

STREAM INVENTORY REPORT

Piercy Creek

INTRODUCTION

A stream inventory was conducted from October 9, 2007 to October 22, 2007 on Piercy Creek. The survey began at the confluence with South Fork Eel River and extended upstream 2.2 miles.

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

A biological survey of Piercy Creek was last conducted in 2002 to document the presence of juvenile salmonid species. Findings from that survey will also be included in this report.

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

Piercy Creek is a tributary to the South Fork Eel River, tributary to the Eel River which drains into the Pacific Ocean, located in Mendocino County, California (Map 1). Piercy Creek's legal description at the confluence with the South Fork Eel River is T5S R3E S35. Its location is 39.9742 north latitude and 123.8036 west longitude, LLID number 1238023399744. Piercy Creek is a first order stream and has approximately 1.6 miles of blue line stream according to the USGS Piercy 7.5 minute quadrangle. Piercy Creek drains a watershed of approximately 3.6 square miles. Elevations range from about 487 feet at the mouth of the creek to 1,100 feet in the headwater areas. The watershed is a second growth redwood forest, under the ownership of the Redwood Forest Foundation, Inc. Vehicle access exists via Highway 101. Take the Piercy exit, proceed north on the frontage road and take the first road to the west. This road leads to the South Fork Eel River, where the river must be crossed in order to gain access to the confluence of Piercy Creek.

METHODS

The habitat inventory conducted in Sample 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.

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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.

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 Piercy 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". Piercy 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

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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 Piercy 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.

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 Piercy 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 Piercy 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 Piercy Creek, the dominant composition type and the dominant

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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.

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 Piercy Creek. Detailed biological sampling (electrofishing and/or underwater observation) was not conducted on Piercy Creek during the 2007 survey. Data from a 2006 electrofishing survey is listed in the Biological Inventory Results section of this report. Electrofishing 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

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- 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 Piercy 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
- 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 9, 2007 to October 22, 2007 was conducted by L. Lee and M. Cavin (WSP). The total length of the stream surveyed was 11,645 feet with an additional 209 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 1.16 cfs on October 25, 2007.

Piercy Creek is a B3 channel type for 6,479 feet of the stream surveyed (Reach 1) and an F2 channel type for 5,166 feet of the stream surveyed (Reach 2). 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. F2 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and boulder-dominant substrates.

Water temperatures taken during the survey period ranged from 49 to 52 degrees Fahrenheit. Air temperatures ranged from 50 to 61 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 42.5% riffle units, 35% pool units, 21.5% flatwater units and 1% dry units

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(Graph 1). Based on total length of Level II habitat types there were 49% riffle units, 22% pool units, 21% flatwater units and 8% dry units (Graph 2).

Ten Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 29% mid-channel pool units, 26% high gradient riffle units and 13% run units (Graph 3). Based on percent total length, high gradient riffle units made up 32%, mid-channel pool units 18%, and step run units 13%.

A total of 70 pools were identified (Table 3). Main channel pools were the most frequently encountered at 87% (Graph 4) and comprised 92% 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. Twenty-two of the 70 pools (31%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 70 pool tail-outs measured, 10 had a value of 1 (14.3%); 31 had a value of 2 (44.3%); 11 had a value of 3 (15.7%); 10 had a value of 4 (14.3%); 8 had a value of 5 (11.4%) (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 71, flatwater habitat types had a mean shelter rating of 48, and pool habitats had a mean shelter rating of 56 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 52 and scour pools had a mean shelter rating of 89 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Terrestrial vegetation was the dominant cover type in Piercy Creek. Graph 7 describes the pool cover in Piercy Creek. Terrestrial vegetation was the dominant pool cover type followed by large woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 39% of pool tail-outs and small cobble was observed in 29% of pool tail-outs.

The mean percent canopy density for the surveyed length of Piercy Creek was 92% (Table 7). Eight percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 81% and 19%, respectively. Graph 9 describes the mean percent total canopy in Piercy Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 87%. The mean percent left bank vegetated was 85%. The dominant elements composing the structure of the stream banks consisted of 87% sand/silt/clay, 11% cobble/gravel and 3% bedrock (Graph 10). Hardwood trees were the dominant vegetation type observed in 66% of the units surveyed.

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Additionally, 23% of the units surveyed had coniferous trees as the dominant vegetation type, 7% had grass, and 4% had brush as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Piercy Creek was biologically sampled in 2006 by Campbell Timberland Management Company for fish presence and identification. Using an electrofisher, 39 coho and 84 steelhead trout were captured and identified. The survey took place approximately 1,680 feet upstream from the confluence with South Fork Eel River.

DISCUSSION

Piercy Creek is a B3 channel type for the first 6,479 feet of stream surveyed and an F2 channel type for the remaining 5,166 feet of stream surveyed. The suitability of B3 and F2 channel types for fish habitat improvement structures is as follows: B3 channel types are excellent for plunge weirs, boulder clusters and bank-placed boulders, single and opposing wing-deflectors, and log cover. F2 channel types are fair for plunge weirs, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days October 9, 2007 to October 22, 2007, ranged from 49 to 52 degrees Fahrenheit. Air temperatures ranged from 50 to 61 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.

Riffle habitat types comprised 49% of the total length of this survey, pools 22% and flatwater 21%. The pools are relatively shallow, with only 22 of the 70 (31%) pools having a maximum residual depth greater than 2 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.

Forty-one of the 70 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. Eight 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 Piercy Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Forty-seven of the 70 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

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The mean shelter rating for pools was 56. The shelter rating in the flatwater habitats was 48. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by terrestrial vegetation in Piercy Creek. Terrestrial vegetation is the dominant cover type in pools followed by large woody debris. 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 92%. Reach 1 had a canopy density of 92% and Reach 2 had a canopy density of 93%.

The percentage of right and left bank covered with vegetation was high at 87% and 85%, 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.

RECOMMENDATIONS

- 1) Piercy 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 terrestrial vegetation. Adding high quality complexity with woody cover in the pools is desirable.
- 3) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 4) 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.
- 5) 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.

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.

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Position (ft):	Habitat unit #	Comments:
0	0001.00	Start of survey at the confluence with the South Fork Eel River.
836	0002.00	Young-of-the-year (YOY) salmonid observed.
900	0003.00	Bridge #1 is approximately 14' upstream of habitat unit #003; 13.5' wide x 8.5' high x 43' long. The bridge material was constructed of metal.
1096	0009.00	LDA #1 was 4' high x 32' wide x 6' long. It had visible gaps with water flowing through it and no sediment retention. Fish were observed above the accumulation.
1322	0014.00	There was a dry tributary with increasingly steep gradient on the left bank.
1523	0018.00	YOY observed.
1799	0022.00	Large woody debris.
2423	0033.00	Two log structures.
2834	0042.00	Root wad/log structure on the right bank.
3350	0055.00	Left bank log structure.
3510	0058.00	Slide on the right bank measuring 57' long x 40' high.
4408	0079.00	Log causing plunge pool is anchored to the bank by rebar and the plunge height = 1.5'.
4478	0081.00	Log structure.
4618	0085.00	Log structure on left bank.
4740	0087.00	Log structure on left bank. Slide on the left bank that measured 40' long x 40' high; partially revegetated.
5505	0104.00	Boulder structure.
5713	0109.00	One plus salmonids observed nearly every ten habitat units.
5908	0112.00	Left bank stabilization log structure. Left bank erosion, partially revegetated.

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5981	0113.00	Left bank erosion continues.
6045	0115.00	LDA #2 was a possible structure as some logs were connected by cables and others were cabled to the right bank; approximately 8' high x 30' wide x 50' long. Approximately 20 pieces of large woody debris and had visible gaps with water flowing through it and no sediment retention. Fish were observed above the accumulation.
6176	0117.00	Left bank slide that measured 92' long x 80' high.
6456	0120.00	2.5' plunge.
6664	0121.02	4.5' plunge at the top of the habitat unit.
6821	0126.00	Several 1+ fish observed.
7553	0138.00	Left bank log structure.
7710	0140.00	LDA #3 roughly measured 13' high x 45' wide x 33' long. It had about 10 pieces of large woody debris. There were no visible gaps and water did not flow through it. There was sediment retention that measured 28' wide x 68' long x 8' deep which ranged from gravels-silt. The shortest plunge was a 5'. Fish were observed above the accumulation.
8213	0155.00	LDA #4 roughly measured 11' high x 50' wide x 89' long. It had 13 pieces of large woody debris. There were no visible gaps but water did flow through it. There was sediment retention that measured 19' wide x 3' long x 5' deep which ranged from gravels-silt. The shortest plunge was a 5'. Fish were observed above the accumulation
8863	0160.00	Tributary #1 on the right bank.
9049	0161.00	Log structures on the right and left bank, as well as an instream log weir that had a 1' plunge.
9336	0164.00	Left bank log structure.
9685	0168.00	There is a 7' waterfall with no plunge pool. There is a plunge pool (1.2'-3.0' deep) 7' downstream of the edge of the waterfall. The plunge pool had an average depth of 1.2'. The crew continued surveying for approximately 2,000' and saw few YOY.
10284	0180.00	YOY salmonids observed.
10747	0185.00	Boulder/log structure.

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11083	0191.00	A 3' plunge in this unit.
11195	0195.00	LDA #5 was encountered that was a possible barrier to salmonids. The accumulation was 8' high x 40' wide x 233' long and was made of 46 pieces of large woody debris. There were visible gaps and water was flowing through it. Sediment retention measured approximately 46' wide x 80' long x 3' deep and sediment size ranged from gravels to silt. No fish were observed above LDA.
11645	0197.00	End of survey due to lack of habitat, plunge pool and LDA at 11,195.

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}

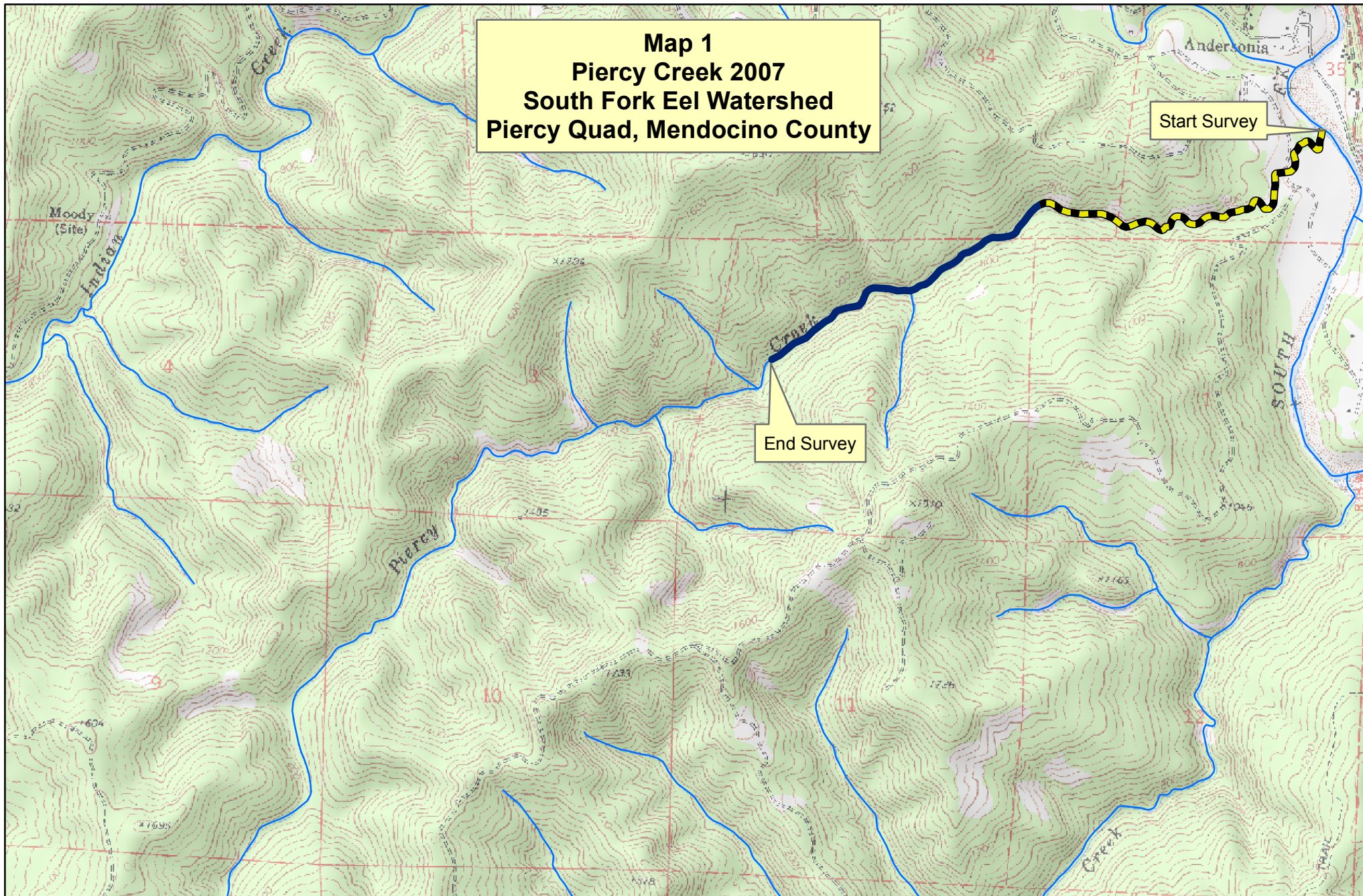
ADDITIONAL UNIT DESIGNATIONS

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



Map 1
Piercy Creek 2007
South Fork Eel Watershed
Piercy Quad, Mendocino County

Start Survey

End Survey



Legend

-  Reach 1, B3 Channel Type
-  Reach 2, F2 Channel Type

0 1,250 2,500 5,000 Feet



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

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0

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
2	0	DRY	1.0	478	956	8.1									
43	6	FLATWATER	21.5	58	2502	21.1	11.0	0.5	1.3	610	26241	365	15691		48
70	70	POOL	35.0	37	2618	22.1	14.9	0.5	1.8	515	36063	579	40546	258	56
85	10	RIFFLE	42.5	68	5778	48.7	11.3	0.5	1.1	381	32400	232	19688		71
Total Units 200	Total Units Fully Measured 86				Total Length (ft.) 11854						Total Area (sq.ft.) 94705		Total Volume (cu.ft.) 75925		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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 (%)
24	3	LGR	12.0	59	1422	12.0	8	0.3	0.9	183	4390	57	1377		27	85
52	5	HGR	26.0	73	3784	31.9	12	0.5	1.4	450	23402	243	12633		87	93
9	2	CAS	4.5	64	572	4.8	16	0.9	2.4	506	4557	465	4183		98	93
26	3	RUN	13.0	38	983	8.3	11	0.5	1.4	445	11572	243	6325		33	92
17	3	SRN	8.5	89	1519	12.8	11	0.6	1.6	775	13183	487	8272		63	94
58	58	MCP	29.0	36	2093	17.7	15	0.4	4.7	500	28996	557	32300	248	49	93
3	3	STP	1.5	103	310	2.6	14	0.3	1.9	1203	3608	1289	3866	447	100	94
4	4	LSL	2.0	27	108	0.9	15	0.8	3.6	407	1627	627	2509	518	84	87
5	5	PLP	2.5	21	107	0.9	18	0.4	2.4	366	1832	374	1871	146	93	91
2	0	DRY	1.0	478	956	8.1										
Total Units	Total Units Fully Measured		Total Length (ft.)			Total Area (sq.ft.)			Total Volume (cu.ft.)							
200	86		11854			93168			73334							

Table 3 - Summary of Pool Types

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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
61	61	MAIN	87	39	2403	92	14.6	0.4	534	32604	255	14764	52
9	9	SCOUR	13	24	215	8	17.0	0.6	384	3459	285	2284	89
Total Units 70	Total Units Fully Measured 70				Total Length (ft.) 2618					Total Area (sq.ft.) 36063		Total Volume (cu.ft.) 17048	

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

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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
58	MCP	83	5	9	34	59	17	29	1	2	1	2
3	STP	4	0	0	3	100	0	0	0	0	0	0
4	LSL	6	0	0	2	50	1	25	1	25	0	0
5	PLP	7	0	0	4	80	1	20	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
70	5	7	43	61	19	27	2	3	1	1

Mean Maximum Residual Pool Depth (ft.): 1.8

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Dry Units: 2

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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
24	3	LGR	0	7	0	0	93	0	0	0	0
52	5	HGR	0	20	1	0	39	0	11	29	0
9	2	CAS	0	13	0	0	28	0	20	40	0
85	10	TOTAL RIFFLE	0	15	1	0	53	0	10	23	0
26	3	RUN	0	17	10	23	50	0	0	0	0
17	3	SRN	0	15	0	0	37	0	20	28	0
43	6	TOTAL FLAT	0	16	5	12	43	0	10	14	0
58	58	MCP	7	12	24	2	31	0	5	19	0
3	3	STP	2	13	7	0	13	0	17	48	0
4	4	LSL	0	19	58	0	18	0	3	4	0
5	5	PLP	10	2	8	6	3	0	45	26	0
70	70	TOTAL POOL	6	12	24	2	27	0	8	20	0
200	86	TOTAL	5	12	20	3	31	0	8	20	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Dry Units: 2

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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
24	3	LGR	0	0	33	67	0	0	0
52	5	HGR	0	0	0	40	40	20	0
9	2	CAS	0	0	0	0	0	100	0
26	3	RUN	0	0	0	100	0	0	0
17	3	SRN	0	0	0	0	100	0	0
58	58	MCP	2	12	17	29	17	21	2
3	3	STP	0	0	0	0	33	67	0
4	4	LSL	0	25	50	0	25	0	0
5	5	PLP	0	0	20	0	20	40	20

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
92	19	81	0	87	85

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: Piercy Creek	LLID: 1238023399744	Drainage: Eel River - South Fork
Survey Dates: 10/9/2007 to 10/22/2007	Survey Length (ft.): 11854	Main Channel (ft.): 11645
Confluence Location: Quad: PIERCY	Legal Description: T05SR03ES35	Latitude: 39:58:28.0N
		Longitude: 123:48:08.0W

STREAM REACH: 1																				
Channel Type: B3			Canopy Density (%): 91.6				Pools by Stream Length (%): 24.0													
Reach Length (ft.): 6479			Coniferous Component (%): 19.0				Pool Frequency (%): 34.2													
Riffle/Flatwater Mean Width (ft.): 10.3			Hardwood Component (%): 81.0				Residual Pool Depth (%):													
BFW:			Dominant Bank Vegetation: Hardwood Trees				< 2 Feet Deep: 73													
Range (ft.): 20 to 51			Vegetative Cover (%): 82.5				2 to 2.9 Feet Deep: 24													
Mean (ft.): 29			Dominant Shelter: Terrestrial Veg.				3 to 3.9 Feet Deep: 0													
Std. Dev.: 9			Dominant Bank Substrate Type: Sand/Silt/Clay				>= 4 Feet Deep: 2													
Base Flow (cfs.): 1.2			Occurrence of LWD (%): 20				Mean Max Residual Pool Depth (ft.): 1.7													
Water (F): 50 - 52			Air (F): 50 - 61		LWD per 100 ft.:		Mean Pool Shelter Rating: 42													
Dry Channel (ft): 836			Riffles: 1																	
			Pools: 3																	
			Flat: 1																	
Pool Tail Substrate (%): Silt/Clay: 2			Sand: 5		Gravel: 51		Sm Cobble: 24		Lg Cobble: 12		Boulder: 5		Bedrock: 0							
Embeddedness Values (%): 1.			12.2		2.		48.8		3.		19.5		4.		14.6		5.		4.9	

Channel Type:	F2	Canopy Density (%):	92.6	Pools by Stream Length (%):	19.7		
Reach Length (ft.):	5166	Coniferous Component (%):	19.4	Pool Frequency (%):	36.3		
Riffle/Flatwater Mean Width (ft.):	12.3	Hardwood Component (%):	80.6	Residual Pool Depth (%):			
BFW:		Dominant Bank Vegetation:	Hardwood Trees	< 2 Feet Deep:	62		
Range (ft.):	19 to 46	Vegetative Cover (%):	91.7	2 to 2.9 Feet Deep:	31		
Mean (ft.):	30	Dominant Shelter:	Boulders	3 to 3.9 Feet Deep:	7		
Std. Dev.:	8	Dominant Bank Substrate Type:	Sand/Silt/Clay	>= 4 Feet Deep:	0		
Base Flow (cfs.):	1.2	Occurrence of LWD (%):	21	Mean Max Residual Pool Depth (ft.):	1.9		
Water (F):	49 - 51	Air (F):	51 - 55	Mean Pool Shelter Rating:	77		
Dry Channel (ft):	120	Riffles:	3				
		Pools:	4				
		Flat:	1				
Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 0	Gravel: 21	Sm Cobble: 34	Lg Cobble: 24	Boulder: 21	Bedrock: 0
Embeddedness Values (%):	1. 17.2	2. 37.9	3. 10.3	4. 13.8	5. 20.7		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

Legal Description: T05SR03ES35

Latitude: 39:58:28.0N

Longitude: 123:48:08.0W

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	2	3	2.9
Boulder	0	0	0.0
Cobble / Gravel	8	10	10.5
Sand / Silt / Clay	76	73	86.6

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	5	7	7.0
Brush	2	4	3.5
Hardwood Trees	62	52	66.3
Coniferous Trees	17	23	23.3
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 3

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

StreamName: Piercy Creek

LLID: 1238023399744

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/22/2007

Confluence Location: Quad: PIERCY

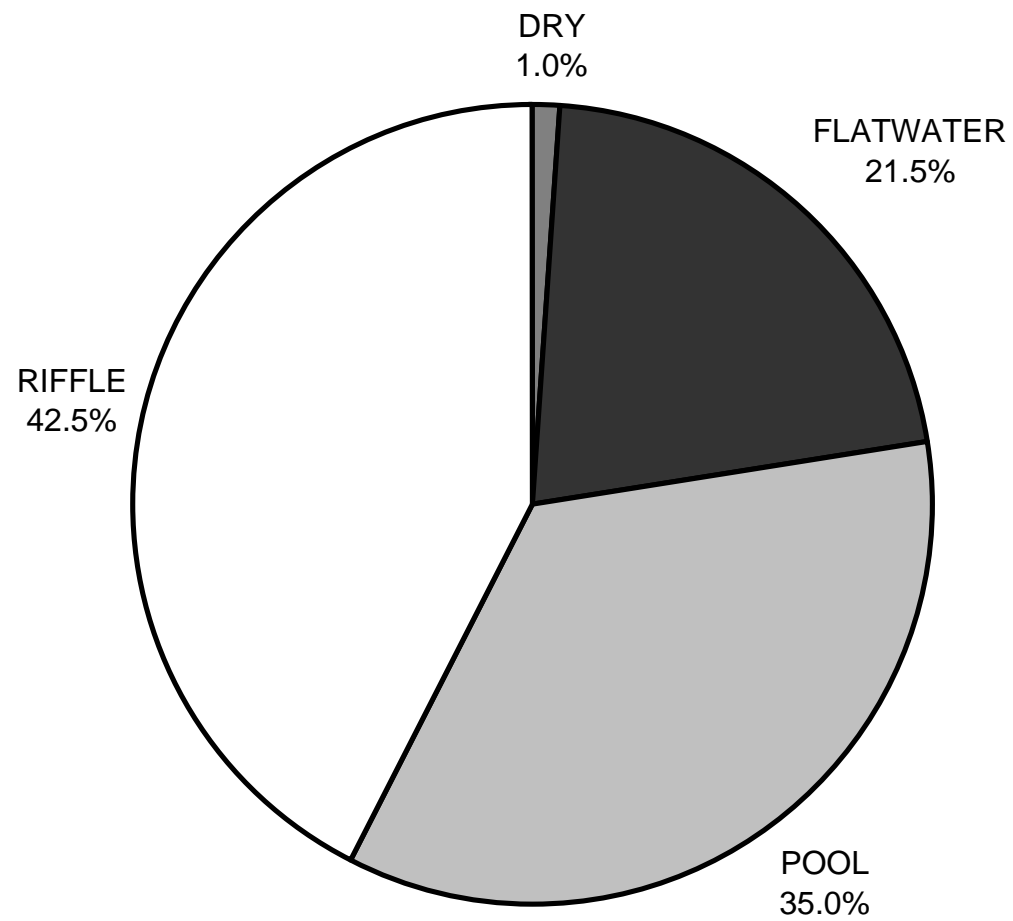
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Longitude: 123:48:08.0W

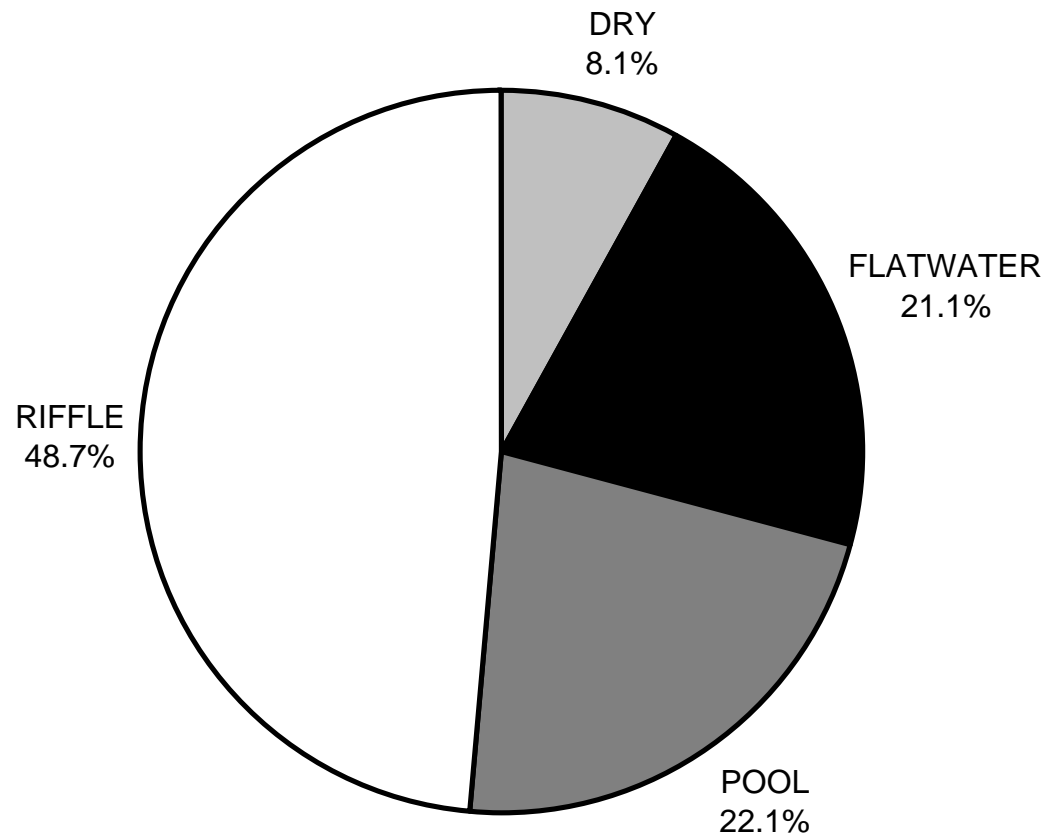
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	6
SMALL WOODY DEBRIS (%)	15	16	12
LARGE WOODY DEBRIS (%)	1	5	24
ROOT MASS (%)	0	12	2
TERRESTRIAL VEGETATION (%)	53	43	27
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	10	10	8
BOULDERS (%)	23	14	20
BEDROCK LEDGES (%)	0	0	0

PIERCY CREEK 2007
HABITAT TYPES BY PERCENT OCCURRENCE



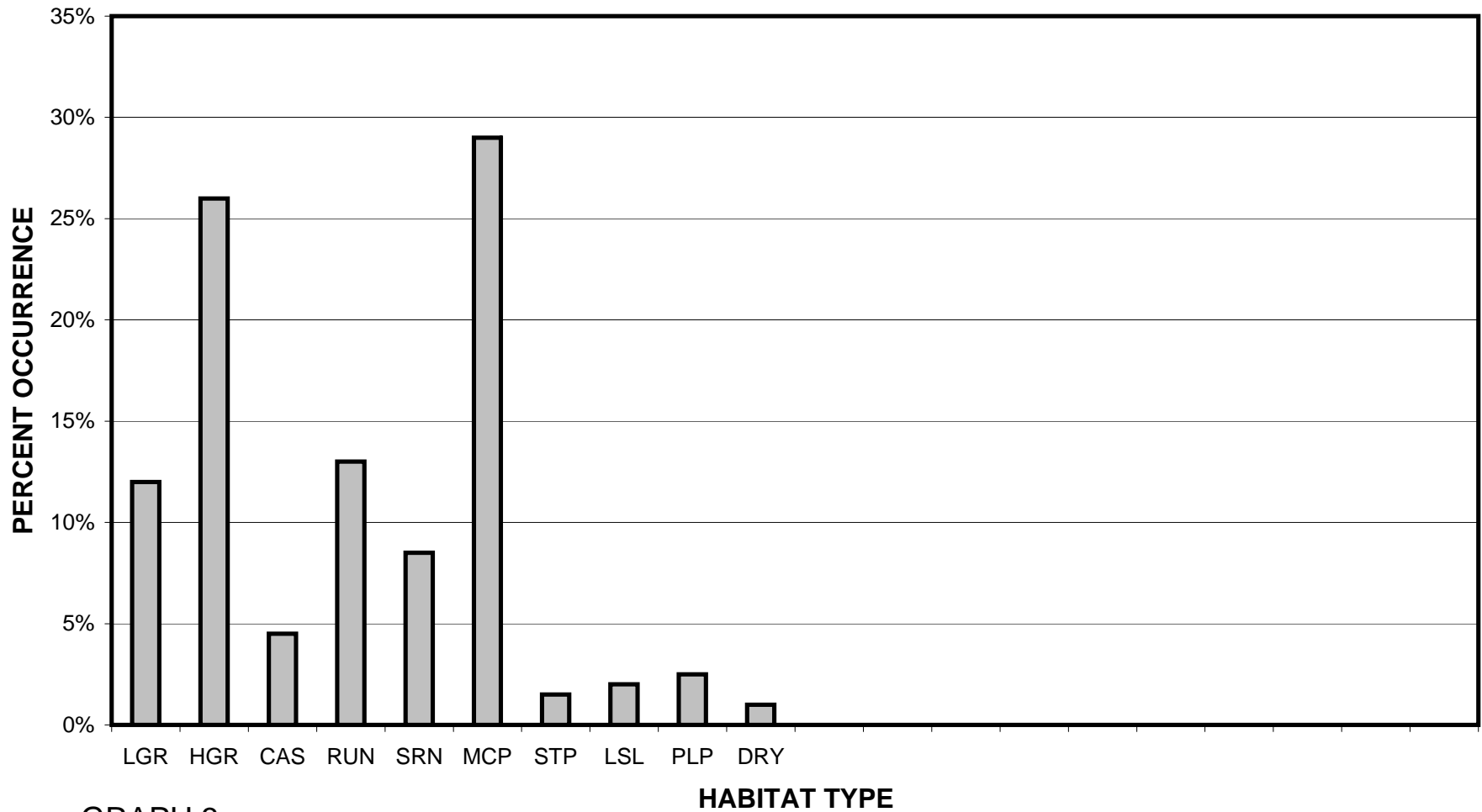
GRAPH 1

PIERCY CREEK 2007
HABITAT TYPES BY PERCENT TOTAL LENGTH

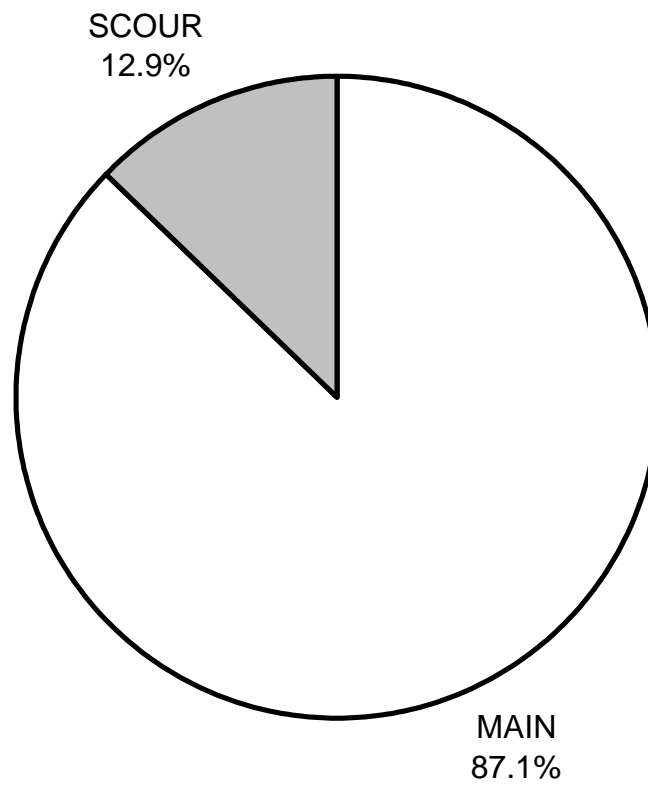


GRAPH 2

GRAPH 3

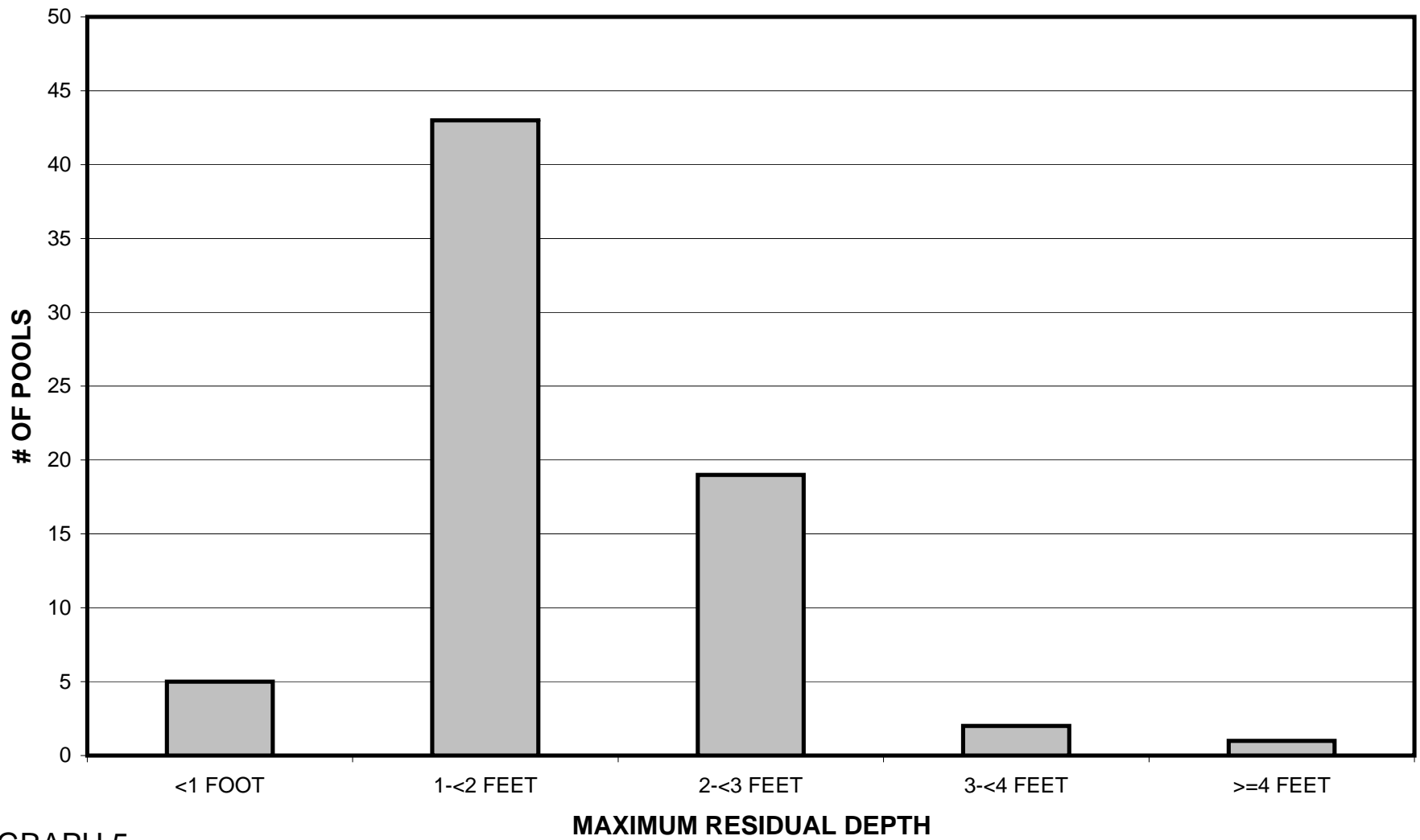


**PIERCY CREEK 2007
POOL TYPES BY PERCENT OCCURRENCE**



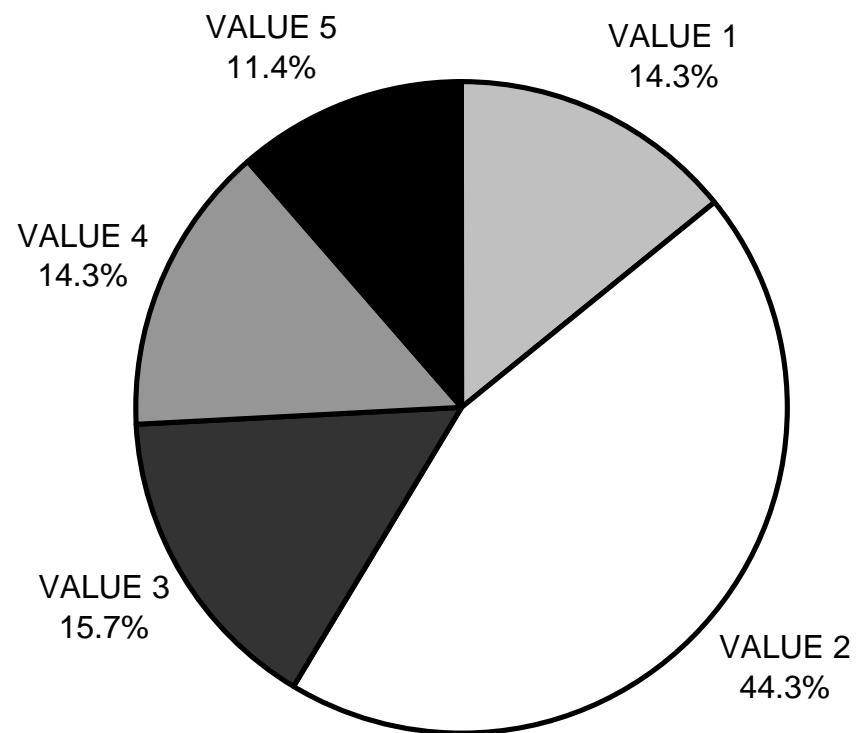
GRAPH 4

PIERCY CREEK 2007 MAXIMUM DEPTH IN POOLS



GRAPH 5

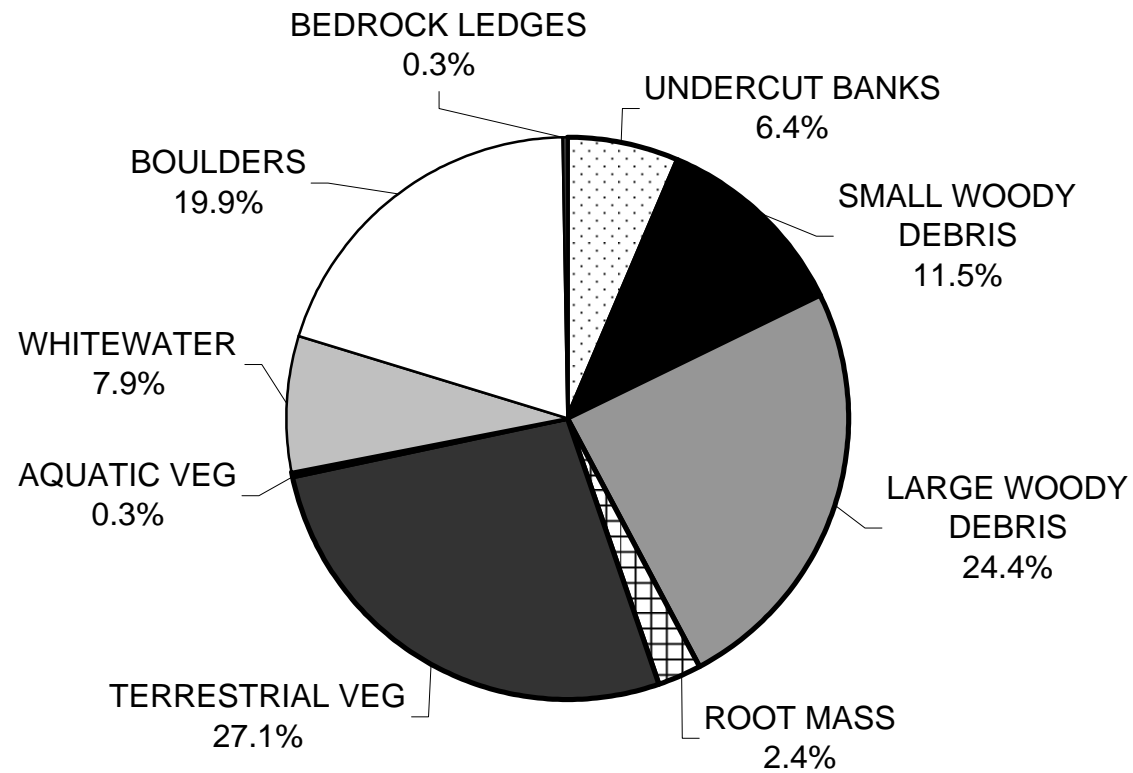
PIERCY CREEK 2007 PERCENT EMBEDDEDNESS



GRAPH 6

PIERCY CREEK 2007

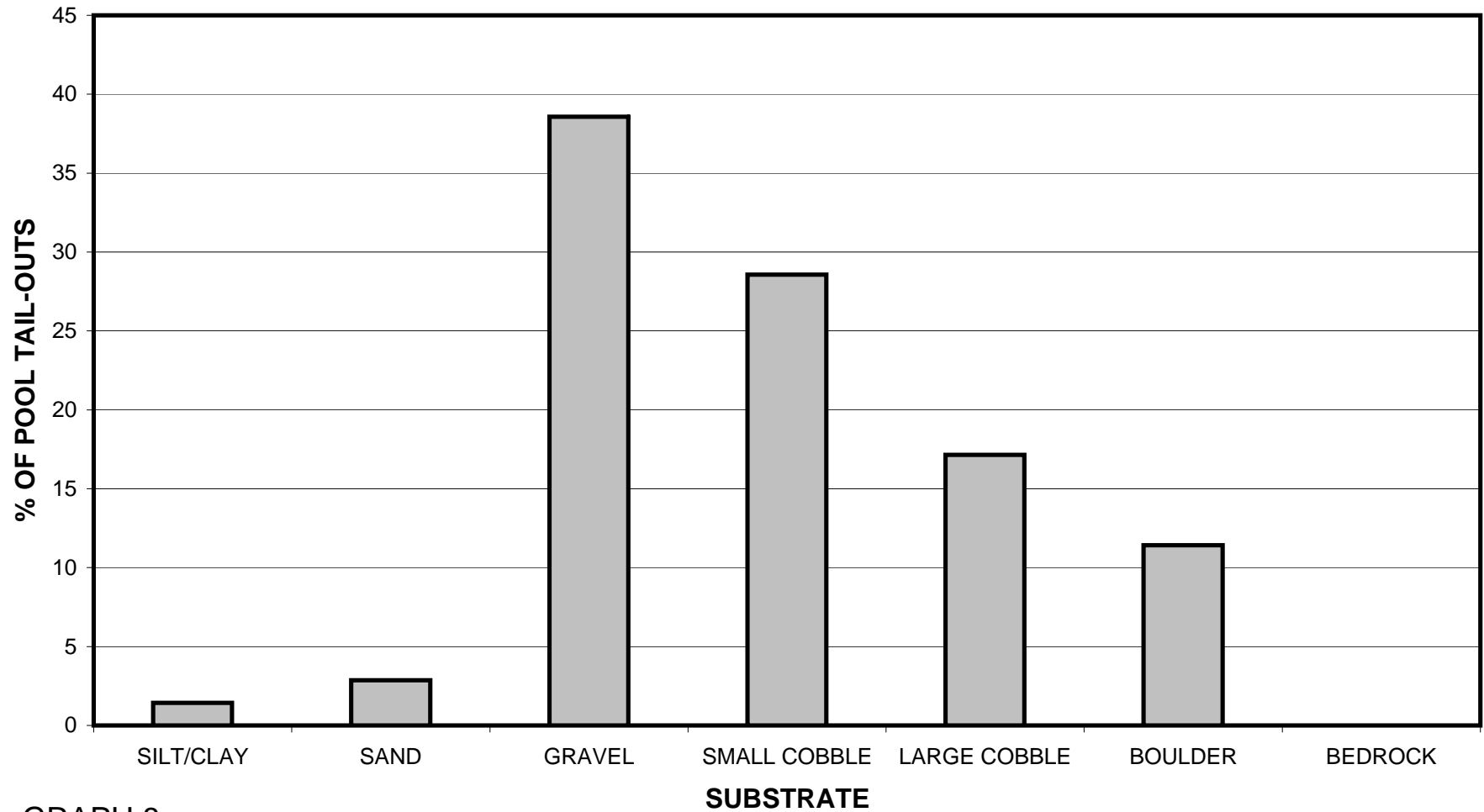
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

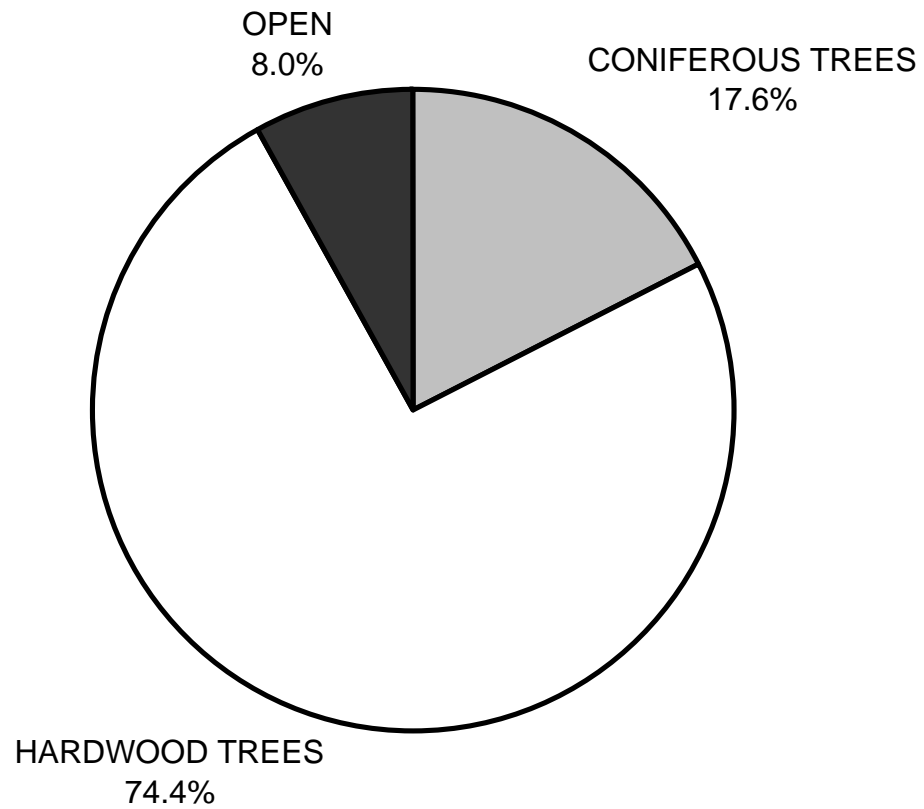
PIERCY CREEK 2007

SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



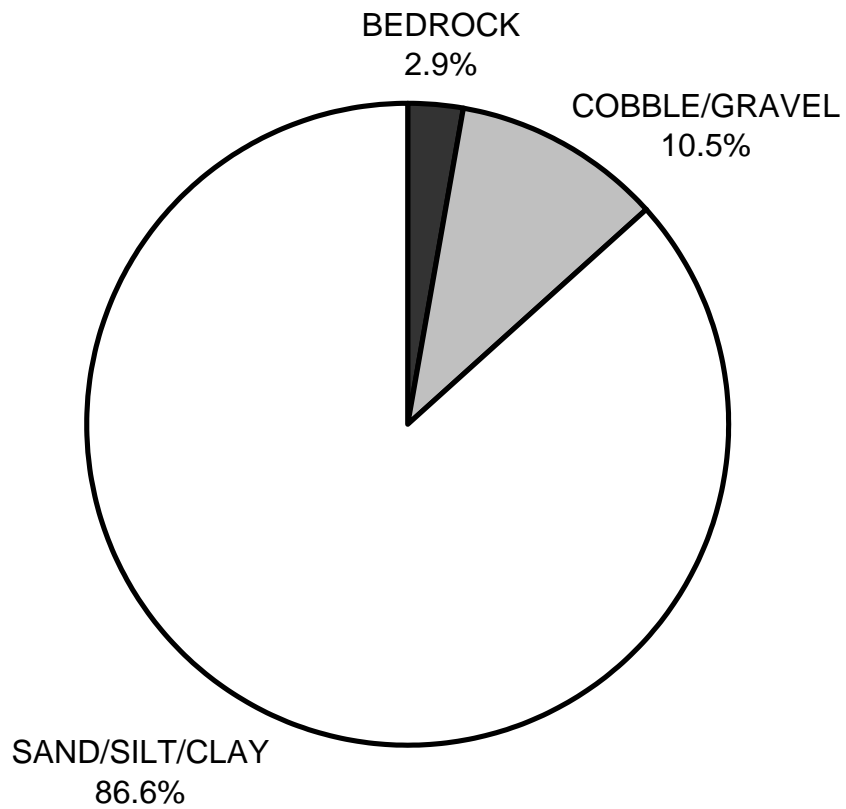
GRAPH 8

**PIERCY CREEK 2007
MEAN PERCENT CANOPY**



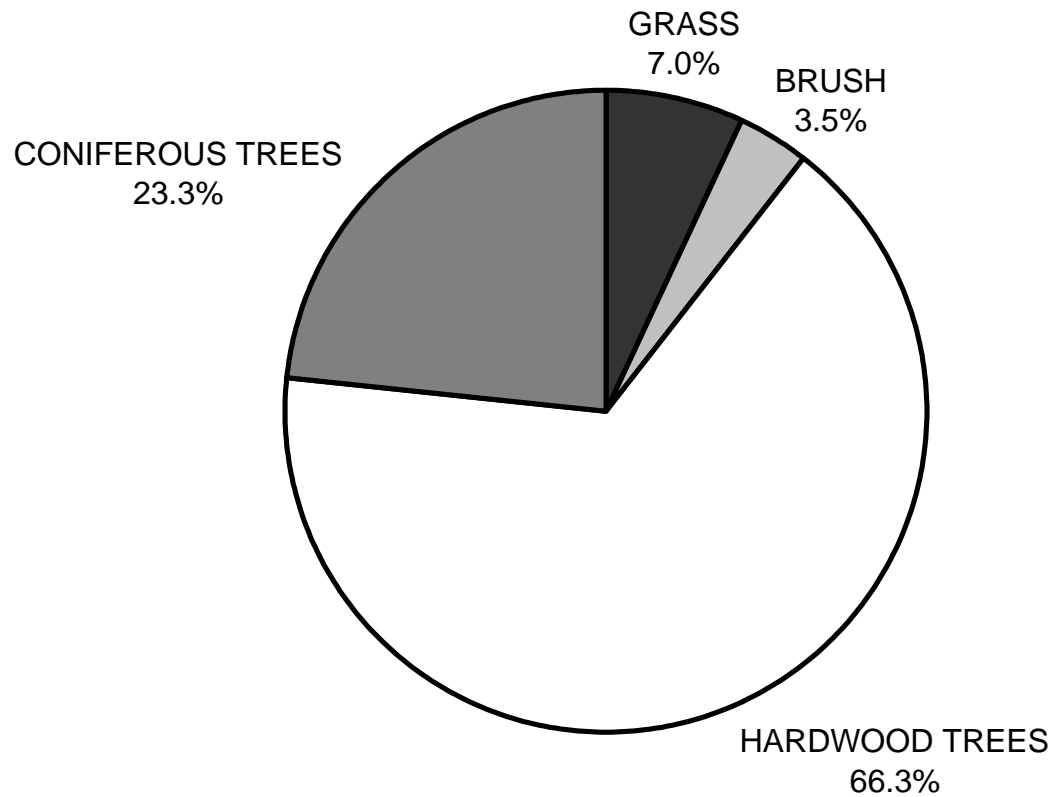
GRAPH 9

PIERCY CREEK 2007
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

PIERCY CREEK 2007
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11