

STREAM INVENTORY REPORT

Little North Fork Noyo River

INTRODUCTION

A stream inventory was conducted from August 30 to September 21, 2010 on Little North Fork Noyo River. The survey began at the confluence with Noyo River and extended upstream 4.1 miles.

The Little North 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 Little North 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

Little North Fork Noyo River is a tributary to Noyo River, is a tributary to Pacific Ocean, located in Mendocino County, California (Map 1). Little North Fork Noyo River's legal description at the confluence with Noyo River is T18N R17W S01. Its location is 39.4452 north latitude and 123.6966 west longitude, LLID number 1236955394453. Little North Fork Noyo River is a first order stream and has approximately 3.6 miles of blue line stream according to the USGS Noyo Hill 7.5 minute quadrangle. Little North Fork Noyo River drains a watershed of approximately 3.75 square miles. Elevations range from about 200 feet at the mouth of the creek to 1,400 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Fort Bragg Sherwood Road to Company Ranch Road. Lumber roads are used to access the stream from this junction.

METHODS

The habitat inventory conducted in Little North 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 Little North 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". Little North 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 Little North 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 Little North 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 Little North 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 Little North 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 Little North Fork Noyo River. In addition, underwater observations were made at 12 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 Little North 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 August 30 to September 21, 2010, was conducted by I. Mikus (DFG), and M. Groff, B. Williams, and B. Leonard (WSP). The total length of the stream surveyed was 21,811 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.25 cfs on September 15, 2010.

Little North Fork Noyo River is an F4 channel type for 21,811 feet of the stream surveyed. F4 channel types 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 51 to 55 degrees Fahrenheit. Air temperatures ranged from 55 to 69 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36% pool units, 32% riffle units, 31% flatwater units, and 1% no survey units (Graph 1). Based on total length of Level II habitat types there were 44% flatwater units, 31% pool units, 24% riffle units, and 1% culvert units (Graph 2).

Ten Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 34% mid-channel pool units, 31% low gradient riffle units, and 18% run units (Graph 3). Based on percent total length, 30% mid-channel pool units, 27% step run units, and 24% low gradient riffle units.

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A total of 214 pools were identified (Table 3). Main channel pools were the most frequently encountered at 94% (Graph 4), and comprised 97% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Fifty-two of the 214 pools (24%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 214 pool tail-outs measured, 28 had a value of 1 (13.1%); 99 had a value of 2 (46.3%); 55 had a value of 3 (25.7%); 28 had a value of 4 (13.1%); 4 had a value of 5 (1.9%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 1, flatwater habitat types had a mean shelter rating of 2, and pool habitats had a mean shelter rating of 17 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 17. Scour pools had a mean shelter rating of 12 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Little North Fork Noyo River. Graph 7 describes the pool cover in Little North Fork Noyo River. 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 82% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 14% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Little North Fork Noyo River was 96%. Four 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 Little North Fork Noyo River.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 97% sand/silt/clay, 1% bedrock, 1% boulder, and 1% cobble/gravel (Graph 10). Coniferous trees were the dominant vegetation type observed in 57% of the units surveyed. Additionally, 25% of the units surveyed had deciduous trees as the dominant vegetation type, and 17% had brush as the dominant vegetation type (Graph 11).

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BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 12 sites for species composition and distribution in Little North Fork Noyo River on September 22, 2010. Water temperatures taken during the survey period of 1240 to 1340 were 55 degrees Fahrenheit. Air temperatures ranged from 60 to 62 degrees Fahrenheit. The sites were sampled by I. Mikus (DFG), and B. Leonard (WSP).

Twelve sites were sampled. The sites yielded 11 young-of-the-year steelhead/rainbow trout (SH/RT), 5 age 1+ SH/RT, 2 age 2+ SH/RT, 26 coho salmon, and 4 sculpin.

The following chart displays the information yielded from these sites:

2010 Little North 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									
09/22/10	1	085	Pool	3,816	4	2	0	22	0
	2	349	Pool	13,407	0	0	0	4	0
	3	354	Pool	13,630	1	1	0	0	0
	4	357	Pool	13,740	0	0	1	0	0
	5	360	Pool	13,846	1	1	0	0	0
	6	364	Pool	13,963	1	0	0	0	0
	7	376	Pool	14,410	3	0	0	0	0
	8	377	Pool	14,459	1	1	0	0	0
	9	382	Pool	14,656	0	0	0	0	0
	10	385	Pool	14,945	0	0	0	0	0
	11	393	Pool	15,221	0	0	0	0	0
	12	395	Pool	15,280	0	0	1	0	0

DISCUSSION

Little North Fork Noyo River is an F4 channel type for the entire 21,811 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 August 30 to September 21, 2010, ranged from 51 to 55 degrees Fahrenheit. Air temperatures ranged from 55 to 69 degrees Fahrenheit. This is a suitable water temperature range for salmonids. To make any conclusions,

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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 44% of the total length of this survey, riffles 24%, and pools 31%. Fifty-two of the 214 (24%) 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 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.

One hundred twenty-seven of the 214 pool tail-outs measured had embeddedness ratings of 1 or 2. Eighty-three of the pool tail-outs had embeddedness ratings of 3 or 4. Four of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Little North Fork Noyo River should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Two hundred four of the 214 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 17. The shelter rating in the flatwater habitats is 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 Little North Fork Noyo River. 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 96%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 97% and 99%, 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) Little North 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

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meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

- 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) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large woody debris. Adding high quality complexity with woody cover in the pools is desirable.
- 5) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

Position (ft):	Habitat unit #:	Comments:
0	0001.00	Start of survey at the confluence with North Fork Noyo River. The channel type is F4 for the entire length of the survey.
140	0004.00	Log debris accumulation (LDA) #01 contains eight pieces of large woody debris (LWD) and measures 3' high x 26' wide x 16' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from sand to cobble and measures 20' wide x 35' long x 2' deep. Fish are present above the LDA.
1140	0022.00	LDA #02 contains eight pieces of LWD and measures 3.5' high x 30' wide x 5' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to gravel and measures 12' wide x 25' long x 1.5' deep. Fish are present above the LDA.
2069	0052.00	Culvert on the right bank with a tributary flowing partly through it. The culvert is in bad condition and has a hole in it. The tributary's water temperature is 54 degrees Fahrenheit. The tributary is steep and no salmonids were observed.
3514	0080.00	A road crosses the channel. The crossing is a 26' wide x 11' high x 53' long metal car bridge.

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3573	0081.00	A culvert on the right bank draining road.
3684	0084.00	Nearly dry tributary on the left bank.
3863	0088.00	LDA #03 contains nine pieces of LWD and measures 5' high x 32' wide x 9' long. Water flows through the LDA and there are no visible gaps in it. The LDA is not retaining sediment. Fish are present above the LDA.
4163	0096.00	A rootwad on the right bank is causing the creek to go subsurface and is splitting the channel.
4749	0109.00	Tributary #01 enters on the right bank. It contributes to approximately 15% of Little North Fork Noyo River's flow. The water temperature downstream of the tributary is 54 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 tributary is not accessible to salmonids due to its high gradient, approximately 60%, below the road. Above the road crossing the slope is approximately 4%.
6191	0140.00	There is a culvert on the right bank. The bottom of the culvert is rusted through.
6536	0149.00	An erosion site on the left bank measures 20' long x 12' high and is contributing sediment ranging in size from silt to large cobble.
6571	0150.00	Left bank seep.
6657	0152.00	Tributary #02 enters on the left bank. It contributes to approximately 5% of Little North Fork Noyo River's flow. The water temperature downstream of the tributary is 53 degrees Fahrenheit, the water temperature of the tributary is 52 degrees Fahrenheit, and the water temperature upstream of the confluence is 54 degrees Fahrenheit. The slope of the tributary is 10%. It is not accessible to salmonids. A road fords the creek.
7121	0161.00	There is a perched culvert on the right bank.
7448	0168.00	LDA #04 contains seven pieces of LWD and measures 4' high x 20' wide x 12' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to sand and measures 7' wide x 20' long x 1.5' deep. Fish are present above the LDA. LDA is causing erosion on the right bank, threatening the road.
8042	0186.00	Tributary #03 enters on the right bank. It contributes to approximately 20% of Little North Fork Noyo River's flow. The water temperature

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downstream of the tributary is 53 degrees Fahrenheit, the water temperature of the tributary is 53 degrees Fahrenheit, and the water temperature upstream of the confluence is 54 degrees Fahrenheit. The slope of the tributary is 3%. The first 100' of the tributary are accessible to salmonids, but no fish were observed. A perched culvert approximately 100' from the mouth has failed and the creek is flowing beneath it.

9676	0231.00	LDA #05 contains three pieces of LWD and measures 5' high x 16' wide x 11' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to sand and measures 10' wide x 20' long x 3' deep. Fish are present above the LDA.
9854	0239.00	An abandoned log stringer bridge is collapsing into the creek.
10578	0258.00	LDA #06 contains eight pieces of LWD and measures 6' high x 27' wide x 29' long. Water does not flow through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to gravel and measures 15' wide x 40' long x 3' deep. Fish are present above the LDA.
11084	0274.00	Right bank seep.
11990	0300.00	An erosion site on the left bank measures 40' long x 15' high and is contributing sediment ranging in size from silt to gravel.
12063	0303.00	Tributary #04 enters on the right bank. It contributes to approximately 5% of Little North Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 52 degrees Fahrenheit; the water temperature of the tributary is 52 degrees Fahrenheit. The slope of the tributary is 3%. The tributary may be accessible to fish, but the flow may be too low to support fish. No fish were observed in the tributary.
13437	0351.00	LDA #07 contains six pieces of LWD and measures 10' high x 24' wide x 26' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 10' wide x 30' long x 1' deep. Fish are present above the LDA.
14514	0380.00	Dry tributary on the right bank.
15423	0402.00	There is a 1.7' high plunge over a log.
15940	0417.00	Left bank seep.
16020	0419.00	Left bank seep; its flow is approximately 0.01 cfs.

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16395	0432.00	There is a 50' culvert in the channel; it is no longer in use. The fill from an old crossing is eroding from both banks, contributing silt/clay and sand to the channel.
17054	0451.00	Tributary #05 enters on the right bank. It contributes to approximately 25% of Little North Fork Noyo River's flow. The water temperature downstream and upstream of the tributary is 53 degrees Fahrenheit; the water temperature of the tributary is 53 degrees Fahrenheit. The slope of the tributary is 3%. The tributary is not accessible to salmonids because the channel is deeply incised and narrow, and there is a 4' high plunge approximately 40' from the mouth.
17443	0464.00	Rip rap on right bank.
17487	0466.00	LDA #08 contains six pieces of LWD and measures 4' high x 22' wide x 19' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 7' wide x 20' long x 3' deep. Fish are present above the LDA.
18051	0482.00	There is a 2' high log plunge.
18462	0491.00	A road crosses the channel. The crossing is a 6' wide x 60' long corrugated metal pipe (CMP) culvert. Sediment is accumulating inside the culvert making the height at the inlet 4.3' and the height at the outlet 2.3'. The culvert has a 0% slope and there is no plunge at the outlet.
18931	0505.00	There is a 2' high plunge.
19341	0515.00	LDA #09 contains seven pieces of LWD and measures 5' high x 18' wide x 23' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to sand and measures 10' wide x 30' long x 4' deep. Fish are present above the LDA.
19701	0529.00	There is a 3' high plunge over a log.
20136	0539.00	A road crosses the channel. The crossing is a 4' high x 6' wide x 60' long CMP culvert. There is no plunge at the outlet. Sediment is accumulating inside the culvert and there is a section in the middle of the culvert that has been crushed approximately 1'.
20519	0549.00	An erosion site on the left bank measures 30' long x 10' high and is contributing sediment ranging in size from silt to cobble.
20804	0560.00	An erosion site on the right bank measures 15' long x 6' high and is contributing silt and sand to the channel.

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20866	0562.00	LDA #10 contains 12 pieces of LWD and measures 6' high x 15' wide x 30' long. Water flows through the LDA and there are no visible gaps in it. The LDA is not retaining sediment. Fish are present above the LDA.
21218	0574.00	LDA #11 contains six pieces of LWD and measures 4' high x 19' wide x 6' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to gravel and measures 6' wide x 20' long x 1' deep. Fish are present above the LDA.
21696	0592.00	Tributary #06 enters on the left bank. It contributes to approximately 20% of Little North Fork Noyo River's flow. The water temperature downstream of the tributary is 55 degrees Fahrenheit, the water temperature of the tributary is 54 degrees Fahrenheit, and the water temperature upstream of the confluence is 56 degrees Fahrenheit. The slope of the tributary is 2%. The tributary is not accessible to salmonids.
21753	0596.00	A road crosses the creek. The fill measures 50' long x 4' high x 20' wide.
21811	0598.00	End of survey due 5.5' high plunge over and old road bed. The maximum depth below the plunge is 1.7'. The creek's flow above the road bed is approximately 0.05 cfs. The creek was explored approximately 500' upstream of the plunge. There were approximately five pools; one young-of-the-year (YOY) steelhead and one 1+ steelhead were observed. The road appears to follow the left bank tributary and has the potential to release sediment.

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: Little North Fork Noyo River

LLID: 1236955394453 Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
2	0	CULVERT	0.3	60	120	0.6									
1	0	DRY	0.2	13	13	0.1									
185	13	FLATWATER	30.9	51	9524	43.7	7.0	0.5	0.9	398	73557	191	35384		2
4	0	NOSURVEY	0.7	22	87	0.4									
214	214	POOL	35.8	31	6724	30.8	9.1	0.9	1.7	293	62762	343	73336	293	17
192	28	RIFFLE	32.1	28	5343	24.5	5.7	0.2	0.4	148	28393	32	6150		1
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
598	255				21811					164711			114870		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

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 (%)
187	25	LGR	31.3	28	5278	24.2	6	0.2	1	161	30069	34	6300		1	96
3	1	HGR	0.5	17	50	0.2	9	0.5	0.9	103	308	51	154		5	97
2	2	BRS	0.3	8	15	0.1	1	0.2	0.6	9	18	2	3		0	97
108	7	RUN	18.1	33	3532	16.2	7	0.5	1.1	262	28316	120	12971		1	97
77	6	SRN	12.9	78	5992	27.5	8	0.5	1.4	556	42781	274	21120		3	97
201	201	MCP	33.6	32	6475	29.7	9	0.9	4.5	300	60352	353	71053	302	18	96
1	1	CCP	0.2	32	32	0.1	10	1.1	1.9	320	320	384	384	352	0	100
6	6	LSL	1.0	23	136	0.6	8	0.5	1.5	190	1141	123	737	89	11	96
6	6	PLP	1.0	14	81	0.4	11	0.9	2.4	158	950	194	1162	169	13	94
1	0	DRY	0.2	13	13	0.1										
2	0	CUL	0.3	60	120	0.6										
4	0	NS	0.7	22	87	0.4										

Total Units
598

Total Units Fully Measured
255

Total Length (ft.)
21811

Total Area (sq.ft.)
164253

Total Volume (cu.ft.)
113885

Table 3 - Summary of Pool Types

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

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
202	202	MAIN	94	32	6507	97	9.1	0.9	300	60672	303	61154	17
12	12	SCOUR	6	18	217	3	9.6	0.7	174	2091	129	1548	12

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
214	214	6724	62762	62702

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

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

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
201	MCP	94	10	5	140	70	44	22	6	3	1	0
1	CCP	0	0	0	1	100	0	0	0	0	0	0
6	LSL	3	0	0	6	100	0	0	0	0	0	0
6	PLP	3	0	0	5	83	1	17	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
214	10	5	152	71	45	21	6	3	1	0

Mean Maximum Residual Pool Depth (ft.): 1.7

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Dry Units: 1

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

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
187	25	LGR	50	0	0	0	50	0	0	0	0
3	1	HGR	0	0	0	0	0	0	0	100	0
2	2	BRS	0	0	0	0	0	0	0	0	0
192	28	TOTAL RIFFLE	33	0	0	0	33	0	0	33	0
108	7	RUN	0	70	30	0	0	0	0	0	0
77	6	SRN	0	18	83	0	0	0	0	0	0
185	13	TOTAL FLAT	0	35	65	0	0	0	0	0	0
201	201	MCP	20	32	43	1	1	0	0	2	0
1	1	CCP	0	0	0	0	0	0	0	0	0
6	6	LSL	20	31	49	0	0	0	0	0	0
6	6	PLP	3	30	67	0	0	0	0	0	0
214	214	TOTAL POOL	20	32	44	1	1	0	0	2	0
2	0	CUL									
4	0	NS									
598	255	TOTAL	19	32	43	1	2	0	0	3	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Dry Units: 1

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

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
187	25	LGR	0	0	80	20	0	0	0
3	1	HGR	0	0	0	0	0	100	0
2	2	BRS	0	0	0	0	0	0	100
108	7	RUN	0	0	100	0	0	0	0
77	6	SRN	0	0	100	0	0	0	0
201	201	MCP	0	6	93	0	0	0	0
1	1	CCP	0	0	100	0	0	0	0
6	6	LSL	0	0	100	0	0	0	0
6	6	PLP	0	0	100	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
96	57	43	0	97	99

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 8 - Fish Habitat Inventory Data Summary

Stream Name: Little North Fork Noyo River LLID: 1236955394453 Drainage: Noyo River
 Survey Dates: 8/30/2010 to 9/21/2010 Survey Length (ft.): 21811 Main Channel (ft.): 21811 Side Channel (ft.): 0
 Confluence Location: Quad: NOYO HILL Legal Description: T18NR17WS01 Latitude: 39:26:43.0N Longitude: 123:41:44.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4	Canopy Density (%): 95.9	Pools by Stream Length (%): 30.8
Reach Length (ft.): 21811	Coniferous Component (%): 56.6	Pool Frequency (%): 35.8
Riffle/Flatwater Mean Width (ft.): 6.1	Hardwood Component (%): 43.4	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 76
Range (ft.): 7 to 28	Vegetative Cover (%): 97.9	2 to 2.9 Feet Deep: 21
Mean (ft.): 15	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 3
Std. Dev.: 5	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.3	Occurrence of LWD (%): 30	Mean Max Residual Pool Depth (ft.): 1.7
Water (F): 51 - 55 Air (F): 55 - 69	LWD per 100 ft.:	Mean Pool Shelter Rating: 17
Dry Channel (ft): 13	Riffles: 1	
	Pools: 6	
	Flat: 2	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 82 Sm Cobble: 14 Lg Cobble: 2 Boulder: 2 Bedrock: 1		
Embeddedness Values (%): 1. 13.1 2. 46.3 3. 25.7 4. 13.1 5. 1.9		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Little North Fork Noyo River LLID: 1236955394453 Drainage: Noyo River
Survey Dates: 8/30/2010 to 9/21/2010
Confluence Location: Quad: NOYO HILL Legal Description: T18NR17WS01 Latitude: 39:26:43.0N Longitude: 123:41:44.0W

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	1	4	1.0
Boulder	1	2	0.6
Cobble / Gravel	4	3	1.4
Sand / Silt / Clay	249	246	97.1

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	1	1	0.4
Brush	46	43	17.5
Hardwood Trees	66	62	25.1
Coniferous Trees	142	149	57.1
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Little North Fork Noyo River

LLID: 1236955394453

Drainage: Noyo River

Survey Dates: 8/30/2010 to 9/21/2010

Confluence Location: Quad: NOYO HILL

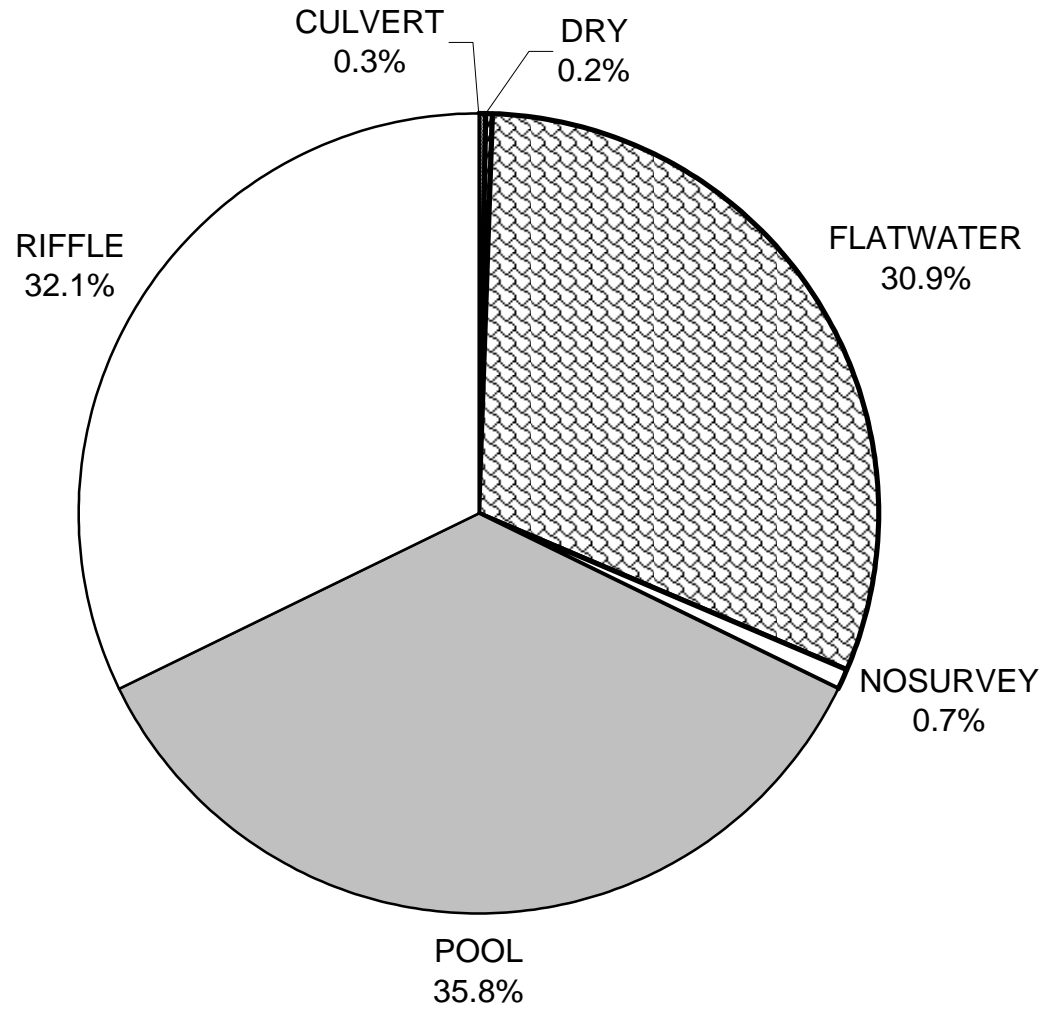
Legal Description: T18NR17WS01

Latitude: 39:26:43.0N

Longitude: 123:41:44.0W

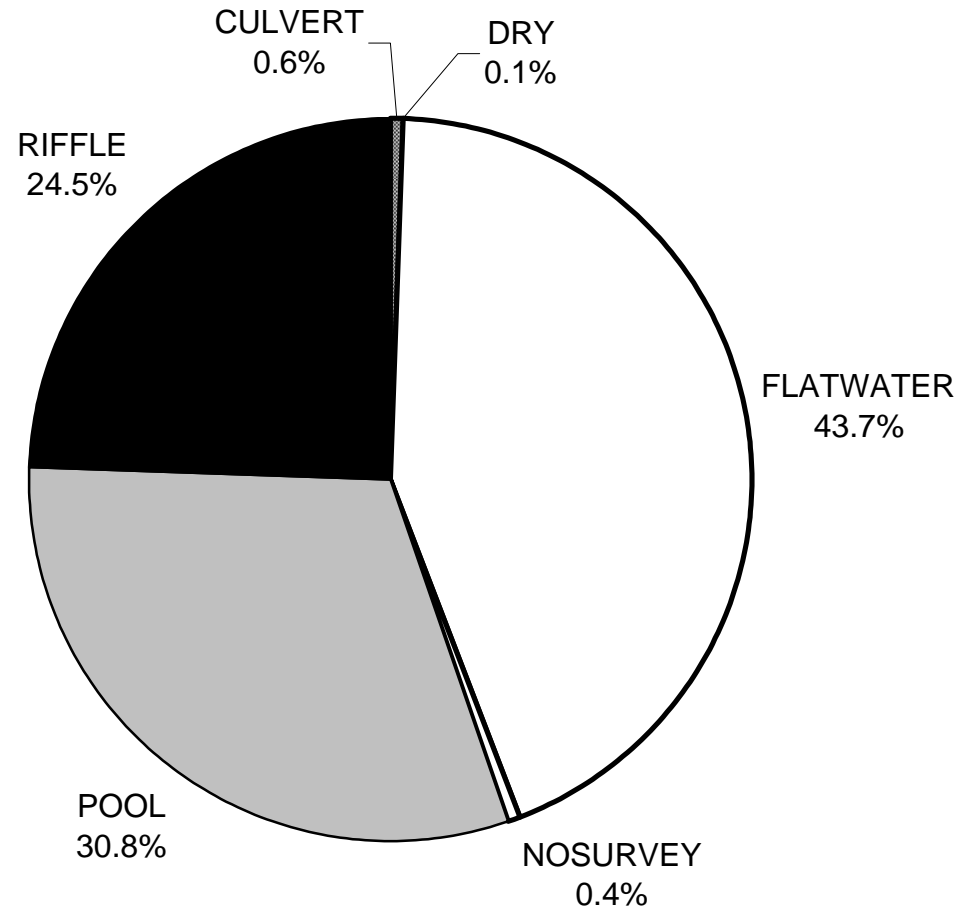
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	33	0	20
SMALL WOODY DEBRIS (%)	0	35	32
LARGE WOODY DEBRIS (%)	0	65	44
ROOT MASS (%)	0	0	1
TERRESTRIAL VEGETATION (%)	33	0	1
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	33	0	2
BEDROCK LEDGES (%)	0	0	0

LITTLE NORTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT OCCURRENCE



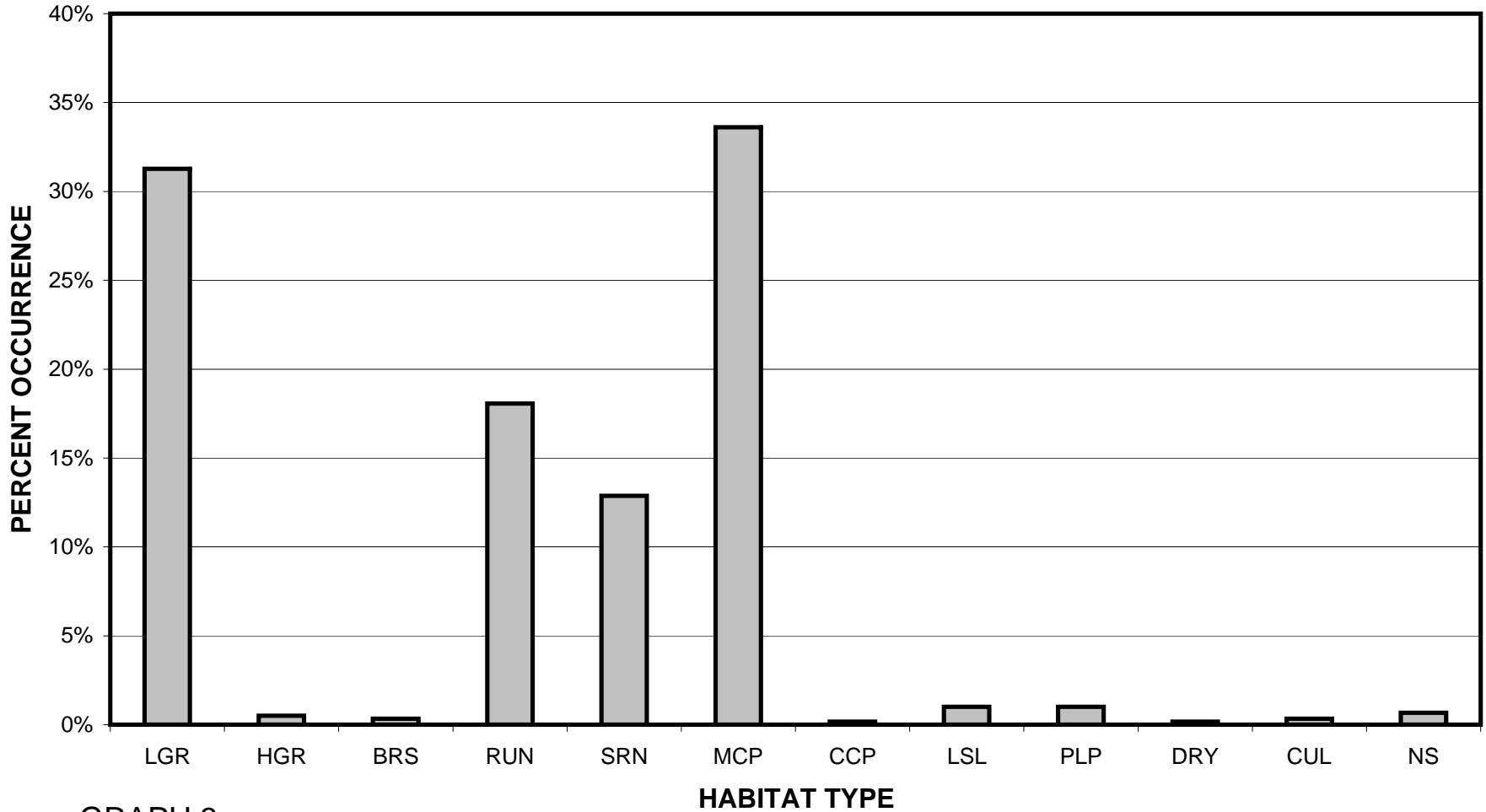
GRAPH 1

LITTLE NORTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT TOTAL LENGTH



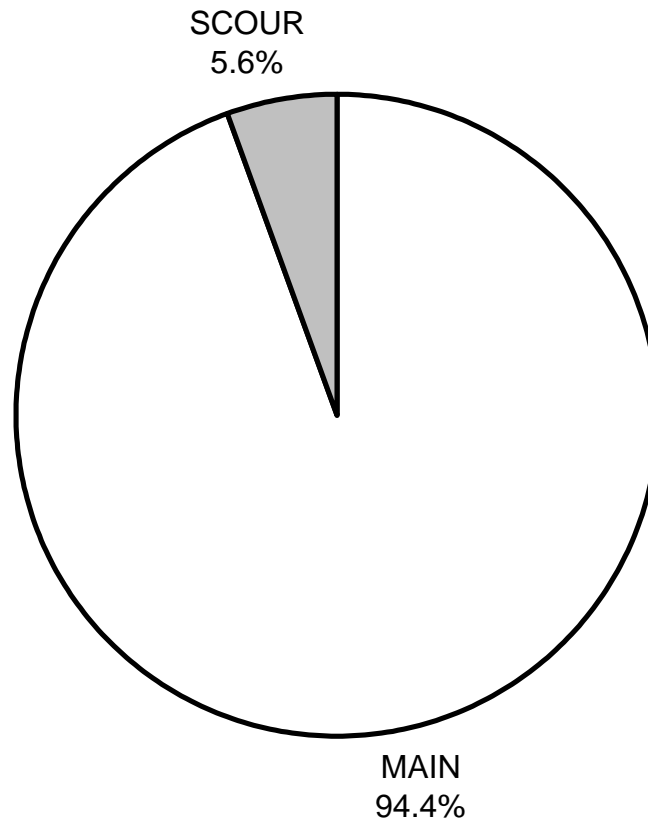
GRAPH 2

LITTLE NORTH FORK NOYO RIVER 2010 HABITAT TYPES BY PERCENT OCCURRENCE



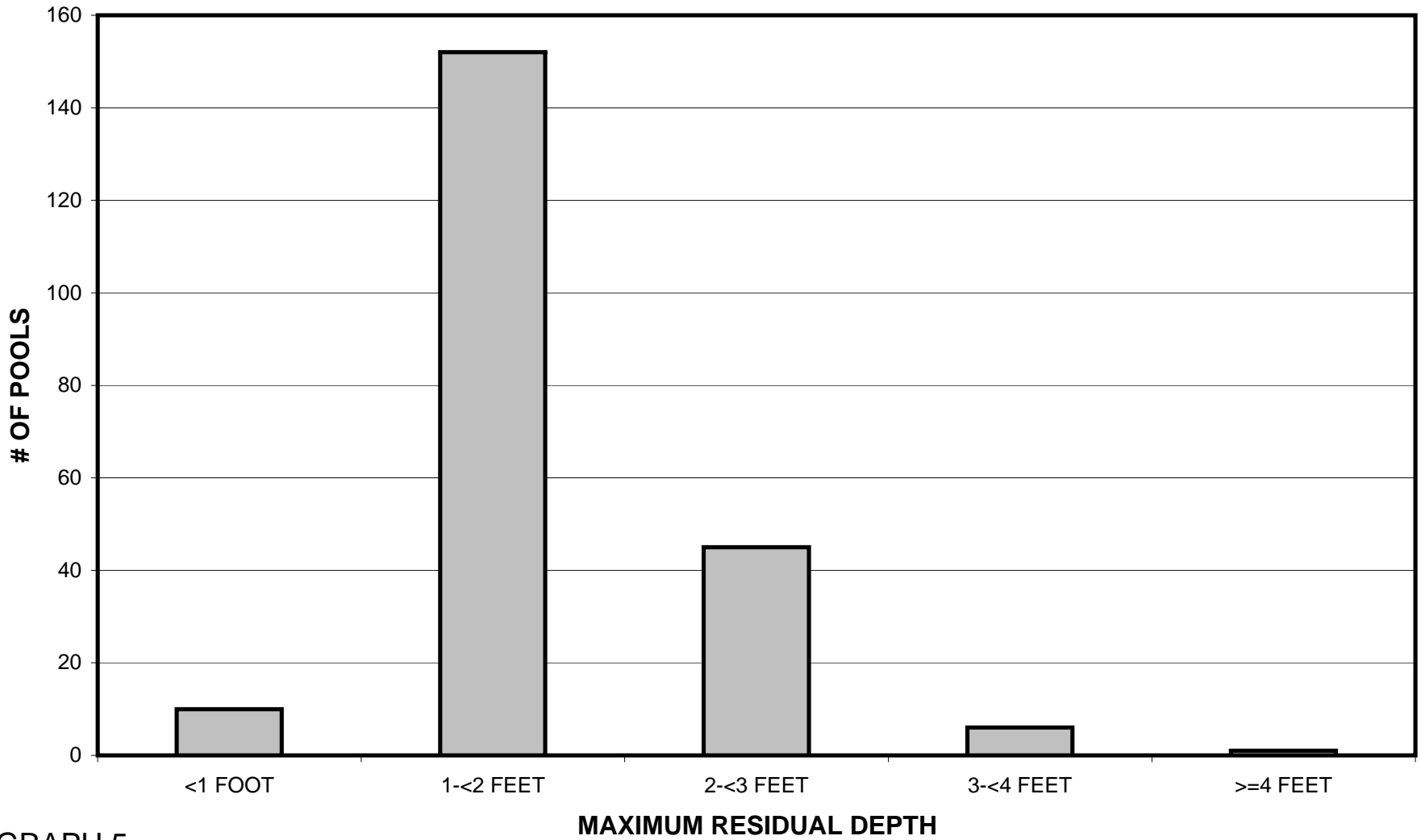
GRAPH 3

LITTLE NORTH FORK NOYO RIVER 2010 POOL TYPES BY PERCENT OCCURRENCE



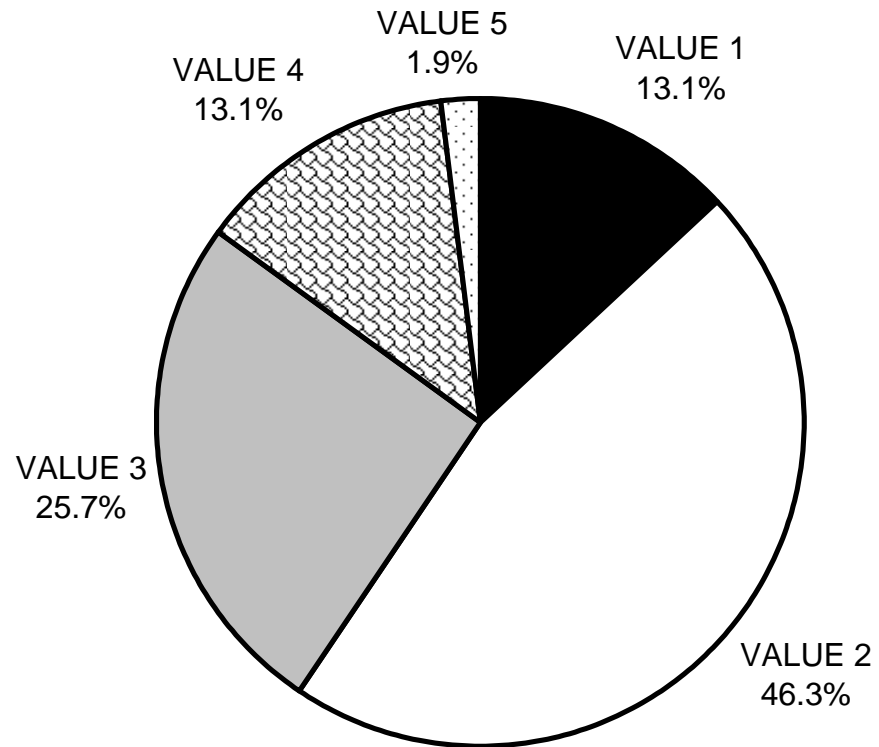
GRAPH 4

LITTLE NORTH FORK NOYO RIVER 2010 MAXIMUM DEPTH IN POOLS



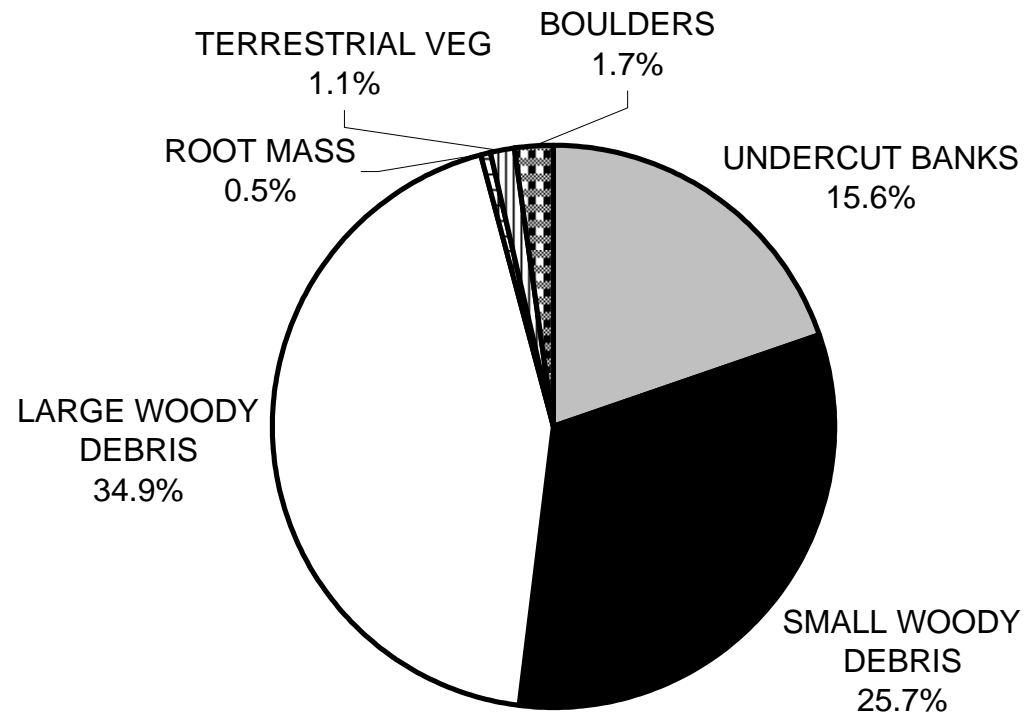
GRAPH 5

LITTLE NORTH FORK NOYO RIVER 2010 PERCENT EMBEDDEDNESS



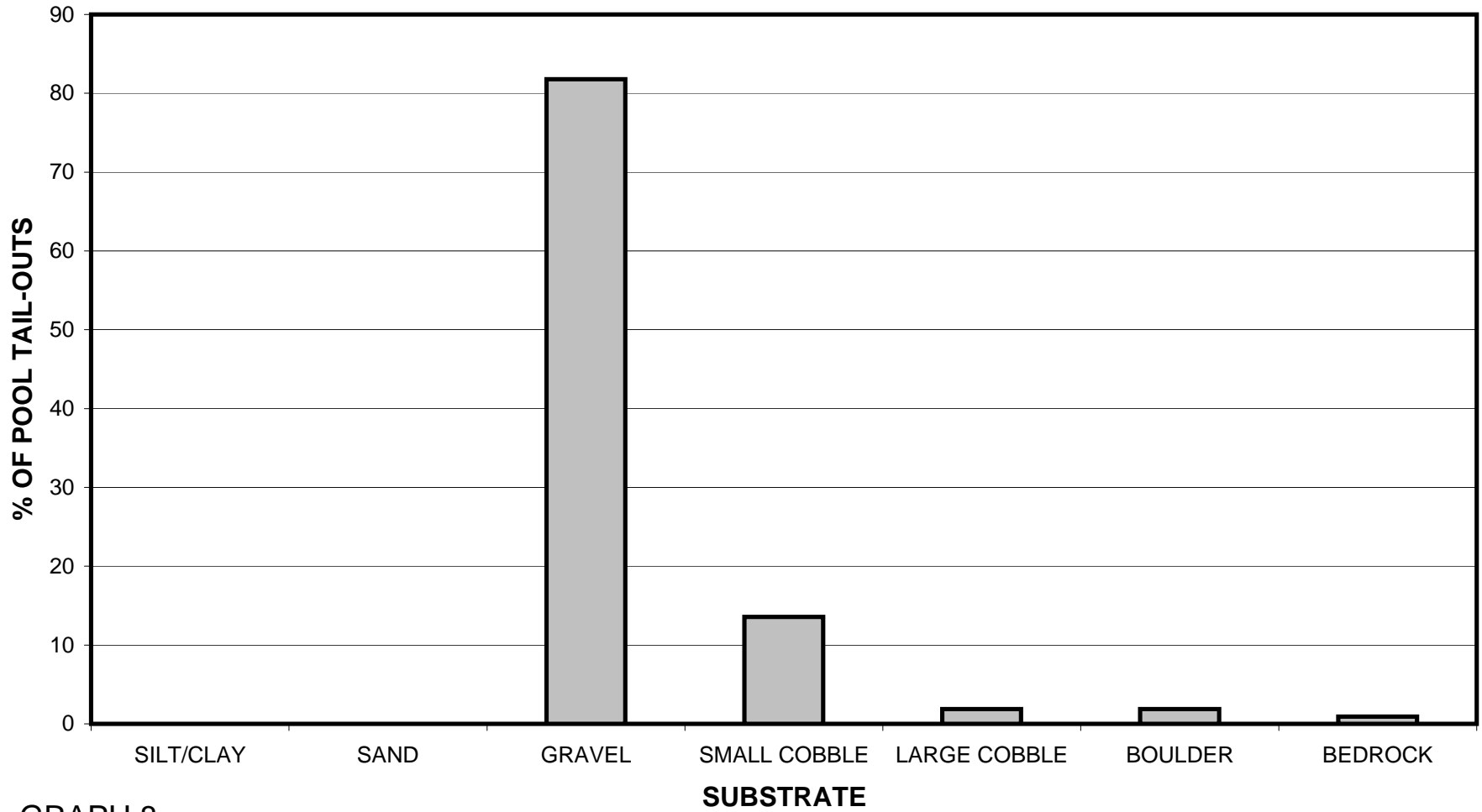
GRAPH 6

LITTLE NORTH FORK NOYO RIVER 2010 MEAN PERCENT COVER TYPES IN POOLS



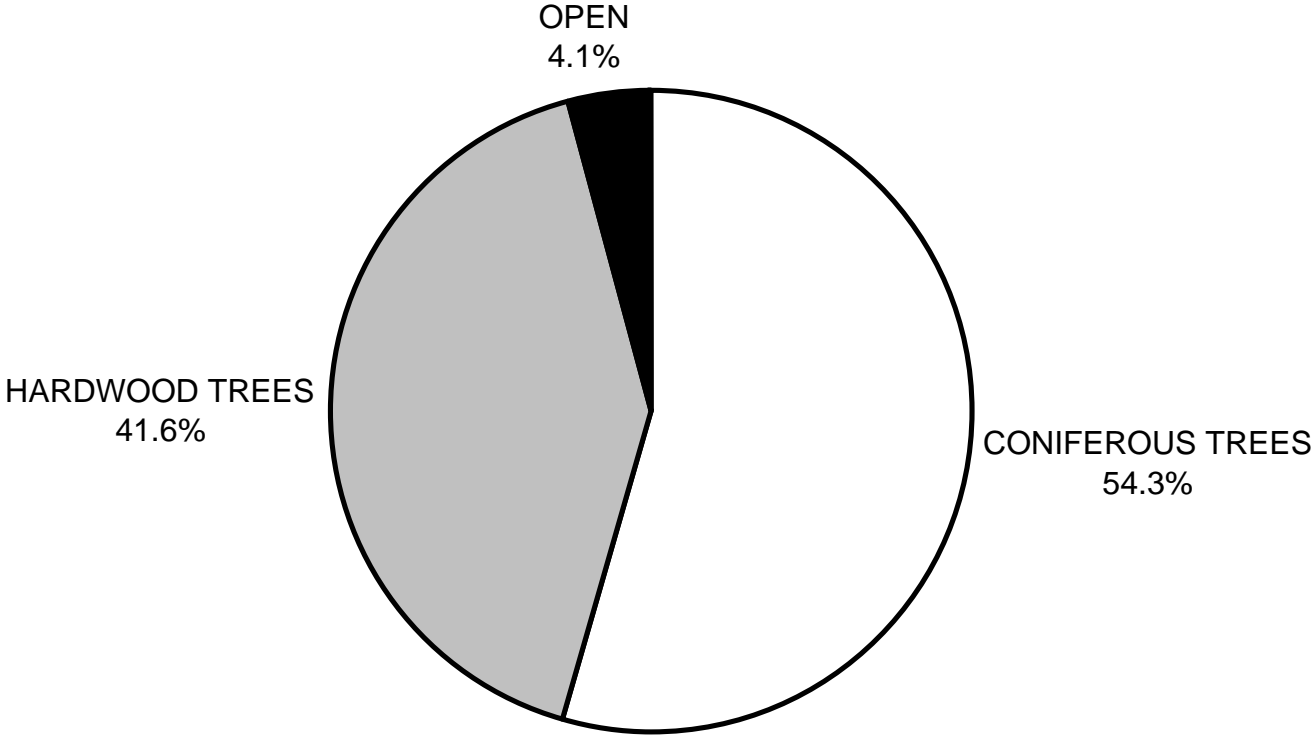
GRAPH 7

LITTLE NORTH FORK NOYO RIVER 2010 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



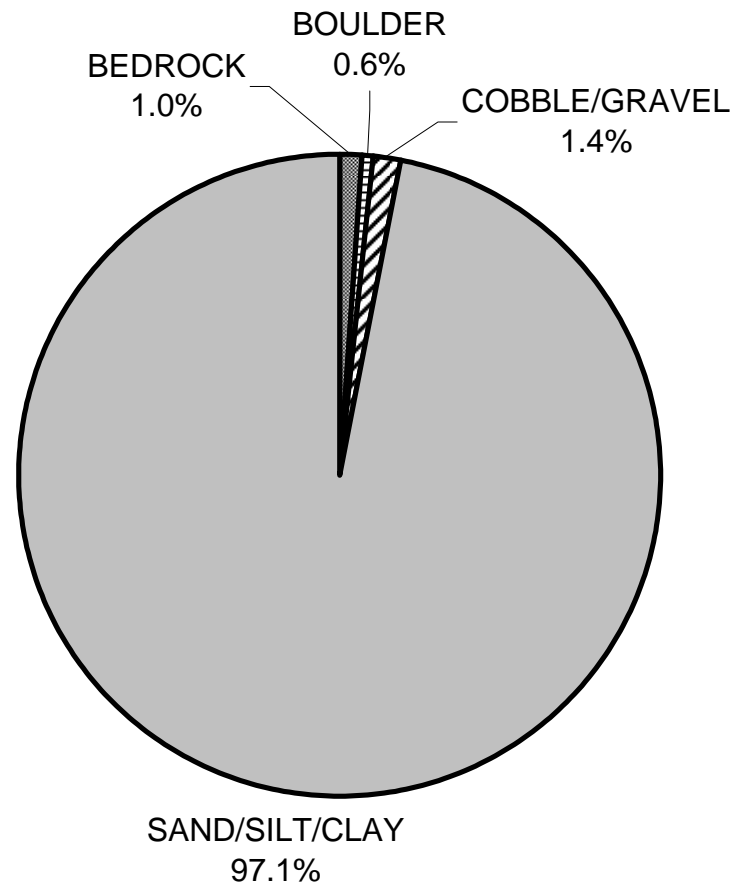
GRAPH 8

**LITTLE NORTH FORK NOYO RIVER 2010
MEAN PERCENT CANOPY**



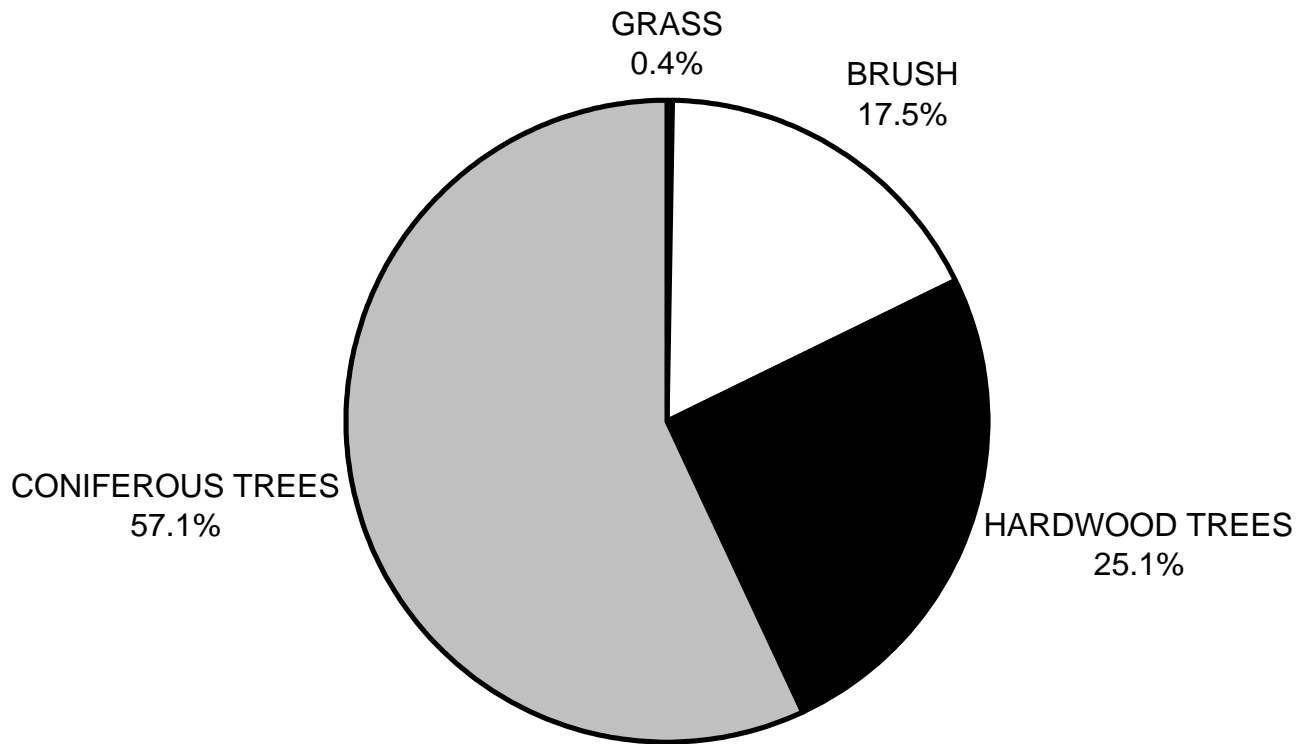
GRAPH 9

LITTLE NORTH FORK NOYO RIVER 2010 DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

LITTLE NORTH FORK NOYO RIVER 2010 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

