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

INTRODUCTION

A stream inventory was conducted during the summer of 1996 on Blue Jay 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 Blue Jay 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 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

Blue Jay Creek is a tributary to Ward Creek which flows into Blue Jay Creek, a tributary of the Russian River, located in Sonoma County, California (see Blue Jay Creek map, page 2). The legal description at the confluence with Ward Creek is T8N, R12W, S13. Its location is 38°32'5" N. latitude and 123°8'3" W. longitude. Year round vehicle access exists from private roads via Fort Ross Road in Cazadero.

Blue Jay Creek and its tributaries drain a basin of approximately 1.5 square miles. Blue Jay Creek is a first order stream and has approximately 2.5 miles of blue line stream, according to the USGS Fort Ross 7.5 minute quadrangles. Elevations range from about 480 feet at the mouth of the creek to 1760 feet in the headwaters. Mixed coniferous forest dominates the watershed, but there are zones of grassland and oak-woodland in the upper watershed. No sensitive plants or animals were listed in DFG's Natural Diversity Database for Blue Jay Creek watershed. The watershed is entirely in private ownership.

METHODS

The habitat inventory conducted in Blue Jay 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 Blue Jay 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.

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". Blue Jay 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 Blue Jay 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 Blue Jay 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 Blue Jay 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 Blue Jay 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 Blue Jay 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

Historical records reflect that a 15-foot waterfall was located on Blue Jay Creek. The waterfall was located approximately where habitat unit 118 was located in the 1996 stream inventory.

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 13 - September 9, 1996 was conducted by Nancy Barney and Bob Barney (NEAP) and data analyzed by Ken Bunzel (DFG). The survey began at the confluence with Ward Creek and extended up Blue Jay Creek until salmonids were no longer observed. The total length of the stream surveyed was 7,748 feet, with an additional 121 feet of side channel. On May 25, 1996 flows were measured at 11.73 cfs at 50 feet south of the bridge off Blue Jay Road, using a Marsh-McBirney Model 2000 flowmeter

This section of Blue Jay Creek has two channel types in three separate reaches: from the mouth to 1,975 feet an F3; next 2,339 feet a B2 and the upper 3,434 feet also an F3.

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 52°F to 77°F. Air temperatures ranged from 45°F to 91°F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 43% riffle units, 31% pool units, 24% flatwater units, and 2% dry streambed units. Based on total **length** there were 52% riffle units, 24% pool units, 22% flatwater units, and 2% dry streambed units (Graph 1).

Two hundred, ten habitat units were measured and 23% were completely sampled. Eighteen 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 33%, mid-channel pools 10%, glides 9% and runs 9% (Graph 2). By percent total **length**, low gradient riffles made up 41%, step pools 9%, glides 8%, and runs 7%.

Sixty-five pools were identified (Table 3). Main Channel pools were most often encountered at 52%, and comprised 61% 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. Fourteen of the 65 pools (22%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 5% 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 35. Flatwater had the lowest rating with 15 and riffle rated 35 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 42, scour pools rated 30, and backwater pools rated 28 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 47%, terrestrial vegetation 12%, and white water 8%. Graph 5 describes the pool shelter in Blue Jay Creek.

Table 6 summarizes the dominant substrate by habitat type. Small cobble was the dominant substrate observed in six of the thirteen low gradient riffles (46%) measured for substrate. Large cobble

was the next most frequently observed dominant substrate, and occurred in 38% of the low gradient riffles (Graph 6).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 63 pool tail-outs measured, twenty two had a value of 1 (35%); nineteen had a value of 2 (30%); six had a value of 3 (10%); and sixteen had a value of 4 (25%). On this scale, a value of one is best for fisheries. Graph 7 describes percent embeddedness by reach.

The mean percent canopy density for the stream reach surveyed was 76%. The mean percentages of deciduous and evergreen trees were 40% and 60%, respectively. Graph 8 describes the canopy for the entire survey and graph 9 describes the canopy by reach.

For the entire stream reach surveyed, the mean percent right bank vegetated was 23% and the mean percent left bank vegetated was 24%. For the habitat units measured, the dominant vegetation types for the stream banks were: 40% evergreen trees, 26% deciduous trees, 15% grass, 10% brush and 9% bare soil. The dominant substrate for the stream banks were: 49% cobble/gravel, 29% boulder, and 22% bedrock (Graph 10).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

A biological inventory was taken on September 10, 1995 in Blue Jay Creek to document the fish species composition and distribution. The method used was single pass electro-fishing with one Smith Root Model 12 electro-fisher. The air temperature was 81°F and the water temperature was 56°F. The observers were Barney, Barney (NEAP) and Coey (DFG).

The inventory was conducted starting at the road crossing in habitat units 36-49 (Reach 1). In riffle and pool habitat types, 94 0+, 23 1+ and one 2+ steelhead (24/100') were observed along with 5 Yellow-legged Frogs. This section had an approximate length of 479 feet.

During the habitat inventory, no salmonids were observed upstream of unit 118, 4,507 feet (0.9 miles) upstream of the mouth.

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

Species Observed in 1996		
SPECIES	**SOURCE**	**Native/Introduced**
Steelhead	DFG	N
Yellow-legged Frog	DFG	N

Records indicate there has been no hatchery stocking, transfers or rescues for Blue Jay Creek.

DISCUSSION

Blue Jay Creek has two channel types in three reaches.

There are 5,409 feet of F3 channel type in Reaches 1 and 3. According to the DFG Salmonid Stream Habitat Restoration Manual, 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. These channel types have 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.

There is 2,339 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. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and shelter.

The water temperatures recorded on the survey days August 13 - September 9, 1996 ranged from 52°F to 77°F. The warmer water temperatures were recorded in Reach 3. These temperatures, if sustained, are above the threshold stress level (65°F) 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 24% 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 Blue Jay Creek, the pools are relatively shallow with 22% having a maximum depth of at least 2 feet. These pools comprised only 5% 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 35. 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 (47%), terrestrial vegetation (12%), and white water (8%). Log and root wad cover structures in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

Seven of the 13 low gradient riffles measured (54%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

However, thirty-five percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Thirty-five percent had a rating of 1 and 30% had a rating of 2. This is rated as "fair". Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. Embeddedness ratings decreased in an upstream direction with Reach 1 having the poorest and Reach 3 having the best ratings.

The higher the percent of fine sediment, the lower the probability that eggs will survive to hatch. This is due to the reduced quantity of oxygenated water able to percolate through the gravel, or because of fine sediment capping the redd and preventing fry emergence.

The mean percent canopy for the overall survey was 76%. This is a good percentage of canopy, since 80 percent is generally considered desirable. Canopy levels decreased in an upstream direction with Reach 3 having only 54% canopy. Cooler water temperatures are desirable in Blue Jay Creek.

Biological surveys are conducted to document fish distribution and are not necessarily representative of population information. Steelhead of all age classes were documented in the 1996 survey, but coho were not found. 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. The 1996 fall survey documented many 0+ fish indicating successful

spawning. Many 1+ fish were also observed indicating good rearing conditions the year before or good holding-over conditions in general.

GENERAL RECOMMENDATIONS

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

The winter 1995 storms brought down many large trees and other woody debris into the stream, which increased the number and quality of pools since the drought years. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Signs of recent and historic tree and log removal were evident in the active channel during our survey. 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.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) Increase the canopy in Reach 3 by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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

4) Where feasible, design and engineer pool enhancement

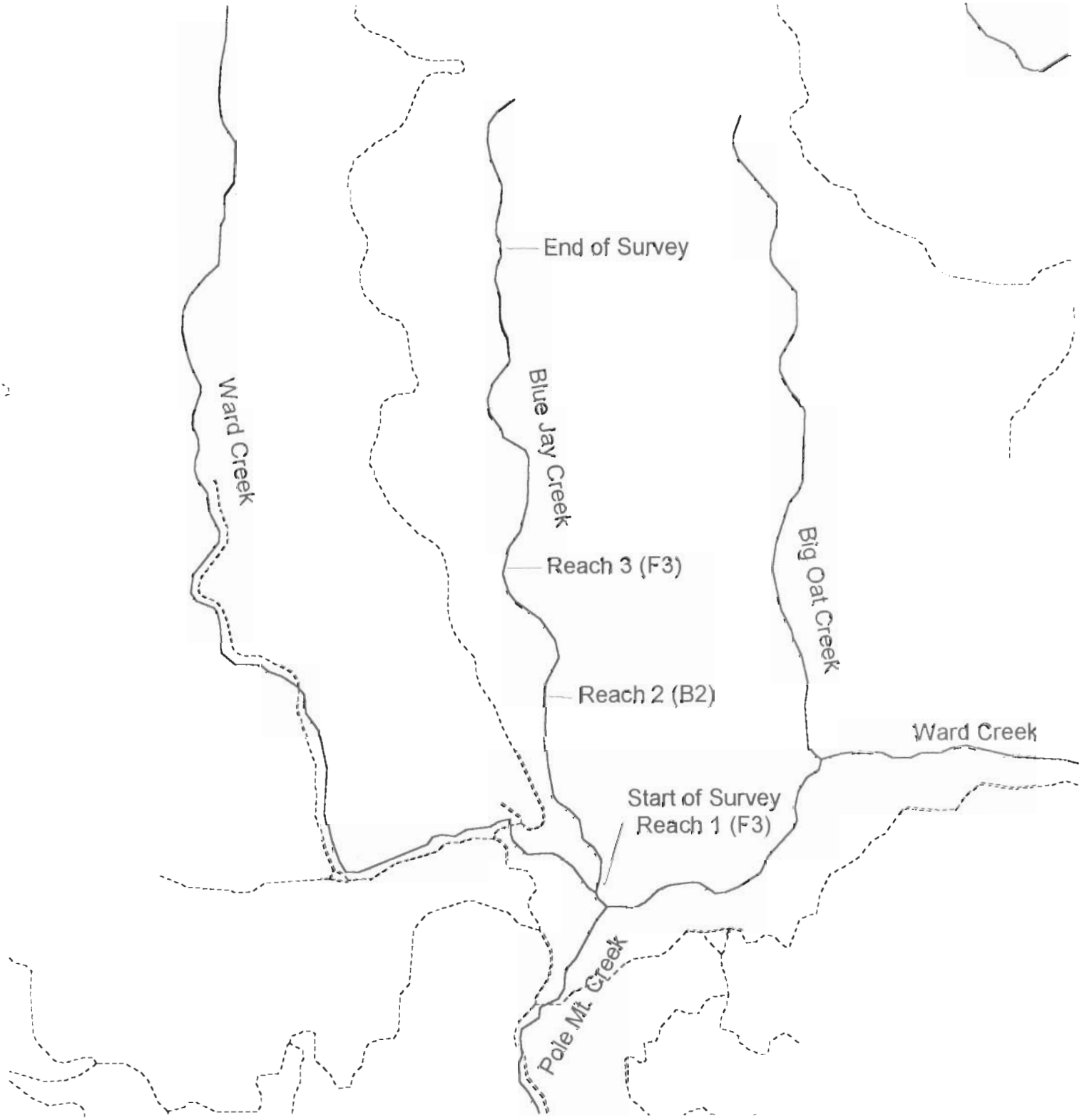
structures to increase the number of pools in all reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

PROBLEM SITES AND LANDMARKS - BLUE JAY 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
9.00	173	FEW FISH
10.10	196	NO FISH
11.00	243	TWO 1+ FISH OBSERVED
21.00	553	CUT LEFT BANK
35.00	935	FEW FISH
37.00	1011	ROAD CROSSES CREEK
40.00	1151	SEVERAL LARGE FISH
47.00	1385	FEWER FISH BUT LARGER
58.00	1744	FEW FISH
83.00	3007	BRIDGE
84.00	3026	ONE FISH
85.00	3099	VERY FEW FISH
97.00	3648	VERY FEW FISH
98.00	3658	NO FISH
99.00	3728	NO FISH
101.00	3775	LOG ACCUMULATION
102.00	3829	SPRING LEFT BANK
103.00	3867	FROGS
112.00	4175	SPRING LEFT BANK
113.00	4196	NO FISH
118.00	4507	ONE LARGE FISH
119.00	4524	NO FISH
123.00	4704	FROGS
128.00	4908	NO FISH
132.00	5088	NO FISH
135.00	5202	SPRING RT BANK
139.00	5512	DRY TRIB RT BANK, SPRING RT BANK
152.00	5858	UPSLOPE SLIDE, LEFT SIDE
153.00	5868	LOG ACCUMULATION
167.00	6294	LOG ACCUMULATION
183.00	6861	BRIDGE 40 X 11 X 6.6
203.00	7748	MTN LION
204.00	7774	END OF SURVEY

Blue Jay Creek



Inland Fisheries Division
Department of Fish and Game
July 19, 1997

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

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

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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
90	16	RIFFLE	43	45	4087	52	9.0	0.2	343	30848	59	5338	0	35
50	10	FLATWATER	24	34	1723	22	5.6	0.4	162	8083	76	3805	0	15
65	22	POOL	31	29	1886	24	7.8	0.9	211	13709	189	12266	169	35
5	0	DRY	2	35	173	2	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.)
210	48	7869	52639	21408

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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.		%
70	12	LGR	33	46	3239	41	10	0.2	0.9	419	29355	66	4642	0	33	72
12	2	HGR	6	43	517	7	6	0.3	0.6	88	1055	26	316	0	15	77
4	1	CAS	2	54	217	3	7	0.4	0.6	176	706	71	282	0	120	98
4	1	BRS	2	29	114	1	4	0.3	0.6	100	399	30	120	0	5	95
7	1	POW	3	32	227	3	7	0.6	1.3	233	1628	130	907	0	13	66
19	3	GLD	9	35	662	8	6	0.4	0.9	129	2459	55	1049	0	5	80
18	3	RUN	9	30	547	7	5	0.3	0.9	67	1211	22	391	0	5	80
6	3	SRN	3	48	288	4	6	0.5	0.9	241	1446	116	694	0	40	81
21	3	MCP	10	21	445	6	9	0.9	4.9	186	3910	175	3673	166	34	64
13	4	STP	6	54	697	9	7	0.8	2.8	312	4052	245	3184	214	53	81
1	1	CRP	0	24	24	0	8	1.4	2.7	176	176	247	247	229	90	70
2	1	LSL	1	25	50	1	8	1.2	2.8	195	390	283	566	44	95	78
7	3	LSR	3	27	191	2	8	0.9	2.8	235	1642	225	1573	201	36	94
9	1	LSBk	4	31	276	4	7	0.8	2.8	222	1999	180	1616	157	6	81
6	4	LSBo	3	18	108	1	7	0.8	2.4	115	691	92	550	76	23	82
3	3	PLP	1	16	47	1	12	1.0	3.2	188	565	215	644	196	28	70
3	2	SCP	1	17	50	1	6	0.7	1.7	98	295	68	204	54	28	95
5	0	DRY	2	35	173	2	0	0.0	0.0	0	0	0	0	0	0	95

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
210	48	7869	51977	20657

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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
34	7	MAIN	52	34	1142	61	7.9	0.9	234	7962	202	6857	186	42
28	13	SCOUR	43	25	695	37	7.9	0.9	194	5435	186	5203	156	30
3	2	BACKWATER	5	17	50	3	6.3	0.7	98	295	68	204	54	28

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
65	22	1886	13692	12263

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

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

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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
21	MCP	32	0	0	16	76	4	19	0	0	1	5
13	STP	20	0	0	12	92	1	8	0	0	0	0
1	CRP	2	0	0	0	0	1	100	0	0	0	0
2	LSL	3	0	0	1	50	1	50	0	0	0	0
7	LSR	11	0	0	6	86	1	14	0	0	0	0
9	LSBk	14	1	11	6	67	2	22	0	0	0	0
6	LSBo	9	1	17	4	67	1	17	0	0	0	0
3	PLP	5	0	0	1	33	1	33	1	33	0	0
3	SCP	5	0	0	3	100	0	0	0	0	0	0

TOTAL UNITS
65

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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	13	LGR	0	9	57	0	285	0	0	5211	0
12	2	HGR	0	0	0	0	0	0	4	12	0
4	1	CAS	0	0	0	0	0	0	66	198	0
4	1	BRS	0	0	0	0	0	0	0	6	0
7	2	POW	4	0	0	0	0	0	0	30	0
19	3	GLD	0	4	17	0	2	0	0	2	0
18	4	RUN	0	0	0	0	2	0	0	15	0
6	3	SRN	0	2	0	0	0	0	7	146	0
21	20	MCP	27	32	66	38	86	62	0	285	0
13	12	STP	0	9	0	0	203	140	201	878	0
1	1	CRP	24	24	0	16	0	0	0	0	16
2	2	LSL	0	30	67	64	0	0	0	6	0
7	7	LSR	105	35	15	91	18	0	0	37	0
9	9	LSBk	0	0	0	0	10	6	0	45	11
6	6	LSBo	2	18	3	0	16	0	0	43	0
3	3	PLP	19	0	9	0	0	0	14	17	0
3	3	SCP	0	7	4	0	7	0	0	37	0
5	0	DRY	0	0	0	0	0	0	0	0	0
TOTAL 210	92		181	170	238	209	629	208	292	6968	27
			2%	2%	3%	2%	7%	2%	3%	78%	0%
TOTAL FOR POOLS 65	63		177	155	164	209	340	208	215	1348	27
			6%	5%	6%	7%	12%	7%	8%	47%	1%

Blue Jay Creek

Drainage: Ward Creek, Big Austin Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 08/13/96 to 09/09/96

Confluence Location: QUAD: FORT ROSS LEGAL DESCRIPTION: T8NR12WS13 LATITUDE: 38°32'5" LONGITUDE: 123°8'3"

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	13	LGR	0	0	8	46	38	0	8
2	2	HGR	0	0	0	0	100	0	0
4	1	CAS	0	0	0	0	0	100	0
4	1	BRS	0	0	0	0	0	0	100
7	1	POW	0	0	100	0	0	0	0
9	3	GLD	0	0	0	33	0	0	67
8	4	RUN	0	0	25	0	75	0	0
6	3	SRN	0	0	0	33	0	0	67
1	3	MCP	0	33	33	0	0	0	33
3	4	STP	0	0	0	50	0	25	25
1	1	CRP	0	0	100	0	0	0	0
2	1	LSL	0	0	100	0	0	0	0
7	4	LSR	0	0	50	25	0	0	25
9	1	LSBk	0	0	0	0	0	0	100
8	4	LSBo	0	25	25	0	25	0	25
3	3	PLP	0	0	33	33	0	33	0
3	2	SCP	0	0	50	50	0	0	0
5	0	DRY	0	0	0	0	0	0	0

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
76.09	60.23	39.77	23.08	23.75

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	10	13	22.12
Boulder	12	18	28.85
Cobble/Gravel	30	21	49.04
Silt/clay	0	0	0

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	8	8	15.38
Brush	5	5	9.62
Deciduous Trees	17	10	25.96
Evergreen Trees	19	23	40.38
No Vegetation	3	6	8.65

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Blue Jay Creek
SAMPLE DATES: 08/13/96 to 09/09/96
STREAM LENGTH: 7748 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: FORT ROSS — Latitude: 38°32'5"
Legal Description: T8NR12WS13 — Longitude: 123°8'3"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: F3	Canopy Density: 92%
Channel Length: 1975 ft.	Evergreen Component: 32%
Riffle/Flatwater Mean Width: 6 ft.	Deciduous Component: 68%
Total Pool Mean Depth: 0.8 ft.	Pools by Stream Length: 25%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 52 - 66 °F Air: 45 - 87 °F	Mean Pool Shelter Rtn: 23
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Vegetative Cover: 30%	Occurrence of LOD: 38%
Dom. Bank Substrate: Cobble/Gravel	Dry Channel: 0 ft.
Embeddness Value: 1. 6% 2. 50% 3. 13% 4. 31%	

STREAM REACH 02

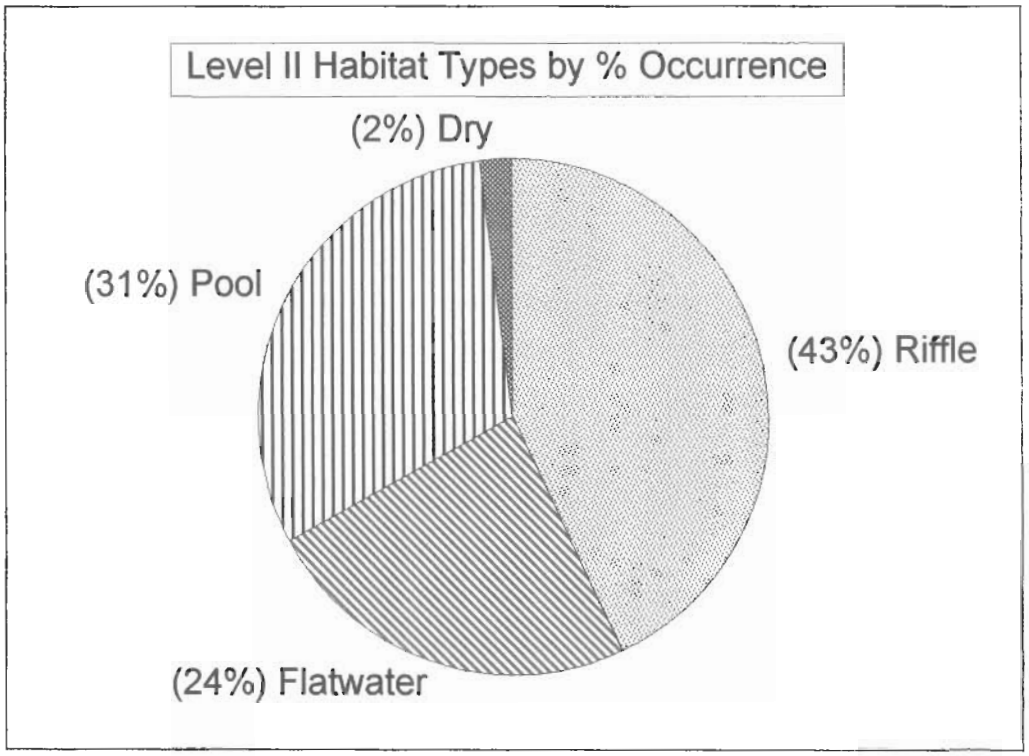
Channel Type: B2	Canopy Density: 87%
Channel Length: 2339 ft.	Evergreen Component: 80%
Riffle/Flatwater Mean Width: 6 ft.	Deciduous Component: 20%
Total Pool Mean Depth: 1.0 ft.	Pools by Stream Length: 30%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 10%
Water: 52 - 63 °F Air: 45 - 77 °F	Mean Pool Shelter Rtn: 32
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Vegetative Cover: 14%	Occurrence of LOD: 36%
Dom. Bank Substrate: Cobble/Gravel	Dry Channel: 71 ft.
Embeddness Value: 1. 45% 2. 18% 3. 5% 4. 32%	

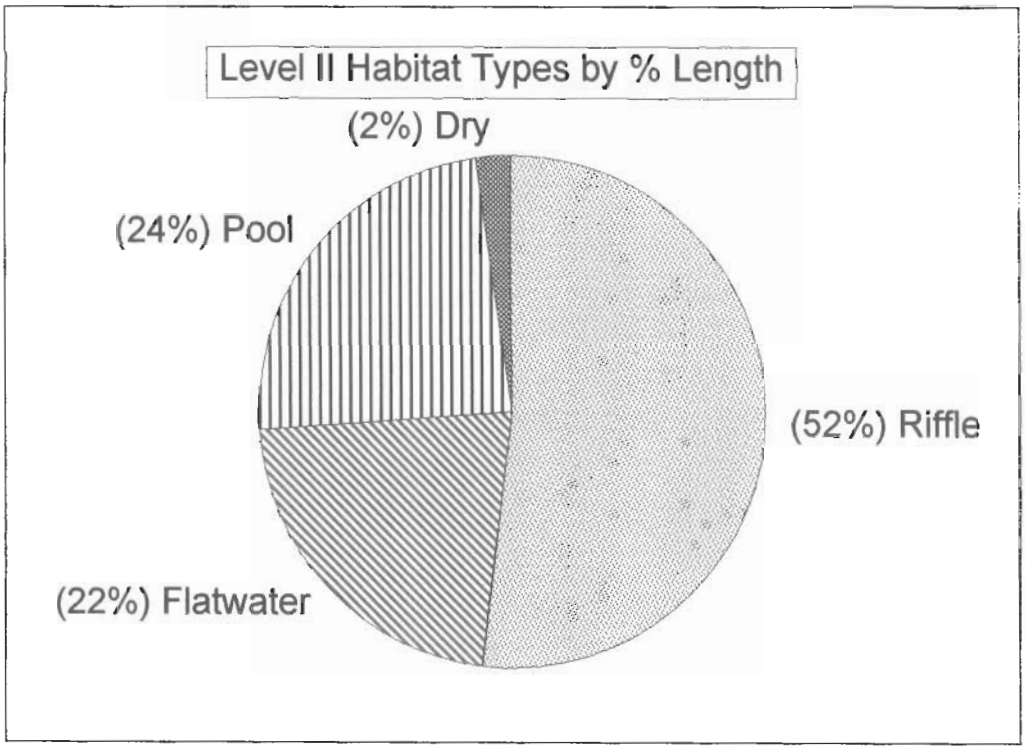
STREAM REACH 03

Channel Type: F3	Canopy Density: 54%
Channel Length: 3434 ft.	Evergreen Component: 69%
Riffle/Flatwater Mean Width: 15 ft.	Deciduous Component: 31%
Total Pool Mean Depth: 0.8 ft.	Pools by Stream Length: 19%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 59 - 77 °F Air: 61 - 91 °F	Mean Pool Shelter Rtn: 48
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Vegetative Cover: 27%	Occurrence of LOD: 16%
Dom. Bank Substrate: Cobble/Gravel	Dry Channel: 102 ft.
Embeddness Value: 1. 44% 2. 28% 3. 12% 4. 16%	

Blue Jay Creek

Level II Habitat Types

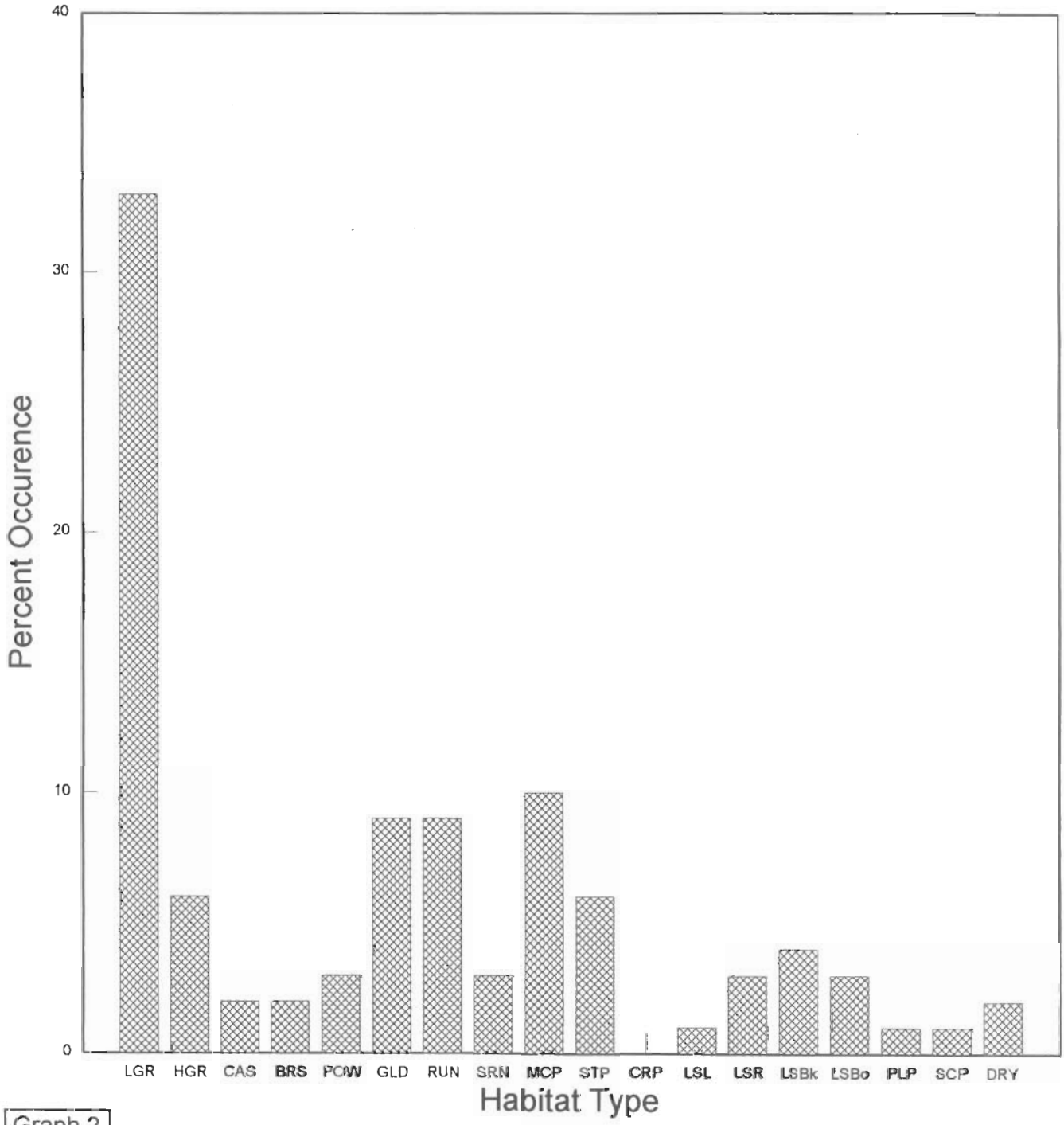




Graph 1

Blue Jay Creek

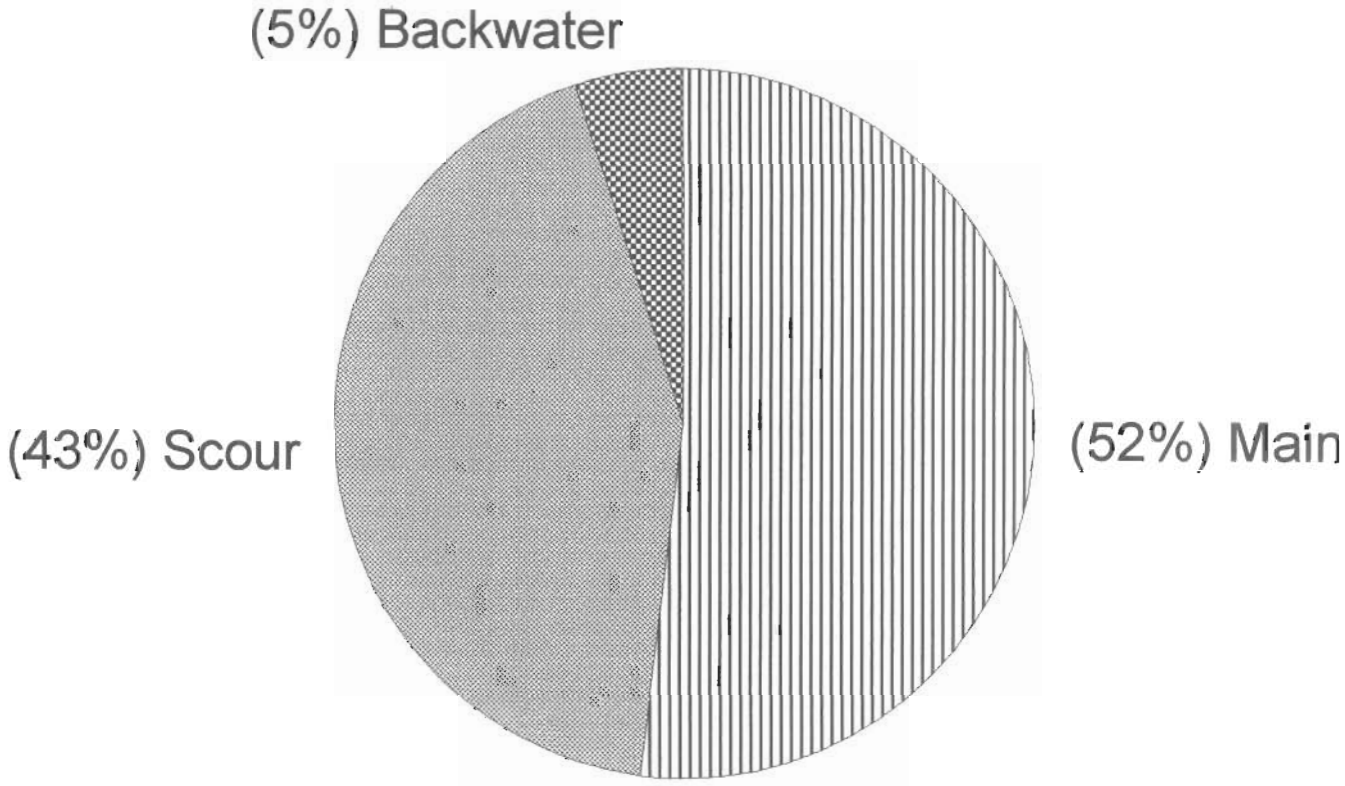
Level IV Habitat Types by % Occurrence



Graph 2

Blue Jay Creek

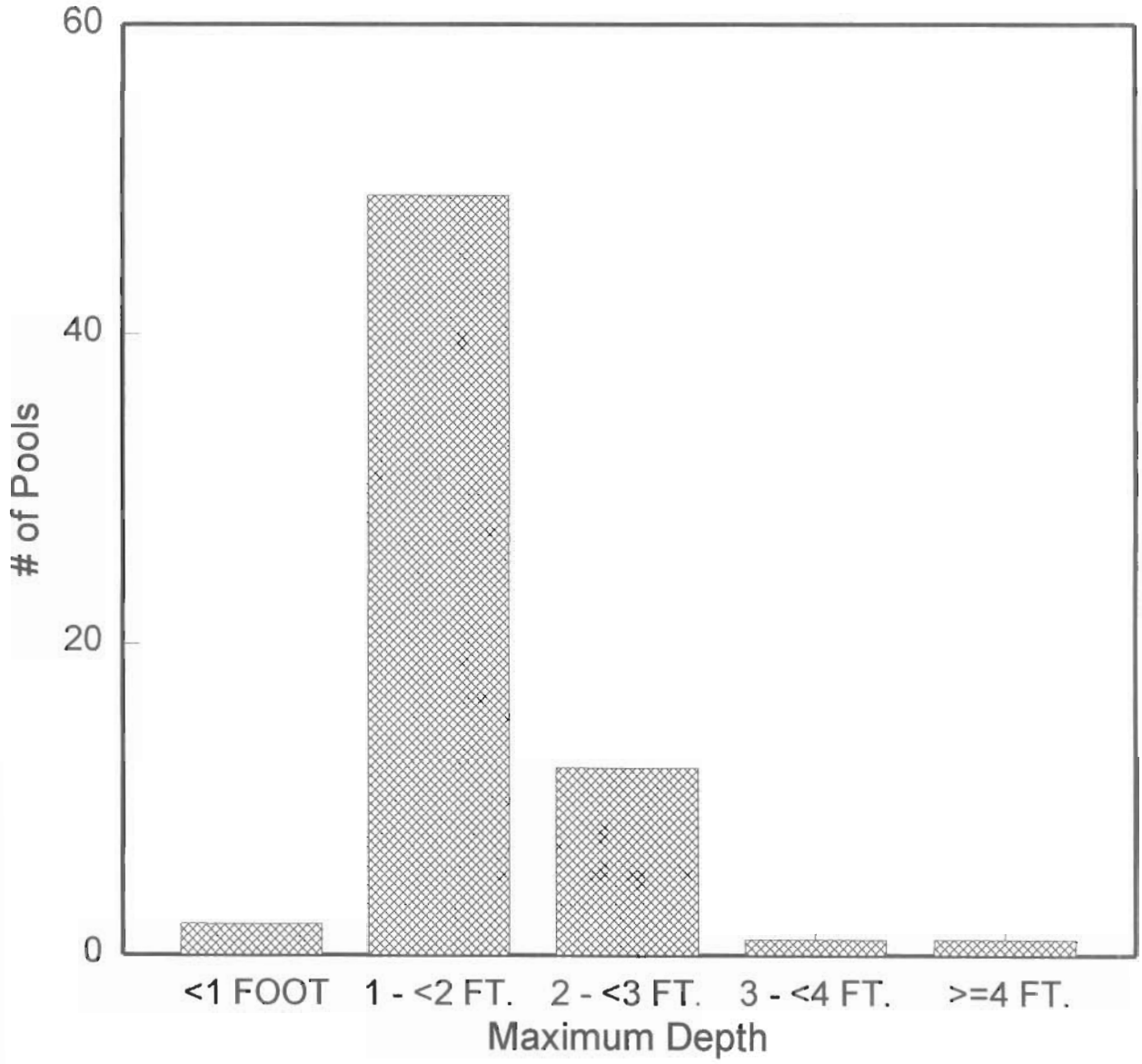
Pool Habitat Types by % Occurrence



Graph 3

Blue Jay Creek

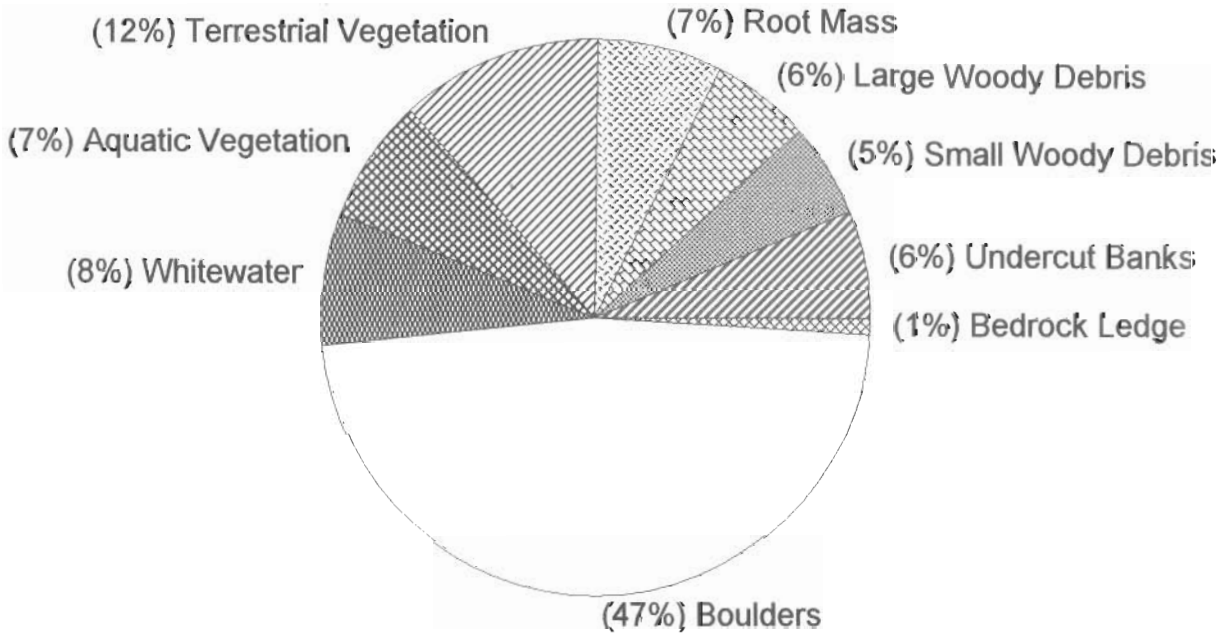
Maximum Depth in Pools



Graph 4

Blue Jay Creek

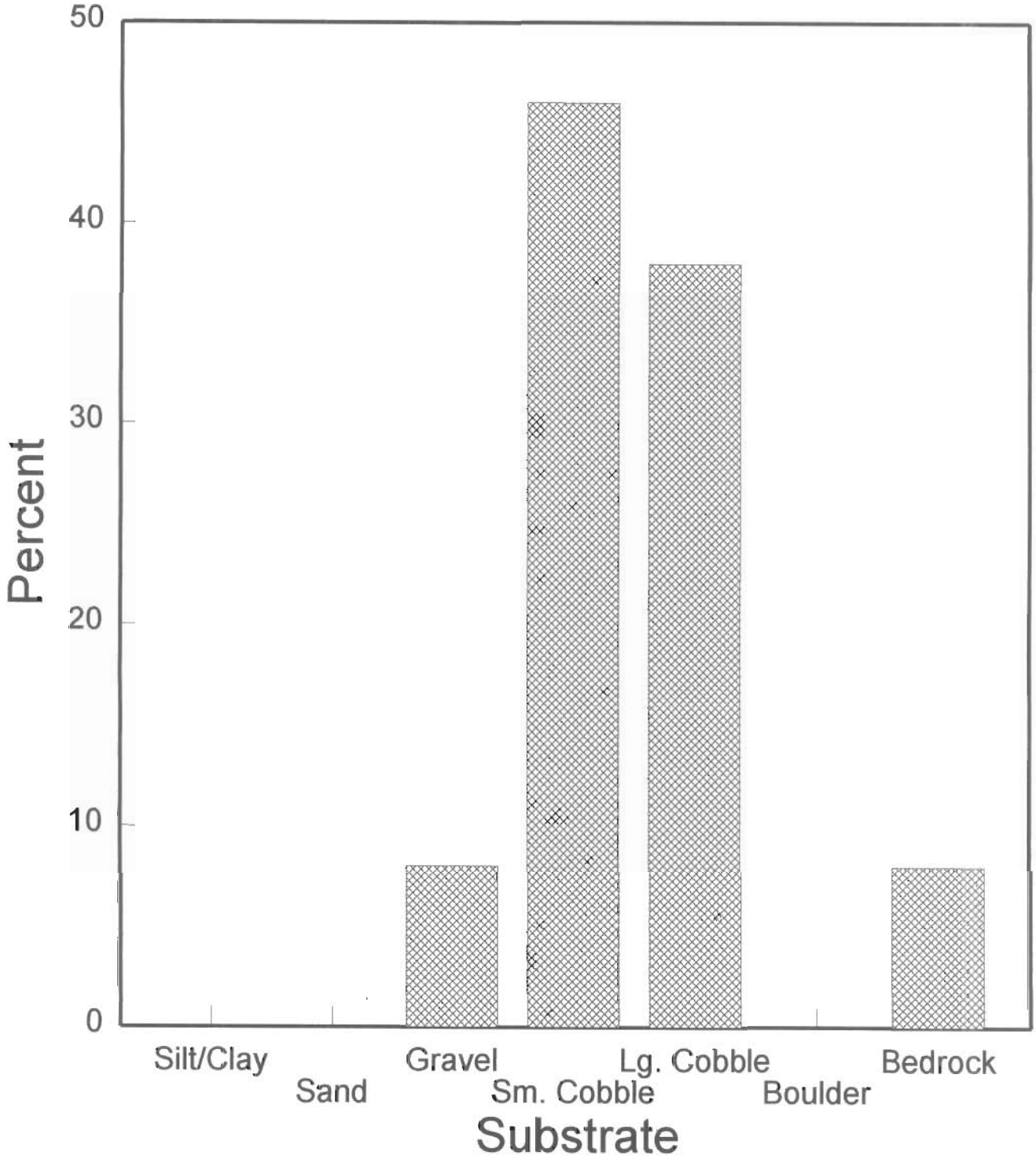
Pool Shelter Types by % Area



Graph 5

Blue Jay Creek

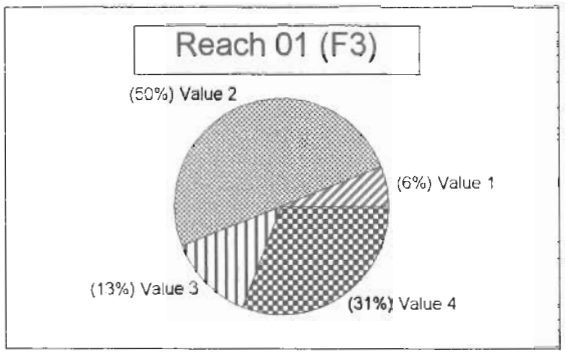
Substrate Composition in Low Gradient Riffles

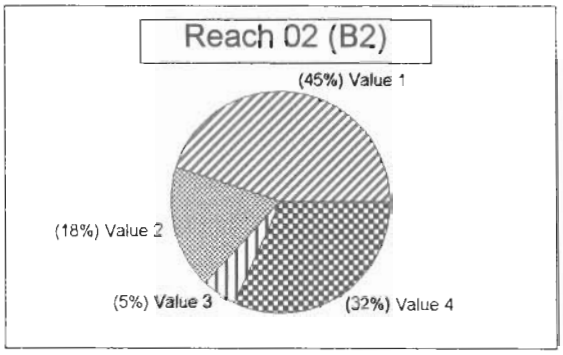


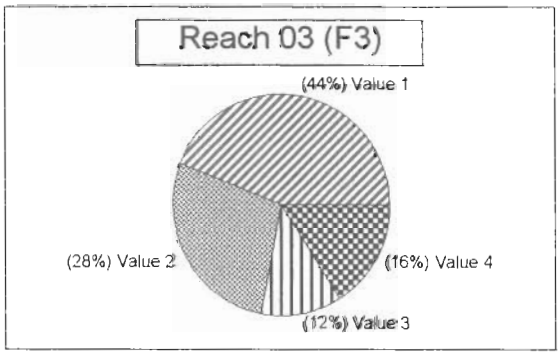
Graph 6

Blue Jay Creek

Percent Cobble Embeddedness by Reach





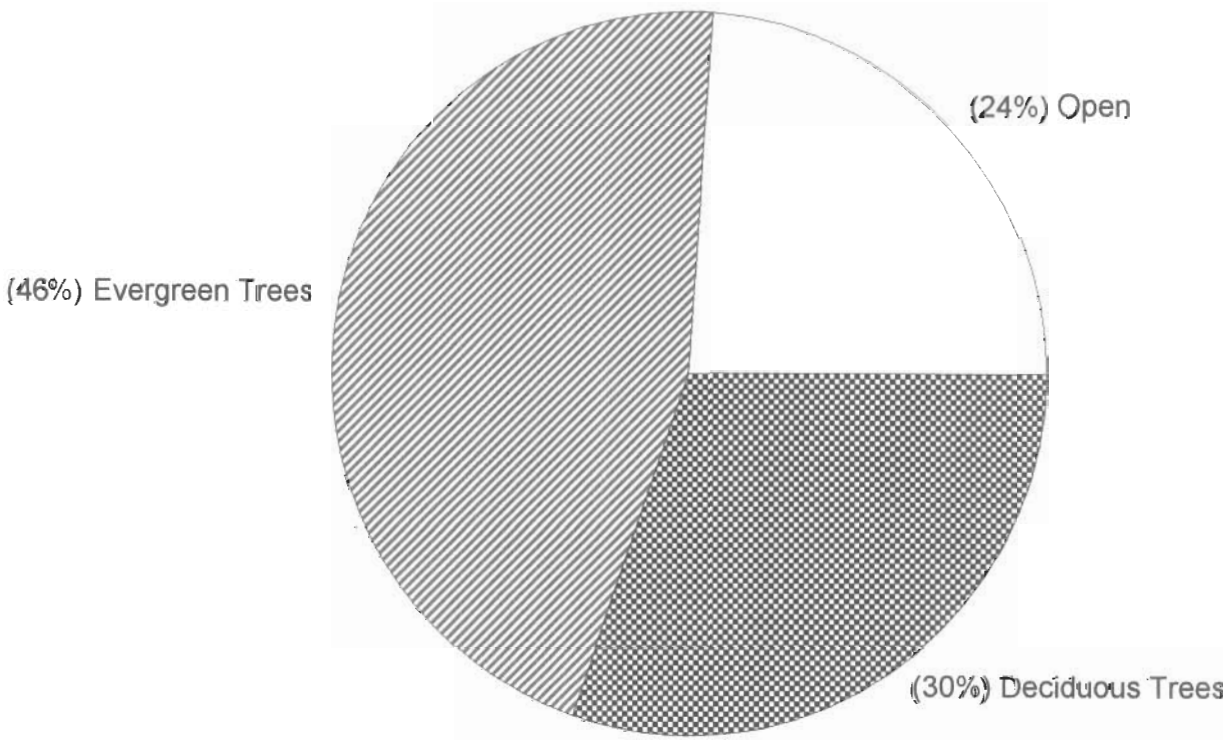


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

Blue Jay Creek

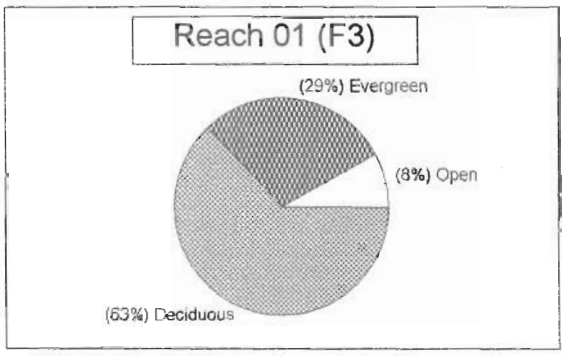
Mean Percent Canopy

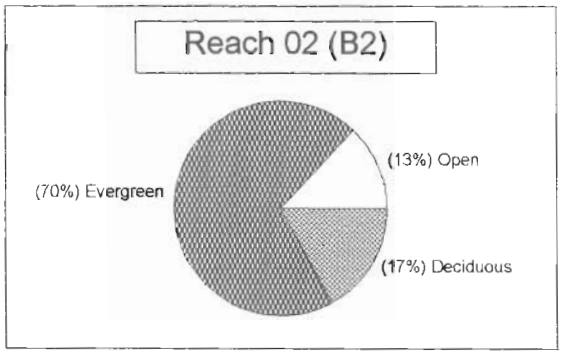


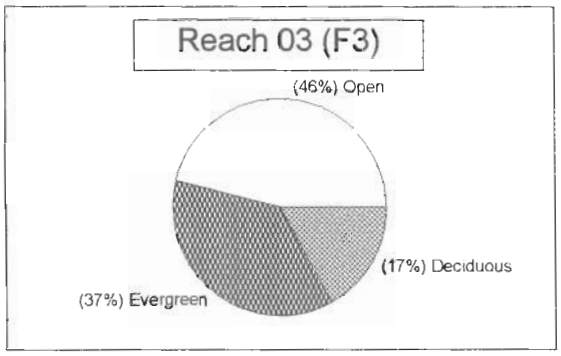
Graph 8

Blue Jay Creek

Percent Canopy by Reach





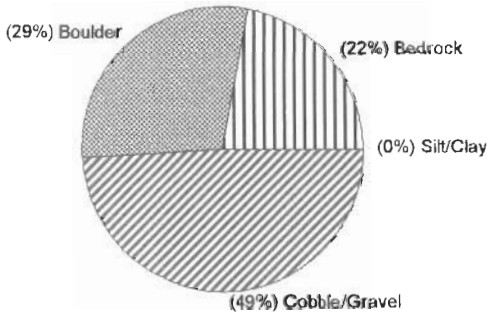


Graph 9

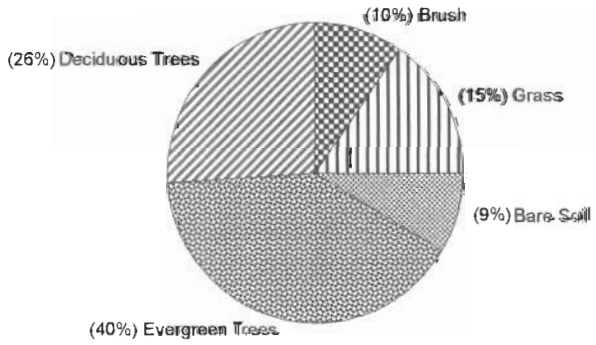
Blue Jay Creek

Percent Bank Composition

Dominant Bank Substrate



Dominant Bank Vegetation



Graph 10