

# STREAM INVENTORY REPORT

## South Fork Noyo River, 2010

### INTRODUCTION

A stream inventory was conducted from July 20 to July 29, 2010 on the South Fork Noyo River. The survey began at the confluence with the Noyo River and extended upstream 9.9 miles.

The South Fork Noyo River 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 South Fork Noyo River. 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 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

The South Fork Noyo River is a tributary to the Noyo River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). The South Fork Noyo River's legal description at the confluence with the Noyo River is T18N R17W S14. Its location is 39.4246 degrees north latitude and 123.7267 degrees west longitude, LLID number 1237256394246. The South Fork Noyo River is a third order stream and has approximately 25.6 miles of blue line stream including the tributaries according to the USGS Noyo Hill 7.5 minute quadrangle. The South Fork Noyo River drains a watershed of approximately 27.4 square miles. Elevations range from about 35 feet at the mouth of the creek to 900 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is primarily in the Jackson Demonstration State Forest and is managed by the California Department of Forestry and Fire Protection for timber production. Vehicle access exists via California Division of Forestry and Fire Protection Road 300.

### METHODS

The habitat inventory conducted in South Fork Noyo River 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

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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 South Fork Noyo River 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". South Fork Noyo River 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 South Fork Noyo River, 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 South Fork Noyo River, 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 South Fork Noyo River, 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 South Fork Noyo River, 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 South Fork Noyo River. 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

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for South Fork Noyo River 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 July 20 to July, 29 2010 was conducted by P. Scott, A. Glasgow, B. Leonard, and M. Groff (WSP) and I. Mikus (CDFG). The total length of the stream surveyed was 52,202 feet with an additional 194 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 3.1 cfs on August 9, 2010.

The South Fork Noyo River is an F4 channel type for the entire length of the survey, 52,202 feet. 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 54 to 62 degrees Fahrenheit. Air temperatures ranged from 53 to 68 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 35% flatwater units, 35% pool units, 30% riffle units, and 1% dry units (Graph 1). Based on total length of Level II habitat types there were 51% flatwater units, 32% pool units, and 17% riffle units (Graph 2).

Fifteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 31%; low gradient riffle units, 29%; and run units, 24% (Graph 3). Based on percent total length, mid-channel pool units made up 29%, run units 28%, and step run units 22%.

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A total of 235 pools were identified (Table 3). Main channel pools were the most frequently encountered at 90% (Graph 4), and comprised 91% 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. One hundred five of the 235 pools (45%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 235 pool tail-outs measured, 43 had a value of 1 (18.3%); 133 had a value of 2 (56.6%); 31 had a value of 3 (13.2%); 1 had a value of 4 (0.4%); 27 had a value of 5 (11.5%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 4, flatwater habitat types had a mean shelter rating of 4, and pool habitats had a mean shelter rating of 22 (Table 1). Of the pool types, backwater pools had the highest mean shelter rating at 32. Main channel pools had a mean shelter rating of 22. Scour pools had a mean shelter rating of 20 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks are the dominant cover type in the South Fork Noyo River. Graph 7 describes the pool cover in the South Fork Noyo River. Undercut banks are 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 73% of the pool tail-outs. Small cobble and bedrock were the next most frequently observed dominant substrate types, each occurring in 11% of the pool tail-outs.

The mean percent canopy density for the surveyed length of the South Fork Noyo River was 93%. Seven percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 31% and 69%, respectively. Graph 9 describes the mean percent canopy in the South Fork Noyo River.

For the stream reach surveyed, the mean percent right bank vegetated was 87%. The mean percent left bank vegetated was 92%. The dominant elements composing the structure of the stream banks consisted of 63% sand/silt/clay, 25% cobble/gravel, 11% bedrock, and 1% boulder (Graph 10). Coniferous trees were the dominant vegetation type observed in 67% of the units surveyed. Additionally, 25% of the units surveyed had deciduous trees as the dominant vegetation type, and 8% had brush as the dominant vegetation type (Graph 11).

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### BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at ten sites for species composition and distribution in South Fork Noyo River on August 9, 2010. Water temperatures taken during the survey period of 1450 to 1605 were 56 degrees Fahrenheit. Air temperatures ranged from 70 to 72 degrees Fahrenheit. The sites were sampled by I. Mikus and S. McSmith (CDFG).

Ten sites were sampled. The sites yielded 10 young-of-the-year steelhead/rainbow trout (SH/RT), 2 age 1+ SH/RT, 4 coho, and 3 bass of unknown species.

The following chart displays the information yielded from these sites:

2010 South Fork Noyo River underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
F4 Channel Type									
8/9/10	1	061	Pool	41,025	4	0	0	2	0
	2	134	Pool	45,425	2	1	0	1	0
	3	186	Pool	48,469	0	0	0	0	0
	4	188	Pool	48,547	3	0	0	1	0
	5	190	Pool	48,720	0	0	0	0	0
	6	198	Pool	49,209	1	0	0	0	0
	7	201	Pool	49,330	0	0	0	0	0
	8	212	Pool	49,839	0	0	0	0	0
	9	223	Pool	50,529	0	0	0	0	0
	10	224	Pool	50,548	0	1	0	0	0

### DISCUSSION

The South Fork Noyo River is an F4 channel type for the entire length 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 July 20 to July 29, 2010 ranged from 54 to 62 degrees Fahrenheit. Air temperatures ranged from 53 to 68 degrees Fahrenheit. To make any conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

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Flatwater habitat types comprised 51% of the total length of this survey, riffles 17%, and pools 32%. One hundred five of the 235 (45%) pools had a maximum residual depth greater than three feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth order streams, a primary pool is defined to have a maximum residual depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing large wood structures that will increase or deepen pool habitat is recommended.

One hundred seventy-six of the 235 pool tail-outs measured had embeddedness ratings of 1 or 2. Thirty-two of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-seven 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.

One hundred ninety-nine of the 235 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 is 22. The shelter rating in the flatwater habitats is 4. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in the South Fork Noyo River. Undercut banks are 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%. In general, revegetation projects are considered when canopy density is less than 80%. The percentage of right and left bank covered with vegetation was 87% and 92%, respectively.

### **RECOMMENDATIONS**

- 1) South Fork Noyo River 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 undercut banks. Adding high quality complexity with woody cover in the pools is desirable.
- 4) The egg collecting station at 22,773 feet, under some flows, is a partial barrier for adult and juvenile salmonids. Good water temperature and flow regimes exist in the stream



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and it offers good conditions for rearing fish. Fish passage alternatives should be investigated.

- 5) The concrete sill at 36,196 feet is a partial barrier for adult and juvenile salmonids. Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage alternatives should be investigated.

### 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 the Noyo River. The channel is an F4 for the entire length of the survey, 51,396 feet.
442	0010.00	A wood and concrete bridge measuring 15' wide x 11' high x 35' long.
1315	0021.00	Out of the influence of the Noyo River.
2595	0037.00	Kass Creek (Tributary #01) enters on the right bank. It contributes approximately 10% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 60 degrees Fahrenheit; the water temperature of the tributary is 56 degrees Fahrenheit. For more information, see the 2010 Kass Creek Stream Habitat Inventory Report.
2748	0038.00	A wooden bridge measuring 12' wide x 15' high x 47' long. The bridge is in poor condition; some beams have collapsed into the channel.
6054	0075.00	Tributary #02 enters on the left bank. It contributes approximately 3% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 57 degrees Fahrenheit, the water temperature of the tributary is 53 degrees Fahrenheit, and the water temperature upstream of the confluence is 58 degrees Fahrenheit. The slope of the tributary is approximately 3%. The tributary is accessible to fish, but no fish were observed.
7427	0090.00	Log debris accumulation (LDA) #01 contains 12 pieces of large woody debris (LWD) and measures 12' high x 65' wide. Water flows through it although there are no visible gaps in the LDA. Retained sediment ranges from sand to small cobble and measures 13' wide x 22' long x 3' deep. Fish are present above the LDA.

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- 7917 0094.00 Tributary #03 enters on the right bank. It contributes approximately 2% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 58 degrees Fahrenheit, the water temperature of the tributary is 54 degrees Fahrenheit, and the water temperature upstream of the confluence is 59 degrees Fahrenheit. The slope of the tributary is 4%. The tributary is accessible to fish, but no fish were observed.
- 9566 0111.00 Tributary #04 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 58 degrees Fahrenheit; the water temperature of the tributary is 58 degrees Fahrenheit. The first 20 feet of the tributary are dry.
- 13364 0149.00 Tributary #05 enters on the right bank. It contributes less than 5% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 55 degrees Fahrenheit, the water temperature of the tributary is 53 degrees Fahrenheit, and the water temperature upstream of the confluence is 56 degrees Fahrenheit. The slope of the tributary is 4%. The tributary is accessible to fish, but no fish were observed.
- 15617 0173.00 Tributary #06 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is approximately 20%, making it inaccessible to fish.
- 17586 0206.00 Tributary #07 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 58 degrees Fahrenheit; the water temperature of the tributary is 53 degrees Fahrenheit. The slope of the tributary is 8%. The tributary is accessible to fish, but no fish were observed.
- 18747 0216.00 Tributary #08 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 58 degrees Fahrenheit, the water temperature of the tributary is 59 degrees Fahrenheit, and the water temperature upstream of the confluence is 54 degrees Fahrenheit. The slope of the tributary is 3%. The tributary is inaccessible to fish due to a 9' high plunge into 0.3' of water within 60' of the confluence with the South Fork Noyo River.
- 21289 0243.00 Tributary #09 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 58 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is

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		8%. The tributary is inaccessible to fish due to a 10' high plunge from a 2' diameter culvert 50' upstream from the confluence with the South Fork Noyo River.
21974	0247.00	Tributary #10 enters on the left bank. It contributes less than 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 58 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is 15%. The tributary is inaccessible to fish due to a 10' high plunge from a culvert 50' upstream from the confluence with the South Fork Noyo River.
22773	0252.00	Egg collecting station on the left bank. There is a 3.2' high plunge over the dam.
22832	0253.00	A concrete dam associated with the egg collecting station.
22857	0254.00	The North Fork of the South Fork Noyo River (Tributary #11) enters on the right bank. It contributes approximately 40% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 58 degrees Fahrenheit, the water temperature of the tributary is 56 degrees Fahrenheit, and the water temperature upstream of the confluence is 55 degrees Fahrenheit. For more information, see the 2010 North Fork of the South Fork Noyo River Stream Habitat Inventory Report.
23211	0257.00	A crossing consisting of a metal and concrete bridge measuring 35' wide x 10' high x 25' long.
24399	0264.00	A wooden footbridge spans the channel. The crossing measures 9' wide x 10' high x 41' long.
24952	0271.00	Peterson Gulch (Tributary #12) enters on the left bank. It contributes approximately 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 55 degrees Fahrenheit. For more information, see the 2010 Peterson Gulch Stream Habitat Inventory Report.
25747	0280.00	Tributary #13 enters on the right bank. It contributes less than 0.5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 57 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is 6%. The tributary is not accessible to fish.

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26771	0293.00	Tributary #14 enters on the left bank. It contributes less than 0.5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 57 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is 12%. The tributary is not accessible to fish.
28297	0311.00	Bear Gulch (Tributary #15) enters on the right bank. It contributes approximately 5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 59 degrees Fahrenheit; the water temperature of the tributary is 55 degrees Fahrenheit. For more information, see the 2010 Bear Gulch Stream Habitat Inventory Report.
29178	0323.00	Tributary #16 enters on the left bank. It contributes approximately 1% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 59 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is 6%. The tributary is accessible to fish, but no fish were observed.
36196	0409.00	There is a concrete dam in the channel. The dam measures 10' long x 23' wide. There is a 2' high plunge over the dam.
36516	0414.00	Parlin Creek (Tributary #17) enters on the right bank. It contributes approximately 35% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 57 degrees Fahrenheit; the water temperature of the tributary is 57 degrees Fahrenheit.
36920	0417.00	"Pipe Creek" (Tributary #18) enters on the left bank. It contributes approximately 10% of the South Fork Noyo River's flow. The water temperature downstream of the tributary is 56 degrees Fahrenheit, the water temperature of the tributary is 53 degrees Fahrenheit, and the water temperature upstream of the confluence is 55 degrees Fahrenheit. The slope of the tributary is approximately 2%. The tributary is accessible to fish; a salmonid was observed.
37514	0426.00	"Gulch 320" (Tributary #19) enters on the left bank. It contributes approximately 5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 57 degrees Fahrenheit; the water temperature of the tributary is 53 degrees Fahrenheit. The slope of the tributary is approximately 4%. The tributary is accessible to fish; a salmonid was observed.
37767	0430.00	A wooden bridge measuring 12' wide x 10' high x 60' long.

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40204	0467.00	Tributary #20 enters on the right bank. It contributes approximately 5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is approximately 6%. The tributary is not accessible to fish.
41576	0485.00	Seep coming out of a perched culvert on the right bank.
42889	0507.00	Dry tributary on the left bank.
43867	0523.00	Left bank seep.
44180	0529.00	Tributary #21 enters on the right bank. It contributes approximately 5% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 56 degrees Fahrenheit. The slope of the tributary is approximately 6%. No fish were observed.
45307	0548.00	Tributary #22 enters on the left bank. It contributes approximately 10% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 55 degrees Fahrenheit; the water temperature of the tributary is 53 degrees Fahrenheit. The slope of the tributary is approximately 5%. No fish were observed.
48547	0603.00	Left bank seep.
49349	0617.00	Tributary #23 enters on the right bank. It contributes approximately 30% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 54 degrees Fahrenheit. The slope of the tributary is approximately 4%. The tributary is accessible to fish, but no fish were observed.
49817	0626.00	LDA #02 contains three pieces of LWD and measures 7' high x 19' wide x 6' long. Water flows through it and there are no visible gaps in the LDA. Retained sediment ranges from silt to sand and measures 8' wide x 190' long x 1' deep. Fish are present above the LDA.
50051	0629.00	Tributary #24 enters on the right bank. It contributes approximately 10% of the South Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 56 degrees Fahrenheit; the water temperature of the tributary is 55 degrees Fahrenheit. The slope of the tributary is approximately 6%. The tributary is accessible to fish, but no fish were observed.
51774	0661.00	Ninety percent of substrate is covered with orange algae.

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52067	0670.00	Green sunfish were observed. Erosion on the left bank measures 20' long x 20' high; it is contributing sediment ranging in size from silt to gravel.
52176	0673.00	End of survey due to the end of anadromy at the McGuire's Pond dam.

## 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: South Fork Noyo River

LLID: 1237256394246 Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0

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
4	0	DRY	0.6	39	155	0.3									
234	30	FLATWATER	34.6	113	26512	50.6	15.9	0.6	1.5	1446	338386	963	225275		4
235	235	POOL	34.8	72	16882	32.2	18.1	1.5	3.1	1348	316672	2711	637074	2321	22
203	26	RIFFLE	30.0	44	8847	16.9	14.1	0.3	0.8	538	109161	202	40951		4
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>			<b>Total Volume (cu.ft.)</b>		
676	291				52396					764218			903299		



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

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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 (%)
198	25	LGR	29.3	44	8746	16.7	15	0.3	2	558	110529	209	41439		4	94
5	1	BRS	0.7	20	101	0.2	2	0.5	0.7	26	128	13	64		20	96
2	2	GLD	0.3	130	259	0.5	22	1.0	2.7	2709	5418	2541	5082		3	99
160	18	RUN	23.7	93	14889	28.4	17	0.6	2.6	1243	198815	763	122091		5	94
72	10	SRN	10.7	158	11364	21.7	13	0.6	2.7	1560	112306	1006	72462		2	94
1	1	TRP	0.1	60	60	0.1	6	0.9	2.2	390	390	390	390	351	45	94
211	211	MCP	31.2	72	15233	29.1	18	1.5	7.5	1357	286302	2760	582385	2374	22	93
1	1	LSL	0.1	43	43	0.1	20	0.5	1.9	860	860	688	688	430	30	92
3	3	LSR	0.4	54	161	0.3	25	1.2	4.1	1408	4225	3044	9132	2461	32	95
14	14	LSBk	2.1	72	1007	1.9	16	1.2	5.6	1155	16170	1842	25789	1394	15	89
1	1	LSBo	0.1	52	52	0.1	11	0.6	2.9	486	486	778	778	292	50	95
2	2	PLP	0.3	48	95	0.2	26	1.3	3.7	1209	2417	1894	3789	1532	15	64
1	1	SCP	0.1	26	26	0.0	11	0.9	1.9	286	286	286	286	257	50	82
1	1	DPL	0.1	205	205	0.4	30	2.4	3.9	5535	5535	13838	13838	13284	15	87
4	0	DRY	0.6	39	155	0.3										

Total Units  
676

Total Units Fully Measured  
291

Total Length (ft.)  
52396

Total Area (sq.ft.)  
743868

Total Volume (cu.ft.)  
878211

**Table 3 - Summary of Pool Types**

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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
212	212	MAIN	90	72	15293	91	18.1	1.5	1352	286692	2365	501288	22
21	21	SCOUR	9	65	1358	8	18.1	1.1	1150	24159	1461	30689	20
2	2	BACKWATER	1	116	231	1	20.5	1.7	2911	5821	6771	13541	33
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>		<b>Total Volume (cu.ft.)</b>	
235	235				16882					316672		545518	

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

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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
1	TRP	0	0	0	0	0	1	100	0	0	0	0
211	MCP	90	0	0	46	22	71	34	44	21	50	24
1	LSL	0	0	0	1	100	0	0	0	0	0	0
3	LSR	1	0	0	1	33	0	0	0	0	2	67
14	LSBk	6	0	0	1	7	6	43	3	21	4	29
1	LSBo	0	0	0	0	0	1	100	0	0	0	0
2	PLP	1	0	0	0	0	1	50	1	50	0	0
1	SCP	0	0	0	1	100	0	0	0	0	0	0
1	DPL	0	0	0	0	0	0	0	1	100	0	0
<b>Total Units</b>			<b>Total &lt; 1 Foot Max Resid. Depth</b>	<b>Total &lt; 1 Foot % Occurrence</b>	<b>Total 1&lt; 2 Foot Max Resid. Depth</b>	<b>Total 1&lt; 2 Foot % Occurrence</b>	<b>Total 2&lt; 3 Foot Max Resid. Depth</b>	<b>Total 2&lt; 3 Foot % Occurrence</b>	<b>Total 3&lt; 4 Foot Max Resid. Depth</b>	<b>Total 3&lt; 4 Foot % Occurrence</b>	<b>Total &gt;= 4 Foot Max Resid. Depth</b>	<b>Total &gt;= 4 Foot % Occurrence</b>
235			0	0	50	21	80	34	49	21	56	24

Mean Maximum Residual Pool Depth (ft.): 3.1

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

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Dry Units: 4

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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
198	25	LGR	32	44	17	0	4	2	0	1	0
5	1	BRS	0	0	0	0	0	0	100	0	0
203	26	TOTAL RIFFLE	28	39	15	0	3	2	11	1	0
2	2	GLD	95	0	0	0	0	0	0	5	0
160	18	RUN	22	44	14	0	6	2	0	1	11
72	10	SRN	29	49	11	0	0	0	0	0	11
234	30	TOTAL FLAT	29	43	13	0	4	1	0	1	10
1	1	TRP	90	0	0	5	5	0	0	0	0
211	211	MCP	33	25	22	3	3	0	0	6	8
1	1	LSL	0	25	75	0	0	0	0	0	0
3	3	LSR	18	18	20	35	0	0	0	8	0
14	14	LSBk	2	6	3	0	0	0	0	10	78
1	1	LSBo	0	0	0	0	0	0	0	80	20
2	2	PLP	5	33	0	0	0	0	45	10	8
1	1	SCP	0	35	15	0	35	15	0	0	0
1	1	DPL	65	10	10	15	0	0	0	0	0
235	235	TOTAL POOL	30	23	20	3	2	0	1	6	13
676	291	TOTAL	30	25	20	3	3	0	1	6	12

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

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Dry Units: 4

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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
198	25	LGR	0	0	60	40	0	0	0
5	1	BRS	0	0	0	0	0	0	100
2	2	GLD	0	0	100	0	0	0	0
160	19	RUN	0	5	74	21	0	0	0
72	10	SRN	0	0	40	30	0	0	30
1	1	TRP	0	0	100	0	0	0	0
211	211	MCP	0	8	78	7	1	0	6
1	1	LSL	0	0	0	100	0	0	0
3	3	LSR	0	0	100	0	0	0	0
14	14	LSBk	0	7	86	7	0	0	0
1	1	LSBo	0	0	100	0	0	0	0
2	2	PLP	0	0	100	0	0	0	0
1	1	SCP	100	0	0	0	0	0	0
1	1	DPL	0	0	100	0	0	0	0

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

Stream Name: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

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Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
93	69	31	0	87	92

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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: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

Latitude: 39:25:29.0N

Longitude: 123:43:32.0W

**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	30	34	11.0
Boulder	3	4	1.2
Cobble / Gravel	77	68	24.9
Sand / Silt / Clay	181	185	62.9

**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	1	2	0.5
Brush	24	23	8.1
Hardwood Trees	68	76	24.7
Coniferous Trees	198	190	66.7
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 2



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

StreamName: South Fork Noyo River

LLID: 1237256394246

Drainage: Noyo River

Survey Dates: 7/20/2010 to 7/29/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS14

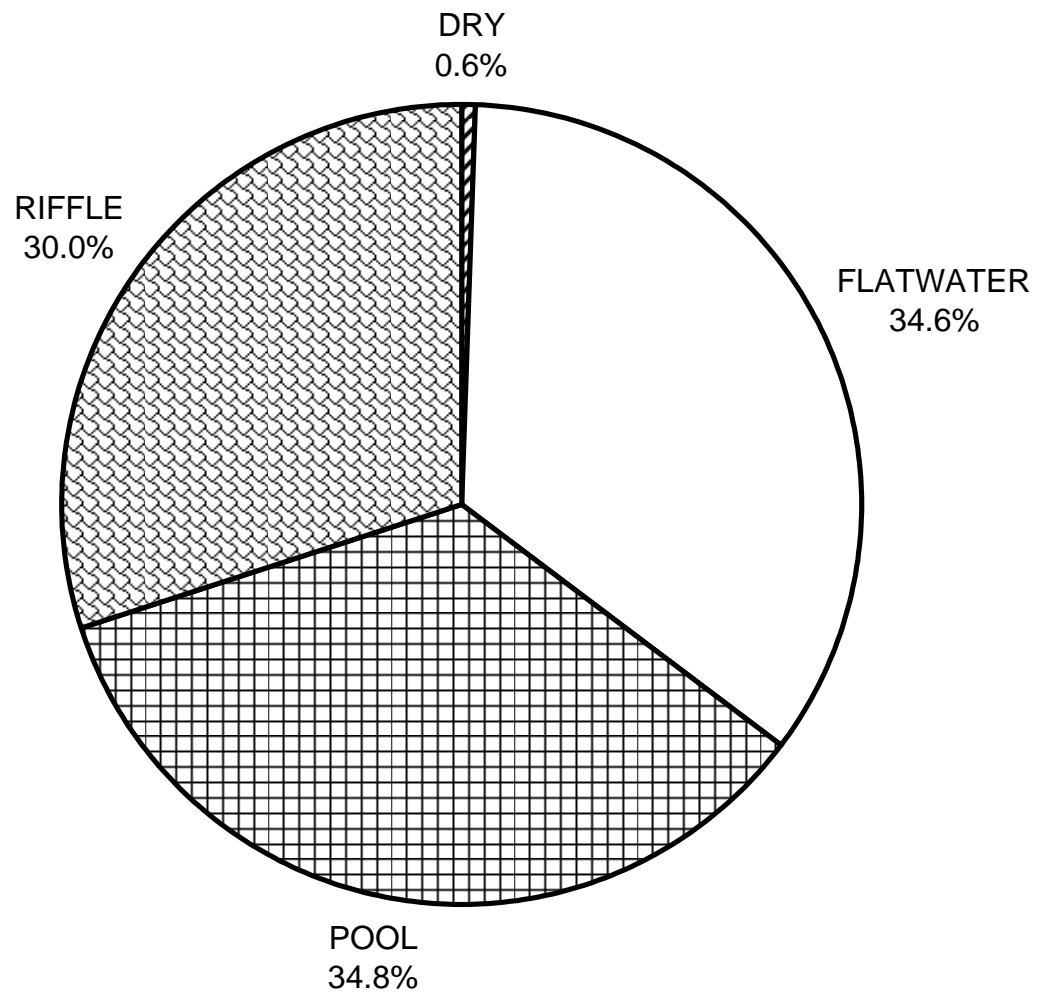
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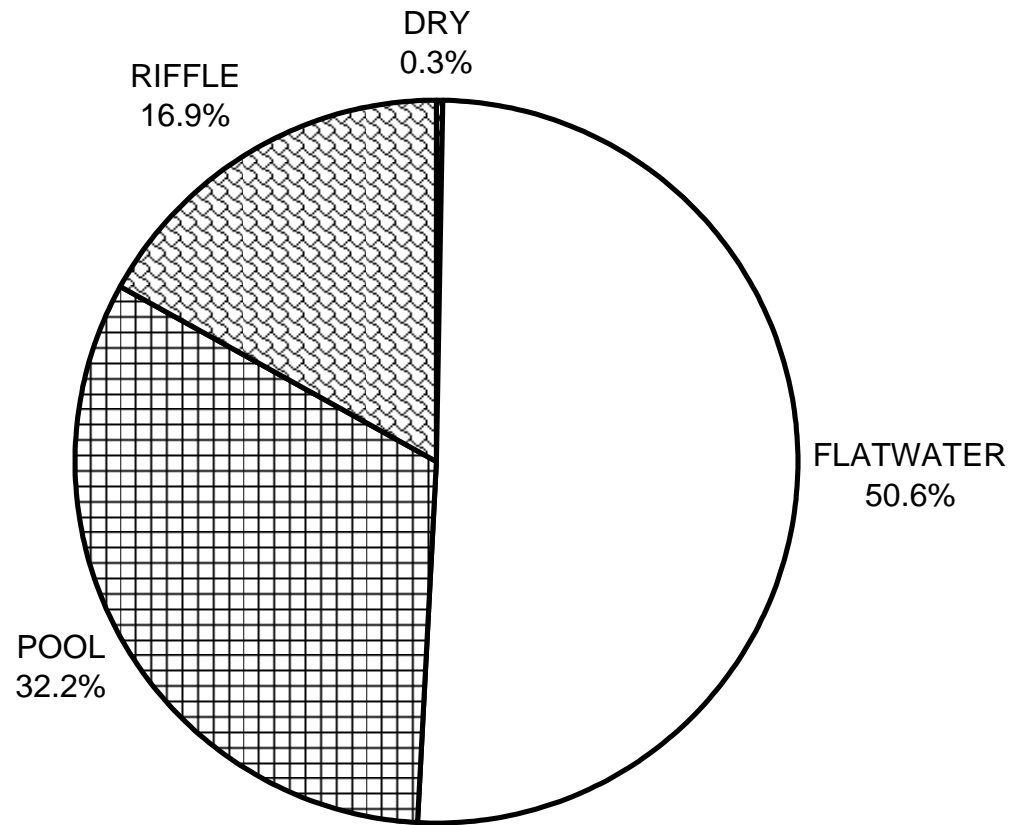
	<b>Riffles</b>	<b>Flatwater</b>	<b>Pools</b>
UNDERCUT BANKS (%)	28	29	30
SMALL WOODY DEBRIS (%)	39	43	23
LARGE WOODY DEBRIS (%)	15	13	20
ROOT MASS (%)	0	0	3
TERRESTRIAL VEGETATION (%)	3	4	2
AQUATIC VEGETATION (%)	2	1	0
WHITEWATER (%)	11	0	1
BOULDERS (%)	1	1	6
BEDROCK LEDGES (%)	0	10	13

# SOUTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT OCCURRENCE



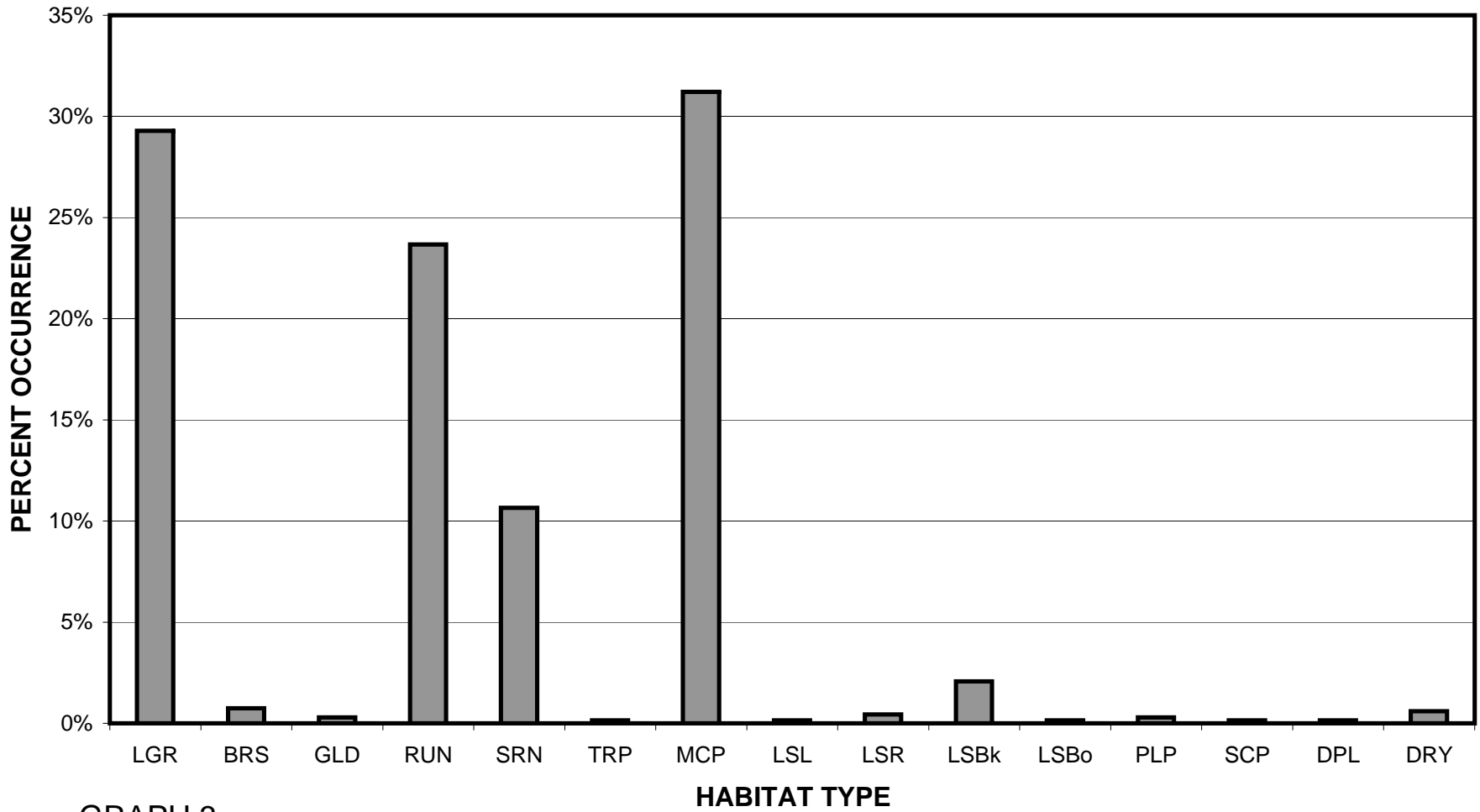
GRAPH 1

# SOUTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT TOTAL LENGTH



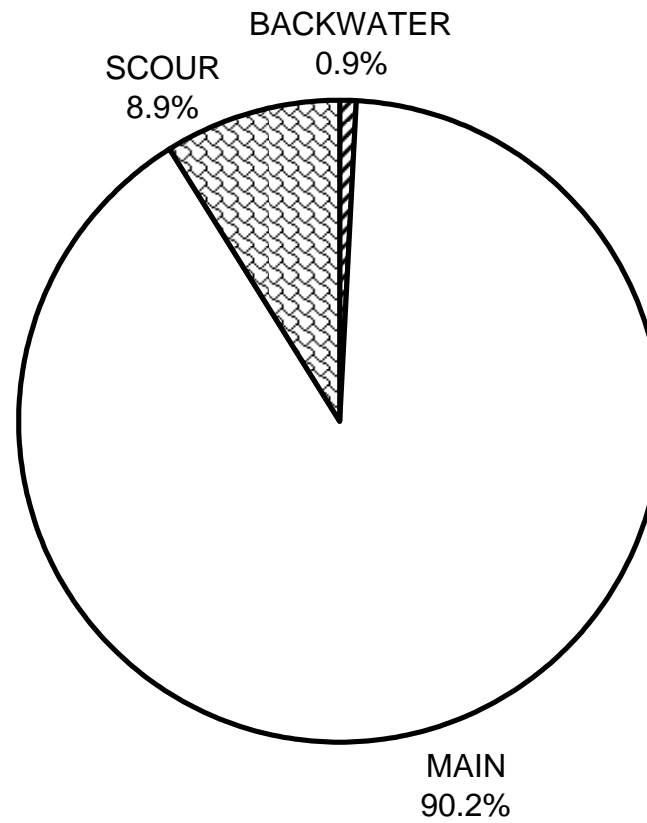
GRAPH 2

# SOUTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT OCCURRENCE



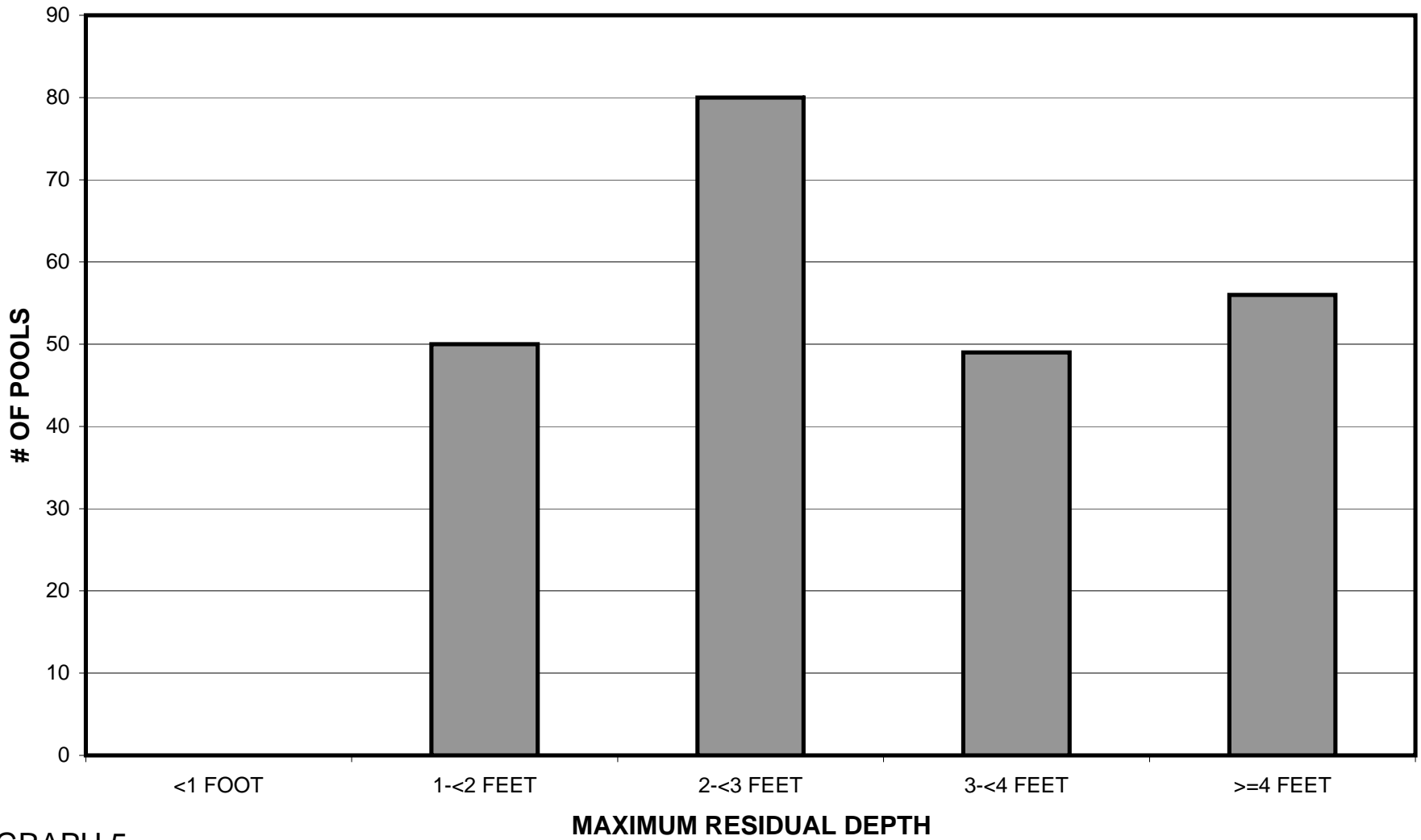
GRAPH 3

# SOUTH FORK NOYO RIVER 2010 POOL TYPES BY PERCENT OCCURRENCE



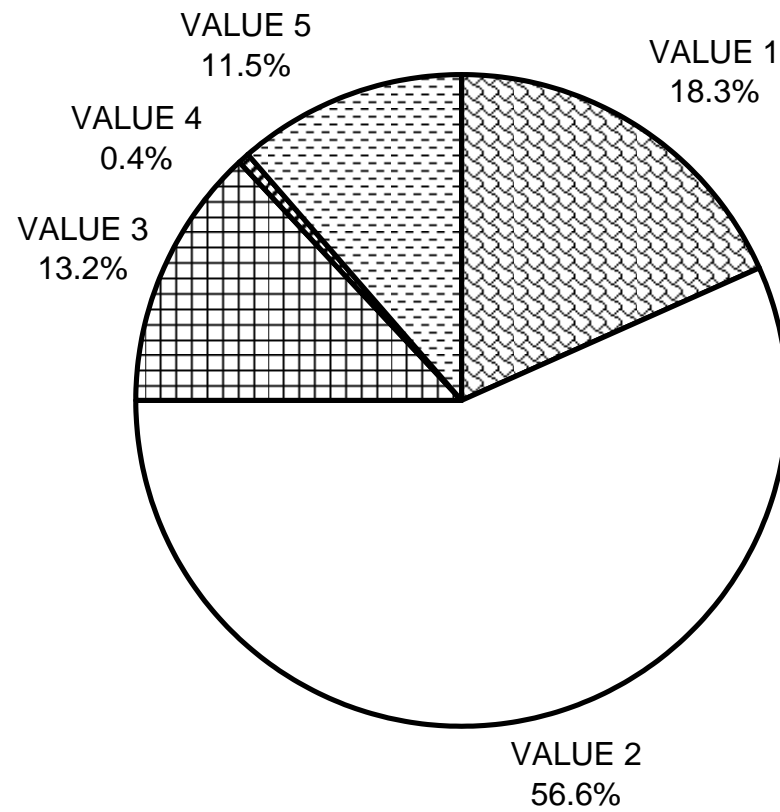
GRAPH 4

# SOUTH FORK NOYO RIVER 2010 MAXIMUM DEPTH IN POOLS



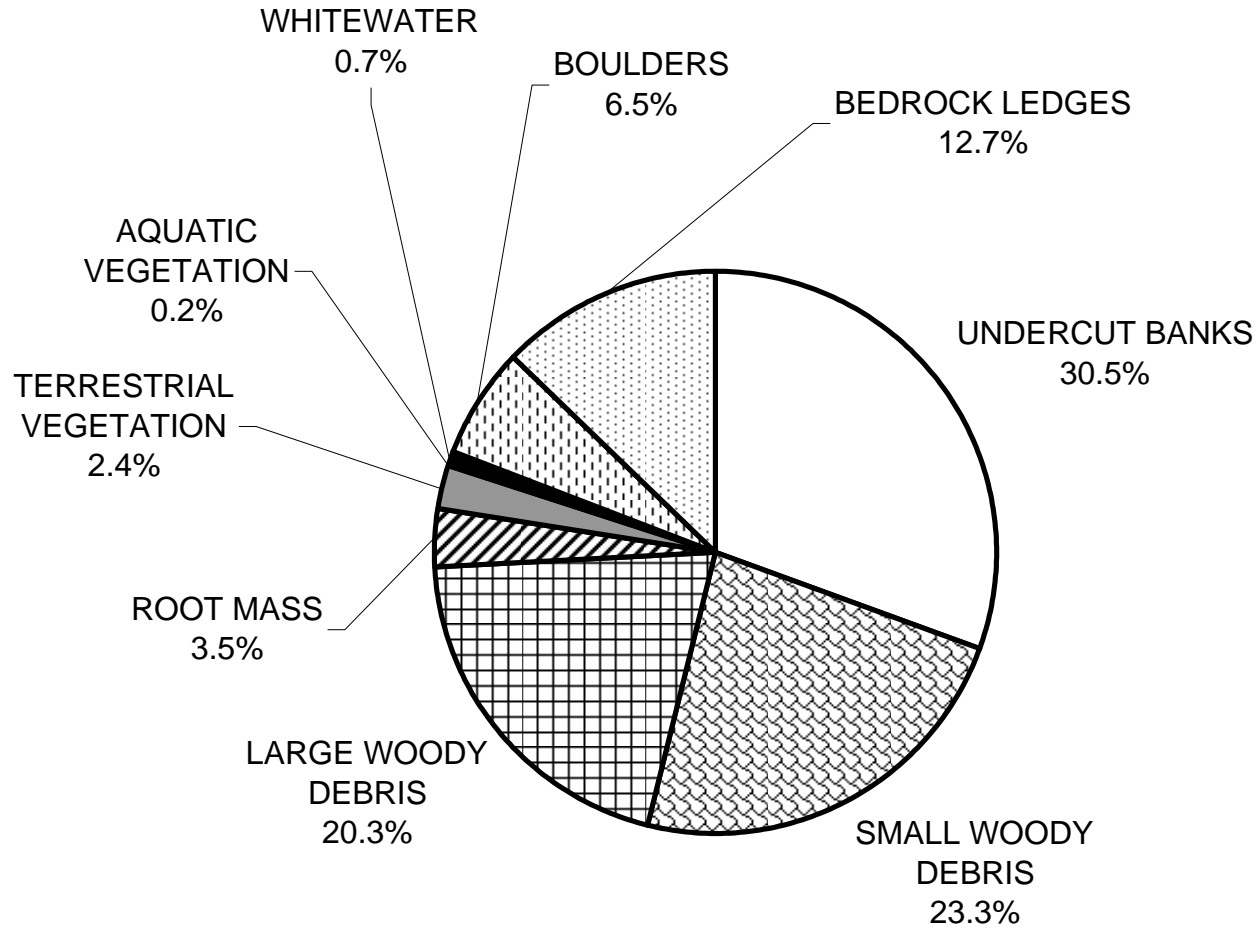
GRAPH 5

# SOUTH FORK NOYO RIVER 2010 PERCENT EMBEDDEDNESS



GRAPH 6

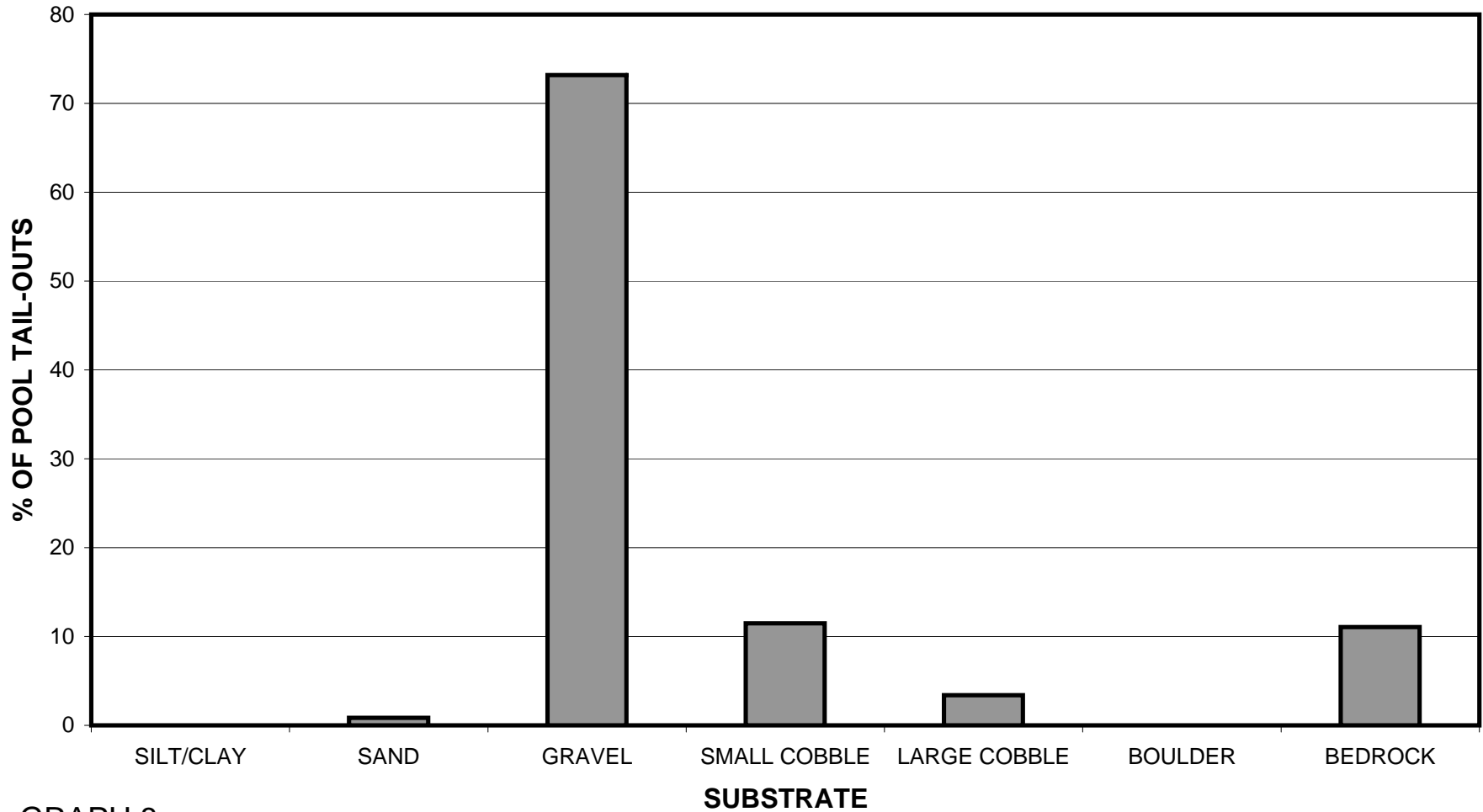
# SOUTH FORK NOYO RIVER 2010 MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

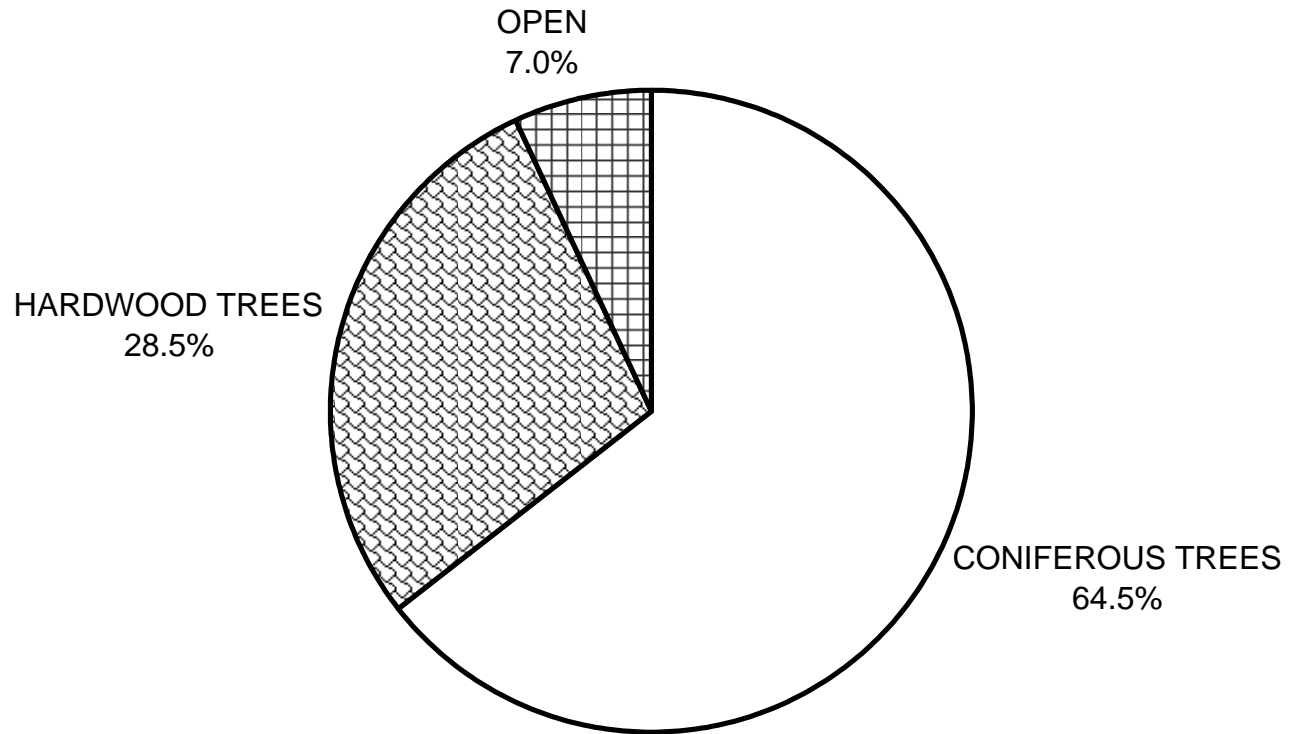


# SOUTH FORK NOYO RIVER 2010 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



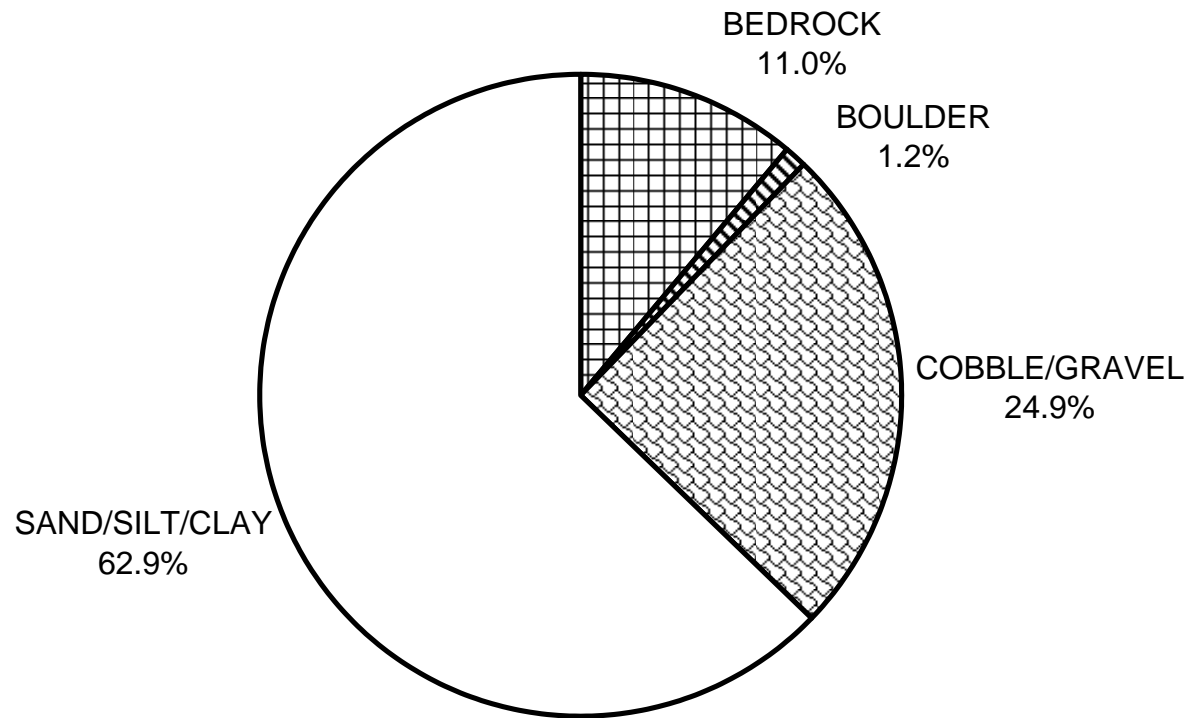
GRAPH 8

# SOUTH FORK NOYO RIVER 2010 MEAN PERCENT CANOPY



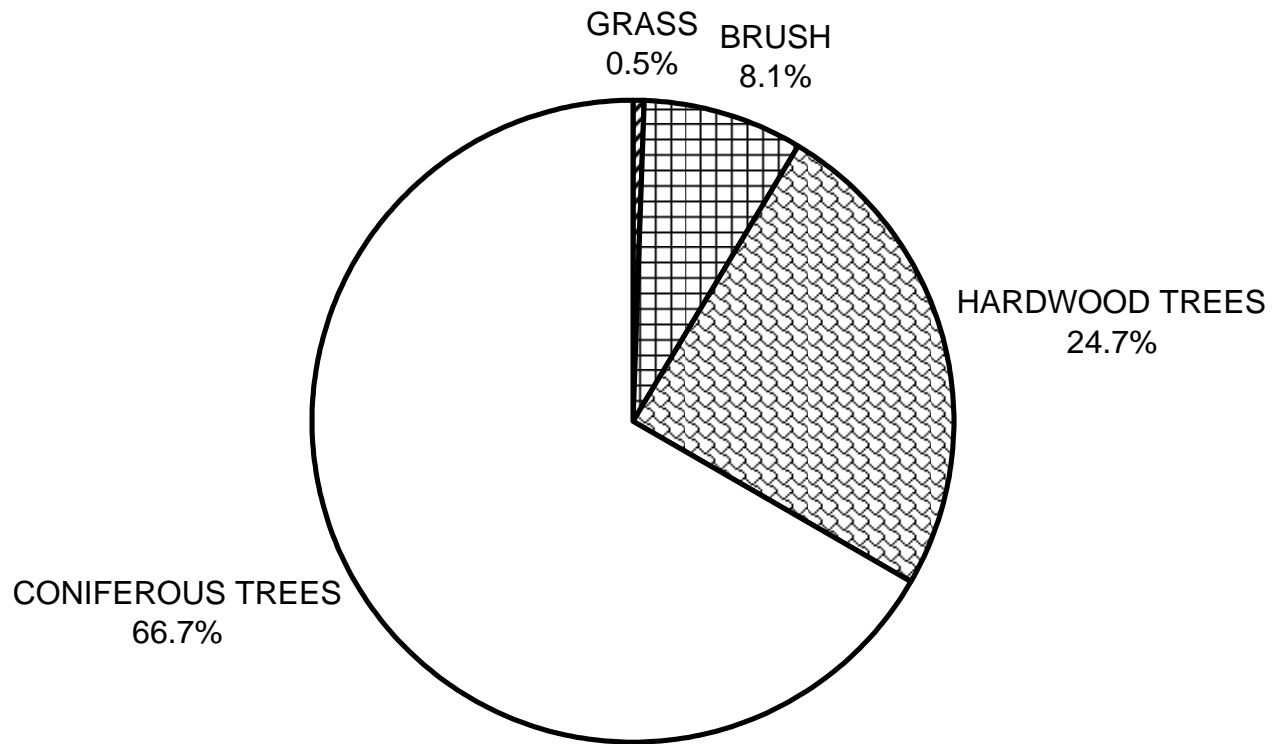
GRAPH 9

**SOUTH FORK NOYO RIVER 2010  
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

# SOUTH FORK NOYO RIVER 2010 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

