



**California Department of Fish and Wildlife  
Sonoma County  
Russian River Watershed  
Stream Habitat Assessment Reports**

**Porter Creek  
(Rio Dell)**

*Surveyed 2012*

*Report Completed in 2013*



## Porter Creek

# STREAM INVENTORY REPORT

## Porter Creek

### INTRODUCTION

A stream inventory was conducted 6/11/2012 to 7/5/2012 on Porter Creek. The survey began at the confluence with Russian River and extended upstream 6.8 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Porter Creek.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for Chinook salmon, coho salmon, and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

### WATERSHED OVERVIEW

Porter Creek is located in Sonoma County, California (Map 1). It is a tributary to Russian River, which flows into Pacific Ocean. Porter Creek's legal description at the confluence with Russian River is T08N R09W Sec.29. Its location is (38:30:54.0N) 38.5151 north latitude and (122:52:54.0W) 122.8816 west longitude, LLID number 1228816385151. Porter Creek is a second order stream and has approximately 7 miles of blue line stream according to the USGS National Hydrology Dataset (NHD). Porter Creek drains a watershed of approximately 7.5 square miles. Elevations range from about 43 feet at the mouth of the creek to 1,716 feet in the headwater areas. Evergreen forest dominates the watershed. The watershed is entirely privately owned, which accounts for 100% of the land area. Ninety-eight percent of the land is considered natural, and 2% is agricultural. Vehicle access exists via Sweetwater Springs Road located off of Westside Road.

### METHODS

The habitat inventory conducted in Porter Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Wildlife (CDFW). This inventory was conducted by a two-person team.

### SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are fully measured. All other habitat unit types encountered for the first time in each reach are measured for all the parameters and

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characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

### 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 eleven components to the inventory form.

#### 1. Flow:

Flow is measured in cubic feet per second (cfs) near the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

#### 2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (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. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

#### 3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees 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 (1990). 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 measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

#### 5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Porter Creek, embeddedness was

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ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders or other considerations.

### 6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile 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 for prey. The shelter rating is calculated for each fully-described habitat unit by multiplying shelter value and percent cover. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover 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 cover. The Habitat Units, 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-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

### 8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. 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 ocularly into percentages of coniferous or hardwood trees.

### 9. Bank Composition and Vegetation:

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-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

### 10. Large Woody Debris Count:

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Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

### 11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests (velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

## BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Porter Creek. In addition, underwater observations were made throughout Reach 1, 2 and 3 using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

## DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.18, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Wildlife. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Porter Creek include:

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- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

### HABITAT INVENTORY RESULTS

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

The habitat inventory of 6/11/2012 to 7/5/2012, was conducted by C. Neill, D. Dela Vega (CCC)/(WSP) (Comple. The total length of the stream surveyed was 35,815 feet with an additional 196 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.12 cfs on the 6<sup>th</sup> of July, 2012.

Porter Creek is a F4 channel type for 7,634 feet of the stream surveyed (Reach 1), a B3 channel type for 10,320 feet of the stream surveyed (Reach 2), a F3 channel type for 3,348 feet of the stream surveyed (Reach 3), a B1 channel type for 3,602 feet of the stream surveyed (Reach 4), a NA channel type for 5,050 feet of the stream surveyed (Reach 5), a G4 channel type for 6,057 feet of the stream surveyed (Reach 6). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width to depth ratios, and gravel-dominant substrates. B3 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks, and cobble-dominant substrates. F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width to depth ratios, and cobble-dominant substrates. B1 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks, and bedrock-dominant substrates. G4 channels are entrenched 'gully' step-pool channels on moderate gradients with low width to depth ratios, and gravel-dominant substrates. NA channels had no access.

Water temperatures taken during the survey period ranged from 48 to 70 degrees Fahrenheit. Air temperatures ranged from 49 to 92 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 45% pool units, 32% flatwater units, 20% riffle units, 2% culvert units, 1% dry units, 0% not surveyed units, (Graph 1). Based on total length of Level II habitat types, there were 43% flatwater units, 27% pool units, 14% not surveyed units, 12% riffle units, 2% dry

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units, 1% culvert units (Graph 2).

Twenty-one Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 31% mid-channel pool units, 24% step run units, 13% low gradient riffle units (Graph 3). Based on percent total length, 37% step run units, 20% mid-channel pool units, 14% not surveyed units.

A total of 189 pools were identified (Table 3). Main channel pools were the most frequently encountered at 78% (Graph 4), and comprised 83% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Ninety-two of the 189 pools (49%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 189 pool tail-outs measured, 106 had a value of 1 (56%), 62 had a value of 2 (33%), 12 had a value of 3 (6%), 9 had a value of 4 (5%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 7, flatwater habitat types had a mean shelter rating of 6, and pool habitats had a mean shelter rating of 17 (Table 1). Of the pool types, the backwater pools had a mean shelter rating of 22, main channel pools had a mean shelter rating of 15, scour pools had a mean shelter rating of 26 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Porter Creek. Graph 7 describes the pool cover in Porter Creek. Boulders are the dominant pool cover type, followed by undercut banks.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel substrate was observed in 76% of pool tail-outs; and small cobble substrate was observed in 8% of pool tail-outs.

The mean percent canopy density for the surveyed length of Porter Creek was 86%. Of the canopy present, the mean percentages of hardwood and coniferous trees were 92% and 8%, respectively. Fourteen percent of the canopy was open. Graph 9 describes the mean percent canopy in Porter Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 90%. The mean percent left bank vegetated was 88% (Table 7). The dominant elements composing the structure of the stream banks consisted of 35% sand/silt/clay, 29% cobble/gravel, 21% bedrock, 15% boulder (Graph 10). Deciduous trees were the dominant vegetation type observed in 76% of the units surveyed. Additionally, 15% of the units surveyed had brush as the dominant vegetation

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type, and 7% had coniferous trees as the dominant vegetation type (Graph 11).

### DISCUSSION

Porter Creek is a F4 channel type for 7,634 feet of the stream surveyed, a B3 channel type for 10,320 feet of the stream surveyed, a F3 channel type for 3,348 feet of the stream surveyed, a B1 channel type for 3,602 feet of the stream surveyed, a NA channel type for 5,050 feet of the stream surveyed, a G4 channel type for 6,057 feet of the stream surveyed. The suitability of F4, B3, F3, B1, NA, and G4 channel types for fish habitat improvement structures is/are as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover; B3 channel types are excellent for plunge weirs, boulder clusters and bank-placed boulders, single and opposing wing-deflectors, and log cover; F3 channel types are good for bank-placed boulders, single and opposing wing-deflectors and fair for plunge weirs, boulder clusters, channel constrictors and log cover; B1 channel types are excellent for bank-placed boulders and good for log cover; NA channel types were not surveyed and suitability cannot be assessed; and G4 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days 6/11/2012 to 7/5/2012, ranged from 48 to 70 degrees Fahrenheit. Air temperatures ranged from 49 to 92 degrees Fahrenheit. This is a suitable water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 43% of the total length of this survey, riffles 12%, and pools 27% (45% pool units, 32% flatwater units, 20% riffle units, 2% culvert units, 1% dry units, 0% not surveyed units). The pools are relatively shallow/deep, with 92 of the 189 (49%) pools having a maximum residual depth greater than two feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

One hundred sixty-eight of the 189 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty-one of the pool tail-outs had embeddedness ratings of 3 or 4. Zero of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Porter Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

One the Hundred fifty-nine of the 189 pool tail-outs measured had gravel and small cobble as the



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dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools is 17. The shelter rating in the flatwater habitats is 6. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Porter Creek. Boulders are the dominant cover type in pools, followed by undercut banks. Log and root wad cover structures in the pool and flatwater habitats would enhance 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.

The mean percent canopy density for the stream was 86%. Reach 1 had a canopy density of 85.6%, Reach 2 had a canopy density of 81.3%, Reach 3 had a canopy density of 92.3%, Reach 4 had a canopy density of 88.5%, Reach 5 had a canopy density of %, and Reach 6 had a canopy density of 88.7%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 90% and 88%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

### GENERAL RECOMMENDATIONS

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

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.

### RECOMMENDATIONS

- 1) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from Boulders and Root Masses. Adding high quality complexity with woody cover in the pools is desirable.
- 2) Access for migrating salmonids should be assessed at all road crossings and dams. Sites include the multiple identified ford crossings located throughout Reach 2 and Reach 7 as well as the in-stream culvert associated with the ford crossing, located near the last access points along Sweetwater Springs Road. The dam sill site located downstream of the last access road bridge was identified as a juvenile fish passage barrier and should be assessed further. All fish passage assessments should be done according to Part 9 of the California Salmonid Stream Habitat Restoration Manual (Flosi et al, 1998). Where needed, crossings should be replaced or modified to improve fish passage.

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- 3) Inventory and map sources of stream bank 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. Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.
- 4) Where feasible, design and engineer pool enhancement structures to increase the number of pools, particularly in Reaches 1, 2, and 6. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 5) Due to the natural high gradient of the stream like throughout Reaches 4, 5 and 6, access for migrating salmonids is an ongoing potential problem. Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and improved where possible.
- 6) There are several reaches 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.
- 7) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

### COMMENTS AND LANDMARKS

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

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
0	0001.00	Start of Survey at the confluence of Porter Creek and the Russian River- WP #075 N38.51532 W122.88351
762	0002.00	10 Salmonid Young of the year (YOY) observed
955	0004.00	Salmonid YOY observed
1,188	0006.00	Rip-rap along the left bank extends into the upstream habitat unit
1,268	0007.00	Rip-rap continues on the left bank into upstream habitat unit

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<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
1,318	0008.00	Rip-rap continues upstream on left bank
1,362	0009.00	Rip-rap continues on the left bank to top of the habitat unit.
1,415	0010.00	1/2ft tall man-made rock dam spanning wetted channel. WP#076 N38.51737 W122.88796
1,523	0011.00	Rip-rap on right bank continues into upstream habitat unit
1,575	0012.00	Rip-rap continues on right bank into upstream habitat unit
1,575	0012.00	20 Salmonid YOY observed
1,728	0013.00	Rip-rap continues on right bank into upstream habitat unit
1,728	0013.00	30 Salmonid YOY Observed
1,889	0014.00	Rip-rap continues on right bank to top of habitat unit
2,183	0017.00	Road Drainage on left bank
2,183	0017.00	Rip-rap on right bank
2,183	0017.00	Crayfish observed
2,289	0020.00	Bridge# 001 is located on Westside Road, and is made of concrete. The bridge has no downcutting, and is not a barrier. The sill is exposed on the right bank edge, but has a natural creek bottom where the sill is no longer present. length= 33', height= 13', width=30' - WP#077 N38.51801 W122.89027
2,449	0023.00	Rip-rap on right bank
3,013	0028.00	30' into habitat unit is baffle pipe on the right bank contributing water to the creek. Rip-rap is armoring the bank underneath the outlet of the baffle pipe.
3,073	0029.00	2 Crayfish Observed
3,372	0031.00	Bridge #002 is a footbridge; it is made of concrete, retaining gravel, and has slight downcutting. It is not a possible barrier, with a height to sill= 0.5'. Length= 24', Height= 14', width= 20'. There is a boulder weir that was constructed in 2011 to allow for fish passage past the sill of the bridge. WP#078 N38.51919 W122.89268
3,494	0035.00	Roach Observed
4,007	0041.00	48ft into the habitat unit is left bank Tributary#001; it is dry. The survey crew checked up 150', and found that it is accessible to fish, but No fish were observed. The estimated Slope is 3-4%. WP#079

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<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		N38.52019 W122.89425. Tributary is overgrown and filled or inactive, draining off of a wetland area.
4,075	0042.00	20' into habitat unit is a baffle pipe on the right bank, contributing <1% of flow
4,244	0044.00	100' into the habitat unit is Bridge#003 located at MacMurray Ranch Road, with a Length=23', a Height =16', and a width=35. It is made of concrete with a natural gravel bottom, has no downcutting or gravel retention, and is not a possible barrier. WP#080 N38.52097 W122.89505
4,367	0045.00	1' diameter Concrete pipe exposed out of right bank
4,367	0045.00	Two 1+ Steelhead observed.
5,017	0052.00	Landslide on left bank continues into next habitat unit ~120' x 6' x 30'
5,409	0057.00	Many salmonid YOY observed
5,590	0060.00	20ft into habitat unit is 3' Diameter baffle pipe exposed from the left bank. Calibration WP#082 N38.52380 W122.89622
5,809	0064.00	1 salmonid YOY observed
5,942	0065.00	At top of the habitat unit is an old decaying car on the right bank
5,971	0066.00	10 salmonid YOY observed
6,452	0072.00	2 salmonid YOY observed at the top of the habitat unit
6,626	0073.00	WP#084 N38.52531 W122.89723
6,626	0073.00	At the bottom of the habitat unit is Left bank Tributary#002; it is dry. The survey crew checked up 200', and Estimated the slope to be 4-10%. No fish were observed. The First 40' is a bedrock sheet with a high gradient of >10%, and after this the channel gradient changes back to 2-4%. The tributary appears to be a drainage from the left bank vineyard.
6,675	0074.00	1+ Salmonid observed
6,915	0077.00	6 salmonid YOY observed
7,347	0083.00	Outlet of baffle pipe is lined with Rip-rap. WP#087 N38.52642 W122.89872
7,347	0083.00	At the top of the habitat unit is right bank Tributary #003 or the Confluence of Spring Creek and Porter Creek. It is dry. The survey crew check up 200', and Estimated the Slope to be 1-4%. No fish were

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<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		observed. The First 40' is low gradient until baffle pipe diverts creek under an access road. The Plunge from pipe outlet to the receiving stream is 4-6'.
7,777	0090.00	Irrigation hose strung about the habitat unit. Calibration WP#088 N38.52742 W122.89882
7,917	0092.00	13' into the habitat unit is a 1' diameter baffle pipe extending 120' up the left bank.
7,917	0092.00	Approx. 80 salmonid YOY observed
8,056	0094.00	Sill is becoming undercut near thalweg. Sill is oriented at 45-60 degree angle to the creek channel with the downstream end of sill on right bank.
8,056	0094.00	Dam #001 is at the bottom of the habitat unit and has old sill which spans across channel to create a plunge of 1.5' into the pool downstream. L=3', H=2', W=40', the dam has No flashboards, with downcutting of 2', is retaining gravel and boulders, and is a Possible barrier to juvenile salmonids but not adults.
8,188	0096.00	50' into the habitat unit is Bridge#004 located at MacMurray Ranch Access road, with a Length=25', a height=13.5', and a width=110'. The bridge is made of concrete, is not retaining gravel, has no downcutting, and is not a possible barrier. The Bridge looks newly constructed, with a natural channel bottom WP#089 N38.52845 W122.89904
8,425	0099.00	Property boundary fence spans the creek at top of the habitat unit
8,788	0105.00	1 salmonid YOY observed
8,944	0107.00	Large boulder creating 2 side channels
8,944	0107.00	20 salmonid YOY observed
9,061	0108.00	8' into the habitat unit is a 4" diameter PVC pipe exposed on the upslope of the left bank
9,100	0109.00	4 salmonid YOY observed
9,763	0120.00	At top of the habitat unit is right bank Tributary#004 it is dry. The survey crew Checked 40' into tributary and Estimated the Slope to be >10%. No fish were observed. The First 40' up the tributary is high gradient, after this point channel grade evens out onto floodplain.
10,209	0129.00	10 steelhead YOY observed
10,354	0132.00	10 steelhead YOY observed

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<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
10,409	0134.00	20 salmonid YOY observed
10,495	0135.00	50 Salmonid YOY obs.
10,595	0136.00	2+ Steelhead observed
10,756	0139.00	Pacific Tree Frog/ Chorus Frog Observed
11,227	0146.00	100' into the habitat unit is left bank Tributary #005; it is dry. The survey crew Checked 100' up, and found it was not accessible to fish, with an Estimated Slope of >10%, No fish were observed. The tributary is a drainage off the saddle of the mountain, and is not entrenched and very overgrown. WP#095 N38.53480 W122.89846
11,227	0146.00	1+ steelhead observed and YOY salmonids Observed
11,348	0147.00	1 Coho YOY observed
11,418	0148.00	At top of the habitat unit is Left bank Tributary #006; it is dry. The survey crew checked up 200' and found it not accessible to fish, with an Estimated Slope of 20%. No fish were observed. The Gradient is steep throughout. WP#096 N38.53502 W122.89892
11,513	0149.00	Calibration WP#096 is located 74' downstream of flagged the habitat unit
11,513	0149.00	Salmonid YOY observed
11,687	0152.00	At top of the habitat unit is right bank Tributary#007; it is dry. The survey crew Checked 200' up, and found it not accessible to fish, with an Estimated Slope of 4-6%. No fish were observed. The channel was Moderately entrenched and over grown, with a gradual gradient throughout the tributary. WP#097 N38.53513 W122.89959
11,800	0155.00	Large 30' tall boulder along right bank near top of the habitat unit.
11,853	0156.00	4' Plunge into downstream habitat unit
11,867	0157.00	2+ steelhead observed (likely to be a resident trout).
11,952	0159.00	Calibration WP#098 N38.53575 W122.89999
11,952	0159.00	21' into the habitat unit is left bank Tributary #008; it is dry. The survey crew checked 200' up, and Estimated the Slope to be 4-10%. It was not accessible to fish, and No fish were observed. The channel is Moderately entrenched, and has an inactive channel on left bank of Tributary. WP#098 N38.53575 W122.89999

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
12,126	0162.00	Plunge from The Habitat Unit to upstream habitat unit is 6' tall
12,562	0168.00	250' into the habitat unit is left bank Tributary #009; it is dry. The survey crew Checked 40' up, and found it not accessible to fish, with an Estimated Slope of >10%. No fish were observed. after the first 40', channel become clogged or pinched with large rootwad, and has a substrate of cobble and gravel. WP#099 N38.53580 W122.90269
12,935	0170.00	Ford Crossing through creek 530' into the habitat unit
13,553	0172.00	Cows have access to the creek
13,856	0174.00	Two 1+ Salmonids observed
14,204	0176.00	66' into the habitat unit is a trail on the left bank. WP#101 N38.53670 W122.90696
14,204	0176.00	At top of the habitat unit is left bank Tributary#010; it is dry. The survey crew checked 150' up, and found it accessible to fish for first 80', with an Estimated Slope of 2-4%. No fish were observed. The Gradient picks up after first 80' with boulders creating 4-6' plunges. 80' into Tributary, an old metal pipe spans the creek.
14,344	0177.00	Two 1+ steelhead observed
14,367	0178.00	WP#102 N38.53714 W122.90732
14,367	0178.00	120' into the habitat unit is left bank Tributary#011; it is dry. The survey crew checked 250' up, and found it not accessible to fish, with an Estimated Slope>20%. no fish observed because of the steep gradient from confluence upstream with sequence of large plunges between 4-6' tall. Past 250' up the tributary flow is diverted through culvert
15,320	0184.01	Cattle Trail on left bank
15,868	0191.00	At top of the habitat unit is left bank Tributary#012; it is dry. The survey crew checked 80' up, and found it not accessible to fish, with an Estimated Slope >5%. No fish were observed. The channel is very entrenched and over grown WP#105 N38.53886 W122.91090
16,391	0197.00	50' into the habitat unit is a Ford Crossing through creek
16,569	0198.00	(2+) steelhead observed (likely to be a resident trout) and one 1+ steelhead observed

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
16,844	0202.00	WP#036 N38.53977 W122.91335
16,844	0202.00	At top of The Habitat Unit is the confluence to Press Creek or left bank tributary#013; it is wet, contributing 10-20% flow to the receiving stream, and has 0.023 cfs. The survey crew checked up trib ~6000' (reference Press Creek Survey-2012), and found it is accessible to fish. The upstream temperature=53F, the downstream temperature=53F, and the temperature in the tributary=52F. Press creek has an Estimated Slope= 2-4%. fish were observed.
17,008	0204.00	One 1+ salmonid and 3 salmonid YOY observed
17,318	0209.00	Bridge#005- is located at Sweetwater Springs Road with a Length=51', a Height =10', and a Width=37', It is Made of concrete, with no gravel retention or downcutting, and has a natural creek channel bottom-no sill. WP#107 N38.53935 W122.91458
17,455	0212.00	Step-run is high gradient with lots of large boulders
17,808	0215.00	At bottom of the habitat unit is spring fed drainage about 20' upslope on the left bank.
17,991	0219.00	15' into the habitat unit is left bank Tributary#014; it is wet, with a 0.01-0.001 cfs, and is contributing <1% flow to the receiving stream. The survey crew checked 60' up, and found it is not accessible to fish. The Estimated Slope=2-4%. No fish were observed. 25' into tributary is a 6-8' plunge; after this the gradient levels out and becomes a moderately entrenched channel. WP#108 N38.53955 W122.91675
18,063	0220.00	2 salmonid YOY observed
18,168	0222.00	35' into the habitat unit is left bank tributary#015; it is dry. The survey crew checked 200' up, and found it was accessible to fish, with an Estimated Slope= 4-6%. no fish were obs. The channel is Entrenched with silt and sand substrate, and overgrown with vegetation. WP#109 N38.53942 W122.91743
18,306	0225.00	One salmonid YOY observed
18,367	0226.00	30' into the habitat unit is old car parts stabilizing the left bank
18,563	0230.00	2+ SH observed
18,677	0231.00	WP#111 N38.53883 W122.91935
18,677	0231.00	16' into the habitat unit is right bank Tributary#016; it



**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		is wet, and contributed 1-2% flow to the receiving stream, and 0.01 cfs. The survey crew checked 150' up, and found it not accessible to fish. The upstream temperature= 56F, the downstream temperature= 54F, and the temperature within the tributary= 52F. The Estimated slope= 2-4%, with no fish observed. At the confluence is a 5' plunge. 150' into tributary water is diverted into culvert
18,908	0232.00	Old car frame in LWD and SWD cluster in the habitat unit
19,104	0235.00	Western Toad observed at bottom of the habitat unit
19,305	0238.00	30' into the habitat unit is right bank Tributary#017; it is dry. The survey crew checked 200' up, and Estimated the Slope to be =2-6%. It was not accessible to fish, and No fish were observed. 150' into tributary, flow is divert through culvert under Sweetwater Springs road.
19,663	0245.00	110' into the habitat unit is 1' Diameter plastic baffle pipe coming out of right bank
19,663	0245.00	At top of the habitat unit is left bank Tributary#018; it is dry. The survey crew checked 200' up, and found it was not accessible to fish, with an Estimated Slope=2-6%. No fish were observed. 125' into trib is an old road crossing where culvert constricts creek. After this the gradient pick ups. WP#114 N38.54024 W122.92224
19,978	0246.00	1+ salmonid observed
20,057	0248.00	5 salmonid YOY observed
20,358	0253.00	30' into the habitat unit is a 1' Diameter plastic baffle pipe in the right bank. WP#116 N38.54057 W122.92369
20,358	0253.00	At top of the habitat unit is left bank Tributary#019; it is dry. The Survey crew checked 200' up, and found it was accessible to fish, with an Estimated Slope= 2-6%. No fish were observed. 125' into tributary is old road crossing where culvert diverts flow under road. Gradient picks up after this point.
20,595	0256.00	1+ steelhead observed
21,317	0265.00	Baffle Pipe on right bank at top of the habitat unit continues under road upslope
21,592	0269.00	Left bank side underneath bridge is filled with gravel,

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		with sill partially intact. WP#119 N38.54177 W122.92703 (WP taken at bottom of bridge).
21,592	0269.00	Bridge#006 is located at Sweetwater springs road and is a Length=40', a Height=10', and a Width=43'. It is made of concrete, and not retaining gravel. The right bank and left bank are armored with sac-crete. A large 1'wide concrete slab is supporting the middle beam of bridge, while water flows through right bank side. It is not a barrier to salmonids.
21,749	0272.00	55' into the habitat unit is a 1' diameter metal culvert on the left bank creating a 5' plunge to the channel below.
21,749	0272.00	1+ steelhead observed
22,079	0273.00	Redwood rootwad in middle of channel is retaining LWD, SWD, and gravel
22,177	0276.00	6' plunge created by bedrock sheet into confluence pool. after plunge, grade is 2%, and channel is very overgrown and dominate substrates of silt and gravel. WP#120 N38.54306 W122.92857
22,177	0276.00	At top of the habitat unit is right bank Tributary#020; it is wet, with 0.01-0.001 cfs, and contributed >1% flow to the receiving stream. The survey crew checked 80' up, and found it was accessible to fish, with an Estimated Slope=2-4%. the upstream temperature=51F, the downstream temperature=51F, and the temperature within the tributary=52F. No fish were observed.
22,390	0279.00	60' into the habitat unit is a small LDA
23,112	0288.00	Bridge #007 is located at Sweetwater Springs Road and has a Length=35', a Height= 7.5', and a Width=32'. It is made of concrete, has no gravel retention, no downcutting, and a partially intact sill in middle of channel. It is not a barrier to salmonids. WP#122 N38.54324 W122.93126
23,655	0296.00	Two 2+ steelhead observed and Salmonid YOY observed
23,759	0297.00	Rough skinned newt observed in left bank tributary #021. Tributary has well spaced series of 3-4' plunges, and an old unused 1" pvc pipe along left bank. WP#123 N38.54353 W122.93335
23,759	0297.00	At top of the habitat unit is the confluence to John Gordon Creek or left bank Tributary#021; it is wet,

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		with 0.1cfs, and contributes 5-10% flow to the receiving stream. The survey crew checked 175' up , and found it was not accessible to fish. The upstream temperature=49F, the downstream temperature=52F, and the temperature within the tributary=53F, with an Estimated Slope=1-2%. No fish were observed.
23,818	0298.00	Calibration WP#123 N38.54353 W122.93335
24,382	0303.00	WP#124 N38.54400 W122.93517
24,382	0303.00	Right bank Tributary#022 is wet, with 0.1cfs, and 2% contribution of flow to the receiving stream. The Survey Crew checked 100' up, and found it was not accessible to fish. The upstream temperature=51F, the downstream temperature=52F, and the temperature within the tributary = 52F. Tributary has an Estimated slope=2-4%. No fish were observed. Tributary has a 6' plunge at confluence, and 25' into tributary is 4'plunge into 50' long metal culvert.
24,529	0305.00	Left bank Tributary#023 is dry. The survey crew checked 75' up, and found it accessible to fish with an Estimated Slope <1%. No fish were observed. The channel is not very entrenched, and potentially inactive with Substrate of gravel and cobble WP#125 N38.54430 W122.93560
24,688	0307.00	Calibration WP#126 N38.54400 W122.93600 End of Access due to lack of u/s landowner permission.
24,688	0307.00	Bridge#008is located at Sweetwater Springs Road with a Length=20', a height=9', and a Width=50'. The bridge is Made of steel, has no gravel retention, no downcutting, and has a natural bottom with no sill. Bridge looks newly constructed and designates property boundary. WP#126 N38.54400 W122.93600
24,708	0308.00	No Access due to lack of permission by upstream landowners.
29,758	0309.00	Access begins again. Survey Continues WP#127 N38.54868 W122.95102
29,758	0309.00	6 salmonid YOY observed
29,971	0311.00	2 salmonid YOY observed
30,075	0314.00	WP#128 N38.54836 W122.95263
30,075	0314.00	At top of the habitat unit is 1' diameter baffle pipe creating outlet for right bank Tributary#024; it is dry. The survey crew checked 125' up, and found it was

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		not accessible to fish, with an Estimated Slope >10%. No fish were observed. The baffle culvert diverting the tributary has created 8' plunge at outlet. Pipe is severely degraded
30,274	0315.00	Small landslide on right bank at top of the habitat unit has taken away some of Sweetwater Springs Road ~20' x 4' x 45'
30,307	0316.00	Landslide continues into bottom of the habitat unit
30,307	0316.00	At top of the habitat unit 1+ salmonid observed
30,495	0319.00	2+ salmonid observed
30,533	0320.00	First 75' is low gradient through 3' diameter baffle culvert, upstream of this is a plunge and steep slope from second culvert which is 3.5' diameter diverting flow through driveway. WP#129 N38.54836 W122.95324 100' into the habitat unit is a 1' diameter baffle culvert on right bank
30,533	0320.00	At top of the habitat unit is right bank Tributary#025/ Mt. Jackson creek (located 38' upstream of WP). The Tributary is wet, with 1-2 cfs, and 5-10% contribution of flow to the receiving stream. The survey crew checked 125' up, and found it was accessible to fish in high flows with an Estimated Slope=2-6%. The upstream temperature=49F, the downstream temperature=49F, and the temperature within the tributary=50F, No fish were observed.
30,746	0322.00	55' into the habitat unit begins private driveway on right bank and continues into the upstream unit
30,941	0325.00	Private driveway continues along right bank which is armored with rip-rap throughout entire habitat unit
30,968	0326.00	119' into the habitat unit is left bank Tributary#026; it is Dry, with 0% contribution, and 0 cfs., the survey crew checked 200' up, and found the first 75' accessible to fish, with an Estimated Slope= 6-10%. No fish were observed. after first 75' a series of 3-4' plunges creates steeper gradient WP#130 N38.54977 W122.95404
30,968	0326.00	5 salmonid YOY observed
31,115	0327.00	5 YOY, one 2+, and two 1+ salmonids observed
31,137	0328.00	Culvert has cracks in the middle causing flow to spill out upstream of outlets; it is a possible barrier. fish were observed above, (pics#178-179). sac-crete

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
		stabilizing right and left bank on upstream and downstream end. Calibration WP#131 N38.54974 W122.95416
31,137	0328.00	Culvert#001 has Two 3' Diameter concrete culverts diverting creek under ford crossing created as Private driveway. They are made of concrete, with a Height=3', a Width=4.5', a Length=20', and a Diameter=3' x 4.5' (due to oblong shaped). The culverts are creating a plunge height=1.5', which is associated with a max depth at outlet= 2.8'. Slope of culverts is <1%
31,499	0334.00	More detailed information about left bank tributary#027/ Osborne Creek can be found in Osborne Creek Survey 2012.
31,499	0334.00	50' into the habitat unit is the confluence of Osborne Creek or left bank Tributary#027; it is wet, with 5-10% flow contribution to the receiving stream, and 1-2 cfs. The survey crew checked 200' up, and found it was accessible to fish, with an Estimated Slope= 1-4%. The upstream temperature=53F, the downstream temperature=52F, and the temperature within the tributary =51F. No fish were observed., and after the first 100' channel becomes overgrown
31,827	0337.00	The habitat unit Gradient= 4-10%
31,987	0342.00	90' into the habitat unit is right bank tributary#028; is is dry. The survey crew checked 50' up, and found it was accessible to fish, with an Estimated Slope=4-10%. No fish were observed. Channel is very steep with series of 4' plunges, and is entrenched and overgrown. WP#134 N38.55028 W122.95643
32,145	0343.00	Tributary is composed of one dry downstream tributary and one wet upstream tributary where they converge at Porter in a high gradient habitat unit. LDA sits at top of the habitat unit above large 20' cascade. WP#135 N38.55014 W122.95668
32,145	0343.00	10' into the habitat unit is right bank tributary#029; it is wet, with 1% flow contribution to the receiving stream, and 0.2 cfs. the survey crew checked 200' up, and found it was accessible to fish, with an Estimated slope= 4-10%., The upstream temperature=52F, the downstream temperature=51F, and the temperature within the tributary=51F. No fish were observed.

**Porter Creek**

<b>Position</b>	<b>Habitat Unit #</b>	<b>Memo</b>
32,145	0343.00	LDA#001 is a Potential barrier for salmonids due to the series of short plunges and a 25' drop. The LDA has a Length=13', a Height=7', and a Width=25', with 6 pieces. The water flows through, but there are no visible gaps, and it is retaining gravel (~ 25' x 7' x 20') Salmonids seen above.
32,230	0345.00	5' plunge into the habitat unit
32,295	0348.00	138' into the habitat unit is right bank tributary#030; it is dry. The survey crew checked 80' up, yet no fish observed, and it was found to not be accessible to fish due to very steep channel which had series of plunges created by boulders and bedrock. Channel is very overgrown. Calibration WP#136 N38.55051 W122.95740 taken 27' downstream.
32,543	0351.00	3' plunge into the habitat unit from the upstream habitat unit.
32,560	0352.00	Potential barrier created from series of 2-3' plunges throughout the entire habitat unit
32,750	0355.00	Channel is completely filled in with rock and boulder from rockslide from bedrock outcrop on the left bank.
33,446	0367.00	3' plunge into the habitat unit downstream
33,735	0374.00	Small LDA at top of the habitat un it has 2-3 pieces.
34,025	0380.00	16' into the habitat unit is old ford crossing from private road. There is an old unused culvert up on the left bank
34,061	0381.00	First 40' of Tributary is bedrock sheet creating 3-4' plunge, then channels gets bouldery with intermittent pools, and is a moderately entrenched channel WP#140 N38.55294 W122.96067
34,061	0381.00	At top of The Habitat Unit is right bank tributary#31; it is wet, with a 1% flow contribution to the receiving stream, and 0.01-0.02 cfs. The survey crew checked 100' up, and found it was accessible to adult salmonids with an Estimated slope= 4-6%. The upstream temperature=47F, the downstream temperature=49F, and the temperature within the tributary=48F. No fish were observed.
34,255	0384.00	WP#141 N38.55324 W122.96101
34,255	0384.00	At top of the habitat unit is left bank tributary#32; it is dry. The survey crew checked 120' up, and found it was not accessible to fish, with an Estimated

## Porter Creek

Position	Habitat Unit #	Memo
		Slope=4-6%. No fish were observed. The first 40' diverted under old 1' diameter baffle pipe under old road. Channel looks inactive and very overgrown.
34,401	0387.00	At top of the habitat unit is a right bank drainage that is extremely steep (>10%) with bedrock substrate
34,572	0390.00	37' into the habitat unit is an old road crossing
34,645	0391.00	Extremely eroded slope on left bank ~15' x 20'
34,790	0394.00	WP#143 N38.55398 W122.96189
34,790	0394.00	53' into the habitat unit is left bank tributary#33; it is wet with intermitent pools, and contributes 0% of the flow downstream, with 0 cfs. The survey crew checked 140' up, and found it was not accessible to fish, with an Estimated slope >10%. No fish were observed. There was a series of step-pools with 3'-6' plunges, and the channel is very entrenched with boulder and cobble substrate.
34,790	0394.00	sculpin observed
34,908	0395.00	Unidentified fish observed
34,925	0396.00	Left bank drainage at top of the habitat unit is not accessible to fish
34,925	0396.00	25' into the habitat unit is right bank tributary#34; it is dry. The survey crew checked 200' up, and found it was, not accessible to fish, with an Estimated Slope=2-10%. No fish were observed. There is a 5-6' plunge at confluence, and after this, the first 150' are 2-4% gradient and then picks up at 4-10%. WP#144 N38.55404 W122.96222
34,985	0397.00	Right bank is very eroded and bare.
35,012	0399.00	100' into the habitat unit is a large boulder about 10-12' tall. 175' into the habitat unit are more large boulders blocking flow causing water to go subsurface
35,232	0400.00	4.5' plunge at top of The Habitat Unit
35,232	0400.00	1 salmonid YOY observed
35,257	0402.00	3' plunging steps created by wood
35,363	0404.00	1' plunge at top of the habitat unit
35,382	0405.00	35' into the habitat unit is a spring on the left bank
35,531	0407.00	Old road crossing at top of the habitat unit
35,589	0408.00	3' Plunge created from old ford crossing

## Porter Creek

Position	Habitat Unit #	Memo
35,589	0408.00	Right bank Tributary#35 is dry. The survey crew checked 150' up, and found it was not accessible to fish, with an Estimated Slope >10%. No fish were observed. The first 50' has scoured out old ford crossing, and after this gradient picks up (>10%) with series of 6' plunges. Calibration WP#146 N38.55610 W122.96317
35,601	0409.00	Channel filled with cobble and gravel to create ford crossing.
35,741	0415.00	2' plunge at top of the habitat unit
35,794	0418.00	At top of The Habitat Unit is right bank Tributary#36; it is wet, with 40% contribution flow to the receiving stream, and 1-2 cfs. The survey crew checked 125' up, and found it was not accessible to fish, with an estimated Slope >10%. The upstream temperature=50F, the downstream temperature=51F, and the temperature within the tributary=50F. No fish were observed. Channel starts with a series of 3-7' plunges, with bedrock and boulder substrate.
35,815	0418.00	End of Survey due to lack of landowner permission upstream. WP#147 N38.55605 W122.96320

## REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

McCain, M., D. Fuller, L. Decker and K. Overton. 1990. Stream habitat classification and inventory procedures for northern California. FHC Currents. No.1. U.S. Department of Agriculture. Forest Service, Pacific Southwest Region.

Rosgen, D.L., 1994. A Classification of Natural Rivers. *Catena*, Vol 22: 169-199, Elsevier Science, B. V. Amsterdam.



## Porter Creek

### LEVEL III and LEVEL IV HABITAT TYPES

#### RIFFLE

Low Gradient Riffle	(LGR)	[1.1]	{ 1 }
High Gradient Riffle	(HGR)	[1.2]	{ 2 }

#### CASCADE

Cascade	(CAS)	[2.1]	{ 3 }
Bedrock Sheet	(BRS)	[2.2]	{24}

#### FLATWATER

Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

#### MAIN CHANNEL POOLS

Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}

#### SCOUR POOLS

Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

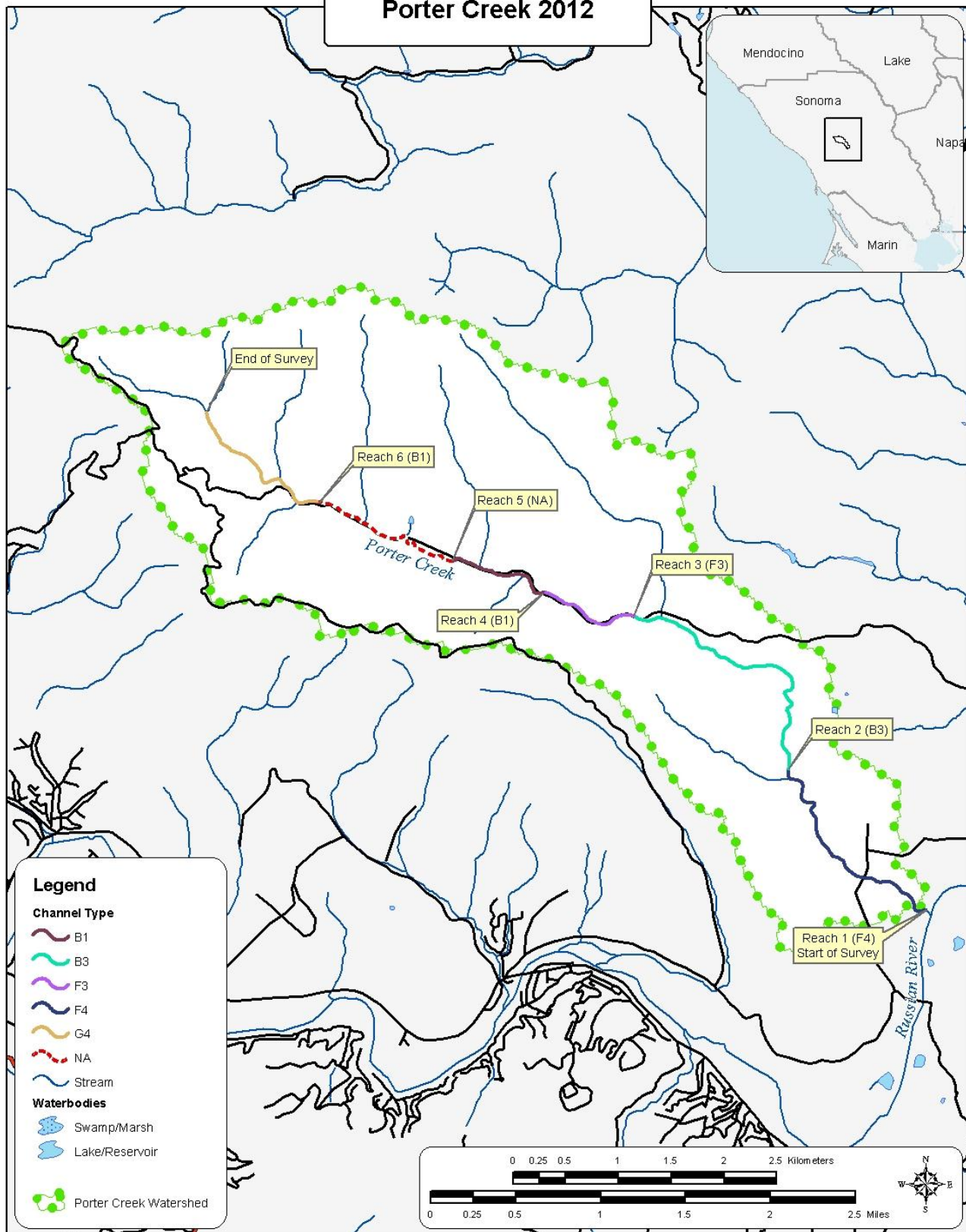
#### BACKWATER POOLS

Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}

#### ADDITIONAL UNIT DESIGNATIONS

Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to marsh	(MAR)	[9.1]	

# Porter Creek 2012



**Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types**

**Stream Name:** Porter Creek

**LLID:** 1228816385151

**Drainage:** Russian River - Lower

**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE

**Legal Description:** T08NR09WS29

**Latitude:** 38:30:54.0N

**Longitude:** 122:52:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
7	0	CULVERT	1.7	32	223	0.6									
4	0	DRY	1.0	221	885	2.5									
134	37	FLATWATER	31.9	116	15600	43.3	8.6	0.5	1.0	818	109576	475	63705		6
1	0	NOSURVEY	0.2	5050	5050	14.0									
189	189	POOL	45.0	52	9800	27.2	10.5	1.0	2.1	530	100164	658	124375	565	17
85	23	RIFFLE	20.2	52	4453	12.4	12.1	0.3	0.7	568	48279	253	21530		7
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>						<b>Total Area (sq.ft.)</b>		<b>Total Volume (cu.ft.)</b>		
420	249				36011						258019		209610		

**Table 2 - Summary of Habitat Types and Measured Parameters**

**Stream Name:** Porter Creek

**LLID:** 1228816385151

**Drainage:** Russian River - Lower

**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE

**Legal Description:** T08NR09WS29

**Latitude:** 38:30:54.0N

**Longitude:** 122:52:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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	Mean Canopy (%)
54	11	LGR	12.9	48	2566	7.1	11.0	0.2	0.8	445	24034	99	5324		5	86
16	4	HGR	3.8	76	1213	3.4	15.0	0.5	1.1	1292	20666	806	12892		9	87
11	4	CAS	2.6	53	583	1.6	19.0	0.6	1.5	639	7030	330	3632		15	90
4	4	BRS	1.0	23	91	0.3	5.0	0.3	1.1	111	445	49	197		4	88
17	7	GLD	4.0	71	1213	3.4	11.0	0.6	1.6	757	12877	521	8853		7	88
17	10	RUN	4.0	73	1237	3.4	10.0	0.6	1.4	684	11620	493	8374		5	86
100	20	SRN	23.8	132	13150	36.5	7.0	0.4	1.5	906	90593	451	45095		7	85
3	3	TRP	0.7	59	176	0.5	6.0	1.1	2.2	362	1087	482	1447	424	8	74
130	130	MCP	31.0	54	7058	19.6	10.0	1.0	3.7	568	73834	705	91670	607	14	86
2	2	CCP	0.5	30	59	0.2	11.0	0.6	1.9	314	627	240	481	188	5	93
12	12	STP	2.9	71	855	2.4	12.0	0.7	2.8	490	5876	401	4810	335	22	87
5	5	CRP	1.2	65	327	0.9	10.0	0.8	2.7	657	3287	811	4053	654	6	85
3	3	LSL	0.7	66	198	0.5	9.0	1.1	3.1	589	1766	709	2128	650	17	88
8	8	LSR	1.9	53	427	1.2	10.0	0.9	3.2	539	4311	593	4746	472	26	93
4	4	LSBk	1.0	47	187	0.5	13.0	1.4	3.9	639	2555	1069	4277	979	14	89
4	4	LSBo	1.0	32	129	0.4	21.0	1.2	3.0	624	2496	971	3883	846	15	84
14	14	PLP	3.3	19	264	0.7	10.0	1.3	4.2	239	3341	395	5536	338	40	87
4	4	DPL	1.0	30	120	0.3	8.0	1.2	2.8	246	984	336	1344	286	23	87
4	0	DRY	1.0	221	885	2.5										76
7	0	CUL	1.7	32	223	0.6										93
1	0	NS	0.2	5050	5050	14.0										
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>						<b>Total Area (sq.ft.)</b>		<b>Total Volume</b>			
420	249				36011						267429		208742(cu.ft.)			

**Table 3 - Summary of Pool Habitat Types**

**Stream Name:** Porter Creek

**LLID:** 1228816385151

**Drainage:** Russian River - Lower

**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE

**Legal Description:** T08NR09WS29

**Latitude:** 38:30:54.0N

**Longitude:** 122:52:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol (cu.ft.)	Mean Shelter Rating
147	147	MAIN	78	55	8148	83	10.3	0.9	554	81424	575	84536	15
38	38	SCOUR	20	40	1532	16	11.5	1.1	467	17755	554	21036	26
4	4	BACKWATER	2	30	120	1	8.0	1.2	246	984	286	1146	23
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>		<b>Total Volume (cu.ft.)</b>	
189	189				9800					100164		106717	

**Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types**

**Stream Name:** Porter Creek **LLID:** 1228816385151 **Drainage:** Russian River - Lower  
**Survey:** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE **Legal Description:** T08NR09WS29 **Latitude:** 38:30:54.0N **Longitude:** 122:52:54.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
3	TRP	2	0	0	2	67	1	33	0	0	0	0
130	MCP	69	2	2	66	51	46	35	16	12	0	0
2	CCP	1	0	0	2	100	0	0	0	0	0	0
12	STP	6	0	0	5	42	7	58	0	0	0	0
5	CRP	3	0	0	3	60	2	40	0	0	0	0
3	LSL	2	0	0	1	33	1	33	1	33	0	0
8	LSR	4	0	0	2	25	4	50	2	25	0	0
4	LSBk	2	0	0	1	25	0	0	3	75	0	0
4	LSBo	2	0	0	2	50	1	25	1	25	0	0
14	PLP	7	0	0	8	57	4	29	1	7	1	7
4	DPL	2	0	0	1	25	3	75	0	0	0	0
Total Units			Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Feet Max Resid. Depth	Total 1 < 2 Feet % Occurrence	Total 2 < 3 Feet Max Resid. Depth	Total 2 < 3 Feet % Occurrence	Total 3 < 4 Feet Max Resid. Depth	Total 3 < 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
189			2	1	93	49	69	37	24	13	1	1

Mean Maximum Residual Pool Depth (ft.): 2

### Table 5 - Summary of Mean Percent Cover By Habitat Type

**Stream Name:** Porter Creek      **Dry Units:** 4      **LLID:** 1228816385151      **Drainage:** Russian River - Lower  
**Survey Dates:** 6/11/2012 to 7/5/2012  
**Confluence Location: Quad:** GUERNEVILLE      **Legal Description:** T08NR09WS29      **Latitude:** 38:30:54.0N      **Longitude:** 122:52:54.0W

Habitat Units Measured	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
54	11	LGR	6	0	0	5	31	0	0	13	0
16	4	HGR	13	0	0	13	0	0	3	73	0
11	4	CAS	0	0	0	0	0	0	13	80	8
4	4	BRS	0	0	0	0	30	0	0	10	10
85	23	TOTAL RIFFLE	5	0	0	4	20	0	3	34	3
17	7	GLD	14	0	0	29	31	11	0	14	0
17	10	RUN	4	5	8	4	28	0	7	24	0
100	20	SRN	6	12	10	7	26	2	0	35	2
134	37	TOTAL FLAT	7	8	8	10	28	3	2	28	1
3	3	TRP	0	17	0	0	7	0	0	17	60
130	130	MCP	19	13	4	16	8	2	1	28	5
2	2	CCP	0	0	0	0	0	0	0	100	0
12	12	STP	21	8	5	17	0	0	8	33	9
5	5	CRP	10	4	0	10	16	0	4	36	0
3	3	LSL	0	17	37	7	0	0	0	7	0
8	8	LSR	41	7	8	43	2	0	0	0	0
4	4	LSBk	10	5	13	20	0	0	0	13	40
4	4	LSBo	14	10	0	14	0	0	0	58	5
14	14	PLP	9	2	2	9	0	0	12	59	6
4	4	DPL	31	0	0	31	0	0	0	38	0
189	189	TOTAL POOL	18	11	5	17	6	1	2	30	7
7	0	CUL									
1	0	NS									
420	249	TOTAL	16	9	5	15	11	1	2	30	5

**Table 6 - Summary of Dominant Substrates By Habitat Type**

**Stream Name:** Porter Creek      **Dry Units:** 4      **LLID:** 1228816385151      **Drainage:** Russian River - Lower  
**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE      **Legal Description:** T08NR09WS29      **Latitude:** 38:30:54.0N      **Longitude:** 122:52:54.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
54	11	LGR	0	0	73	9	9	0	9
16	4	HGR	0	0	0	25	50	0	25
11	4	CAS	0	0	0	0	0	75	25
4	4	BRS	0	0	0	0	0	0	100
17	7	GLD	0	14	86	0	0	0	0
17	10	RUN	0	10	90	0	0	0	0
100	20	SRN	0	5	85	5	0	0	5
3	3	TRP	0	0	67	0	0	0	33
130	130	MCP	0	16	72	5	3	0	4
2	2	CCP	0	0	50	0	0	0	50
12	12	STP	0	8	67	17	0	0	8
5	5	CRP	0	0	100	0	0	0	0
3	3	LSL	0	67	33	0	0	0	0
8	8	LSR	0	25	75	0	0	0	0
4	4	LSBk	0	50	25	0	0	0	25
4	4	LSBo	0	50	50	0	0	0	0
14	14	PLP	0	21	29	14	14	21	0
4	4	DPL	0	25	50	0	0	0	25
7	1	CUL	0	0	100	0	0	0	0
1	0	NS	0	0	0	0	0	0	0



### Table 7 - Summary of Mean Percent Canopy for Entire Stream

**Stream Name:** Porter Creek

**LLID:** 1228816385151

**Drainage:** Russian River - Lower

**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE

**Legal Description:** T08NR09WS29

**Latitude:** 38:30:54.0N

**Longitude:** 122:52:54.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
86	8	92	0	90	88

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

**Table 8 - Fish Habitat Inventory Data Summary**

Stream Porter Creek LLID: 1228816385151 Drainage Russian River - Lower  
 Survey Dates: 6/11/2012 to 7/5/2012 Survey Length (ft.): 36011 Main Channel (ft.): 35815 Side Channel (ft.): 196  
 Confluence Location: Quad GUERNEVILLE Legal Description: T08NR09WS29 Latitude: 38:30:54.0N Longitude: 122:52:54.0W

**Summary of Fish Habitat Elements By Stream Reach**

**STREAM REACH: 1**

Channel Type: F4	Canopy Density (%): 85.6	Pools by Stream Length	44.7
Reach Length (ft.): 7634	Coniferous Component (%): 2.1	Pool Frequency (%):	50.6
Riffle/Flatwater Mean Width (ft.): 8.2	Hardwood Component	Residual Pool Depth (%):	
BFW:	Dominant Bank	Hardwood Trees	< 2 Feet Deep: 27.3
Range (ft.): 15.00 to 32.00	Vegetative Cover (%): 90.2		2 to 2.9 Feet Deep: 52.3
Mean (ft.): 22.37	Dominant	Root masses	3 to 3.9 Feet Deep: 20.5
Std. Dev.: 5.82	Dominant Bank Substrate	Sand/Silt/Clay	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0.262	Occurrence of LWD (%): 14.1	Mean Max Residual Pool Depth	2.36
Water (F): 56 - 59 Air (F): 67 - 80	LWD per 100 ft.:	Mean Pool Shelter	19
Dry Channel (ft.): 762	Riffles: 0		
	Pools: 1		
	Flat: 1		

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 2.3 Gravel: 88.6 Sm Cobble: 4.5 Lg Cobble: 0.0 Boulder 2.3 Bedrock: 2.3  
 Embeddedness Values (%): 1. 65.9 2. 29.5 3. 2.3 4. 2.3 5. 0.0

**STREAM REACH: 2**

Channel Type: B3	Canopy Density (%): 81.3	Pools by Stream Length	28.3
Reach Length (ft.): 10124	Coniferous Component (%): 1.2	Pool Frequency (%):	45.3
Riffle/Flatwater Mean Width (ft.): 13.4	Hardwood Component	Residual Pool Depth (%):	
BFW:	Dominant Bank	Hardwood Trees	< 2 Feet Deep: 37.9
Range (ft.): 15.00 to 33.00	Vegetative Cover (%): 90.9		2 to 2.9 Feet Deep: 43.1
Mean (ft.): 22.38	Dominant	Boulders	3 to 3.9 Feet Deep: 17.2
Std. Dev.: 4.80	Dominant Bank Substrate	Cobble/Gravel	>= 4 Feet Deep: 1.7
Base Flow (cfs): 0.262	Occurrence of LWD (%): 1.1	Mean Max Residual Pool Depth	2.32
Water (F): 53 - 70 Air (F): 63 - 92	LWD per 100 ft.:	Mean Pool Shelter	17
Dry Channel (ft.): 0	Riffles: 0		
	Pools: 1		
	Flat: 0		

Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 67.2 Sm Cobble: 8.6 Lg Cobble: 5.2 Boulder 15.5 Bedrock: 3.4  
 Embeddedness Values (%): 1. 51.7 2. 32.8 3. 12.1 4. 3.4 5. 0.0

# Porter Creek

## Summary of Fish Habitat Elements By Stream Reach

### STREAM REACH: 3

Channel Type: F3	Canopy Density (%): 92.3	Pools by Stream Length: 40.7
Reach Length (ft.): 3348	Coniferous Component (%): 32.3	Pool Frequency (%): 46.8
Riffle/Flatwater Mean Width (ft.): 9.3	Hardwood Component: 67.7	Residual Pool Depth (%):
BFW:	Dominant Bank: Hardwood Trees	< 2 Feet Deep: 45.5
Range (ft.): 9.00 to 20.00	Vegetative Cover (%): 90.2	2 to 2.9 Feet Deep: 31.8
Mean (ft.): 18.47	Dominant: Undercut Banks	3 to 3.9 Feet Deep: 22.7
Std. Dev.: 2.17	Dominant Bank Substrate: Sand/Silt/Clay	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0.262	Occurrence of LWD (%): 4.8	Mean Max Residual Pool Depth: 2.23
Water (F): 51 - 58    Air (F): 49 - 72	LWD per 100 ft.:	Mean Pool Shelter: 18
Dry Channel (ft.): 0	Riffles: 0	
	Pools: 1	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0.0    Sand: 4.5    Gravel: 77.3    Sm Cobble: 13.6    Lg Cobble: 4.5    Boulder: 0.0    Bedrock: 0.0		
Embeddedness Values (%): 1. 86.4    2. 13.6    3. 0.0    4. 0.0    5. 0.0		

### STREAM REACH: 4

Channel Type: B1	Canopy Density (%): 88.5	Pools by Stream Length: 23.2
Reach Length (ft.): 3602	Coniferous Component (%): 2.4	Pool Frequency (%): 40.4
Riffle/Flatwater Mean Width (ft.): 6.7	Hardwood Component: 97.6	Residual Pool Depth (%):
BFW:	Dominant Bank: Hardwood Trees	< 2 Feet Deep: 63.2
Range (ft.): 9.00 to 18.00	Vegetative Cover (%): 94.0	2 to 2.9 Feet Deep: 36.8
Mean (ft.): 11.57	Dominant: Root masses	3 to 3.9 Feet Deep: 0.0
Std. Dev.: 3.19	Dominant Bank Substrate: Bedrock	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0.262	Occurrence of LWD (%): 2.8	Mean Max Residual Pool Depth: 1.78
Water (F): 49 - 52    Air (F): 49 - 56	LWD per 100 ft.:	Mean Pool Shelter: 17
Dry Channel (ft.): 0	Riffles: 0	
	Pools: 1	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0.0    Sand: 5.3    Gravel: 52.6    Sm Cobble: 5.3    Lg Cobble: 5.3    Boulder: 0.0    Bedrock: 31.6		
Embeddedness Values (%): 1. 26.3    2. 36.8    3. 5.3    4. 31.6    5. 0.0		

# Porter Creek

## Summary of Fish Habitat Elements By Stream Reach

### STREAM REACH: 5

Channel Type: NA	Canopy Density (%):	Pools by Stream Length	0.0
Reach Length (ft.): 5050	Coniferous Component (%):	Pool Frequency (%):	0.0
Riffle/Flatwater Mean Width (ft.):	Hardwood Component	Residual Pool Depth (%):	
BFW:	Dominant Bank	< 2 Feet Deep:	
Range (ft.): 18.00 to 18.00	Vegetative Cover (%): 0.0	2 to 2.9 Feet Deep:	
Mean (ft.): 18.00	Dominant	3 to 3.9 Feet Deep:	
Std. Dev.: 0.00	Dominant Bank Substrate	>= 4 Feet Deep:	
Base Flow (cfs): 0.262	Occurrence of LWD (%):	Mean Max Residual Pool Depth	
Water (F): 49 - 49 Air (F): 54 - 54	LWD per 100 ft.:	Mean Pool Shelter	
Dry Channel (ft.): 0	Riffles:		
	Pools:		
	Flat:		
Pool Tail Substrate (%): Silt/Clay: Sand: Gravel: Sm Cobble: Lg Cobble: Boulder Bedrock:			
Embeddedness Values (%): 1. 2. 3. 4. 5. 0.0			

### STREAM REACH: 6

Channel Type: G4	Canopy Density (%): 88.7	Pools by Stream Length	21.0
Reach Length (ft.): 6057	Coniferous Component (%): 14.4	Pool Frequency (%):	41.8
Riffle/Flatwater Mean Width (ft.): 8.6	Hardwood Component 85.6	Residual Pool Depth (%):	
BFW:	Dominant Bank Hardwood Trees	< 2 Feet Deep:	84.8
Range (ft.): 8.00 to 21.00	Vegetative Cover (%): 82.4	2 to 2.9 Feet Deep:	15.2
Mean (ft.): 12.00	Dominant Boulders	3 to 3.9 Feet Deep:	0.0
Std. Dev.: 3.46	Dominant Bank Substrate Cobble/Gravel	>= 4 Feet Deep:	0.0
Base Flow (cfs): 0.262	Occurrence of LWD (%): 1.9	Mean Max Residual Pool Depth	1.52
Water (F): 48 - 56 Air (F): 54 - 78	LWD per 100 ft.:	Mean Pool Shelter	15
Dry Channel (ft.): 123	Riffles: 1		
	Pools: 1		
	Flat: 1		
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 82.6 Sm Cobble: 10.9 Lg Cobble: 6.5 Boulder 0.0 Bedrock: 0.0			
Embeddedness Values (%): 1. 50.0 2. 43.5 3. 6.5 4. 0.0 5. 0.0			

**Table 9 -Mean Percentage of Dominant Substrate and Vegetation**

**Stream Name:** Porter Creek **LLID:** 1228816385151 **Drainage:** Russian River - Lower  
**Survey** 6/11/2012 to 7/5/2012  
**Confluence Location: Quad:** GUERNEVILLE **Legal Description:** T08NR09WS29 **Latitude:** 38:30:54.0N **Longitude:** 122:52:54.0W

**Mean Percentage of Dominant Stream Bank Substrate**

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	40	63	20.6
Boulder	45	32	15.4
Cobble/Gravel	74	73	29.4
Sand/Silt/Clay	91	82	34.6

**Mean Percentage of Dominant Stream Bank Vegetation**

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	2	5	1.4
Brush	38	36	14.8
Hardwood	189	192	76.2
Coniferous	20	15	7.0
No Vegetation	1	2	0.6

**Total Stream Cobble Embeddedness Values:** 2

### Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

**Stream Name:** Porter Creek

**LLID:** 1228816385151

**Drainage:** Russian River - Lower

**Survey** 6/11/2012 to 7/5/2012

**Confluence Location: Quad:** GUERNEVILLE

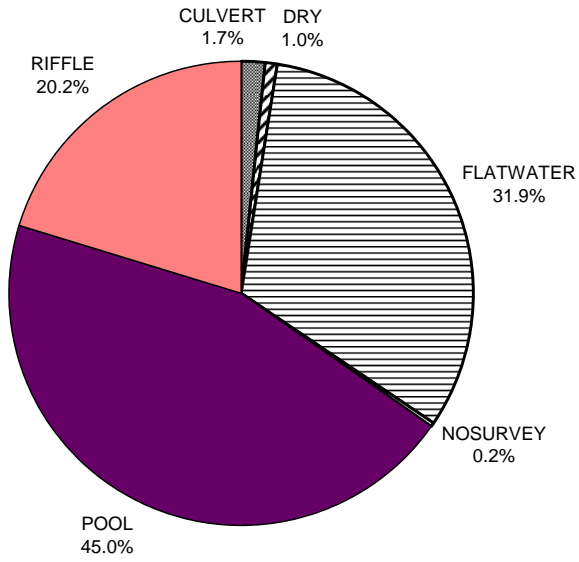
**Legal Description:** T08NR09WS29

**Latitude:** 38:30:54.0N

**Longitude:** 122:52:54.0W

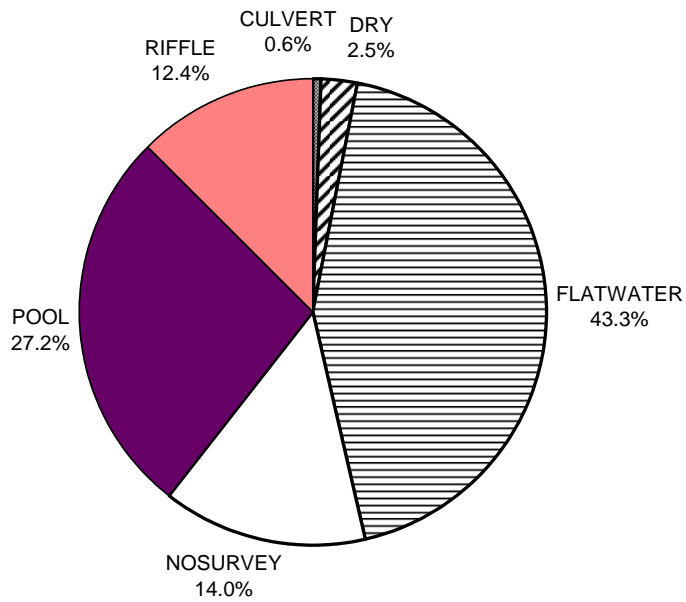
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	5	7	18
SMALL WOODY DEBRIS (%)	0	8	11
LARGE WOODY DEBRIS (%)	0	8	5
ROOT MASS (%)	4	10	17
TERRESTRIAL VEGETATION	20	28	6
AQUATIC VEGETATION (%)	0	3	1
WHITEWATER (%)	3	2	2
BOULDERS (%)	34	28	30
BEDROCK LEDGES (%)	3	1	7

**PORTER CREEK 2012  
HABITAT TYPES BY PERCENT OCCURRENCE**



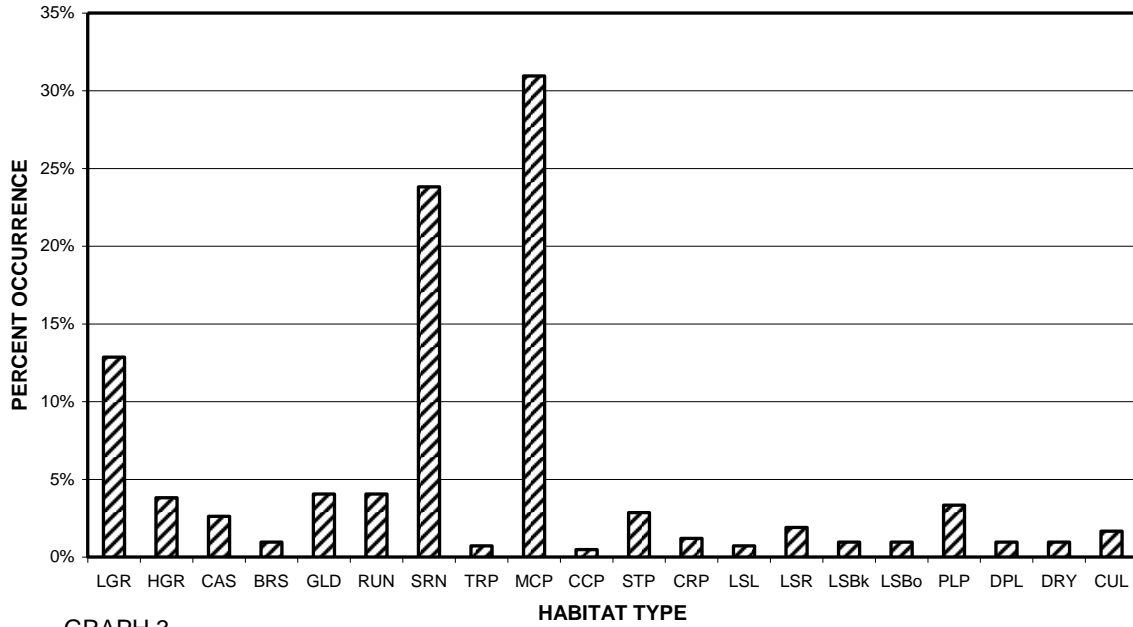
GRAPH 1

**PORTER CREEK 2012  
HABITAT TYPES BY PERCENT TOTAL LENGTH**



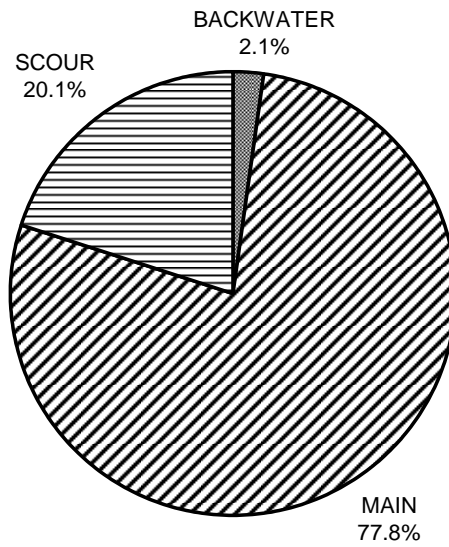
GRAPH 2

**PORTER CREEK 2012  
HABITAT TYPES BY PERCENT OCCURRENCE**



GRAPH 3

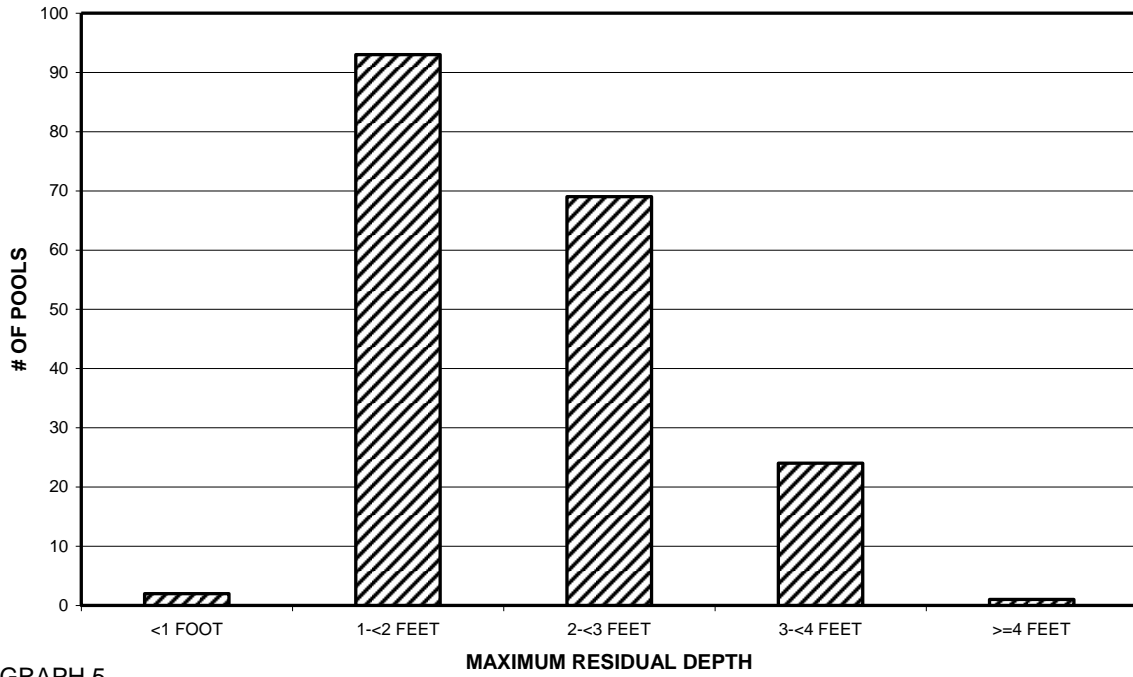
**PORTER CREEK 2012  
POOL TYPES BY PERCENT OCCURRENCE**



GRAPH 4

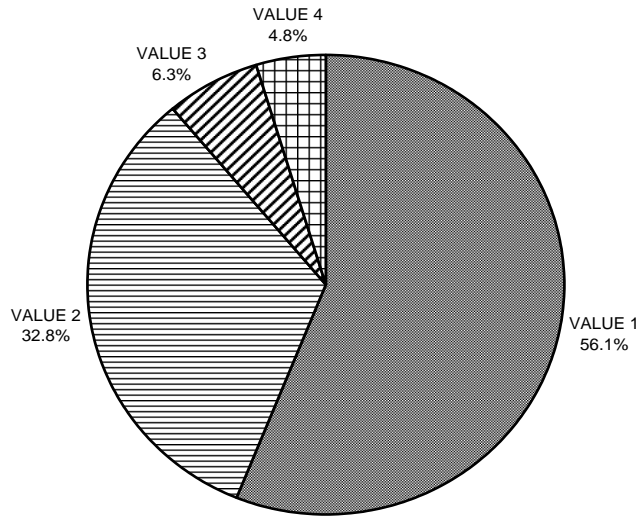


**PORTER CREEK 2012  
MAXIMUM DEPTH IN POOLS**



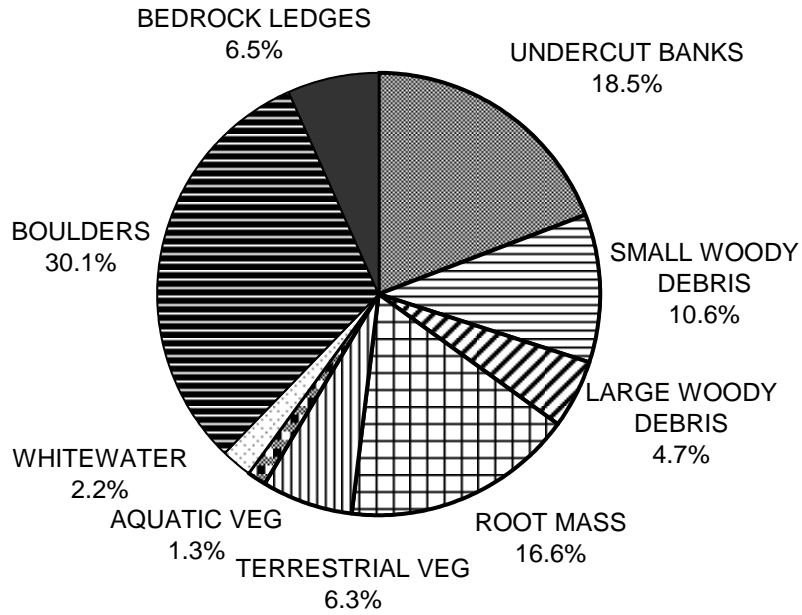
GRAPH 5

**PORTER CREEK 2012  
PERCENT EMBEDDEDNESS**



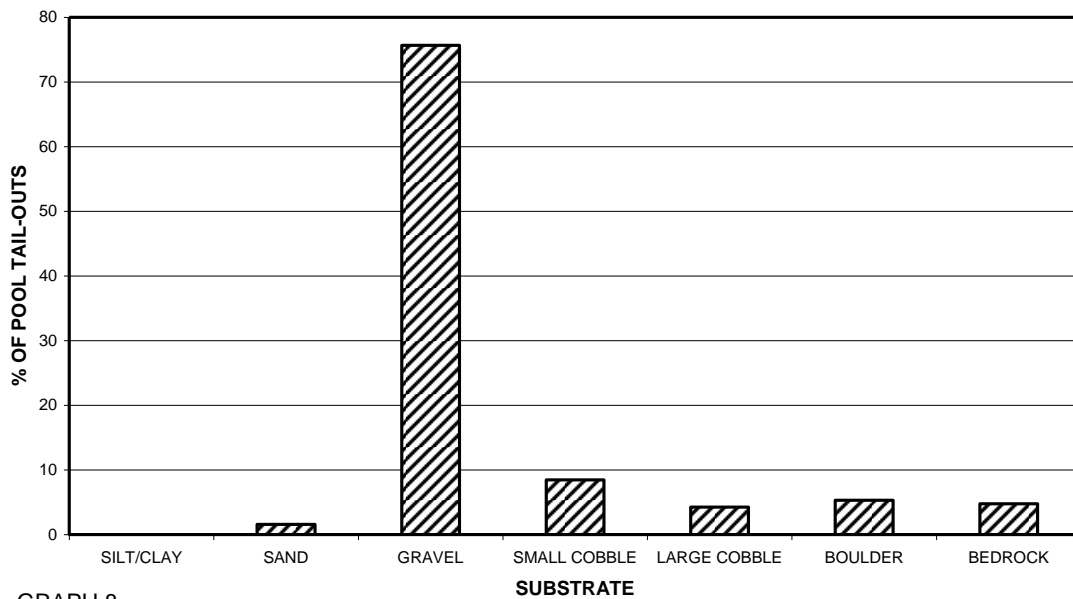
GRAPH 6

## PORTER CREEK 2012 MEAN PERCENT COVER TYPES IN POOLS



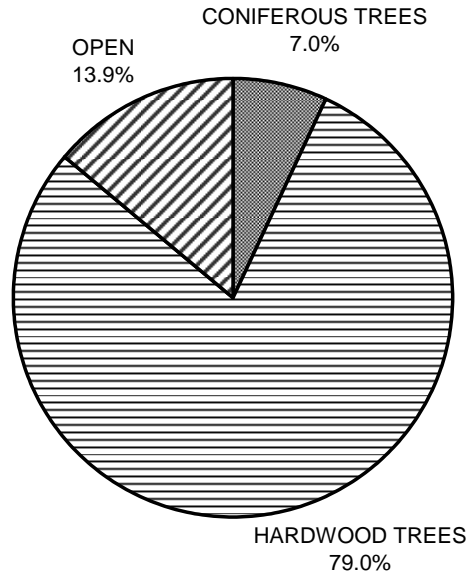
GRAPH 7

## PORTER CREEK 2012 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



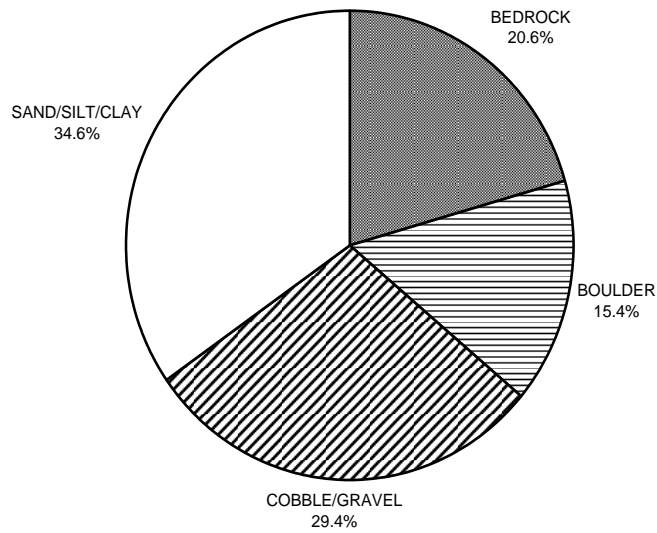
GRAPH 8

**PORTER CREEK 2012  
MEAN PERCENT CANOPY**



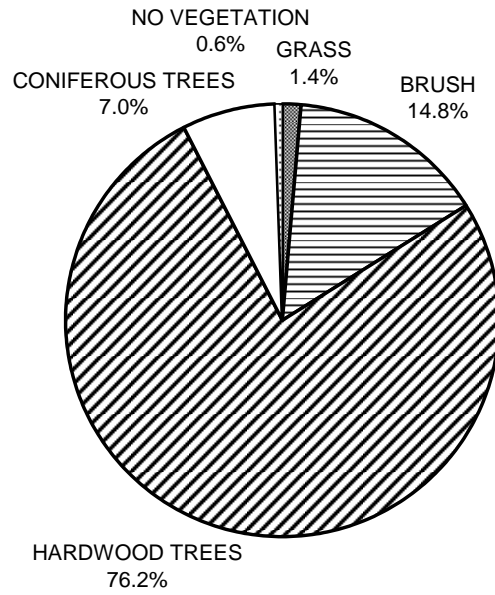
GRAPH 9

**PORTER CREEK 2012  
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**PORTER CREEK 2012  
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11