

# **STREAM INVENTORY REPORT**

## **Salmon Creek**

### **INTRODUCTION**

A stream inventory was conducted during October 3, 2007 to October 29, 2007 on Salmon Creek. The survey began at the confluence with the South Fork Eel River and extended upstream 7.3 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Salmon 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**

Salmon Creek is a tributary to South Fork Eel River, tributary to Eel River, which drains to the Pacific Ocean, located in Humboldt County, California (Map 1). Salmon Creek's legal description at the confluence with South Fork Eel River is T3S R3E S3. Its location is 40.2352 north latitude and 123.8308 west longitude, LLID number 1238309402351. Salmon Creek is a fourth order stream and has approximately 30.1 miles of blue line stream according to the USGS Miranda 7.5 minute quadrangle. Salmon Creek drains a watershed of approximately 36.9 square miles. Elevations range from about 200 feet at the mouth of the creek to 2,000 feet in the headwater areas. Redwood and Douglas fir forest dominates the watershed, but there are areas of grassland and oak-woodland in the upper watershed. The watershed is primarily privately owned. Vehicle access exists via State Highway 101 to Miranda.

### **METHODS**

The habitat inventory conducted in Salmon Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Conservation Corps (CCC) Technical Advisors and Watershed Stewards Project/AmeriCorps (WSP) Members 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.

### **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 measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

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### 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 Salmon 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". Salmon 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 Salmon Creek, embeddedness was 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 like bedrock, log sills, boulders or other considerations.

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### 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 Salmon 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. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

### 7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-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 densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Salmon 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 Salmon 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:

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.

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### 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 is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks during habitat typing in Salmon Creek. Detailed biological sampling was not conducted on Salmon Creek during the 2007 survey. Data from a 2003 mask and snorkel survey is listed in the Biological Inventory Results section of this report. Underwater observation sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

## DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. 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 Salmon Creek include:

- 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

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- 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 October 3, 2007 to October 29, 2007, was conducted by B. Rahn, and T. Chapple (WSP). The total length of the stream surveyed was 38,464 feet with an additional 137 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 6.16 cfs on October 10, 2007.

Salmon Creek is an F4 channel type for 15,488 feet of the stream surveyed (Reach 1), a C4 channel type for 7,361 feet of the stream surveyed (Reach 2), a B4 channel type for 8,114 feet of the stream surveyed (Reach 3), and a B2 channel type for 7,638 feet of the stream surveyed (Reach 4). F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. C4 channels are meandering point-bar riffle/pool alluvial channels with a broad well defined floodplain on low gradients and gravel-dominant substrates. B4 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks on moderate gradients with low width/depth ratios and gravel-dominant substrates. B2 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks, with low width/depth ratios on a moderate gradient and boulder-dominant substrates.

Water temperatures taken during the survey period ranged from 50 to 59 degrees Fahrenheit. Air temperatures ranged from 49 to 66 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40% flatwater units, 36% riffle units, 23% pool units, and 1% dry units (Graph 1). Based on total length of Level II habitat types there were 45% flatwater units, 28% riffle units, 24% pool units, and 2% dry units (Graph 2).

Sixteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 25% run units, 23% low gradient riffle units and 14% mid-channel pool units (Graph 3). Based on percent total length, run units made up 24%, low gradient riffle units 20%, and mid-channel pool units 17%.

A total of 86 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 65% (Graph 4), and comprised 70% 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. Fifty-six of the 86 pools (65%) had a residual depth of three feet or greater (Graph 5).

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The depth of cobble embeddedness was estimated at pool tail-outs. Of the 86 pool tail-outs measured, 51 had a value of 1 (59.3%); 11 had a value of 2 (12.8%); and 24 had a value of 5 (27.9%) (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 88, flatwater habitat types had a mean shelter rating of 44, and pool habitats had a mean shelter rating of 75 (Table 1). Of the pool types, the backwater pools had a mean shelter rating of 70, main channel pools had a mean shelter rating of 81, and scour pools had a mean shelter rating of 65 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Salmon Creek. Graph 7 describes the pool cover in Salmon Creek. Boulders are the dominant pool cover type followed by bedrock ledges.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 41% of pool tail-outs, and boulders were observed in 26% of pool tail-outs.

The mean percent canopy density for the surveyed length of Salmon Creek was 59%. Forty-one percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 67% and 33%, respectively. Graph 9 describes the mean percent canopy in Salmon Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 68%. The mean percent left bank vegetated was 66%. The dominant elements composing the structure of the stream banks consisted of 35% cobble/gravel, 27% boulder, 20% bedrock, and 17% sand/silt/clay (Graph 10). Hardwood trees were the dominant vegetation type observed in 62% of the units surveyed. Additionally, 18% of the units surveyed had coniferous trees as the dominant vegetation type, and 16% had brush as the dominant vegetation (Graph 11).

## BIOLOGICAL INVENTORY RESULTS

Salmon Creek was biologically sampled on June 17, 1993, by the California Department of Fish and Game for fish presence and identification. Using mask and snorkel, one coho and six steelhead rainbow trout were identified during the survey. The survey started 1,134 feet above the confluence with South Fork Eel River and ended upstream approximately 1,404 feet.

## DISCUSSION

Salmon Creek is an F4 channel type for the first 15,488 feet of stream surveyed, a C4 channel type for the next 7,361 feet, a B4 channel type for 8,114 feet, and a B2 channel type for the remaining 7,638 feet. The suitability of F4, C4, B4 and B2 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders and

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fair for plunge weirs, single and opposing wing-deflectors, and log cover. C4 channels are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover. B4 channels are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover. B2 channels are excellent for plunge weirs, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days, October 3, 2007 to October, 29 2007, ranged from 50 to 59 degrees Fahrenheit. Air temperatures ranged from 49 to 66 degrees Fahrenheit. 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 45% of the total length of this survey, riffles 28%, and pools 24%. The pools are relatively deep, with 56 of the 86 (56%) pools having a maximum residual depth greater than 3 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth order streams, a primary pool is defined to have a maximum residual depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended.

Sixty-two of the 85 pool tail-outs measured had embeddedness ratings of 1 or 2. None of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-four 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.

Forty-six of the 86 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 75. The shelter rating in the flatwater habitats was 44. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Salmon Creek. Boulders are the dominant cover type in pools followed by bedrock ledges. 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 59%. Reach 1 had a canopy density of 72.9%, reach 2 had a canopy density of 45.7%, reach 3 had a canopy density of 46.3%, and reach 4 had a canopy density of 60.3%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was moderate at 68% and 66%, 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.

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### RECOMMENDATIONS

- 1) Salmon Creek should be managed as an anadromous, natural production stream.
- 2) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from boulders. Adding high quality complexity with woody cover in the pools is desirable.
- 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.
- 4) Increase the canopy on Salmon Creek by planting appropriate native vegetation like willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.
- 5) 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.

Position (ft):	Habitat Unit #:	Comments:
0	0001.00	Start of survey at confluence with South Fork Eel River. Salmon Creek is dry from the confluence and through the length of the first habitat unit. This marks the beginning of reach #1 which is a F4 channel type.
717	0002.00	Bridge #01 is the Highway 101 bridge. It measured 60' wide x 40' high x 110' long. It was made of concrete.
1109	0007.00	Bridge #02 was the Salmon Creek Road/Maple Hills Road bridge. It measured 28' wide x 25' high x 80' long. It was made of concrete and steel.
1696	0013.00	There were hundreds of pike minnow and/or roach throughout this unit.
3676	0030.00	Tributary #01 entered from the left bank. Its flow was estimated at 0.01 cfs and it was contributing to less than 1% of Salmon Creek's flow. The temperature of the tributary was 56 degrees Fahrenheit; the temperature



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of Salmon Creek downstream and upstream of the tributary was 57 degrees Fahrenheit. The tributary was not accessible to fish due to a high gradient of 25%. No fish were observed in the tributary.

4870	0041.00	There was riprap bank stabilization on the right bank for 50 feet. Above the riprap there was erosion on the right bank measuring 100' high x 100' long.
5792	0051.00	There was a ford crossing the creek measuring 8' wide x 35' long.
6255	0055.00	There was riprap with willow along the left bank. Above this rip rap there was erosion measuring 80' high. The riprap and erosion continued through habitat unit #80. The riprap and erosion appears on both banks, but primarily on the right bank, there was willow growing out of some of the riprap.
7766	0066.00	Tributary #02 entered from the right bank. It had water but it was not flowing. The temperature of the tributary was 53 degrees Fahrenheit. The temperature of Salmon Creek downstream and upstream of the tributary was 58 and 56 degrees Fahrenheit, respectively. The tributary had a slope of 5% and was accessible to fish. No fish were observed in the first 300'.
7960	0068.00	There was a large boulder-wing dam on the right bank forming a pool and preventing further erosion of the right bank.
10116	0084.00	There was a ford across the creek. It was 13' wide x 130' long and it was not a barrier.
12131	0105.00	Bridge #03 was the Salmon Creek Road bridge. It was 29' wide x 30' high x 71' long. It was made of concrete and steel.
12841	0111.00	Tributary #03 entered from the left bank. Its flow was estimated at 0.4 cfs, and was contributing to 1% of Salmon Creek's flow. The temperature of the tributary was 54 degrees Fahrenheit. The temperature of Salmon Creek downstream and upstream of the tributary was 58 degrees Fahrenheit. The tributary had a steep slope of 25% and was not accessible to fish. No fish were observed in the first 200'.
13256	0114.00	There was erosion on left bank measuring 60' by 100'.
13813	0120.00	Tributary #04 was named "Mill Creek" and entered from the left bank. Flow was estimated at 1 cfs and it was contributing to 3% of Salmon Creek's flow. The temperature of the tributary was 56 degrees Fahrenheit; the temperature of Salmon Creek downstream and upstream of the tributary was 60 degrees Fahrenheit. The slope of the tributary was 5% and it was accessible to fish. Fish were observed in the tributary.

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14048	0122.00	Bridge #04 was the Salmon Creek Road bridge and it measured 28' wide x 25' high x 80' long. It was made of concrete and steel.
15322	0132.00	There was right bank erosion measuring 15' high.
15488	0134.00	At this unit the channel type changed to a C4. Reach 2 begins here.
15738	0135.00	There was a left bank slide that extended from Salmon Creek Road to the creek. It was 200' long x 60' tall. There was riprap at the bottom of the slide.
16100	0136.00	There was a series of riprap wing deflectors and willow mats along the right bank for 300'.
16382	0138.00	Wide sand bar floodplain on right and left banks. Cattle and horses have access to the creek here.
16436	0139.00	There was erosion on the left bank measuring 200' long x 30' high, and was contributing gravel and silt to the creek.
16633	0141.00	There was cut bank erosion on the left bank measuring 30' x 10'.
16946	0144.00	There was a very wide flood plain and gravel banks in this area. Livestock have access to the creek over the next few units.
17601	0149.00	There was an electric fence across the creek.
17731	0150.00	There was a slide on the right bank that was causing trees to fall into the stream channel.
18415	0156.00	There was a ford crossing the creek in the middle of this habitat unit. The ford was 10' wide x 72' long, and was crossing over gravel substrate. It was not a barrier to salmonids.
19284	0162.00	There were excavator tracks and large piles of gravel in the stream through to the next unit.
19528	0164.00	There was a rock and gravel dam that was 3' high. It created a pool upstream. There were salmonid passable areas through the dam.
19656	0165.00	Bridge #05 was 10' wide x 32' high x 67' long. It was made of steel and wood.
20115	0168.00	There was erosion on the right bank 15' high. The erosion went through to the next unit.
20767	0172.00	Tributary #05 entered from the right bank. Its flow was estimated at 0.2 cfs and it was contributing to 0.5% of Salmon Creek's flow. The temperature of the tributary was 52 degrees Fahrenheit. The temperature

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of Salmon Creek downstream and upstream of the tributary was 54 degrees Fahrenheit. The slope of the tributary was 10%. The mouth had a steep gradient, but the tributary is possibly accessible to fish. No fish were observed in the first 200' of the tributary. This tributary may only be flowing at this time due to the recent rain events.

20893	0173.00	There was erosion on the right bank measuring 50' long x 60' high.
22849	0186.00	The channel type changed to a B4, this marks the beginning of reach 3.
23295	0191.00	There was a landslide on the right bank, measuring 50' x 100'.
25988	0215.00	Cattle had access to creek from pasture land on left bank.
25988	0215.00	Tributary #06 entered from the left bank. Its flow was estimated at 0.25 cfs, and it was contributing to 0.5% of Salmon Creek's flow. The temperature of the tributary was 56 degrees Fahrenheit. The temperature of Salmon Creek downstream and upstream of the tributary was 52 degrees Fahrenheit. The tributary had a slope of 15%, it was accessible to fish. No fish were observed in the tributary, but the water was turbid due to recent rain.
26129	0216.00	Pasture land, mostly treeless began on the left bank of this unit and continued for 8 habitat units (~400').
26279	0217.00	There was a blue goo slide on the left bank for 500'.
26279	0217.00	There was a 4' bedrock plunge at the top of this unit. This may be a temporal barrier to the numerous pikeminnow that have been observed throughout Salmon Creek.
27163	0227.00	There was an active slide on the right bank, the entire mountainside was sliding into the creek.
27621	0231.00	There was pasture on the left bank for 1000'.
27767	0232.00	There was an active slide on the right bank causing trees to fall into creek.
28000	0233.00	Tributary #07 was named "South Fork Salmon Creek" and it entered from the right bank. Its flow was estimated at 4 cfs, and it was contributing to 40% of Salmon Creek's flow. The temperature of the tributary, and Salmon Creek downstream and upstream of the tributary were all 54 degrees Fahrenheit. The slope of the tributary was 4% and it was accessible to fish. Salmonids were observed in the tributary.
28677	0241.00	There was a slide on the right bank measuring 100' long x 50' high.
28960	0246.00	There was pasture on the left bank.

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29102	0248.00	There was eroding pasture land on the left bank.
29344	0252.00	There was pasture land with blue goo slides on both the right and left banks. The erosion was contributing all size classes of substrate.
29545	0254.00	There was pasture land on the left bank for the next half mile. Portions of the pastureland had blue goo slides entering the creek.
30666	0270.00	Tributary #08 entered from the left bank. Its flow was estimated at 0.25 cfs, and it was contributing to approximately 0.5% of Salmon Creek's flow. The temperature of the tributary was 64 degrees Fahrenheit. The temperature of Salmon Creek upstream and downstream of the tributary was 52 degrees Fahrenheit. The tributary had a slope of 25% and it was probably not accessible to fish. No fish were observed in the first 200' of stream.
30826	0272.00	The channel type has changed to a B2, this marks the beginning of reach 4.
31605	0287.00	Tributary #09 entered from the right bank. Its flow was estimated at 0.1 cfs, and it was contributing to approximately 0.25% of Salmon Creek's flow. The temperature of the tributary was 54 degrees Fahrenheit. The temperature of Salmon Creek was 53 degrees Fahrenheit both downstream and upstream of the tributary. The tributary's slope was 45% and it was not accessible to fish. No fish were observed in the tributary for the first 200 feet.
32449	0300.00	The stream had a 15% gradient here.
32860	0305.00	A pikeminnow was observed in this pool.
33122	0307.00	There was right and left bank erosion contributing all substrate sizes to the creek (clay to boulders).
33626	0313.00	Tributary #10 entered from the right bank. Its flow was estimated at 1 cfs, and it was contributing to 15% of Salmon Creek's flow. The temperature of the tributary was 53 degrees Fahrenheit. The temperature of Salmon Creek downstream and upstream of the tributary was 53 and 54 degrees Fahrenheit, respectively. The tributary was accessible to fish. It had a 10% slope and salmonids were observed in it.
33914	0317.00	There was a ford crossing over gravel and cobble. It measured 12' wide x 50' long. It was not a barrier to salmonids.
33990	0319.00	There was a young-of-the-year (YOY) salmonid observed in this unit.
35104	0328.00	There was pasture on the left bank for approximately 600'.

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35791	0339.00	There was a bedrock chute plunge measuring 5' tall x 6" wide.
35853	0341.00	There was a cascade at the top of this pool, it passed through a 2' wide chute.
36409	0350.00	There was a right bank slide measuring 90' long x 80' high and contributing blue goo and boulders to the creek.
36932	0358.00	There were YOY salmonids observed in this unit.
37054	0359.00	The hillside on the right bank was sliding into the creek.
37433	0365.00	Tributary #11 entered from the left bank. Its flow was estimated at 0.4 cfs, and it was contributing to 1% of Salmon Creek's flow. The temperature of the tributary was 54 degrees Fahrenheit. The temperature of Salmon Creek upstream and downstream of the tributary was 52 degrees Fahrenheit. The gradient of the tributary was 20% and it was accessible to fish for the first 200'. Fish were observed in the first 200'. After 200' there is a 4' high log debris accumulation (LDA).
38379	0372.00	A one year plus fish was observed in this pool.
38464	0372.00	The survey ended at the end of anadromy. There was a 20' tall bedrock sheet waterfall, followed by two more large waterfalls, all of which are barriers to salmonid migration.

## 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.

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### 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 }

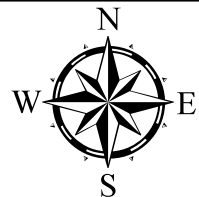
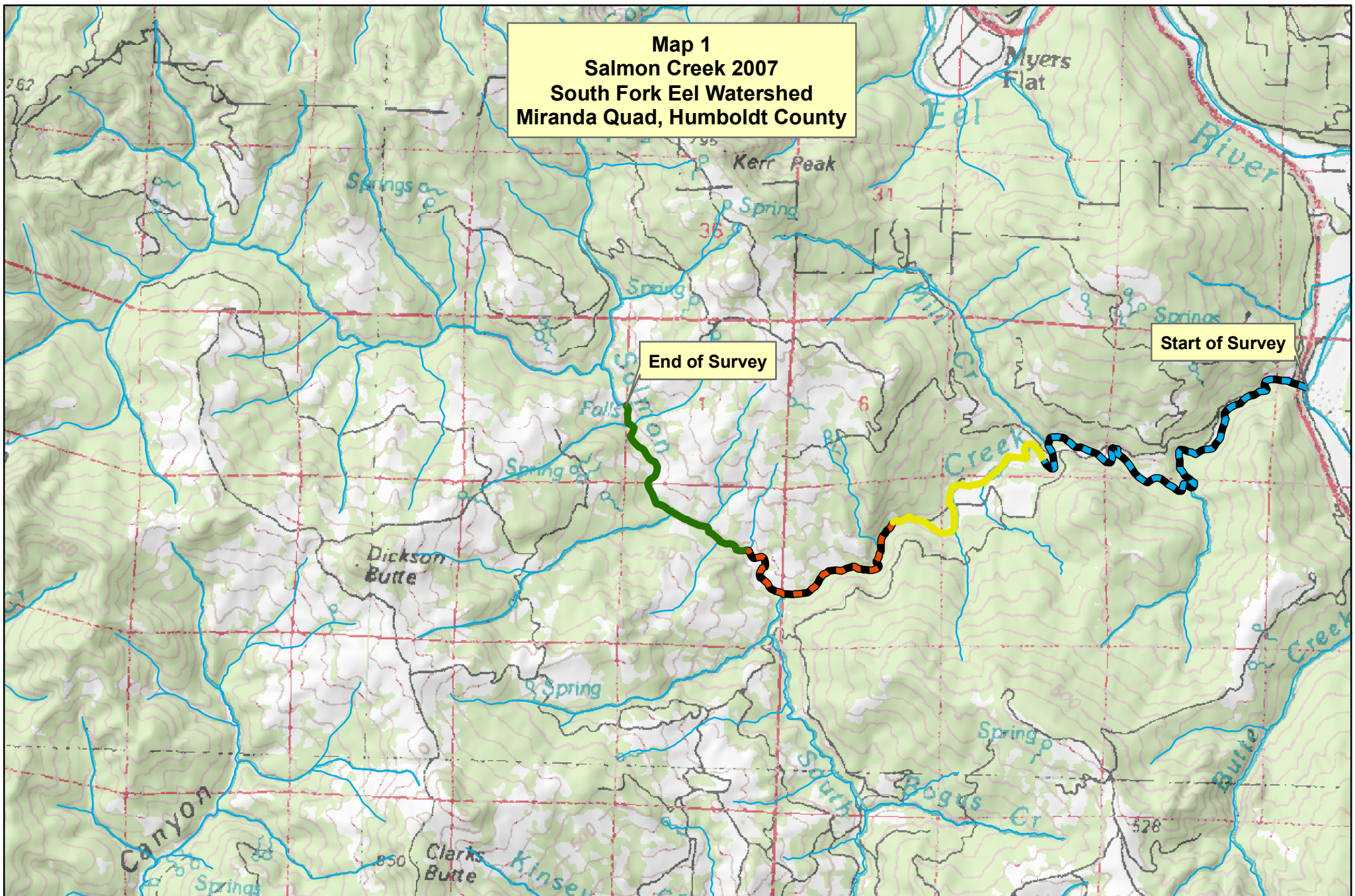
#### BACKWATER POOLS

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 a marsh	(MAR)	[9.1]	

Map 1  
Salmon Creek 2007  
South Fork Eel Watershed  
Miranda Quad, Humboldt County



### Legend

- Reach 1, F4 Channel Type
- Reach 2, C4 Channel Type
- Reach 3, B4 Channel Type
- Reach 4, B2 Channel Type

0 2,600 5,200 10,400 Feet



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

Stream Name: Salmon Creek LLID: 1238309402351 Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA Legal Description: T03SR03ES03 Latitude: 40:14:06.0N Longitude: 123:49:51.0

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
3	0	DRY	0.8	314	941	2.4									
150	16	FLATWATER	40.0	116	17347	44.9	26.8	1.2	2.4	3291	493640	3993	598971		44
86	86	POOL	22.9	109	9394	24.3	29.7	1.8	3.9	3377	290431	8557	735939	6735	75
136	18	RIFFLE	36.3	80	10919	28.3	24.9	0.5	1.1	1282	174412	752	102216		88
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
375	120				38601					958484			1437126		



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

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	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 (%)
86	11	LGR	22.9	90	7752	20.1	23	0.4	1.4	1492	128279	809	69581		23	61
49	6	HGR	13.1	64	3159	8.2	31	0.7	1.7	1109	54352	771	37767		179	49
1	1	CAS	0.3	8	8	0.0	4	0.2	0.6	21	21	4	4		255	64
3	1	POW	0.8	145	435	1.1	25	2.1	3.6	3610	10830	7581	22743		80	87
19	2	GLD	5.1	160	3044	7.9	46	0.6	1.5	7327	139204	4045	76864		0	63
94	10	RUN	25.1	100	9420	24.4	25	1.4	3.4	2926	275002	4251	399569		40	62
34	3	SRN	9.1	131	4448	11.5	21	0.9	3.2	1712	58213	1904	64725		75	57
53	53	MCP	14.1	122	6461	16.7	30	1.7	8.1	3912	207337	9481	502491	7275	76	59
3	3	STP	0.8	43	128	0.3	40	1.0	3.5	1033	3099	1462	4385	948	155	48
3	3	LSR	0.8	91	273	0.7	29	1.4	4.7	2760	8279	5048	15145	3974	70	50
11	11	LSBk	2.9	142	1566	4.1	29	2.1	7	4162	45784	10108	111185	8298	47	62
8	8	LSBo	2.1	79	635	1.6	26	1.4	5.2	1888	15106	3636	29089	2575	73	56
6	6	PLP	1.6	40	238	0.6	29	4.0	19.1	1238	7426	11682	70091	10737	83	50
1	1	BPB	0.3	85	85	0.2	39	0.7	3.1	3249	3249	3249	3249	2274	60	44
1	1	BPR	0.3	8	8	0.0	19	1.9	2.9	152	152	304	304	289	80	92
3	0	DRY	0.8	314	941	2.4										97

Total Units  
375

Total Units Fully Measured  
120

Total Length (ft.)  
38601

Total Area (sq.ft.)  
956332

Total Volume (cu.ft.)  
1407191

**Table 3 - Summary of Pool Types**

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

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
56	56	MAIN	65	118	6589	70	30.6	1.6	3758	210435	6936	388413	81
28	28	SCOUR	33	97	2712	29	28.1	2.2	2736	76595	6722	188230	65
2	2	BACKWATER	2	47	93	1	29.0	1.3	1700	3401	1281	2563	70
Total Units 86	Total Units Fully Measured 86				Total Length (ft.) 9394					Total Area (sq.ft.) 290431		Total Volume (cu.ft.) 579205	

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

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

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
53	MCP	62	0	0	3	6	17	32	15	28	18	34
3	STP	3	0	0	0	0	1	33	2	67	0	0
3	LSR	3	0	0	0	0	1	33	0	0	2	67
11	LSBk	13	0	0	0	0	1	9	2	18	8	73
8	LSBo	9	0	0	0	0	3	38	3	38	2	25
6	PLP	7	0	0	2	33	1	17	1	17	2	33
1	BPB	1	0	0	0	0	0	0	1	100	0	0
1	BPR	1	0	0	0	0	1	100	0	0	0	0
Total Units			Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Foot Max Resid. Depth	Total 1< 2 Foot % Occurrence	Total 2< 3 Foot Max Resid. Depth	Total 2< 3 Foot % Occurrence	Total 3< 4 Foot Max Resid. Depth	Total 3< 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
86			0	0	5	6	25	29	24	28	32	37

Mean Maximum Residual Pool Depth (ft.): 3.9

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

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Dry Units: 3

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

Habitat Units	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
86	11	LGR	0	0	0	0	17	10	13	60	0
49	6	HGR	0	5	0	1	12	4	23	55	0
1	1	CAS	0	0	0	0	0	0	80	20	0
136	18	TOTAL RIFFLE	0	2	0	0	14	7	22	55	0
3	1	POW	0	10	0	0	10	0	0	80	0
19	2	GLD	0	0	0	0	0	0	0	0	0
94	10	RUN	0	6	2	2	24	2	3	47	15
34	3	SRN	0	3	0	0	33	3	13	47	0
150	16	TOTAL FLAT	0	6	1	1	25	2	5	49	11
53	53	MCP	2	7	4	4	17	1	3	49	13
3	3	STP	0	0	0	0	0	0	37	63	0
3	3	LSR	7	7	7	53	13	0	3	7	3
11	11	LSBk	0	4	4	5	8	0	0	25	55
8	8	LSBo	1	9	1	3	11	1	2	69	3
6	6	PLP	0	1	1	0	4	1	25	63	5
1	1	BPB	0	0	20	0	20	0	0	60	0
1	1	BPR									
86	86	TOTAL POOL	2	6	4	5	13	1	5	48	16
375	120	TOTAL	1	6	3	4	15	2	7	49	13

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

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Dry Units: 3

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

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
86	11	LGR	0	0	45	55	0	0	0
49	6	HGR	0	0	17	33	50	0	0
1	1	CAS	0	0	0	0	0	100	0
3	1	POW	0	0	100	0	0	0	0
19	2	GLD	0	0	100	0	0	0	0
94	10	RUN	0	10	70	20	0	0	0
34	3	SRN	0	0	33	33	0	33	0
53	53	MCP	4	15	75	4	2	0	0
3	3	STP	0	0	33	0	0	67	0
3	3	LSR	33	0	67	0	0	0	0
11	11	LSBk	0	18	82	0	0	0	0
8	8	LSBo	0	0	88	13	0	0	0
6	6	PLP	0	0	100	0	0	0	0
1	1	BPB	0	100	0	0	0	0	0
1	1	BPR	0	0	100	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
59	33	67	0	68	66

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.

Stream Name:	Salmon Creek	LLID:	1238309402351	Drainage:	Eel River - South Fork
Survey Dates:	10/3/2007 to 10/29/2007	Survey Length (ft.):	38601	Main Channel (ft.):	38464
				Side Channel (ft.):	137
Confluence Location:	Quad: MIRANDA	Legal Description:	T03SR03ES03	Latitude:	40:14:06.0N
				Longitude:	123:49:51.0W

### Summary of Fish Habitat Elements By Stream Reach

Channel Type: F4			Canopy Density (%): 72.9			Pools by Stream Length (%): 23.8			
Reach Length (ft.): 15488			Coniferous Component (%): 42.9			Pool Frequency (%): 21.8			
Riffle/Flatwater Mean Width (ft.): 21.2			Hardwood Component (%): 57.1			Residual Pool Depth (%):			
BFW:			Dominant Bank Vegetation: Hardwood Trees			< 2 Feet Deep: 3			
Range (ft.): 45 to 110			Vegetative Cover (%): 72.7			2 to 2.9 Feet Deep: 38			
Mean (ft.): 64			Dominant Shelter: Boulders			3 to 3.9 Feet Deep: 24			
Std. Dev.: 17			Dominant Bank Substrate Type: Cobble/Gravel			>= 4 Feet Deep: 34			
Base Flow (cfs.): 3.0			Occurrence of LWD (%): 4			Mean Max Residual Pool Depth (ft.): 3.7			
Water (F): 55 - 59			Air (F): 54 - 65			Mean Pool Shelter Rating: 65			
Dry Channel (ft): 941			Riffles: 0						
			Pools: 0						
			Flat: 0						
Pool Tail Substrate (%):			Silt/Clay: 0	Sand: 0	Gravel: 79	Sm Cobble: 7	Lg Cobble: 10	Boulder: 3	Bedrock: 0
Embeddedness Values (%):			1. 82.8	2. 13.8	3. 0.0	4. 0.0	5. 3.4		

Channel Type:	C4	Canopy Density (%):	45.7	Pools by Stream Length (%):	26.2
Reach Length (ft.):	7361	Coniferous Component (%):	44.2	Pool Frequency (%):	21.2
Riffle/Flatwater Mean Width (ft.):	33.6	Hardwood Component (%):	55.8	Residual Pool Depth (%):	
BFW:		Dominant Bank Vegetation:	Hardwood Trees	< 2 Feet Deep:	0
Range (ft.):	21 to 61	Vegetative Cover (%):	61.9	2 to 2.9 Feet Deep:	27
Mean (ft.):	46	Dominant Shelter:	Boulders	3 to 3.9 Feet Deep:	27
Std. Dev.:	14	Dominant Bank Substrate Type:	Cobble/Gravel	>= 4 Feet Deep:	45
Base Flow (cfs.):	6.0	Occurrence of LWD (%):	5	Mean Max Residual Pool Depth (ft.):	4.1
Water (F):	54 - 56	Air (F):	52 - 62	Mean Pool Shelter Rating:	47
Dry Channel (ft):	0	Riffles:	0		
		Pools:	0		
		Flat:	0		
Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 0	Gravel: 45	Sm Cobble: 45	Lg Cobble: 9
Embeddedness Values (%):	1. 63.6	2. 36.4	3. 0.0	4. 0.0	5. 0.0
				Boulder: 0	Bedrock: 0

## Summary of Fish Habitat Elements By Stream Reach

### STREAM REACH: 3

Channel Type: B4	Canopy Density (%): 45.6	Pools by Stream Length (%): 27.1
Reach Length (ft.): 7977	Coniferous Component (%): 30.1	Pool Frequency (%): 28.1
Riffle/Flatwater Mean Width (ft.): 29.6	Hardwood Component (%): 69.9	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 12
Range (ft.): 33 to 62	Vegetative Cover (%): 64.7	2 to 2.9 Feet Deep: 24
Mean (ft.): 46	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 40
Std. Dev.: 11	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 24
Base Flow (cfs.): 6.0	Occurrence of LWD (%): 2	Mean Max Residual Pool Depth (ft.): 3.4
Water (F): 50 - 55 Air (F): 49 - 66	LWD per 100 ft.:	Mean Pool Shelter Rating: 76
Dry Channel (ft): 0	Riffles: 0	
	Pools: 0	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 20 Sm Cobble: 12 Lg Cobble: 24 Boulder: 40 Bedrock: 4		
Embeddedness Values (%): 1. 48.0 2. 8.0 3. 0.0 4. 0.0 5. 44.0		

### STREAM REACH: 4

Channel Type: B2	Canopy Density (%): 60.3	Pools by Stream Length (%): 20.6
Reach Length (ft.): 7638	Coniferous Component (%): 16.3	Pool Frequency (%): 20.8
Riffle/Flatwater Mean Width (ft.): 23.2	Hardwood Component (%): 83.7	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 5
Range (ft.): 30 to 52	Vegetative Cover (%): 65.3	2 to 2.9 Feet Deep: 24
Mean (ft.): 40	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 19
Std. Dev.: 7	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 52
Base Flow (cfs.): 6.0	Occurrence of LWD (%): 2	Mean Max Residual Pool Depth (ft.): 4.7
Water (F): 52 - 54 Air (F): 55 - 66	LWD per 100 ft.:	Mean Pool Shelter Rating: 103
Dry Channel (ft): 0	Riffles: 1	
	Pools: 1	
	Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 10 Sm Cobble: 14 Lg Cobble: 19 Boulder: 52 Bedrock: 5		
Embeddedness Values (%): 1. 38.1 2. 4.8 3. 0.0 4. 0.0 5. 57.1		



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

Stream Name: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

Latitude: 40:14:06.0N

Longitude: 123:49:51.0W

**Mean Percentage of Dominant Stream Bank Substrate**

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	34	15	20.4
Boulder	27	38	27.1
Cobble / Gravel	37	48	35.4
Sand / Silt / Clay	22	19	17.1

**Mean Percentage of Dominant Stream Bank Vegetation**

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	2	8	4.2
Brush	20	19	16.3
Hardwood Trees	67	81	61.7
Coniferous Trees	31	12	17.9
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 2

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

StreamName: Salmon Creek

LLID: 1238309402351

Drainage: Eel River - South Fork

Survey Dates: 10/3/2007 to 10/29/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES03

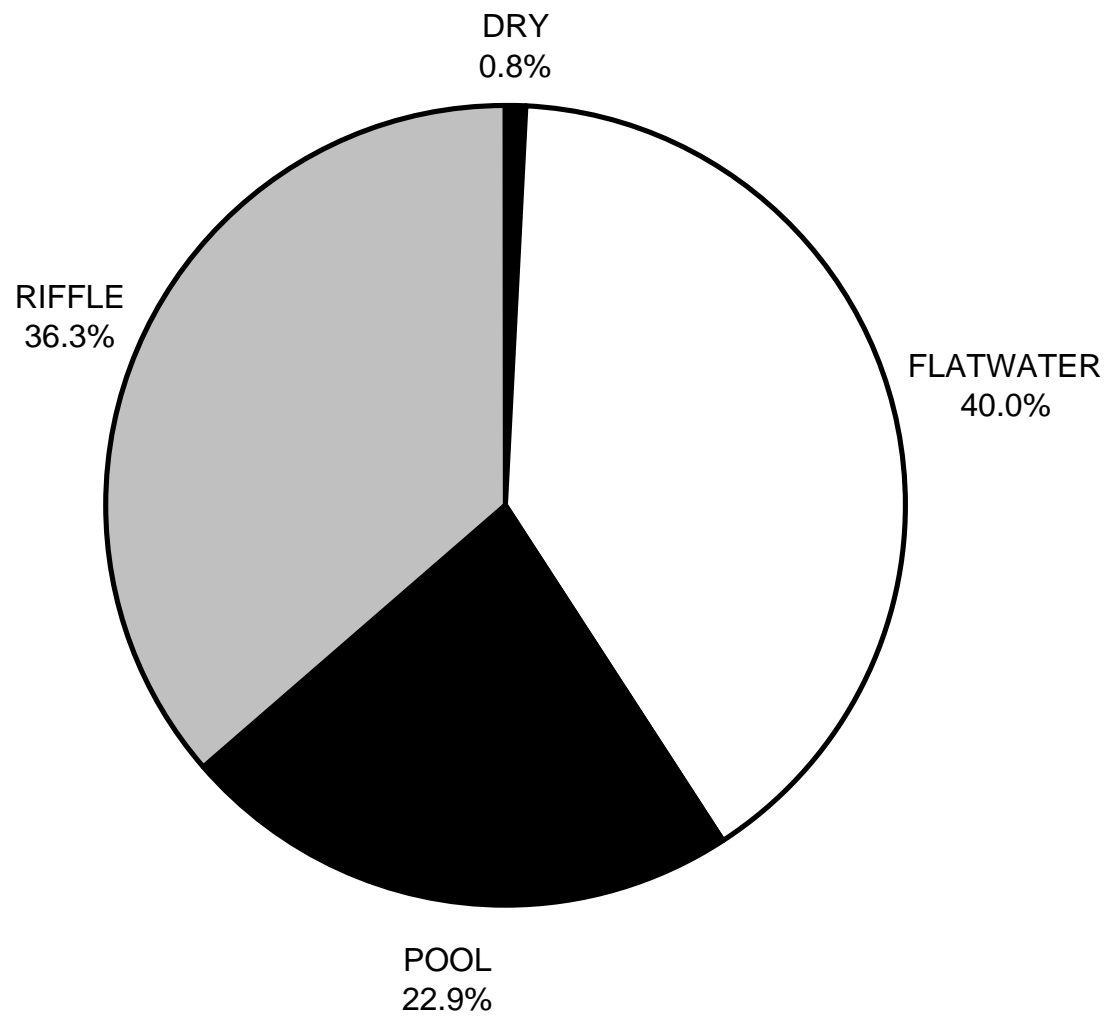
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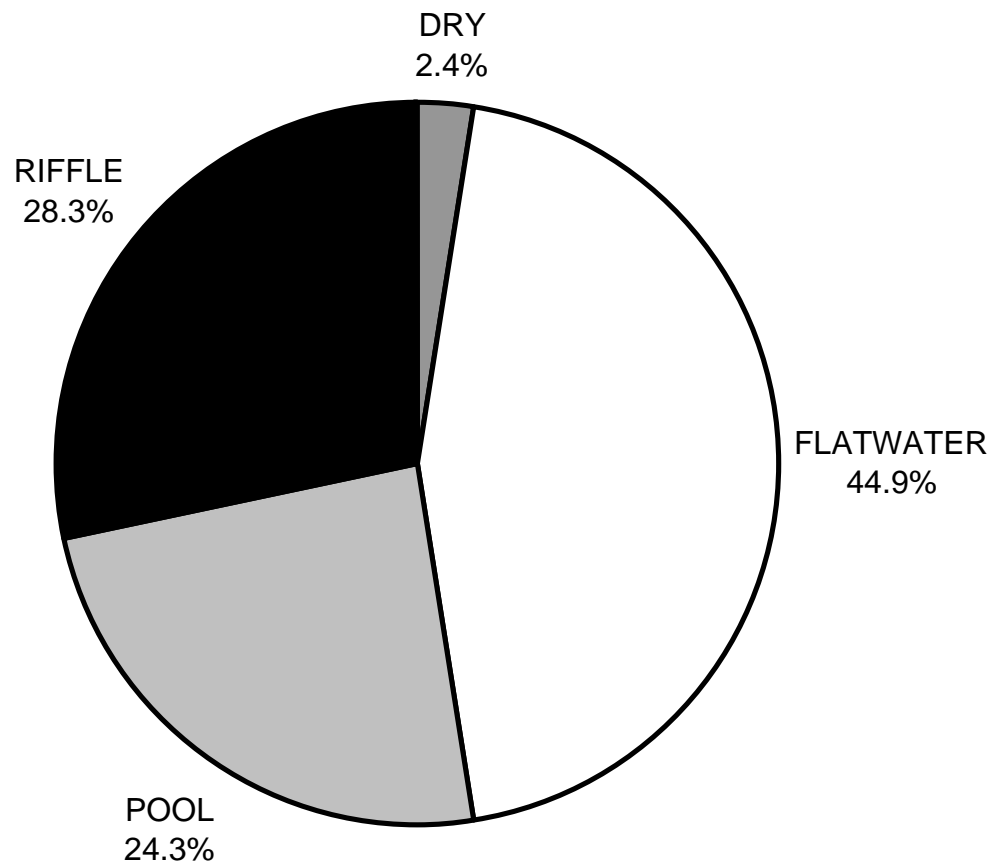
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	2
SMALL WOODY DEBRIS (%)	2	6	6
LARGE WOODY DEBRIS (%)	0	1	4
ROOT MASS (%)	0	1	5
TERRESTRIAL VEGETATION (%)	14	25	13
AQUATIC VEGETATION (%)	7	2	1
WHITEWATER (%)	22	5	5
BOULDERS (%)	55	49	48
BEDROCK LEDGES (%)	0	11	16

**SALMON CREEK 2007**  
**HABITAT TYPES BY PERCENT OCCURRENCE**



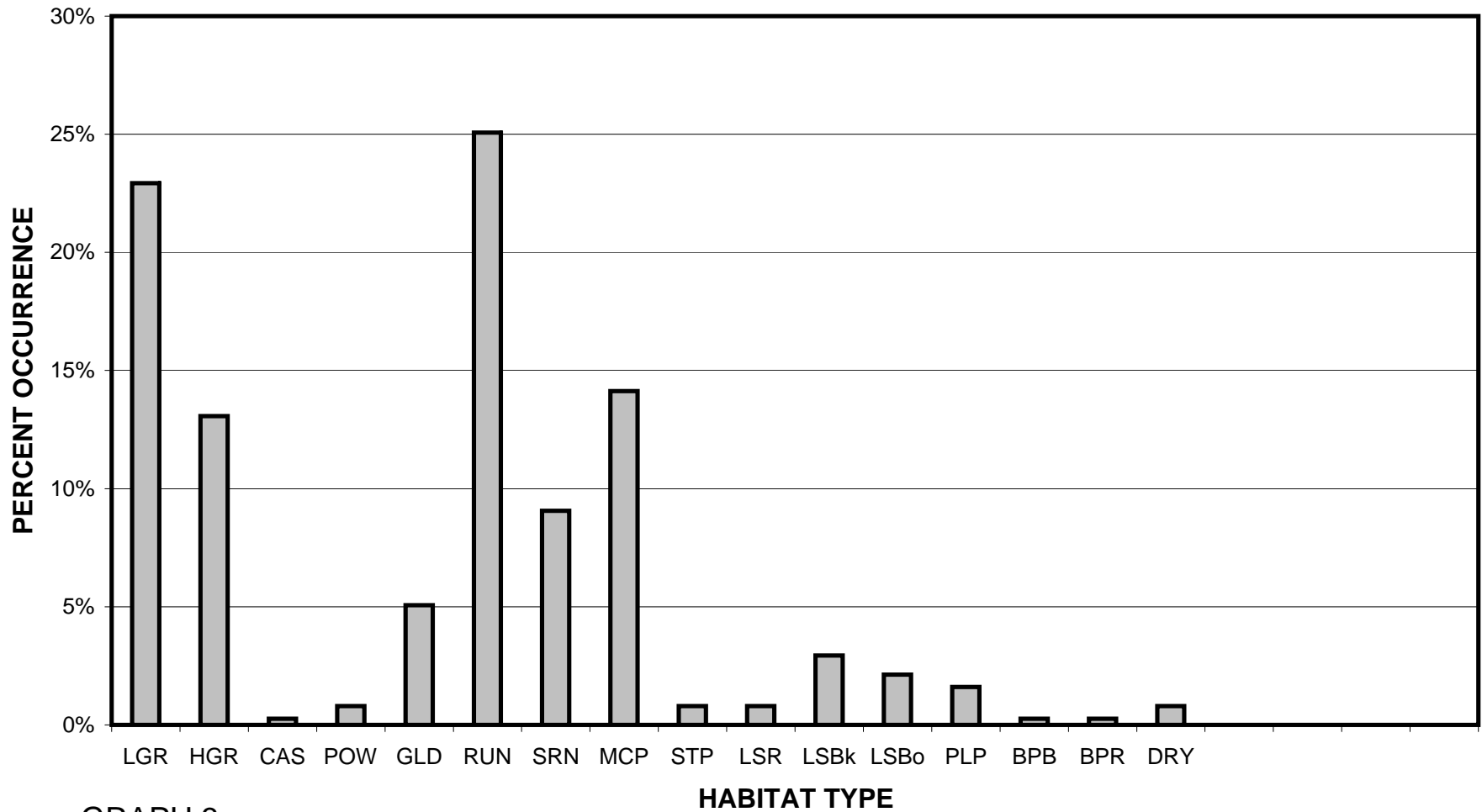
GRAPH 1

**SALMON CREEK 2007**  
**HABITAT TYPES BY PERCENT TOTAL LENGTH**



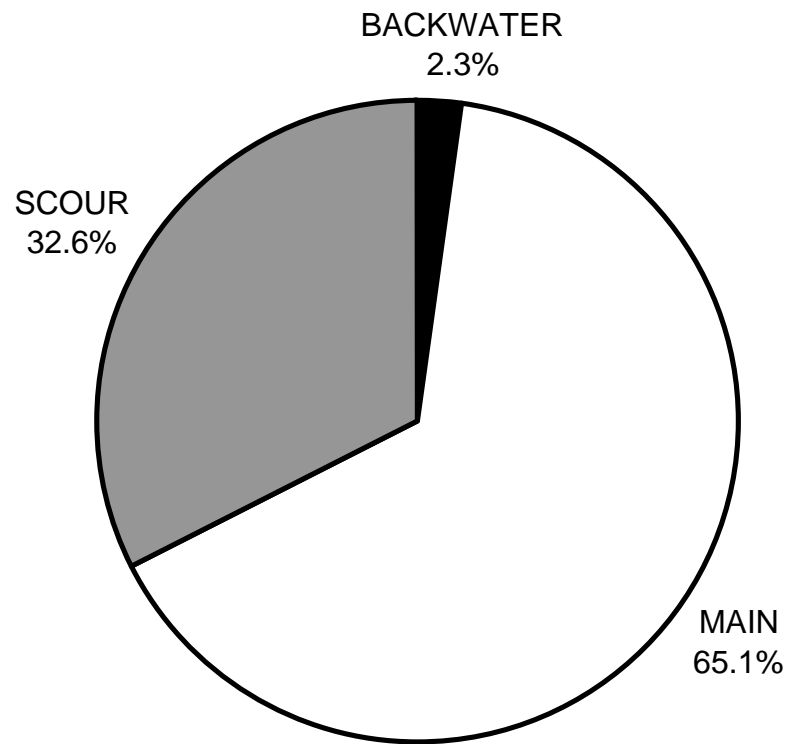
GRAPH 2

**SALMON CREEK 2007**  
**HABITAT TYPES BY PERCENT OCCURRENCE**



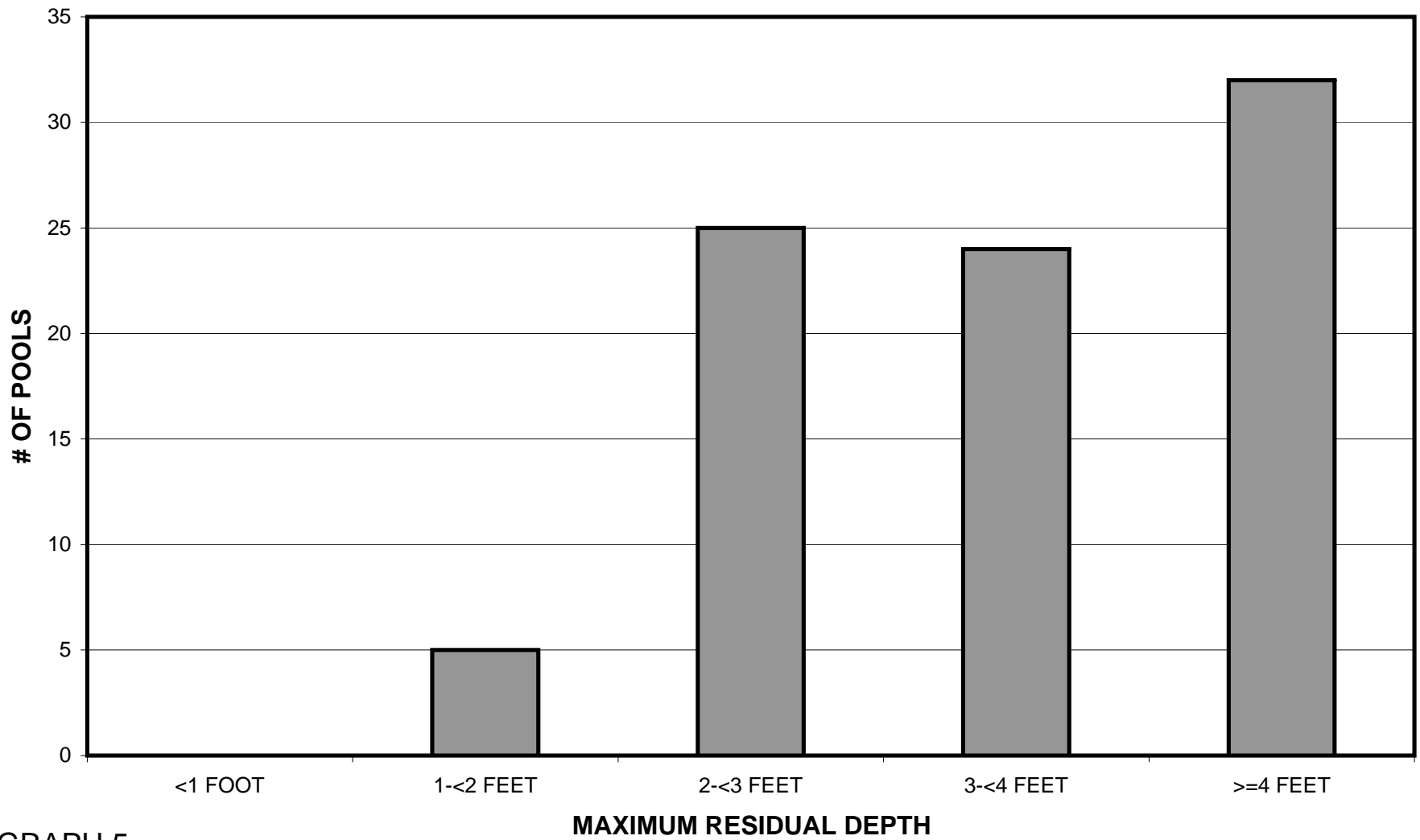
### GRAPH 3

**SALMON CREEK 2007**  
**POOL TYPES BY PERCENT OCCURRENCE**



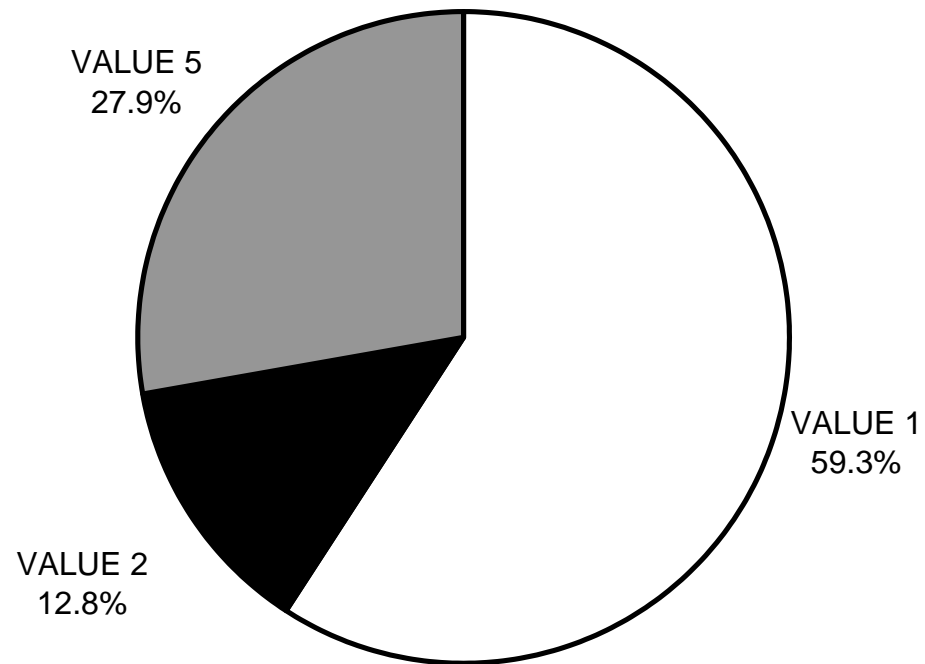
GRAPH 4

# **SALMON CREEK 2007 MAXIMUM DEPTH IN POOLS**



GRAPH 5

# **SALMON CREEK 2007 PERCENT EMBEDDEDNESS**

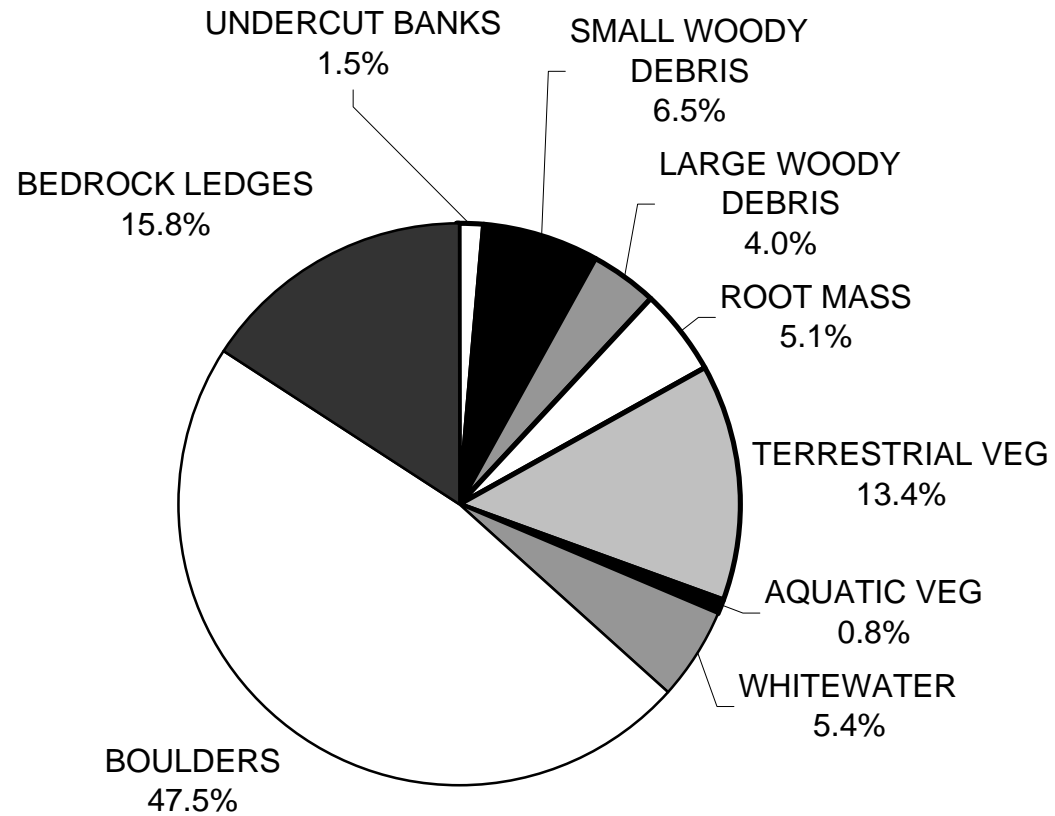


GRAPH 6



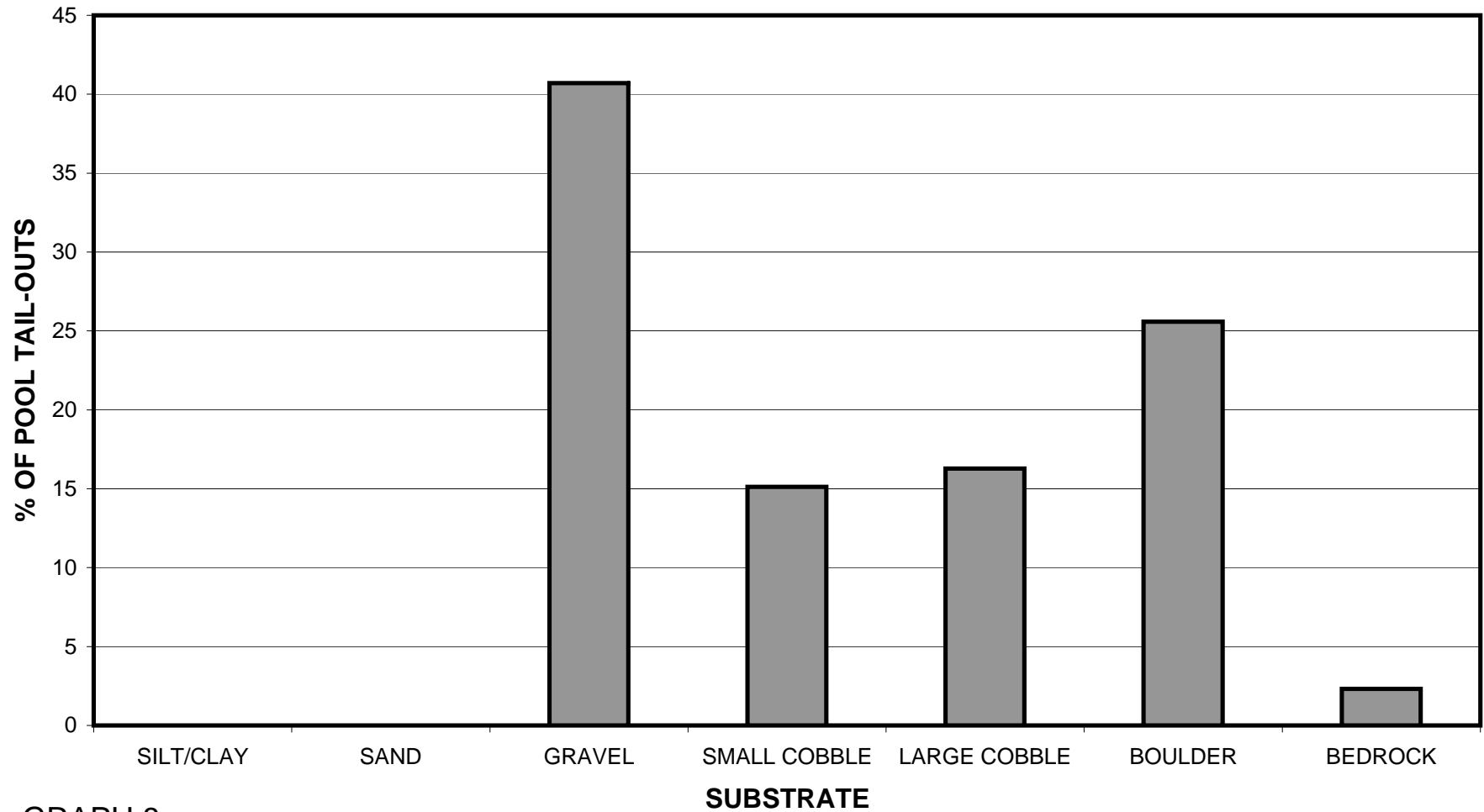
# **SALMON CREEK 2007**

## **MEAN PERCENT COVER TYPES IN POOLS**



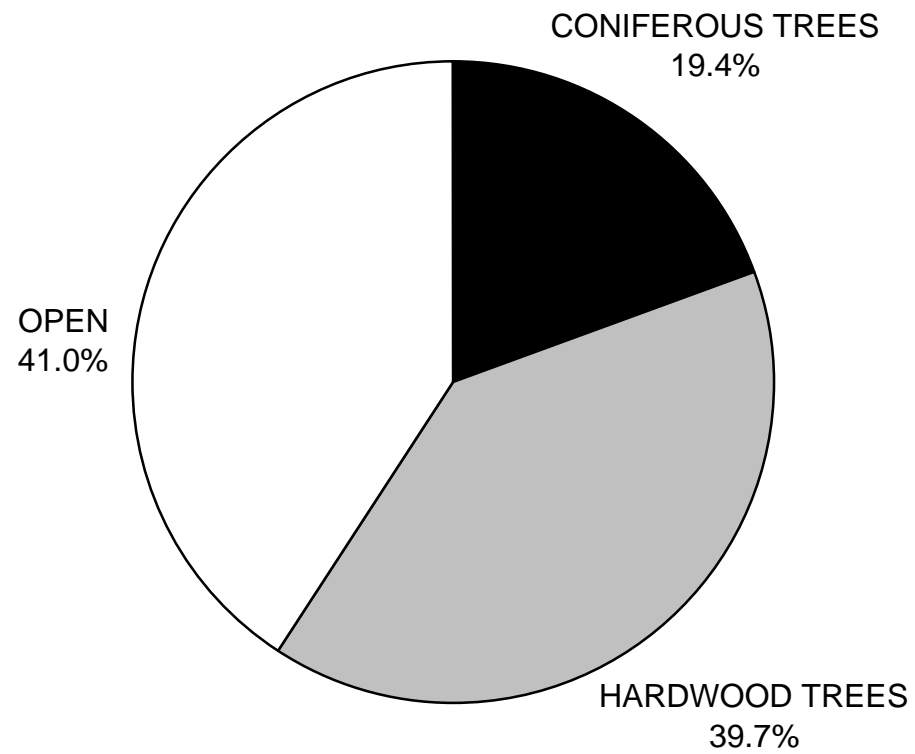
GRAPH 7

**SALMON CREEK 2007**  
**SUBSTRATE COMPOSITION IN POOL TAIL-OUTS**



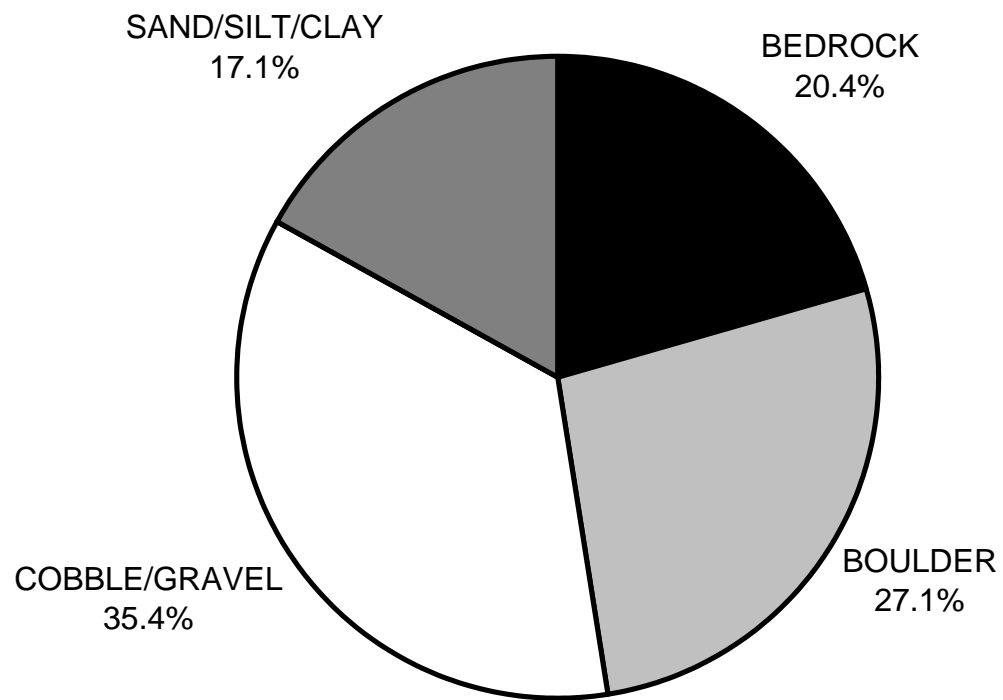
GRAPH 8

# **SALMON CREEK 2007 MEAN PERCENT CANOPY**



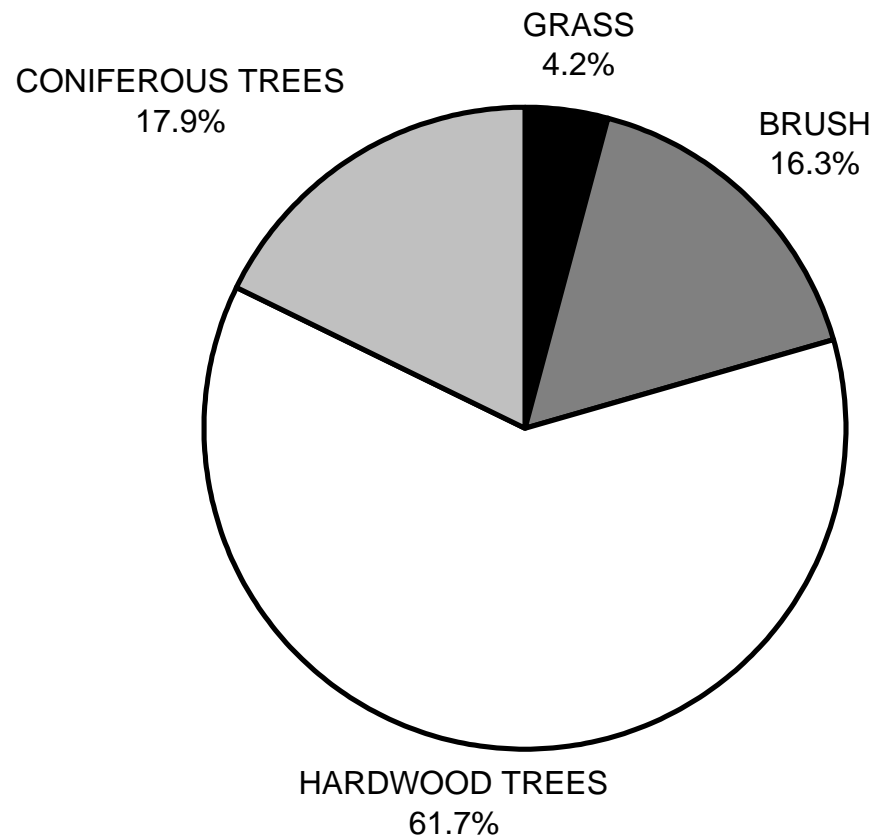
GRAPH 9

**SALMON CREEK 2007**  
**DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**SALMON CREEK 2007**  
**DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11