

# **STREAM INVENTORY REPORT**

## **Coon Creek**

### INTRODUCTION

A stream inventory was conducted on August 22, 2007 on Coon Creek. The survey began at the confluence with Butte Creek and extended upstream 0.5 miles.

The Coon Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Coon Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

Coon Creek is a tributary to Butte Creek, tributary to South Fork Eel River, tributary to Eel River which drains to the Pacific Ocean, located in Humboldt County, California (Map 1). Coon Creek's legal description at the confluence with Butte Creek is T3S R3E S10. Its location is 40.2146 north latitude and 123.8239 west longitude, LLID number 1238228402147. Coon Creek is a first order stream and has approximately 1.5 miles of blue line stream according to the USGS Miranda 7.5 minute quadrangle. Coon Creek drains a watershed of approximately 1.9 square miles. Elevations range from about 270 feet at the mouth of the creek to 1,350 feet in the headwater areas. Redwood and Douglas fir forest dominates the watershed. The watershed is privately owned and is managed for timber production. Vehicle access exists via Highway 101 south. Take the Miranda exit. Turn left, and turn left again on Maple Hills Road. Turn left on Bear Buttes Road, and turn onto first left after the dirt road. Park at the gate, and then walk down to the creek. Coon Creek is downstream from bridge.

### METHODS

The habitat inventory conducted in Coon 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 Coon 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". Coon 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.

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### 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 Coon 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 Coon 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 Coon 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 Coon 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.

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### 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 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 Coon Creek. In addition, underwater observations were made at 10 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

## DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, 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

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for Coon 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 August 22, 2007, was conducted by B. Rahn, and L. Lee (WSP). The total length of the stream surveyed was 2,731 feet.

Stream flow was not measured on Coon Creek.

Coon Creek is an F4 channel type for the entire 2,731 feet of the stream surveyed. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 58 to 60 degrees Fahrenheit. Air temperatures ranged from 60 to 62 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40% riffle units, 32% flatwater units, 20% pool units, and 8% dry units (Graph 1). Based on total length of Level II habitat types there were 55% riffle units, 29% flatwater units, 12% dry units, and 4% pool units (Graph 2).

Seven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 40% low gradient riffle units, 22% step run units, and 15% mid-channel pool units (Graph 3). Based on percent total length, low gradient riffle units made up 55%, step run units 25%, and dry units 12%.

A total of 8 pools were identified (Table 3). Main Channel pools were the most frequently encountered, at 75% (Graph 4), and comprised 79% 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. Two of the 8 pools (25%) had a residual depth of two feet or greater (Graph 5).

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The depth of cobble embeddedness was estimated at pool tail-outs. Of the 8 pool tail-outs measured, 1 had a value of 1 (12.5%); 4 had a value of 2 (50%); 3 had a value of 3 (37.5%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst.

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 180, flatwater habitat types had a mean shelter rating of 67, and pool habitats had a mean shelter rating of 45 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 45, scour pools had a mean shelter rating of 45 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Coon Creek. Graph 7 describes the pool cover in Coon 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. Small cobble was observed in 50% of pool tail-outs, and gravel was observed 38% of pool tail-outs.

The mean percent canopy density for the surveyed length of Coon Creek was 86%. Fourteen percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 43% and 57%, respectively. Graph 9 describes the mean percent canopy in Coon Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 85%. The mean percent left bank vegetated was 86%. The dominant elements composing the structure of the stream banks consisted of 58% cobble/gravel, 27% bedrock, 12% sand/silt/clay, and 4% boulder (Graph 10). Coniferous trees were the dominant vegetation type observed in 58% of the units surveyed. Additionally, 35% of the units surveyed had deciduous trees as the dominant vegetation type, 4% had grass as the dominant vegetation, and 4% had brush as the dominant vegetation (Graph 11).

## **BIOLOGICAL INVENTORY RESULTS**

Ten sites were surveyed by mask and snorkel for species composition and distribution in Coon Creek on September 26, 2007. Water temperatures taken during the snorkeling period 1100-1215 ranged from 53 to 55 degrees Fahrenheit. Air temperatures ranged from 55 to 59 degrees Fahrenheit. The sites were sampled by S. Monday (DFG), T. Fisher, and R. Marsh (WSP).

In reach 1, which comprised the first 2,731 feet of stream, 10 sites were sampled. The reach sites yielded 37 young-of-the-year steelhead/rainbow trout (SH/RT).

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### 2007 Coon Creek Underwater Observations.

Date	Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	Coho		SH/RT		
					YOY	1+	YOY	1+	2+
Reach 1: F4 Channel Type									
09/26/08	1	002	3.3	190	0	0	10	0	0
09/26/08	2	006	4.2	259	0	0	6	0	0
09/26/08	3	011	4.2	743	0	0	20	0	0
09/26/08	4	017	4.2	1014	0	0	1	0	0
09/26/08	5	022	4.2	1395	0	0	0	0	0
09/26/08	6	031	3.4	2269	0	0	0	0	0
09/26/08	7	032	5.4	2364	0	0	0	0	0
09/26/08	8	034	4.2	2405	0	0	0	0	0
09/26/08	9	036	5.6	2443	0	0	0	0	0
09/26/08	10	038	4.2	2478	0	0	0	0	0

## DISCUSSION

Coon Creek is F4 channel type for the entire 2,731 feet of stream surveyed. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channels are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey day August 22, 2007, ranged from 58 to 60 degrees Fahrenheit. Air temperatures ranged from 60 to 62 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 4% of the total length of this survey, riffles 55%, and pools 4%. The pools are relatively shallow, with only 2 of the 8 (25%) 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.

Five of the 8 pool tail-outs measured had embeddedness ratings of 1 or 2. Three of the pool tail-

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outs had embeddedness ratings of 3 or 4. None 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.

Seven of the 8 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 45. The shelter rating in the flatwater habitats was 67. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Coon 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 86%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 85% and 86%, 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) Coon 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) 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) 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.
- 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.



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### 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	Survey began at the confluence with Butte Creek.
165	0002.00	Log debris accumulation (LDA) #1 was 11' high x 30' wide x 20' long and it was made up of 10 pieces of large woody debris (LWD). Water was flowing through and there were visible gaps in the LDA. The sediment that was being retained measured 30' wide x 80' long x 5' deep and ranged in size from gravels to boulders. Fish were observed above the LDA.
545	0008.00	LDA #2 was 9' high x 34' wide x 27' long, and it consisted of 9 pieces of LWD. Water was not flowing through the LDA and there were no visible gaps in it. The retained sediment measured 35' wide x 100' long x 5' deep and ranged in size from sand to boulders. Fish were seen above the LDA. There was a slide on right bank measuring ~ 40' long x 60' high, it was partially vegetated.
785	0013.00	There was a right bank slide measuring ~ 50' long x 60' high. There was a 2.5' plunge 28' into this unit.
877	0014.00	There was a left bank slide contributing boulders and gravels. There was lots of sediment in the channel here.
1014	0017.00	There were young-of-the-year and a 1+ year old salmonids observed. These were the last salmonids to be observed during the survey.
1027	0018.00	LDA #3 was 10' high x 30' wide x 25' long and contained 4 pieces of LWD. Water was flowing through the LDA, but there were no visible gaps. The sediment being retained measured approximately 35' wide x 100' long x 10' high. The sediment ranged in size from gravels to boulders. There were no fish observed above the LDA and it was a possible barrier to juvenile and adult salmonids. There was an 8' high plunge that had a less than 1' deep jump pool beneath it, and there was very little flow above the LDA. There was erosion on the left bank that was contributing gravel and boulders and measured ~ 70' long X 60' high.
1268	0020.00	LDA #4 was 12' high x 31' wide x 85' long and included 15 pieces of LWD. Water was not flowing through and there were no visible gaps. Sediment was being retained in the dimensions of 38' wide x 100' long x 10' deep, the sediment ranged in size from gravels to boulders. No fish

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were seen above the LDA and the LDA is a possible barrier to juvenile and adult salmonids. Water was seeping through gravels at the top of the LDA. There was erosion on the left and right banks along the full length of the LDA (measuring ~85' long x 50' high) which was contributing LWD, boulders, cobbles, gravels and small woody debris.

1395	0022.00	There was a slide on the left bank measuring 80' long x 50' wide. At the top of this unit there was a boulder and a root wad pinching the flow of the creek, causing a possible migration barrier.
2380	0033.00	There was a 3' plunge at the top of this unit.
2443	0036.00	There was a 2' plunge.
2478	0038.00	There was a landslide on the left bank measuring 80' long x 80' wide.
2489	0039.00	LDA #5 measured 10' high x 30' wide x 20' long and included 11 pieces of large wood. Water was not flowing through, and there were no visible gaps in the LDA. Sediment was being retained in the dimensions of 30' wide x 300' long x 10' deep, and ranged in size from gravels to cobbles. There were no fish seen above the LDA and it was a possible barrier to both juveniles and adults.
2731	0040.00	End of survey due to little flowing water and multiple migration barriers. No fish were observed since the third large debris accumulation on habitat unit #18. A visual survey upstream of this unit revealed no salmonids.

## 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 }

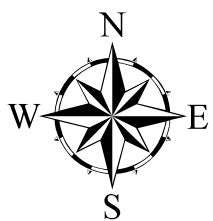
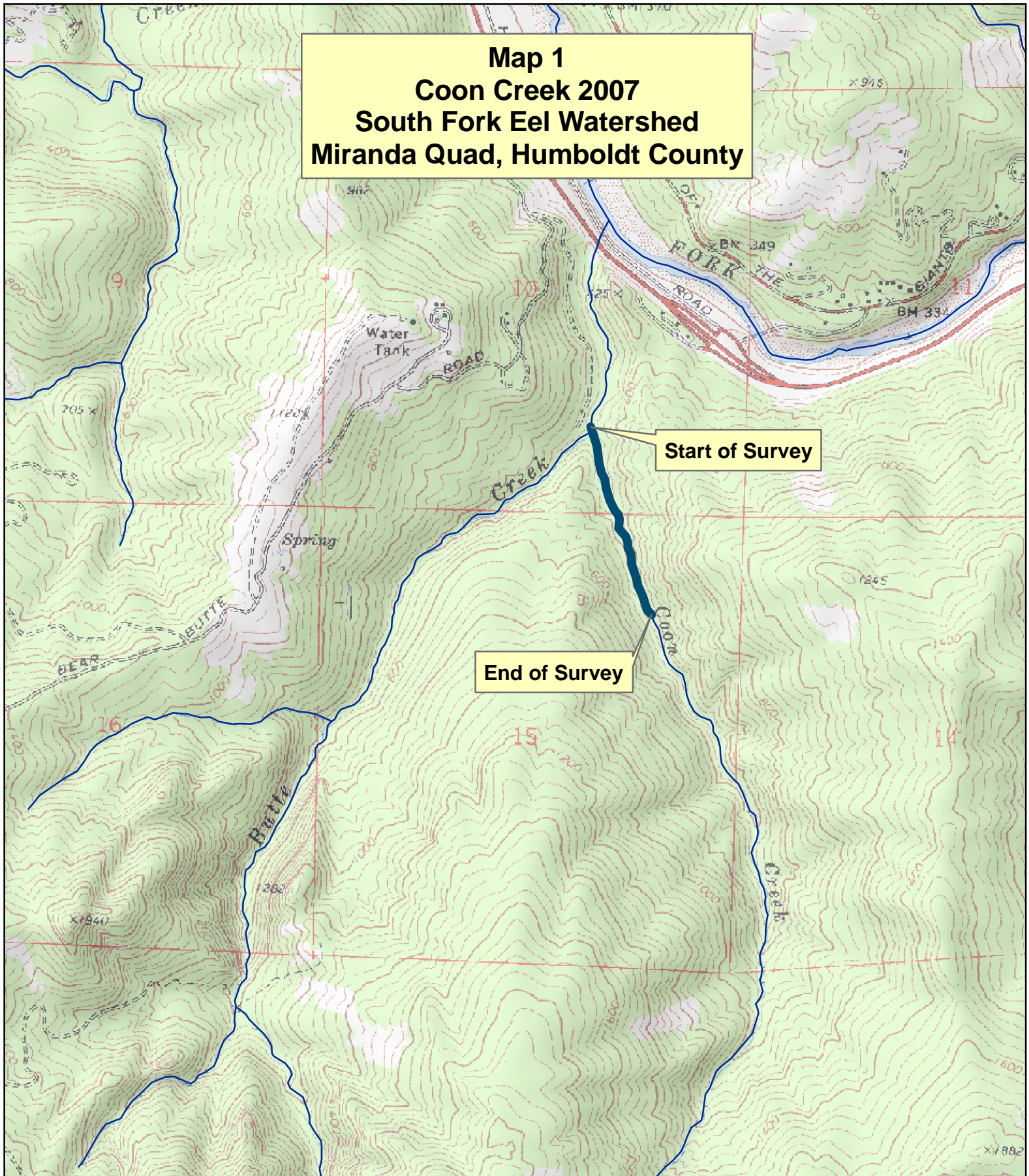
#### BACKWATER POOLS

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**  
**Coon Creek 2007**  
**South Fork Eel Watershed**  
**Miranda Quad, Humboldt County**



**Legend**

— Reach 1, F4 Channel Type

0 750 1,500 3,000 Feet



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

Stream Name: Coon Creek LLID: 1238228402147 Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA Legal Description: T03SR03ES10 Latitude: 40:12:53.0N Longitude: 123:49:22.0

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	7.5	110	331	12.1									
13	3	FLATWATER	32.5	61	788	28.9	6.5	0.7	1.2	380	4939	288	3744		67
8	8	POOL	20.0	15	119	4.4	7.9	1.0	1.7	112	894	140	1117	108	45
16	2	RIFFLE	40.0	93	1493	54.7	7.3	0.4	0.9	637	10197	255	4079		180
Total Units	Total Units Fully Measured			Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)			
40	13			2731						16030		8940			

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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

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 (%)
16	2	LGR	40.0	93	1493	54.7	7	0.4	0.9	637	10197	255	4079		180	91
4	1	RUN	10.0	25	99	3.6	6	0.7	1.1	165	661	116	463		10	98
9	2	SRN	22.5	77	689	25.2	7	0.7	1.7	487	4385	374	3368		95	78
6	6	MCP	15.0	16	94	3.4	8	1.0	2	127	761	158	950	122	45	85
1	1	LSBk	2.5	16	16	0.6	4	0.8	1.2	64	64	64	64	51	15	76
1	1	PLP	2.5	9	9	0.3	8	1.2	1.8	68	68	103	103	82	75	94
3	0	DRY	7.5	110	331	12.1										80

Total Units  
40

Total Units Fully Measured  
13

Total Length (ft.)  
2731

Total Area (sq.ft.)  
16138

Total Volume (cu.ft.)  
9026

Table 3 - Summary of Pool Types

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

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
6	6	MAIN	75	16	94	79	8.5	1.0	127	761	122	732	45
2	2	SCOUR	25	13	25	21	6.0	1.0	66	132	67	133	45
Total Units	Total Units Fully Measured				Total Length (ft.)				Total Area (sq.ft.)			Total Volume (cu.ft.)	
8	8				119				894			865	

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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

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
6	MCP	75	0	0	4	67	2	33	0	0	0	0
1	LSBk	13	0	0	1	100	0	0	0	0	0	0
1	PLP	13	0	0	1	100	0	0	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
8	0	0	6	75	2	25	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.7



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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Dry Units: 3

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

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
16	2	LGR	0	20	25	5	5	0	5	40	0
16	2	TOTAL RIFFLE	0	20	25	5	5	0	5	40	0
4	1	RUN	0	0	0	0	0	0	0	50	50
9	2	SRN	0	5	10	20	0	0	5	55	5
13	3	TOTAL FLAT	0	3	7	13	0	0	3	53	20
6	6	MCP	3	2	11	13	0	0	0	52	19
1	1	LSBk	0	0	0	20	0	0	0	0	80
1	1	PLP	15	0	35	25	0	0	10	15	0
8	8	TOTAL POOL	4	1	13	16	0	0	1	41	24
40	13	TOTAL	3	5	13	13	1	0	2	43	20

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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Dry Units: 3

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

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
16	2	LGR	0	0	100	0	0	0	0
4	1	RUN	0	0	100	0	0	0	0
9	2	SRN	0	0	50	0	0	50	0
6	6	MCP	0	17	50	0	0	33	0
1	1	LSBk	0	100	0	0	0	0	0
1	1	PLP	0	0	100	0	0	0	0

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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
86	57	43	0	85	86

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: Coon Creek	LLID: 1238228402147	Drainage: Eel River - South Fork
Survey Dates: 8/22/2007 to 8/22/2007	Survey Length (ft.): 2731	Main Channel (ft.): 2731
		Side Channel (ft.): 0
Confluence Location: Quad: MIRANDA	Legal Description: T03SR03ES10	Latitude: 40:12:53.0N
		Longitude: 123:49:22.0W

### Summary of Fish Habitat Elements By Stream Reach

Channel Type:	F4	Canopy Density (%):	86.1	Pools by Stream Length (%):	4.4
Reach Length (ft.):	2731	Coniferous Component (%):	56.8	Pool Frequency (%):	20.0
Riffle/Flatwater Mean Width (ft.):	6.8	Hardwood Component (%):	43.2	Residual Pool Depth (%):	
BFW:		Dominant Bank Vegetation:	Coniferous Trees	< 2 Feet Deep:	75
Range (ft.):	14 to 24	Vegetative Cover (%):	85.6	2 to 2.9 Feet Deep:	25
Mean (ft.):	18	Dominant Shelter:	Boulders	3 to 3.9 Feet Deep:	0
Std. Dev.:	4	Dominant Bank Substrate Type:	Cobble/Gravel	>= 4 Feet Deep:	0
Base Flow (cfs.):	0.0	Occurrence of LWD (%):	13	Mean Max Residual Pool Depth (ft.):	1.7
Water (F):	58 - 60	Air (F):	60 - 62	Mean Pool Shelter Rating:	45
Dry Channel (ft):	331	Riffles:	3		
		Pools:	8		
		Flat:	5		
Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 13	Gravel: 38	Sm Cobble: 50	Lg Cobble: 0
	Boulder: 0	Bedrock: 0			
Embeddedness Values (%):	1. 12.5	2. 50.0	3. 37.5	4. 0.0	5. 0.0

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

Stream Name: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

Latitude: 40:12:53.0N

Longitude: 123:49:22.0W

**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	3	4	26.9
Boulder	0	1	3.8
Cobble / Gravel	8	7	57.7
Sand / Silt / Clay	2	1	11.5

**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	0	1	3.8
Brush	0	1	3.8
Hardwood Trees	4	5	34.6
Coniferous Trees	9	6	57.7
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 2

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

StreamName: Coon Creek

LLID: 1238228402147

Drainage: Eel River - South Fork

Survey Dates: 8/22/2007 to 8/22/2007

Confluence Location: Quad: MIRANDA

Legal Description: T03SR03ES10

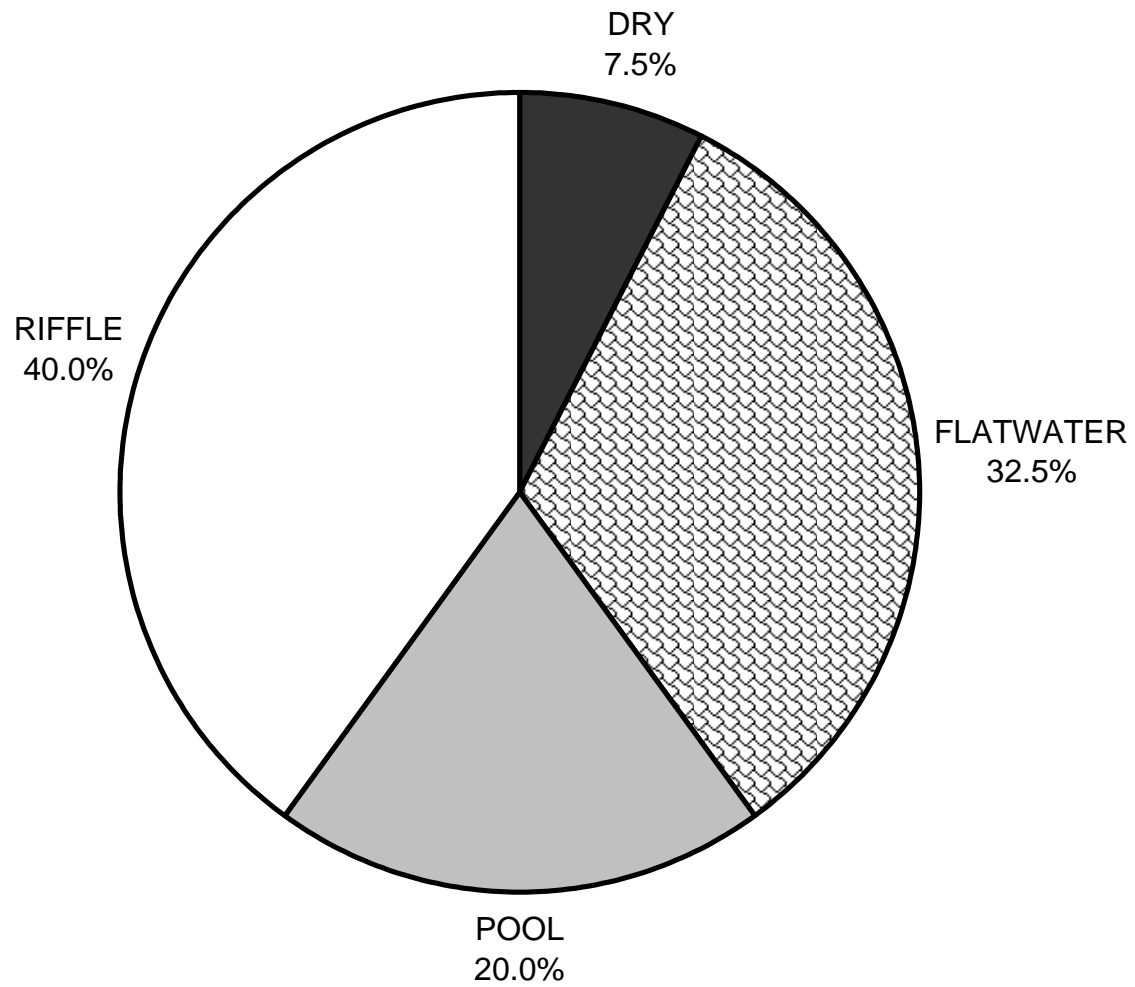
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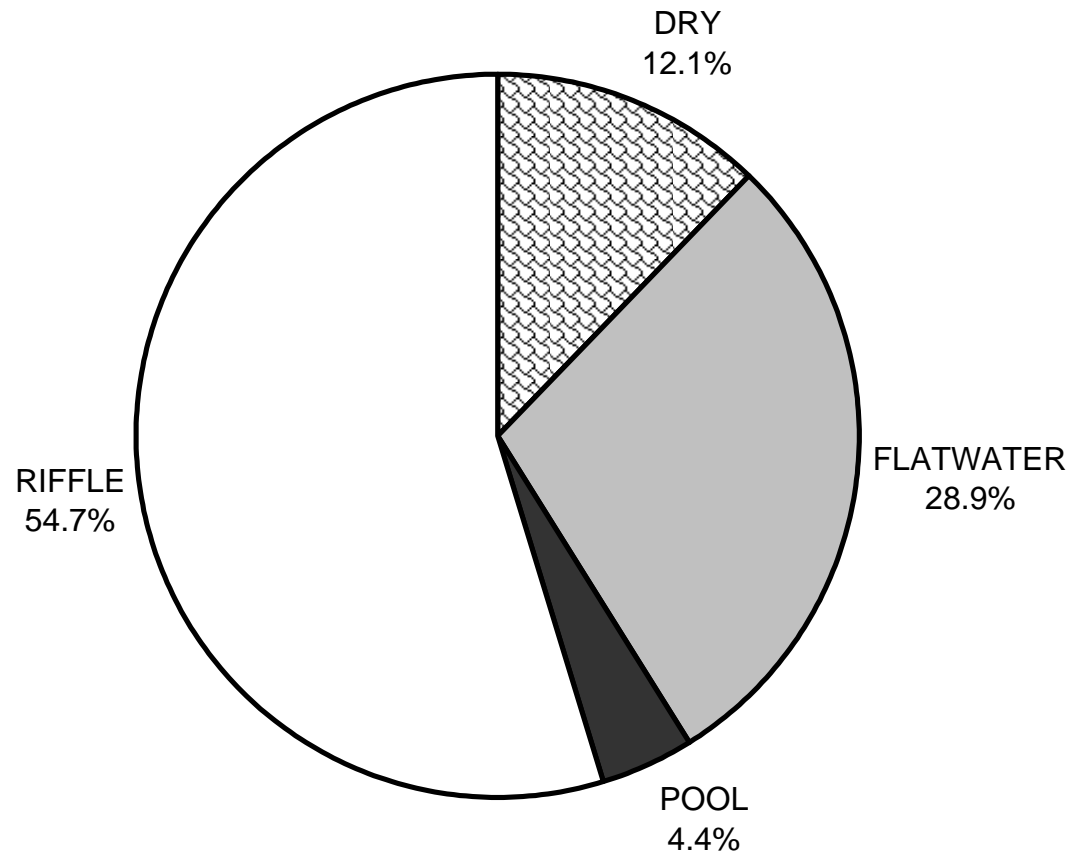
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	4
SMALL WOODY DEBRIS (%)	20	3	1
LARGE WOODY DEBRIS (%)	25	7	13
ROOT MASS (%)	5	13	16
TERRESTRIAL VEGETATION (%)	5	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	5	3	1
BOULDERS (%)	40	53	41
BEDROCK LEDGES (%)	0	20	24

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



GRAPH 1

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

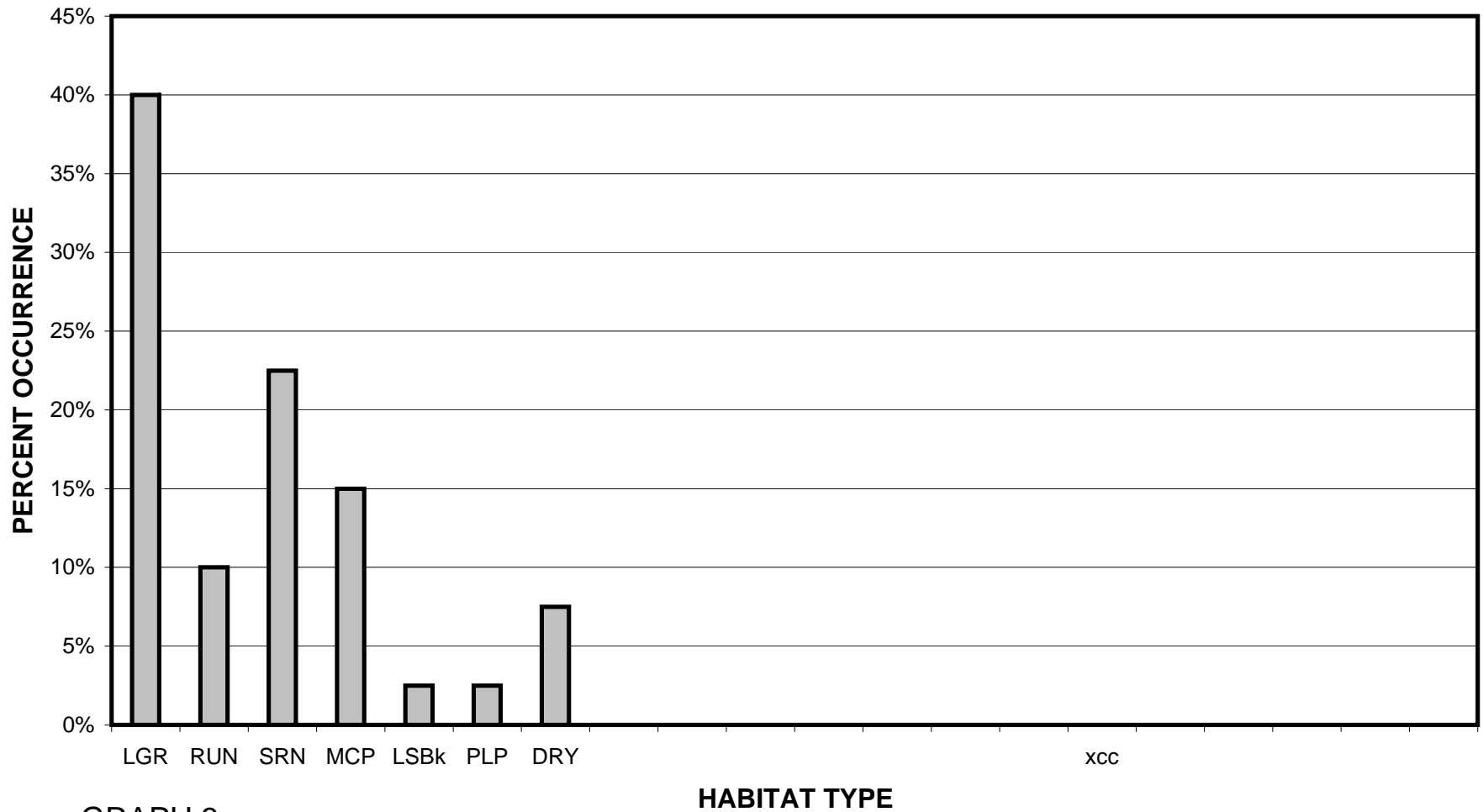


GRAPH 2



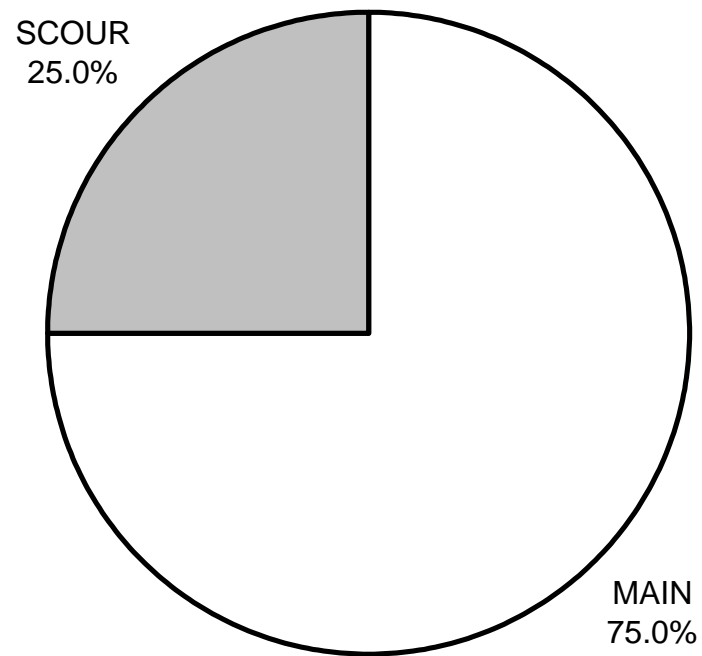
# COON CREEK 2007

## HABITAT TYPES BY PERCENT OCCURRENCE



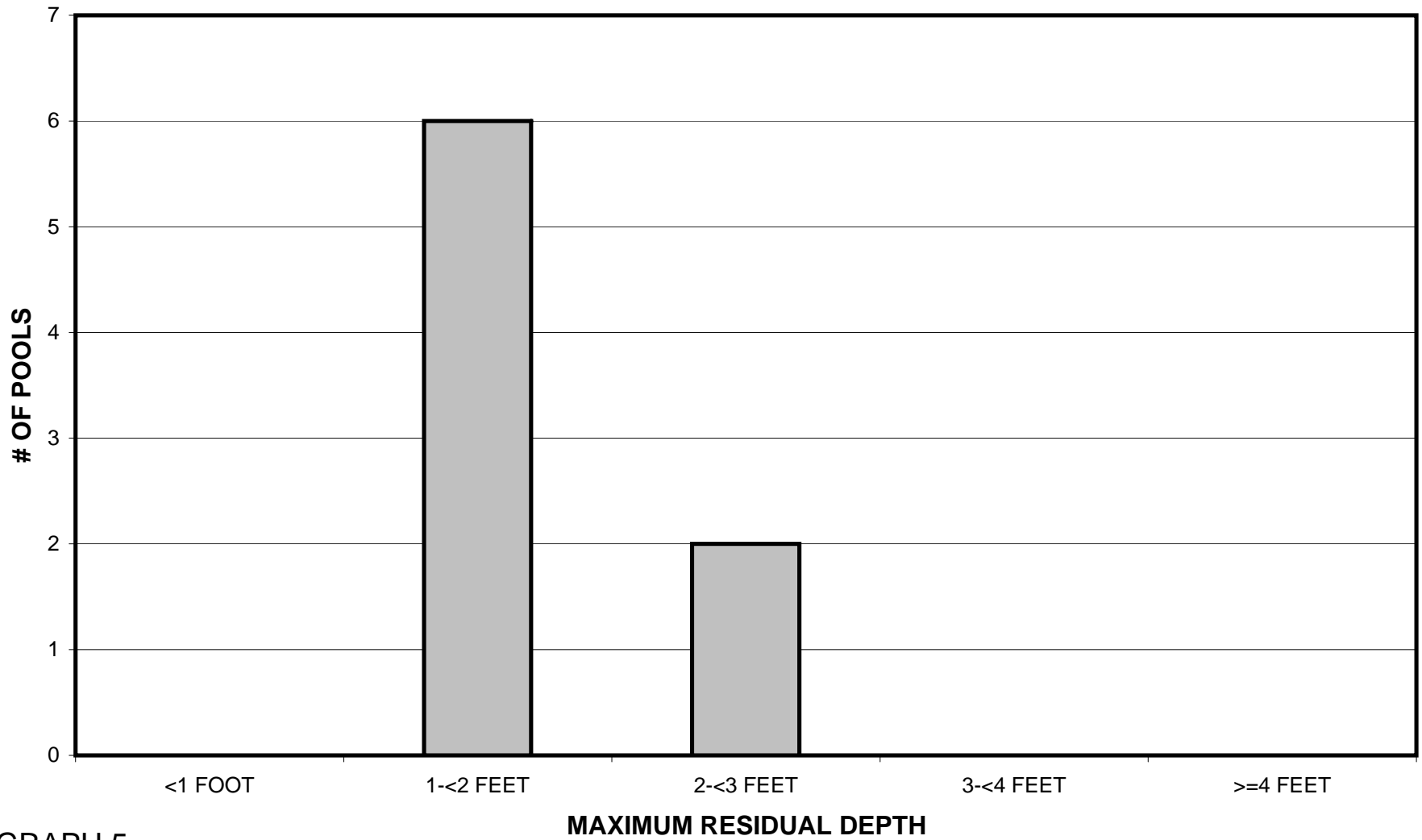
GRAPH 3

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



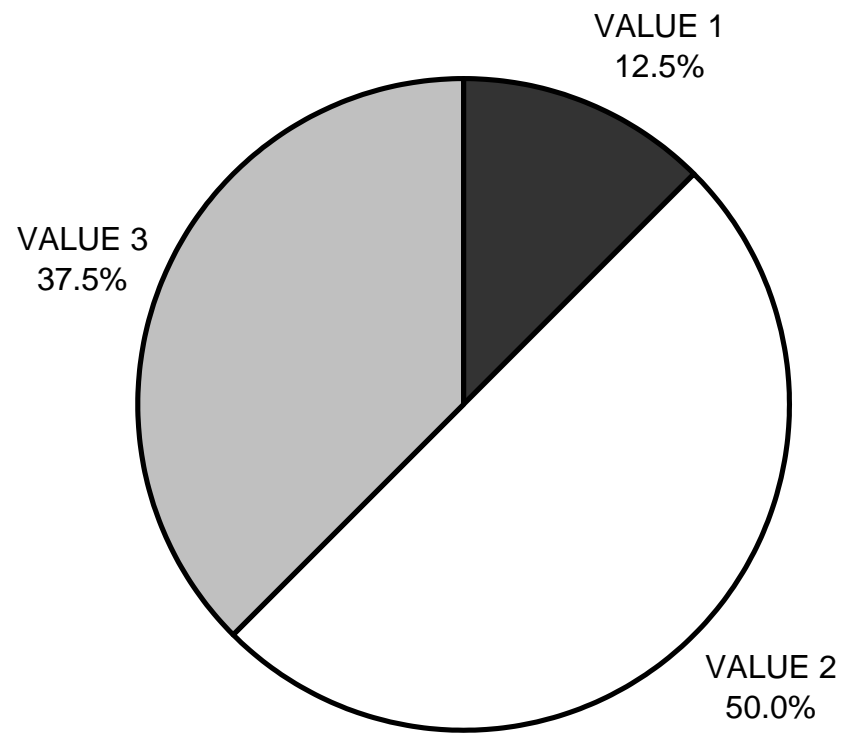
GRAPH 4

**COON CREEK 2007  
MAXIMUM DEPTH IN POOLS**



GRAPH 5

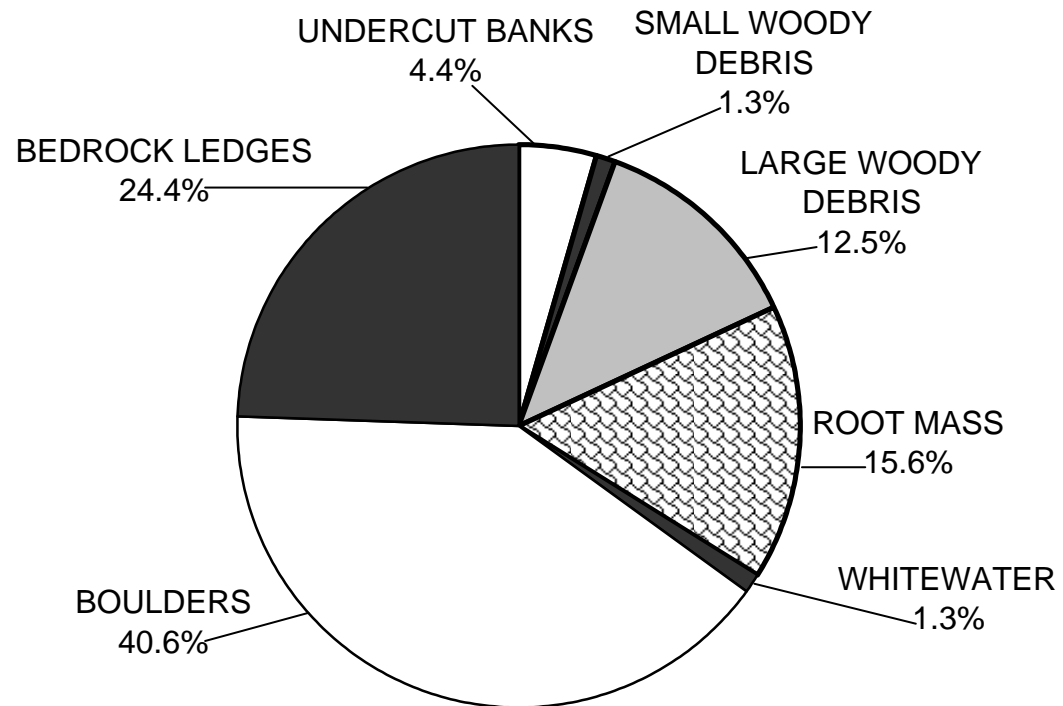
# COON CREEK 2007 PERCENT EMBEDDEDNESS



GRAPH 6

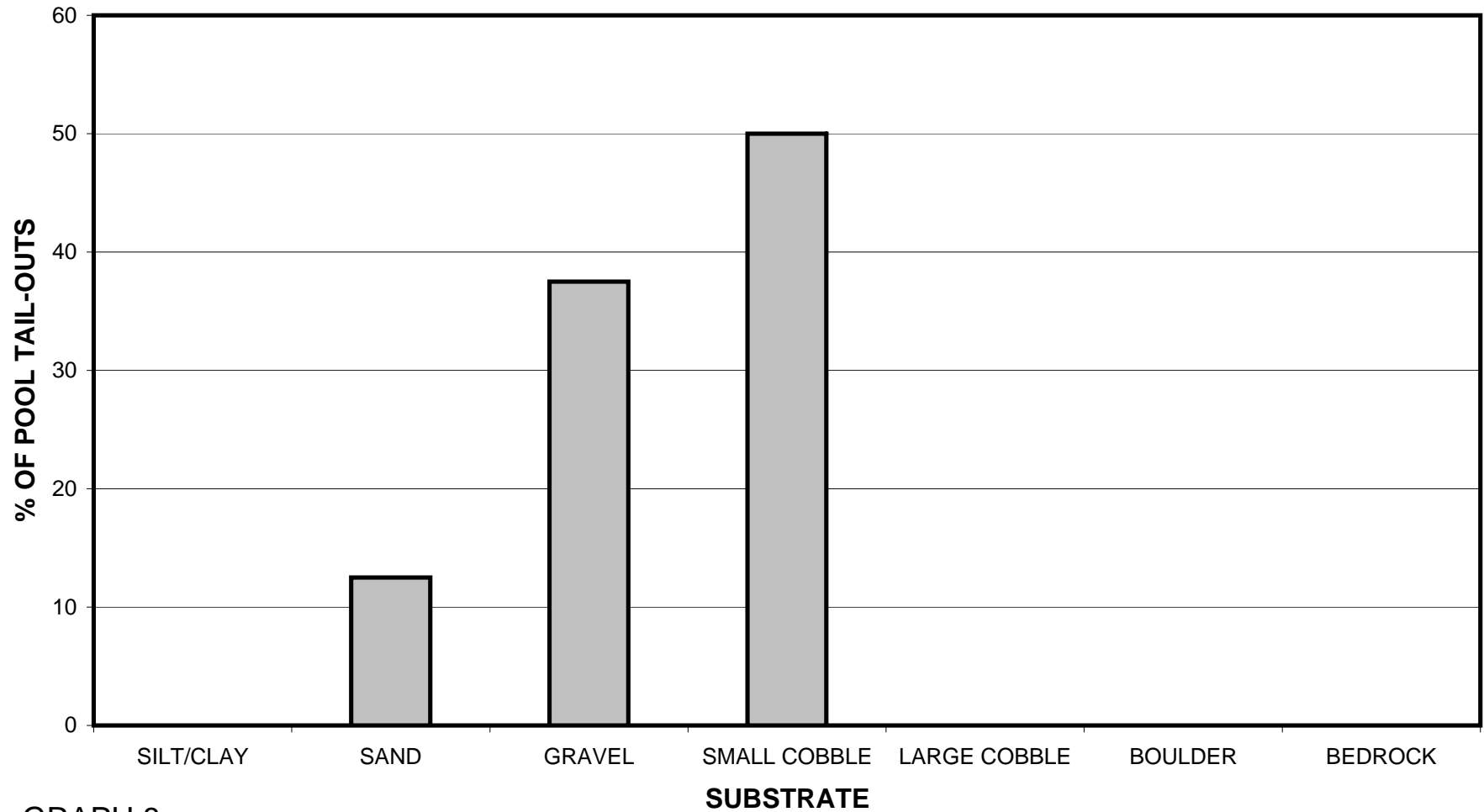
# COON CREEK 2007

## MEAN PERCENT COVER TYPES IN POOLS



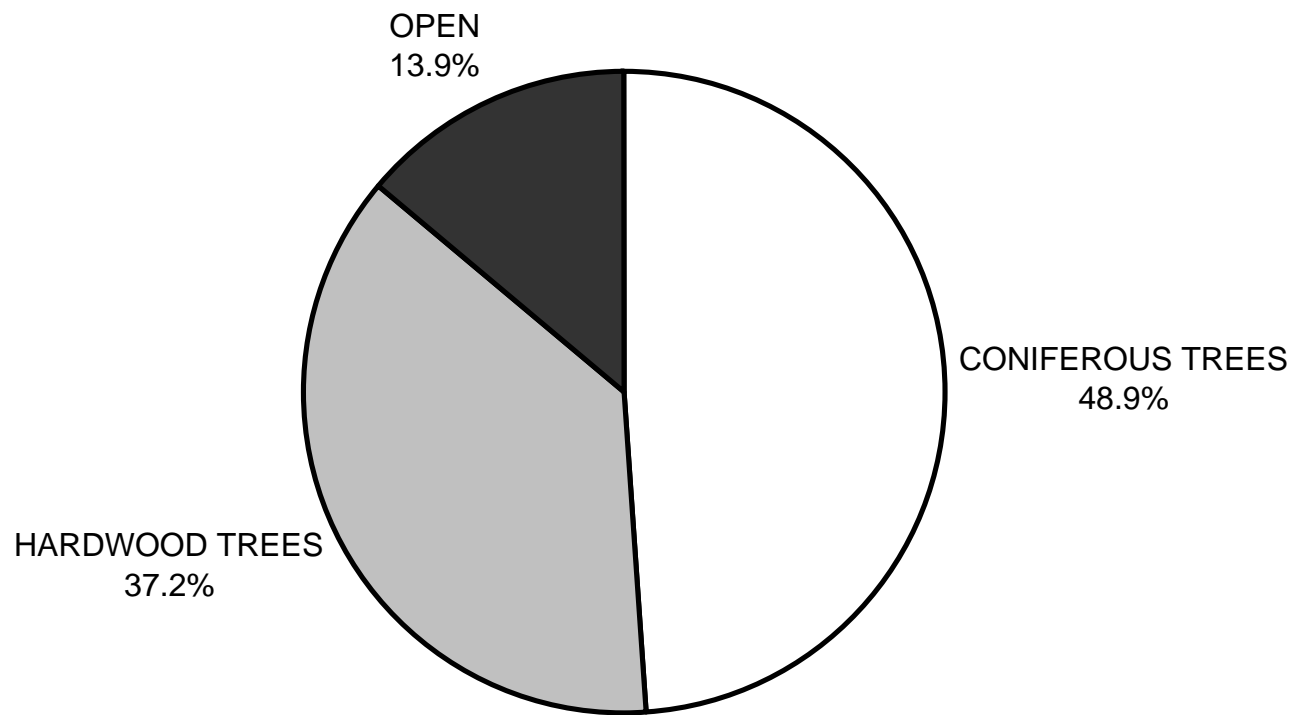
GRAPH 7

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



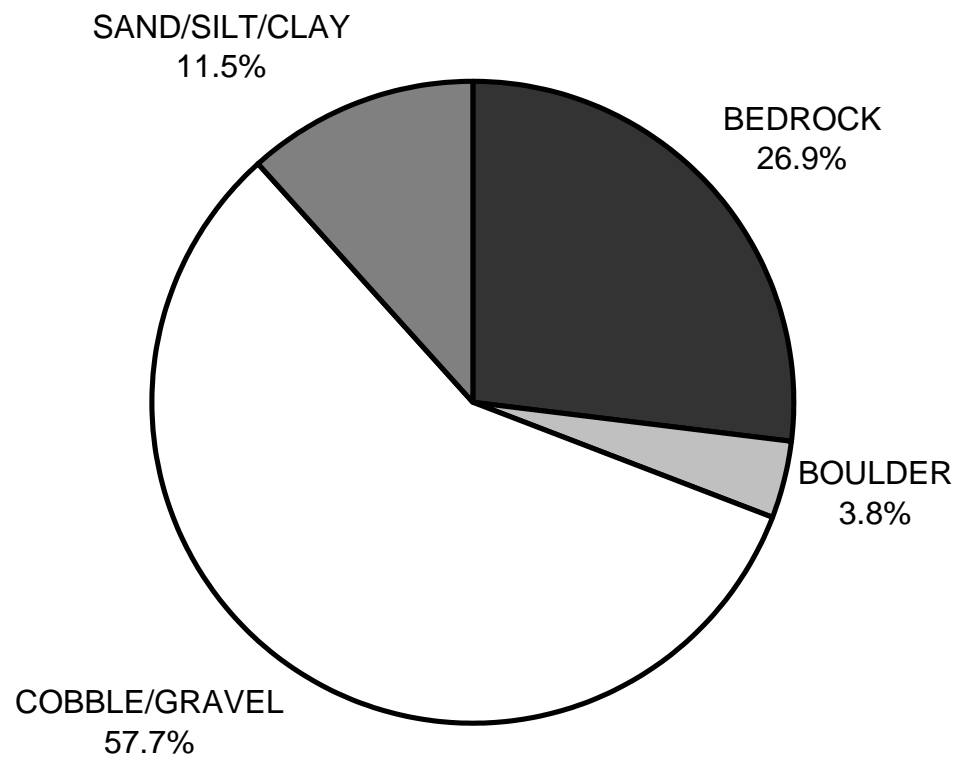
GRAPH 8

**COON CREEK 2007  
MEAN PERCENT CANOPY**



GRAPH 9

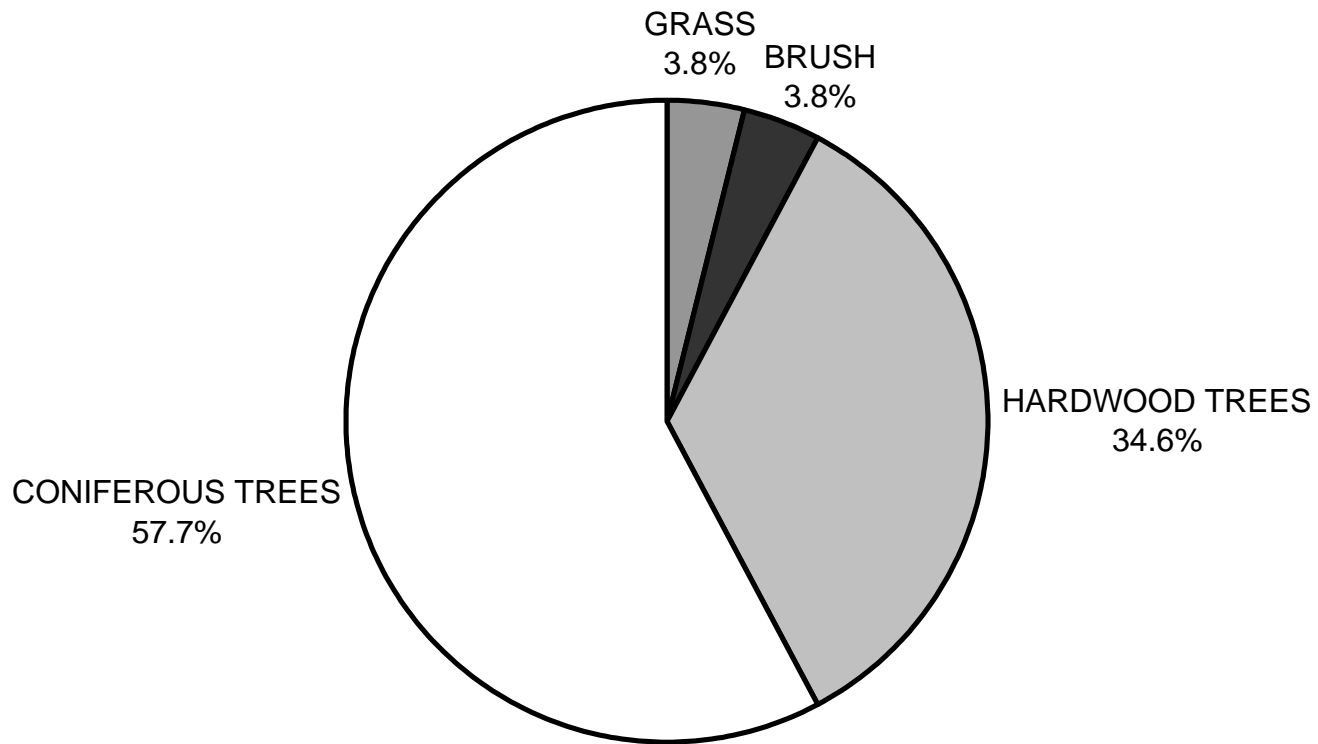
**COON CREEK 2007**  
**DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10



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



GRAPH 11