CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Foote Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1997

INTRODUCTION

A stream inventory was conducted during the summer of 1997 on Foote Creek starting at the confluence with Redwood 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 Foote 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

Foote Creek is a tributary to Redwood Creek which flows into Maacama Creek, a tributary of the Russian River, located in Sonoma County, California (see Foote Creek map, page 2). The legal description at the confluence with Redwood Creek is T9N, R8W, S2. Its location is 38°38'23" N. latitude and 122°41'58" W. longitude. Year round vehicle access exists from Highway 101 near Lytton, via Highway 128, via private ranch roads.

Foote Creek and its tributaries drain a basin of approximately 2.7 square miles. Foote Creek is a second order stream and has approximately 2.8 miles of blue line stream, according to the USGS Mt. St Helena 7.5 minute quadrangle. Foote Creek has no major tributaries. Summer flow was not measured. Elevations range from about 400 feet at the mouth of the creek to 1880 feet in the headwaters. Grassland and oak-woodland dominates the watershed. The watershed is owned by several private landowners and is primarily managed for vineyard production and grazing.

There are no sensitive plants listed from the CNPS Inventory or DFG's Natural Diversity Database within Foote watershed.

METHODS

The habitat inventory conducted in Foote Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi et al.,1997). 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 Foote 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 (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.

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". Foote 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 Foote 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 Foote 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, 1997. Canopy density relates to the amount of stream shaded from the sun. In Foote 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 Foote 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 Foote 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:

No historical stream surveys exist.

HABITAT INVENTORY RESULTS

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

The habitat inventory of 11/13/97 to 11/14/97 was conducted by S. Tarbell, M. Miller, and T. Parlato (AmeriCorps). The survey began at the confluence with Redwood Creek and extended up Foote Creek to the end of anadromous fish passage at a dam. The total length of the stream surveyed was 9048 feet, with an additional 136 feet of side channel.

Flows were not measured on Foote Creek.

This section of Foote Creek has two channel types: from the mouth to 7590 feet an F4 and the upper 1458 feet an A2.

F4 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate.

A2 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly boulder substrate.

Water temperatures ranged from 54°F to 60°F. Air temperatures

ranged from 58°F to 62°F. Summer temperatures were also measured using remote temperature recorders placed in pools (see Temperature Summary graphs at end of report). A recorder located upstream of Unit #044(stopping point of survey and 800' upstream of lake) logged temperatures every 2 hours from July 8 to September 19, 1997. The location of the temperature recorded was chosen at this point, because it was the only area with flowing water. The highest temperature recorded was 75°F in August and the lowest was 59°F in September.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 49% flatwater units, 27% pool units, 13% riffle units, and 11% dry streambed units. Based on total **length** there were 82% flatwater units, 7% riffle units, 6% pool units, and 5% dry streambed units (Graph 1).

Forty five habitat units were measured and 22% were completely sampled. Eleven Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent **occurrence** were runs at 31%, plunge pools 13%, dry streambed 11% and glides 9% (Graph 2). By percent total **length**, runs made up 68%, step runs 10%, dry streambed 5%, and glides 5%.

Twelve pools were identified (Table 3). Scour pools were most often encountered at 58%, and comprised 35% of the total length of pools (Graph 3).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Six of the twelve pools (50%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 3% 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. Pool types had the highest shelter rating at 16. Riffle had the lowest rating with 10 and flatwater rated 13 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 16 and the main channel pools rated 16. (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 22%, aquatic vegetation 17%, terrestrial vegetation 15%, and bedrock ledges 14%. Graph 5 describes the pool shelter in Foote Creek.

Table 6 summarizes the dominant substrate by habitat type. The low gradient riffles were not measured. In the glides and runs

measured, gravel was the dominant substrate.(Graph 6 is not included).

No mechanical gravel sampling was conducted in 1997 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the twelve pool tail-outs measured, one had a value of 1 (8%); seven had a value of 2 (58%); one had a value of 3 (8%); and three had a value of 4 (25%). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 58%. The mean percentages of deciduous and evergreen trees were 82% and 18%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 47% and the mean percent left bank vegetated was 53%. For the habitat units measured, the dominant vegetation types for the stream banks were: 42% grass, 34% deciduous trees, 16% evergreen trees, and 8% brush. The dominant substrate for the stream banks were: 87% silt/clay/sand, 11% bedrock, and 3% cobble/gravel. (Graph 10).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

No historical biological surveys of Foote Creek exist.

During the November 1997 habitat inventory of Foote Creek, steelhead and roach were observed from the streambanks. Electrofishing was not done in 1997.

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

Species Observed in Historical and Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced
1997	Steelhead	DFG	N
1997	California Roach	DFG	N

No known fish rescue operations have occurred in the watershed.

ADULT SURVEYS:

A spawning survey was conducted in Foote Creek on 3/4/1998, beginning below the reservoir at habitat unit #023 and extending upstream to the end of the survey at the reservoir spillway. No fish or redds were observed. Spawning gravel was determined to be minimal and in poor condition.

DISCUSSION

Foote Creek has two channel types: F4 (7590 ft.) and A2 (1458 ft.).

There are 7590 feet of F4 channel type in Reach 1 and 1448 feet of A2 channel type in Reach 2. According to the DFG Salmonid Stream Habitat Restoration Manual, F4 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover. The high energy, steep gradient A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

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 11/13/97 to 11/14/97 ranged from 54°F to 60°F. Air temperatures ranged from 58°F to 62°F. The warmer water temperatures were recorded in Reach 1. This temperature regime is favorable to salmonids.

Summer temperatures measured using remote temperature recorders placed in pools ranged from 59° to 75°F for the reach above unit #044. The Temperature Summary graph shows that for much of the summer (July through August and part of September) the upper watershed exhibited temperatures above the optimal for salmonids.

To make any further conclusions, temperatures need to be monitored for a longer period of time through the critical summer months, and more extensive biological sampling conducted.

Pools comprised 6% 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 Foote Creek, the existing pools are relatively deep with 50% having a maximum depth of at least 2 feet. However, these pools comprised 3% of the total length of stream habitat. 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 16. However, a pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by boulders (22%), aquatic vegetation (17%), terr. vegetation (15%), and bedrock ledges (14%). Log and root wad cover in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

Spawning habitats had gravel as the dominant substrate. This is generally considered good for spawning salmonids.

Fifty nine percent of the pool tail-outs measured had embeddedness ratings of 2. 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 2 had the best ratings and Reach 1 had the poorest ratings.

The mean percent canopy for the survey was only 58%. This is a low percentage of canopy, since 80 percent is generally considered desirable. Elevated water temperatures could be reduced by increasing stream canopy. Cooler water temperatures are desirable in Foote Creek. 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.

GENERAL RECOMMENDATIONS

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

Landowners should be sensitive to 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.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) The upper half of Reach 1 is being impacted from livestock in the riparian zone. Livestock in streams generally inhibit the growth of new trees, exasperate erosion, and reduce summertime survival of juvenile fish by defecating in the water.

Alternatives to limit cattle access, control erosion and increase canopy, should be explored with the landowner, and developed if possible.

2) For sources of upslope and in-channel erosion, utilize a biotechnical approach. 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) Increase the canopy on Foote Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable level. The 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 could be coordinated to follow bank stabilization or upslope erosion control projects.

4) Where feasible, design and engineer pool enhancement structures to increase the number of pools in the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.(Proposed)

5) In addition, where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing shelter is from boulders and vegetation. Adding high quality complexity with larger woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in flatwater and pool locations. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

6) Spawning gravels on Foote Creek are limited. Structures to decrease channel incision and recruit spawning gravel (using gravel retention structures), should be installed to trap, sort and expand redd distribution in the upper portion of the stream. Biotechnical techniques could be utilized in aggraded portions to reclaim the floodplain and decrease channel width to increase riparian vegetation and gravel transport.

RESTORATION IMPLEMENTED

1) Increase the canopy on Foote Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable level. The 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 could be coordinated to follow bank stabilization or upslope erosion control projects. (Reach 1 planted)

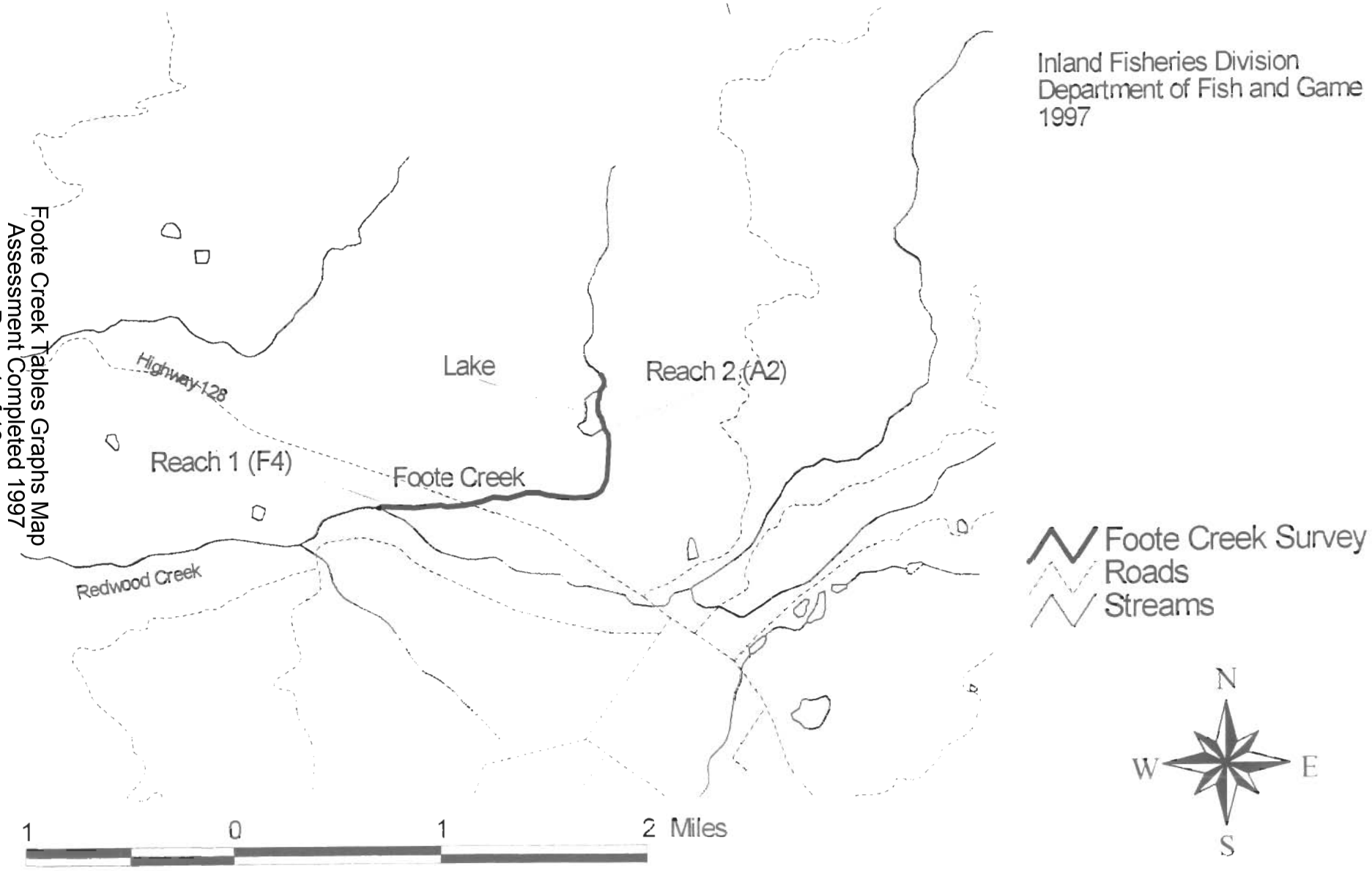
PROBLEM SITES AND LANDMARKS - FOOTE CREEK SURVEY COMMENTS

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	263	Dry at mouth, confluence of Redwood & Foote. Erosion LB. Continue vineyards both banks.
2.00	361	4" PVC pipe LB 20'. Erosion both banks.
3.00	504	Shelter is very poor for a value of 2. Erosion LB. Many squawfish.
4.00	705	Erosion LB. Banks vertical from scour.
5.00	790	Erosion RB. Blackberry LB.
7.00	1030	Bridge @ 185'. Wet road crossing @ 204'. Clay/silt fill/road retaining water. Erosion on road.
8.00	1167	2" PVC pipe drains into creek RB
9.00	1367	10' long concrete road crossing at start of unit. Plastic 12" culvert RB. Erosion RB/LB.
10.00	1466	Erosion RB. Many squawfish. Paved road RB units #002-101.
11.00	3426	Bridge @ 545'. Dry trib RB @ 1340'. 2'6" culvert RB @ 660'. 200' long dredge squawfish
13.00	3605	End of Berringer property. End Vineyards.
14.00	3961	Dry side channel RB 68'DS to 160'US into unit. (92' long). Frog
14.10	3961	Cow carcass LB.
15.00	4000	Highly grazed area. Cow feces common.
16.00	4307	Highly grazed, siltated.
18.00	4431	Wet road crossing in creek.
20.00	4657	Dry trib RB.
22.00	6454	865' small bridge(see form). Highly grazed area/ cow feces in creek. @

		1473' there are bedrock steps for 57' (low steps). Dry trib @ 1704'.
24.00	7392	Wet road crossing in creek (cement). Roach. 755' RB overflow pipe (wet) from lake RB.
27.00	7590	Dry trib LB @ 104'.
28.00	7600	Begin channel change: A2 anomaly.
33.00	8089	Erosion LB: 47'l x 25'h x 5'd.
37.00	8286	Dam sheet done: Fish barrier. Talked with landowner and he confirmed no steelhead above the dam but said he had seen spawning SH (below dam) in previous years, but not in the last 2-3 years.
42.00	8765	Wet trib LB. Highly siltated/ both banks very steep and erosive.
44.00	9048	***End of Survey*** Creek continues dry for 500'. The area has been dredged (recent). Above the dredged area continues the channel with decent habitat, but warm water (lots of algae and amphibians). END SURVEY

Foote Creek



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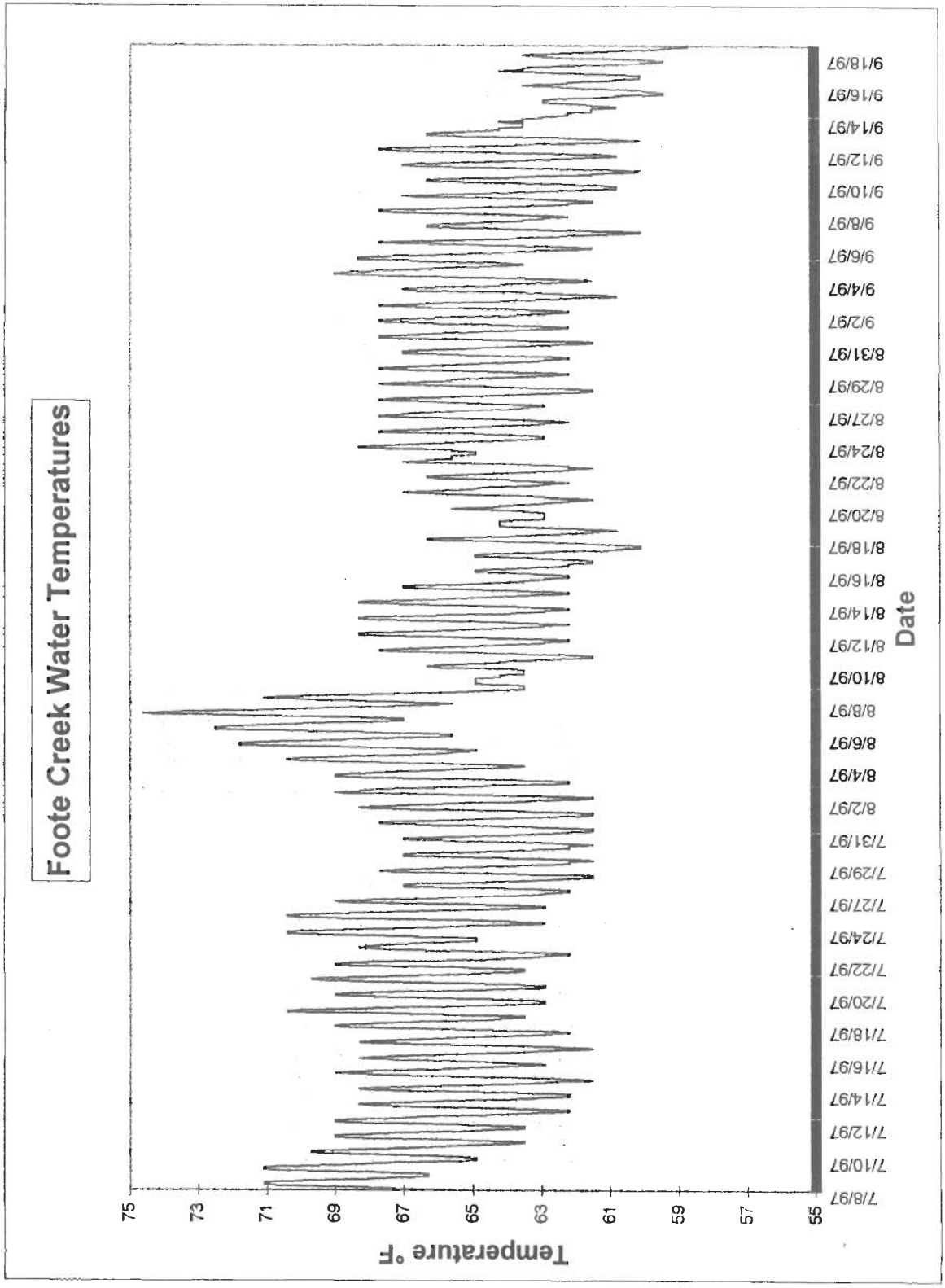
Foote Creek Water Temperatures
Temperature °F
75
73
71
69
67
65
63
61
59
57
55
Date
7/8/97
7/10/97
7/12/97
7/14/97
7/16/97
7/18/97
7/20/97
7/22/97
7/24/97
7/27/97
7/29/97
7/31/97
8/2/97
8/4/97
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8/14/97
8/16/97
8/18/97
8/20/97
8/22/97
8/24/97
8/27/97
8/29/97
8/31/97
9/2/97
9/4/97
9/6/97
9/8/97
9/10/97
9/12/97
9/14/97
9/16/97
9/18/97

Foote Creek

Drainage: Russian River

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

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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
6	0	RIFFLE	13	107	641	7	3.0	0.3	208	1250	113	678	0	10
22	4	FLATWATER	49	344	7574	82	5.5	0.3	1334	29345	492	10832	0	13
12	6	POOL	27	43	521	6	9.0	0.9	291	3496	247	2963	228	16
5	0	DRY	11	90	448	5	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.)
45	10	9184	34091	14473

Foote Creek

Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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 %
2	0	LGR	4	151	301	3	3	0.2	0.4	140	281	28	56	0	0	0
3	0	CAS	7	102	305	3	4	0.7	1.8	438	1313	306	919	0	20	95
1	0	BRS	2	35	35	0	3	0.1	0.1	47	47	5	5	0	0	10
4	1	GLD	9	111	442	5	10	0.4	1.0	1359	5434	543	2174	0	40	15
14	1	RUN	31	446	6244	68	5	0.3	1.4	1602	22425	577	8075	0	8	57
4	2	SRN	9	222	888	10	5	0.4	1.4	786	3143	298	1192	0	8	37
3	3	MCP	7	58	173	2	7	1.1	2.9	448	1343	471	1412	417	15	38
2	1	STP	4	84	168	2	3	0.6	1.4	190	380	105	211	83	20	68
1	1	LSL	2	71	71	1	11	0.5	2.4	781	781	391	391	156	5	50
6	1	PLP	13	18	109	1	12	1.0	2.5	165	992	158	950	112	18	90
5	0	DRY	11	90	448	5	0	0.0	0.0	0	0	0	0	0	0	100

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
45	10	9184	36138	15384

Foote Creek

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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
5	4	MAIN	42	68	341	65	5.4	0.9	345	1723	325	1623	334	16
7	2	SCOUR	58	26	180	35	11.6	0.9	253	1772	192	1341	123	16

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
12	6	521	3496	2963

Foote Creek

Drainage: Russian River

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

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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
3	MCP	25	0	0	0	0	3	100	0	0	0	0
2	STP	17	0	0	2	100	0	0	0	0	0	0
1	LSL	8	0	0	0	0	1	100	0	0	0	0
6	PLP	50	0	0	4	67	2	33	0	0	0	0

TOTAL UNITS
12

Foote Creek

Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD:

LEGAL DESCRIPTION:

LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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
2	1	LGR	0	0	0	0	0	0	0	0	0
3	1	CAS	0	0	0	5	0	0	0	95	0
1	0	BRS	0	0	0	0	0	0	0	0	0
4	1	GLD	20	0	0	0	20	60	0	0	0
14	3	RUN	0	1	0	0	0	19	0	80	0
4	2	SRN	0	0	0	0	0	0	0	100	0
3	3	MCP	21	0	0	10	21	37	0	11	0
2	1	STP	0	10	0	15	5	0	0	70	0
1	1	LSL	0	0	100	0	0	0	0	0	0
6	6	PLP	3	3	0	1	16	5	1	31	40
5	0	DRY	0	0	0	0	0	0	0	0	0
45	19	ALL HABITAT TYPES	8	1	4	2	10	27	0	44	4
12	11	FALLS ONLY	10	2	13	6	15	17	0	22	14

Foote Creek

Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 11/13/97 to 11/14/97

Confluence Location: QUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0"

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
2	0	LGR	0	0	0	0	0	0	0
3	0	CAS	0	0	0	0	0	0	0
1	1	BRS	0	0	0	0	0	0	100
1	1	GLD	0	0	100	0	0	0	0
3	3	RUN	0	0	100	0	0	0	0
2	2	SRN	0	0	50	0	0	50	0
3	3	MCP	0	33	67	0	0	0	0
1	1	STP	0	0	0	0	0	100	0
1	1	LSL	0	0	100	0	0	0	0
3	3	PLP	0	0	100	0	0	0	0
2	2	DRY	0	0	100	0	0	0	0

Foote 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
58.25	17.75	82.25	46.58	52.89

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	2	2	10.53
Boulder	0	0	0
Cobble/Gravel	0	1	2.63
Silt/clay	17	16	86.84

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	8	8	42.11
Brush	1	2	7.89
Deciduous Trees	7	6	34.21
Evergreen Trees	3	3	15.79
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Foote Creek
SAMPLE DATES: 11/13/97 to 11/14/97
SURVEY LENGTH:
MAIN CHANNEL: 9048 ft. SIDE CHANNEL: 136 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Latitude: 0½0'0"
Legal Description: Longitude: 0½0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-27)

Channel Type: F4	Mean Canopy Density: 48%
Main Channel Length: 7590 ft.	Evergreen Component: 0%
Side Channel Length: 136 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 5.6 ft.	Pools by Stream Length: 3%
Pool Mean Depth: 0.9 ft.	Pools >=2 ft. Deep: 83%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 0%
Water: 54-60½F Air: 58-62½F	Mean Pool Shelter Rtn: 17
Dom. Bank Veg.: Grass	Dom. Shelter: Boulders
Bank Vegetative Cover: 51%	Occurrence of LOD: 100%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 291 ft.

Embeddness Value: 1. 17% 2. 33% 3. 17% 4. 33%

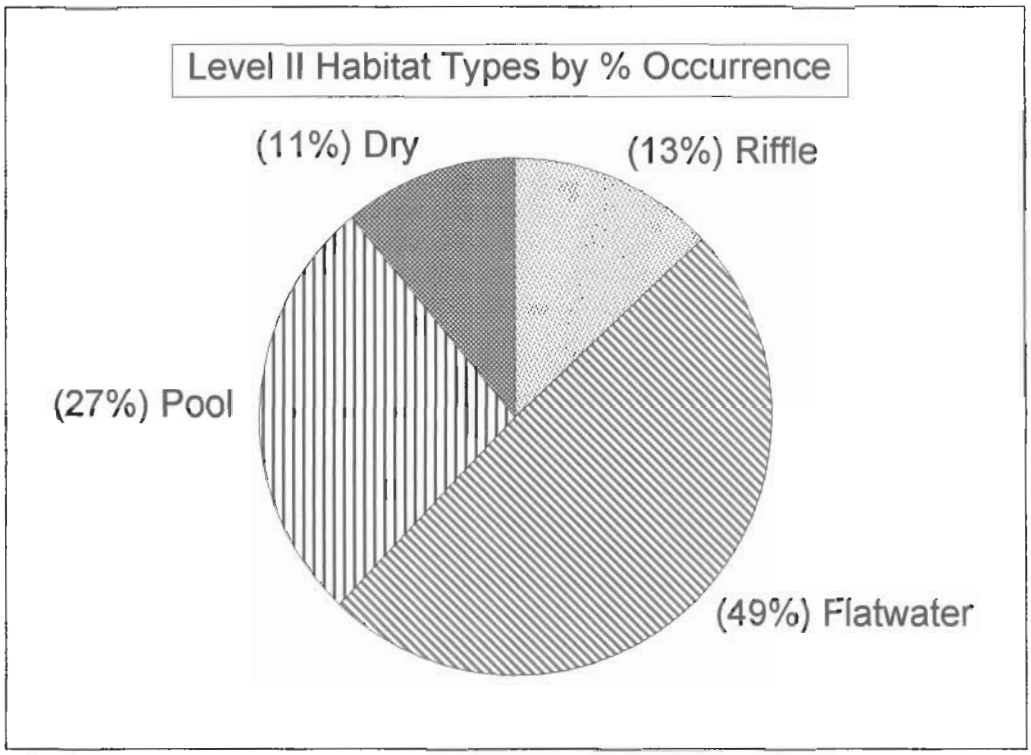
STREAM REACH 2 (Units 28-44)

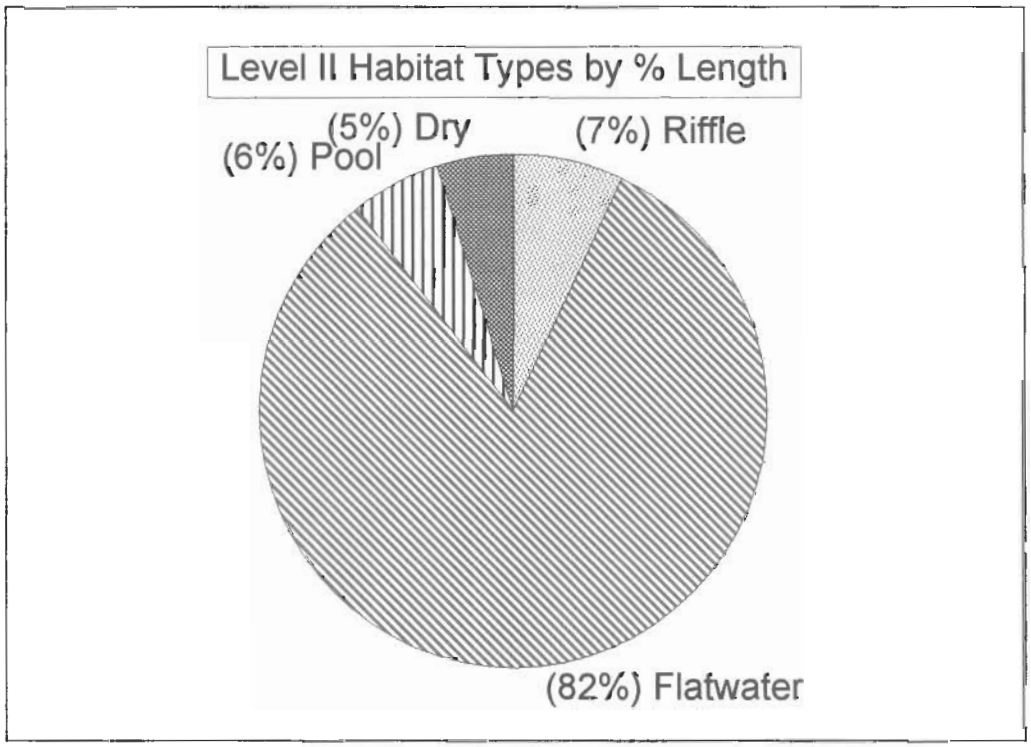
Channel Type: A2	Mean Canopy Density: 67%
Main Channel Length: 1458 ft.	Evergreen Component: 32%
Side Channel Length: 0 ft.	Deciduous Component: 68%
Riffle/Flatwater Mean Width: 3.5 ft.	Pools by Stream Length: 18%
Pool Mean Depth: 0.9 ft.	Pools >=2 ft. Deep: 17%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 0%
Water: 54-56½F Air: 58-58½F	Mean Pool Shelter Rtn: 15
Dom. Bank Veg.: Grass	Dom. Shelter: Boulders
Bank Vegetative Cover: 47%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 157 ft.

Embeddness Value: 1. 0% 2. 83% 3. 0% 4. 17%

Foote Creek

Level II Habitat Types

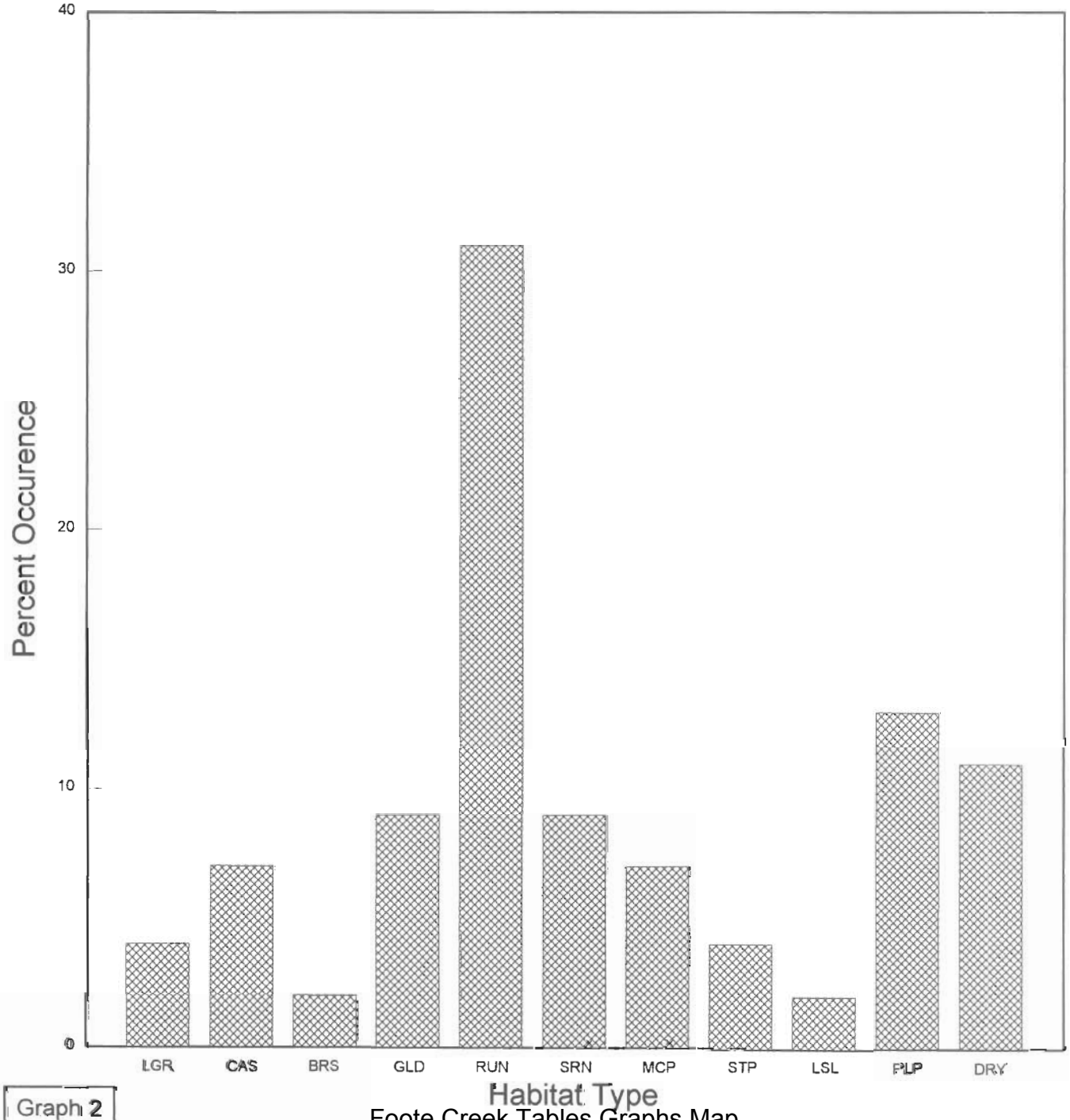




Graph 1

Foote Creek

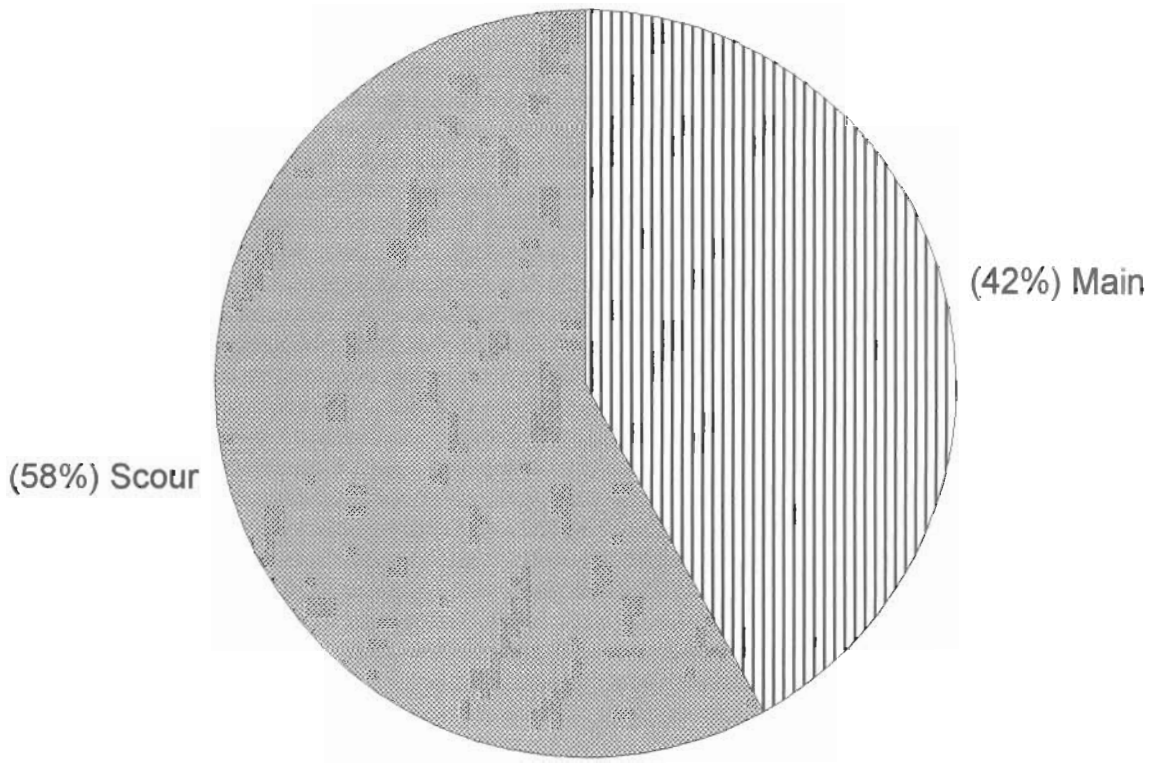
Level IV Habitat Types by % Occurrence



Graph 2

Foote Creek

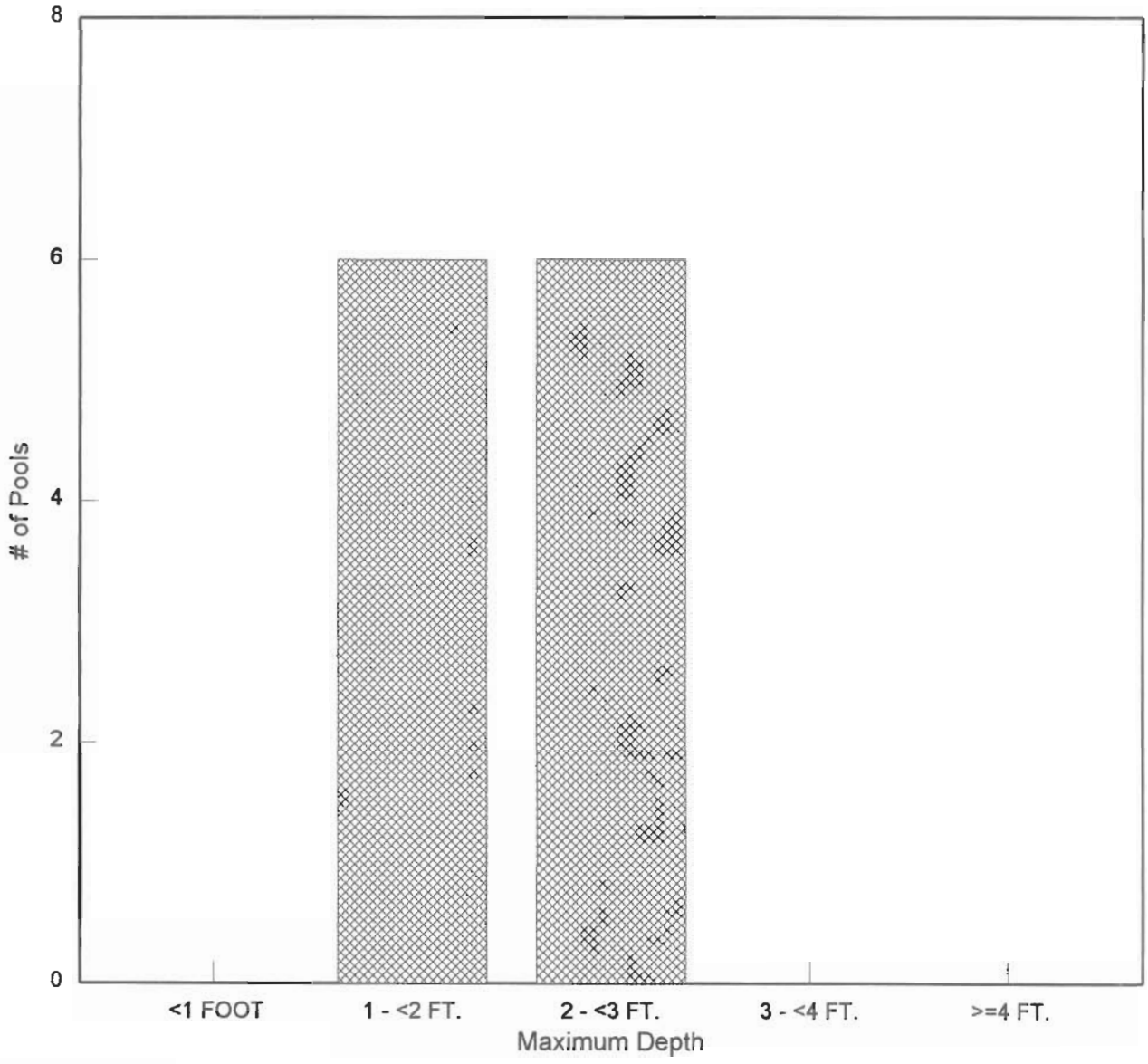
Pool Habitat Types by % Occurrence



Graph 3

Foote Creek

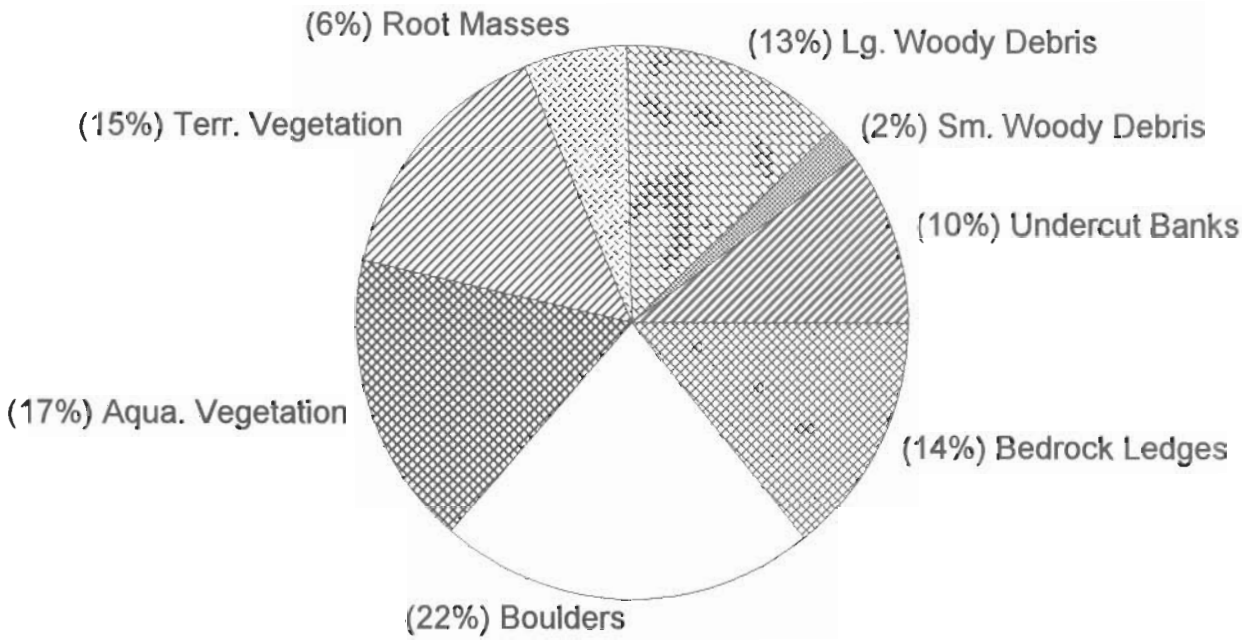
Maximum Depth in Pools



Graph **4**

Foote Creek

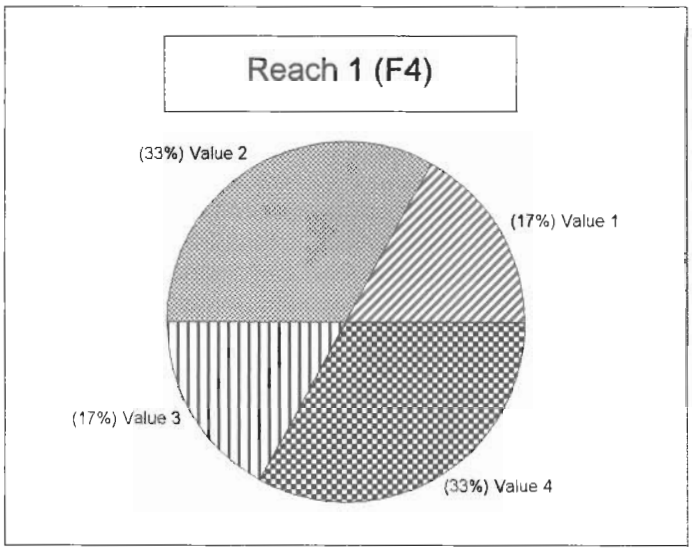
Pool Shelter Types by % Area

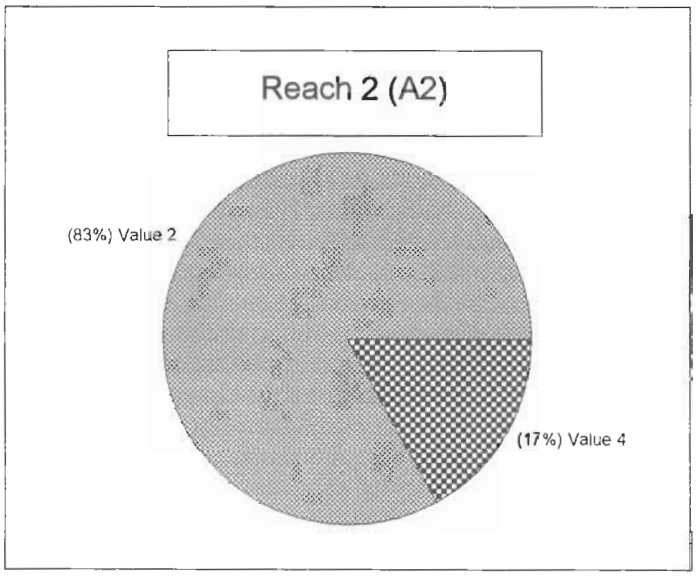


Graph 5

Foote Creek

Percent Cobble Embeddedness by Reach



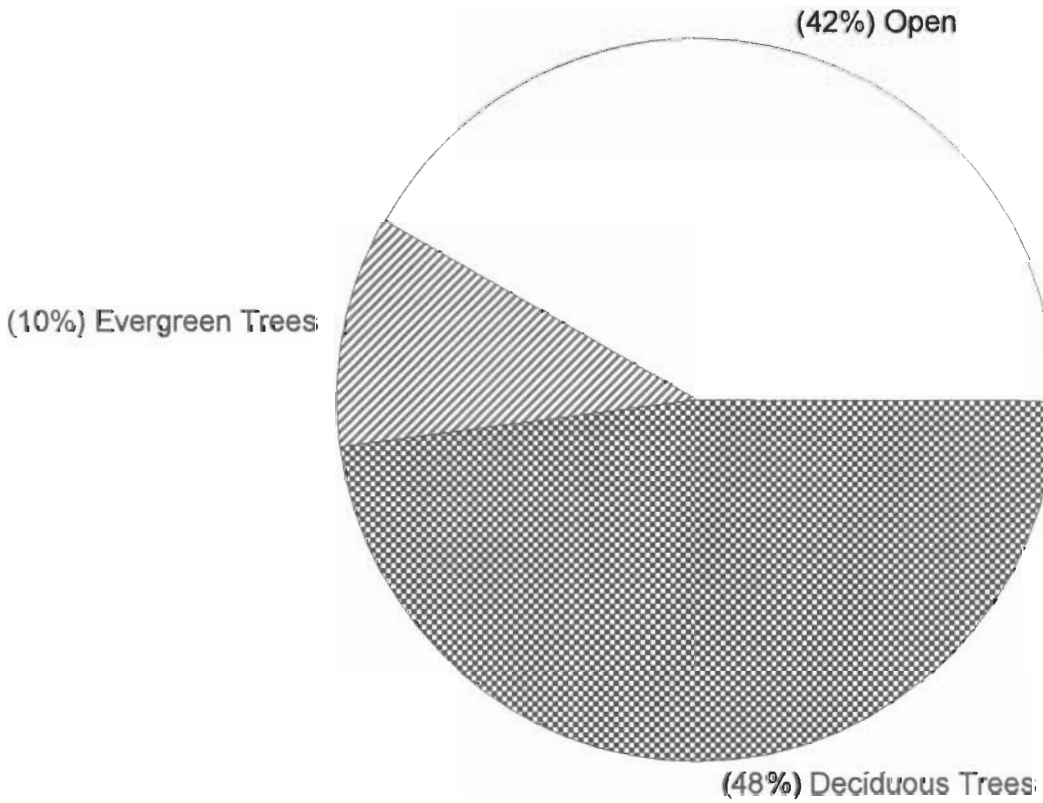


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

Foote Creek

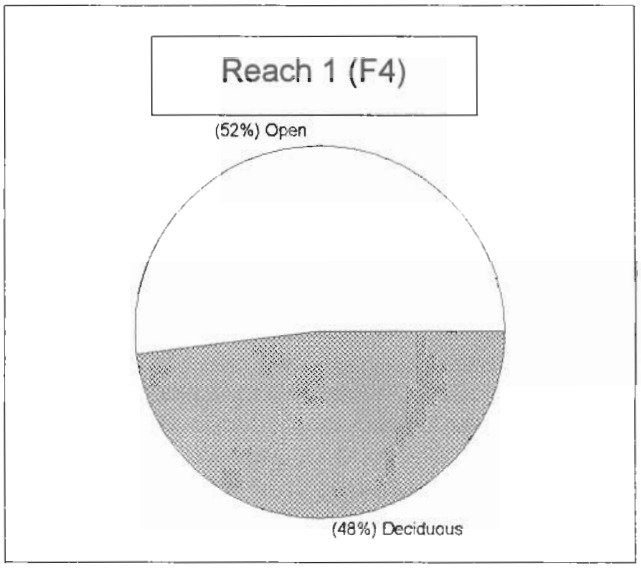
Mean Percent Canopy

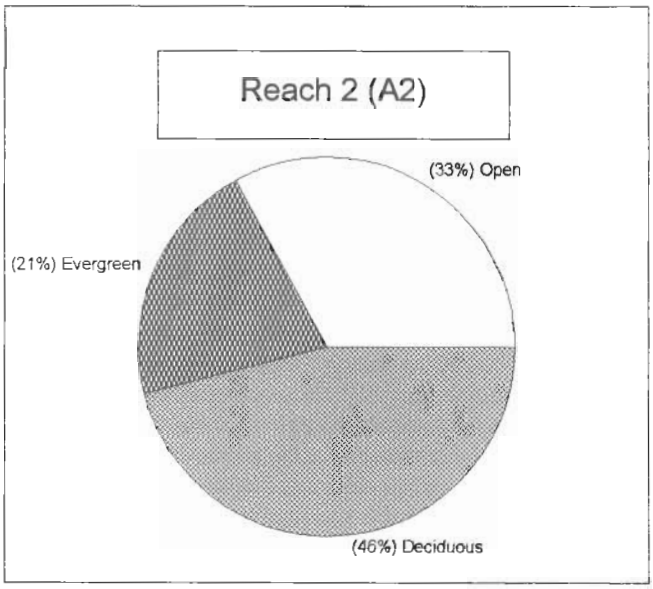


Graph 8

Foote Creek

Percent Canopy By Reach

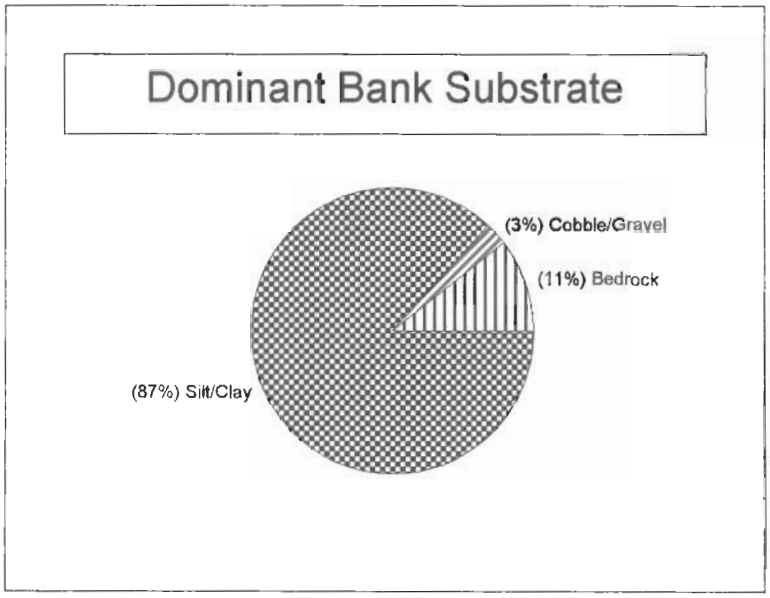


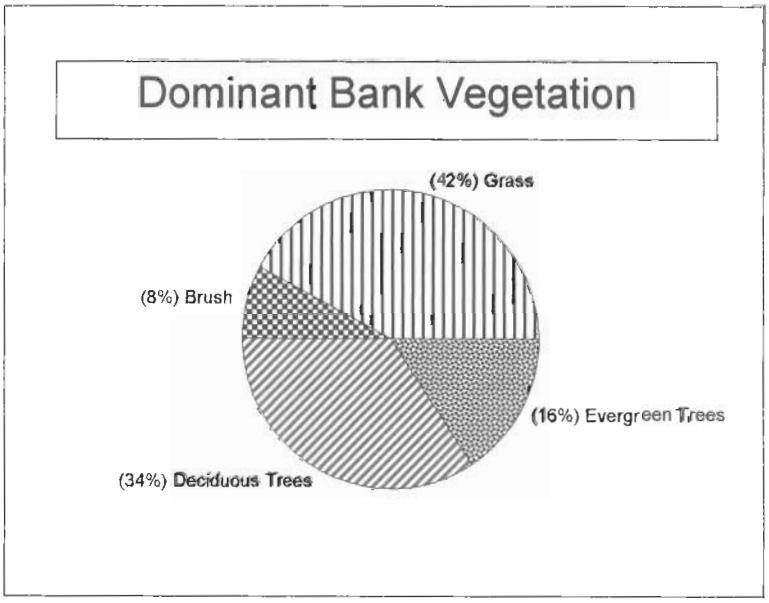


Graph 9

Foote Creek

Percent Bank Composition





Graph 10