

STREAM INVENTORY REPORT

Moody Creek

INTRODUCTION

A stream inventory was conducted from September 17 to October 1, 2008 on Moody Creek. The survey began at the confluence with Indian Creek and extended upstream 1.7 miles.

The Moody 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 Moody 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

Moody Creek is a tributary to Indian Creek, tributary to South Fork Eel River, tributary to the Eel River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Moody Creek's legal description at the confluence with Indian Creek is T24N R18W S05. Its location is 39.9613 north latitude and 123.8744 west longitude, LLID number 1238745399615. Moody Creek is a first order stream and has approximately one mile of blue line stream according to the USGS Piercy 7.5 minute quadrangle. Moody Creek drains a watershed of approximately 2.2 square miles. Elevations range from about 730 feet at the mouth of the creek to 1,300 feet in the headwater areas. Mixed hardwood forest dominates the watershed. The watershed is entirely privately owned and is managed for timber. Vehicle access exists via Highway 101 Piercy exit. Take 271 south for about ½ mile and turn left at the yellow gates. For further instructions, contact landowners.

METHODS

The habitat inventory conducted in Moody Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and 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

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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 Moody 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". Moody 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 Moody Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75%

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(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 Moody 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 densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Moody 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 Moody 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 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 Moody Creek. In addition, underwater observations were made at ten 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

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Moody 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

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- 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 September 17 to October 21, 2008 was conducted by M. Westersund and B. Leonard (WSP). The total length of the stream surveyed was 9,204 feet with an additional 54 feet of side channel.

Stream flow was not measured on Moody Creek.

Moody Creek is an F4 channel type for 9,258 feet of the stream surveyed (Reach 1). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios, very stable with gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 46 to 52 degrees Fahrenheit. Air temperatures ranged from 45 to 58 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 46% pool units, 29% flatwater units, 14% dry units, 6% riffle units, and 4% no survey units (Graph 1). Based on total length of Level II habitat types there were 31% flatwater units, 28% dry units, 35% pool units, 4% no survey units, and 3% riffle units (Graph 2).

Five Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 46%; run units, 23%; and dry units 14% (Graph 3). Based on total length, mid-channel pool units made up 35%, dry units 28%, and run units 22%.

A total of 79 pools were identified (Table 3). Main channel pools were the most frequently encountered at 100% (Graph 4), and comprised 100% 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. Thirty-eight of the 79 pools (48%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 79 pool tail-outs measured, 40 had a value of 1 (51%); 32 had a value of 2 (41%); 7 had a value of 3 (9%) (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

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within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 2, flatwater habitat types had a mean shelter rating of 2, and pool habitats had a mean shelter rating of 18 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 18 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Moody Creek. Graph 7 describes the pool cover in Moody Creek. Large woody debris is the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 46% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 36% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Moody Creek was 93%. Seven percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 83% and 17%, respectively. Graph 9 describes the mean percent canopy in Moody Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 89%. The mean percent left bank vegetated was 89%. The dominant elements composing the structure of the stream banks consisted of 68% sand/silt/clay, 15% bedrock, 13% cobble/gravel, and 4% boulder (Graph 10). Hardwood trees were the dominant vegetation type observed in 90.1% of the units surveyed. Additionally, 9.9% of the units surveyed had conifer trees as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Ten sites were snorkel surveyed for species composition and distribution in Moody Creek on October 30, 2008. Water temperature taken during the survey period was 46 degrees Fahrenheit. The air temperature was 47 degrees Fahrenheit. The sites were sampled by S. McSmith (DFG) and B. Leonard (WSP).

In reach 1, which comprised the first 9,258 feet of stream, 10 sites were sampled. The reach sites yielded 41 young-of-the-year (YOY) steelhead/rainbow trout (SH/RT), 3 age 1+ SH/RT, 84 young-of-the-year coho, and 1 age 1+ coho.

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The following chart displays the information yielded from these sites:

2008 Moody Creek underwater observations.

Date	Site #	Hab. Unit #	Hab. Type	Approx. Dist. from mouth (ft.)	Coho		SH/RT		
					YOY	1+	YOY	1+	2+
Reach 1: F4 Channel Type									
10/30/08	1	004	4.2	253	20	0	5	0	0
10/30/08	2	024	4.2	1,125	23	0	11	0	0
10/30/08	3	036	4.2	1,726	1	0	2	0	0
10/30/08	4	055	4.2	2,598	20	1	8	1	0
10/30/08	5	064	4.2	2,894	20	0	15	0	0
10/30/08	6	071	4.2	3,507	0	0	0	0	0
10/30/08	7	074	4.2	3,893	0	0	0	0	0
10/30/08	8	090	4.2	4,691	0	0	0	0	0
10/30/08	9	0101	4.2	5,208	0	0	0	0	1
10/30/08	10	0116	4.2	6,153	0	0	0	0	1

DISCUSSION

Moody Creek is an F4 channel type for the 9,258 feet of stream surveyed. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey days September 17 to October 1, 2008 ranged from 46 to 52 degrees Fahrenheit. Air temperatures ranged from 45 to 58 degrees Fahrenheit. To make any 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 31% of the total length of this survey, riffles 3%, and pools 35%. The pools are relatively deep, with 38 of the 79 (48%) of the pools had 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

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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.

Seventy-two of the 79 pool tail-outs measured had embeddedness ratings of 1 or 2. Seven of the pool tail-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.

Sixty-four of the 78 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 18. The shelter rating in the flatwater habitats was 2. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Moody Creek. Large woody debris is the dominant cover type in pools followed by small 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 93%. The percentage of right and left bank covered with vegetation was 89% and 89%, respectively.

RECOMMENDATIONS

- 1) Moody Creek should be managed as an anadromous, natural production stream.
- 2) 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.
- 3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large wood. Adding high quality complexity with woody cover in the pools is desirable.
- 4) 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.
- 5) There are several log debris accumulations present on Moody Creek that are retaining large quantities of fine sediment. The modification of the debris accumulation at 3,449' is desirable, but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.

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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	Start of survey at the confluence with Indian Creek.
253	0004.00	This unit is out of the influence of Indian Creek.
849	0019.00	Log debris accumulation (LDA) #001 contains 5 pieces of large woody debris (LWD) and measures 6' high x 21' wide x 9' long with water flowing through and visible gaps. Sediment retention ranges from silt to boulder and measures 20' wide x 50' long x 3' wide. Fish were observed above the LDA.
1601	0033.00	LDA #002 contains 30 pieces of LWD and measures 12' high x 50' wide x 71' long with water flowing through and no visible gaps. Sediment retention ranges from silt to large cobble and measures 60' wide x 80' long x 8' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were observed above the LDA.
1782	0038.00	LDA #003 contains 10 pieces of LWD and measures 16' high x 30' wide x 30' long with water flowing through and visible gaps. Sediment retention ranges from silt to large cobble and measures 30' wide x 40' long x 4' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were observed above the LDA.
1841	0040.00	LDA #004 contains 1 piece of LWD and measures 3' high x 15' wide x 3' long with water flowing through and no visible gaps. Sediment retention ranges from silt to large cobble and measures 15' wide x 20' long x 2' deep. This LDA serves as a possible barrier to juvenile salmonids. Fish were observed above the LDA.
2318	0050.00	There is a dry tributary on the right bank.
2332	0051.00	There is a dry tributary on the right bank.
2490	0053.00	LDA #005 contains 12 pieces of LWD and measures 10' high x 30' wide x 20' long with water flowing through and visible gaps. Sediment retention ranges from sand to boulder and measures 20' wide x 30' long x 3' deep.
2544	0055.00	LDA #006 contains 14 pieces of LWD and measures 8' high x 30' wide x 15' long with visible gaps and no water flowing through. Sediment retention ranges from silt to boulder and measures 30' wide x 40' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids.

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- 2858 0065.00 LDA #007 contains 30 pieces of LWD and measures 14' high x 30' wide x 50' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 30' wide x 130' long x 5' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA. This unit is unsurveyable due to the LDA.
- 2923 0066.00 LDA #008 contains 20 pieces of LWD and measures 6' high x 25' wide x 30' long with visible gaps and no water flowing through. Sediment retention ranges from silt to small cobble and measures 25' wide x 60' long x 4' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
- 3449 0071.00 LDA #009 contains 23 pieces of LWD and measures 7' high x 27' wide x 53' long with visible gaps and no water flowing through. Sediment retention ranges from silt to gravel and measures 30' wide x 50' long x 4' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
- 3835 0074.00 There is an old road crossing in this unit.
- 4065 0076.00 LDA #010 contains 6 pieces of LWD and measures 5' high x 20' wide x 25' long with visible gaps and no water flowing through. Sediment retention ranges from sand to small cobble and measures 20' wide x 30' long x 2' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
- 5515 0107.00 LDA #011 contains 18 pieces of LWD and measures 9' high x 21' wide x 30' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 30' wide x 60' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
- 5596 0108.00 There is a dry tributary on the right bank.
- 5706 0109.00 LDA #012 contains 10 pieces of LWD and measures 6' high, 27' wide, 28' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 15' wide x 20' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
- 5824 0112.00 There is an old road crossing in this unit.
- 6343 0122.00 LDA #013 contains 6 pieces of LWD and measures 6' high x 30' wide x 10' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 25' wide x 30' long x 3' deep. This LDA serves as a

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possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.

6505	0125.00	LDA #014 contains 15 pieces of LWD and measures 6' high x 31' wide x 25' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 30' wide x 50' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
6554	0126.00	There is a dry tributary on the left bank marked "Gulch #3".
7227	0140.00	LDA #015 contains 1 piece of LWD and measures 3' high x 20' wide x 23' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 20' wide x 30' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids.
7281	0141.00	LDA #016 contains 30 pieces of LWD and measures 7' high x 30' wide x 49' long with visible gaps and no water flowing through. Sediment retention ranges from sand to gravel and measures 30' wide x 60' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. There is an old road crossing in this unit. Gulch #4 is located on the right bank.
8034	0146.00	There is a dry tributary on the left bank.
8598	0161.00	LDA #017 contains 60 pieces of LWD and measures 9' high x 40' wide x 89' long with visible gaps and no water flowing through. Sediment retention ranges from sand to large cobble and measures 15' wide x 20' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids. Fish were not observed above the LDA.
8766	0164.00	LDA #018 contains 12 pieces of LWD and measures 6' high x 25' wide x 26' long with visible gaps and no water flowing through. Sediment retention ranges from sand to small cobble and measures 25' wide x 50' long x 3' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids.
8870	0166.00	LDA #019 contains 6 pieces of LWD and measures 5' high x 25' wide x 20' long with visible gaps and no water flowing through. Sediment retention ranges from sand to small cobble and measures 15' wide x 30' long x 2' deep. This LDA serves as a possible barrier to both juvenile and adult salmonids.
9056	0168.00	One 1+ fish and ten juvenile salmonids were observed.
9084	0169.00	End of survey due to poor access. A left bank tributary enters this unit.

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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]	

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

Stream Name: Moody Creek

LLID: 1238745399615 Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
24	0	DRY	14.1	106	2550	27.5									0
50	8	FLATWATER	29.4	57	2865	30.9	7.6	0.5	1.0	300	14985	151	6603		2
7	0	NOSURVEY	4.1	52	365	3.9									
79	79	POOL	46.5	41	3210	34.7	11.6	1.1	2.3	469	37071	637	50291	552	18
10	3	RIFFLE	5.9	27	268	2.9	13.5	0.2	0.7	36	355	7	47		3
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
170	90				9258					52411			56941		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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 (%)
10	3	LGR	5.9	27	268	2.9	9	0.2	1	24	237	7	47		3	96
39	6	RUN	22.9	52	2020	21.8	6	0.5	1.4	296	11553	191	6193		2	94
11	2	SRN	6.5	77	845	9.1	7	0.3	0.8	160	1763	52	570		0	96
79	79	MCP	46.5	41	3210	34.7	12	1.1	17.9	469	37071	637	50291	552	18	92
24	0	DRY	14.1	106	2550	27.5									0	92
7	0	NS	4.1	52	365	3.9										

Total Units
170

Total Units Fully Measured
90

Total Length (ft.)
9258

Total Area (sq.ft.)
50623

Total Volume (cu.ft.)
57102

Table 3 - Summary of Pool Types

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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
79	79	MAIN	100	41	3210	100	11.6	1.1	469	37071	552	43577	18

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
79	79	3210	37071	43577

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

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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
79	MCP	100	5	6	36	46	23	29	8	10	7	9

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
79	5	6	36	46	23	29	8	10	7	9

Mean Maximum Residual Pool Depth (ft.): 2.3

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Dry Units: 24

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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
10	2	LGR	0	0	0	0	0	0	0	100	0
10	2	TOTAL RIFFLE	0	0	0	0	0	0	0	100	0
39	5	RUN	0	48	3	0	0	0	0	50	0
11	1	SRN									
50	6	TOTAL FLAT	0	47	2	0	0	0	0	50	0
79	79	MCP	6	18	47	9	0	0	0	12	8
79	79	TOTAL POOL	6	18	47	9	0	0	0	12	8
7	0	NS									
170	90	TOTAL	5	18	46	9	0	0	0	14	8

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Dry Units: 24

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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
10	2	LGR	0	50	0	0	0	50	0
39	5	RUN	20	0	60	0	0	0	20
11	2	SRN	0	0	100	0	0	0	0
79	79	MCP	8	37	53	0	1	1	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
93	17	83	0	89	89

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

Open units represent habitat units with zero canopy cover.

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS05

Latitude: 39:57:41.0N

Longitude: 123:52:28.0W

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	15	13	15.4
Boulder	4	3	3.8
Cobble / Gravel	10	14	13.2
Sand / Silt / Clay	62	61	67.6

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	0	0	0.0
Brush	0	0	0.0
Hardwood Trees	79	85	90.1
Coniferous Trees	12	6	9.9
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Moody Creek

LLID: 1238745399615

Drainage: Eel River - South Fork

Survey Dates: 9/17/2008 to 10/1/2008

Confluence Location: Quad: PIERCY

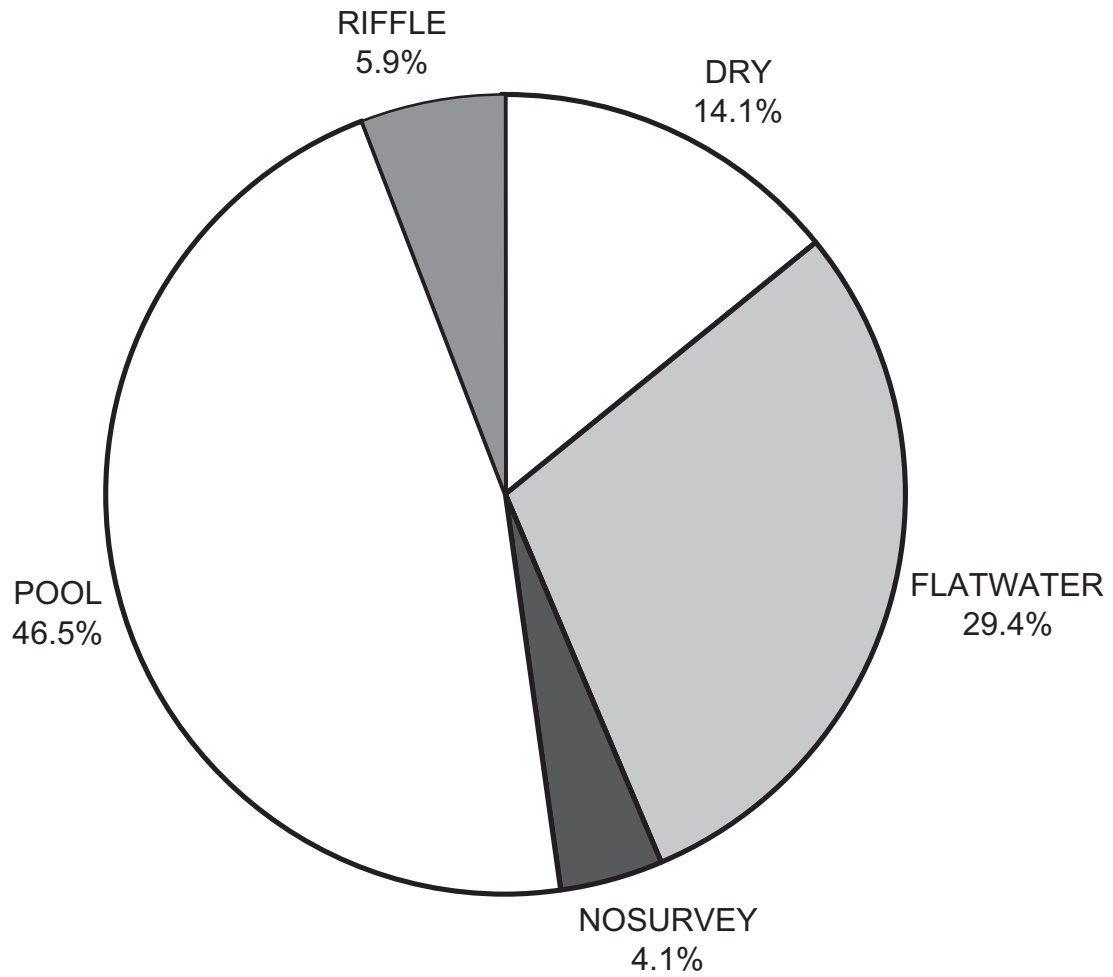
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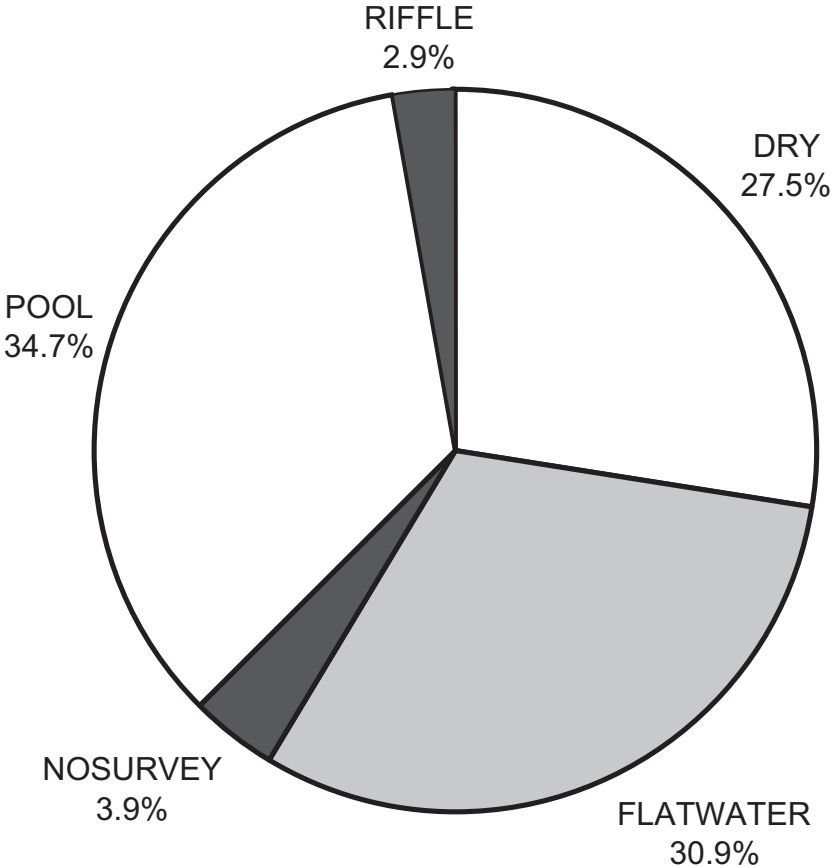
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	6
SMALL WOODY DEBRIS (%)	0	47	18
LARGE WOODY DEBRIS (%)	0	2	47
ROOT MASS (%)	0	0	9
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	100	50	12
BEDROCK LEDGES (%)	0	0	8

MOODY CREEK 2008 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

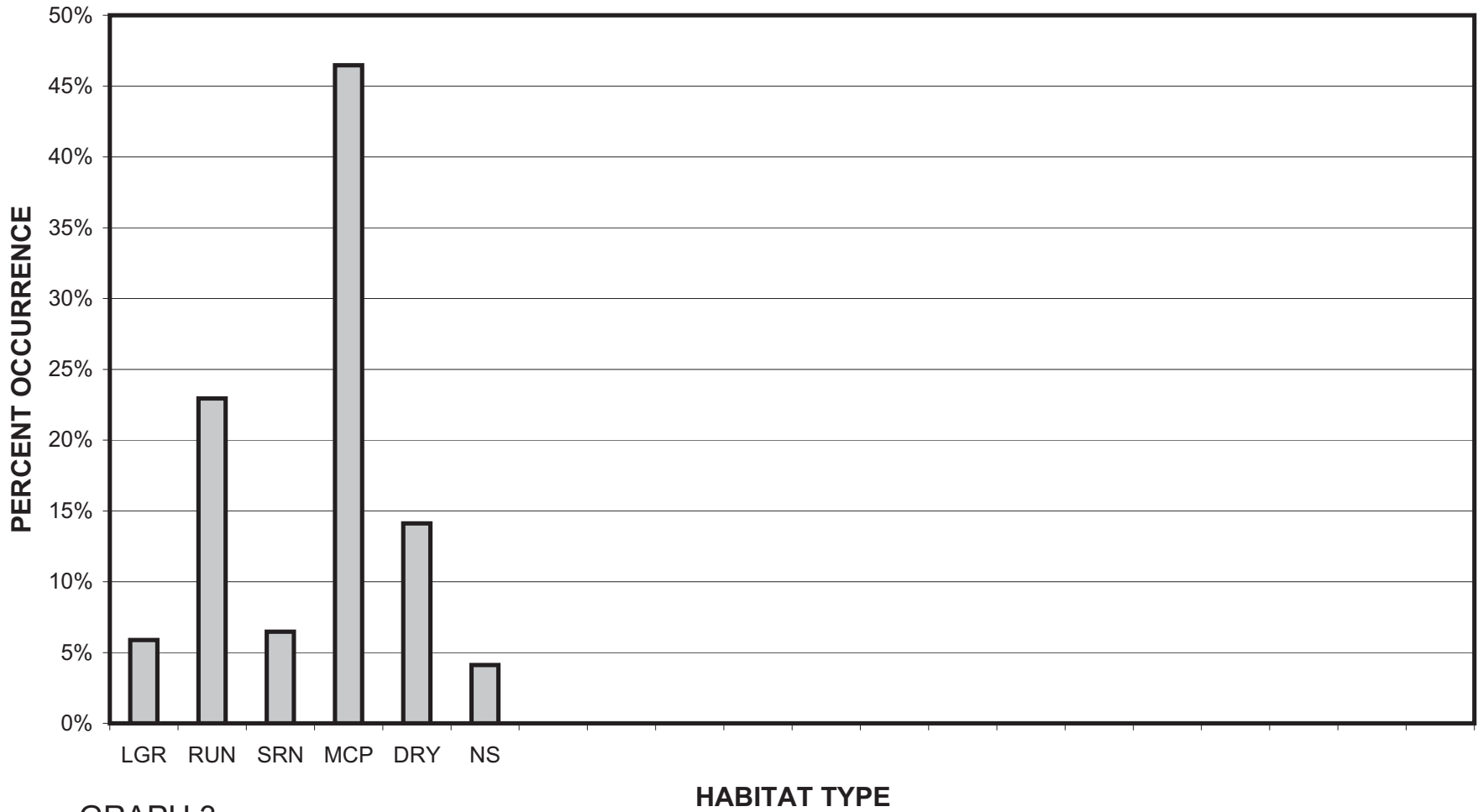
**MOODY CREEK 2008
HABITAT TYPES BY PERCENT TOTAL LENGTH**



GRAPH 2

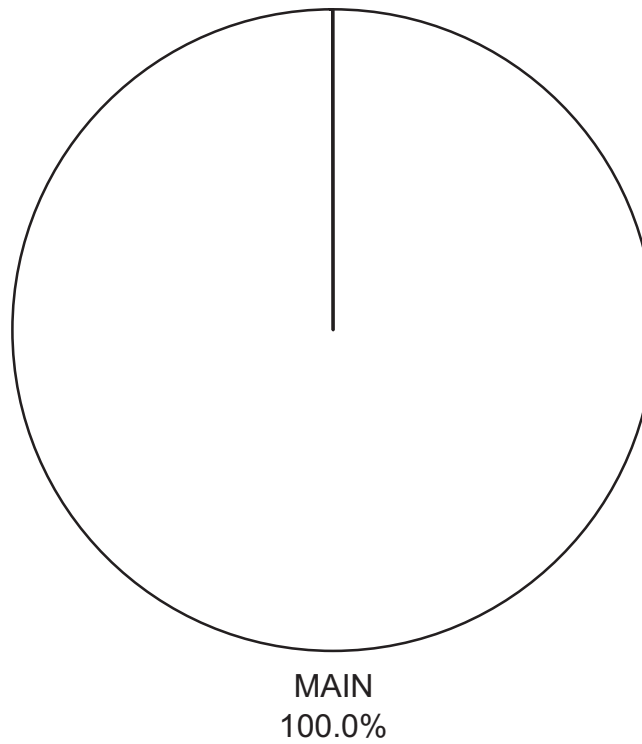
MOODY CREEK 2008

HABITAT TYPES BY PERCENT OCCURRENCE



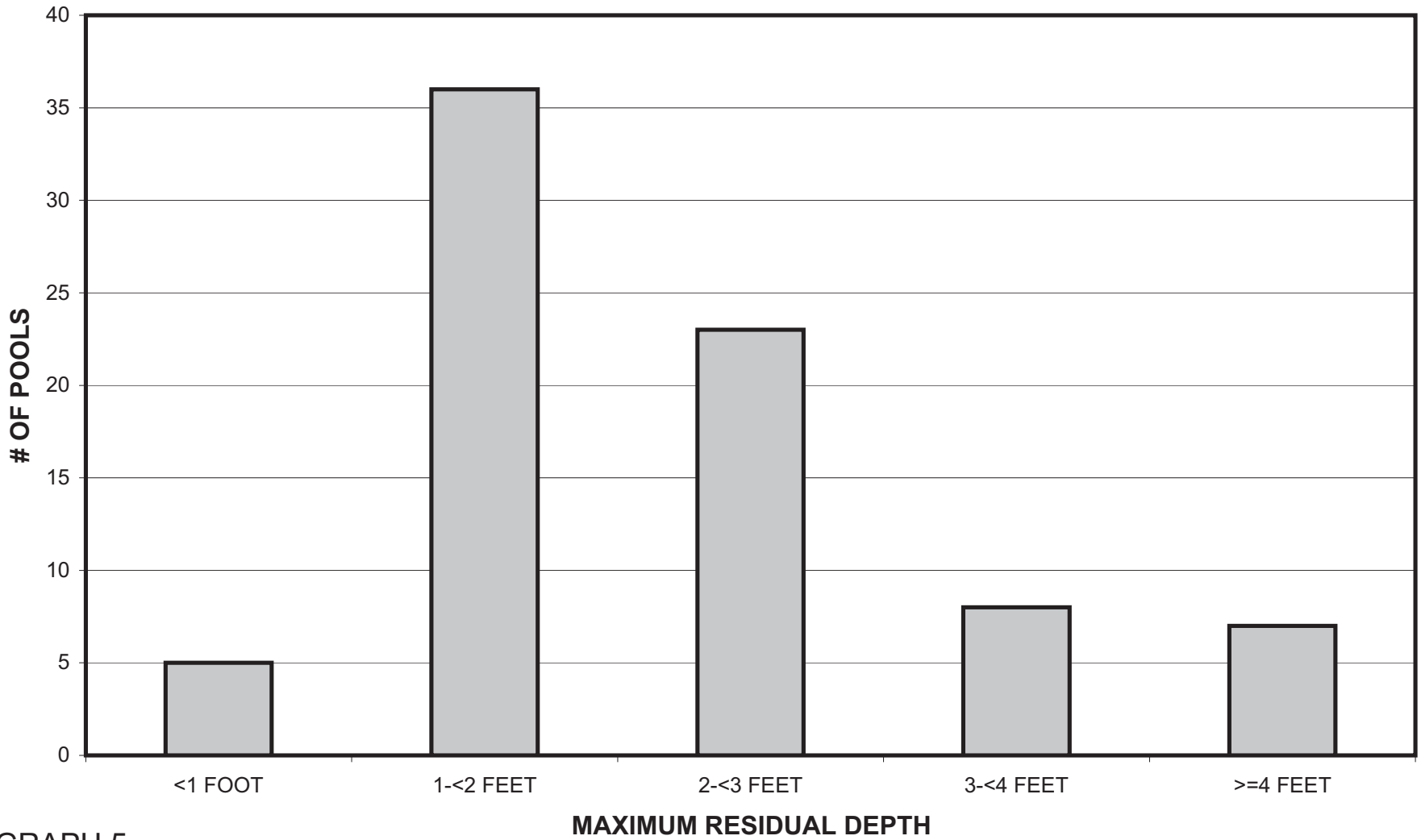
GRAPH 3

**MOODY CREEK 2008
POOL TYPES BY PERCENT OCCURRENCE**



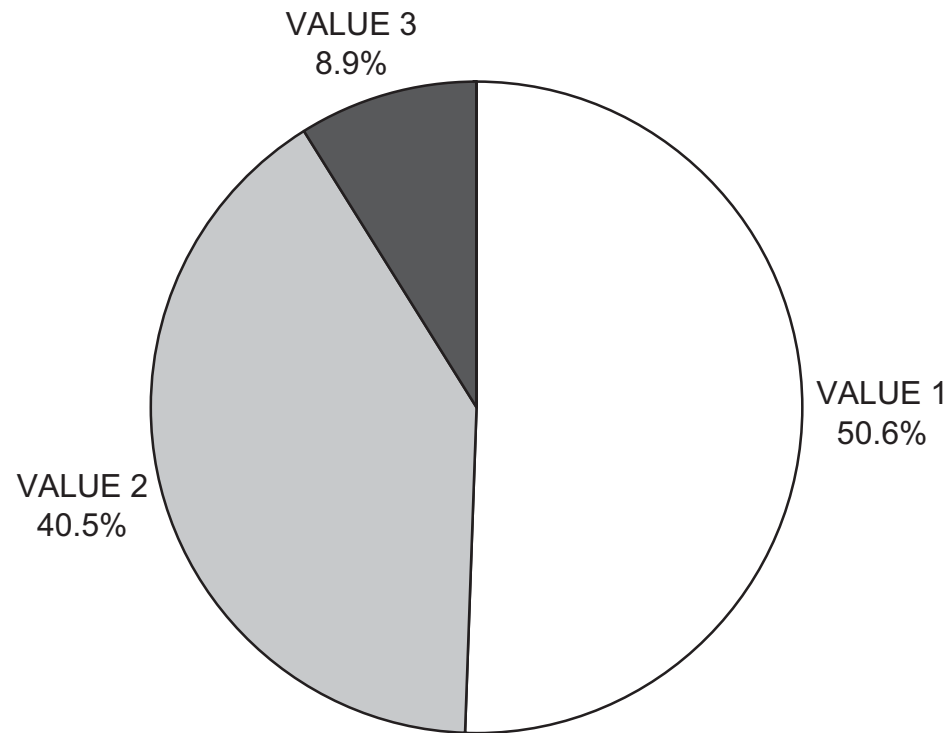
GRAPH 4

MOODY CREEK 2008 MAXIMUM DEPTH IN POOLS



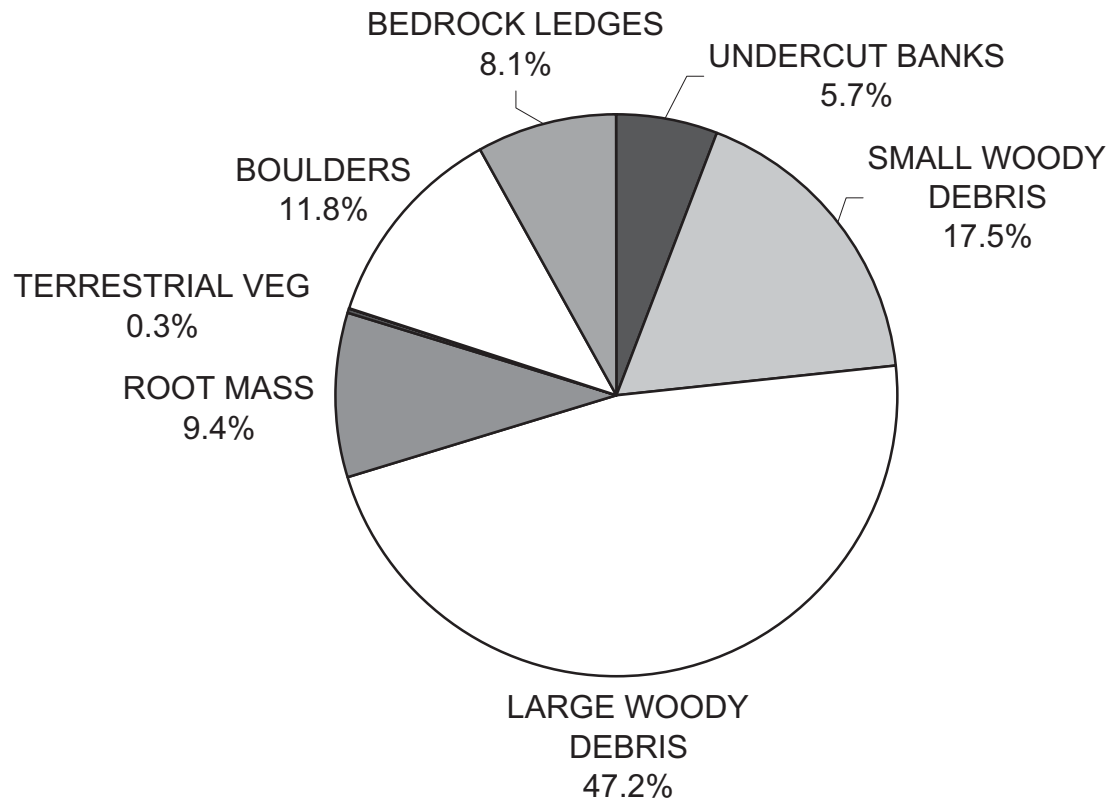
GRAPH 5

MOODY CREEK 2008 PERCENT EMBEDDEDNESS



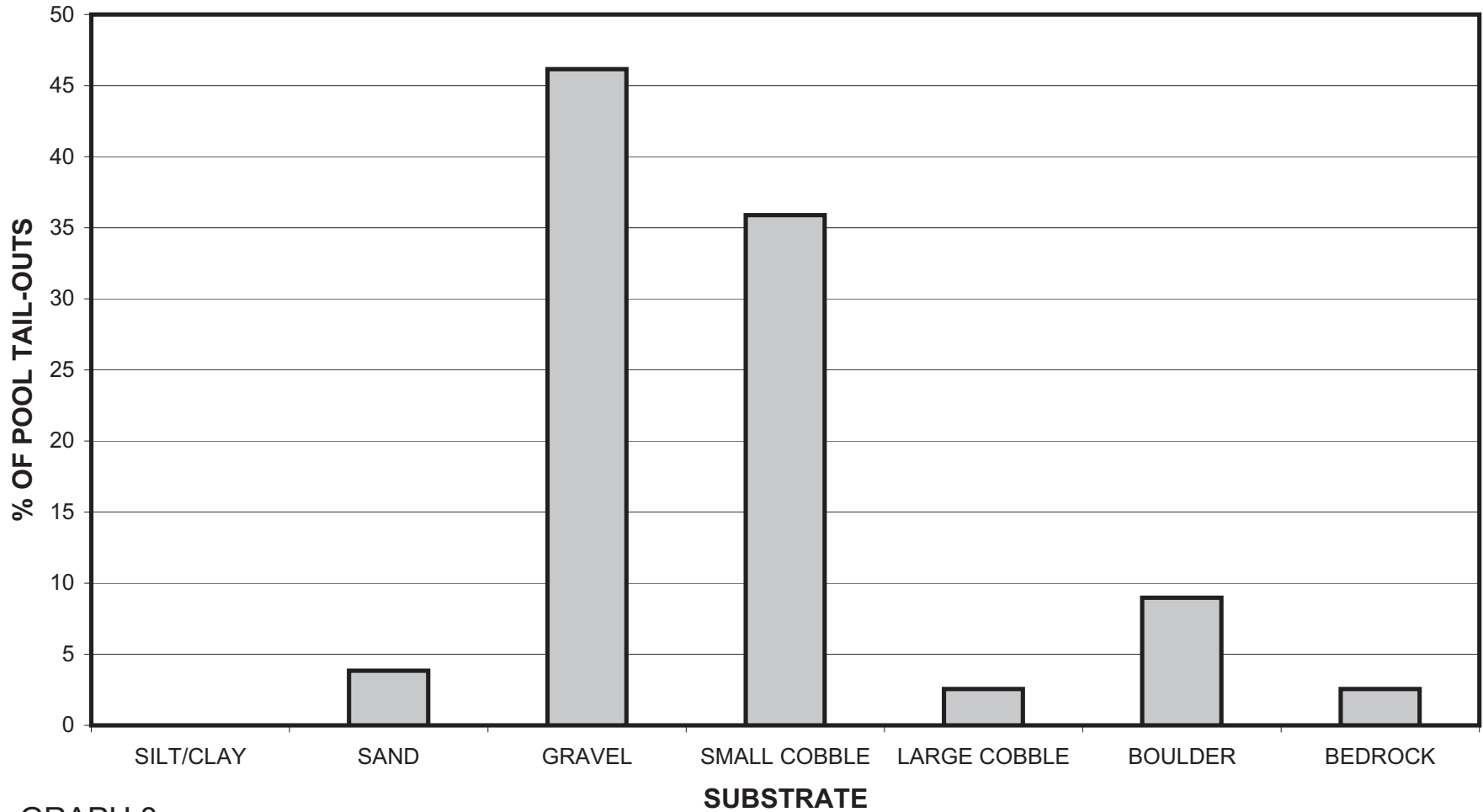
GRAPH 6

MOODY CREEK 2008 MEAN PERCENT COVER TYPES IN POOLS



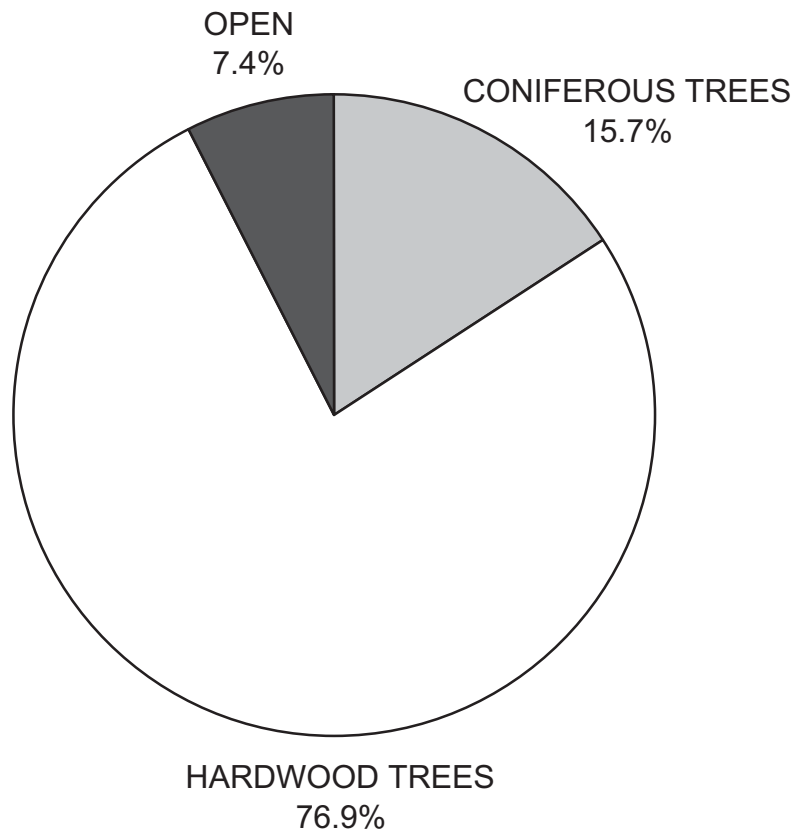
GRAPH 7

MOODY CREEK 2008 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



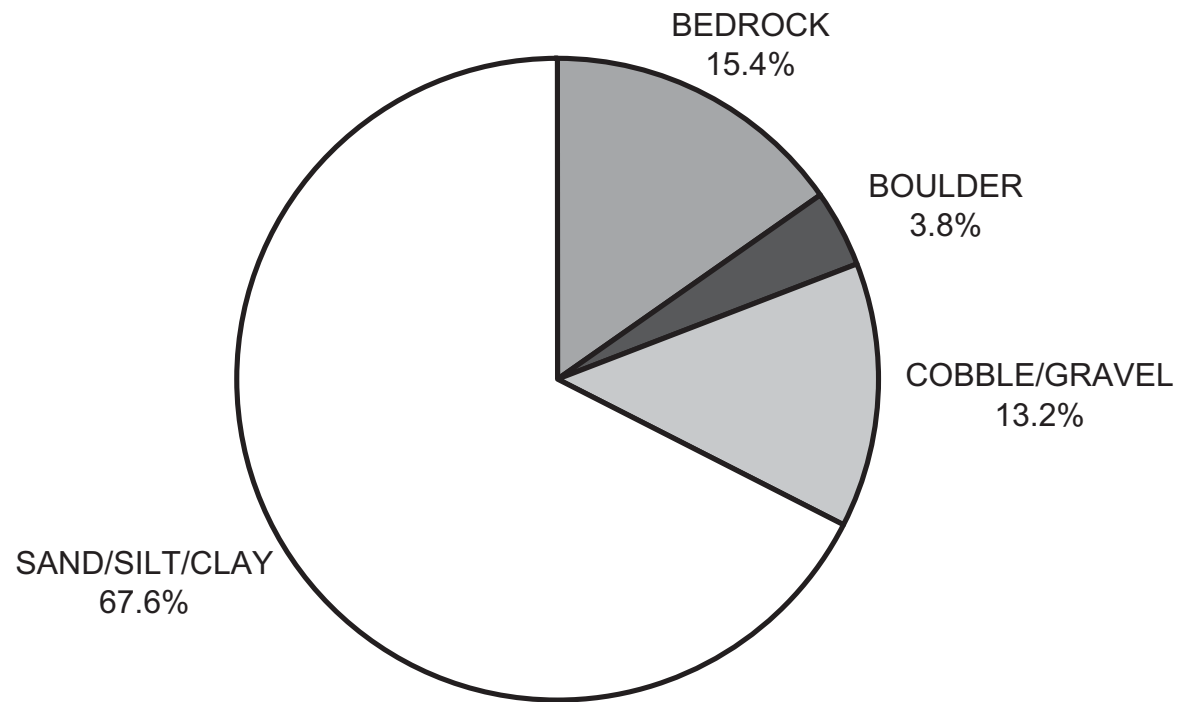
GRAPH 8

MOODY CREEK 2008 MEAN PERCENT CANOPY



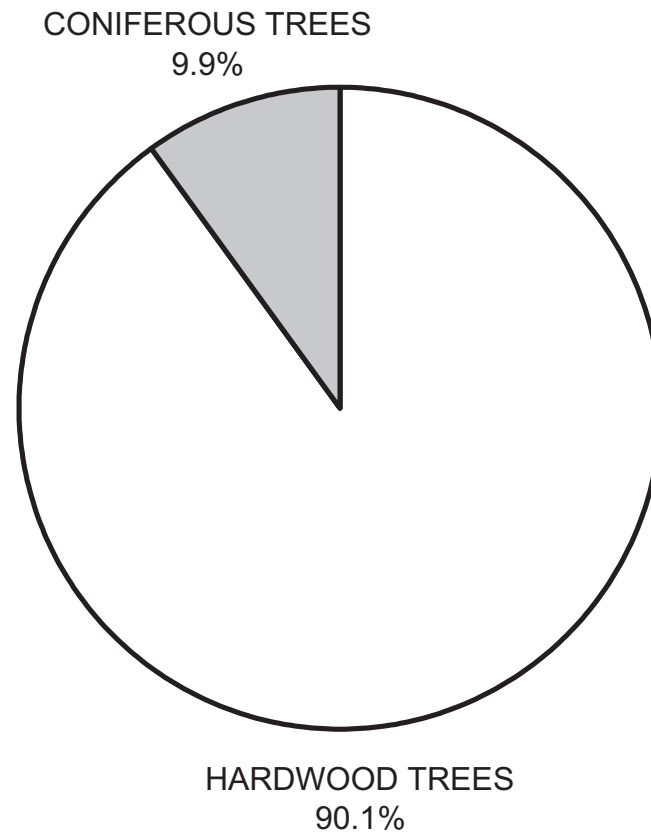
GRAPH 9

**MOODY CREEK 2008
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**MOODY CREEK 2008
DOMINANT BANK VEGETATION IN SURVEY REACH**

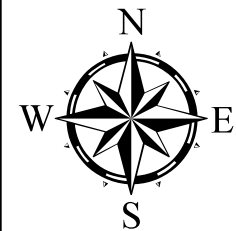


GRAPH 11


**Map 1
Moody Creek 2008
Indian Creek Watershed
Piercy Quad
Mendocino County**

Start of Survey

End of Survey



Legend

 Reach 1, F4 Channel Type

0 1,400 2,800 Feet

