

STREAM INVENTORY REPORT

North Fork Standley Creek

INTRODUCTION

A stream inventory was conducted from September 29 to October 5, 2009 on North Fork Standley Creek. The survey began at the confluence with Standley Creek and extended upstream 1.6 miles.

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

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for Chinook salmon, coho salmon, and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

North Fork Standley Creek is a tributary to Standley Creek, tributary to the South Fork Eel River, tributary to Eel River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). North Fork Standley Creek's legal description at the confluence with Standley Creek is T24N R18E S14. Its location is 39.9324 degrees north latitude and 123.8308 degrees west longitude, LLID number 1238296399325. North Fork Standley Creek is an intermittent stream according to the USGS Piercy 7.5 minute quadrangle. North Fork Standley Creek drains a watershed of approximately 1.7 square miles. Elevations range from about 860 feet at the mouth of the creek to 1,200 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for conservation and limited timber production. Vehicle access exists via Dimmick Road off U.S. Highway 101.

METHODS

The habitat inventory conducted in North Fork Standley Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and

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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 North Fork Standley Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1994). This methodology is described in the *California Salmonid Stream Habitat Restoration Manual*. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1990). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". North Fork Standley Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

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5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In North Fork Standley Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition for prey. The shelter rating is calculated for each fully-described habitat unit by multiplying shelter value and percent cover. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. In North Fork Standley Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In North Fork Standley Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood trees.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In North Fork Standley Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

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10. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests (velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in North Fork Standley Creek. In addition, underwater observations were made at 20 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 North Fork Standley Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

HABITAT INVENTORY RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of September 29 to October 5, 2009 was conducted by M. Groff and T. Fleming (WSP). The total length of the stream surveyed was 8,350 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.07 cfs on September 30, 2009.

North Fork Standley Creek is an F4 channel type for the first 2,788 feet of the stream surveyed (Reach 1) and a G4 channel type for the remaining 5,562 feet of the stream surveyed (Reach 2). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. G4 channels are entrenched “gully” step-pool channels on moderate gradients with low width /depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 47 to 54 degrees Fahrenheit. Air temperatures ranged from 45 to 58 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 32% pool units, 28% riffle units, and 26% flatwater units (Graph 1). Based on total length of Level II habitat types there were 28% flatwater units, 27% riffle units, 26% pool units, and 20% dry units (Graph 2).

Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low gradient riffle units, 27.6%; mid-channel pool units, 24%; and run units, 16% (Graph 3). Based on percent total length, low gradient riffle units made up 26%, mid-channel pool units 19%, dry units 20%, and step run units 17%.

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A total of 81 pools were identified (Table 3). Main channel pools were the most frequently encountered at 79% (Graph 4), and comprised 76% 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. Eleven of the 81 pools (14%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 81 pool tail-outs measured, 35 had a value of 1 (43.2%); 28 had a value of 2 (34.6%); 8 had a value of 3 (9.9%); 6 had a value of 4 (7.4%); 4 had a value of 5 (4.9%) (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 0, flatwater habitat types had a mean shelter rating of 12, and pool habitats had a mean shelter rating of 19 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 21. Scour pools had a mean shelter rating of 13 and backwater pools had a mean shelter rating of 5 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 52% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 35% of the pool tail-outs.

The mean percent canopy density for the surveyed length of North Fork Standley Creek was 93%. Seven percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 52% and 48%, respectively. Graph 9 describes the mean percent canopy in North Fork Standley Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 99%. The mean percent left bank vegetated was 98%. The dominant elements composing the structure of the stream banks consisted of 48% cobble/gravel, 28% sand/silt/clay, and 23% bedrock (Graph 10). Coniferous trees were the dominant vegetation type observed in 46% of the units surveyed. Additionally, 40% of the units surveyed had deciduous trees as the dominant vegetation type, and 11% had brush as the dominant vegetation type (Graph 11).

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BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 20 sites for species composition and distribution in North Fork Standley Creek on October 6, 2009. Water temperatures taken during the sample period of 0917 to 1212 ranged from 47 to 50 degrees Fahrenheit. Air temperatures ranged from 42 to 58 degrees Fahrenheit. The sites were sampled by S. McSmith (DFG).

In reach 1, which comprised the first 2,788 feet of stream, ten sites were sampled. The reach sites yielded 42 young-of-the-year steelhead/rainbow trout (SH/RT), five age 1+ SH/RT, and 12 coho.

In reach 2, ten sites were sampled starting approximately 2,878 from the confluence with Standley Creek and continuing upstream 4,102 feet. The reach sites yielded seven young-of-the-year SH/RT, two age 1+ SH/RT, and two age 2+ SH/RT.

The following chart displays the information yielded from these sites:

2009 North Fork Standley Creek underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
Reach 1: F4 Channel Type									
10/06/09	1	002	5.4	54	0	0	0	5	0
	2	009	4.2	346	9	0	0	7	0
	3	018	4.2	632	7	1	0	0	0
	4	028	4.2	947	4	1	0	0	0
	5	038	5.4	1,171	3	1	0	0	0
	6	055	4.2	1,621	5	0	0	0	0
	7	066	4.2	2,032	6	1	0	0	0
	8	074	4.2	2,331	3	1	0	0	0
	9	083	4.2	2,512	3	0	0	0	0
	10	095	4.2	2,788	2	0	0	0	0
Reach 2: G4 Channel Type									
10/06/09	11	100	4.2	2,892	0	0	1	0	0
	12	108	4.2	3,193	1	1	0	0	0
	13	126	4.2	4,001	2	0	0	0	0
	14	142	4.2	4,331	1	0	0	0	0
	15	168	4.3	5,080	2	0	0	0	0
	16	186	4.2	5,605	0	0	0	0	0

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	17	202	4.2	6,073	0	0	0	0	0
	18	208	4.2	6,221	0	1	0	0	0
	19	217	4.2	2,458	1	0	0	0	0
	20	238	4.2	6,980	0	0	1	0	0

DISCUSSION

North Fork Standley Creek is an F4 channel type for the first 2,788 feet of stream surveyed (Reach 1), and a G4 channel type for the remaining 5,562 feet (Reach 2). The suitability of F4 and G4 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. G4 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days September 29 to October 5, 2009, ranged from 47 to 54 degrees Fahrenheit. Air temperatures ranged from 45 to 58 degrees Fahrenheit. To make any conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 28% of the total length of this survey, riffles 27%, and pools 26%. Eleven of the 81 (14%) 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 large wood structures that will increase or deepen pool habitat is recommended.

Sixty-three of the 81 pool tail-outs measured had embeddedness ratings of 1 or 2. Fourteen 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.

Seventy of the 81 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 19. The shelter rating in the flatwater habitats is 12. 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 North Fork Standley Creek. Large woody debris is the dominant cover type in pools followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

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The mean percent canopy density for the stream was 93%. Reach 1 had a canopy density of 92%, reach 2 had a canopy density of 92%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 99% and 98%, 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) North Fork Standley Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large woody debris. Adding high quality complexity with woody cover in the pools is desirable.
- 4) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

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 confluence with Standley Creek. The channel is an F4.
315	0009.00	A landslide on left bank measures approximately 40' high x 100' long. It is contributing woody debris and fine sediment. Woody debris is accumulating in the channel.
437	0012.00	Outside of the influence of Standley Creek.
695	0021.00	Right bank seep. Log debris accumulation (LDA) #01 is 6.5' high x 18' wide x 5' long and consists of 13 pieces of large woody debris (LWD).

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There are no gaps visible in the LDA and the flow is subsurface. The retained sediment ranges from silt to gravel and measures 9' wide x 10' long x 3' deep. The 5' high plunge over the logs is a possible barrier to salmonids. Fish were observed above the LDA.

1016	0033.00	There is a 3' high plunge over a log.
1171	0039.00	A landslide on left bank is contributing large woody debris.
1191	0040.00	Large woody debris is accumulating on left bank.
1254	0044.00	A landslide on left bank measuring approximately 50' long x 25' high is contributing woody debris and fine sediment, gravel and cobble. LDA #02 is 7' high x 24' wide x 45' long and consists of 20 pieces of LWD. There are gaps visible in the LDA and water flows through it. The retained sediment ranges from silt to sand and measures 12' wide x 8' long x 3' deep. Fish were observed above the LDA.
1312	0046.00	A landslide on right bank measuring approximately 100' long x 40' high is contributing woody debris and fine sediment.
1364	0048.00	A landslide on the left bank measuring approximately 60' long x 45' high is contributing woody debris and fine sediment. LDA #03 is 10' high x 40' wide x 53' long and consists of 16 pieces of LWD. There are no gaps visible in the LDA and the flow is subsurface. The retained sediment ranges from silt to gravel and measures 10' wide x 12' long x 3' deep. Fish were observed above the LDA.
1443	0050.00	Erosion on both banks is contributing fine sediment.
1500	0052.00	There is a 2' high plunge over a log.
1561	0054.00	An unnamed logging road crosses the channel. The log bridge is 38' wide x 11' high x 36' long. The two logs on the outside edges of the bridge have collapsed into the channel.
1743	0059.00	An isolated pool contains multiple young-of-the-year salmonids (YOY).
2052	0068.00	The right bank is eroding.
2331	0075.00	There is a landslide on right bank measures approximately 40' long x 60' high.
2400	0078.00	There is a dry tributary on left bank.

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2419	0079.00	Dry tributary on left bank. There is an LDA approximately 400' up the tributary.
2788	0096.00	The channel changes from an F4 to a G4.
2971	0104.00	LDA #04 is 7' high x 25' wide x 11' long and consists of six pieces of LWD. There are no gaps visible in the LDA and the flow is subsurface. The retained sediment ranges from silt to gravel and measures 25' wide x 40' long x 3' deep. Fish were observed above the LDA.
2995	0105.00	Woody debris is starting to accumulate in channel 45' upstream of LDA #04.
3107	0107.00	A landslide on left bank measures approximately 30' high x 20' long. It is contributing woody debris and fine sediment.
3193	0109.00	Erosion on the right bank measures approximately 80' long x 6' high is contributing fine sediment and gravel.
3360	0112.00	A landslide on left bank measures approximately 160' long x 60' high. It is contributing woody debris and fine sediment. Woody debris is also entering from a deposit on the right bank. Small woody debris from the slide is blocking the channel and there is a potential LDA. Active erosion on the right bank measures approximately 60' long x 6' high.
3500	0114.00	LDA #05 is 6' high x 18' wide x 18' long and consists of six pieces of LWD. There are gaps visible in the LDA. The flow is subsurface. The retained sediment ranges from silt to gravel and measures 10' wide x 10' long x 2' deep. Fish were observed above the LDA.
3900	0123.00	LDA #06 is 7.5' high x 29' wide x 45' long and consists of 13 pieces of LWD. There are gaps visible in the LDA. The flow is subsurface. The retained sediment ranges from silt to sand and measures 6' wide x 15' long x 3' deep. Fish were observed above the LDA.
4040	0130.00	Woody debris is accumulating on the left bank; it is retaining fine sediment.
4366	0144.00	Woody debris is accumulating in the channel.
5003	0165.00	LDA #07 is 6.5' high x 19' wide x 12' long and consists of six pieces of LWD. There are gaps visible in the LDA and water does flow through. The LDA is not retaining sediment. Fish were observed above the LDA.
5063	0168.00	Tributary #01 enters from the left bank. The tributary consists of isolated puddles; it is not contributing to the flow of North Fork

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Standley Creek. The water temperature of the tributary was 56 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 50 degrees Fahrenheit. The tributary has a five percent gradient. It may be inaccessible to fish due to a 5' high jump at the mouth. No fish were observed in the tributary. In the main channel there is a 3' high plunge over a log.

5414	0179.00	LDA #08 is 10' high x 20' wide x 42' long and consists of eight pieces of LWD. There are gaps visible in the LDA. The flow is subsurface. The retained sediment ranges from silt to gravel and measures 10' wide x 20' long x 4' deep. Fish were observed above the LDA.
5499	0183.00	Woody debris is accumulating in the channel, creating a potential LDA.
5591	0186.00	There is a 2' high plunge over a log.
5892	0198.00	Woody debris is accumulating on the right bank, creating a potential LDA.
6202	0208.00	LDA #09 is 6' high x 23' wide x 4' long and consists of three pieces of LWD. There are no gaps visible in the LDA. The flow is subsurface. The retained sediment ranges from silt to gravel and measures 14' wide x 20' long x 3' deep. Fish were observed above the LDA.
6342	0214.00	LDA #10 is 6' high x 30' wide x 23' long and consists of six pieces of LWD. There are no gaps visible in the LDA; water does flow through it. The LDA is not retaining sediment. Fish were observed above the LDA.
6365	0215.00	Woody debris is accumulating on the left bank, creating a potential LDA.
6434	0217.00	LWD debris is accumulating in the channel.
6549	0221.00	LWD debris is accumulating in the channel.
6590	0223.00	Tributary #02 enters from the left bank. The first 50' of the tributary are dry. The flow of the tributary is less than 0.05cfs; it is contributing approximately 40 percent of the flow of North Fork Standley Creek. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 48 degrees Fahrenheit. The tributary has a two percent gradient. It is accessible to fish, but no fish were observed in the tributary. In the main channel there is a 2' high plunge over a log.
6897	0236.00	Woody debris is accumulating in the channel.

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6919	0237.00	There is a dry tributary on the right bank.
6965	0238.00	LDA #11 is 6' high x 18' wide x 3' long and consists of five pieces of LWD. There are no gaps visible in the LDA and water flows through it. The LDA is retaining fine sediment measuring 10' wide x 15' long x 4' deep. The 3' high plunge over the logs is a possible barrier to salmonids. No fish were observed above the LDA.
7017	0240.00	A landslide on the left bank measures approximately 30' long x 20' high. It is contributing fine sediment and woody debris. No fish were observed beyond this point.
7028	0241.00	A landslide on left bank measuring approximately 50' long x 70' high is contributing fine sediment and woody debris.
7388	0247.00	LDA #12 is 7' high x 28' wide x 22' long and consists of five pieces of LWD. There are gaps visible in the LDA and the flow is subsurface. The LDA is retaining fine sediment measuring 14' wide x 30' long x 5' deep. The 3.5' high plunge over the logs is a possible barrier to salmonids.
7877	0258.00	There is a 4' high plunge over a log.
7960	0259.00	LWD is accumulating in the channel.
7973	0260.00	There is a 4' high log plunge.
8139	0264.00	Tributary #03 enters from the right bank. The first 30' of the tributary are dry. The flow of the tributary is less than 0.05cfs; it is contributing approximately 20 percent of the flow of North Fork Standley Creek. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 50 degrees Fahrenheit. The tributary's gradient is greater than 20 percent 70' upstream from the mouth, making it in accessible to fish.
8178	0266.00	LDA #13 is 10' high x 21' wide x 28' long and consists of seven pieces of LWD. There are gaps visible in the LDA. The flow is subsurface. The retained sediment ranges from silt to gravel and measures 15' wide x 15' long x 5' deep. The 6.5' high plunge over the logs is a possible barrier to salmonids.
8206	0267.00	LDA #14 is 45' upstream from LDA #13. LDA #14 is 7' high x 20' wide x 3' long and consists of five pieces of LWD. There are no gaps visible in the LDA and the flow is subsurface. The LDA is retaining fine sediment measuring 10' wide x 20' long x 5' deep. The 5.5' high plunge over the logs is a possible barrier to salmonids.

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8350 0270.00 End of survey due to diminishing habitat. Visual observation 800' upstream from this point revealed that the channel is more than 95 percent dry. There are two LDAs, both with 10' high plunges over logs. The channel narrows and the gradient increases to over 10 percent.

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: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0

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
36	0	DRY	14.0	43	1539	19.6									
67	9	FLATWATER	26.1	33	2189	27.9	5.0	0.3	0.6	138	9272	46	3075		12
13	0	NOSURVEY		39	501										
81	81	POOL	31.5	25	2039	26.0	9.3	0.7	1.4	234	18965	232	18759	185	19
73	13	RIFFLE	28.4	29	2082	26.5	4.9	0.1	0.3	143	10447	22	1595		0
Total Units	Total Units Fully Measured			Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)			
270	103			8350						38685		23429			

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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 (%)
71	11	LGR	27.6	29	2030	25.9	5	0.1	0.5	161	11448	24	1687		0	94
2	2	HGR	0.8	26	52	0.7	6	0.2	0.6	43	87	11	23		0	92
41	5	RUN	16.0	21	854	10.9	5	0.3	0.9	83	3386	26	1050		21	94
26	4	SRN	10.1	51	1335	17.0	4	0.3	0.6	208	5412	71	1853		1	96
62	62	MCP	24.1	24	1511	19.3	10	0.7	4	237	14676	230	14242	184	21	93
2	2	CCP	0.8	22	45	0.6	8	0.7	1.8	178	355	153	307	118	9	97
1	1	CRP	0.4	27	27	0.3	11	1.4	2.3	297	297	505	505	416	5	91
3	3	LSL	1.2	18	53	0.7	9	0.6	1.5	159	477	122	367	93	35	89
2	2	LSR	0.8	35	70	0.9	6	0.5	1.1	256	512	158	315	106	8	98
10	10	LSBk	3.9	29	293	3.7	7	0.8	2.7	217	2168	254	2543	209	8	91
1	1	DPL	0.4	40	40	0.5	12	0.7	1.1	480	480	480	480	336	5	96
36	0	DRY	14.0	43	1539	19.6										79
13	0	NS		39	501											85

Total Units
270

Total Units Fully Measured
103

Total Length (ft.)
8350

Total Area (sq.ft.)
39298

Total Volume (cu.ft.)
23371

Table 3 - Summary of Pool Types

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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
64	64	MAIN	79	24	1556	76	9.8	0.7	235	15031	182	11652	21
16	16	SCOUR	20	28	443	22	7.4	0.7	216	3454	187	2997	13
1	1	BACKWATER	1	40	40	2	12.0	0.7	480	480	336	336	5
Total Units	Total Units Fully Measured				Total Length (ft.)				Total Area (sq.ft.)			Total Volume (cu.ft.)	
81	81				2039				18965			14985	

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

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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
62	MCP	77	9	15	44	71	8	13	0	0	1	2
2	CCP	2	1	50	1	50	0	0	0	0	0	0
1	CRP	1	0	0	0	0	1	100	0	0	0	0
3	LSL	4	0	0	3	100	0	0	0	0	0	0
2	LSR	2	0	0	2	100	0	0	0	0	0	0
10	LSBk	12	0	0	9	90	1	10	0	0	0	0
1	DPL	1	0	0	1	100	0	0	0	0	0	0
Total Units			Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Foot Max Resid. Depth	Total 1< 2 Foot % Occurrence	Total 2< 3 Foot Max Resid. Depth	Total 2< 3 Foot % Occurrence	Total 3< 4 Foot Max Resid. Depth	Total 3< 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
81			10	12	60	74	10	12	0	0	1	1

Mean Maximum Residual Pool Depth (ft.): 1.4

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Dry Units: 36

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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
71	11	LGR	0	0	0	0	0	0	0	0	0
2	2	HGR	0	0	0	0	0	0	0	0	0
73	13	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
41	5	RUN	0	40	10	0	0	0	0	50	0
26	4	SRN	0	100	0	0	0	0	0	0	0
67	9	TOTAL FLAT	0	60	7	0	0	0	0	33	0
62	62	MCP	4	22	62	1	1	0	0	10	0
2	2	CCP	0	50	50	0	0	0	0	0	0
1	1	CRP	0	0	100	0	0	0	0	0	0
3	3	LSL	0	48	52	0	0	0	0	0	0
2	2	LSR	0	100	0	0	0	0	0	0	0
10	10	LSBk	37	28	23	7	0	0	0	3	2
1	1	DPL	50	0	50	0	0	0	0	0	0
81	81	TOTAL POOL	7	26	56	2	1	0	0	8	0
13	0	NS									
270	103	TOTAL	7	28	54	2	1	0	0	9	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Dry Units: 36

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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
71	11	LGR	0	0	91	9	0	0	0
2	2	HGR	0	50	50	0	0	0	0
41	5	RUN	0	0	60	40	0	0	0
26	4	SRN	0	0	100	0	0	0	0
62	62	MCP	0	0	94	5	0	2	0
2	2	CCP	0	0	100	0	0	0	0
1	1	CRP	0	0	100	0	0	0	0
3	3	LSL	0	0	100	0	0	0	0
2	2	LSR	0	0	100	0	0	0	0
10	10	LSBk	0	0	100	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: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
93	48	52	0	99	98

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: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Survey Length (ft.): 8350

Main Channel (ft.): 8350

Side Channel (ft.): 0

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4

Reach Length (ft.): 2788

Riffle/Flatwater Mean Width (ft.): 5.3

BFW:

Range (ft.): 12 to 23

Mean (ft.): 20

Std. Dev.: 3

Base Flow (cfs.): 0.1

Water (F): 51 - 54

Air (F): 48 - 58

Dry Channel (ft): 435

Canopy Density (%): 92.8

Coniferous Component (%): 36.5

Hardwood Component (%): 63.5

Dominant Bank Vegetation: Coniferous Trees

Vegetative Cover (%): 98.1

Dominant Shelter: Large Woody Debris

Dominant Bank Substrate Type: Cobble/Gravel

Occurrence of LWD (%): 36

LWD per 100 ft.:

Riffles: 2

Pools: 10

Flat: 5

Pools by Stream Length (%): 33.1

Pool Frequency (%): 33.7

Residual Pool Depth (%):

< 2 Feet Deep: 84

2 to 2.9 Feet Deep: 13

3 to 3.9 Feet Deep: 0

>= 4 Feet Deep: 3

Mean Max Residual Pool Depth (ft.): 1.5

Mean Pool Shelter Rating: 20

Pool Tail Substrate (%): Silt/Clay: 0

Sand: 3

Gravel: 63

Sm Cobble: 25

Lg Cobble: 9

Boulder: 0

Bedrock: 0

Embeddedness Values (%): 1. 53.1

2. 28.1

3. 6.3

4. 12.5

5. 0.0

STREAM REACH: 2

Channel Type: G4

Reach Length (ft.): 5562

Riffle/Flatwater Mean Width (ft.): 4.7

BFW:

Range (ft.): 12 to 29

Mean (ft.): 21

Std. Dev.: 4

Base Flow (cfs.): 0.1

Water (F): 47 - 52

Air (F): 45 - 54

Dry Channel (ft): 1104

Canopy Density (%): 92.9

Coniferous Component (%): 54.2

Hardwood Component (%): 45.8

Dominant Bank Vegetation: Hardwood Trees

Vegetative Cover (%): 98.2

Dominant Shelter: Large Woody Debris

Dominant Bank Substrate Type: Cobble/Gravel

Occurrence of LWD (%): 35

LWD per 100 ft.:

Riffles: 2

Pools: 10

Flat: 4

Pools by Stream Length (%): 20.1

Pool Frequency (%): 28.0

Residual Pool Depth (%):

< 2 Feet Deep: 88

2 to 2.9 Feet Deep: 12

3 to 3.9 Feet Deep: 0

>= 4 Feet Deep: 0

Mean Max Residual Pool Depth (ft.): 1.4

Mean Pool Shelter Rating: 19

Pool Tail Substrate (%): Silt/Clay: 0

Sand: 4

Gravel: 45

Sm Cobble: 41

Lg Cobble: 6

Boulder: 2

Bedrock: 2

Embeddedness Values (%): 1. 36.7

2. 38.8

3. 12.2

4. 4.1

5. 8.2

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

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	27	21	23.3
Boulder	1	0	0.5
Cobble / Gravel	53	46	48.1
Sand / Silt / Clay	22	36	28.2

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	4	3	3.4
Brush	10	12	10.7
Hardwood Trees	43	39	39.8
Coniferous Trees	46	49	46.1
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: North Fork Standley

LLID: 1238296399325

Drainage: Eel River - South Fork

Survey Dates: 9/29/2009 to 10/5/2009

Confluence Location: Quad: PIERCY

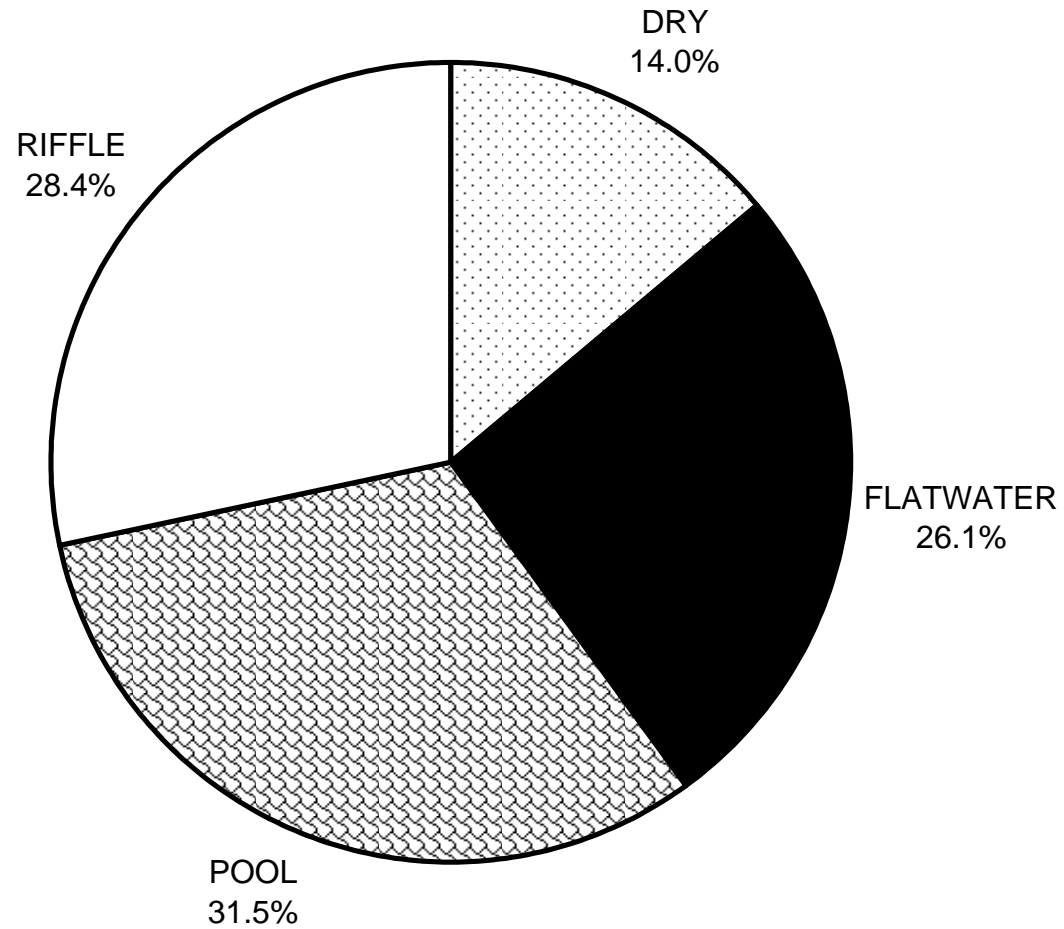
Legal Description: T24NR18ES14

Latitude: 39:55:57.0N

Longitude: 123:49:47.0W

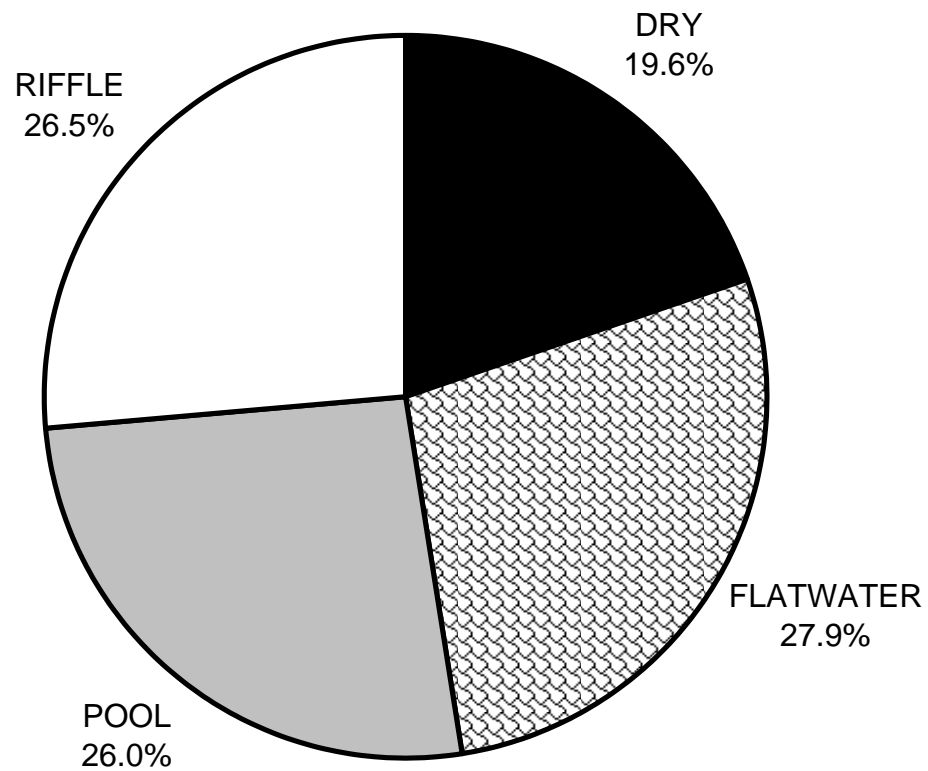
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	7
SMALL WOODY DEBRIS (%)	0	60	26
LARGE WOODY DEBRIS (%)	0	7	56
ROOT MASS (%)	0	0	2
TERRESTRIAL VEGETATION (%)	0	0	1
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	33	8
BEDROCK LEDGES (%)	0	0	0

NORTH FORK STANDLEY 2009 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

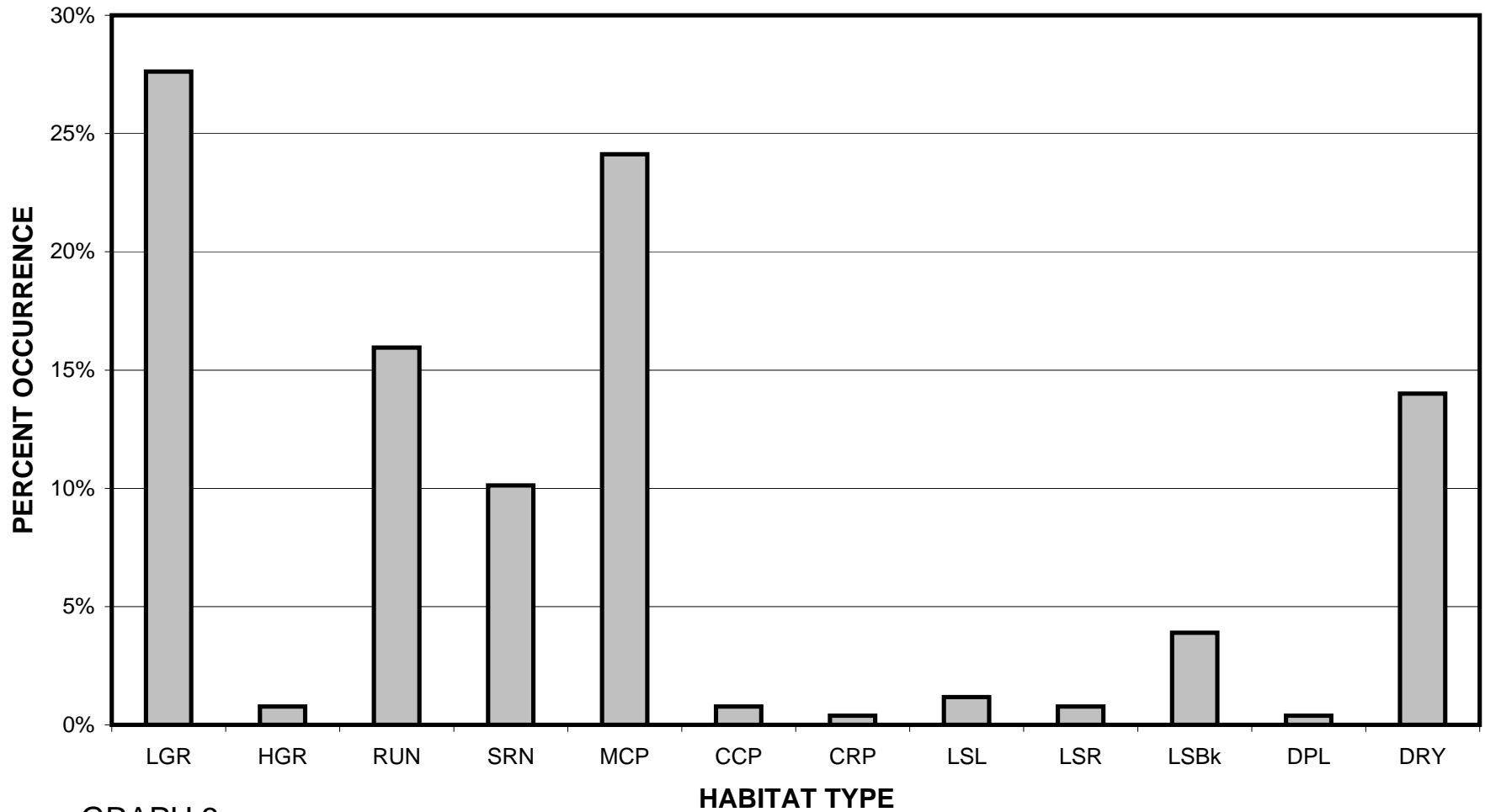
NORTH FORK STANDLEY 2009 HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

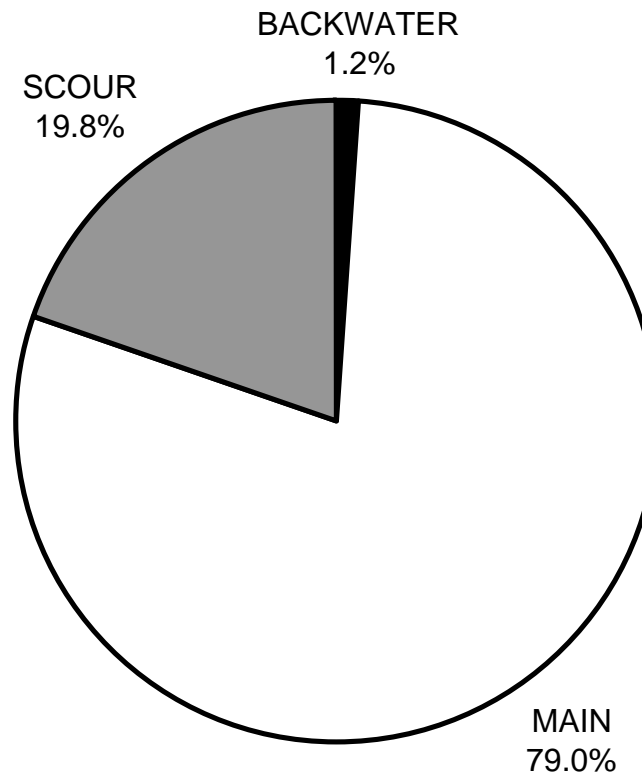
NORTH FORK STANDLEY 2009

HABITAT TYPES BY PERCENT OCCURRENCE



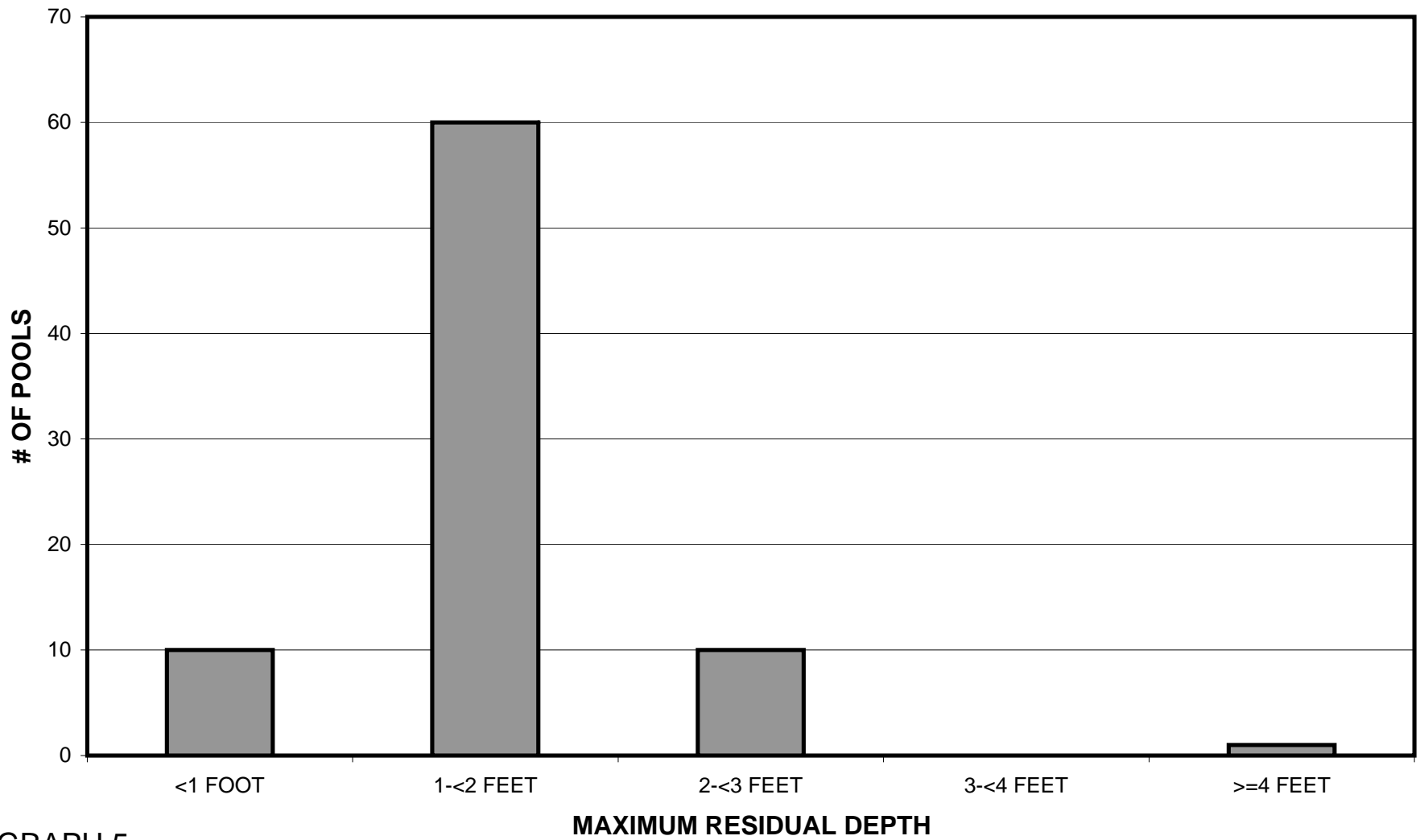
GRAPH 3

**NORTH FORK STANDLEY 2009
POOL TYPES BY PERCENT OCCURRENCE**



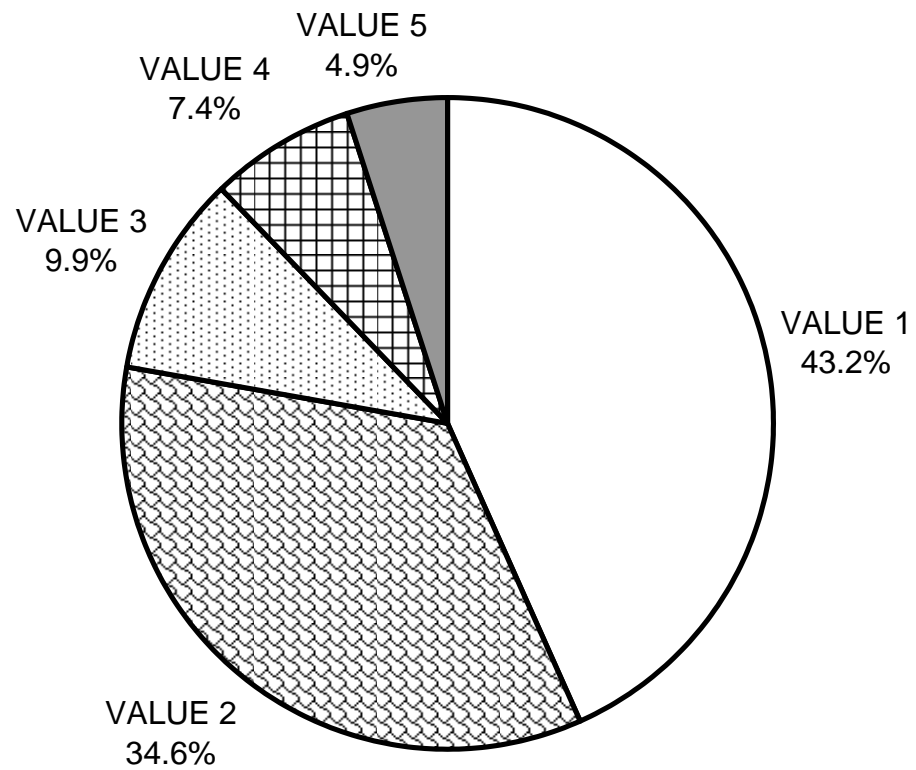
GRAPH 4

NORTH FORK STANDLEY 2009 MAXIMUM DEPTH IN POOLS



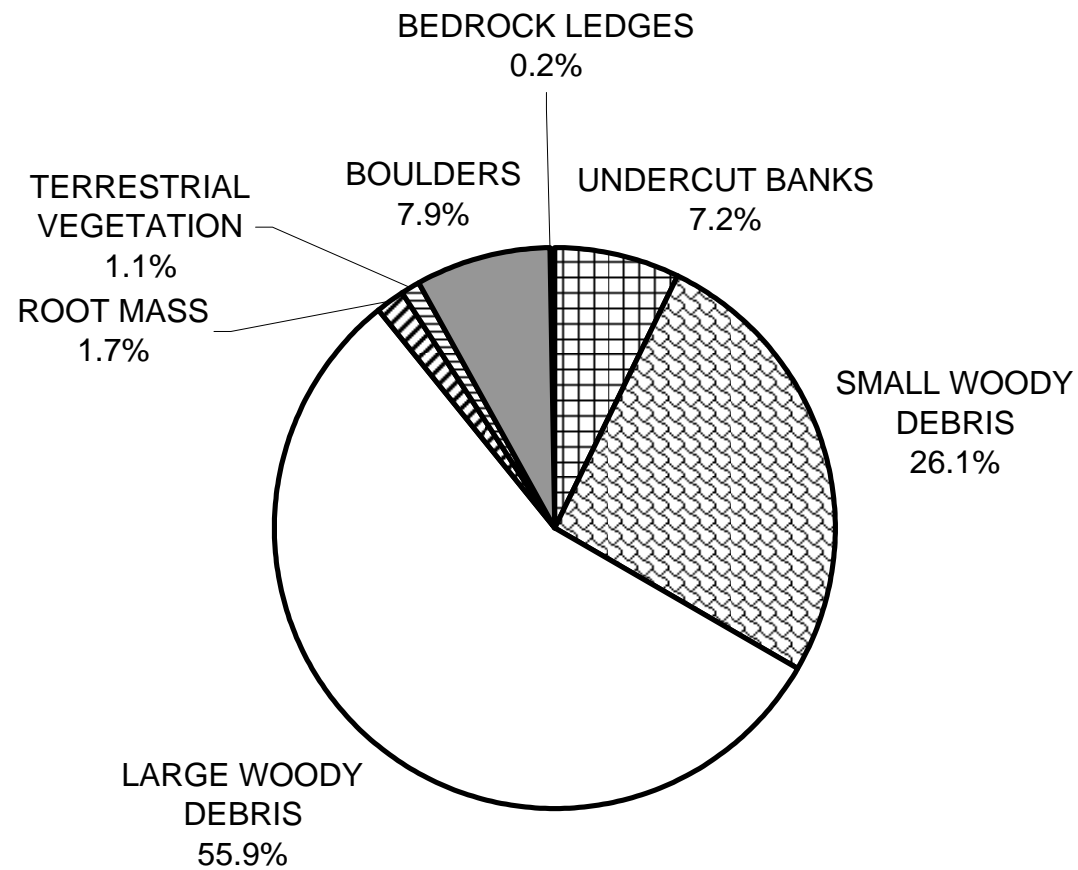
GRAPH 5

NORTH FORK STANDLEY 2009 PERCENT EMBEDDEDNESS



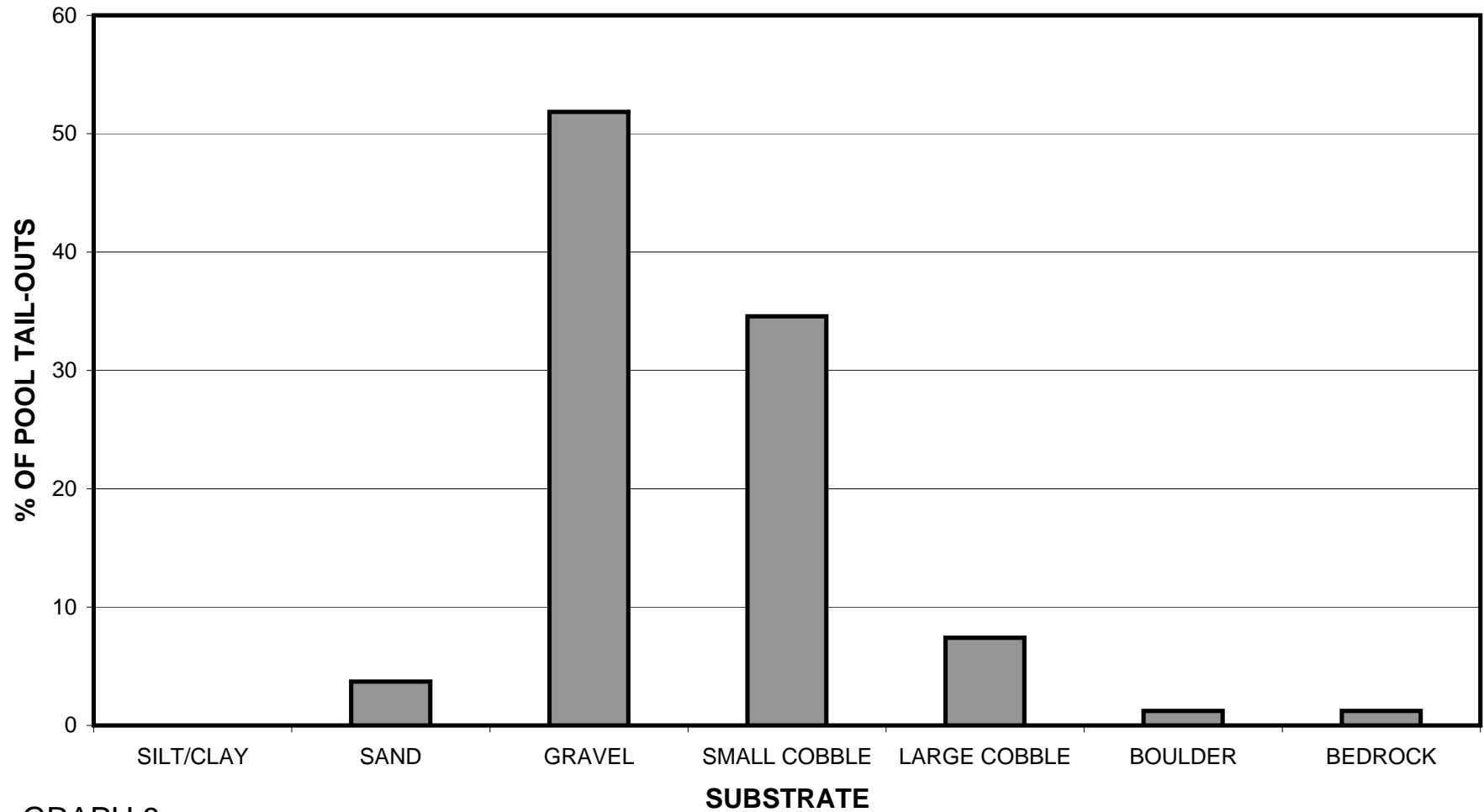
GRAPH 6

NORTH FORK STANDLEY 2009 MEAN PERCENT COVER TYPES IN POOLS



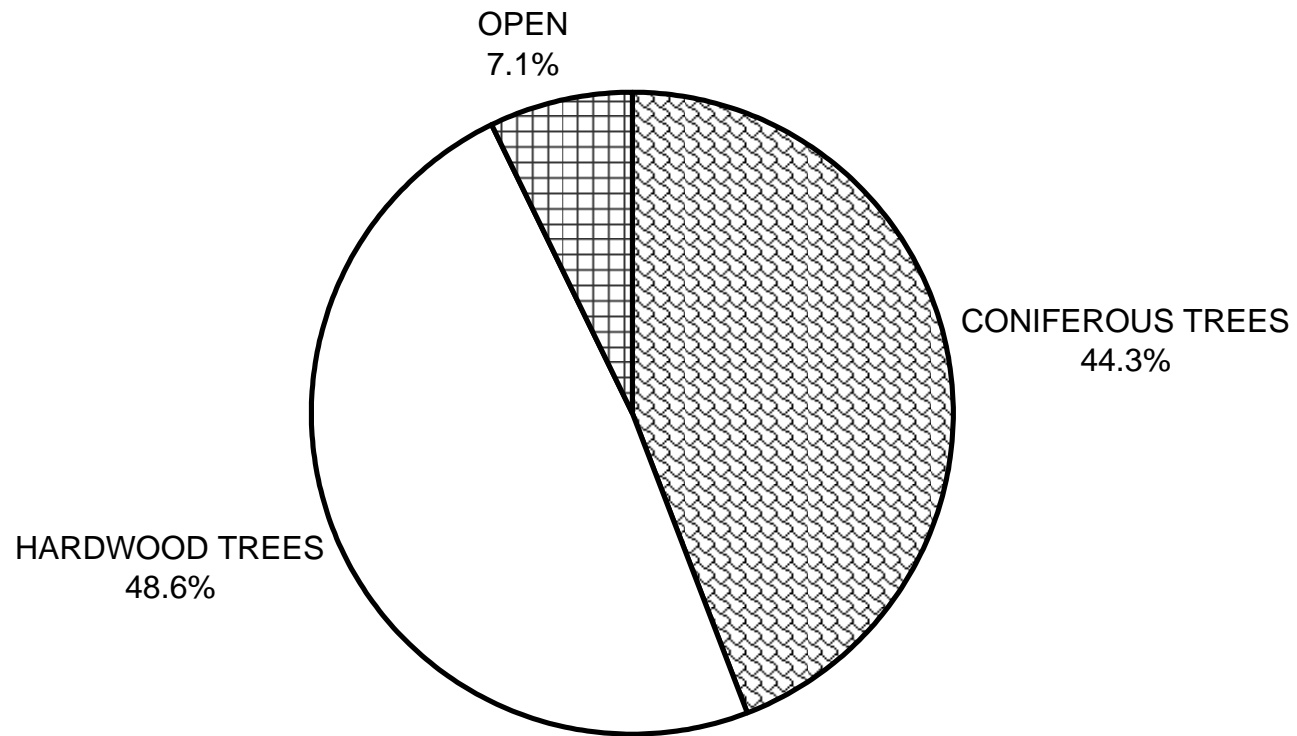
GRAPH 7

NORTH FORK STANDLEY 2009 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



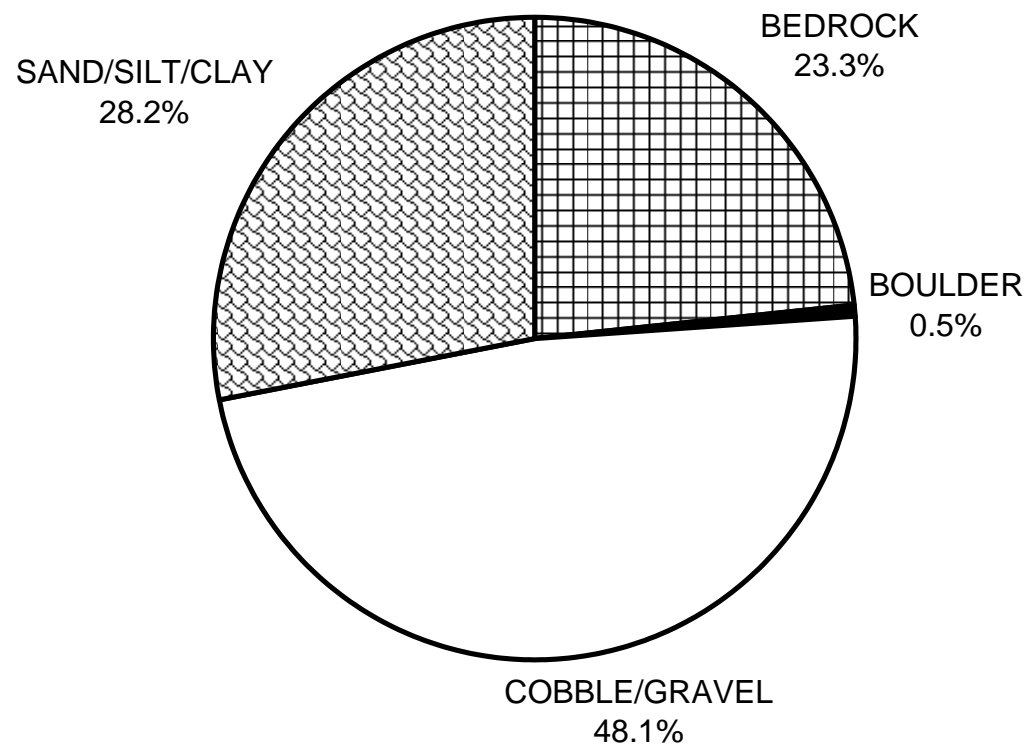
GRAPH 8

**NORTH FORK STANDLEY 2009
MEAN PERCENT CANOPY**



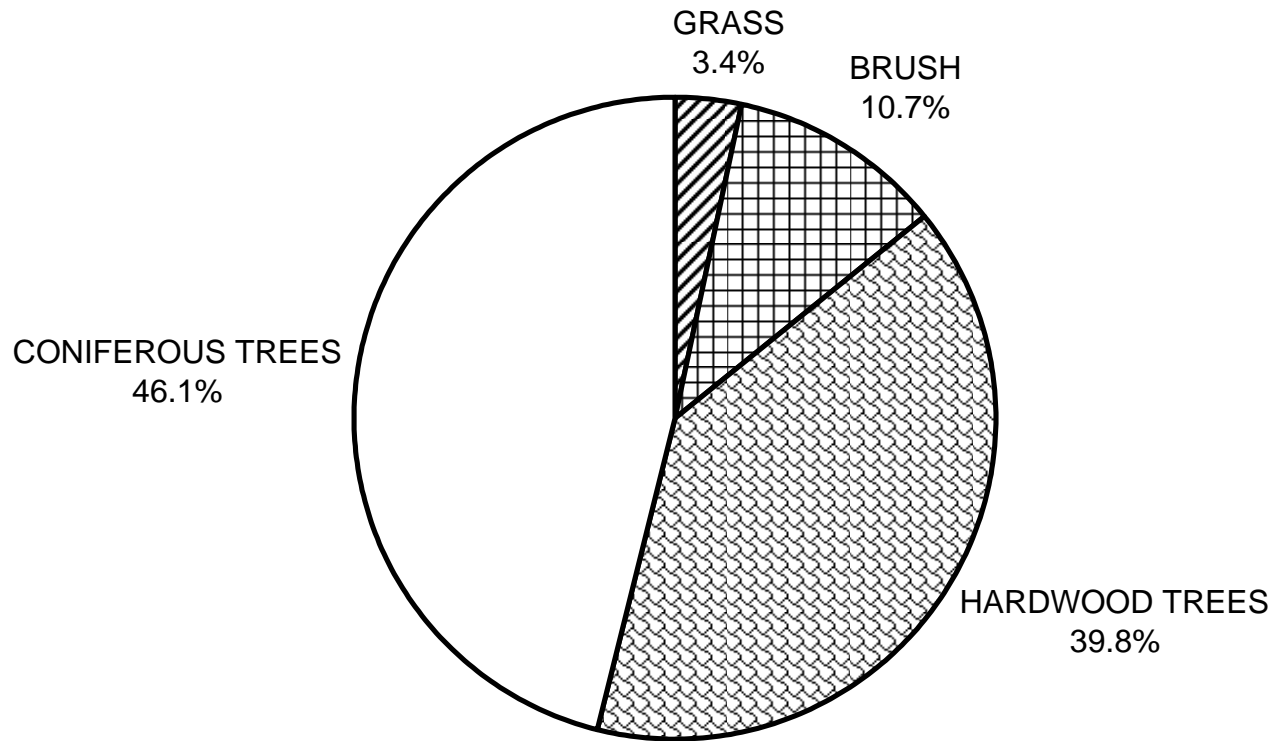
GRAPH 9

**NORTH FORK STANDLEY 2009
DOMINANT BANK COMPOSITION IN SURVEY REACH**



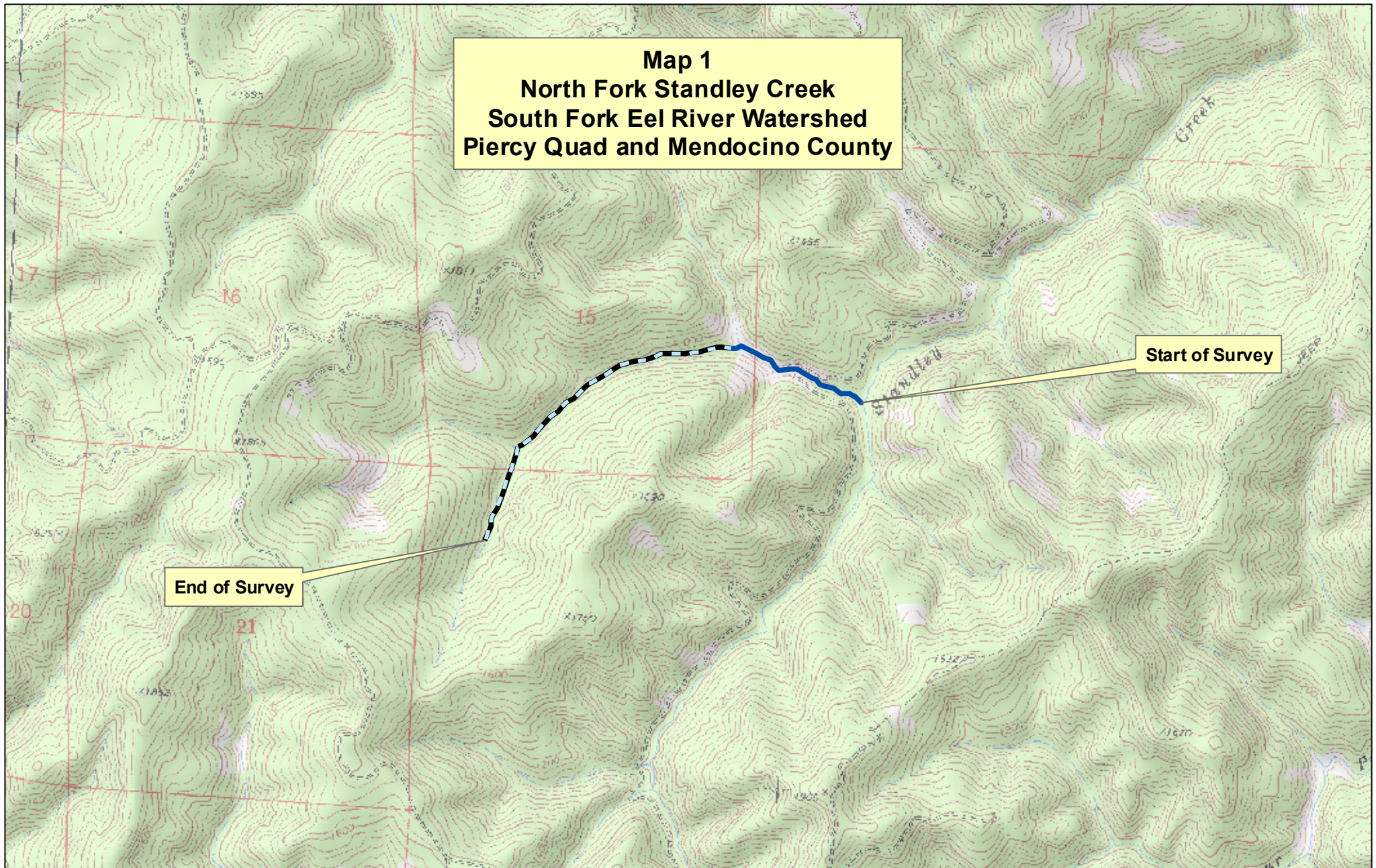
GRAPH 10

**NORTH FORK STANDLEY 2009
DOMINANT BANK VEGETATION IN SURVEY REACH**

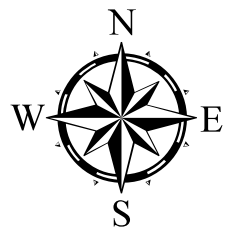


GRAPH 11

Map 1
North Fork Standley Creek
South Fork Eel River Watershed
Piercy Quad and Mendocino County



Legend



- Reach 1, F4 Channel Type
- - - Reach 2, G4 Channel Type

0 1,500 3,000 Feet

