

STREAM INVENTORY REPORT

North Fork Strongs Creek

INTRODUCTION

A stream inventory was conducted from August 5 to August 26, 2009 on North Fork Strongs Creek. The survey began at the confluence with Strongs Creek and extended upstream 1.9 miles.

The North Fork Strongs 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 Strongs Creek.

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 Strongs Creek is a tributary to Strongs Creek, tributary to the Eel River, which drains to the Pacific Ocean, located in Humboldt County, California (Map 1). North Fork Strongs Creek's legal description at the confluence with Strongs Creek is T03N R01W S36. Its location is 40.5983 north latitude and 124.1213 west longitude, LLID number 1241213405983. North Fork Strongs Creek is a second order stream and has approximately 3.6 miles of blue line stream according to the USGS Hydesville 7.5 minute quadrangle. North Fork Strongs Creek drains a watershed of approximately 3.1 square miles. Elevations range from about 100 feet at the mouth of the creek to 1,000 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 Newburg road in Fortuna, CA.

METHODS

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

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the

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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 Strongs 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 Strongs 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 Strongs 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 Strongs Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

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

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In North Fork Strongs 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 Strongs 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 Strongs Creek. These sampling techniques are 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 Strongs Creek include:

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

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 5 to August 26, 2009 was conducted by I. Mikus (DFG), and M. Groff, K. Underwood, N. Talkington, J. Ferreria and R. Okey (WSP). The total length of the stream surveyed was 10,285 feet.

Stream flow was not measured on North Fork Strongs Creek.

North Fork Strongs Creek is an F4 channel type for 1,611 feet of the stream surveyed (Reach 1), a B6 channel type for 1,278 feet of the stream surveyed (Reach 2), and an F6 channel type for 7,396 feet of the stream surveyed (Reach 3). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. B6 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks and silt/clay-dominant substrates. F6 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and silt/clay-dominant substrates.

Water temperatures taken during the survey period ranged from 53 to 65 degrees Fahrenheit. Air temperatures ranged from 50 to 66 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 43% pool units, 29% flatwater units, and 14% riffle units (Graph 1). Based on total length of Level II habitat types there were 49% pool units, 30% flatwater units, and 10% riffle units (Graph 2).

Eleven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 40%; run units, 24%; and low gradient riffle

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units, 12% (Graph 3). Based on percent total length, mid-channel pool units made up 47%, run units, 22% and low gradient riffle units, 10%.

A total of 193 pools were identified (Table 3). Main channel pools were the most frequently encountered at 94% (Graph 4), and comprised 96% 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. Sixty-five of the 193 pools (34%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 193 pool tail-outs measured, 1 had a value of 1 (0.5%); 36 had a value of 2 (18.7%); 42 had a value of 3 (21.8%); 69 had a value of 4 (35.8%); 45 had a value of 5 (23.3%) (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 13, flatwater habitat types had a mean shelter rating of 5, and pool habitats had a mean shelter rating of 27 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 36. Main channel pools had a mean shelter rating of 26 and backwater pools had a mean shelter rating of 20 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in North Fork Strongs Creek. Graph 7 describes the pool cover in North Fork Strongs 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 53% of the pool tail-outs. Silt/clay 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 North Fork Strongs Creek was 95%. Five percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 38% and 62%, respectively. Graph 9 describes the mean percent canopy in North Fork Strongs Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 98%. The mean percent left bank vegetated was 97%. The dominant elements composing the structure of the stream banks consisted of 95% sand/silt/clay, and 5% bedrock (Graph 10). Coniferous trees were the dominant vegetation type observed in 45% of the units surveyed. Additionally, 40% of the units surveyed had brush as the dominant vegetation type, and 14% had deciduous trees as the dominant vegetation type (Graph 11).

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DISCUSSION

North Fork Strongs Creek is an F4 channel type for the first 1,611 feet of the stream surveyed (Reach 1), a B6 channel type for the next 1,278 feet of the stream surveyed (Reach 2), and an F6 channel type for the remaining 7,396 feet of the stream surveyed (Reach 3). The suitability of F4, B6, and F6 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. B6 channel types are excellent for bank-placed boulders and log cover and good for plunge weirs, single and opposing wing-deflectors and channel constrictors and fair for boulder clusters. F6 channel types are good for bank-placed boulders and fair for plunge weirs, boulder clusters, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days August 5 to August 26, 2009 ranged from 53 to 59 degrees Fahrenheit. Air temperatures ranged from 50 to 66 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 30% of the total length of this survey, riffles 10%, and pools 49%. Sixty-five of the 193 (34%) 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.

Thirty-seven of the 193 pool tail-outs measured had embeddedness ratings of 1 or 2. One hundred eleven of the pool tail-outs had embeddedness ratings of 3 or 4. Forty-five 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 North Fork Strongs Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

One hundred twenty-five of the 193 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 27. The shelter rating in the flatwater habitats is 5. 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 Strongs 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

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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 95%. Reach 1 had a canopy density of 95.2%, Reach 2 had a canopy density of 94.6%, and Reach 3 had a canopy density of 95.6%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 98% and 97%, 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 Strongs 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) 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 Strongs Creek.
125	0007.00	There are wood planks across the creek.
404	0018.00	Tributary #01 enters from the right bank and is not flowing. The temperature of the tributary is 56 degrees Fahrenheit. The temperature of North Fork Strongs Creek upstream and downstream of the tributary

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is 58 degrees Fahrenheit. The tributary is accessible to fish and it has an estimated 3% slope. No fish were observed in the tributary.

- | | | |
|------|---------|---|
| 529 | 0021.00 | LDA #01 is 2.5' high x 20' wide x 3' long and contains two pieces of large woody debris (LWD). Water does not flow through the LDA and there are no visible gaps in the LDA. Sediment is being retained in the dimensions of 10' wide x 25' long x 0.5' deep and the sediment ranges in size from silt to small cobble. Fish were seen above the LDA. The LDA contains a buried bridge. |
| 778 | 0029.00 | LDA #02 is 2' high x 22' wide x 12' long and contains seven pieces of LWD. Water does not flow through and there are no visible gaps. Sediment is being retained in the dimensions of 10' wide x 20' long x 1' deep and ranges in size from silt to small cobble. Fish were observed above the LDA. |
| 805 | 0030.00 | There is erosion on the left bank that measures approximately 20' long x 10' high and is contributing silt to the creek. |
| 970 | 0036.00 | LDA #03 measures 3.5' high x 12' wide x 2.5' long and contains three pieces of LWD. Water does flow through and there are no visible gaps in the LDA. There is sediment being retained in the approximate dimensions of 15' wide x 20' long x 2.5' deep. The sediment ranges in size from silt to small cobble. Fish were observed above the LDA. |
| 1274 | 0047.00 | LDA #04 is 3' high x 11' wide x 2.5' long and contains three pieces of LWD. Water does flow through the LDA and there are no visible gaps in it. Sediment is being retained in the dimensions of 3' wide x 10' long x 1' deep and ranges in size from silt to gravel. Fish were observed above the LDA. |
| 1598 | 0060.00 | Algal mats are providing the aquatic shelter in this unit. |
| 1717 | 0065.00 | LDA #05 is 6.5' high x 30' wide x 10' long and contains 12 pieces of LWD. Water does not flow through and there are no visible gaps in the LDA. The retained sediment measures approximately 15' wide x 30' long x 2.5' deep and ranges in size from silt to gravel. Fish were observed above the LDA. |
| 1846 | 0069.00 | LDA #06 is 4.5' high x 24' wide x 25' long and contains 16 pieces of LWD. No water flows through and there are no visible gaps. Sediment is being retained in the approximate dimensions of 4' wide x 20' long x 1' deep and it ranges in size from silt to sand. Fish were observed above the LDA. |

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- 1899 0073.00 LDA #07 is 5.5' high x 15' wide x 8' long and contains four pieces of LWD. Water does flow through, there are no visible in the LDA. Sediment is being retained and it measures approximately 10' wide x 175' long x 1.5' deep and ranges in size from silt to sand.
- 1976 0076.00 There are five or more young of the year salmonids in this pool.
- 2083 0080.00 LDA #08 is 6' high x 30' wide x 37' long and contains 18 pieces of LWD. Water does not flow through the LDA and there are no visible gaps. Sediment is being retained and measures approximately 5' wide x 100' long x 1' deep. The sediment is silt and sand. Fish were seen above the LDA.
- 2229 0089.00 LDA #09 is 8.5' high x 28' wide x 12' long and contains nine pieces of LWD. Water does not flow through and there are visible gaps. Sediment is being retained and measures approximately 10' wide x 30' long x 5' deep. The sediment is silt and sand. Fish were observed above the LDA.
- 2267 0092.00 LDA #10 is 14' high x 30' wide x 113' long and contains more than 50 pieces of LWD. Water does not flow through and there are no visible gaps in the LDA. Sediment is being retained and measures approximately 15' wide x 150' long x 3' deep. The sediment ranges in size from silt to gravel. Fish were seen above the LDA. The LDA includes habitat units #092-098.
- 2454 0102.00 LDA #11 contains eight pieces of LWD and measures 9' high x 15' wide x 16' long with water not flowing through and no visible gaps. Sediment is being retained and measures approximately 8' wide x 15' long x 3' deep. The sediment ranges in size from silt to gravel. Fish were observed above this LDA.
- 2506 0105.00 LDA #12 is 3.5' high x 26' wide x 8' long and contains 14 pieces of LWD. Water does not flow through and there are visible gaps. Sediment is being retained and measures approximately 10' wide x 20' long x 3' deep. The sediment ranges in size from silt to gravel. Fish were observed above the LDA.
- 2533 0107.00 LDA #13 is 8' high x 24' wide x 17' long and contains 16 pieces of LWD. Water does flow through and there are no visible gaps in the LDA. Sediment is being retained and measures 25' wide x 35' long x 3' deep. The sediment is made up of silt and sand. The creek is currently subsurface under the LDA.
- 2583 0109.00 LDA #14 is 5' high x 40' wide x 25' long and contains eight pieces of LWD. Water does not flow through and there are no visible gaps in the

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- LDA. Sediment is being retained and measures approximately 12' wide x 40' long x 2.5' deep. The sediment is made up of silt and sand. The creek is dry at the top of the LDA. Fish were seen above.
- 3169 0131.00 LDA #15 is 7.5' high x 15' wide x 8' long and contains eight pieces of LWD. Water does flow through, there are no visible gaps. Sediment is being retained and it measures approximately 6' wide x 20' long x 3' deep and is composed of silt and sand. Fish were observed above the LDA.
- 3286 0136.00 The left bank is eroding. The erosion measures approximately 20' long x 30' high and is contributing silt, sand, gravel and cobble. The erosion is also undercutting redwood trees.
- 3427 0141.00 LDA #16 is 3.7' high x 18' wide x 9.5' long and contains two pieces of LWD. Water does not flow through it and there are no visible gaps in it. It is retaining sediment in the approximate dimensions of 4' wide x 12' long x 1' deep. The sediment is composed of silt, sand and gravel. The creek goes dry above it and it has a log plunge of 2.8' high. Fish were observed above the LDA.
- 3498 0143.00 There is erosion on the left bank, it measures approximately 30' long x 20' high. The erosion is contributing silt, sand, gravel and cobbles to the creek bed.
- 3536 0145.00 There is a railcar bridge over this unit. It is 19' wide x 50' long x 10.2' above the creek channel. It is made of metal. Both the right and left banks are rip-rapped with boulders.
- 3786 0148.00 LDA #17 is 3' high x 15' wide x 16' long and contains eight pieces of LWD. Water does not flow through and there are visible gaps in the LDA. Silt, sand, and gravel are being retained. The retained sediment measures approximately 3' wide x 30' long x 1' deep. Fish were seen above the LDA.
- 3892 0154.00 LDA #18 is 4' high x 14' wide x 5' long and contains five pieces of LWD. Water flows through it and there are visible gaps in the LDA. The LDA is storing sediment in the dimensions of 15' wide x 50' long x 3' deep. The sediment ranges in size from silt to gravel. Fish were observed above the LDA. There are more than 20 logs on the left bank which have disrupted the original channel and have pushed the creek to the right bank. The left bank logs are mixed in with the retained sediment.
- 4008 0160.00 LDA #19 is in the middle of this unit and measures 3.5' high x 11.5' wide x 3.5' long and contains four pieces of LWD. Water does flow

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- through and there are visible gaps in the LDA. Sediment is not being retained. Fish were observed above the LDA. LDA #20 is at the top of this unit and it measures 4' high x 7' wide x 1' long and contains three pieces of LWD. Water does flow through and there are no visible gaps in the LDA. The LDA is retaining sediment which measures approximately 10' wide x 8' long x 1' deep and is made up of silt and sand. The creek goes dry at the LDA. Fish were observed above the LDA.
- 4049 0161.00 At the top of this unit is LDA #21. It is 4' high x 16' wide x 3' long and contains four pieces of LWD. Water does flow through and there are visible gaps in the LDA. Sediment is being retained and measures approximately 3' wide x 15' long x 1.5' deep. The sediment ranges in size from silt to gravel. The LDA creates a 1' high plunge. Fish were seen above the LDA.
- 4068 0162.00 LDA #22 is 4.5' tall x 13' wide x 3' long and contains two pieces of LWD. Water does flow through it and it does have visible gaps in it. Sediment is being retained and it measures approximately 6' wide x 15' long x 2' deep and is silt and sand. Fish were seen above it.
- 4338 0169.00 The left bank is eroding, the erosion measures approximately 60' long x 60' high and is contributing silt, sand, and gravel to the stream.
- 4338 0169.00 LDA #23 is 4' high x 25' wide x 8' long and contains 12 pieces of LWD. Water does flow through and there are visible gaps. Sediment is being retained. It measures approximately 10' wide x 10' long x 3' deep and is made up of silt.
- 4387 0171.00 LDA #24 is 6.5' high x 20' wide x 11' long and contains nine pieces of LWD. Water does flow through and it has no visible gaps. Sediment is being retained and measures approximately 15' wide x 15' long x 2' deep and is made of silt and sand.
- 4465 0174.00 There is a right bank slump measuring approximately 15' long x 30' high. It is contributing silt to the creek.
- 4465 0174.00 LDA #25 is 4' high x 11' wide x 12.5' long and contains five pieces of LWD. Water does flow through and there are visible gaps in the LDA. Sediment is being retained and measures 2' wide x 10' long x 1' deep and is made of silt and sand. Fish were seen above the LDA.
- 4615 0180.00 At this unit there is a blown out LDA that has pushed the channel to the right bank causing erosion 20' long x 15' high. The erosion is contributing silt, sand, gravel, and cobbles.

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4694	0184.00	LDA #26 is 7.5' high x 37' wide x 22' long and contains 30 pieces of LWD. Water does not flow through the LDA but it does have visible gaps. It is retaining sediment measuring approximately 8' wide x 30' long x 3' deep and the sediment is made up of silt. Fish were seen above the LDA.
4797	0188.00	LDA #27 is 5' high x 19' wide x 1.5' long and contains two pieces of LWD. Water does flow through and there are visible gaps in the LDA. Sediment is being retained and measures approximately 4' wide x 20' long x 2' deep and is made up of silt and sand. Fish were seen above the LDA.
4909	0193.00	Tributary #02 is flowing at less than 0.01 cfs and is contributing to approximately 1% of NF Strongs' flow. The temperature of the tributary is 54 degrees Fahrenheit. North Fork Strongs Creek is 57 degrees Fahrenheit above and below the tributary. The tributary is not accessible to fish as it has a 5' high log and sediment barrier near its mouth. The slope of the tributary is approximately 4% and no fish were observed in it.
4909	0193.00	LDA #28 is 7.5' high x 18' wide x 16' long and contains 22 pieces of LWD. Water does flow through the LDA and there are visible gaps. Sediment is not being retained by the LDA.
5070	0198.00	LDA #29 is 5.5' high x 14' wide x 2' long and contains one piece of LWD. Water does not flow through it and there are no visible gaps. Sediment is being retained and measures approximately 15' wide x 20' long x 3' deep and is silt and sand. Fish were seen above the LDA.
5182	0201.00	A young-of-the-year (YOY) and a 1 year + salmonid was observed from the bank.
5221	0203.00	LDA #30 is 4' high x 22' wide x 22' high and contains 15 pieces of LWD. Water does flow through and there are no visible gaps. Sediment is being retained and it measures approximately 3' wide x 20' long x 2' deep and was made of silt and sand. Fish were seen above the LDA.
5507	0212.00	LDA #31 is 4.5' high x 4.5' wide x 19' long and contains nine pieces of LWD. Water does flow through the LDA and it does not have any visible gaps. Sediment is not being retained by the LDA. Fish were seen above the LDA.
5847	0225.00	The right bank is eroding and sliding into the creek. The slide is approximately 50' long x 20' high and is contributing silt and sand to the creek.

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6065	0233.00	LDA #32 is 7' high x 13' wide x 70' long and contains 42 pieces of LWD. Water does not flow through it and there are no visible gaps in it. The LDA is not retaining sediment. Fish were seen above the LDA.
6132	0235.00	The right bank is eroding, the erosion may be caused by an LDA. The erosion measures approximately 10' long x 7' high and is contributing silt/clay.
6188	0238.00	LDA #33 is 3.5' high x 16' wide x 23' long and contains seven pieces of LWD. Water does not flow through it and it has no visible gaps. Fish were seen above the LDA.
6253	0242.00	LDA #34 is 3.5' high x 11.5' wide x 12' long and contains four pieces of LWD. Water flows through it and there were no visible gaps in the LDA. Sediment is being retained in the approximate dimensions of 5' wide x 15' long x 1.5' deep and is composed of silt and sand. Fish were observed above the LDA.
6268	0243.00	There is a small debris accumulation (SDA) at the top of this unit. The SDA is retaining sediment that measures approximately 1.5' deep x 8' long x 7' wide and is composed of silt and sand.
6328	0248.00	LDA #35 is 3.5' high x 9' wide x 1' long and contains three pieces of LWD. Water does flow through and there are no visible gaps. Sediment is not being retained by the LDA. Fish were seen above the LDA.
6378	0251.00	LDA #36 is 11' high x 13' wide x 10' long and contains 11 pieces of LWD. Water does flow through and there are visible gaps in the LDA. Sediment is not being retained. Fish were seen above the LDA.
6423	0253.00	The right bank is eroding. The erosion measures approximately 30' long x 10' high and is contributing silt and clay to the stream channel.
6528	0258.00	A 2+ year old salmonid was observed in this unit.
6528	0258.00	LDA #37 is 6' high x 11' wide x 7' long and contains three pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained and it measures approximately 15' wide x 10' long x 3' deep and is composed of silt and sand. The creek is currently dry due to the LDA. Fish were seen above the LDA. There are four pier posts in the creek, apparently leftover from a bridge.
6606	0262.00	There are two pier posts in the creek.
6728	0270.00	LDA #38 is 5.5' high x 16' wide x 21' long and contains 11 pieces of LWD. Water flow through the LDA and it has no visible gaps.

North Fork Strongs Creek

		Sediment is being retained and it measures approximately 3' wide x 7' long x 1' deep and is composed of silt and sand. Fish were seen above the LDA.
6758	0272.00	There is a 2' high log plunge.
6785	0274.00	There are three pier posts in the creek, possibly indicating an old bridge crossing. There is a small debris accumulation in this unit.
6841	0277.00	LDA #39 is 2.5' high x 12' wide x 12' long and contains nine pieces of LWD. Water flows through it and there are visible gaps in the LDA. Sediment is not being retained by the LDA. Fish were seen above the LDA.
6920	0279.00	LDA #40 is 3.5' tall x 14' wide x 6' long and contains two pieces of LWD. Water does flow through the LDA and there are no visible gaps in the LDA. Sediment is not being retained by it. Fish were seen above the LDA.
7103	0285.00	LDA # 41 is 3' high x 12' wide x 20' long and contains three pieces of LWD. Water does not flow through it and there are visible gaps in the LDA. Sediment is being stored by the LDA that measures approximately 15' wide x 10' long x 3' deep and ranges in size from silt to gravel. The creek is dry at the LDA. Fish were observed above the LDA.
7199	0289.00	LDA #42 is 6' high x 18' wide x 70' long and contains 20 pieces of LWD. Water flows through the LDA and there are visible gaps in the LDA. Sediment is not being retained by the LDA. Fish were observed above the LDA.
7311	0292.00	LDA #43 is 3.5' high x 16' wide x 18' long and contains five pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained and it measures approximately 4' wide x 12' long x 1' deep and is composed of silt, sand and gravel. Fish were observed above the LDA.
7354	0295.00	Two YOY salmonids were observed in this unit.
7414	0297.00	Tributary #03 enters from the right bank. It is flowing at an estimated 0.1 cfs and is contributing to approximately 30% of North Fork Strongs Creek flow. The temperature of the tributary is 52 degrees Fahrenheit. The temperature of North Fork Strongs Creek upstream and downstream of the tributary is 55 and 54 degrees Fahrenheit respectively. The tributary is accessible to fish, but no fish were observed in it. There is a LDA and sediment barrier in the tributary, about 500' from its mouth.

North Fork Strongs Creek

- 7456 0298.00 LDA #44 is 11' high x 17' wide x 130' long and spans through four habitat units. It contains approximately 40 pieces of LWD. Water does not flow through it and there are no visible gaps in it. The LDA is retaining sediment in the approximate dimensions of 4' wide x 60' long x 1' deep and is composed of silt and sand. The creek goes dry. Fish were seen above the LDA.
- 7658 0305.00 LDA #45 is 5' high x 12' wide x 20' long and contains 10 pieces of LWD. No water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 5' wide x 10' long x 3' deep and it is composed of silt, sand, and gravel. Fish were seen above the LDA.
- 7736 0309.00 LDA #46 is 6' high x 17' wide x 20' long and contains 12 pieces of LWD. Water does not flow through and there are visible gaps in the LDA. Sediment is being retained in the approximate dimensions of 15' wide x 10' long 1' deep and is composed of silt and sand. Fish were seen above the LDA.
- 7764 0311.00 LDA #47 is 6' high x 15' wide x 40' long and contains 14 pieces of LWD. Water does not flow through it and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 5' wide x 25' long x 2' deep and is composed of silt and sand. Fish were seen above the LDA.
- 7840 0316.00 LDA #48 is 7' high x 8' wide x 6' long and contains two pieces of LWD. Water does not flow through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 15' wide x 20' long x 3' deep and it is composed of silt and sand. Fish were seen above the LDA.
- 7946 0322.00 LDA #49 is 4' high x 13' wide x 2' long and contains three pieces of LWD. Water does not flow through the LDA and there are no visible gaps in the LDA. Sediment is being retained and it measures approximately 10' wide x 12' long x 2' deep. The sediment is composed of silt and sand.
- 7974 0324.00 LDA #50 is 8' high x 17' wide x 10' long and contains 10 pieces of LWD. Water does not flow through it and there are no visible gaps in it. Sediment is being retained in the dimensions of 15' wide x 30' long x 3' deep and is composed of silt and sand. Fish were seen above the LDA.
- 8129 0332.00 LDA #51 is 5.5' high x 11' wide x 5' long and contains two pieces of LWD. Water flows through the LDA and there are no visible gaps in it.

North Fork Strongs Creek

		Sediment is being retained in the dimensions of 10' wide x 50' long x 1' deep and is composed of silt and sand. Fish were seen above the LDA.
8287	0341.00	A YOY salmonid was observed in this habitat unit.
8410	0349.00	LDA #52 is 3.5' high x 15' wide x 4' long and contains five pieces of LWD. Water flows through the LDA and there are no visible gaps. Sediment is not being retained by the LDA. Fish were seen above the LDA.
8505	0353.00	There is a small debris accumulation at the top of this unit.
8637	0360.00	There are two pier posts in the creek channel.
8672	0362.00	LDA #53 is 4' high x 12' wide x 3.5' long and contains three pieces of LWD. Water does not flow through it and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 10' wide x 20' long x 3' deep and is composed of silt and sand. Fish were observed above the LDA.
8730	0366.00	There is erosion on the left bank. The erosion measures approximately 40' long x 15' high and is contributing silt and sand to the creek channel.
8782	0370.00	There is erosion on the left bank. The erosion measures approximately 20' high x 15' long and is contributing silt to the stream channel.
8782	0370.00	LDA #55 is 7' high x 14' wide x 4' long and contains nine pieces of LWD. Water does not flow through it and there are no visible gaps through it. Sediment is being retained in the dimensions of 30' wide x 30' long x 2' deep and is composed of silt and sand. Also the creek goes dry at the top of the LDA. Fish were observed above the LDA.
9033	0384.00	LDA #56 is 5.5' high x 16' wide x 10' long and contains 11 pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 7' wide x 50' long x 2' deep and ranges in size from silt to gravel. Fish were seen above the LDA.
9071	0388.00	There are two pier posts in the creek.
9081	0389.00	There is a pier post in the creek.
9097	0390.00	There are two pier posts in the creek.
9203	0394.00	A YOY salmonid was observed from the bank.

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9251	0396.00	LDA #57 is 4' high x 16' wide x 3' long and contains six pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximated dimensions of 4' wide x 30' long x 1' deep and is composed of silt and sand. Currently the creek goes dry at the top of the LDA. Fish were seen above the LDA.
9294	0400.00	LDA #58 is 4.5' high x 17' wide x 8' long and contains four pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 6' wide x 20' long x 2' deep and is composed of silt and sand. Fish were observed upstream of the LDA.
9320	0401.00	There is a left bank slump/slide that measures approximately 20' long x 30' high. It is contributing silt to the creek.
9349	0402.00	There is a seep on the left bank.
9545	0410.00	LDA #59 is 4' high x 12' wide x 10' long and contains six pieces of LWD. Water does not flow through the LDA and there are visible gaps in the LDA. Sediment is being retained and it measures approximately 5' wide x 50' long x 1' deep. The sediment is composed of silt and sand. Fish were observed above the LDA.
9629	0413.00	There is a dry side channel that cuts around an LDA that is upstream. The side channel is about 3' wide and 2' high above the natural channel.
9639	0414.00	LDA #60 is 8' high x 14' wide x 10' long and contains seven pieces of LWD. Water does not flow through the LDA and there are no visible gaps in the LDA. Sediment is not being retained.
9661	0415.00	LDA #61 is 5' high x 18' wide x 7' long and contains 10 pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 8' long x 3' deep and it is composed of silt and sand. Fish were observed above the LDA.
9729	0421.00	In this unit and the next unit upstream there are four pier posts in the creek, two of which are part of an LDA.
9756	0422.00	LDA #62 is 3' high x 12' wide x 2.5' long and contains five pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 5' wide x 12' long x 1' deep and is composed of silt and sand. Fish were seen above the LDA.

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- 9883 0430.00 LDA #63 is 6.5' high x 15' wide x 17' long and contains nine pieces of LWD. Water does not flow through the LDA and there are no visible gaps through it. Sediment is being retained in the approximate dimensions of 20' wide x 80' long x 3' deep and it is composed of silt, sand and gravel. Fish were observed above the LDA.
- 10129 0444.00 One YOY salmonid was observed in this unit.
- 10221 0449.00 There is a small debris accumulation and a rootwad in this unit.
- 10285 0450.00 End of survey at a perched redwood. The redwood's rootmass spans the natural creek channel causing the creek to push a 1' diameter hole through the roots and dirt. There is a winter side channel on the left bank, although it is plugged up with large and small wood. Above the perched redwood there are multiple LDA's and dry sections of the creek. A young of year salmonid was observed above the perched redwood. Fish numbers have steadily decreased after each of the 63 LDA's.

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.

North Fork Strongs Creek

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 Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
49	0	DRY	10.9	16	780	7.6									
132	21	FLATWATER	29.3	24	3108	30.2	3.3	0.3	0.6	78	10327	28	3723		5
15	0	NOSURVEY	3.3	19	284	2.8									
193	193	POOL	42.9	26	5051	49.1	8.5	0.9	1.8	228	44051	273	52612	250	27
61	14	RIFFLE	13.6	17	1062	10.3	3.3	0.2	0.3	24	1435	3	211		13
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
450	228				10285					55812			56547		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDEVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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 (%)
56	12	LGR	12.4	18	1001	9.7	3	0.1	0.4	26	1478	4	200		8	96
5	2	HGR	1.1	12	61	0.6	4	0.3	1	6	32	3	14		40	94
109	14	RUN	24.2	21	2257	21.9	3	0.3	0.9	60	6511	22	2377		5	95
23	7	SRN	5.1	37	851	8.3	3	0.3	0.9	115	2650	41	943		6	89
180	180	MCP	40.0	27	4844	47.1	9	0.9	5	235	42246	278	50019	254	26	96
1	1	STP	0.2	25	25	0.2	8	1.7	2.8	200	200	340	340	340	60	95
5	5	LSL	1.1	12	59	0.6	6	0.6	1.4	76	380	51	255	47	22	93
1	1	LSBk	0.2	18	18	0.2	8	0.6	1.2	137	137	82	82	82	5	89
5	5	PLP	1.1	18	88	0.9	10	1.4	3.8	190	952	342	1712	331	57	98
1	1	DPL	0.2	17	17	0.2	8	1.5	2.6	136	136	204	204	204	20	95
49	0	DRY	10.9	16	780	7.6										
15	0	NS	3.3	19	284	2.8										

Total Units
450

Total Units Fully Measured
228

Total Length (ft.)
10285

Total Area (sq.ft.)
54721

Total Volume (cu.ft.)
56146

Table 3 - Summary of Pool Types

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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
181	181	MAIN	94	27	4869	96	8.5	0.9	235	42446	254	45978	26
11	11	SCOUR	6	15	165	3	8.3	1.0	133	1468	179	1974	36
1	1	BACKWATER	1	17	17	0	8.0	1.5	136	136	204	204	20

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
193	193	5051	44050	48157

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

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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
180	MCP	93	4	2	116	64	46	26	12	7	2	1
1	STP	1	0	0	0	0	1	100	0	0	0	0
5	LSL	3	0	0	5	100	0	0	0	0	0	0
1	LSBk	1	0	0	1	100	0	0	0	0	0	0
5	PLP	3	0	0	2	40	1	20	2	40	0	0
1	DPL	1	0	0	0	0	1	100	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
193	4	2	124	64	49	25	14	7	2	1

Mean Maximum Residual Pool Depth (ft.): 1.8

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Dry Units: 49

Confluence Location: Quad: HYDEVILLE

Legal Description: T03NR01WS36 Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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
56	12	LGR	15	67	2	0	0	0	0	17	0
5	2	HGR	0	0	0	10	0	0	0	90	0
61	14	TOTAL RIFFLE	13	57	1	1	0	0	0	27	0
109	14	RUN	0	71	24	0	0	0	0	4	0
23	7	SRN	26	36	18	0	0	0	0	20	0
132	21	TOTAL FLAT	11	57	22	0	0	0	0	11	0
180	180	MCP	13	36	45	2	0	1	0	2	0
1	1	STP	0	5	90	5	0	0	0	0	0
5	5	LSL	0	33	66	1	0	0	0	0	0
1	1	LSBk	0	100	0	0	0	0	0	0	0
5	5	PLP	2	26	68	0	0	0	0	4	0
1	1	DPL	30	60	10	0	0	0	0	0	0
193	193	TOTAL POOL	13	36	46	2	0	1	0	2	0
15	0	NS									
450	228	TOTAL	13	38	43	2	0	1	0	3	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Dry Units: 49

Confluence Location: Quad: HYDEVILLE

Legal Description: T03NR01WS36 Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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
56	12	LGR	0	0	67	17	17	0	0
5	2	HGR	0	0	50	0	0	50	0
109	14	RUN	29	21	36	7	0	0	7
23	7	SRN	0	0	71	14	0	0	14
180	180	MCP	66	11	20	2	1	0	1
1	1	STP	100	0	0	0	0	0	0
5	5	LSL	60	0	40	0	0	0	0
1	1	LSBk	100	0	0	0	0	0	0
5	5	PLP	60	40	0	0	0	0	0
1	1	DPL	100	0	0	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
95	62	38	0	98	97

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 Strongs Creek LLID: 1241213405983 Drainage: Eel River - Lower
 Survey Dates: 8/5/2009 to 8/26/2009 Survey Length (ft.): 10285 Main Channel (ft.): 10285 Side Channel (ft.): 0
 Confluence Location: Quad: HYDESVILLE Legal Description: T03NR01WS36 Latitude: 40:35:54.0N Longitude: 124:07:17.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4	Canopy Density (%): 95.2	Pools by Stream Length (%): 47.4
Reach Length (ft.): 1611	Coniferous Component (%): 8.4	Pool Frequency (%): 36.7
Riffle/Flatwater Mean Width (ft.): 5.4	Hardwood Component (%): 91.6	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Brush	< 2 Feet Deep: 82
Range (ft.): 13 to 29	Vegetative Cover (%): 96.4	2 to 2.9 Feet Deep: 14
Mean (ft.): 20	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 5
Std. Dev.: 5	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 19	Mean Max Residual Pool Depth (ft.): 1.5
Water (F): 56 - 58 Air (F): 52 - 64	LWD per 100 ft.:	Mean Pool Shelter Rating: 16
Dry Channel (ft): 0	Riffles: 2	
	Pools: 6	
	Flat: 4	
Pool Tail Substrate (%): Silt/Clay: 5 Sand: 0 Gravel: 18 Sm Cobble: 59 Lg Cobble: 18 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 0.0 2. 22.7 3. 63.6 4. 13.6 5. 0.0		

STREAM REACH: 2

Channel Type: B6	Canopy Density (%): 94.6	Pools by Stream Length (%): 52.0
Reach Length (ft.): 1278	Coniferous Component (%): 69.5	Pool Frequency (%): 50.0
Riffle/Flatwater Mean Width (ft.): 2.8	Hardwood Component (%): 30.5	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 63
Range (ft.): 11 to 34	Vegetative Cover (%): 96.1	2 to 2.9 Feet Deep: 30
Mean (ft.): 21	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 3
Std. Dev.: 7	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 3
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 33	Mean Max Residual Pool Depth (ft.): 1.9
Water (F): 56 - 58 Air (F): 58 - 64	LWD per 100 ft.:	Mean Pool Shelter Rating: 25
Dry Channel (ft): 182	Riffles: 2	
	Pools: 17	
	Flat: 6	
Pool Tail Substrate (%): Silt/Clay: 27 Sand: 40 Gravel: 27 Sm Cobble: 7 Lg Cobble: 0 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 0.0 2. 23.3 3. 6.7 4. 43.3 5. 26.7		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: F6	Canopy Density (%): 95.6	Pools by Stream Length (%): 49.0
Reach Length (ft.): 7396	Coniferous Component (%): 69.4	Pool Frequency (%): 42.7
Riffle/Flatwater Mean Width (ft.): 2.8	Hardwood Component (%): 30.6	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 65
Range (ft.): 7 to 19	Vegetative Cover (%): 98.0	2 to 2.9 Feet Deep: 26
Mean (ft.): 12	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 9
Std. Dev.: 3	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 1
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 41	Mean Max Residual Pool Depth (ft.): 1.9
Water (F): 53 - 65 Air (F): 50 - 66	LWD per 100 ft.:	Mean Pool Shelter Rating: 29
Dry Channel (ft): 598	Riffles: 8	
	Pools: 14	
	Flat: 8	
Pool Tail Substrate (%): Silt/Clay: 13 Sand: 4 Gravel: 64 Sm Cobble: 6 Lg Cobble: 7 Boulder: 1 Bedrock: 6		
Embeddedness Values (%): 1. 0.7 2. 17.0 3. 18.4 4. 37.6 5. 26.2		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

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	10	11	4.6
Boulder	1	0	0.2
Cobble / Gravel	0	2	0.4
Sand / Silt / Clay	217	214	94.5

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	1	0	0.2
Brush	98	86	40.4
Hardwood Trees	36	29	14.3
Coniferous Trees	93	112	45.0
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 4

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

StreamName: North Fork Strongs Creek

LLID: 1241213405983

Drainage: Eel River - Lower

Survey Dates: 8/5/2009 to 8/26/2009

Confluence Location: Quad: HYDESVILLE

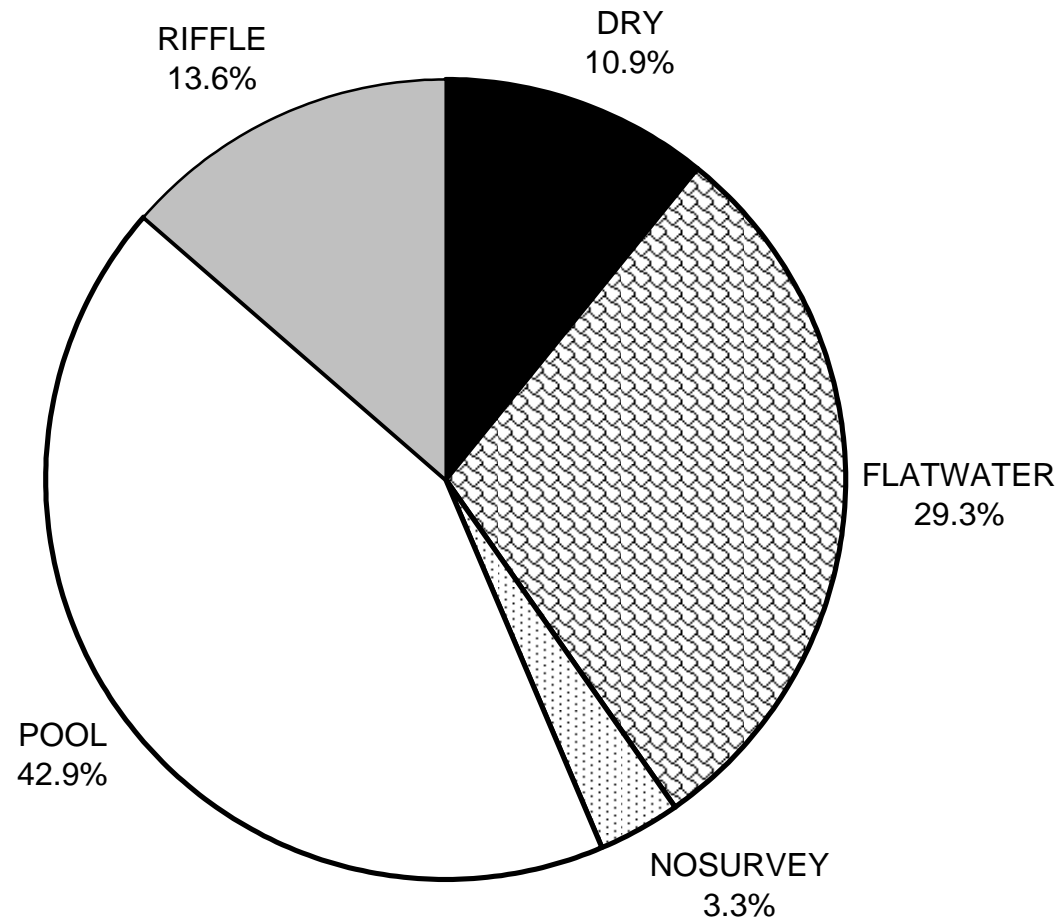
Legal Description: T03NR01WS36

Latitude: 40:35:54.0N

Longitude: 124:07:17.0W

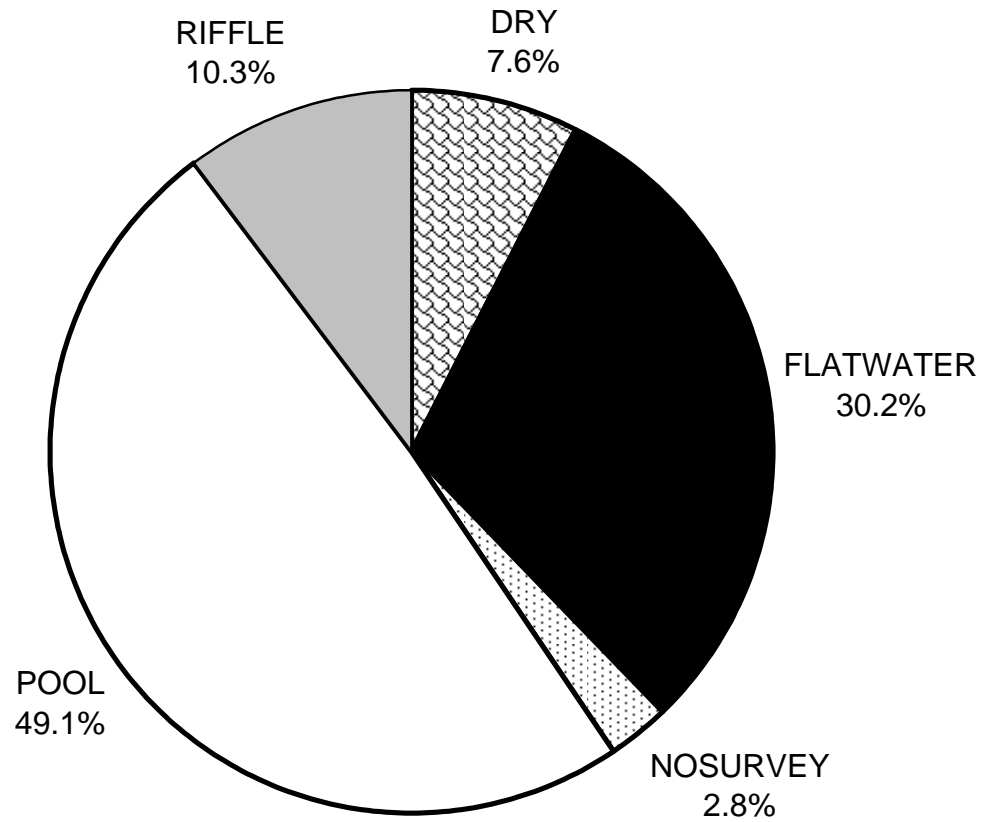
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	13	11	13
SMALL WOODY DEBRIS (%)	57	57	36
LARGE WOODY DEBRIS (%)	1	22	46
ROOT MASS (%)	1	0	2
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	1
WHITEWATER (%)	0	0	0
BOULDERS (%)	27	11	2
BEDROCK LEDGES (%)	0	0	0

NORTH FORK STRONGS CREEK 2009 HABITAT TYPES BY PERCENT OCCURRENCE



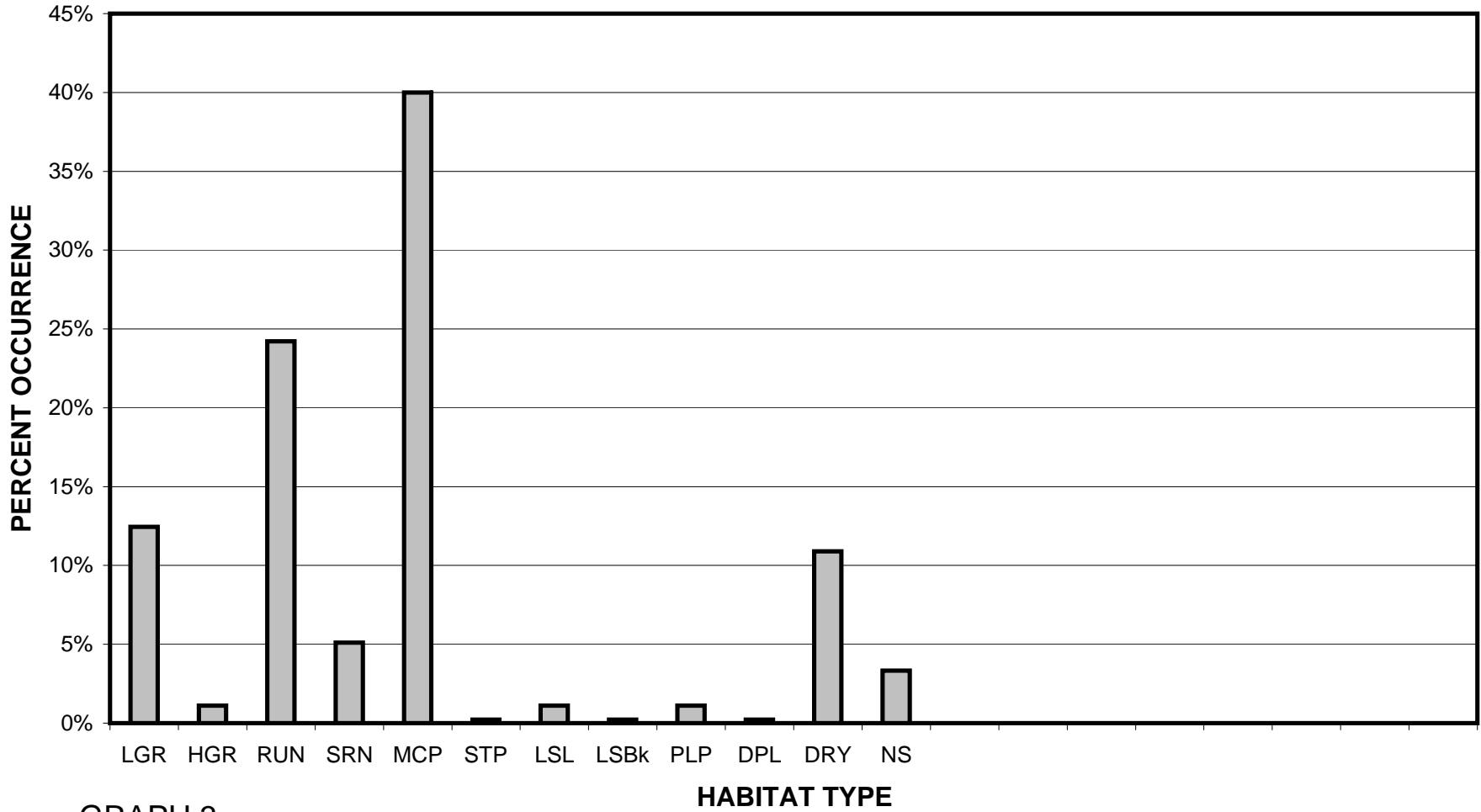
GRAPH 1

NORTH FORK STRONGS CREEK 2009 HABITAT TYPES BY PERCENT TOTAL LENGTH



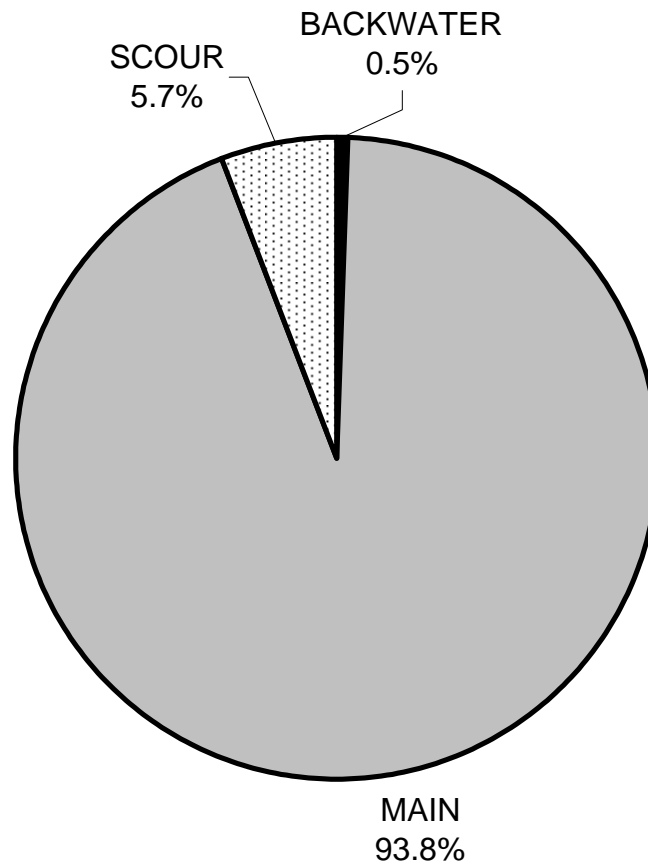
GRAPH 2

NORTH FORK STRONGS CREEK 2009 HABITAT TYPES BY PERCENT OCCURRENCE



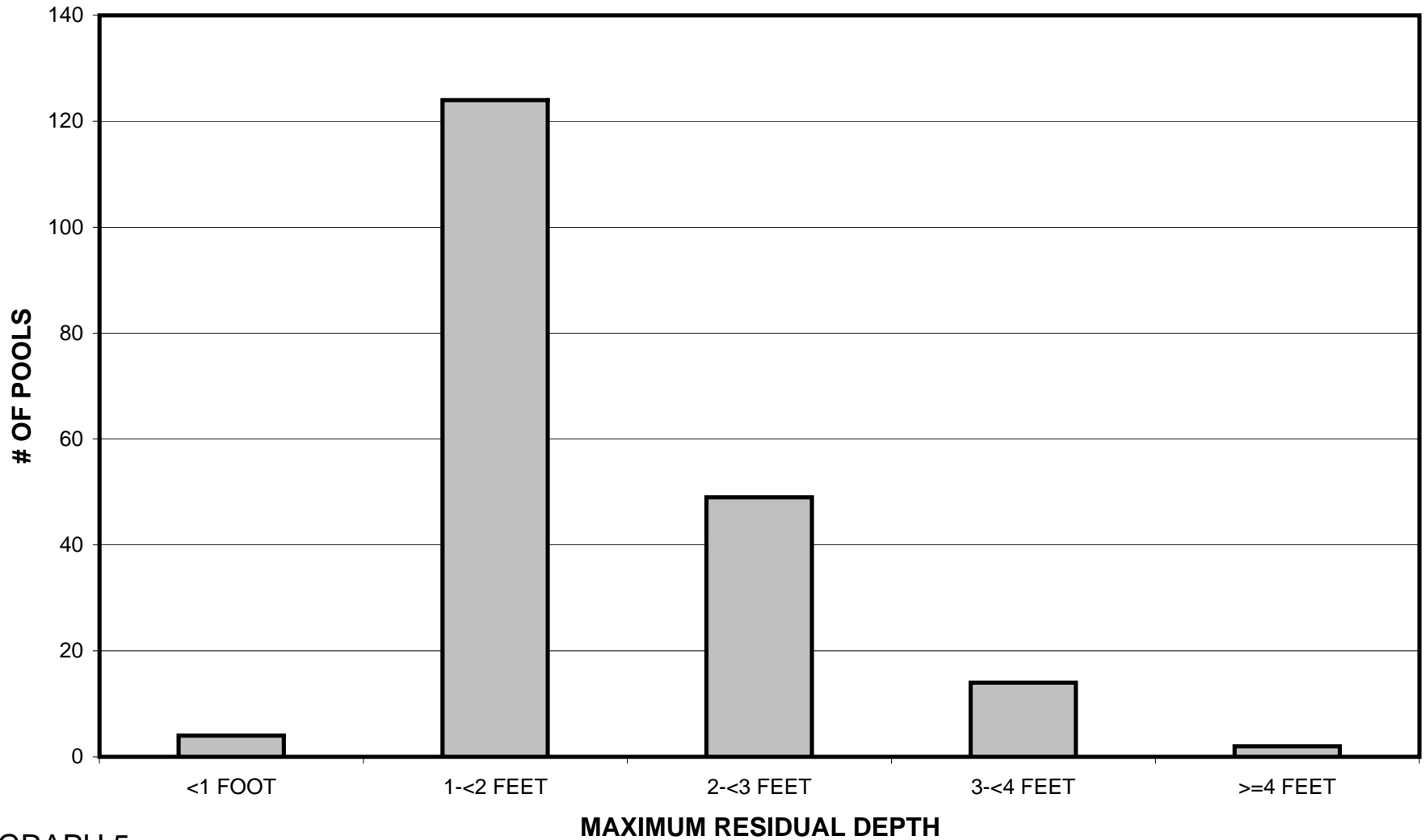
GRAPH 3

NORTH FORK STRONGS CREEK 2009 POOL TYPES BY PERCENT OCCURRENCE



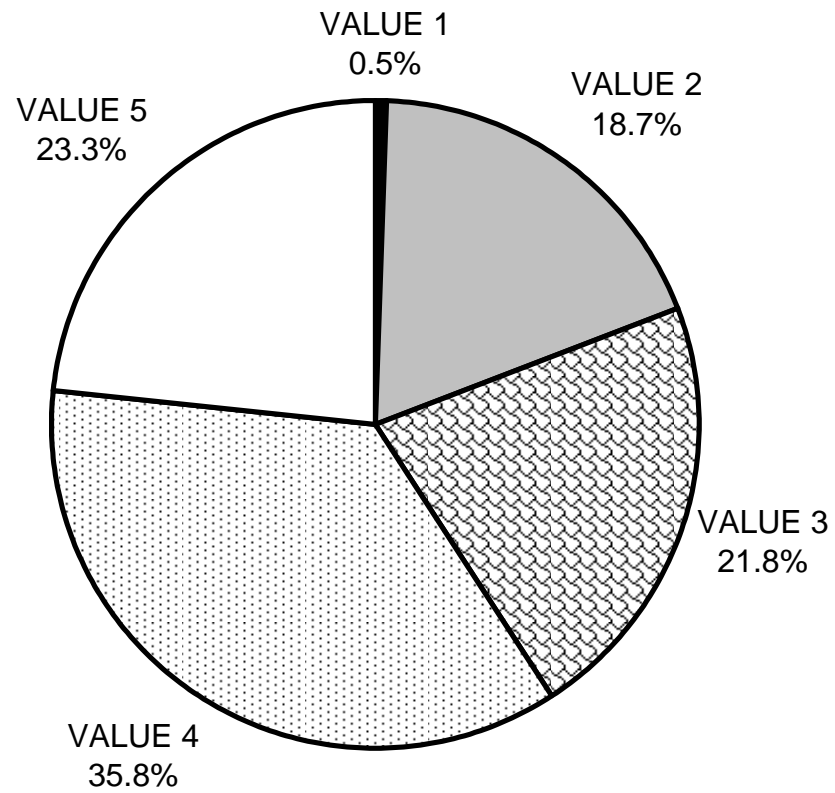
GRAPH 4

NORTH FORK STRONGS CREEK 2009 MAXIMUM DEPTH IN POOLS



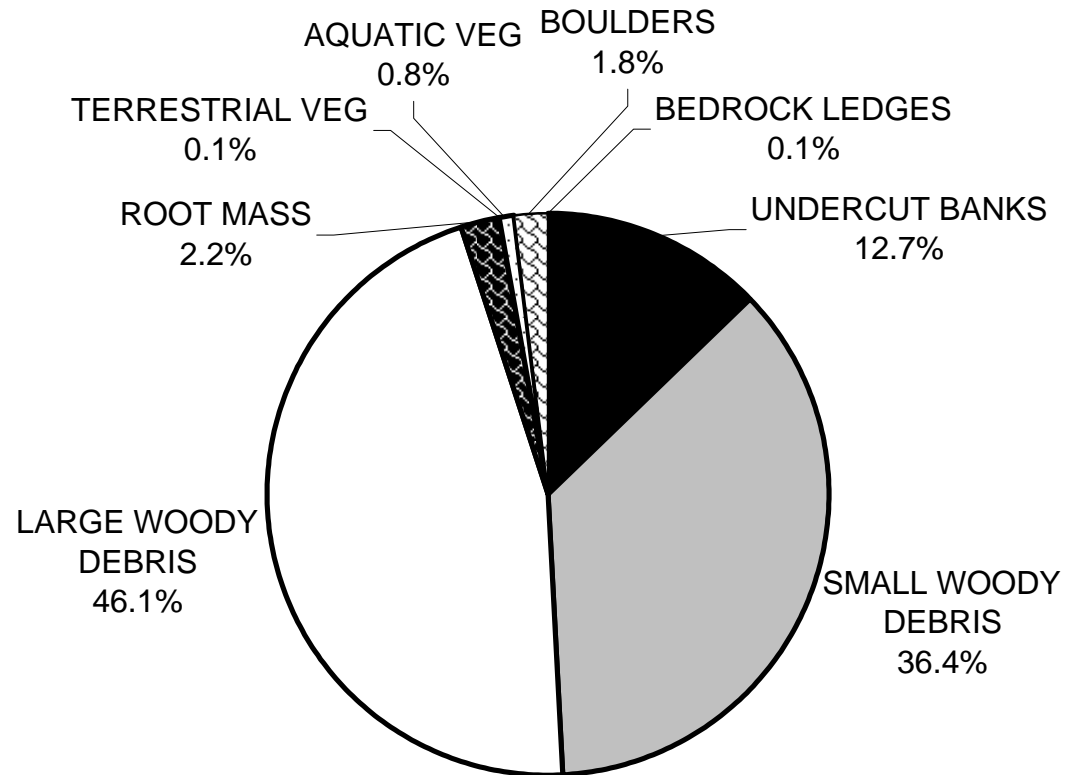
GRAPH 5

NORTH FORK STRONGS CREEK 2009 PERCENT EMBEDDEDNESS



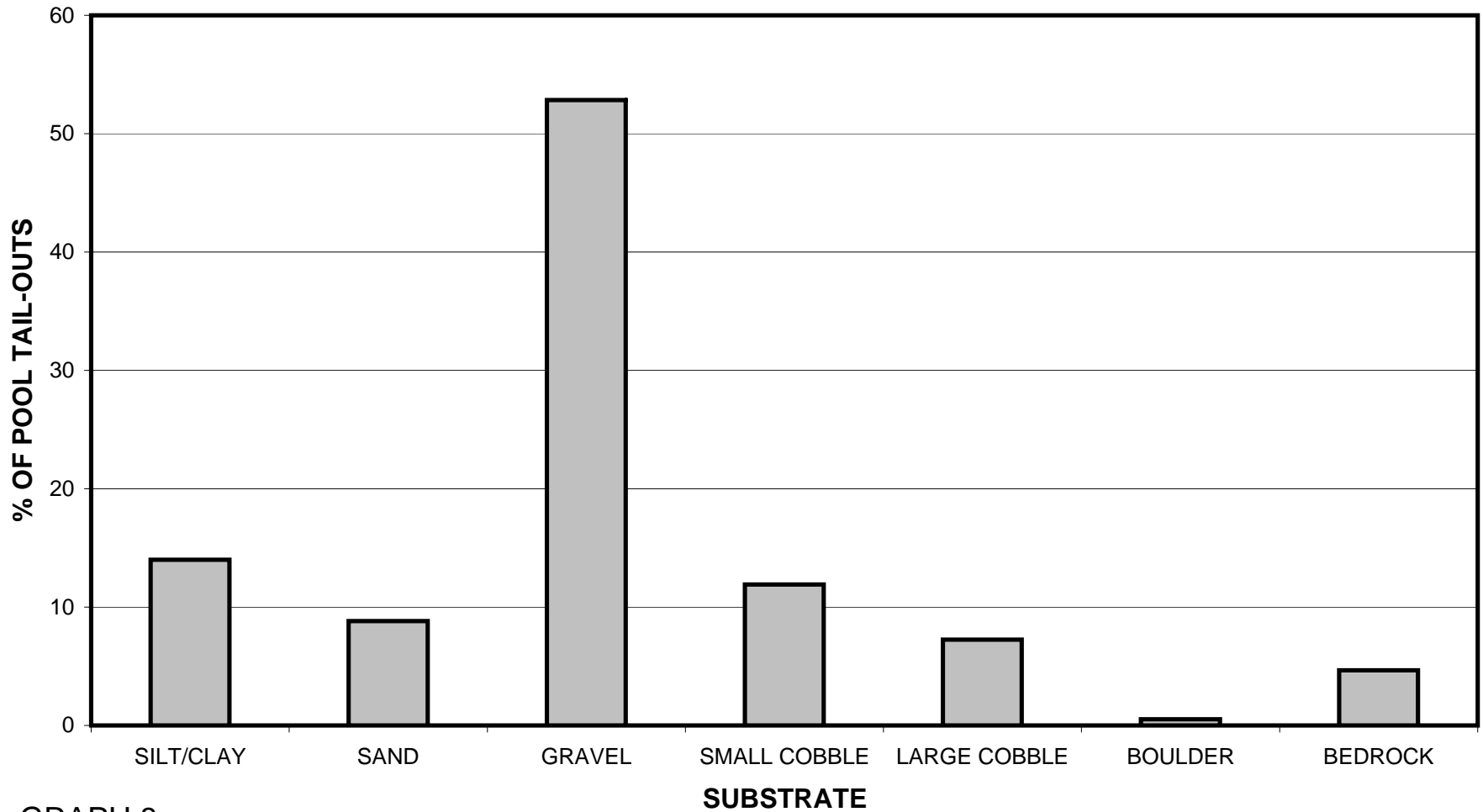
GRAPH 6

NORTH FORK STRONGS CREEK 2009 MEAN PERCENT COVER TYPES IN POOLS



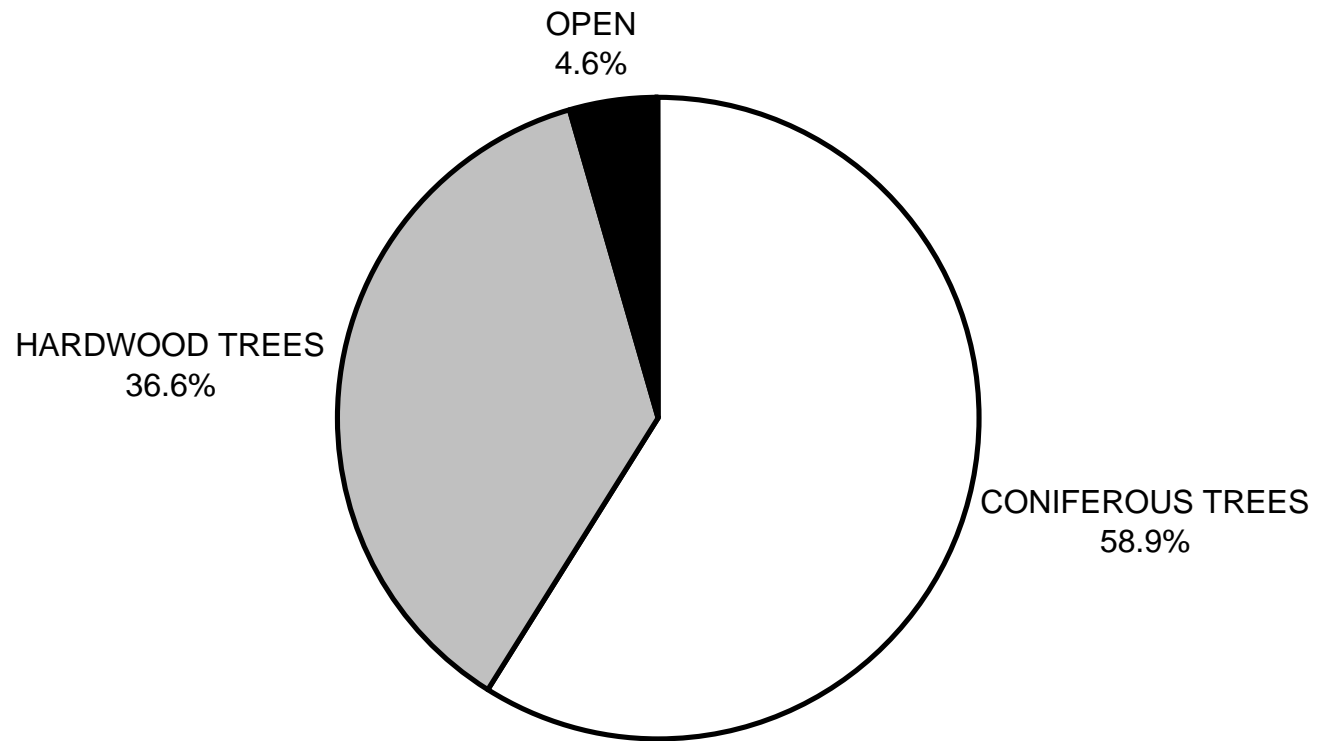
GRAPH 7

NORTH FORK STRONGS CREEK 2009 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



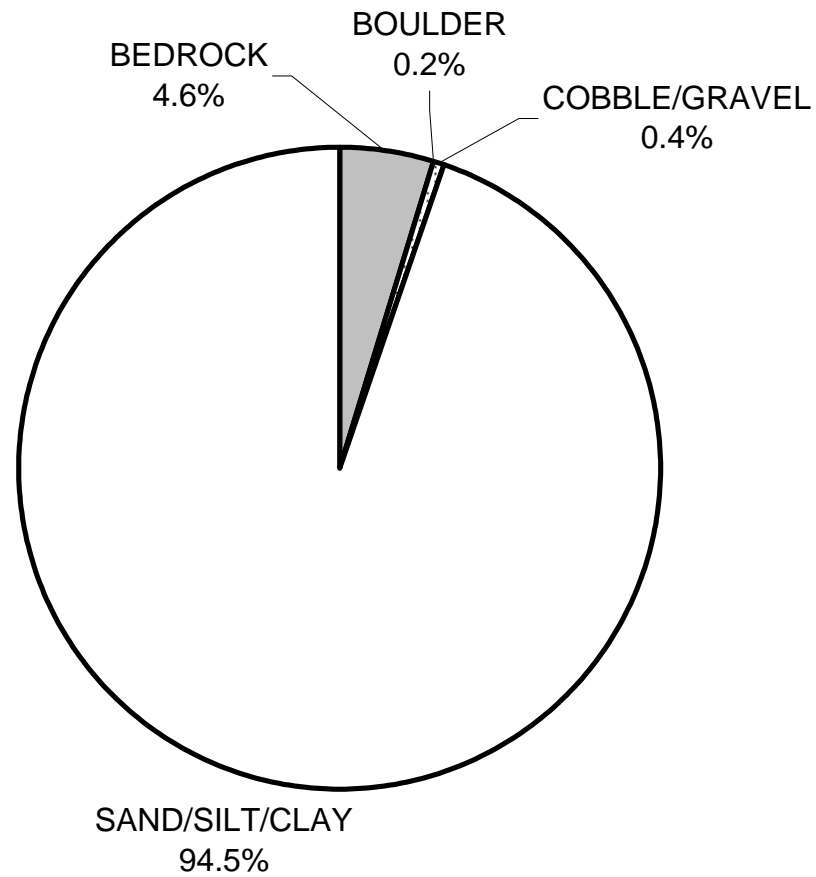
GRAPH 8

NORTH FORK STRONGS CREEK 2009 MEAN PERCENT CANOPY



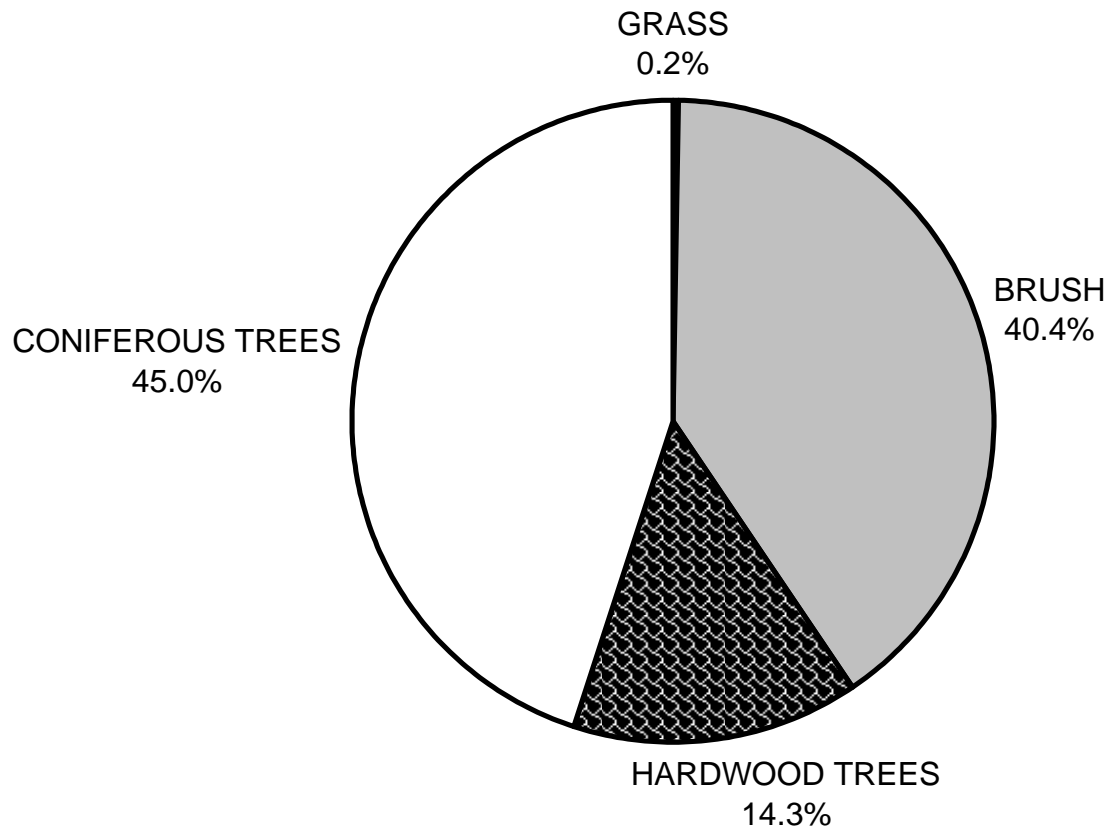
GRAPH 9

NORTH FORK STRONGS CREEK 2009 DOMINANT BANK COMPOSITION IN SURVEY REACH



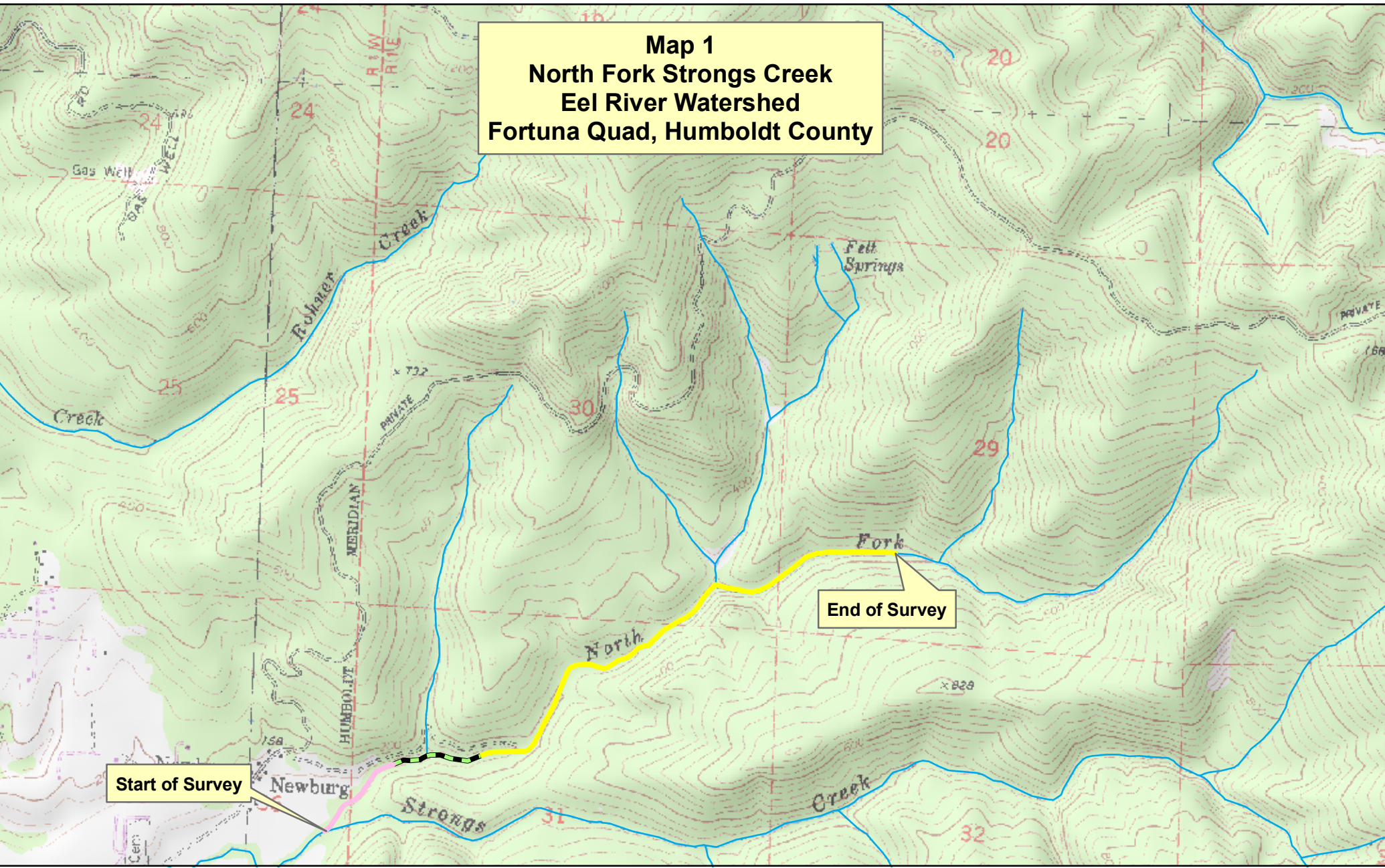
GRAPH 10

NORTH FORK STRONGS CREEK 2009 DOMINANT BANK VEGETATION IN SURVEY REACH



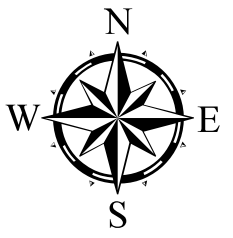
GRAPH 11

Map 1
North Fork Strongs Creek
Eel River Watershed
Fortuna Quad, Humboldt County



Start of Survey

End of Survey



Legend

- Reach 1, F4 Channel Type
- Reach 2, B6 Channel Type
- Reach 3, F6 Channel Type

