STREAM INVENTORY REPORT
Porter Creek
Tributary to Russian River
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1997

INTRODUCTION

A stream inventory was conducted during the summer of 1997 on Porter 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 Porter 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

Porter Creek is a tributary of the Russian River, located in Sonoma County, California (see Porter Creek map, page 2). The legal description at the confluence with the Russian River is T8N, R9W, S29. Its location is 38°30'55" N. latitude and 122°52'55" W. longitude. Year round vehicle access exists from Westside Road via Highway 101 near Healdsburg. The upper reaches can be accessed by Sweetwater Springs Road via Westside Road.

Porter Creek and its tributaries drain a basin of approximately 7.3 square miles. Porter Creek is a second order stream and has approximately 7 miles of blue line stream, according to the USGS Guerneville 7.5 minute quadrangle. Major tributaries include Press Creek and Osborne Creek which are included in this report. Gordon Creek and Scotts Creek are also tributaries of Porter Creek, but were not surveyed due to lack of landowner access. Summer flow was measured as approximately 0.4 cfs on November 5, 1997. Elevations range from about 40 feet at the mouth of the creek to 1600 feet in the headwaters. Deciduous forest dominates the riparian corridor, but there are zones of conifers and evergreens along the lower floodplain, as well as grassland and oak-woodland in the upslope areas. The watershed is entirely privately owned, and managed for timber, vineyard and livestock production.

METHODS

The habitat inventory conducted in Porter 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 Porter 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.

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". Porter 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 Porter 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). A rating of "not suitable" (5) 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 Porter 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. 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 Porter 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.

8. 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 Porter 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.

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 Porter 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 Porter 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 stream surveys in the summer month of August, 1963 and in October, 1982. Each survey was summarized as follows:

In the 1963 survey, the flow was estimated at .4 cfs, the average width was 6 ft, the average depth was 2 inches, with maximum depth of 4 inches and minimum of 1 ½ inches.

The 1982 survey was done from the headwaters to the mouth of the creek, approximately 5.5 miles. No water temperature was taken during this survey. The substrate was described as 40% boulder, 30% cobble, 20% gravel, and 10% sand/silt. The upper reaches had more gravel deposits, up to 30% of the channel. In the lower ½ mile to the mouth, the bottom consisted of 50% gravel and 50% coarse sand and silt. The spawning area in the majority of the creek was estimated as fair with small deposits of gravel present. Pools were present during low water flow. Some deeper pools existed near the mouth. The pool:riffle ratio was 10:90. The wetted width of the lower half of the stream was 8-10 ft. average. The wetted width of the upper half ranged between 2-3 ft. The stream depth averaged 4-5 inches. In the lower 1 ½ miles, the stream was intermittent and dry at the mouth. Winter bed widths in the lower section widen to 15-25 ft. One large log jam existed 1/4 mile upstream from the mouth at Westside Rd. It was recommended to have this log jam removed. The only diversion existing was at the McMurray Ranch.

HABITAT INVENTORY RESULTS

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

The habitat inventory of Porter Creek was conducted from 09/16/97 to 11/05/97 by Eddy Sanchez, Sarah Nossaman, Todd Parlato and Marc Miller (AmeriCorps). The survey began at the confluence with the Russian River and extended up Porter Creek to the end of landowner access permission at a slide located at the base of the headwaters (Reach 4 at unit #175). The stream channel is filled in by a log jam/rock falls due to gully erosion from the road above. The total length of the stream surveyed was 28,807 feet.

Flow was estimated to be 0.4 cfs during the survey period.

This section of Porter Creek has four channel types: from the mouth to 8887 feet an F4; next 6581 feet an F2; next 9391 feet an F4 and the upper 3948 feet a B3.

F4 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate. F2 channel types are similar but with a predominantly boulder substrate.

B3 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 cobble substrate.

Water temperatures ranged from 52°F to 61°F. Air temperatures ranged from 55°F to 84°F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 43% flatwater units, 32% pool units, 15% riffle units, and 11% dry streambed units. Based on total length there were 59% flatwater units, 28% dry streambed units, 8% pool units, and 6% riffle units (Graph 1).

One hundred eighty nine habitat units were measured and 22% were completely sampled. Seventeen Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent occurrence were runs at 28%, low gradient riffles 13%, dry streambed 11% and step runs 10% (Graph 2). By percent total length, runs made up 46%, dry streambed 28%, step runs 10%, and low gradient riffles 5%.

Sixty pools were identified (Table 3). Scour pools were most often

encountered at 60%, and comprised 48% 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. Twenty three of the 60 pools (38%) had a depth of two feet or greater (Graph 4). These deeper pools comprised only 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 22. Flatwater had the lowest rating with 10 and riffle rated 12 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 22 and scour pools rated 22. (Table 3)

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were undercut banks at 26%, boulders 25%, root masses 21%, and small woody debris 12%. Graph 5 describes the pool shelter in Porter Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in two of the four low gradient riffles measured. Small cobble was dominant in 1 of the low gradient riffles (Graph 6).

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

The depth of cobble/gravel embeddedness was estimated at pool tail-outs. Of the 59 pool tail-outs measured, 15 had a value of 1 (25%); 25 had a value of 2 (42%); 16 had a value of 3 (27%); and three 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 79%. The mean percentages of deciduous and evergreen trees were 53% and 47%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 74% and the mean percent left bank vegetated was 66%. For the habitat units measured, the dominant vegetation types for the stream banks were: 47% deciduous trees, 46% evergreen trees, 6% brush, and 1% grass. The dominant substrate for the stream banks were: 75% silt/clay/sand, 13% bedrock, 7% boulder and 5% cobble/gravel (Graph 10).

HABITAT INVENTORY RESULTS FOR PRESS CREEK (Porter trib.)

The habitat inventory of Press Creek was conducted on 11/06/97 - 11/10/97 by T. Parlato & M. Miller (Americorps) and data analyzed by Ken Bunzel (DFG). The survey began at the confluence with Porter Creek and extended up Press Creek to the survey. The total length of the stream surveyed was 5424 feet.

Flows were not measured on Press Creek.

This section of Press Creek(Porter Trib) has two channel types: from the mouth to 1420 feet an E3 and the upper 4004 feet a G2.

E3 channel types are low gradient (<2%), meandering riffle/pool streams with a low width/depth ratio and little deposition. They are very efficient and stable with a high meander width ratio and have a predominantly cobble substrate.

G2 channel types are characterized as well entrenched "gully" step-pool channels with a low width/depth ratio, a moderate gradient (2-4%) and a predominantly boulder substrate.

Water temperatures ranged from 50°F to 54°F. Air temperatures ranged from 54°F to 59°F.

Based on percent of occurrence there were 32% flatwater units, 32% pool units, 26% dry streambed units, and 11% riffle units. Based on total length there were 60% dry streambed units, 25% flatwater units, 10% pool units, and 6% riffle units.

Fifty seven habitat units were measured and 32% were completely sampled. Thirteen Level IV habitat types were identified. The most frequent habitat types by percent occurrence were dry streambed at 26%, step runs 16%, runs 14% and mid-channel pools 9%. By percent total length, dry streambed made up 60%, runs 14%, step runs 9%, and cascades 3%.

Eighteen pools were identified. Scour pools were most often encountered at 67%, and comprised 62% of the total length of pools. nine of the eighteen pools (50%) had a depth of two feet or greater. These deeper pools comprised 5% of the total length of stream habitat.

Pool types had the highest shelter rating at 29. Flatwater had the lowest rating with 4 and riffle rated 5. Of the pool types, the main channel pools had the highest mean shelter rating at 38 and scour pools rated 25. By percent area, the dominant pool shelter

types were undercut banks at 30%, large woody debris 22%, boulders 20%, and root masses 15%.

The depth of cobble/gravel embeddedness at pool tail-outs was estimated at a rating of 2 being most frequent (57%), a rating of 3 at (22%) and a rating of 4 at (11%). A rating of 1 (which is the most suitable for successful spawning) was estimated only at 10% of the pools measured.

The mean percent canopy density for the stream was 89.5%. The mean percentages of deciduous and evergreen trees were 20% and 80%, respectively.

HABITAT INVENTORY RESULTS FOR OSBORNE CREEK (Porter trib.)

The habitat inventory of Osborne Creek was conducted on 11/12/97 by Todd Parlato & Marc Miller (AmeriCorps) and data analyzed by Ken Bunzel (DFG). The survey began at the confluence of Porter Creek and extended up to a debris accumulation at approximately 640 ft. above the confluence with Porter. The total length of the stream surveyed was 873 feet.

Flows were not measured on Osborne Creek.

This section of Osborne Creek has one channel type: from the mouth to 873 feet a G3.

G3 channel types are characterized as well entrenched "gully" step-pool channels with a low width/depth ratio, a moderate gradient (2-4%) and a predominantly cobble substrate.

Water temperatures ranged from 50°F to 53°F. Air temperatures ranged from 51°F to 55°F.

Based on frequency of occurrence there were 55% flatwater units, 27% pool units, 9% riffle units, and 9% dry streambed units.

Eight Level IV habitat types were identified. The most frequent habitat types by percent occurrence were step runs at 27%, runs 18%, bedrock sheets 9% and glides 9%. By percent total length, step runs made up 57%, dry streambed 19%, runs 15%, and glides 3%.

Three pools were identified. Scour pools were most often encountered at 67%, and comprised 56% of the total length of pools. None of the pools had a depth of two feet or greater.

Pool types had the highest shelter rating at 8, flatwater rated 5,

and riffle had the lowest rating with . By percent area, the dominant pool shelter types were undercut banks at 53%, small woody debris 18%, boulders 15%, and terr. vegetation 13%.

The mean percent canopy density for the stream reach surveyed was 84%. The mean percentages of deciduous and evergreen trees were 39% and 61%, respectively. For the entire stream reach surveyed, the mean percent right bank vegetated was 65% and the mean percent left bank vegetated was 88%. For the habitat units measured, the dominant vegetation types for the stream banks were: 44% evergreen trees, 38% deciduous trees and 19% brush. The dominant substrate for the stream banks were: 94% silt/clay/sand and 6% bedrock.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

In the 1982 survey, steelhead were visually observed in pools, and estimated at a rate of about 10/100 ft.

On October 28, 1997 a biological inventory was conducted in 4 sites of Porter Creek to document fish species composition and distribution. Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature ranged from 52°-70°F and the water temperature from 56°F. to 58°F. The observers were Todd Parlato and Marc Miller.

The inventory of Reach 1 started in habitat unit #006 (approx. 2900 ft. from the mouth) and ended approximately 1415 feet upstream. In riffle and pool habitat types (59) 0+, (4) 1+ and (0) 2+ steelhead were observed along with 71 California Roach, and 98 sculpin (Cottus sp.).

The inventory of Reach 2 (lower section) started in habitat unit #036, 975 feet upstream of an instream road crossing and continued for approximately 1320 feet in habitat units #036-#043. In riffle and pool habitat types (4) 0+, (1) 1+ and (0) 2+ steelhead were observed along with (6)unidentified frogs.

The inventory of Reach 2 (upper section) was continued starting at Bridge #3 (habitat unit #063) and ending approximately 423 feet upstream in habitat unit #070. In riffle and pool habitat types (20) 0+, (9) 1+ and (2) 2+ steelhead were observed along with (5)unidentified frogs, and (5)Pacific Giant Salamanders.

The inventory of Reach 3 was conducted in habitat units #070-#092

for approximately 1415 feet. In pool, run and glide habitat types (31) 0+, (19) 1+ and (0) 2+ steelhead were observed along with (8) unidentified frogs and (2) Pacific Giant Salamanders.

During the habitat inventory,at unit #175 there was a log and debris accumulation/rock falls (15 ft. high) that appeared to impede further passage.

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
1963, 1982,1997	Steelhead	DFG	N
1997	Sculpin	DFG	N
1997	Pacific Giant Salamander	DFG	N
1997	California Roach	DFG	N

Historical records reflect Steelhead fingerlings were stocked in Porter Creek in 1982 and again in 1986, Table 2. No known fish rescue operations have occurred in the watershed.

Table 2. Summary of fish hatchery-stocking

YEAR	SPECIES	SOURCE	#	SIZE
1982	SH	Dry Creek	19,248	FING
1986	SH	Dry Creek	13,500	FING

SH = steelhead
FING = fingerling

No juvenile surveys were conducted in Press or Osborne Creeks, although juvenile steelhead were visually observed during the survey period.

ADULT SURVEYS:

A spawning survey was conducted in Porter Creek on 2/27/1998, beginning at bridge #1 and extending to habitat unit #30. No live fish, carcasses or redds were observed.

Another spawning/carcass survey was continued in Porter Creek on 3/3/1998. This survey began at bridge #3 and extended to habitat unit #3. One live steelhead, five redds, and four possible redds were observed.

DISCUSSION

Porter Creek has four channel types: F4 (8887 ft.), F2 (6581 ft.), F4 (9391 ft.) and B3 (3948 ft.).

There are 18278 feet of F4 channel type in Reaches 1 and 3. According to the DFG Salmonid Stream Habitat Restoration Manual, F4 channel types are fair for low-stage weirs, single and opposing wing-deflectors and log cover.

There is 6581 ft. of F2 channel type in Reach 2. According to the DFG manual, F2 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover. Any work considered in the F type channels will require careful design, placement, and construction that must include protection for any unstable banks.

There is 3948 ft. of B3 channel type in Reach 4. B3 channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. They are rated good for medium-stage plunge weirs. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and shelter.

The water temperatures recorded on the survey days 09/16/97 to 11/05/97 ranged from 52°F to 61°F. Air temperatures ranged from 55°F to 84°F. The warmer water temperatures were recorded in Reach 1. These temperatures are below the threshold stress levels for salmonids. To make any further conclusions, temperatures should be monitored through the warmer summer months (July-August).

Pools comprised 8% 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 Porter Creek, the pools are relatively shallow with 38% having a maximum depth of at least 2 feet. However, these pools comprised only 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 22. 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 undercut banks (26%), boulders (25%), root masses (21%), and small woody debris (12%). Log and root wad cover in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

Three of the four low gradient riffles measured (75%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

Thirty two percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 25% 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 comparison, Reach 1 except where dry, had the best ratings and Reach 3 had the poorest 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. In Porter Creek, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

The mean percent canopy for the entire survey was 79%. This is good since 80 percent is generally considered desirable. However, the riparian buffer is thin or nearly absent in areas with livestock or agriculture. Riparian removal, increased grazing or vineyard development within the riparian corridor could all lead to less stream canopy, channel incision causing bank erosion and higher water temperatures. Large trees required to contribute shade also provide a long term source of large woody debris needed for instream structure and bank stability.

DISCUSSION FOR PRESS CREEK

Press Creek has two channel types: E3 (1420 ft.) and G2 (4004 ft.).
According to the DFG Salmonid Stream Habitat Restoration Manual,

E3 channel types are good for bank-placed boulders and fair for opposing wing-deflectors and G2 channel types are fair for log cover. 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 11/06/97 to 11/10/97 ranged from 50°F to 54°F. Air temperatures ranged from 54°F to 59°F. This temperature regime is favorable to salmonids.

In Press Creek, the pools are relatively deep with 50% having a maximum depth of at least 2 feet. However, these pools comprised only 5% of the total length of stream habitat.

The mean shelter rating for pools was 29. The relatively small amount of pool shelter that now exists is being provided primarily by undercut banks (30%), large woody debris (22%), boulders (20%), and root masses (15%).

None of the low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered poor for spawning salmonids.

Thirty three percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 11% had a rating of 1.

The mean percent canopy for the survey was 90%. This is excellent, since 80 percent is generally considered desirable. However, Reach 2 had numerous bank erosion problems from channel incision that could result in loss of mature riparian. This reach could benefit from gravel retention structures to offset channel downcutting.

DISCUSSION FOR OSBORNE CREEK

Osborne Creek is a G3 channel type which is good for bank-placed boulders and fair for low-stage weirs, opposing wing-deflectors and log cover.

The water temperatures recorded on the survey day 11/12/97 ranged from 50°F to 53°F. Air temperatures ranged from 51°F to 55°F. This temperature regime is favorable to salmonids.

Pools comprised 6% of the total length of this survey. In Osborne Creek, the pools are shallow with zero having a maximum depth of at least 2 feet.

The mean shelter rating for pools was 8. The relatively small amount of pool shelter that now exists is being provided primarily by undercut banks (53%), small woody debris (18%), boulders (15%), and terr. vegetation (13%). Log and root wad cover structures in the pool and flatwater habitats are needed to improve both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

None of the low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered poor for spawning salmonids.

Sixty six percent of the pool tail-outs measured a 1 or 2 which is considered good for the needs of salmon and steelhead.

The mean percent canopy for the survey was 84%. This is an excellent percentage of canopy, since 80 percent is generally considered desirable.

SUMMARY

Biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were documented consistently during each past survey year. Although habitat appears suitable for coho, no coho were observed. A fair amount of 1+ fish were observed indicating relatively good rearing conditions the year before. Habitat conditions upstream of our survey reaches are suitable but not accessible due to the landslide (unit #175). Overall, habitat conditions for steelhead have declined over time.

In general, Reaches 2 and 4 of Porter Creek are good for salmon and steelhead habitat. Some long, heavily shaded sections of the stream occur with lots of woody debris, pools and cover which may be used as rearing habitat.

In the upper portion of Reach 1 bank protection and riparian planting (for canopy shade and bank stabilization) are recommended. The lowest portion of this reach has downcut severely, thus stream velocity has increased resulting streambank erosion and loss of mature conifers.

Upstream of the Press Creek confluence conditions are better. In Reaches 4 and 5, spawning and rearing habitat exists, canopy shading is higher, although instream shelter is still lacking. However, many opportunities and alternatives exist for habitat

improvement due to the more stable channel type.

GENERAL RECOMMENDATIONS

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

For erosion, utilize a biotechnial approach and prioritize sites according to present and potential sediment yield.

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. 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) The slide at unit #175 should be assessed for fish passage and slide stabilization.

2) In Porter Creek, active and potential sediment sources related to the road system need to be mapped, and treated according to their potential for sediment yield to the stream and its tributaries. County road maintenance practices along the County maintained portion are a major source of sediment into Porter Creek.

3) There is at least 1 section where the stream 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.

4) Increase the canopy on Porter Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels (portions of Reaches 1). 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 will need to be coordinated to follow bank stabilization or upslope erosion

control projects.

5) Since the date of this survey, rip-rap was placed on both sides of the channel and large organic debris was removed for approximately 500 feet in Reach 1 just below Westside Road. Alternatives to encourage pool formation, increase shelter values, and increase sediment transport should be explored with the landowner. Single and opposing rock or log wing deflectors, and log cover/scour would be very effective. Construction of a low floodplain bench (utilizing existing rock placed above bankfull) would encourage sediment transport and decrease erosion.

6) Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing shelter is from vegetation and undercut banks. 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 (runs) and pool locations in the upper reaches. This must be done where the banks are stable (Reaches 2 and 4) or in conjunction with stream bank armor to prevent erosion (Reach 1 and 3). In some areas the material is at hand.

7) Where feasible, design and engineer pool enhancement structures to increase the number of pools. Many run type habitats could be converted to deep pools with the addition of large organic debris (such as root wads and logs) to create cover and scour. This must be done where the banks are stable (Reaches 2&4) or in conjunction with stream bank armor to prevent erosion (Reach 1 and 3).

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS FOR PRESS CREEK

1) Channel incision in Press Creek threatens excellent mature riparian canopy and inhibits pool development. Low stage weirs constructed of rock or logs would offset channel incision and erosion and retain gravel for spawning and pool development.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS FOR OSBORNE CREEK

1) Modify log jam at 640' from confluence, to permit fish passage but retain LWD for pool formation.

PROBLEM SITES AND LANDMARKS - PORTER 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	2216	-Russian River water extends into mouth 158'. At 1425' from mouth begins rip rap project(in progress) up to 20' high(boulders). Creek bed surface with silt from construction. At 1637' culvert(see form). Rip rap stops LB @ 1833' from mouth. At 2030' construction access road. At 2130'RB rip rap stops. At 2164' (2) 1&1/4' pipes cross creek 2' above creekbed. Irrigation pipe with construction in progress.
3.00	2414	Rip rap boulder RB 57'.
6.00	2912	Dry trib LB. Bridge #1(see form). 0+ SH. Rip rap RB 50'. Sculpin
7.00	2934	Temp 59 in shade & 64 in sun. Possible coho 0+. Rip rap RB 50'
9.00	3123	Roach, stickleback, 0+ SH; Coho?
10.00	3310	Rip rap 40'. Rip rap 25'(see culvert form).
13.00	3570	Vineyard access RB. Overflow valvepipe RB. Vineyard access LB.
19.00	3822	Roach 3' culvert RB(see form). Boulder riprap 30'
20.00	3857	Boulder rip rap.
22.00	4262	Roach/0+SH
23.00	4315	Dry trib LB. Culvert RB(see form).
24.00	4461	Dry trib LB
27.00	4744	Culvert RB(see form). Bridge #2(see form). Sm. culvert RB. Roach
29.00	4826	Squawfish,roach
31.00	4909	Rip rap RB
33.00	5059	Access road through creek
35.00	8584	***Begin F2 Channel*** Culvert RB 644' into unit(see form). At 1224' into unit rip rap (50') RB . PVC 1&1/4' in creek bed (1476'). Dry trib LB @ 1600'. Dry trib LB @ 1740'. 2700' dry trib RB (PVC from trib). Road crossing-filled in creek bed (see culvert form) @ 2840' into unit. Cement weir across creek @ 2910': 2'L x 3'H x 30'W. 1' irrigation pipes in creek @ 3040' extending 85'.

36.00	8685	0+ SH
42.00	9000	0+ SH
43.00	9899	Erosion (see form) Survey break at the Byrd/ Gallo property line due to no access
46.00	13353	Resume survey after no access.
47.00	13383	Dry trib RB
50.00	13603	0+,1+ SH
54.00	13810	Wet trib LB. Water temp= 60
57.00	13954	0+,1+ SH
61.00	14164	0+ SH
62.00	14186	Next to road
63.00	14258	Bridge #3(see form)
66.00	14395	Road continues RB
71.00	14673	Spring flowing into channel LB
73.00	14776	Western toad
76.00	14932	Road continues RB
77.00	15043	Sign of cattle in creek(footprints)
78.00	15058	Dry trib LB, dry side channel LB.
86.00	15567	***Begin reach #3 (F4)*** Road continues RB
87.00	15666	Trib RB wet(not significant); probably drainage from road.
88.00	15745	Dry trib RB.
89.00	15861	Dry trib RB.
90.00	15915	Small debris jam.
91.00	15971	Old slide LB; sparsely vegetated, sediment transport corridor: 75' x 175'upslope x 8' depth.
92.00	16021	Dry trib RB.
95.00	16888	Dry trib RB; new culvert RB; drainage from RB road. Dry trib LB 600' into unit.
96.00	16952	Road continues RB.
99.00	17152	Dry trib LB.
102.00	17385	Boulder rip rap RB: 25'l x 30'h.
103.00	18002	0+ SH
105.00	18172	Culvert RB drains from dry trib RB under road.
106.00	18299	Bridge #4(see form). Road continues LB.
107.00	18351	0+ SH
110.00	18566	1.5' culvert LB(drains from road). 0+ SH.
112.00	18746	0+ SH. Jam #2(see form). Culvert LB(wet) drainage from trib LB.
113.00	18906	Culvert LB; drains from road.
114.00	18994	Unnamed trib RB.

116.00	19148	Culvert LB drains from road. Road continues LB.
119.00	19668	Large Oregon ash tree laying in creek.
121.00	19939	Bridge #5(see form). Road goes to RB.
126.00	20425	Road continues RB.
127.00	20460	Wet rib LB- John Gordon Creek. Temp= 56.
129.00	20556	Culvert RB- drains from road.
130.00	20732	***End of Access***
131.00	24732	Access begins. Unit 131 begins approx. 300' upstream of bridge on residence #5235. Start at flashboard dam. Area is highly siltated. Flashboard dam- not much gravel retention so possibly not used recently.
133.00	24899	Channel change(see form)- B3 Begin reach #4
135.00	25046	2 0+ SH
139.00	25290	(2) 8" cement culverts 3' in length in middle of creek.
140.00	25321	1+ SH
141.00	25354	Dry trib RB
142.00	25388	0+ SH
143.00	25536	Dry trib LB
145.00	25753	Channel type done: B3
148.00	26108	Highly siltated pool. Roadway just off RB.
149.00	26195	Very large root wad (last pool) from giant redwood stump in center of channel.
151.00	26304	Four 2+ SH; 1+ SH. 5' culvert RB from wet trib(under Sweet Water Springs Road).
152.00	26601	10" culvert RB. 2+ SH
153.00	26624	Dry trib RB. 1+ SH; 0+ SH
156.00	26888	Large double culvert on private drive.
159.00	27071	Landowner has witnessed fish spawning here in past few years. Two 0+ SH 1+ SH.
160.00	27169	(3)0+; 1+ SH
163.00	27328	Wet trib LB: temp @ 53.
164.00	27351	0+ SH
166.00	27555	Dry trib RB. (2)0+ SH
168.00	27665	2+ SH
170.00	27771	Highly siltated pool
175.00	28033	Dry trib RB. Major landslide in

		center of creek. Bedrock, boulder debris jam area covers the whole stream. Approx 3+ yrs. old. Steep gradient.
178.00	28317	Dry trib RB

Addendum: Survey of the gully erosion on RB shows that it is actually road run-off contained by three separate . These culverts are up a steep slope approx. 1000' from Porter Creek. The "tribs" converge approx. 750' from Porter Creek and have caused much erosion as they formed a single channel. The site where they converge with Porter Creek is the location (read: cause) of the debris jam.

PROBLEM SITES AND LANDMARKS - PRESS CREEK SURVEY COMMENTS

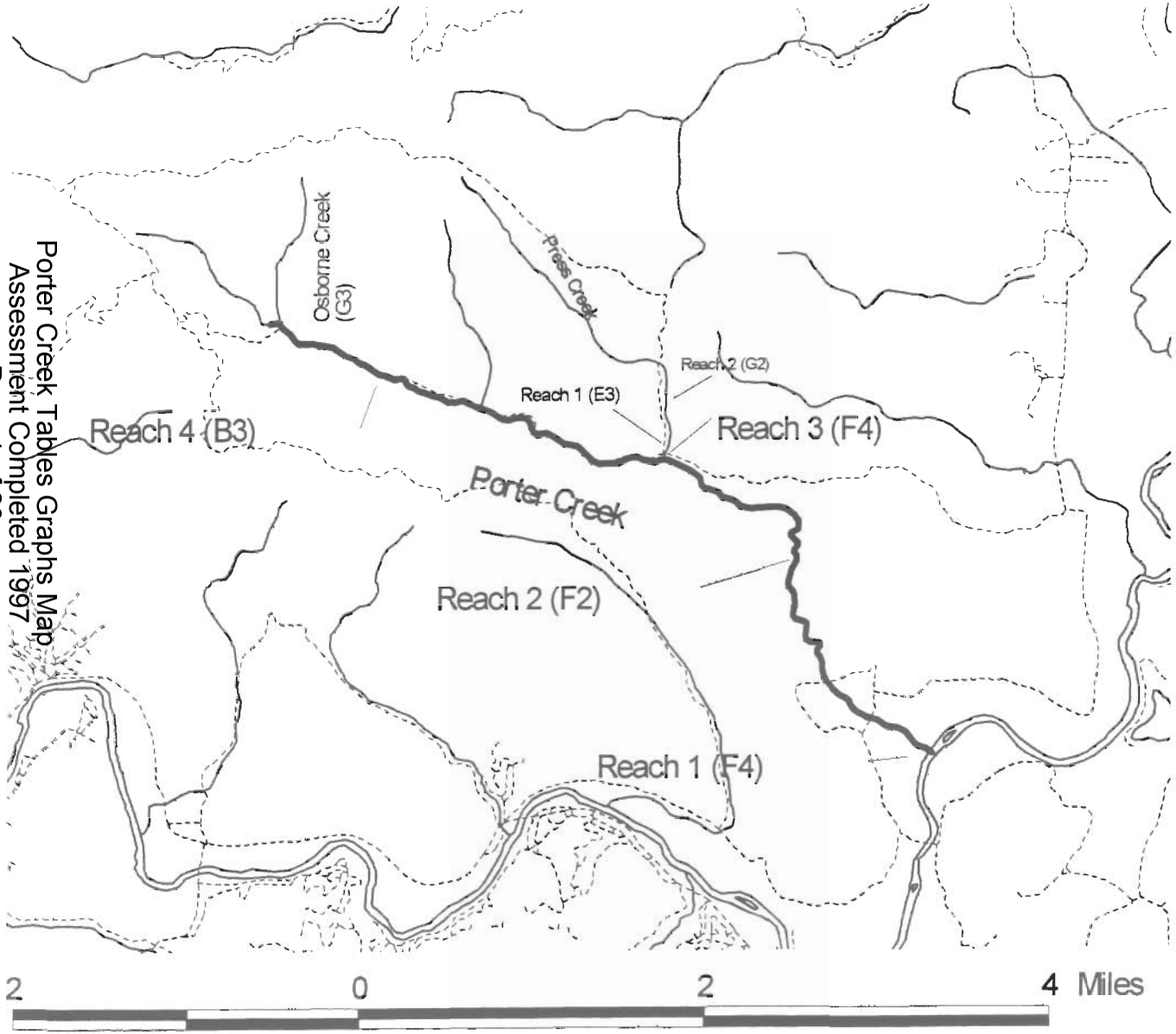
HABITAT UNIT#	*STREAM LEN(FT.)*	*COMMENTS*
2.00	*104*	*Bridge #1(see form)*
3.00	*162*	*0+ SH*
5.00	*206*	*Woody debris in creek from slide RB. Caused by road above RB. 24'l x 25'h x 5.5'd. Road eroding away (STC).*
7.00	*315*	*0+ SH*
12.00	*430*	*(2)0+ SH Begin F3 channel anomaly*
15.00	*557*	*3 frogs. Two dry tribs LB*
16.00	*648*	*(3) 0+ SH. End F3 channel anomaly.*
17.00	*717*	*(6) 0+ SH.*
18.00	*736*	*(2)0+ SH.*
22.00	*975*	*(1)1+ SH.*
25.00	*1227*	*(2)0+ SH. Small jam over pool- redwood fallen onto opposite bank. Not a barrier.*
26.00	*1297*	*Dry Trib LB; blown-out eroded RB from fallen trees- stable bank.*
27.00	*1323*	*(4)0+ SH.*
31.00	*1447*	*1+ SH; 0+ SH.*
35.00	*1618*	*Beautiful Pool!*
36.00	*1690*	*Cobble backed up from log that formed 5.6 (previous unit).*
41.00	*1959*	*Channel type completed= G2.*
42.00	*2031*	*Cascade/mostly dry. Jam & erosion sheets done. 0+ SH.*
43.00	*2218*	*Erosion sheet done.*

44.00	2313	Dry trib RB.
49.00	2583	Dry trib RB.
52.00	3066	Floating fence 232' into unit. Dry trib LB 397' into unit. PGS
53.00	3149	Cow feces in creek.
54.00	3178	Cow feces in creek.
55.00	3354	Dry trib RB.
56.00	3424	3 Frogs.
57.00	5424	Creek drys up; major grazing and aggradation; END OF SURVEY

PROBLEM SITES AND LANDMARKS - OSBORNE CREEK SURVEY COMMENTS

HABITAT UNIT#	STREAM LEN(FT.)	COMMENTS
6.00	239	Dry trib LB.
8.00	465	Dry trib RB.
10.00	641	Jam(see form).
11.00	873	150' into unit old logging crossing; not in use. ***End of Survey***

Porter Creek



Inland Fisheries Division
Department of Fish and Game
1997

Porter Creek Survey
Roads
Streams

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Porter Creek Tables Graphs Map
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PORTER CREEK Drainage: Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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
28	7	RIFFLE	15	61	1698	6	4.4	0.3	296	8281	93	2592	0	12
81	11	FLATWATER	43	208	16855	59	5.2	0.4	649	52606	333	26957	0	10
60	24	POOL	32	38	2284	8	6.3	0.8	233	13984	188	11258	161	22
20	0	DRY	11	399	7971	28	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.)
189	42	28807	74871	40807

PORTER CREEK

Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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 %
24	4	LGR	13	56	1343	5	5	0.2	0.9	279	6694	54	1286	0	1	75
1	1	HGR	1	61	61	0	3	0.3	0.7	101	101	30	30	0	20	85
2	1	CAS	1	121	242	1	5	0.5	1.4	620	1240	310	620	0	0	50
1	1	BRS	1	52	52	0	5	0.4	0.8	234	234	94	94	0	60	100
10	2	GLD	5	77	769	3	6	0.3	1.1	328	3277	107	1071	0	5	80
52	4	RUN	28	256	13288	46	5	0.3	1.0	484	25143	159	8272	0	6	81
19	5	SRN	10	147	2798	10	5	0.5	1.6	975	18530	607	11537	0	15	84
17	4	MCP	9	49	840	3	6	0.9	3.1	286	4857	237	4026	195	22	85
1	1	CCP	1	23	23	0	5	0.7	1.6	115	115	81	81	69	15	100
6	2	STP	3	53	318	1	6	0.9	3.0	302	1809	297	1780	264	24	75
3	2	CRP	2	42	126	0	6	0.7	2.0	287	860	207	621	114	8	68
3	1	LSL	2	42	125	0	8	0.7	2.3	312	936	229	687	167	47	58
7	3	LSR	4	39	274	1	7	0.7	2.5	248	1735	155	1085	110	21	87
6	4	LSBk	3	28	167	1	6	0.8	3.9	161	966	129	774	119	13	81
12	6	LSBo	6	26	317	1	6	0.8	2.3	165	1980	126	1516	118	26	79
5	1	PLP	3	19	95	0	7	0.9	3.2	145	726	138	688	128	14	88
20	0	DRY	11	399	7971	28	0	0.0	0.0	0	0	0	0	0	0	70

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
189	42	28807	69203	34167

PORTER CREEK

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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
24	7	MAIN	40	49	1181	52	5.8	0.9	283	6782	245	5886	207	22
36	17	SCOUR	60	31	1104	48	6.5	0.8	200	7202	149	5371	122	22

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
60	24	2284	13984	11258

PORTER CREEK Drainage: Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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
17	MCP	28	0	0	11	65	5	29	1	6	0	0
1	CCP	2	0	0	1	100	0	0	0	0	0	0
6	STP	10	0	0	3	50	2	33	1	17	0	0
3	CRP	5	0	0	2	67	1	33	0	0	0	0
3	LSL	5	0	0	2	67	1	33	0	0	0	0
7	LSR	12	0	0	3	43	4	57	0	0	0	0
6	LSBk	10	0	0	4	67	1	17	1	17	0	0
12	LSBo	20	0	0	7	58	5	42	0	0	0	0
5	PLP	8	0	0	4	80	0	0	1	20	0	0

TOTAL UNITS
60

PORTER CREEK

Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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
24	4	LGR	0	100	0	0	0	0	0	0	0
1	1	HGR	0	0	0	0	0	0	0	100	0
2	1	CAS	0	0	0	0	0	0	0	0	0
1	1	BRS	10	60	0	20	10	0	0	0	0
10	2	GLD	0	0	0	62	38	0	0	0	0
52	4	RUN	32	0	0	0	0	53	0	16	0
19	5	SRN	26	27	2	10	3	0	0	31	0
17	17	MCP	32	11	2	19	6	0	0	30	0
1	1	CCP	50	0	0	0	0	0	0	50	0
6	6	STP	15	8	11	18	4	0	0	37	7
3	2	CRP	100	0	0	0	0	0	0	0	0
3	3	LSL	0	51	49	0	0	0	0	0	0
7	7	LSR	23	8	15	50	0	0	0	3	0
6	6	LSBk	33	11	0	6	24	0	0	0	26
12	11	LSBo	31	0	0	31	0	0	0	38	0
5	4	PLP	32	0	0	11	0	0	0	18	40
20	0	DRY	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES 189	75		26	16	7	18	4	3	0	25	2
POOLS ONLY 60	57		26	12	9	21	4	0	0	25	3

PORTER CREEK Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE Survey Dates: 09/16/97 to 11/05/97

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T08NR09WS29 LATITUDE: 38°30'55" LONGITUDE: 122°52'55"

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
24	4	LGR	0	0	50	25	0	25	0
	1	MGR	0	0	0	0	0	100	0
	1	CAS	0	0	0	0	0	0	100
	1	BRS	0	0	0	0	0	0	100
	3	GLD	33	33	33	0	0	0	0
	4	RUN	25	25	0	25	0	0	25
	6	SRN	0	17	17	33	17	0	17
	6	MCP	17	50	17	0	0	0	17
	1	CCP	0	0	0	100	0	0	0
	2	STP	50	0	0	0	0	0	50
	2	CRP	50	50	0	0	0	0	0
	2	LSL	50	50	0	0	0	0	0
	3	LSR	33	0	67	0	0	0	0
	4	LSBk	0	50	25	0	0	0	25
	8	LSBo	0	75	13	0	0	13	0
	1	PLP	0	100	0	0	0	0	0
20	5	DRY	20	0	60	0	0	20	0

PORTER 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
79.10	46.79	53.21	74.30	65.70

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	7	6	13
Boulder	3	4	7
Cobble/Gravel	1	4	5
Silt/clay	39	36	75

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	1	1
Brush	5	1	6
Deciduous Trees	20	27	47
Evergreen Trees	25	21	46
No Vegetation	0	0	0

STREAM REACH 4 (Units 133-189)

Channel Type: B3	Mean Canopy Density: 85%
Main Channel Length: 3948 ft.	Evergreen Component: 59%
Side Channel Length: 0 ft.	Deciduous Component: 42%
Riffle/Flatwater Mean Width: 4.8 ft.	Pools by Stream Length: 24%
Pool Mean Depth: 0.9 ft.	Pools >=2 ft. Deep: 44%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 16%
Water: 52-56°F Air: 59-66°F	Mean Pool Shelter Rtn: 21
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 57%	Occurrence of LOD: 59%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 85 ft.

Embeddness Value: 1. 28% 2. 28% 3. 40% 4. 4% 5. 0%

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: PORTER CREEK
SAMPLE DATES: 09/16/97 to 11/05/97
SURVEY LENGTH:
MAIN CHANNEL: 28807 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Guerneville Latitude: 38°30'55"
Legal Description: T08NR09WS29 Longitude: 122°52'55"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

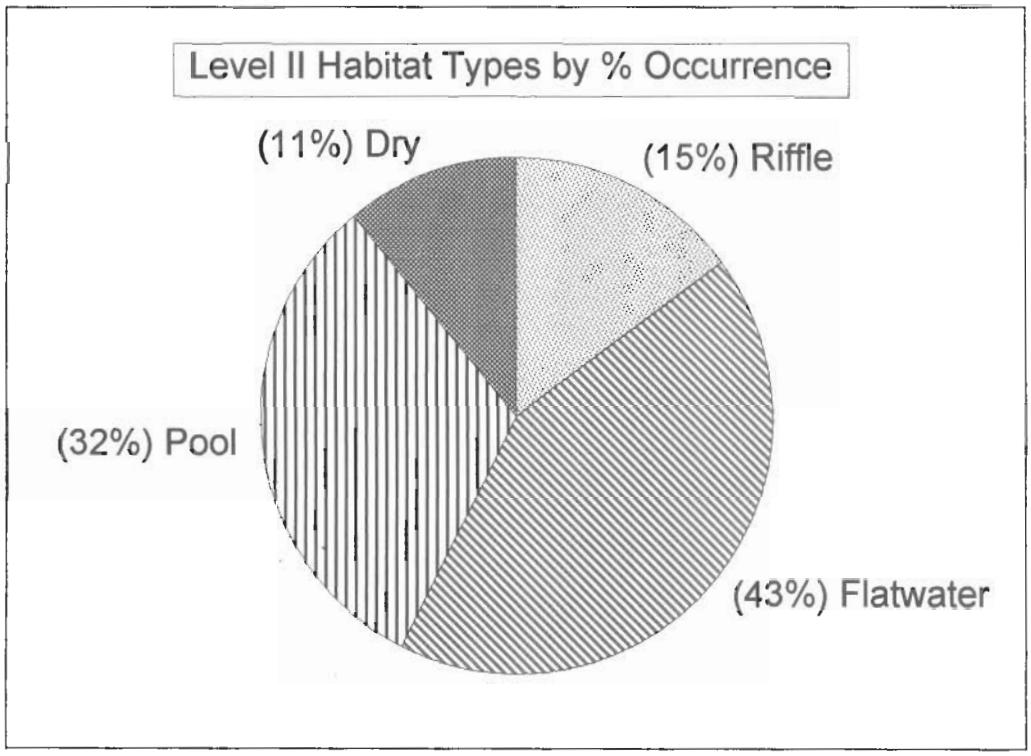
STREAM REACH 1 (Units 1-40)
Channel Type: F4 Mean Canopy Density: 71%
Main Channel Length: 8887 ft. Evergreen Component: 24%
Side Channel Length: 0 ft. Deciduous Component: 76%
Riffle/Flatwater Mean Width: 5.2 ft. Pools by Stream Length: 4%
Pool Mean Depth: 0.6 ft. Pools >=2 ft. Deep: 22%
Base Flow: 0.0 cfs Pools >=3 ft. Deep: 0%
Water: 58-61°F Air: 67-74°F Mean Pool Shelter Rtn: 31
Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Boulders
Bank Vegetative Cover: 83% Occurrence of LOD: 54%
Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 6019 ft.
Embeddness Value: 1. 56% 2. 22% 3. 22% 4. 0% 5. 0%

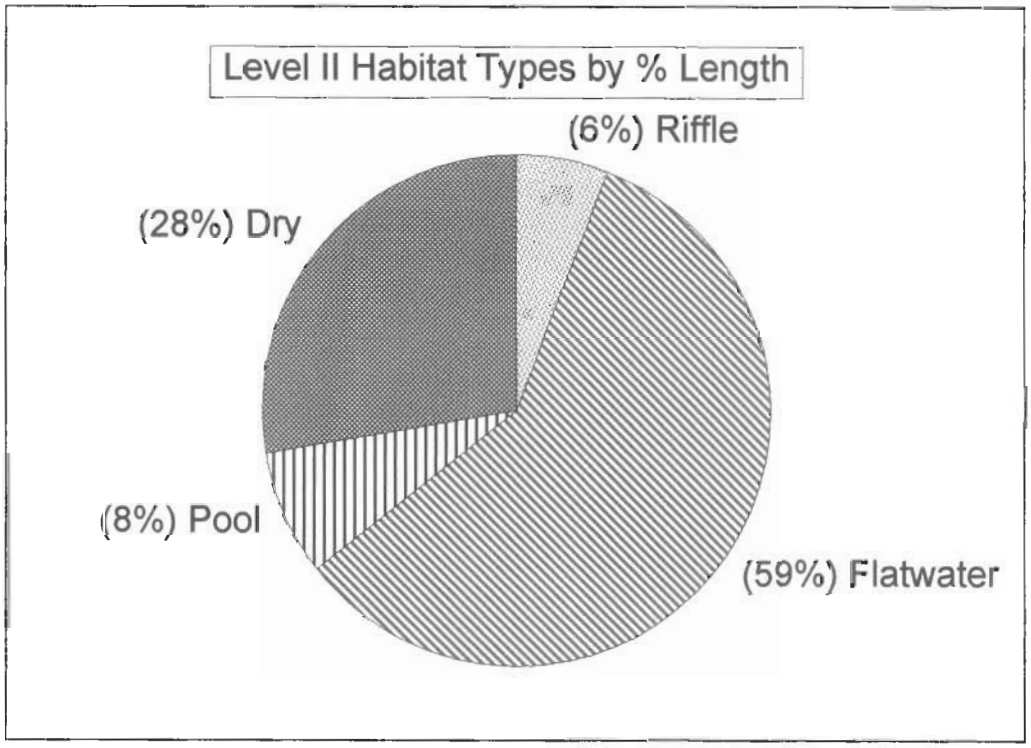
STREAM REACH 2 (Units 41-85)
Channel Type: F2 Mean Canopy Density: 80%
Main Channel Length: 6581 ft. Evergreen Component: 30%
Side Channel Length: 0 ft. Deciduous Component: 70%
Riffle/Flatwater Mean Width: 6.3 ft. Pools by Stream Length: 3%
Pool Mean Depth: 0.8 ft. Pools >=2 ft. Deep: 40%
Base Flow: 0.0 cfs Pools >=3 ft. Deep: 0%
Water: 56-61°F Air: 66-84°F Mean Pool Shelter Rtn: 12
Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Boulders
Bank Vegetative Cover: 59% Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 1867 ft.
Embeddness Value: 1. 20% 2. 30% 3. 40% 4. 10% 5. 0%

STREAM REACH 3 (Units 86-132)
Channel Type: F4 Mean Canopy Density: 80%
Main Channel Length: 9391 ft. Evergreen Component: 70%
Side Channel Length: 0 ft. Deciduous Component: 30%
Riffle/Flatwater Mean Width: 4.0 ft. Pools by Stream Length: 9%
Pool Mean Depth: 0.8 ft. Pools >=2 ft. Deep: 38%
Base Flow: 0.0 cfs Pools >=3 ft. Deep: 0%
Water: 52-54°F Air: 55-65°F Mean Pool Shelter Rtn: 26
Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Undercut Banks
Bank Vegetative Cover: 78% Occurrence of LOD: 10%
Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft.
Embeddness Value: 1. 7% 2. 87% 3. 0% 4. 7% 5. 0%

Porter Creek

Level II Habitat Types

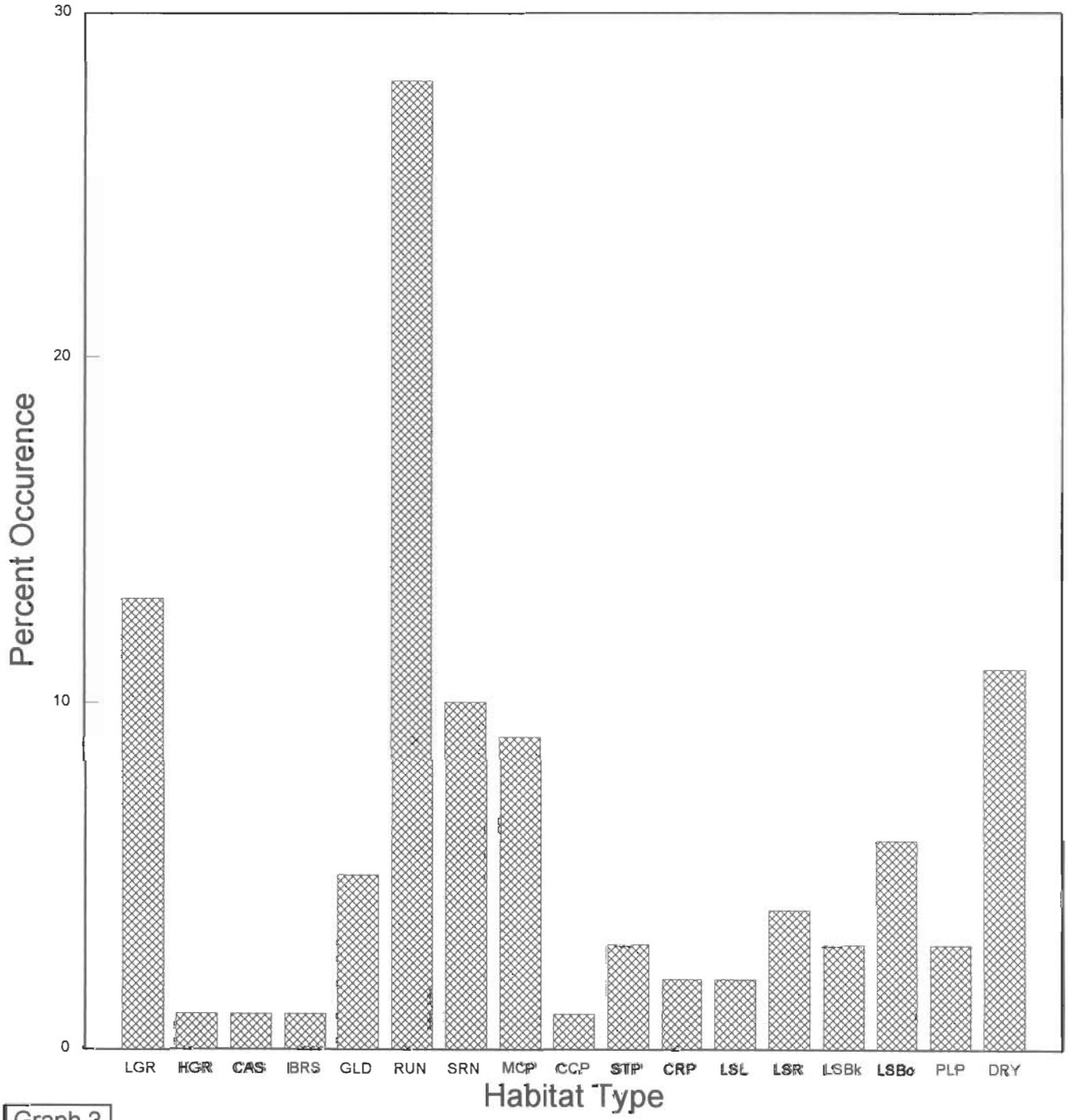




Graph 1

Porter Creek

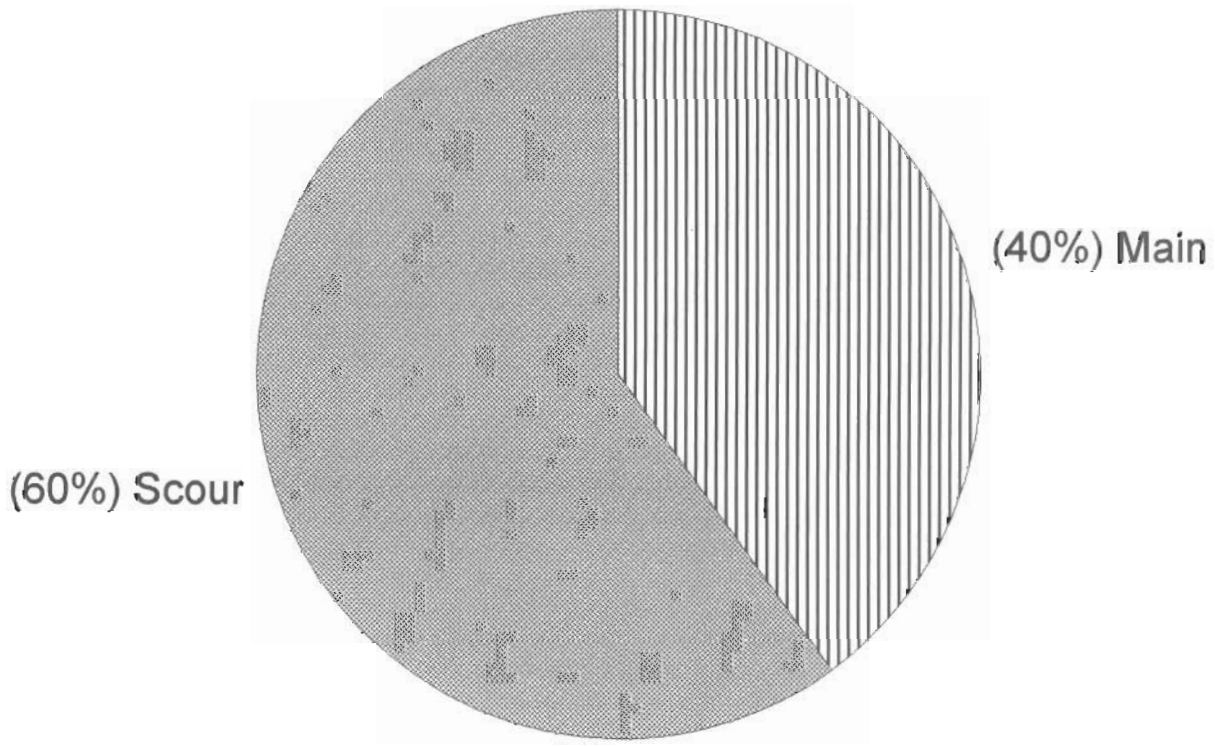
Level IV Habitat Types by % Occurrence



Graph 2

Porter Creek

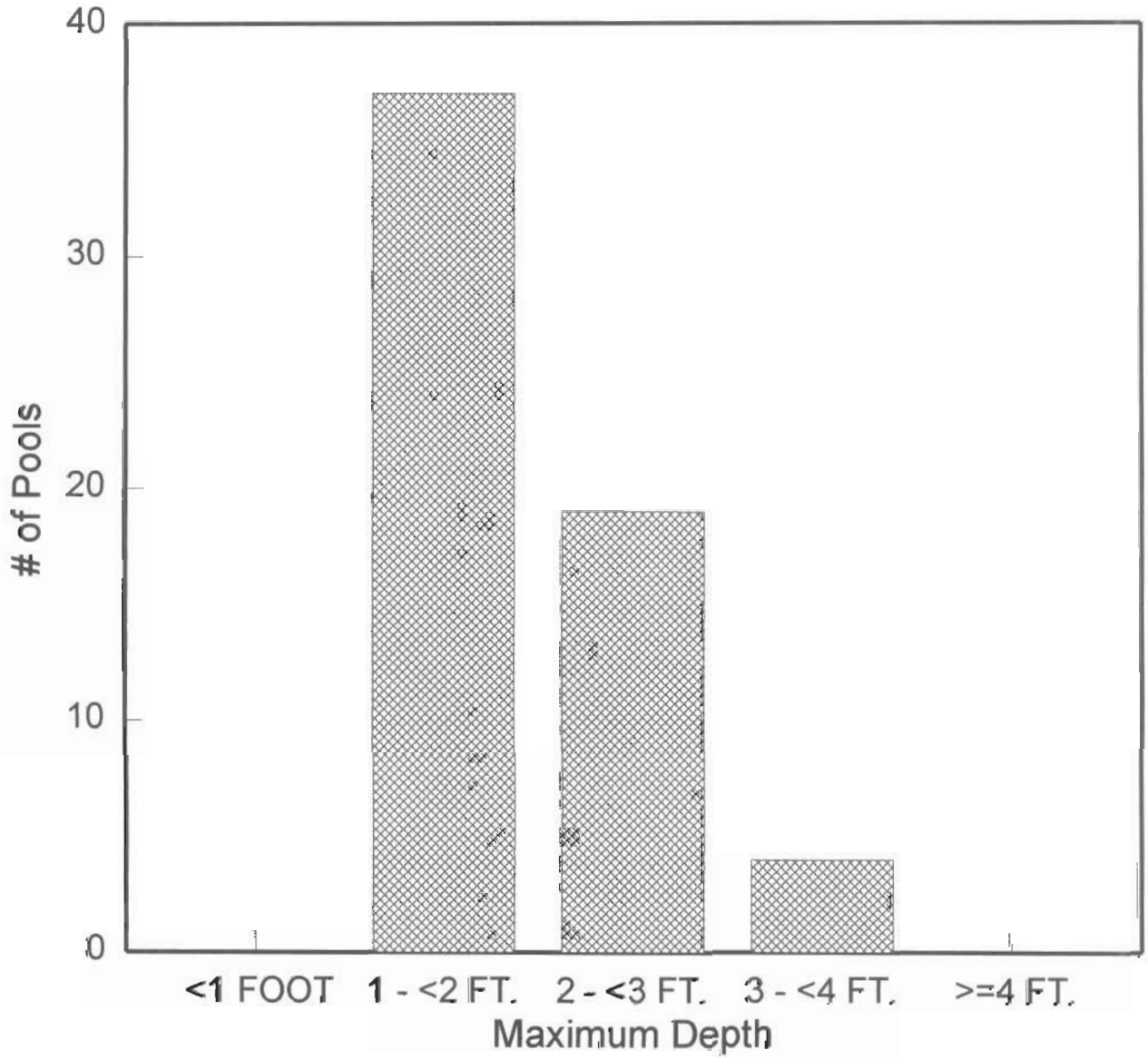
Pool Habitat Types by % Occurrence



Graph 3

Porter Creek

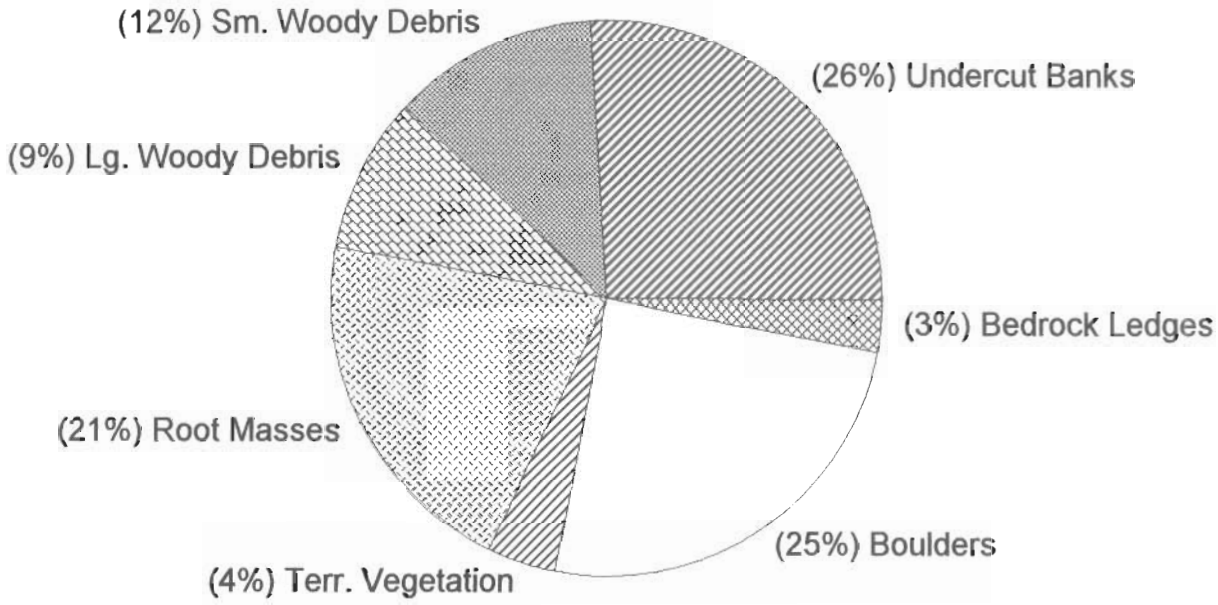
Maximum Depth in Pools



Graph 4

Porter Creek

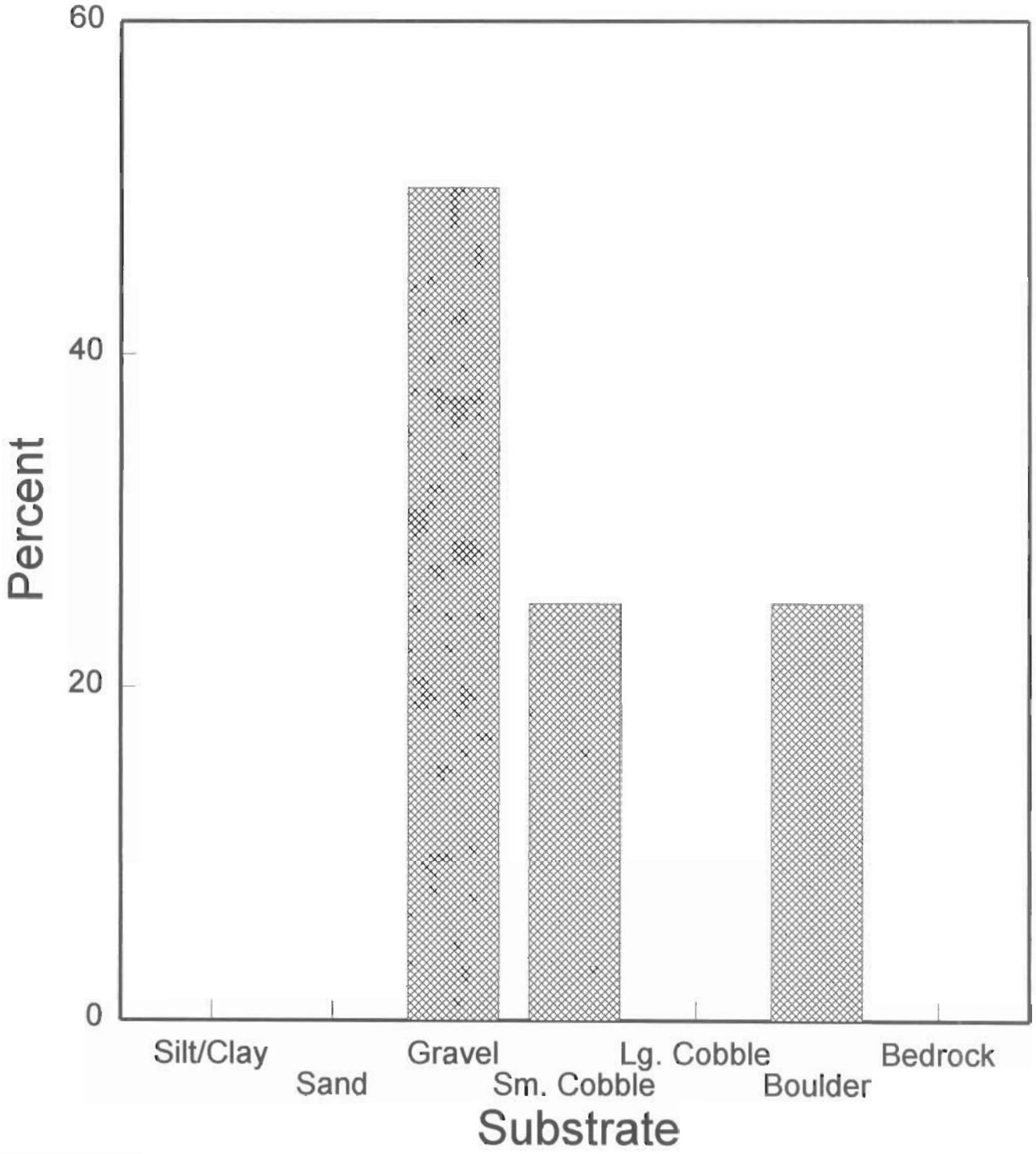
Pool Shelter Types by % Area



Graph 5

Porter Creek

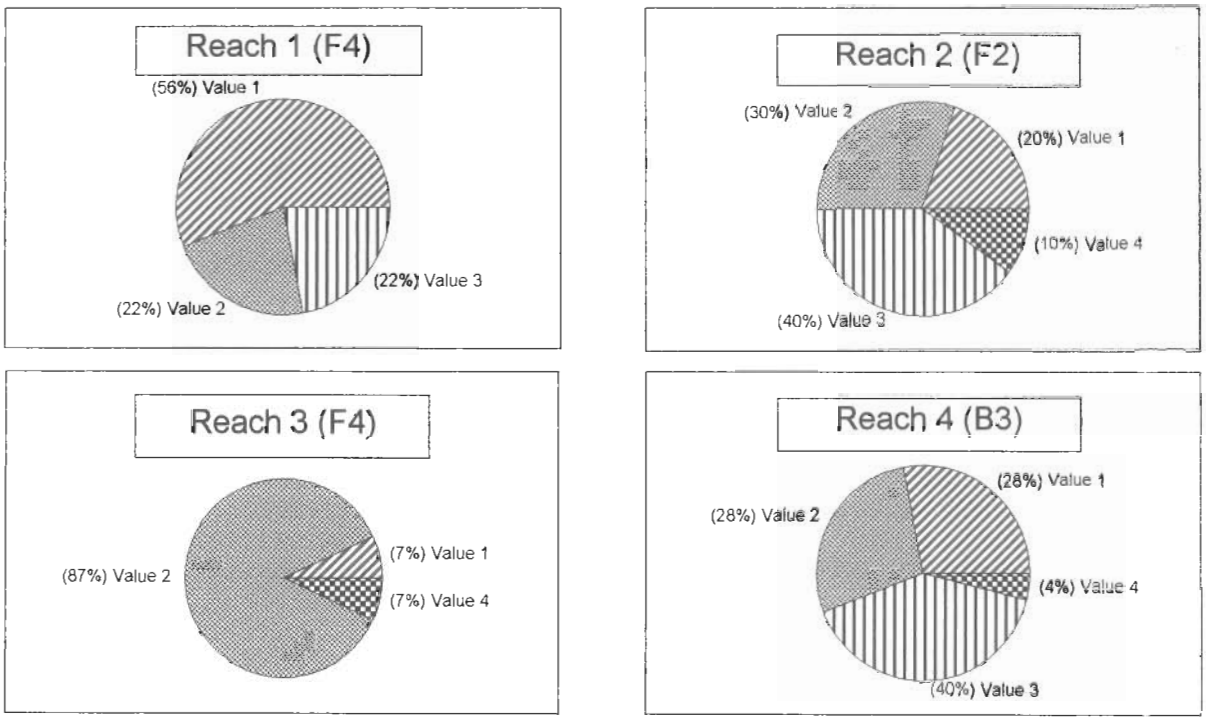
Substrate Composition in Low Gradient Riffles



Graph 6

PORTER CREEK

Percent Cobble Embeddedness by Reach

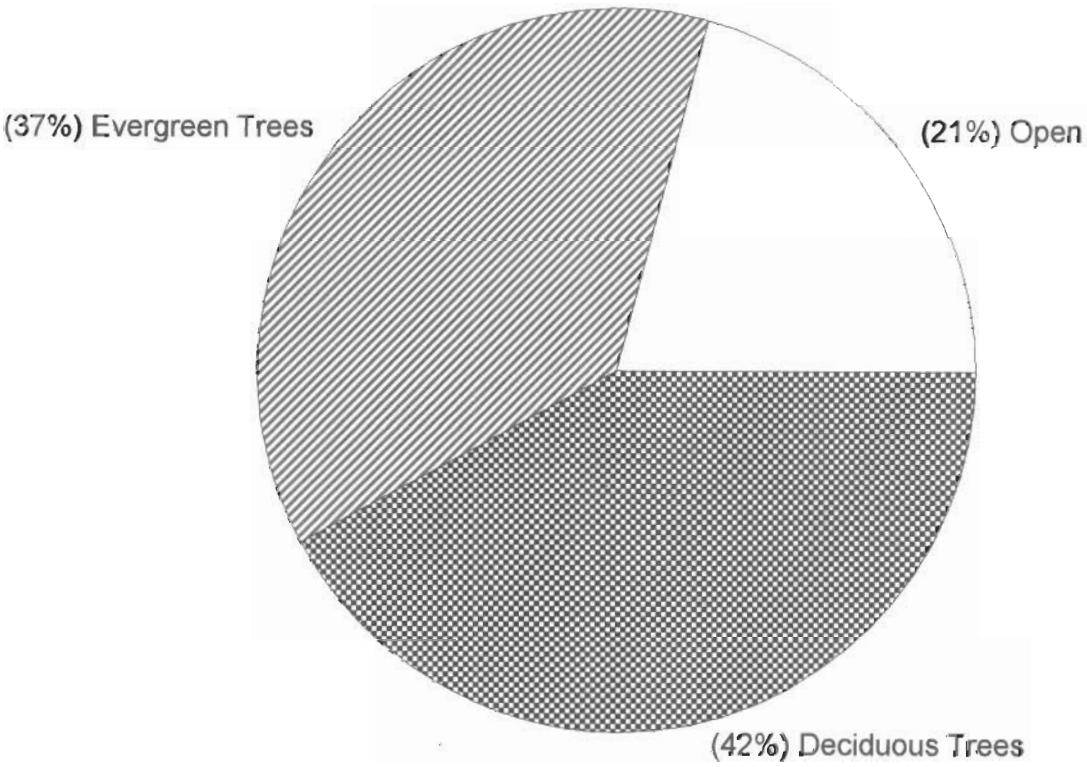


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

Porter Creek

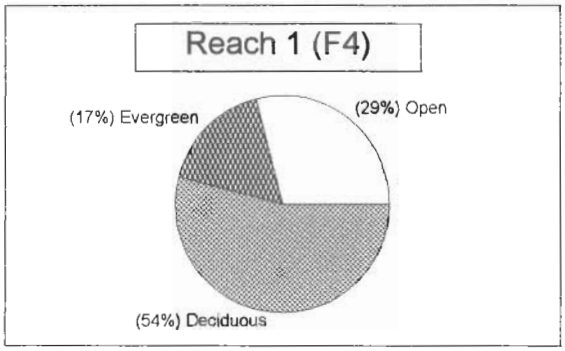
Mean Percent Canopy

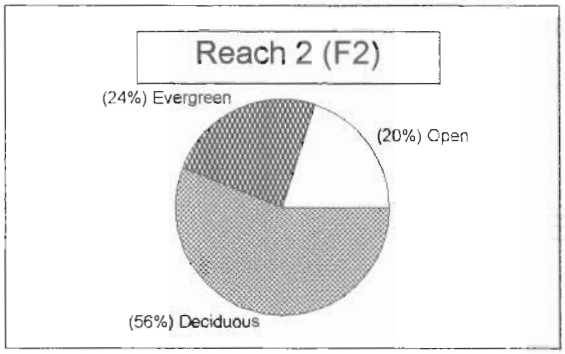


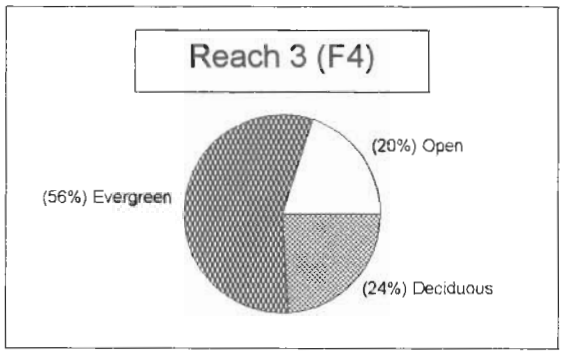
Graph 8

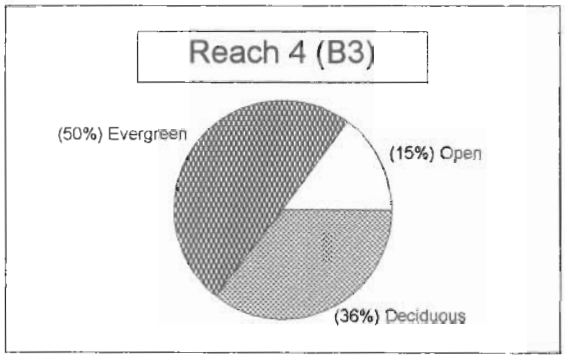
PORTER CREEK

Percent Canopy By Reach







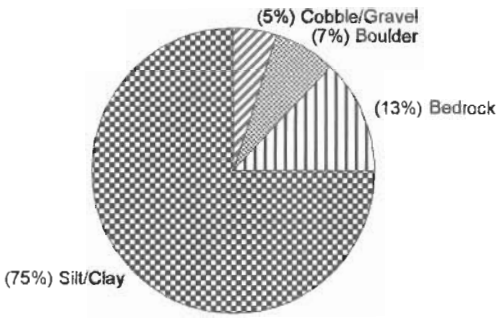


Graph 9

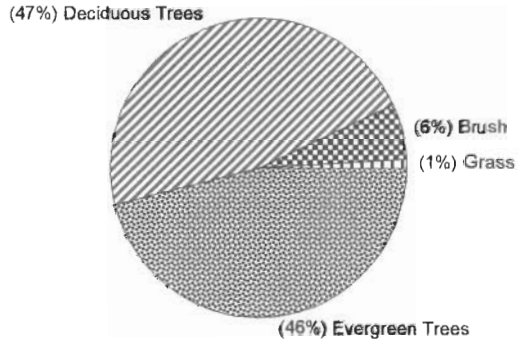
Porter Creek

Percent Bank Composition

Dominant Bank Substrate

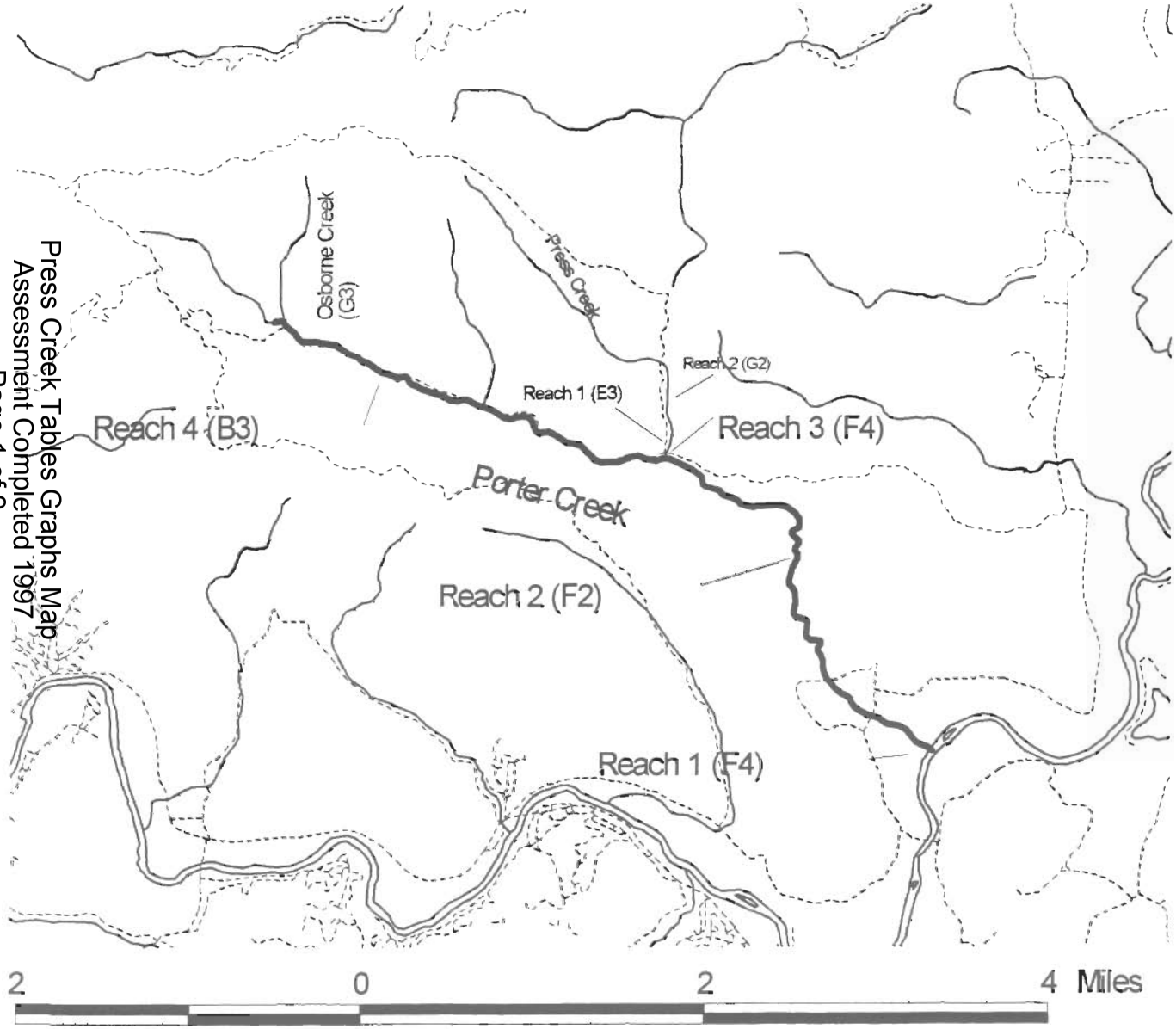


Dominant Bank Vegetation



Graph 10

Porter Creek



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Press Creek Tables Graphs Map
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Press Creek(Porter Trib) Drainage: Porter Creek

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 11/06/97 to 11/10/97

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	2	RIFFLE	11	52	310	6	4.2	0.3	136	816	55	327	0	5
18	4	FLATWATER	32	74	1330	25	4.3	0.3	239	4297	73	1313	0	4
18	12	POOL	32	31	552	10	7.4	0.9	224	4035	218	3931	196	29
15	0	DRY	26	215	3232	60	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.)
57	18	5424	9148	5571

Press Creek(Porter Trib) Drainage: Porter Creek

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS Survey Dates: 11/06/97 to 11/10/97

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 %
4	1	LGR	7	36	143	3	4	0.2	0.4	60	240	10	39	0	0	96
2	1	CAS	4	84	167	3	4	0.5	1.8	288	576	144	288	0	10	73
1	0	GLD	2	69	69	1	8	0.3	1.1	497	497	149	149	0	10	0
8	3	RUN	14	94	752	14	4	0.3	0.8	228	1822	77	614	0	3	88
9	1	SRN	16	57	509	9	4	0.3	0.6	126	1134	29	263	0	0	96
5	2	MCP	9	31	154	3	6	0.7	2.2	184	920	117	583	71	40	96
1	1	STP	2	58	58	1	7	0.6	1.7	339	339	204	204	136	30	95
1	1	CRP	2	29	29	1	6	1.0	2.9	174	174	174	174	0	10	100
3	2	LSR	5	23	70	1	6	0.9	2.9	151	454	137	412	118	50	75
3	2	LSBk	5	31	93	2	5	0.9	2.2	169	507	139	418	111	22	97
3	2	LSBo	5	33	100	2	8	0.8	2.1	272	817	232	697	115	13	85
2	2	PLP	4	24	48	1	16	1.5	3.5	412	824	722	1444	1116	30	100
15	0	DRY	26	215	3232	60	0	0.0	0.0	0	0	0	0	0	0	81

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
57	18	5424	8304	5284

Press Creek(Porter Trib) Drainage: Porter Creek

Table 3 - SUMMARY OF POOL TYPES Survey Dates: 11/06/97 to 11/10/97

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
6	3	MAIN	33	35	212	38	6.3	0.7	210	1259	131	787	88	38
12	9	SCOUR	67	28	340	62	8.0	1.0	231	2776	262	3144	258	25

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
18	12	552	4035	3931

Press Creek(Porter Trib) Drainage: Porter Creek

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 11/06/97 to 11/10/97

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
5	MCP	28	0	0	4	80	1	20	0	0	0	0
1	STP	6	0	0	1	100	0	0	0	0	0	0
1	CRP	6	0	0	0	0	1	100	0	0	0	0
3	LSR	17	0	0	2	67	1	33	0	0	0	0
3	LSBk	17	0	0	1	33	2	67	0	0	0	0
3	LSBo	17	0	0	1	33	2	67	0	0	0	0
2	PLP	11	0	0	0	0	0	0	2	100	0	0

TOTAL UNITS
18

Press Creek(Porter Trib) Drainage: Porter Creek

Table 5 - Summary of Shelter by Habitat Type Survey Dates: 11/06/97 to 11/10/97

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
4	1	LGR	0	0	0	0	0	0	0	0	0
2	1	CAS	0	0	0	0	0	0	0	100	0
1	1	GLD	70	0	0	0	30	0	0	0	0
8	3	RUN	0	72	0	0	0	0	0	28	0
9	1	SRN	0	0	0	0	0	0	0	0	0
5	4	MCP	4	29	28	28	0	0	0	12	0
1	1	STP	50	0	10	0	0	0	0	40	0
1	1	CRP	100	0	0	0	0	0	0	0	0
3	2	LSR	15	6	38	41	0	0	0	0	0
3	3	LSBk	19	0	37	19	0	0	0	13	13
3	3	LSBo	17	0	0	4	9	0	0	52	19
2	2	PLP	65	0	24	0	0	0	0	11	0
15	1	DRY	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES 57	24		32	10	18	13	4	0	0	20	4
POOLS ONLY 18	16		30	8	22	15	1	0	0	20	4

Press Creek(Porter Trib) Drainage: Porter Creek

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE Survey Dates: 11/06/97 to 11/10/97

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
4	2	LGR	0	0	0	0	100	0	0
2	1	CAS	0	0	0	0	0	100	0
1	1	GLD	0	0	100	0	0	0	0
8	3	RUN	0	0	67	0	33	0	0
2	2	SRN	0	0	0	0	50	50	0
5	3	MCP	0	67	0	0	33	0	0
1	1	STP	0	0	0	0	0	100	0
1	1	CRP	0	0	100	0	0	0	0
2	2	LSR	0	50	50	0	0	0	0
2	2	LSBk	0	50	50	0	0	0	0
2	2	LSBo	0	50	0	0	0	50	0
2	2	PLP	0	100	0	0	0	0	0
7	7	DRY	14	0	29	0	43	0	14

Press Creek(Porter Trib)

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
89.50	79.00	21.00	71.21	73.28

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	4	6	17.24
Boulder	0	2	3.45
Cobble/Gravel	1	2	5.17
Silt/clay	24	19	74.14

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	1	0	1.72
Deciduous Trees	5	6	18.97
Evergreen Trees	23	23	79.31
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Press Creek(Porter Trib)
SAMPLE DATES: 11/06/97 to 11/10/97
SURVEY LENGTH:
MAIN CHANNEL: 5424 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Latitude: 0°0'0"
Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-30)

Channel Type: E3	Mean Canopy Density: 91%
Main Channel Length: 1420 ft.	Evergreen Component: 71%
Side Channel Length: 0 ft.	Deciduous Component: 29%
Riffle/Flatwater Mean Width: 4.1 ft.	Pools by Stream Length: 21%
Pool Mean Depth: 0.8 ft.	Pools >=2 ft. Deep: 40%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 10%
Water: 53-54°F Air: 55-59°F	Mean Pool Shelter Rtn: 25
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 68%	Occurrence of LOD: 33%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 265 ft.

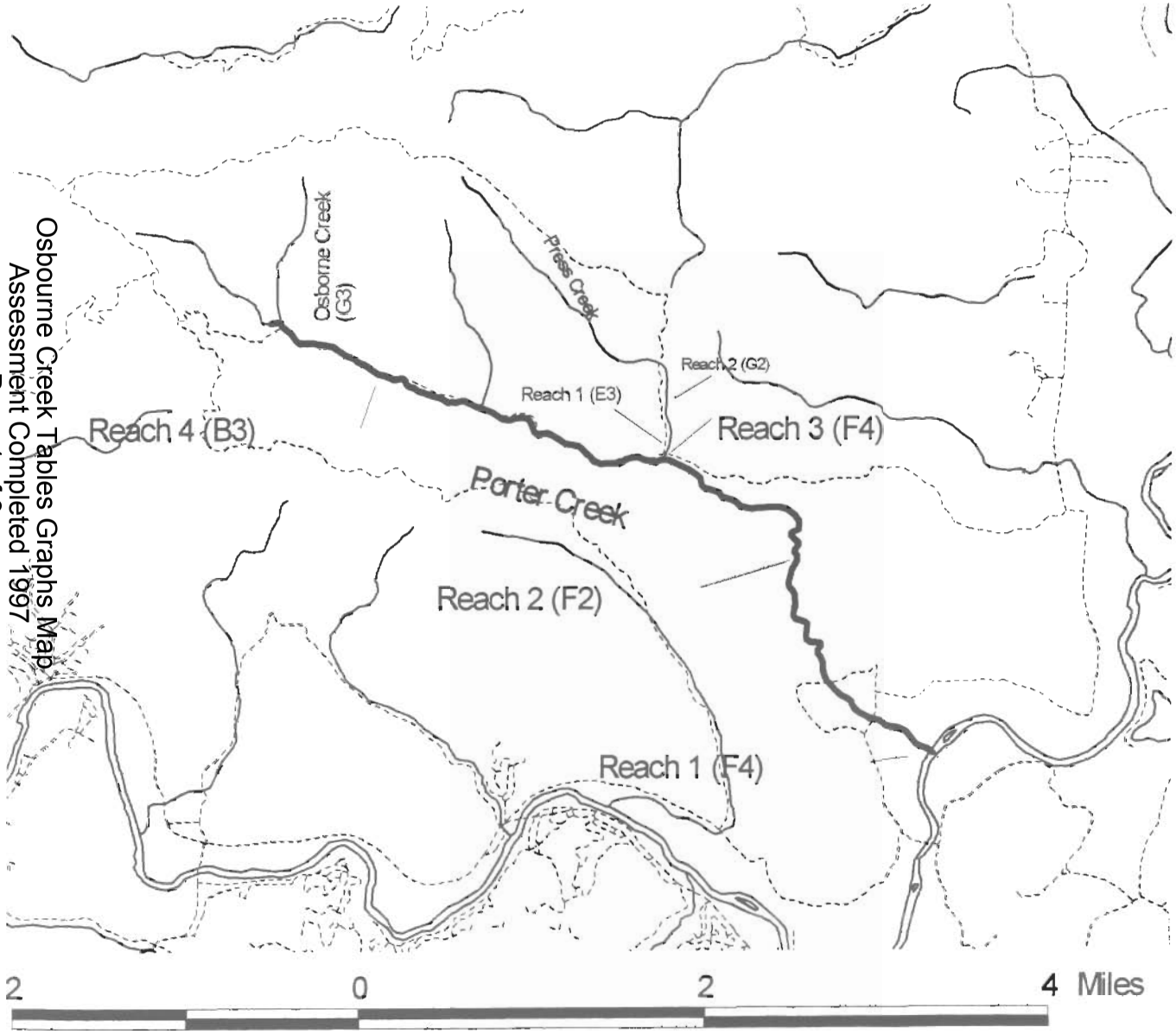
Embeddness Value: 1. 20% 2. 40% 3. 30% 4. 10%

STREAM REACH 2 (Units 31-57)

Channel Type: G2	Mean Canopy Density: 88%
Main Channel Length: 4004 ft.	Evergreen Component: 89%
Side Channel Length: 0 ft.	Deciduous Component: 11%
Riffle/Flatwater Mean Width: 4.4 ft.	Pools by Stream Length: 6%
Pool Mean Depth: 0.9 ft.	Pools >=2 ft. Deep: 63%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 13%
Water: 50-53°F Air: 54-59°F	Mean Pool Shelter Rtn: 34
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 77%	Occurrence of LOD: 31%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 2967 ft.

Embeddness Value: 1. 0% 2. 75% 3. 13% 4. 13%

Porter Creek



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Osbourne Creek Tables Graphs Map
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Osborne Creek-PorterTrib

Drainage: Russian River

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

Survey Dates: 11/12/1997

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
1	0	RIFFLE	9	6	6	1	4.0	0.1	24	24	2	2	0	0
6	3	FLATWATER	55	109	655	75	4.3	0.3	134	801	40	238	0	5
3	3	POOL	27	17	50	6	4.2	0.7	70	211	46	137	25	8
1	0	DRY	9	162	162	19	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.)
11	6	873	1036	378

Osborne Creek-Porter Trib | Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS | Survey Dates: 11/12/1997

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 %
1	0	BRS	9	6	6	1	4	0.1	0.1	24	24	2	2	0	0	65
1	1	GLD	9	26	26	3	5	0.5	0.8	130	130	65	65	0	5	80
2	1	RUN	18	64	128	15	4	0.2	0.4	91	182	18	36	0	0	90
3	1	SRN	27	167	501	57	4	0.2	0.4	179	538	36	108	0	10	95
1	1	MCP	9	22	22	3	5	0.5	1.1	105	105	52	52	21	5	75
1	1	LGR	9	14	14	2	1	0.8	1.5	8	8	7	7	6	5	70
1	1	PLP	9	14	14	2	7	0.8	1.4	98	98	78	78	49	15	100
1	0	DRY	9	162	162	19	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)
11	6	873	1086	349

Osborne Creek-PorterTrib

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 11/12/1997

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
1	1	MAIN	33	22	22	44	5.0	0.5	105	105	52	52	21	5
2	2	SCOUR	67	14	28	56	3.8	0.8	53	106	43	85	27	10

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
3	3	50	211	137

Osborne Creek-PorterTrib | Drainage: Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES | Survey Dates: 11/12/1997

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
1	MCP	33	0	0	1	100	0	0	0	0	0	0
1	LSBk	33	0	0	1	100	0	0	0	0	0	0
1	PLP	33	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
3

Osborne Creek-PorterTrib

Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 11/12/1997

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
1	0	BRS	0	0	0	0	0	0	0	0	0
1	1	GLD	0	0	0	0	50	0	0	50	0
2	1	RUN	0	0	0	0	0	0	0	0	0
3	1	SRN	0	0	0	0	30	0	0	70	0
1	1	MCP	0	0	0	0	50	0	0	50	0
1	1	LSBk	0	0	0	0	0	0	0	60	40
1	1	PLP	75	25	0	0	0	0	0	0	0
1	0	DRY	0	0	0	0	0	0	0	0	0
11	6	ALL HABITAT TYPES	20	7	0	0	26	0	0	47	0
3	3	POOLS ONLY	53	18	0	0	13	0	0	15	1

Osborne Creek-PorterTrib

Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 11/12/1997

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
1	1	BRS	0	0	0	0	0	0	100
1	1	GLD	0	0	0	0	0	0	100
2	1	RUN	0	0	0	0	0	0	100
3	1	SRN	0	0	0	0	0	100	0
1	1	MCP	0	0	0	0	0	0	100
1	1	LSBk	0	0	0	0	0	0	100
1	1	PLP	0	100	0	0	0	0	0
1	1	DRY	0	0	100	0	0	0	0

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
84.38	61.25	38.75	65.00	88.13

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	1	0	6.25
Boulder	0	0	0
Cobble/Gravel	0	0	0
Silt/clay	7	8	93.75

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	1	2	18.75
Deciduous Trees	3	3	37.50
Evergreen Trees	4	3	43.75
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Osborne Creek-PorterTrib
SAMPLE DATES:
SURVEY LENGTH:
MAIN CHANNEL: 873 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Latitude: 0°0'0"
Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-11)

Channel Type: G3	Mean Canopy Density: 84%
Main Channel Length: 873 ft.	Evergreen Component: 61%
Side Channel Length: 0 ft.	Deciduous Component: 39%
Riffle/Flatwater Mean Width: 4.3 ft.	Pools by Stream Length: 6%
Pool Mean Depth: 0.7 ft.	Pools >=2 ft. Deep: 0%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 0%
Water: 50-50°F Air: 55-55°F	Mean Pool Shelter Rtn: 8
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 77%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 162 ft.

Embeddness Value: 1. 33% 2. 33% 3. 0% 4. 33%