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, 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 Briggs 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:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully measured habitat units, dominant and sub-dominant substrate elements were visually

estimated using a list of seven size classes.

8. Canopy:

Stream canopy density was 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 Briggs 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 visually into percentages of evergreen or deciduous trees.

9. Bank Composition:

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 Briggs Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully measured unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation was estimated and recorded.

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 Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. 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 Briggs 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 by Reach
- Percent Bank Composition and Bank Vegetation

HISTORICAL STREAM SURVEYS:

The Department of Fish and Game conducted a survey of Briggs Creek in August 1973. The average flow was 0.8 cfs and the lower quarter mile of the stream was dry. The average air temperature was 69°F and the average water temperature was 62°F.

The spawning gravel was described as "generally loose" with 20-30% of the streambed being suitable for spawning. The lower section of the creek had substrate consisting of 35% boulders, 40% gravel and cobble, 20% silt, 3% bedrock, and 2% sand. The upper section of the creek was described as 75% boulders, 22% cobble and gravel, and 3% sand. The lower section of the creek had many pools, with a 1:1 pool to riffle ratio. Shelter was provided by undercut banks and boulders.

The first barrier consisted of a series of waterfalls in a steep canyon with a 50% gradient. These waterfalls were not passable to fish at any time. Further upstream, there was a 20 foot high waterfall which was also impassable to fish. No diversions or springs were observed during the survey. Pollution observed consisted of runoff from livestock in the lower section of the creek.

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 29 - September 25, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps) and data analyzed by Ken Bunzel (DFG). The survey began at the confluence with Maacama Creek and extended up Briggs Creek 4.2 miles. A bedrock cascade fish barrier is located 0.24 miles downstream of the end of the survey near the confluence with Mill Stream. The total length of the stream surveyed was 21,937 feet, with an additional 1,060 feet of side channel. A flow of 2.30 cfs was measured on September 11, 1996 at the road crossing downstream of the caretakers house (about 1,050 feet from the mouth in habitat unit 12), using a Marsh-McBirney Model 2000 flowmeter.

This section of Briggs Creek has 2 channel types: from the mouth to 15,693 feet an F3 and the upper 6,244 feet a B2. F3 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly cobble substrate. B2 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 boulder substrate.

Water temperatures ranged from 56-71°F and air temperatures ranged from 56-97°F. Summer temperatures were also measured using a remote temperature recorder placed in a pool in Reach 1 (habitat unit 99, about 10,000 feet from the mouth) (see Temperature Summary graphs at end of report). The recorder logged temperatures every 2 hours from June 12 - October 9, 1996. The highest temperature recorded was 75.6°F in July and the lowest was 55.0°F in June. The mean of the daily highs was 66.7°F for the month of June, 71.7°F for July, 69.5°F for August, 62.8°F for September, and 61.8°F for October.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 35% pool units, 33% riffle units, and 31% flatwater units. Based on total **length** there were 41% riffle units, 32% flatwater units, and 26% pool units (Graph 1).

Two hundred, forty habitat units were measured and 21% were completely sampled. Fifteen Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent **occurrence** were low gradient riffles at 29%, runs 22%, bedrock scour pools 11% and mid-channel pools 10%

(Graph 2). By percent total **length**, low gradient riffles made up 38%, runs 20%, step pools 9%, and step runs 8%.

Eighty-four pools were identified (Table 3). Scour pools were most often encountered at 62%, but only comprised 39% of the total length of pools (Graph 3). No backwater pools were identified. Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Forty-four of the 84 pools (52%) had a depth of three feet or greater (Graph 4). These deeper pools comprised 17% 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 26. Flatwater had the lowest rating with 19 and pools rated 24 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 26, and main channel pools rated 21 (Table 3). Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 42%, root masses 22%, undercut banks 12%, and bedrock ledges 8%. Graph 5 describes the pool shelter in Briggs Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel or cobble were dominant substrates observed in 4 of the 6 (67%) low gradient riffles measured (Graph 6). The depth of cobble embeddedness was estimated at pool tail-outs. Of the 84 pool tail-outs measured, 15 had a value of 1 (18%); 46 had a value of 2 (55%); 19 had a value of 3 (23%); and 4 had a value of 4 (5%). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 65%. The mean percentages of deciduous and evergreen trees were 58% and 42%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 55% and the mean percent left bank vegetated was 51%. For the habitat units measured, the dominant vegetation types for the stream banks were: 40% deciduous trees, 36% evergreen trees, 18% grass, and 5% bare soil. The dominant substrate for the stream banks were: 40% silt/clay/sand, 22% bedrock, 22% cobble/gravel and 16% boulder (Graph 10).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

In the August 1973 survey, the lower 3 miles of the stream were described as not suitable for salmonids because of the abundant non-game fish species, borderline water temperatures, abundant algae, runoff from livestock, and heavy siltation. Above this section for about 1.5 miles to the waterfall barriers, 0+ steelhead were observed at a rate of 50/100'. Above the falls for about 3 miles, juvenile rainbow trout were utilizing the stream to maximum capacity. The rainbow trout were observed at a rate of 25/100' and were up to 1 foot in length. California Roach, Sacramento Suckers, Sacramento Pikeminnow, and unidentified salamanders and frogs were also seen during the survey.

On October 9, 1996 a biological inventory was conducted by Sanchez (AmeriCorps), Carey (AmeriCorps), B. and A. McMicking (Landowners), and Coey (DFG). Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from the site were counted by species, and returned to the stream.

The inventory of Reach 1 started at the bedrock sheets (habitat unit 75) and ended at unit 82, approximately 600 feet upstream. In riffle, pool, and run habitat types 173 0+, 68 1+, and 6 2+ steelhead (40/100') were observed along with 138 California Roach, 40 Sacramento Pikeminnow, 29 Sacramento Suckers, 22 sculpin (Cottus Sp.), 2 Yellow-legged Frogs, and 1 crayfish.

The inventory of Reach 1 was continued starting at unit 144 and ending approximately 765 feet upstream in unit 151. In pool, riffle, and run habitat types 221 0+, 24 1+, and 1 2+ steelhead were observed (32/100') along with 46 sculpin, 20 Sacramento Pikeminnow, 3 Yellow-legged Frogs, 2 crayfish, and 1 Pacific Giant Salamander.

On October 3, 1996 the inventory of Reach 2 started at the end of McMicking's road crossing and ended approximately 925 feet upstream in habitat units 200-208. The air temperature was 72°F and the water temperature was 55°F. The observers were Sanchez (AmeriCorps), Nossaman (AmeriCorps), and Coey (DFG). In riffle, run, and pool habitat types 171 0+, 37 1+, and 4 2+ steelhead were observed (23/100') along with 1 Yellow-legged Frog.

On October 13, 1996 the inventory of Reach 2 was continued at habitat unit 227. The water temperature was 58°F and the air temperature was 75°F. The observers were Sanchez (AmeriCorps) and

Campo (AmeriCorps). In pool, riffle, and run habitat types 25 0+ and 10 1+ steelhead were observed along with 1 Pacific Giant salamander and 3 Yellow-legged Frogs.

A summary of historical and recent data collected appears in the table below.

Species Observed in Historical and Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced
1973, 1996	Steelhead Trout	DFG	N
1996	Sculpin (Cottus Sp.)	DFG	N
1973, 1996	California Roach	DFG	N
1973, 1996	Sacramento pikeminnow	DFG	N
1973, 1996	Sacramento Sucker	DFG	N
1996	Crayfish	DFG	N
1996	Pacific Giant Salamander	DFG	N
1996	Yellow-legged Frog	DFG	N

No introduced species were observed during any of the surveys. Historical records reflect steelhead fingerlings were stocked in Briggs Creek in 1982 and 1984 from Warm Springs Hatchery.

Table 2. Summary of fish hatchery-stocking/transfers/rescues

YEAR	SPECIES	SOURCE	#	SIZE
1982	SH	WARM SPRINGS	46,272	FING
1984	SH	WARM SPRINGS	6,552	FING

WARM SPRINGS = Warm Springs Hatchery (Geyserville)
SH = steelhead

ADULT SURVEYS:

A spawning/carcass survey was conducted on January 11, 1996 on Briggs Creek, beginning at the McMicking Bridge. Two possible redds 2' x 4' in area were observed in good gravel. No adult fish were observed.

A second spawning/carcass survey was conducted on March 15, 1996, beginning at the mouth and extending upstream 2 miles to the confluence with Coon Creek. Three adult (one 2-3 lb., one 6 lb. and one 8 lb.) steelhead were observed.

DISCUSSION

Briggs Creek has two channel types: F3 and B2. There are 15,693 feet of F3 channel type in Reach 1. According to the DFG Salmonid Stream Habitat Restoration Manual, fishery enhancement opportunities in 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. There are 6,244 feet of B2 channel type in Reach 2. B2 channel types are excellent for low and medium-stage plunge weirs, single and opposing wing deflectors and bank cover. Both of these channel types have gradients and the stable stream banks that are suitable for the instream habitat improvement alternatives designed to increase pool habitat, trap spawning gravels, and provide protective shelter for fish.

The water temperatures recorded on the survey days August 29 - September 25, 1996 ranged from 56-71°F and air temperatures ranged from 56-97°F. Temperatures in the 70's, if sustained, are above the targeted threshold stress level for salmonids. Summer temperatures measured using a remote temperature recorder placed in a pool in Reach 1 ranged from 55-76°F. The Temperature Summary graph shows that in June the lower watershed exhibited temperatures above the optimal for salmonids.

Cooler water temperatures are desirable in Briggs Creek. Since the mean percent canopy for the survey was only 65%, 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 structure and bank stability.

Pools comprised 26% of the total **length** of this survey. In third and fourth order streams a primary pool is defined to have a maximum depth of at least three feet, occupy at least half the

width of the low flow channel, and be as long as the low flow channel width. In Briggs Creek, the pools are relatively deep with 52% having a maximum depth of at least 3 feet. These pools comprised 17% of the total length of stream habitat.

The mean shelter rating for pools was 24. The amount of pool shelter that now exists is being provided primarily by boulders. Log and root wad cover in the pool and flatwater habitats 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.

Sixty-seven percent of the low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. Reaches 1 and 2 both had more than half of the ratings being either a 1 or 2. Only twenty-seven percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Briggs Creek, the amount of fine sediment in potential spawning habitat is minimal.

Biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were documented in both the 1973 and 1996 surveys, while coho were not observed during any of the surveys. This is likely because physiological and environmental requirements for coho are more stringent than for steelhead, or coho were absent or present only in small numbers. Landowners have observed occasional use by coho in the past. The 1996 summer surveys documented many 0+ fish indicating successful spawning. However, few 1+ fish were observed indicating poor rearing conditions the year before or poor holding-over conditions in general.

SUMMARY

In general, Briggs Creek has excellent steelhead habitat. The best spawning habitat exists in Reach 1, where there is abundant gravel and small cobble, and low levels of fine sediment. Spawning utilization in reach 2 is likely lower because the substrate is dominated by boulders with fewer areas with gravel or small cobble. Good rearing habitat exists in both reaches although stream temperatures are higher and shade canopy is lower than desirable.

GENERAL RECOMMENDATIONS

Briggs Creek should be maintained as an anadromous, natural production stream. A permanent barrier exists at 20,000'. Healthy steelhead populations and suitable habitat exists above this barrier for several miles. No stocking should occur above this barrier.

Woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Landowners are encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) Increase the canopy on Briggs Creek in localized areas by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is below desirable levels (80% canopy). The reach above the survey section should be assessed for planting and treated as well, to reduce temperatures throughout. Cooler water temperatures would decrease habitat preference towards warm water fish, particularly pikeminnow which prey on salmonids.

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 grazing runoff.

3) Due to its excellent habitat qualities, Briggs Creek should be monitored for fish and macroinvertebrate populations. Data will aid in restoring other similar Russian River tributaries.

4) Although roads in the watershed are in fair shape, drainage techniques which minimize sediment delivery (outsloping, rolling dips, and critical dips at stream crossings) could be employed to further reduce sediment levels.

PROBLEM SITES AND LANDMARKS - BRIGGS CREEK SURVEY COMMENTS

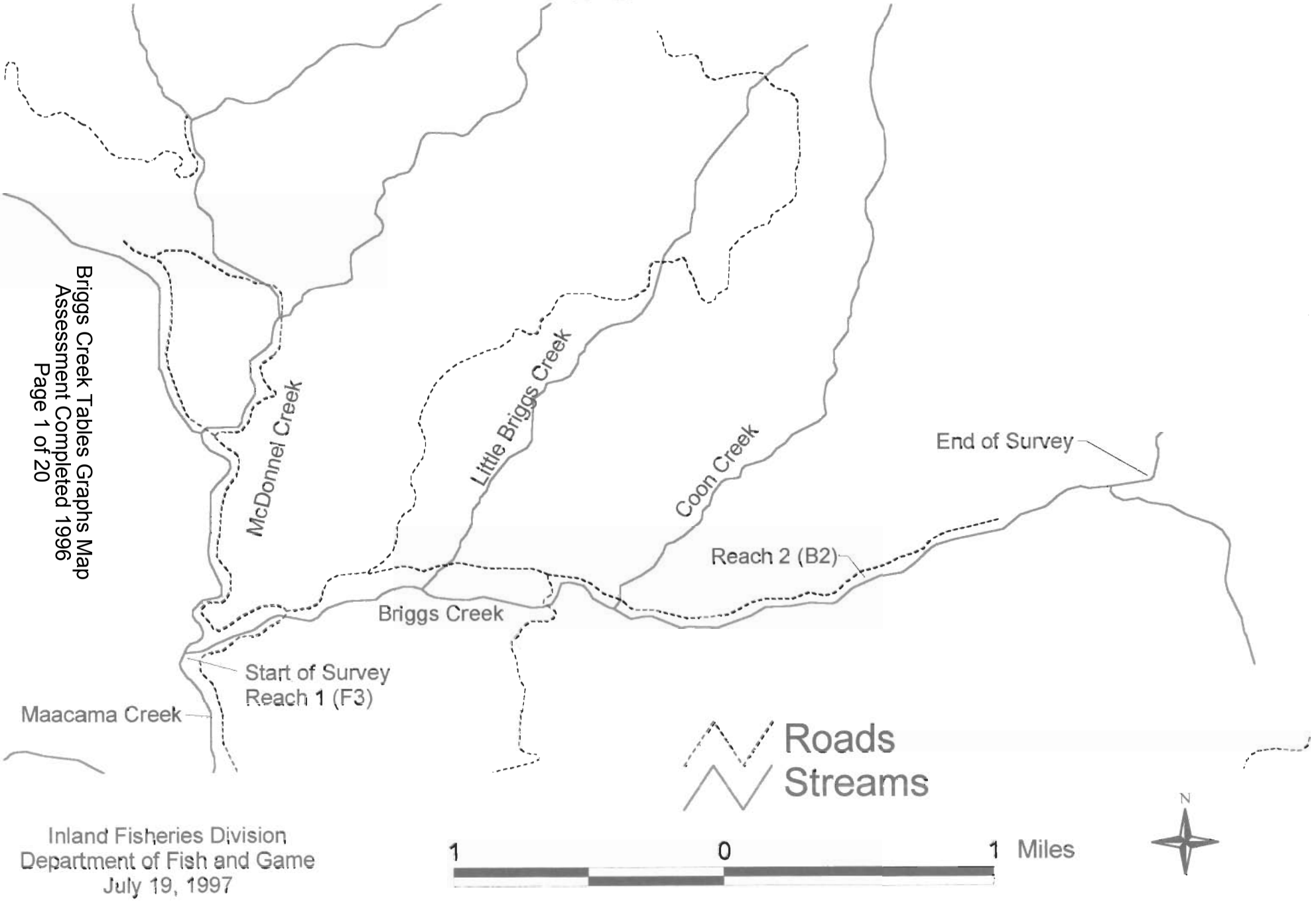
The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
1.00	78	CONFLUENCE W/ MCDONNELL-69°F
4.00	406	CATTLE FENCE LF BANK-GOOD SHAPE
9.00	803	BARBED WIRE FENCE IN MIDDLE OF UNIT
11.00	946	RD ALONG RT BANK
12.00	1043	RD XING THROUGH END OF UNIT
13.00	1131	RD XING IS AT THE BEGINNING OF UNIT
14.00	1389	RD ON LF BANK
17.00	1669	BELOW CARETAKER-KEN'S HOUSE RT BANK
17.10	1669	SIDE CHANNEL ON LEFT
18.00	1727	BELOW KEN'S HOUSE
20.00	1860	DRY TRIB RT BANK
23.00	2199	DRAINAGE DITCH COMES IN FROM ROAD
24.00	2279	CATTLE FENCE ACROSS CREEK, BRIDGE#1
25.00	2330	SMALL TRIB LF BANK
31.00	2646	3 1+ SHD
33.00	3001	DRY TRIB RT BANK, BARN ABOVE RT BANK
35.00	3268	DRY SIDE CHANNEL
36.00	3397	DRY TRIB RT BANK
37.00	3472	2 + SHD
41.00	3958	SMALL DRY TRIB RT
44.00	4536	3 2+ SHD
46.00	4853	CATTLE FENCE CROSSING CREEK
47.00	4947	1+ SHD
50.00	5269	DRY TRIB LF BANK CONFLUENCE W/ LITTLE BRIGGS RT-67°F
51.00	5321	ROAD MEETS CREEK
52.10	5371	HUNDREDS OF PIKEMINNOW
56.00	5530	SMALL DRY TRIB RT, COWS ALONG CREEK THROUGHOUT THESE UNITS 56-64
63.00	6417	CATTLE FENCING ALONG UPPER RT BANK
64.00	6434	DRY SIDE CHANNEL LF
65.00	6486	DRY SIDE CHANNEL RT
69.00	6853	COWS ALONG CREEK
71.00	7274	ERODIBLE ENTRENCHED LF BANK, DRY TRIB IN LF VALLEY, DOESN'T REACH CREEK, DRY SIDE CHANNEL RT
74.00	7611	BEDROCK CHANNEL, DRY TRIB LF (HARD TO SEE FROM CREEK)
75.00	7752	12 FT DRAINAGE CULVERT UPPER RT BANK

78.00	7898	ROAD CROSSES CREEK DRY TRIB LF BANK
79.00	7967	CHANNEL BECOMES MORE ENTRENCHED,DRY TRIB LF BANK
81.00	8097	FLOATING FENCE CROSSES CREEK
87.00	8724	SM. DRY TRIB RT. W/CULVERT 36' DAM DOWNCUTTING 4'4"
95.00	9703	MANY PIKEMINNOW CONFLUENCE W/WEST BRANCH 58°F IN TRIB
96.00	9908	CONFLUENCE W/MAIN STEM OF COON RT. 58°F IN COON
97.00	9987	DRY TRIB LF.
99.00	10144	0+ SHD
106.00	10482	1+SHD
109.00	10584	TEMP MENTOR
110.00	10630	DRY SIDE CHANNEL
112.00	10855	ROAD DIRECTLY PARALLEL TO CREEK RT BANK 0+ SHD
118.00	11476	1+ SHD
119.00	11543	FENCE ALONG UPPER L/B
121.00	11700	2+ SHD
123.00	11996	DRY TRIB LF BANK MOUNTAIN TROUT? 2+
126.00	12253	SM. DRY TRIB RT. DOZENS OF PIKEMINNOW
127.00	12328	0+ SHD
128.00	12524	CATTLE FENCE ALONG UPPER RT BANK DRAINAGE TRIB FROM ROAD CULVERT RT.
132.00	12788	TRIB L/B 63°F WET 1'ST 200' THEN DRY. TOO LOW TO HABITAT TYPE
133.00	12908	NOT WET AT CONFLUENCE
134.00	12969	50' BEDROCK FACE RT BANK
138.00	13295	ROAD CROSSING
139.00	13366	DRY TRIB RT BANK W/ 36" CULVERT DOWNCUTTING 3'
140.00	13618	DRY SIDE CHANNEL LF BANK
147.00	14071	DRY TRIB RT BANK
149.00	14300	FENCE ALONG UPPER LF BANK TO EDGE OF CREEK
151.00	14608	DRY TRIB LF BANK
153.00	14690	HIGHLY ERODED LF BANK
155.00	14834	FENCE ALONG UPPER LF BANK THROUGHOUT THESE UNITS
157.00	15232	CHANNEL BECOMING MORE ENTRENCHED
159.00	15377	SMALL DRY TRIB RT BANK
160.00	15538	DRY TRIB LF BANK
163.00	15694	ERODED RT BANK 80'H X 40'W X 35'L
164.00	15915	DRY TRIB RT BANK CHANNEL CHANGE
167.00	16064	ERODED LF BANK 65'H X 100'L X 20'W
169.00	16185	APPROX 5 0+ SHD

178.00	16631	CATTLE FENCE COMES DOWN TO CREEK DRY TRIB RT BANK
182.00	16953	DRY TRIB
184.00	17158	CATTLE FENCE ALONG UPPER LF BANK
185.00	17198	ERODED RT BANK 25'L X 15'H X 10'W
188.00	17292	ROAD CROSSING
192.00	17591	ERODED LF BANK (HEALING OVER W/GRASS) 50'L X 65'H X 25'W
196.00	18022	SMALL DRY TRIB LF BANK
197.00	18283	0+ SHD DRY TRIB RT BANK
199.00	18616	CATTLE FENCE UPPER RT BANK LARGE DRY TRIB LF BANK
200.00	18717	ERODIBLE RT BANK ERODED LF BANK 25'L X 40'H X 20'W
201.00	18807	BEDROCK BASE
203.00	18913	DRY SIDE CHANNEL RT BANK
205.00	19351	ROAD CROSSING
214.00	20692	BEDROCK CASCADE, POSSIBLE FISH BARRIER. CONFIRMED BY LANDOWNER (SMITH) TO BE BARRIER TO SHD “NO STEELHEAD EVER SEEN ABOVE BEDROCK FALLS”
218.00	20989	FLAG AT END OF UNIT
219.00	21039	DRY TRIB LF BANK
220.00	21150	ERODED RT BANK 30'L X 45'H X 25'W
221.00	21285	SMALL DRY TRIB RT BANK
225.00	21710	SMALL DRY TRIB
226.00	21815	NEWT. GRADIENT FLATTENS OUT AGAIN
228.00	21938	VERY SMALL DRY DRAINAGE TRIB RT BANK
230.00	22068	CONFLUENCE W/ S.FORK 59°. END OF SURVEY SURVEYED 1330 FEET OF STREAM ABOVE CASCADE BELIEVED TO BE FISH BARRIER.

Briggs Creek



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Inland Fisheries Division
Department of Fish and Game
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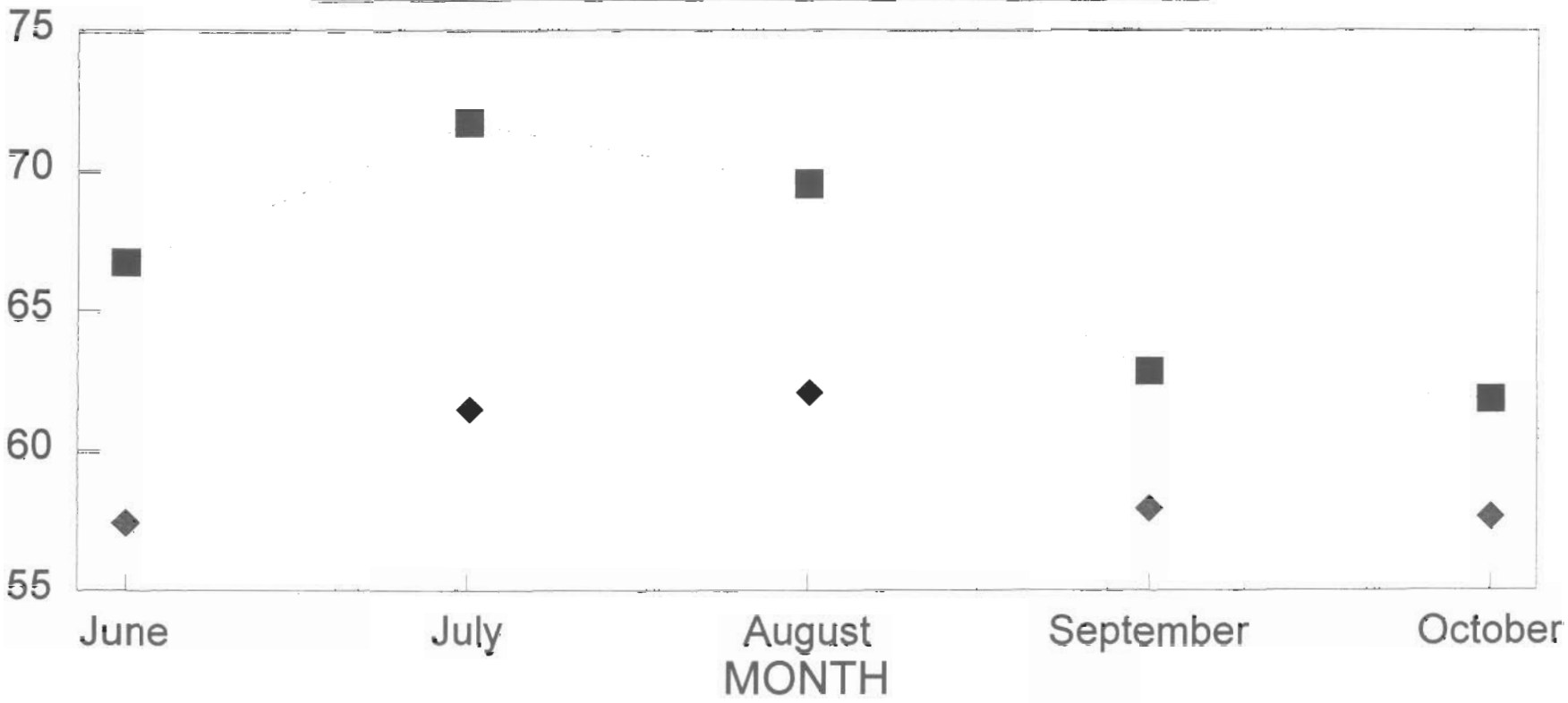
Tempmentor Summary
Briggs Creek



Sample Period: Jun 12 - Oct 09, 1996
Location: 300' above confl. w/ coon ck.

Briggs Creek

Drainage: Maacama Creek, Russian River

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

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

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
80	8	RIFFLE	33	118	9479	41	14.7	0.6	607	48555	388	31059	0	26
75	15	FLATWATER	31	99	7427	32	18.3	0.7	1253	94011	871	65318	0	19
84	28	POOL	35	72	6075	26	18.2	1.6	1299	109152	2268	190494	1562	24
1	0	DRY	0	16	16	0	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
240	51	22997	251717	286871

Briggs Creek

Drainage: Maacama Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM 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	MEAN CANOPY %
70	6	LGR	29	124	8676	38	15	0.6	1.1	484	33908	287	20122	0	26	57
8	2	HGR	3	93	742	3	19	0.8	1.4	1177	9418	865	6916	0	25	75
2	0	CAS	1	31	61	0	8	0.2	1.6	202	403	40	81	0	0	80
2	1	POW	1	62	123	1	22	0.7	1.5	1101	2202	771	1542	0	40	70
10	3	GLD	4	80	796	3	25	0.6	2.0	1419	14190	697	6970	0	7	60
52	7	RUN	22	89	4606	20	18	0.7	2.1	1219	63363	812	42237	0	17	62
11	4	SRN	5	173	1902	8	13	0.9	3.0	1201	13206	1112	12234	0	24	69
23	5	MCP	10	70	1617	7	21	1.6	5.7	1682	38675	3019	69429	2192	17	73
9	5	STP	4	231	2081	9	17	1.7	6.2	3172	28548	5689	51203	3987	30	71
3	2	LSL	1	64	191	1	14	1.2	3.0	929	2788	1299	3897	1083	37	62
11	5	LSR	5	58	642	3	20	1.5	4.0	1228	13510	1874	20617	1129	33	75
26	5	LSBk	11	43	1124	5	16	1.7	5.6	732	19020	1333	34664	897	18	69
9	4	LSBo	4	38	342	1	13	1.5	3.6	520	4677	854	7683	507	37	66
3	2	PLP	1	26	78	0	24	1.4	4.0	564	1691	814	2443	394	30	75
1	0	DRY	0	16	16	0	0	0.0	0.0	0	0	0	0	0	0	60

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
240	51	22997	245598	280036

Briggs Creek

Drainage: Maacama Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

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
32	10	MAIN	38	116	3698	61	20.0	1.6	2079	66527	3731	119385	2670	21
52	18	SCOUR	62	46	2377	39	17.1	1.6	812	42235	1353	70378	870	26

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
84	28	6075	108762	189763

Briggs Creek

Drainage: Maacama Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

UNITS 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
23	MCP	27	0	0	1	4	13	57	6	26	3	13
9	STP	11	0	0	0	0	2	22	3	33	4	44
3	LSL	4	0	0	0	0	2	67	1	33	0	0
11	LSR	13	0	0	1	9	4	36	5	45	1	9
26	LSBk	31	0	0	1	4	10	38	10	38	5	19
9	LSBo	11	0	0	0	0	5	56	4	44	0	0
3	PLP	4	0	0	0	0	1	33	1	33	1	33

TOTAL UNITS 84

Briggs Creek

Drainage: Maacama Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

	UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	SQ. FT. UNDERCUT BANKS	SQ. FT. SWD	SQ. FT. LWD	SQ. FT. ROOT MASS	SQ. FT. TERR. VEGETATION	SQ. FT. AQUATIC VEGETATION	SQ. FT. WHITE WATER	SQ. FT. BOULDERS	SQ. FT. BEDROCK LEDGES
	70	6	LGR	0	96	32	0	0	18	0	362	0
	8	2	HGR	0	0	0	0	0	0	23	437	0
	2	0	CAS	0	0	0	0	0	0	0	0	0
	2	1	POW	0	0	0	0	0	0	0	339	0
	10	3	GLD	77	77	0	60	0	0	0	92	0
	52	7	RUN	187	0	93	214	47	11	4	682	0
	11	5	SRN	8	27	10	34	0	23	21	605	167
	23	23	MCP	635	339	195	1110	29	24	0	1086	11
	9	9	STP	102	178	64	347	0	52	359	2739	726
	3	3	LSL	79	124	40	74	0	0	0	50	0
	11	11	LSR	383	29	16	1113	146	29	3	189	0
	26	26	LSBk	284	44	4	114	229	0	3	1007	229
	9	9	LSBo	97	0	54	104	0	0	0	371	0
	3	3	PLP	0	0	37	0	0	0	25	110	113
	1	0	DRY	0	0	0	0	0	0	0	0	0
TOTAL	240	108		1852	914	545	3170	451	157	438	8069	1246
				11%	5%	3%	19%	3%	1%	3%	48%	7%
TOTAL FOR POOLS	84	84		1580	714	410	2862	404	105	390	5552	1079
				12%	5%	3%	22%	3%	1%	3%	42%	8%

Briggs Creek

Drainage: Maacama Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 08/29/96 to 09/25/96

Confluence Location: QUAD: Mt St Hel. LEGAL DESCRIPTION: T10NR8WS33 LATITUDE: 38°40'28" LONGITUDE: 122°44'31"

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
70	6	LGR	0	0	50	17	17	17	0
8	2	HGR	0	0	50	50	0	0	0
2	1	CAS	0	0	0	0	0	0	100
1	1	POW	0	0	100	0	0	0	0
10	4	GLD	0	75	25	0	0	0	0
14	7	RUN	0	14	57	0	14	0	14
4	4	SRN	0	0	25	25	0	50	0
5	5	MCP	0	60	40	0	0	0	0
5	5	STP	0	0	40	0	0	20	40
2	2	LSL	0	50	50	0	0	0	0
5	5	LSR	0	100	0	0	0	0	0
5	5	LSBk	0	60	40	0	0	0	0
4	4	LSBo	0	50	50	0	0	0	0
2	2	PLP	0	0	0	0	0	100	0
0	0	DRY	0	0	0	0	0	0	0

Briggs Creek

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

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Decidous	Mean Right bank % Cover	Mean Left Bank % Cover
65.11	41.91	57.64	54.81	51.25

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	11	13	21.82
Boulder	10	8	16.36
Cobble/Gravel	12	12	21.82
Silt/clay	22	22	40

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	10	10	18.18
Brush	0	0	0
Deciduous Trees	19	25	40
Evergreen Trees	23	17	36.36
No Vegetation	3	3	5.45

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Briggs Creek
SAMPLE DATES: 08/29/96 to 09/25/96
STREAM LENGTH: 21937 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Mt St Hel. Latitude: 38°40'28"
Legal Description: T10NR8WS33 Longitude: 122°44'31"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: F3	Canopy Density: 62%
Channel Length: 15693 ft.	Evergreen Component: 37%
Riffle/Flatwater Mean Width: 19 ft.	Deciduous Component: 63%
Total Pool Mean Depth: 1.7 ft.	Pools by Stream Length: 22%
Base Flow: 0.0 cfs	Pools >=3 ft. deep: 55%
Water: 58 - 71 °F Air: 56 - 97 °F	Mean Pool Shelter Rtn: 22
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Vegetative Cover: 56%	Occurrence of LOD: 21%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 14% 2. 57% 3. 25% 4. 4%

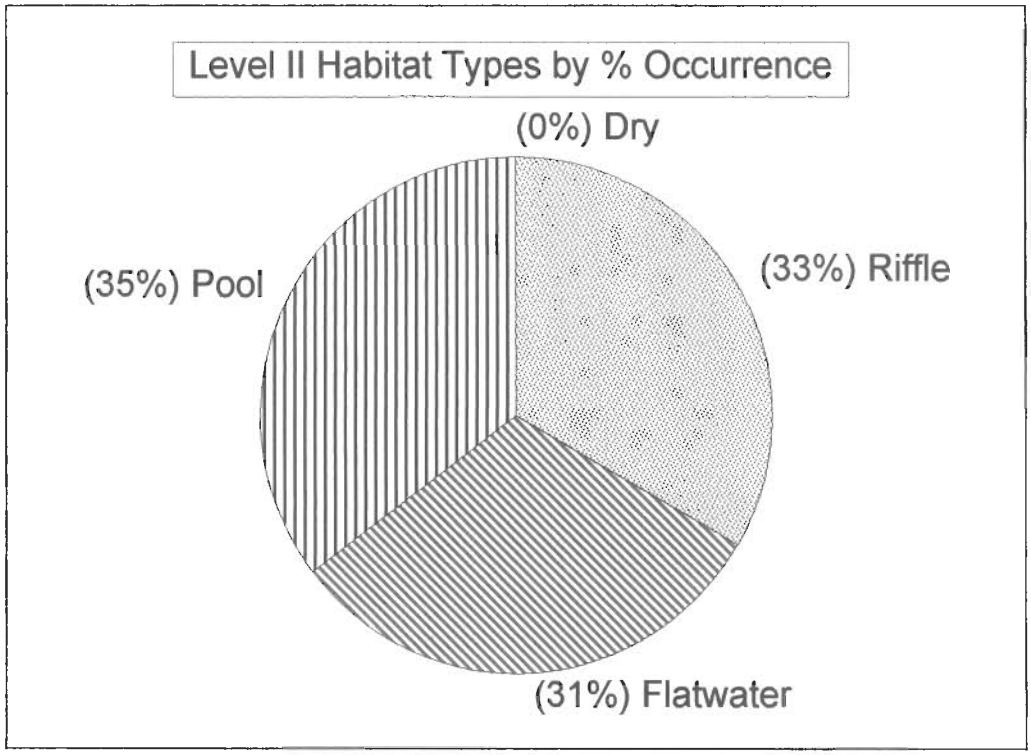
STREAM REACH 02

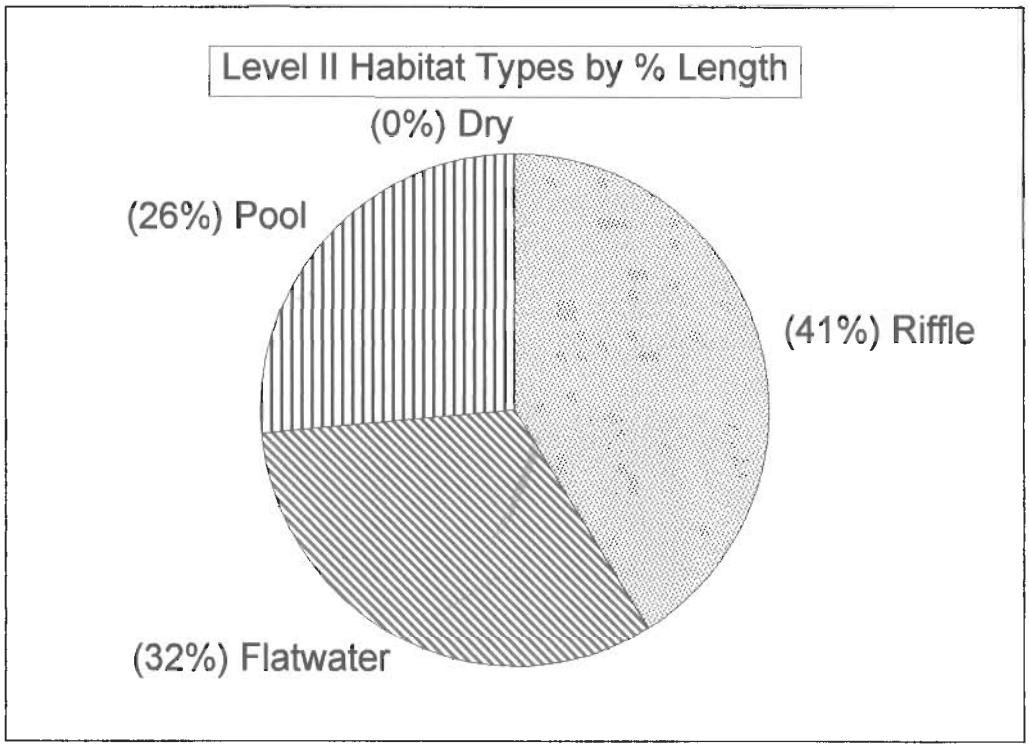
Channel Type: B2	Canopy Density: 72%
Channel Length: 6244 ft.	Evergreen Component: 53%
Riffle/Flatwater Mean Width: 15 ft.	Deciduous Component: 45%
Total Pool Mean Depth: 1.5 ft.	Pools by Stream Length: 40%
Base Flow: 0.0 cfs	Pools >=3 ft. deep: 50%
Water: 56 - 62 °F Air: 68 - 84 °F	Mean Pool Shelter Rtn: 29
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Vegetative Cover: 47%	Occurrence of LOD: 15%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 25% 2. 50% 3. 18% 4. 7%

Briggs Creek

Level II Habitat Types

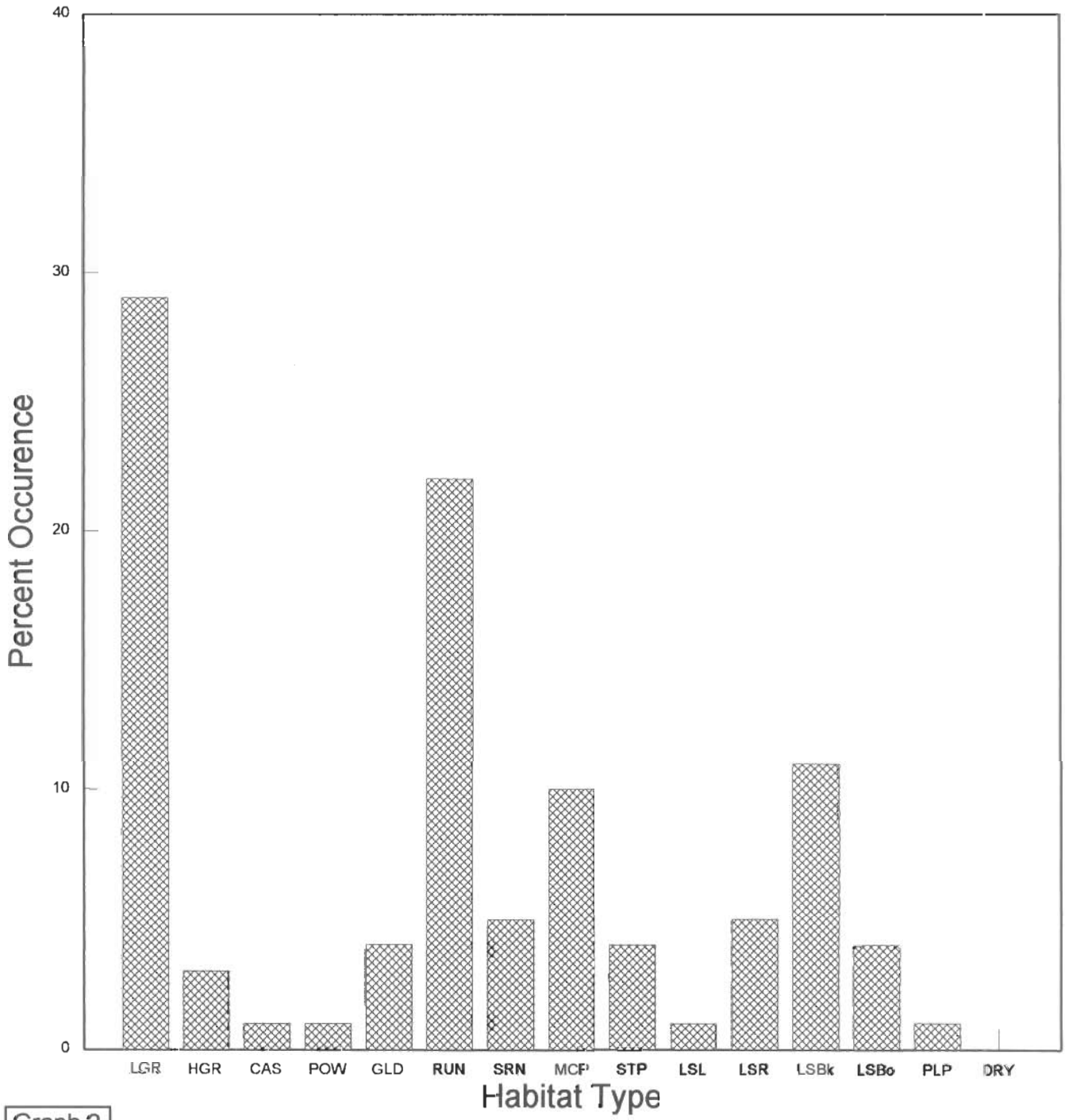




Graph 1

Briggs Creek

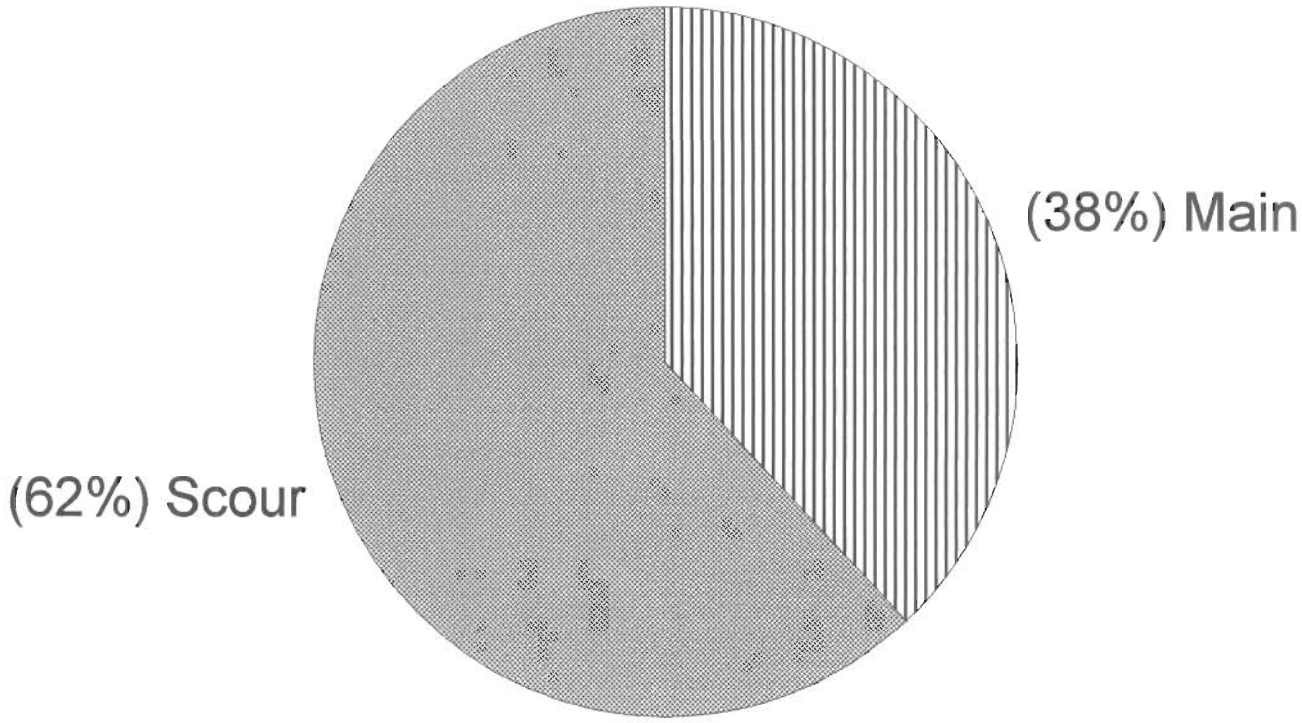
Level IV Habitat Types by % Occurrence



Graph 2

Briggs Creek

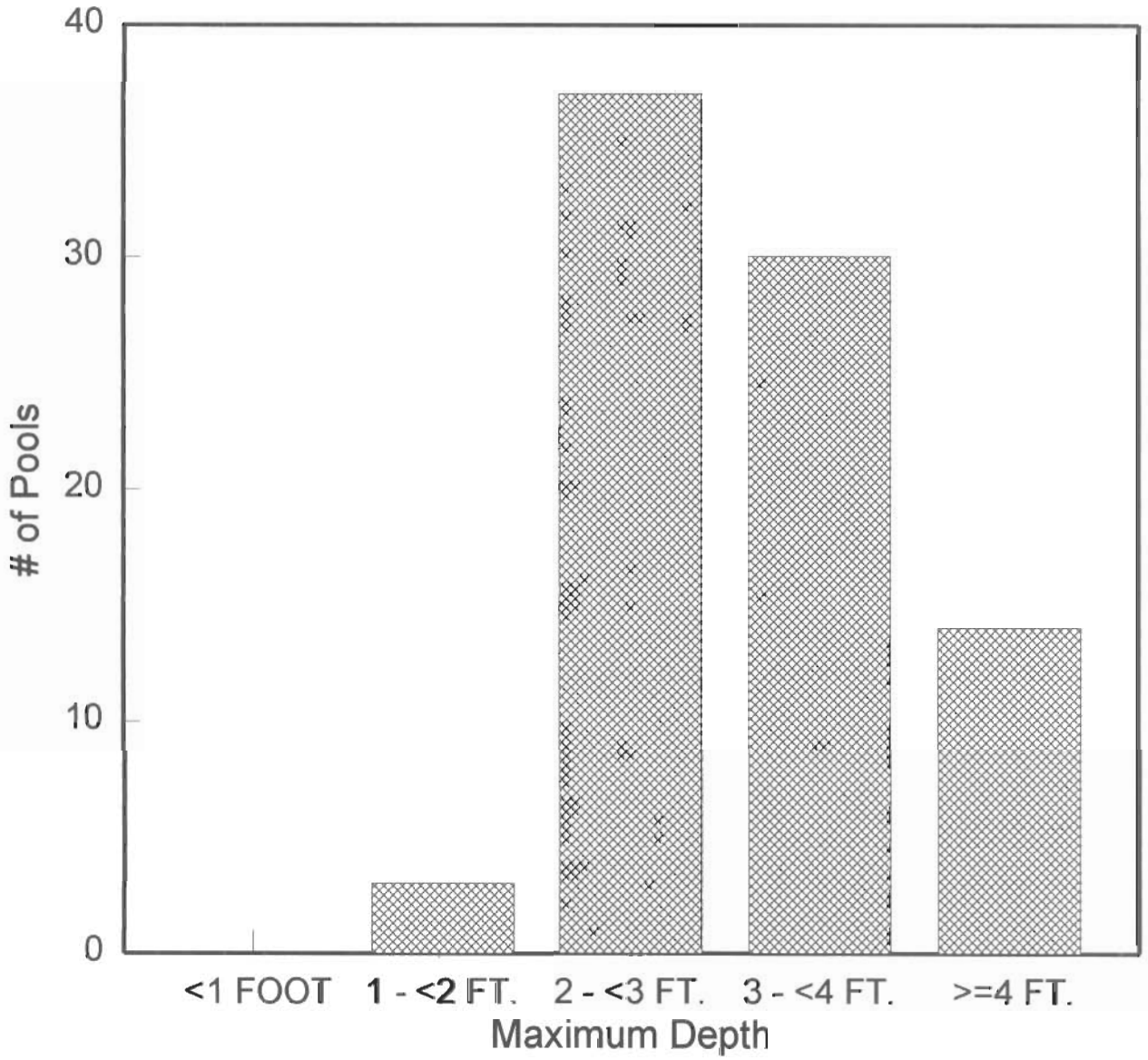
Pool Habitat Types by % Occurrence



Graph 3

Briggs Creek

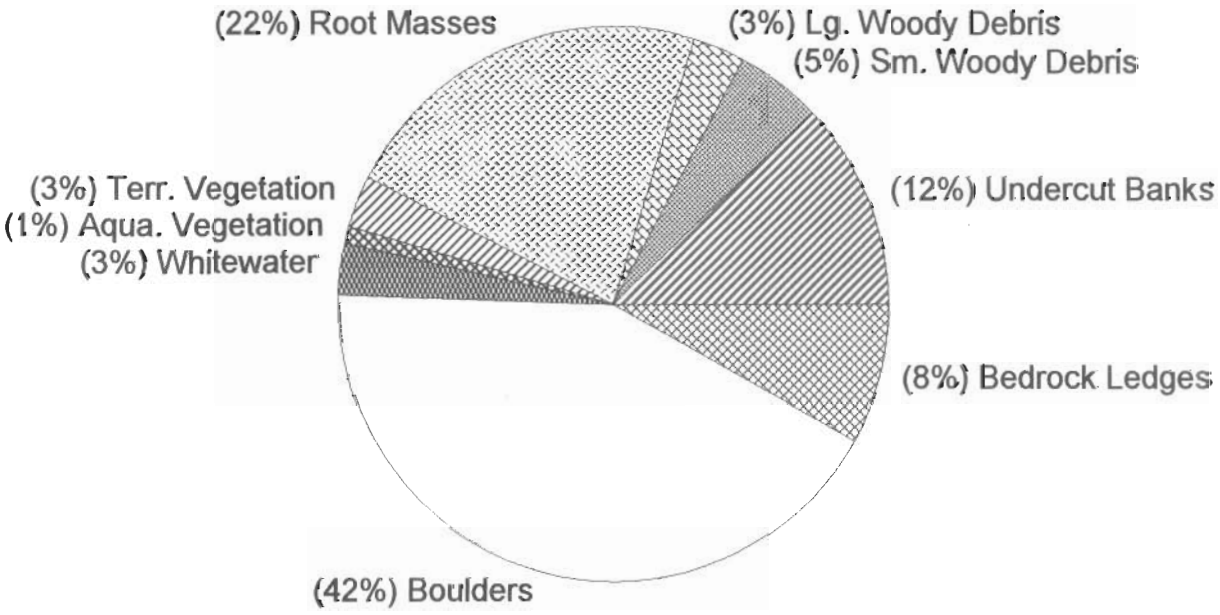
Maximum Depth in Pools



Graph 4

Briggs Creek

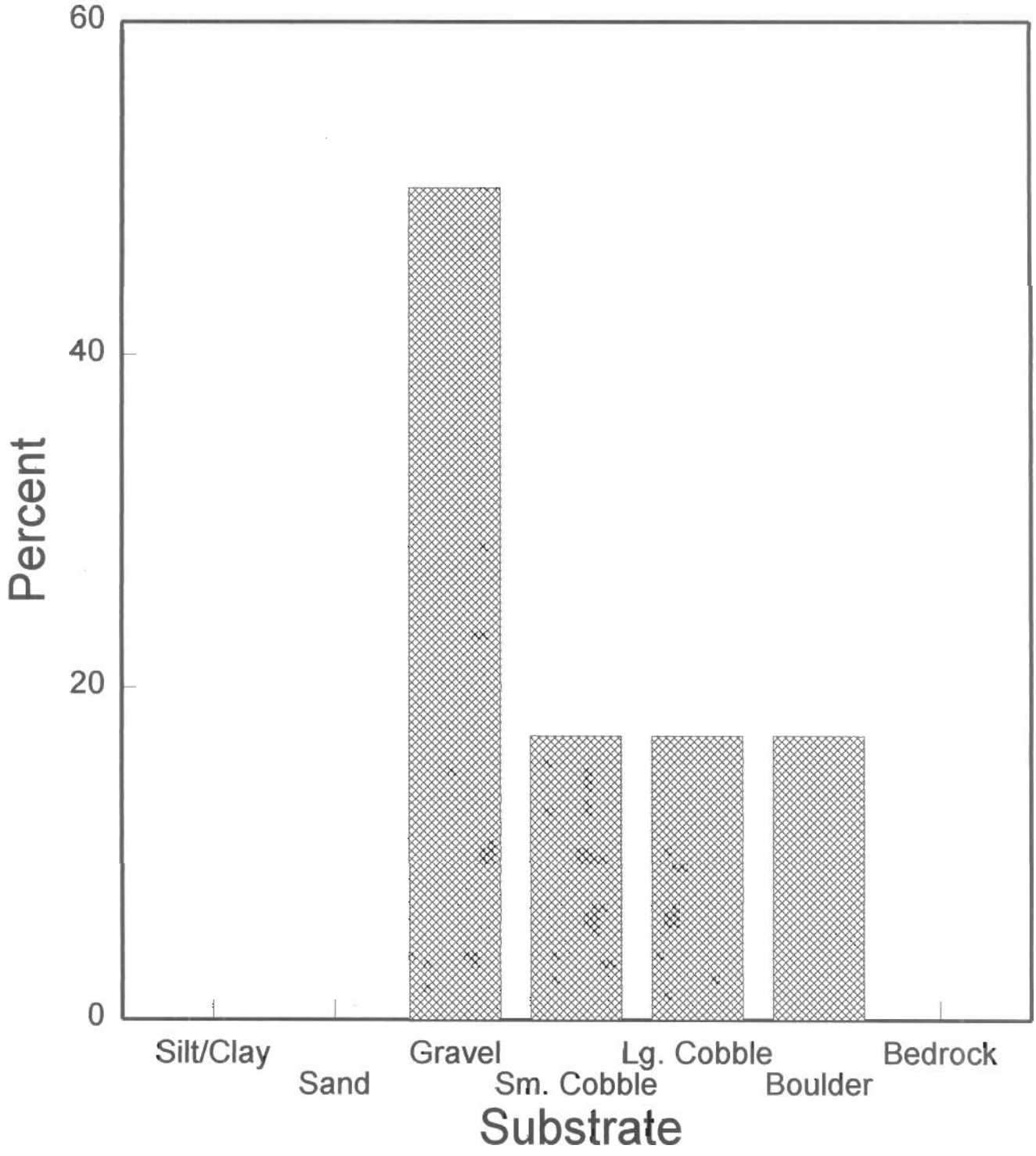
Pool Shelter Types by % Area



Graph 5

Briggs Creek

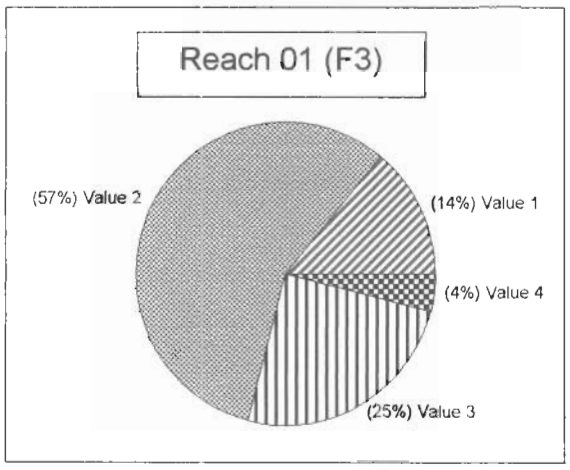
Substrate Composition in Low Gradient Riffles

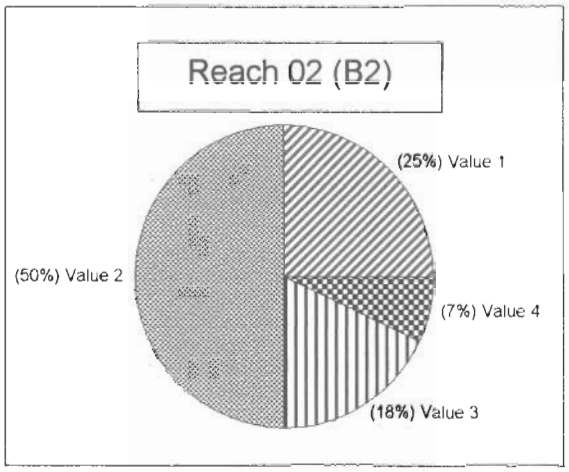


Graph 6

Briggs Creek

Percent Cobble Embeddedness by Reach



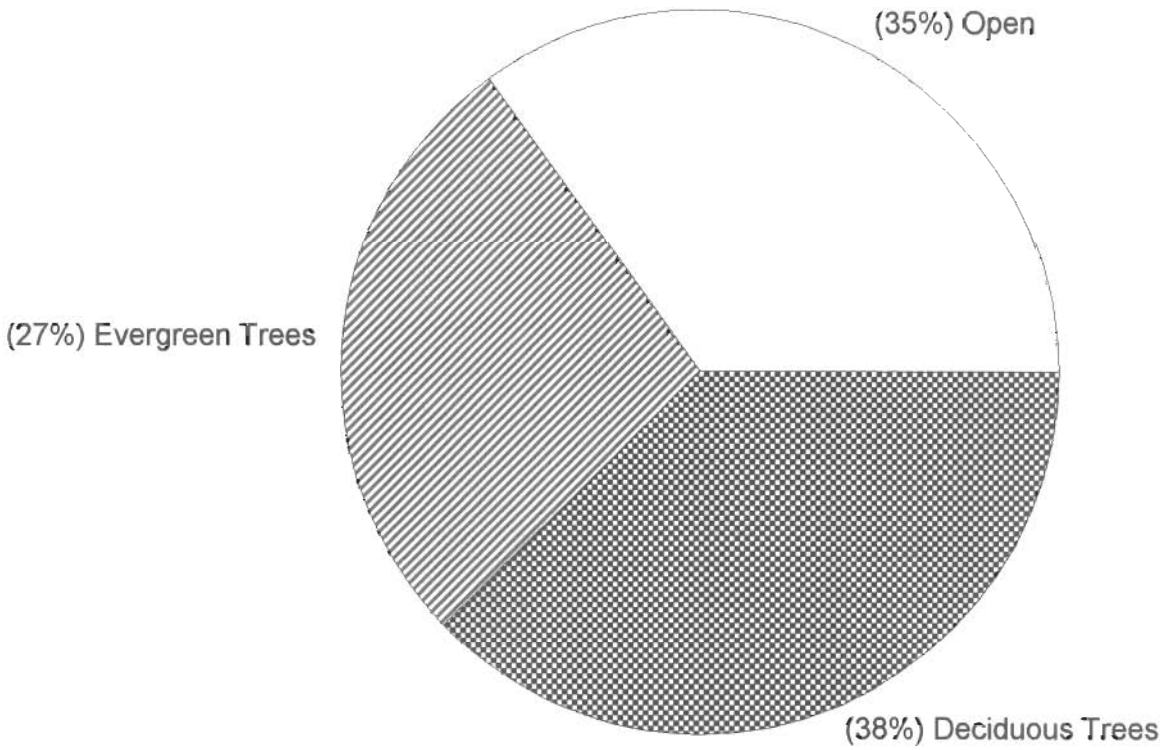


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

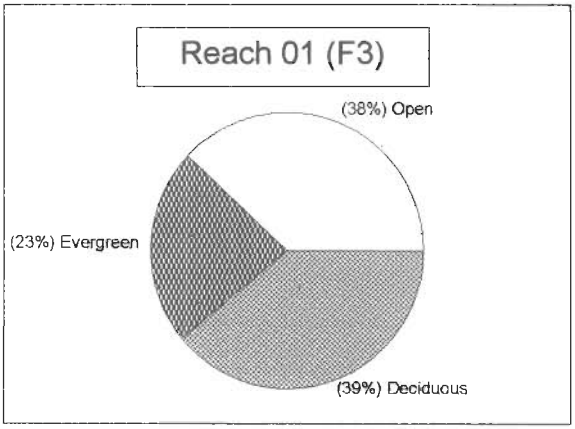
Briggs Creek

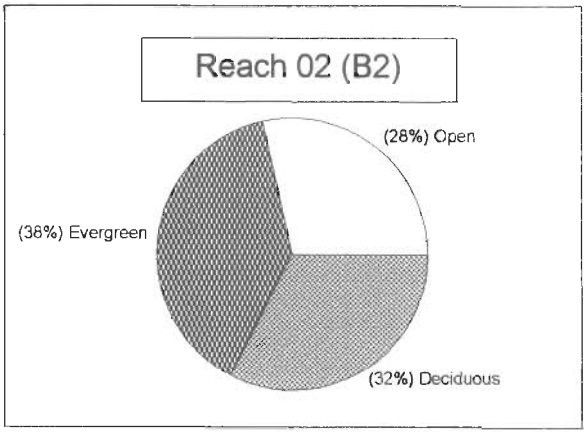
Mean Percent Canopy



Graph 8

Briggs Creek
Percent Canopy By Reach

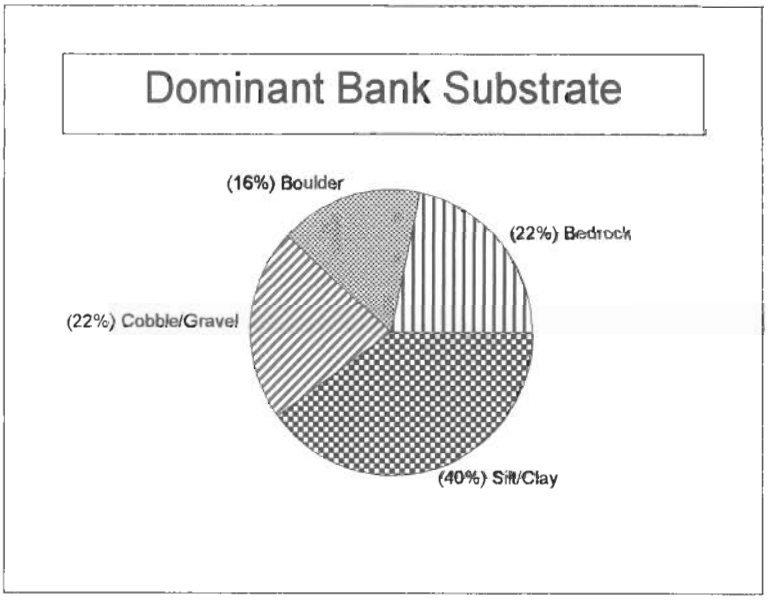


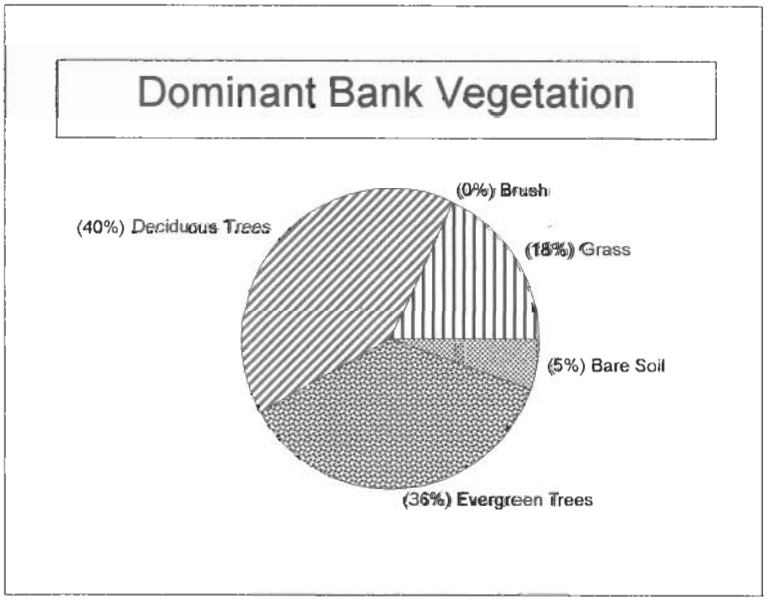


Graph 9

Briggs Creek

Percent Bank Composition





Graph 10