

# STREAM INVENTORY REPORT

## South Fork Ten Mile River

### INTRODUCTION

A stream inventory was conducted from July 30 to September 12, 2012 on South Fork Ten Mile River. The survey began at the confluence with Ten Mile River and extended upstream 20.1 miles.

The South Fork Ten Mile River inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in South Fork Ten Mile River. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

### WATERSHED OVERVIEW

South Fork Ten Mile River is a tributary to Ten Mile River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). South Fork Ten Mile River's legal description at the confluence with Ten Mile River is T19N R17W S03. Its location is 39.5401 degrees north latitude and 123.7468 degrees west longitude, LLID number 1237454395401. South Fork Ten Mile River is a third order stream and has approximately 19.2 miles of blue line stream according to the USGS Dutchmans Knoll 7.5 minute quadrangle. South Fork Ten Mile River drains a watershed of approximately 39.1 square miles. Elevations range from about five feet at the mouth of the creek to 1,400 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production and as rangeland. Vehicle access exists via Little Valley Road, just north of Fort Bragg, CA.

### METHODS

The habitat inventory conducted in South Fork Ten Mile River follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Wildlife (CDFW). This inventory was conducted by a two-person team.

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### 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 parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

### HABITAT INVENTORY COMPONENTS

A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the *California Salmonid Stream Habitat Restoration Manual*. This form was used in South Fork Ten Mile River to record measurements and observations. There are eleven components to the inventory form.

#### 1. Flow:

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

#### 2. Channel Type:

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

#### 3. Temperatures:

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

#### 4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1990). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". South Fork Ten Mile River habitat typing used standard basin level measurement criteria. These parameters require

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that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

### 5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In South Fork Ten Mile River, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed not suitable for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

### 6. Shelter Rating:

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

### 7. Substrate Composition:

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

### 8. Canopy:

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

### 9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to

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withstand winter flows. In South Fork Ten Mile River, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

### 10. Large Woody Debris Count:

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

### 11. Average Bankfull Width:

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

## BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in South Fork Ten Mile River. In addition, underwater observations were made at 26 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 Wildlife. 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

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- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for South Fork Ten Mile River include:

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

## HABITAT INVENTORY RESULTS

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

The habitat inventory of July 30 to September 12, 2012 was conducted by M. Zee, A. Blessing, A. Garcia, C. Tiffany, B. James, and R. Spencer (WSP). The total length of the stream surveyed was 106,178 feet with an additional 605 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 3.1 cfs on September 6, 2012.

South Fork Ten Mile River is an F4 channel type for 100,198 feet of the stream surveyed (Reach 1), a B4 channel type for 4,422 feet of the stream surveyed (Reach 2), and an A3 channel type for 1,558 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. B4 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks and gravel-dominant substrates. A3 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 50 to 64 degrees Fahrenheit. Air temperatures ranged from 50 to 78 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 38% pool units, 31% riffle units, 29% flatwater units, 1% dry units, and

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1% unsurveyed units (Graph 1). Based on total length of Level II habitat types there were 45% pool units, 34% flatwater units, 20% riffle units, and 1% dry units (Graph 2).

Sixteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 34%; low gradient riffle units, 28%; and run units, 18% (Graph 3). Based on percent total length, mid-channel pool units made up 40%, low gradient riffle units 18%, and step run units 18%.

A total of 608 pools were identified (Table 3). Main channel pools were the most frequently encountered at 93% (Graph 4), and comprised 94% 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. Two hundred nine of the 608 pools (34%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 608 pool tail-outs measured, 325 had a value of 1 (53.5%); 276 had a value of 2 (45.4%); seven had a value of 3 (1.2%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 9, flatwater habitat types had a mean shelter rating of 15, and pool habitats had a mean shelter rating of 32 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at 57. Scour pools had a mean shelter rating of 34. Main channel pools had a mean shelter rating of 31 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in South Fork Ten Mile River. Graph 7 describes the pool cover in South Fork Ten Mile River. Large woody debris is the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 82% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 15% of the pool tail-outs.

The mean percent canopy density for the surveyed length of South Fork Ten Mile River was 90%. Ten percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 67% and 33%, respectively. Graph 9 describes the mean percent canopy in South Fork Ten Mile River.

For the stream reach surveyed, the mean percent right bank vegetated was 96%. The mean percent left bank vegetated was 96%. The dominant elements composing the structure of the stream banks consisted of 55% sand/silt/clay, 38% cobble/gravel, 5% bedrock, and 2% boulders (Graph 10). Deciduous trees were the dominant vegetation type observed in 57% of the units

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surveyed. Additionally, 39% of the units surveyed had coniferous trees as the dominant vegetation type, and 3% had grass as the dominant vegetation type (Graph 11).

### BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 26 sites for species composition and distribution in South Fork Ten Mile River on September 26, October 1, and October 9, 2012. The sites were sampled by I. Mikus and M. Groff (CDFW).

In Reach 1, which comprised the first 100,198 feet of stream, 26 sites were sampled. The reach sites yielded 434 young-of-the-year (YOY) steelhead/rainbow trout (SH/RT), 32 age 1+ SH/RT, eight age 2+ SH/RT, and 89 YOY coho salmon.

The following chart displays the information yielded from these sites:

2012 South Fork Ten Mile River 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									
09/26/12	1	351	Pool	27158	15	0	1	1	0
	2	1000	Pool	76620	41	4	0	7	0
	3	1003	Pool	76759	26	4	0	5	0
	4	1005	Pool	76857	8	0	0	4	0
	5	1011	Pool	77215	68	1	1	2	0
	6	1015	Pool	77395	18	1	0	7	0
	7	1017	Pool	77541	10	1	0	9	0
	8	1025	Pool	78035	46	6	3	9	0
	9	1062	Pool	79954	27	1	0	14	0
	10	1076	Pool	80736	10	0	0	8	0
10/09/12	11	1120	Pool	83974	6	0	0	2	0
	12	1124	Pool	84269	8	0	0	10	0
	13	1151	Pool	85774	4	0	0	3	0
	14	1174	Pool	86904	4	0	0	1	0
	15	1193	Pool	87908	15	2	0	7	0
	16	1196	Pool	88058	80	4	1	0	0
	17	1199	Pool	88269	8	0	1	0	0

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10/01/12	18	1255	Pool	90755	5	1	0	0	0
	19	1257	Pool	90822	5	1	0	0	0
	20	1305	Pool	93162	4	1	1	0	0
	21	1335	Pool	94853	2	2	0	0	0
	22	1364	Pool	96258	7	3	0	0	0
	23	1395	Pool	97901	2	1	0	0	0
	24	1419	Pool	99036	2	1	0	0	0
	25	1429	Pool	99487	7	0	0	0	0
	26	1431	Pool	99580	6	1	0	0	0

### DISCUSSION

South Fork Ten Mile River is an F4 channel type for the first 100,198 feet of stream surveyed, a B4 channel type for the next 4,422 feet, and an A3 channel type for the remaining 1,558 feet. The suitability of F4, B4, and A3 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. B4 channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover. A3 channels are generally not suitable for fish habitat improvement projects.

The water temperatures recorded on the survey days July 30 to September 12, 2012 ranged from 50 to 64 degrees Fahrenheit. Air temperatures ranged from 50 to 78 degrees Fahrenheit. This is a suitable water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level for salmonids. To make any further conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

Flatwater habitat types comprised 34% of the total length of this survey, riffles 20%, and pools 45%. Two hundred nine of the 608 pools measured (34%) had a maximum residual depth greater than three feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth order streams, a primary pool is defined to have a maximum residual depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

Six hundred one of the 608 pool tail-outs measured had embeddedness ratings of 1 or 2. Seven of the pool tail-outs had embeddedness ratings of 3 or 4. None of the pool tail-outs had a rating of 5, which is considered not suitable 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.



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Five hundred ninety of the 608 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 32. The shelter rating in the flatwater habitats is 15. 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 South Fork Ten Mile River. Large woody debris is the dominant cover type in pools followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

The mean percent canopy density for the stream was 90%. Reach 1 had a canopy density of 89%, Reach 2 had a canopy density of 98%, and Reach 3 had a canopy density of 99%. In general, revegetation projects are considered when canopy density is less than 80%. The percentage of right and left bank covered with vegetation was 96% and 96%, respectively.

### RECOMMENDATIONS

- 1) South Fork Ten Mile River should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 3) In Reaches 1 and 2, increase woody cover in the pools and flatwater habitat units since the shelter ratings are below the target value. 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.

### 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 Ten Mile River. The channel is an F4. Ten Mile haul road crosses the channel. The crossing is a 20' wide x 130' long x 14' high steel bridge.

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10582	0107.00	Camp 1 Ten Mile Road crosses the channel. The crossing is a 14' wide x 52' long x 16' high wooden bridge.
11457	0117.00	Smith Creek (tributary #01) enters on the right bank. It contributes approximately 10% to South Fork Ten Mile River's flow. The water temperature of the tributary was 57 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. See the 2012 Smith Creek Stream Habitat Inventory Report.
19628	0250.00	Left bank seep.
20505	0265.00	Campbell Creek (tributary #02) enters on the right bank. The first 10 feet of the tributary are dry. The water temperature of the tributary was 58 degrees Fahrenheit, the water temperature downstream of the tributary was 55 degrees Fahrenheit, and the water temperature upstream of the confluence was 56 degrees Fahrenheit. See the 2012 Campbell Creek Stream Habitat Inventory Report.
22615	0292.00	Dry left bank tributary.
23333	0300.00	Gravel quarry on the left bank. Seed Orchard Road crossing.
26586	0350.00	Little Valley haul road crosses the channel. The crossing is an 18' wide x 89' long x 15' high steel bridge.
30397	0399.00	Left bank seep.
33146	0447.00	Remnants of railroad trestles.
33896	0454.00	Remnants of railroad trestles.
34079	0457.00	Tributary #03 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 52 degrees Fahrenheit, the water temperature downstream of the tributary was 55 degrees Fahrenheit, and the water temperature upstream of the confluence was 53 degrees Fahrenheit. The slope of the tributary is approximately 15%. The tributary is not accessible to salmonids.
43476	0590.00	Tributary #04 enters on the right bank. The tributary was dry at the mouth. The water temperature of the tributary was 58 degrees Fahrenheit, the water temperature downstream of the tributary was 58 degrees Fahrenheit, and the water temperature upstream of the confluence was 59 degrees Fahrenheit. The slope of the tributary is approximately 15%. The tributary is not accessible to salmonids.

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46381	0633.00	Left bank seep.
47446	0647.00	Churchman Creek (tributary #05) enters on the left bank. It contributes approximately 5% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. See the 2012 Churchman Creek Stream Habitat Inventory Report.
50441	0679.00	Tributary #06 enters on the right bank. It contributes approximately 4% to South Fork Ten Mile River's flow. The water temperature of the tributary was 55 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 57 degrees Fahrenheit. The slope of the tributary is approximately 12%. The tributary is not accessible to salmonids.
52156	0697.00	Remnants of railroad trestles.
52809	0708.00	"Gulch 5" (tributary #07) enters on the right bank. It contributes approximately 3% to South Fork Ten Mile River's flow. The water temperature of the tributary was 57 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 58 degrees Fahrenheit. The slope of the tributary is approximately 4%. The tributary is accessible to salmonids, but no fish were observed.
54601	0732.00	Gauging station. Road 14500 crosses the channel. The crossing is a 13' wide x 49' long x 16' high steel bridge.
55489	0745.00	Tributary #08 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 58 degrees Fahrenheit. The slope of the tributary is approximately 2%. The tributary went dry approximately 12' upstream from the mouth.
57231	0765.00	Remnants of railroad trestles.
59459	0794.00	Tributary #09 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 56 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 57 degrees Fahrenheit. The slope of the tributary was approximately 45%. The tributary is not accessible to salmonids.

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60030	0800.00	Left bank seep.
61876	0822.00	Left bank seep.
63301	0830.00	Remnants of railroad trestle. "Gulch 6" (tributary #10) enters on the right bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 55 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is approximately 45%. The tributary is not accessible to salmonids.
64544	0844.00	Tributary #11 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is 15-20%. The tributary is not accessible to salmonids.
65657	0858.00	Remnants of railroad trestles.
65810	0860.00	"Gulch 7" (tributary #12) enters on the right bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 56 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is approximately 7%. The flow went subsurface approximately 13 feet upstream from the mouth.
67014	0877.00	Right bank seep.
67100	0879.00	Remnants of railroad trestles on left bank.
69933	0919.00	Dry right bank tributary.
70750	0928.00	Tributary #13 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 52 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is 40-50%. The tributary is not accessible to salmonids.
71878	0938.00	A landslide on the left bank measures approximately 40' high x 40' long.
74918	0980.00	Tributary #14 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is 15-25%. There is a 4 foot high plunge approximately 20 feet upstream from the mouth.

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75141	0982.00	Left bank seep. Tributary #15 enters on the left bank. It contributes approximately 2% to South Fork Ten Mile River's flow. The water temperature of the tributary was 52 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is 10-15%. The tributary is not accessible to salmonids.
76536	1000.00	Redwood Creek (tributary #16) enters on the right bank. It contributes approximately 5% to South Fork Ten Mile River's flow. See the 2012 Redwood Creek Stream Habitat Inventory Report.
80489	1074.00	Log debris accumulation (LDA) #01 contains 11 pieces of large woody debris (LWD) and measures 12' high x 35' wide x 18' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 7' wide x 100' long x 2' deep. Fish were observed above the LDA.
81485	1088.00	Tributary #17 enters on the left bank. It contributes less than 1% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream of the tributary was 62 degrees Fahrenheit, and the water temperature upstream of the confluence was 64 degrees Fahrenheit. The slope of the tributary is approximately 10%. The tributary is not accessible to salmonids.
83438	1114.00	Gulch Eleven (tributary #18) enters on the left bank. It contributes approximately 15% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 54 degrees Fahrenheit. See the 2012 Gulch Eleven Stream Habitat Inventory Report.
83974	1121.00	LDA #02 contains 15 pieces of LWD and measures 8.5' high x 33' wide x 15' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 6' wide x 40' long x 1.5' deep. Fish were observed above the LDA.
87955	1195.00	There is a 2.4' high plunge over woody debris.
88385	1201.00	Tributary #19 enters on the left bank. It contributes less than 1% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 57 degrees Fahrenheit. The slope of the tributary is approximately 10%. The tributary is not accessible to salmonids.

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91021	1261.00	LDA #03 contains 14 pieces of LWD and measures 7' high x 40' wide x 23' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to small cobble and measures 9' wide x 20' long x 3' deep. Fish were observed above the LDA.
91071	1262.00	"Gulch 14" (tributary #20) enters on the left bank. The tributary is barely flowing, contributing little water to South Fork Ten Mile River. The water temperature of the tributary was 56 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 56 degrees Fahrenheit. The slope of the tributary is approximately 6%. The tributary is not accessible to salmonids.
92695	1300.00	Tributary #21 enters on the right bank. The tributary is barely flowing; it contributes little water to South Fork Ten Mile River. The water temperature of the tributary was 52 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is approximately 10%. There is a 5 foot high plunge over woody debris approximately 50' upstream from the mouth.
93231	1307.00	LDA #04 contains nine pieces of LWD and measures 6' high x 34' wide x 11' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to gravel and measures 9' wide x 45' long x 3' deep. Fish were observed above the LDA.
94197	1324.00	There is a 30' long x 27' high landslide.
94637	1334.00	Right bank seep.
95019	1339.00	LDA #05 contains 40 pieces of LWD and measures 10' high x 20' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 11' wide x 30' long x 2.5' deep. Fish were observed above the LDA.
95544	1349.00	LDA #06 contains 14 pieces of LWD and measures 10' high x 48' wide x 22' long. There are visible gaps in the LDA. Retained sediment ranges from sand to small cobble and measures 4' wide x 15' long x 2' deep. Fish were observed above the LDA.
96050	1362.00	LDA #07 contains 18 pieces of LWD and measures 8' high x 40' wide x 39' long. Water does not flow through the LDA; the flow is subsurface. There are visible gaps in the LDA. Retained sediment ranges from sand to small cobble and measures 8' wide x 20' long x 2.5' deep. Fish were observed above the LDA.

## South Fork Ten Mile River

97100	1378.00	LDA #08 contains 23 pieces of LWD and measures 7' high x 36' wide x 26' long. Water does not flow through the LDA; the flow is subsurface above it. There are visible gaps in the LDA. Retained sediment ranges from sand to small cobble and measures 7' wide x 30' long x 2' deep. Fish were observed above the LDA.
99036	1420.00	LDA #09 contains six pieces of LWD and measures 10' high x 34' wide x 13' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to gravel and measures 6' wide x 25' long x 3' deep. Fish were observed above the LDA.
100198	1442.00	The channel changes from an F4 to a B4.
100376	1444.00	LDA #10 contains eight pieces of LWD and measures 5' high x 18' wide x 10' long. Water does not flow through the LDA; the flow subsurface for approximately 21 feet above it. There are visible gaps in the LDA. Retained sediment ranges from sand to large cobble and measures 8' wide x 33' long x 2.5' deep. Fish were observed above the LDA.
102515	1504.00	LDA #11 contains seven pieces of LWD and measures 6' high x 25' wide x 7' long. Water does not flow through the LDA; the flow is subsurface above it. There are no visible gaps in the LDA. Retained sediment ranges from silt to small cobble and measures 4' wide x 12' long x 4' deep. Fish were observed above the LDA.
103265	1525.00	LDA #12 contains seven pieces of LWD and measures 5.5' high x 35' wide x 5' long. Water does not flow through the LDA; the flow is subsurface above it. There are no visible gaps in the LDA. Retained sediment ranges from sand to cobble and measures 12' wide x 13' long x 3.5' deep. Fish were observed above the LDA.
104430	1544.00	LDA #13 contains four pieces of LWD and measures 4' high x 21' wide x 6' long. Water does not flow through the LDA; the channel is dry for 39 feet above it. There are visible gaps in the LDA. Retained sediment ranges from sand to small cobble and measures 20' wide x 30' long x 3' deep. Fish were observed above the LDA.
104620	1551.00	The channel changes from a B4 to an A3.
104636	1552.00	LDA #14 contains 12 pieces of LWD and measures 8' high x 25.5' wide x 12' long. Water does not flow through the LDA; the channel is dry for 282' above it. There are no visible gaps in the LDA. Retained sediment ranges from sand to large cobble and measures 8' wide x 35' long x 6' deep. No fish were observed above the LDA.

## South Fork Ten Mile River

- 105251 1561.00 Tributary #22 enters on the left bank. It contributes approximately 1% to South Fork Ten Mile River's flow. The water temperature of the tributary was 54 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 54 degrees Fahrenheit. The slope of the tributary is approximately 20%. The tributary is not accessible to salmonids.
- 105383 1564.00 LDA #15 contains 10 pieces of LWD and measures 5' high x 34' wide x 9' long. Water does not flow through the LDA; the flow is subsurface above it. There are visible gaps in the LDA. Retained sediment ranges from sand to large cobble and measures 4' wide x 45' long x 3' deep.
- 106163 1580.00 End of survey due to diminished habitat. The stream consists of long dry sections and very shallow riffles and runs with bedrock and cobble as the dominant substrates. The slope is over 7% and continues to increase. No fish were observed above LDA #014, 1,000 feet downstream of the end of survey point.

## 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.



## South Fork Ten Mile River

### LEVEL III and LEVEL IV HABITAT TYPES

#### RIFFLE

Low Gradient Riffle	(LGR)	[1.1]	{ 1 }
High Gradient Riffle	(HGR)	[1.2]	{ 2 }

#### CASCADE

Cascade	(CAS)	[2.1]	{ 3 }
Bedrock Sheet	(BRS)	[2.2]	{24}

#### FLATWATER

Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

#### MAIN CHANNEL POOLS

Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}

#### SCOUR POOLS

Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

#### BACKWATER POOLS

Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}

#### ADDITIONAL UNIT DESIGNATIONS

Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401 Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS Legal Description: T19NR15WS09 Latitude: 39:32:24.0N Longitude: 123:44:43.0

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
16	0	DRY	1.0	40	648	0.6									
465	69	FLATWATER	29.2	77	35896	33.6	11.8	0.5	1.1	724	336497	410	190488		15
9	0	NOSURVEY	0.6	23	209	0.2									
608	608	POOL	38.2	80	48425	45.3	18.0	1.0	2.6	1645	1000191	2772	1685648	2248	32
493	57	RIFFLE	31.0	44	21605	20.2	9.9	0.3	0.6	483	238013	156	76685		9
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>			<b>Total Volume (cu.ft.)</b>		
1591	734				106783					1574700			1952821		

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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 (%)
448	46	LGR	28.2	42	18875	17.7	10	0.3	1.1	440	197302	125	56023		6	90
44	10	HGR	2.8	62	2717	2.5	11	0.3	1.4	720	31658	309	13587		16	99
1	1	BRS	0.1	13	13	0.0	5	0.4	0.8	65	65	26	26		80	85
1	0	POW	0.1	78	78	0.1										
291	45	RUN	18.3	58	16936	15.9	12	0.6	2.7	580	168894	378	110129		11	91
173	24	SRN	10.9	109	18882	17.7	12	0.4	2	992	171661	468	80990		23	89
538	538	MCP	33.8	80	43224	40.5	18	1.0	7.8	1672	899642	2788	1499956	2272	32	90
7	7	CCP	0.4	83	581	0.5	15	0.9	4.7	1113	7789	1630	11408	1287	24	95
19	19	STP	1.2	81	1538	1.4	16	0.7	2.9	1315	24980	1420	26977	1122	19	88
10	10	CRP	0.6	121	1206	1.1	21	1.4	6.8	3315	33150	9393	93934	6860	28	52
15	15	LSL	0.9	45	674	0.6	16	0.9	3.9	760	11397	870	13055	715	39	95
6	6	LSR	0.4	44	262	0.2	13	1.0	3.1	577	3463	717	4300	586	41	98
10	10	LSBk	0.6	73	732	0.7	19	1.5	3.9	1448	14484	2475	24750	2196	28	94
1	1	BPB	0.1	46	46	0.0	15	1.0	2.7	690	690	828	828	690	100	100
2	2	DPL	0.1	81	162	0.2	28	1.8	4.4	2298	4596	5220	10440	4091	35	67
16	0	DRY	1.0	40	648	0.6										95
9	0	NS	0.6	23	209	0.2										

Total Units  
1591

Total Units Fully Measured  
734

Total Length (ft.)  
106783

Total Area (sq.ft.)  
1569770

Total Volume (cu.ft.)  
1946403

**Table 3 - Summary of Pool Types**

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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
564	564	MAIN	93	80	45343	94	18.0	1.0	1653	932411	2221	1248369	31
41	41	SCOUR	7	70	2874	6	17.4	1.2	1524	62494	2556	104809	34
3	3	BACKWATER	0	69	208	0	24.0	1.5	1762	5286	2957	8872	57
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>		<b>Total Volume (cu.ft.)</b>	
608	608				48425					1000191		1362050	

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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
538	MCP	88	7	1	181	34	160	30	116	22	74	14
7	CCP	1	0	0	3	43	2	29	1	14	1	14
19	STP	3	0	0	9	47	10	53	0	0	0	0
10	CRP	2	0	0	3	30	1	10	3	30	3	30
15	LSL	2	2	13	4	27	6	40	3	20	0	0
6	LSR	1	0	0	3	50	2	33	1	17	0	0
10	LSBk	2	0	0	0	0	4	40	6	60	0	0
1	BPB	0	0	0	0	0	1	100	0	0	0	0
2	DPL	0	0	0	0	0	1	50	0	0	1	50
<b>Total Units</b>			<b>Total &lt; 1 Foot Max Resid. Depth</b>	<b>Total &lt; 1 Foot % Occurrence</b>	<b>Total 1&lt; 2 Foot Max Resid. Depth</b>	<b>Total 1&lt; 2 Foot % Occurrence</b>	<b>Total 2&lt; 3 Foot Max Resid. Depth</b>	<b>Total 2&lt; 3 Foot % Occurrence</b>	<b>Total 3&lt; 4 Foot Max Resid. Depth</b>	<b>Total 3&lt; 4 Foot % Occurrence</b>	<b>Total &gt;= 4 Foot Max Resid. Depth</b>	<b>Total &gt;= 4 Foot % Occurrence</b>
608			9	1	203	33	187	31	130	21	79	13

Mean Maximum Residual Pool Depth (ft.): 2.6

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Dry Units: 16

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09 Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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
448	46	LGR	0	7	14	0	19	3	0	57	0
44	10	HGR	0	8	22	0	0	0	0	70	0
1	1	BRS	0	0	0	0	0	10	70	0	20
493	57	TOTAL RIFFLE	0	7	15	0	15	3	4	56	1
1	0	POW									
291	45	RUN	6	35	11	1	19	6	0	22	0
173	24	SRN	2	32	29	5	7	7	0	19	0
465	69	TOTAL FLAT	4	34	19	2	14	6	0	20	0
538	538	MCP	9	27	32	2	12	2	0	13	2
7	7	CCP	11	41	32	4	10	0	2	0	0
19	19	STP	8	39	32	4	4	2	0	9	0
10	10	CRP	8	32	12	1	18	20	0	5	6
15	15	LSL	5	29	48	2	7	2	0	6	0
6	6	LSR	21	21	15	34	0	7	0	2	0
10	10	LSBk	4	6	7	0	2	0	0	43	40
1	1	BPB	0	10	10	0	0	0	0	60	20
2	2	DPL	3	8	10	10	33	5	0	33	0
608	608	TOTAL POOL	9	27	31	3	11	3	0	13	3
9	0	NS									
1591	734	TOTAL	9	27	30	3	11	3	0	15	3

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Dry Units: 16

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09 Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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
448	46	LGR	0	0	72	28	0	0	0
44	10	HGR	0	0	70	30	0	0	0
1	1	BRS	0	0	0	0	0	0	100
1	0	POW	0	0	0	0	0	0	0
291	45	RUN	2	11	73	11	2	0	0
173	24	SRN	0	0	92	4	4	0	0
538	538	MCP	3	14	74	8	1	0	0
7	7	CCP	0	14	71	14	0	0	0
19	19	STP	5	5	74	11	5	0	0
10	10	CRP	0	20	70	10	0	0	0
15	15	LSL	0	20	60	20	0	0	0
6	6	LSR	0	0	100	0	0	0	0
10	10	LSBk	0	10	50	40	0	0	0
1	1	BPB	0	0	0	0	0	100	0
2	2	DPL	0	0	100	0	0	0	0

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

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
90	33	67	1	96	96

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

Open units represent habitat units with zero canopy cover.



### Table 8 - Fish Habitat Inventory Data Summary

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Survey Length (ft.): 106783

Main Channel (ft.): 106178

Side Channel (ft.): 605

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

#### Summary of Fish Habitat Elements By Stream Reach

##### STREAM REACH: 1

Channel Type:	F4	Canopy Density (%):	89.2	Pools by Stream Length (%):	47.0		
Reach Length (ft.):	100198	Coniferous Component (%):	29.0	Pool Frequency (%):	39.0		
Riffle/Flatwater Mean Width (ft.):	11.4	Hardwood Component (%):	71.0	Residual Pool Depth (%):			
BFW:		Dominant Bank Vegetation:	Hardwood Trees	< 2 Feet Deep:	32		
Range (ft.):	16 to 70	Vegetative Cover (%):	95.5	2 to 2.9 Feet Deep:	32		
Mean (ft.):	33	Dominant Shelter:	Large Woody Debris	3 to 3.9 Feet Deep:	23		
Std. Dev.:	9	Dominant Bank Substrate Type:	Sand/Silt/Clay	>= 4 Feet Deep:	14		
Base Flow (cfs.):	3.1	Occurrence of LWD (%):	26	Mean Max Residual Pool Depth (ft.):	2.7		
Water (F):	50 - 64	Air (F):	50 - 78	LWD per 100 ft.:	Mean Pool Shelter Rating:	33	
Dry Channel (ft):	79	Riffles:	2				
		Pools:	5				
		Flat:	2				
Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 1	Gravel: 85	Sm Cobble: 13	Lg Cobble: 1	Boulder: 0	Bedrock: 0
Embeddedness Values (%):	1. 56.3	2. 42.9	3. 0.9	4. 0.0	5. 0.0		

##### STREAM REACH: 2

Channel Type:	B4	Canopy Density (%):	97.5	Pools by Stream Length (%):	19.7		
Reach Length (ft.):	4422	Coniferous Component (%):	80.7	Pool Frequency (%):	33.0		
Riffle/Flatwater Mean Width (ft.):	8.3	Hardwood Component (%):	19.3	Residual Pool Depth (%):			
BFW:		Dominant Bank Vegetation:	Coniferous Trees	< 2 Feet Deep:	75		
Range (ft.):	16 to 30	Vegetative Cover (%):	97.6	2 to 2.9 Feet Deep:	19		
Mean (ft.):	23	Dominant Shelter:	Large Woody Debris	3 to 3.9 Feet Deep:	6		
Std. Dev.:	4	Dominant Bank Substrate Type:	Sand/Silt/Clay	>= 4 Feet Deep:	0		
Base Flow (cfs.):	3.1	Occurrence of LWD (%):	40	Mean Max Residual Pool Depth (ft.):	1.8		
Water (F):	52 - 55	Air (F):	52 - 65	LWD per 100 ft.:	Mean Pool Shelter Rating:	16	
Dry Channel (ft):	114	Riffles:	2				
		Pools:	14				
		Flat:	7				
Pool Tail Substrate (%):	Silt/Clay: 3	Sand: 3	Gravel: 39	Sm Cobble: 44	Lg Cobble: 11	Boulder: 0	Bedrock: 0
Embeddedness Values (%):	1. 13.9	2. 83.3	3. 2.8	4. 0.0	5. 0.0		

### Summary of Fish Habitat Elements By Stream Reach

**STREAM REACH: 3**

Channel Type: A3	Canopy Density (%): 98.8	Pools by Stream Length (%): 10.5
Reach Length (ft.): 1558	Coniferous Component (%): 99.2	Pool Frequency (%): 16.7
Riffle/Flatwater Mean Width (ft.): 4.6	Hardwood Component (%): 0.8	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 80
Range (ft.): 18 to 20	Vegetative Cover (%): 99.3	2 to 2.9 Feet Deep: 20
Mean (ft.): 19	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 0
Std. Dev.: 1	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 3.1	Occurrence of LWD (%): 31	Mean Max Residual Pool Depth (ft.): 1.7
Water (F): 54 - 55 Air (F): 57 - 59	LWD per 100 ft.:	Mean Pool Shelter Rating: 8
Dry Channel (ft): 455	Riffles: 4	
	Pools: 7	
	Flat: 5	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 60 Sm Cobble: 20 Lg Cobble: 20 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 20.0 2. 60.0 3. 20.0 4. 0.0 5. 0.0		

**Table 9 - Mean Percentage of Dominant Substrate and Vegetation**

Stream Name: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

**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	29	41	4.8
Boulder	16	16	2.2
Cobble / Gravel	284	270	37.7
Sand / Silt / Clay	405	407	55.3

**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	22	25	3.2
Brush	6	8	1.0
Hardwood Trees	424	416	57.2
Coniferous Trees	282	285	38.6
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 1

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

StreamName: South Fork Ten Mile River

LLID: 1237454395401

Drainage: Rockport

Survey Dates: 7/30/2012 to 9/12/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T19NR15WS09

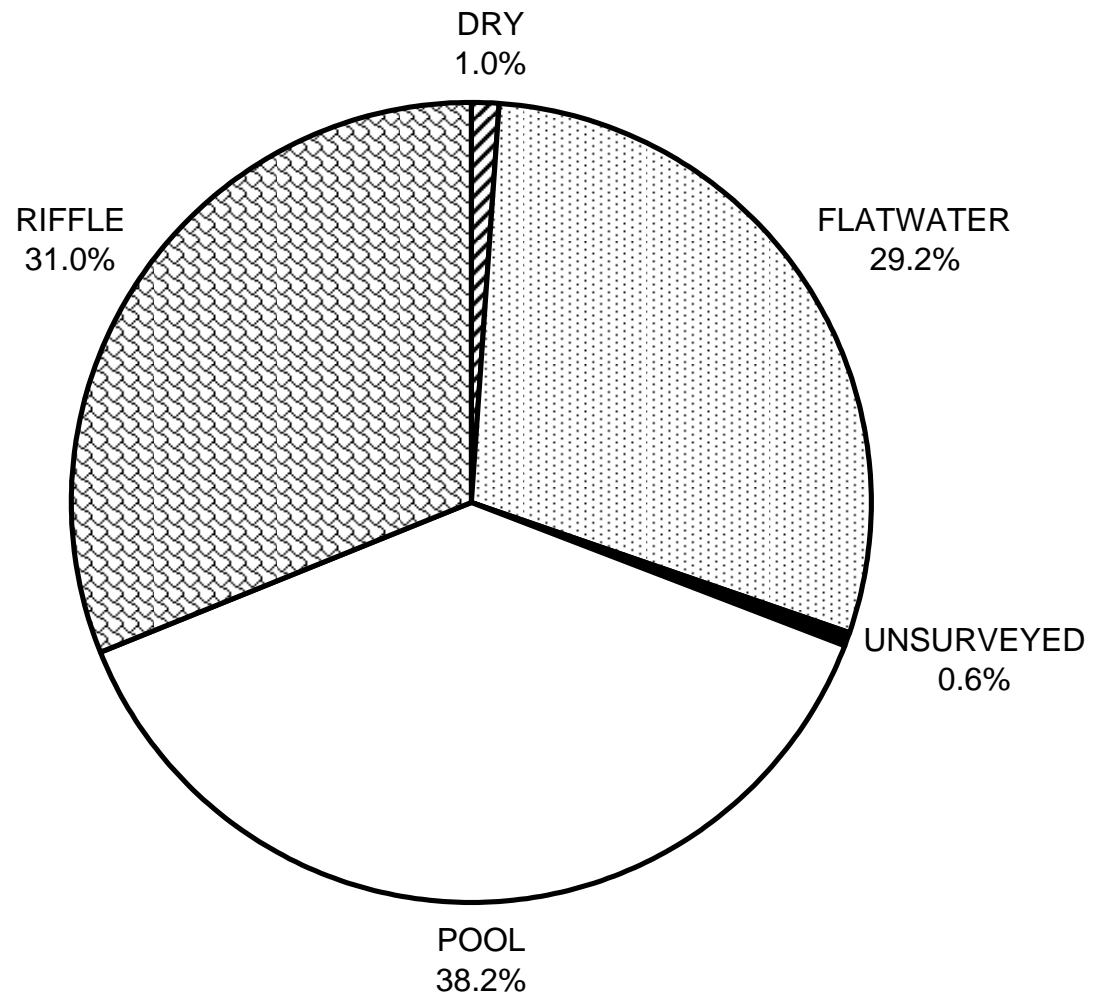
Latitude: 39:32:24.0N

Longitude: 123:44:43.0W

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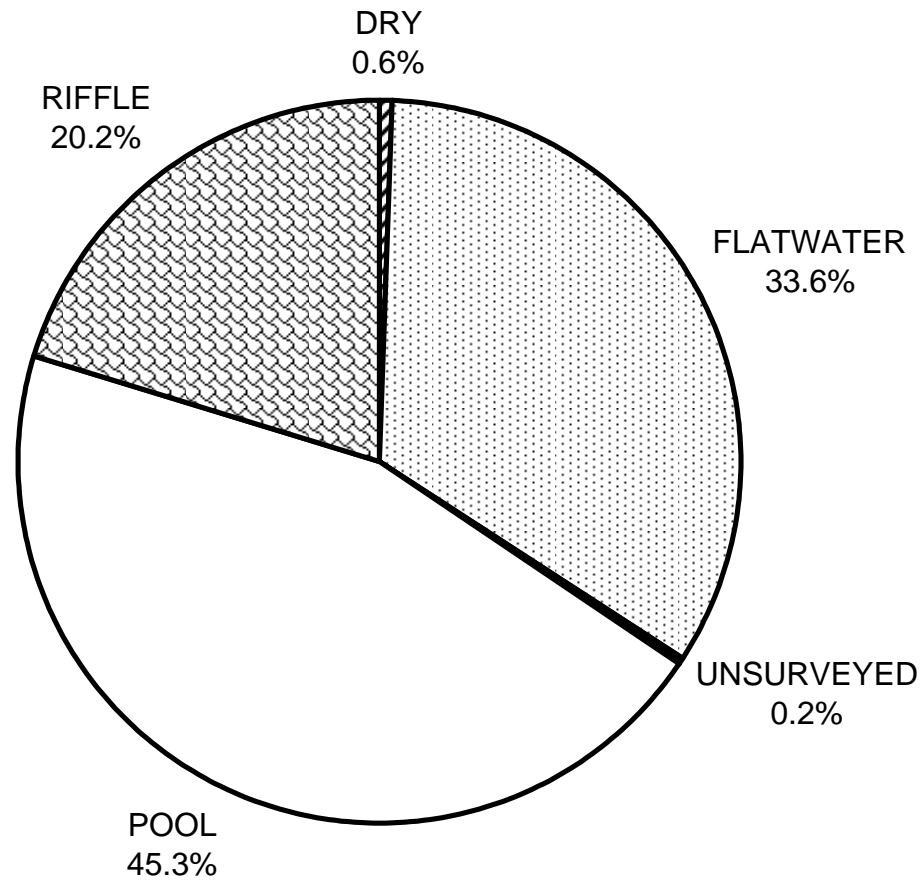
	<b>Riffles</b>	<b>Flatwater</b>	<b>Pools</b>
UNDERCUT BANKS (%)	0	4	9
SMALL WOODY DEBRIS (%)	7	34	27
LARGE WOODY DEBRIS (%)	15	19	31
ROOT MASS (%)	0	2	3
TERRESTRIAL VEGETATION (%)	15	14	11
AQUATIC VEGETATION (%)	3	6	3
WHITEWATER (%)	4	0	0
BOULDERS (%)	56	20	13
BEDROCK LEDGES (%)	1	0	3

# SOUTH FORK TEN MILE RIVER 2012 HABITAT TYPES BY PERCENT OCCURRENCE



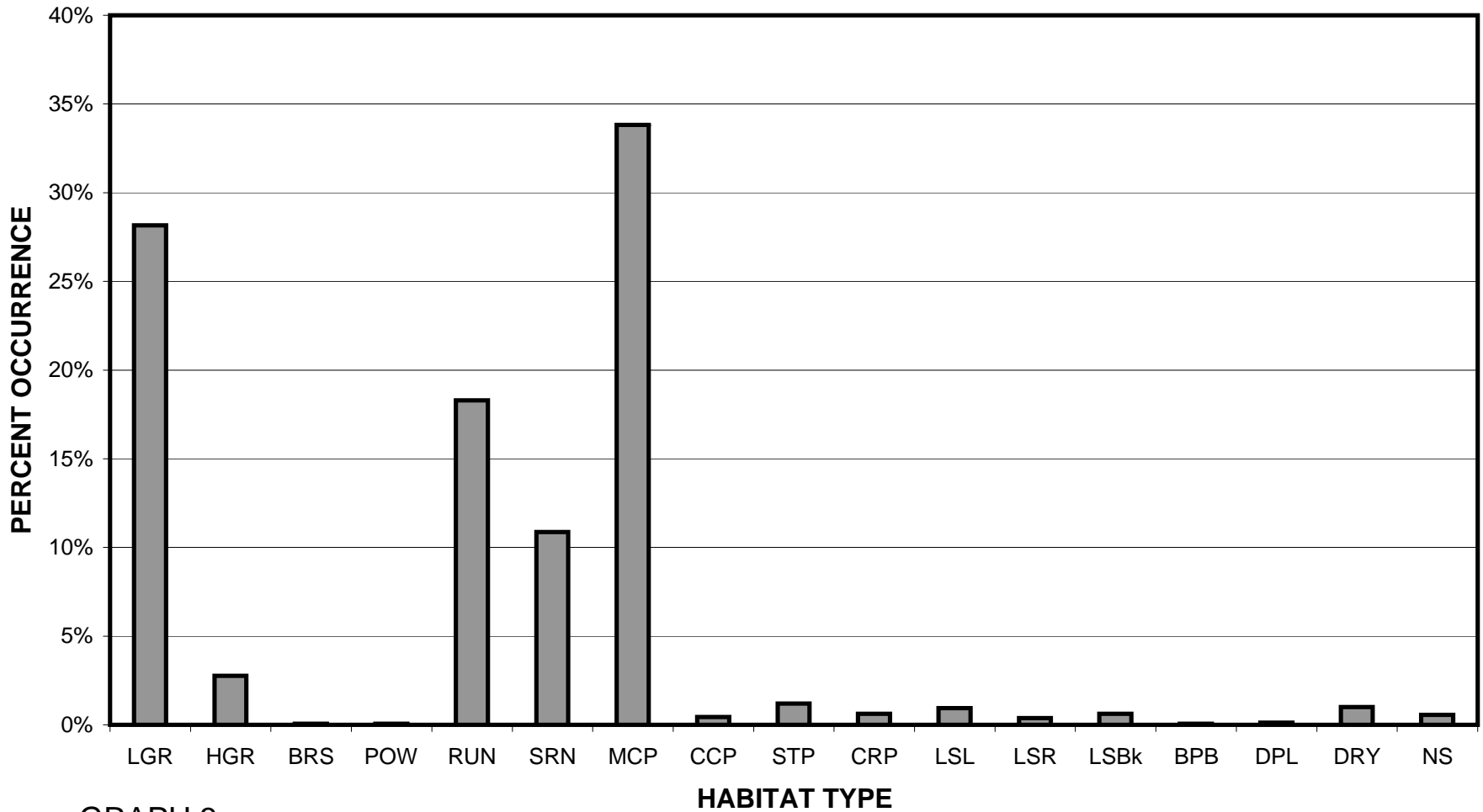
GRAPH 1

# SOUTH FORK TEN MILE RIVER 2012 HABITAT TYPES BY PERCENT TOTAL LENGTH



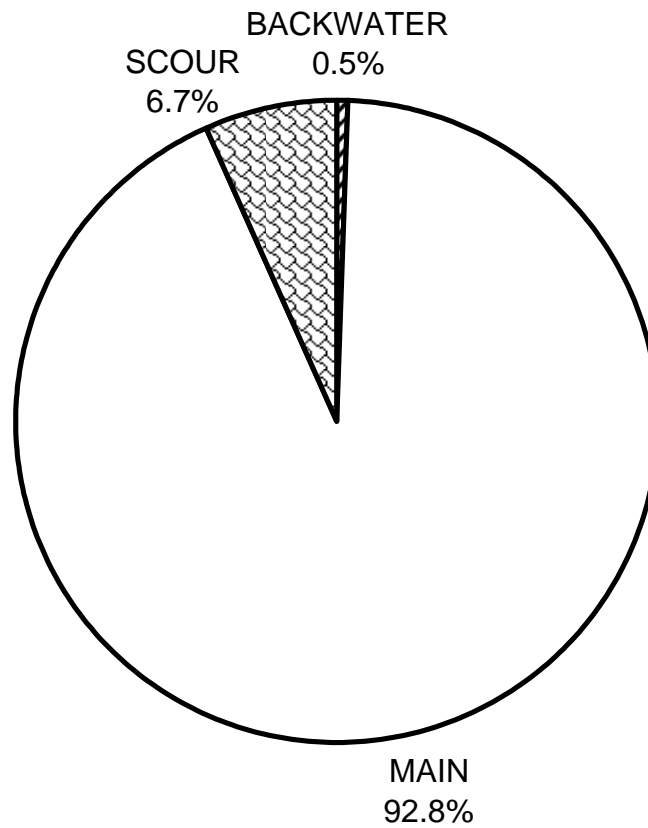
GRAPH 2

# SOUTH FORK TEN MILE RIVER 2012 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 3

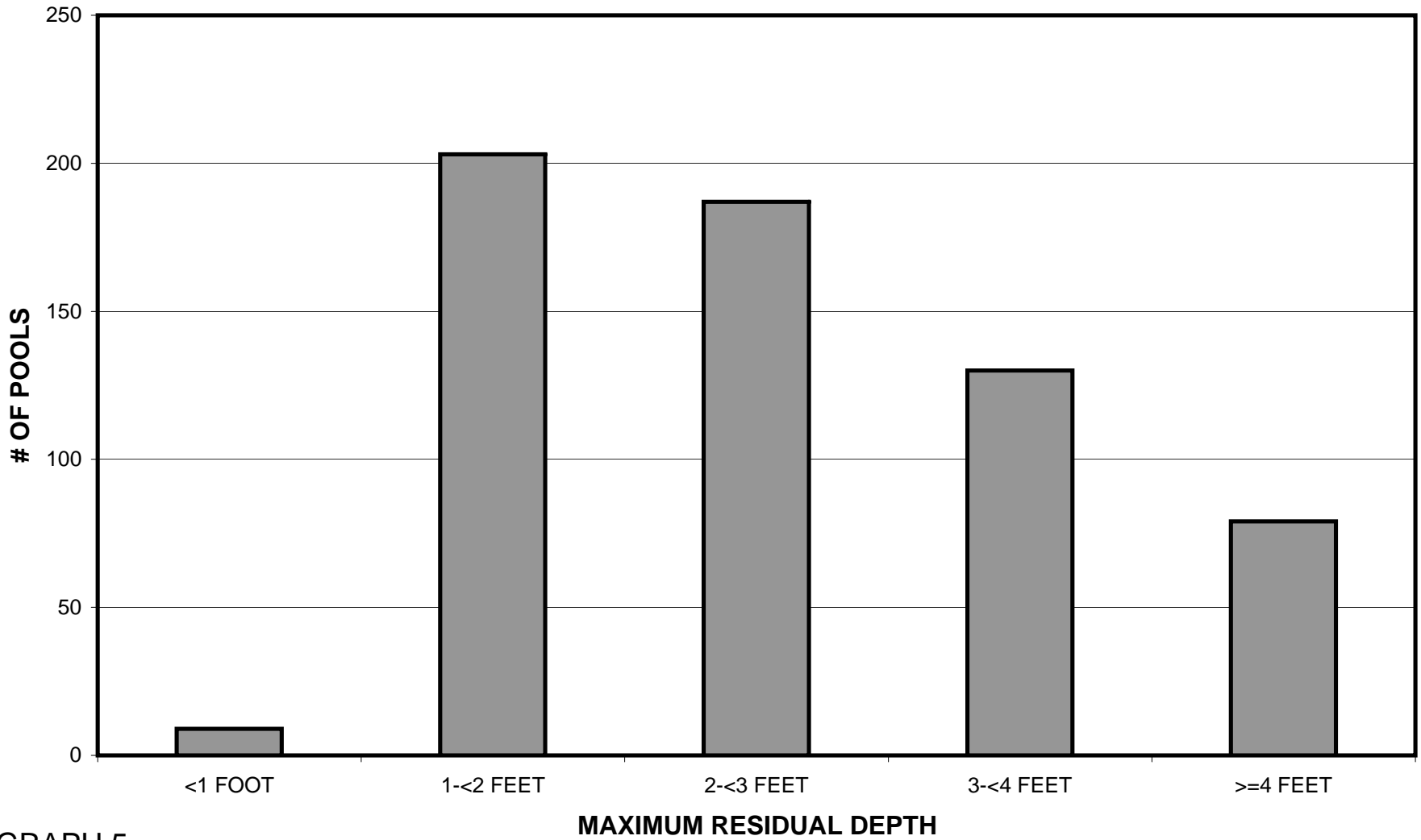
# SOUTH FORK TEN MILE RIVER 2012 POOL TYPES BY PERCENT OCCURRENCE



GRAPH 4

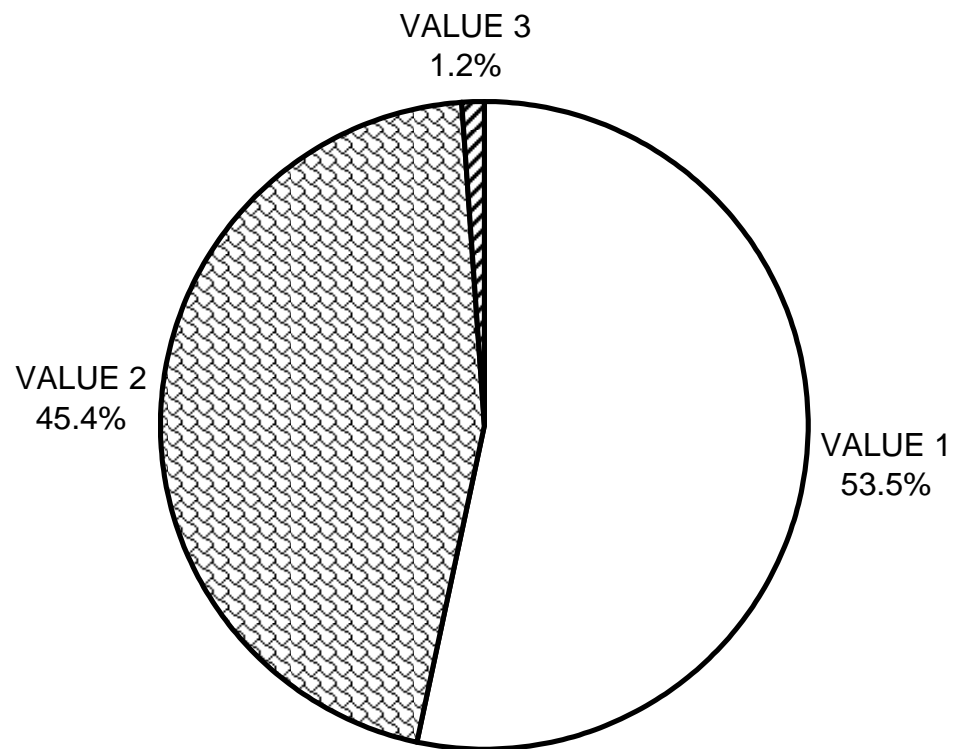


# SOUTH FORK TEN MILE RIVER 2012 MAXIMUM DEPTH IN POOLS



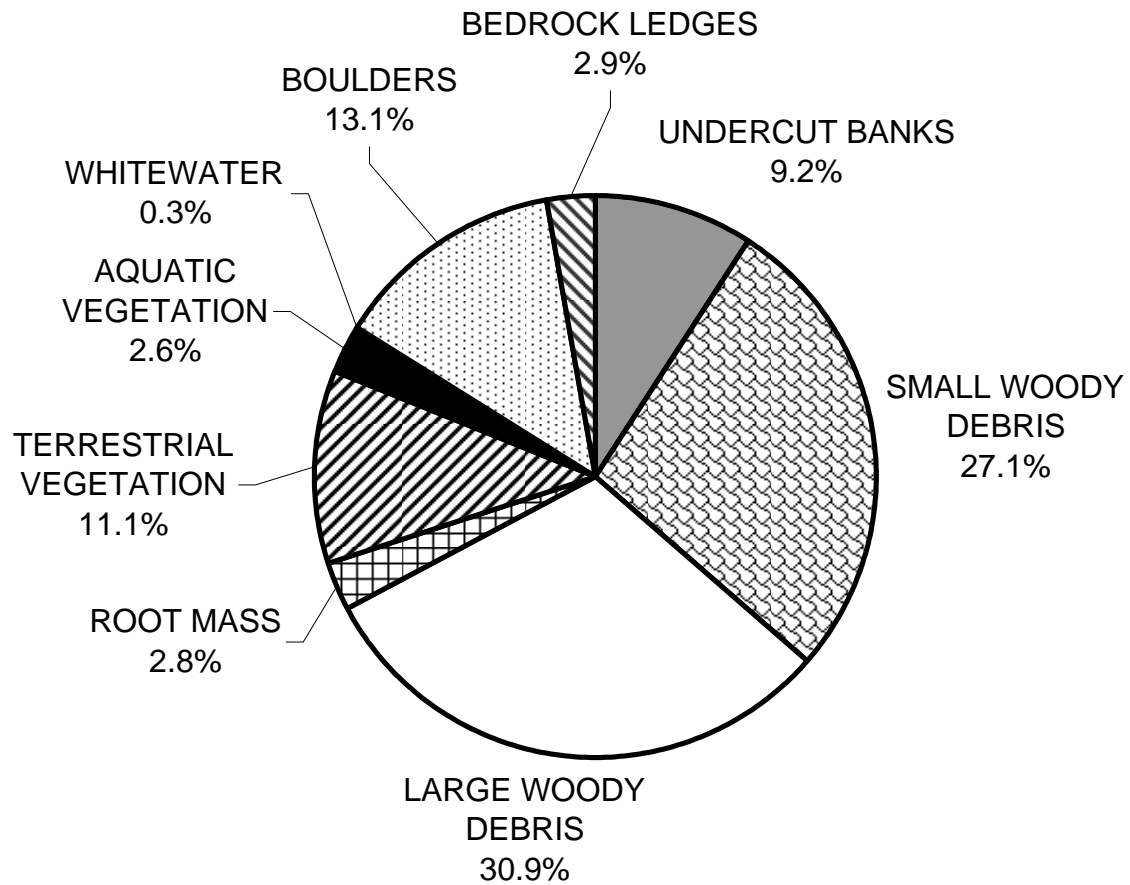
GRAPH 5

# SOUTH FORK TEN MILE RIVER 2012 PERCENT EMBEDDEDNESS



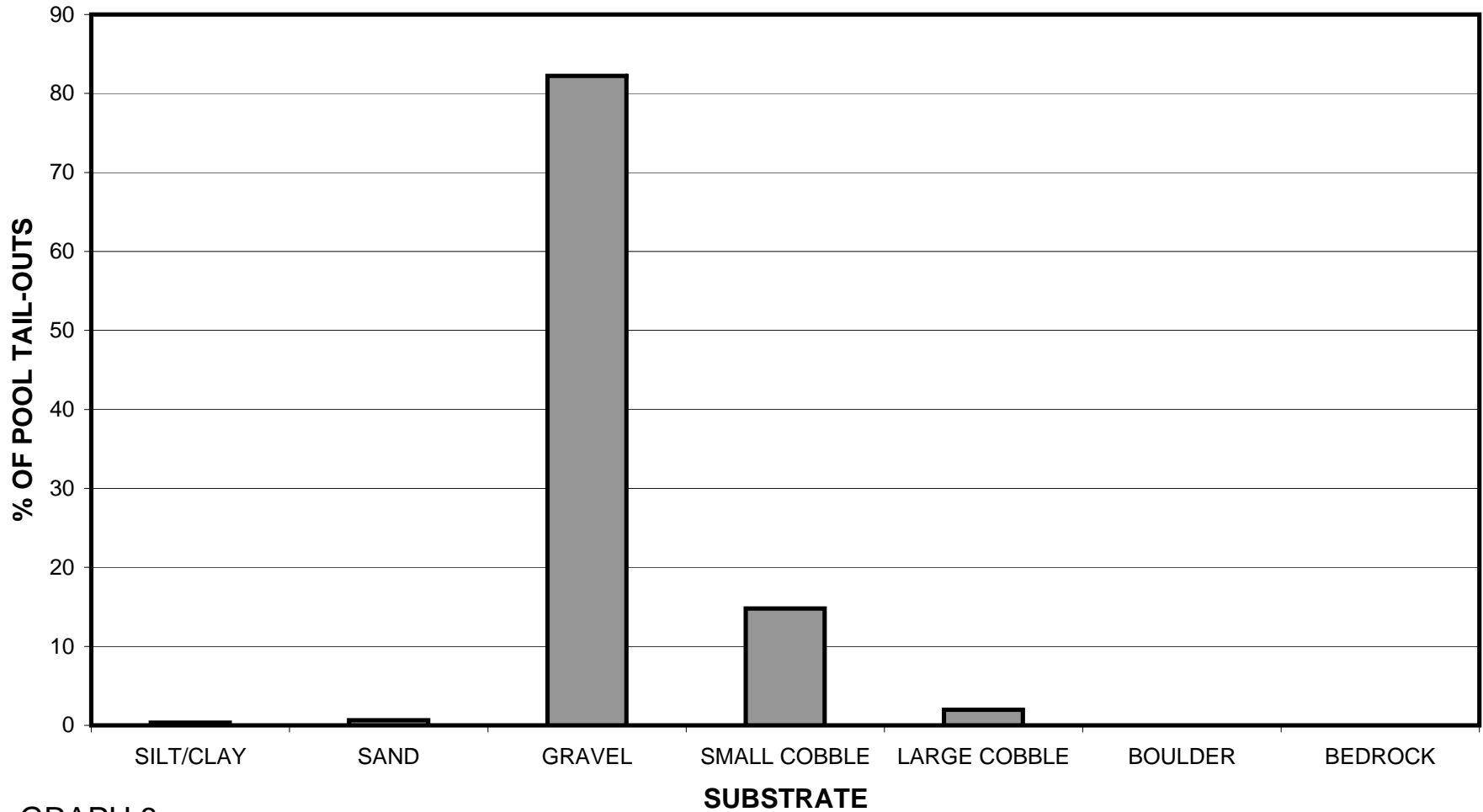
GRAPH 6

# SOUTH FORK TEN MILE RIVER 2012 MEAN PERCENT COVER TYPES IN POOLS



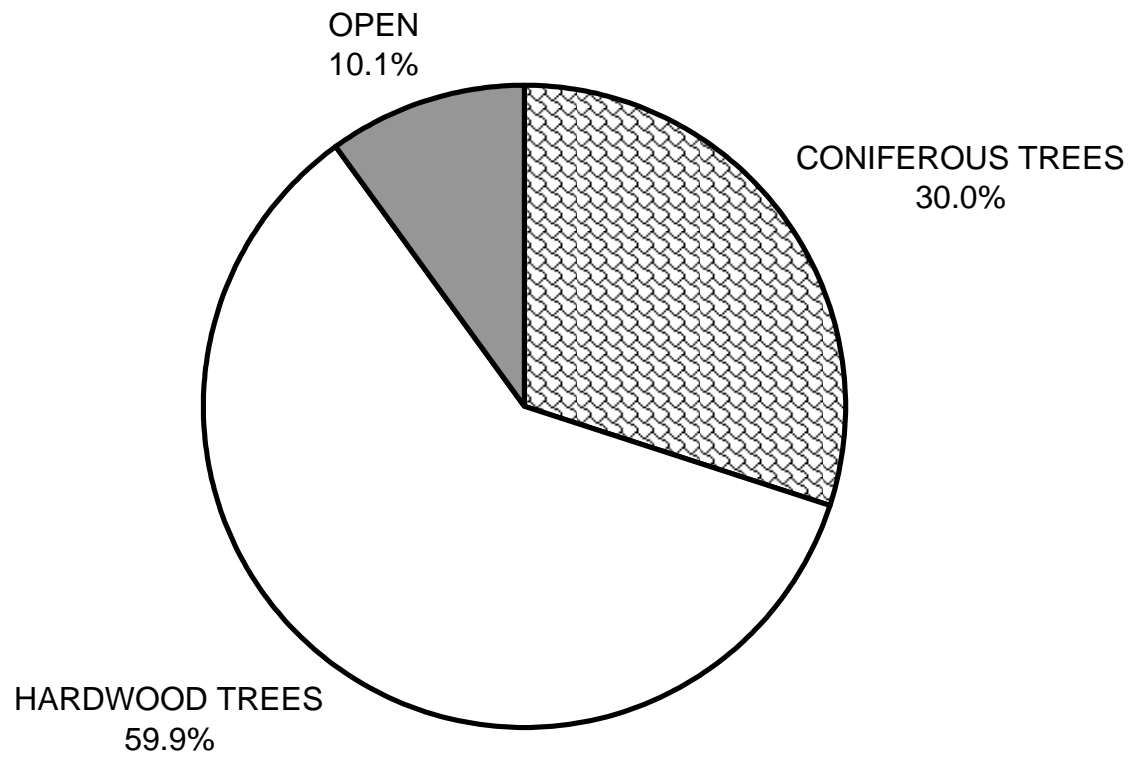
GRAPH 7

# SOUTH FORK TEN MILE RIVER 2012 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



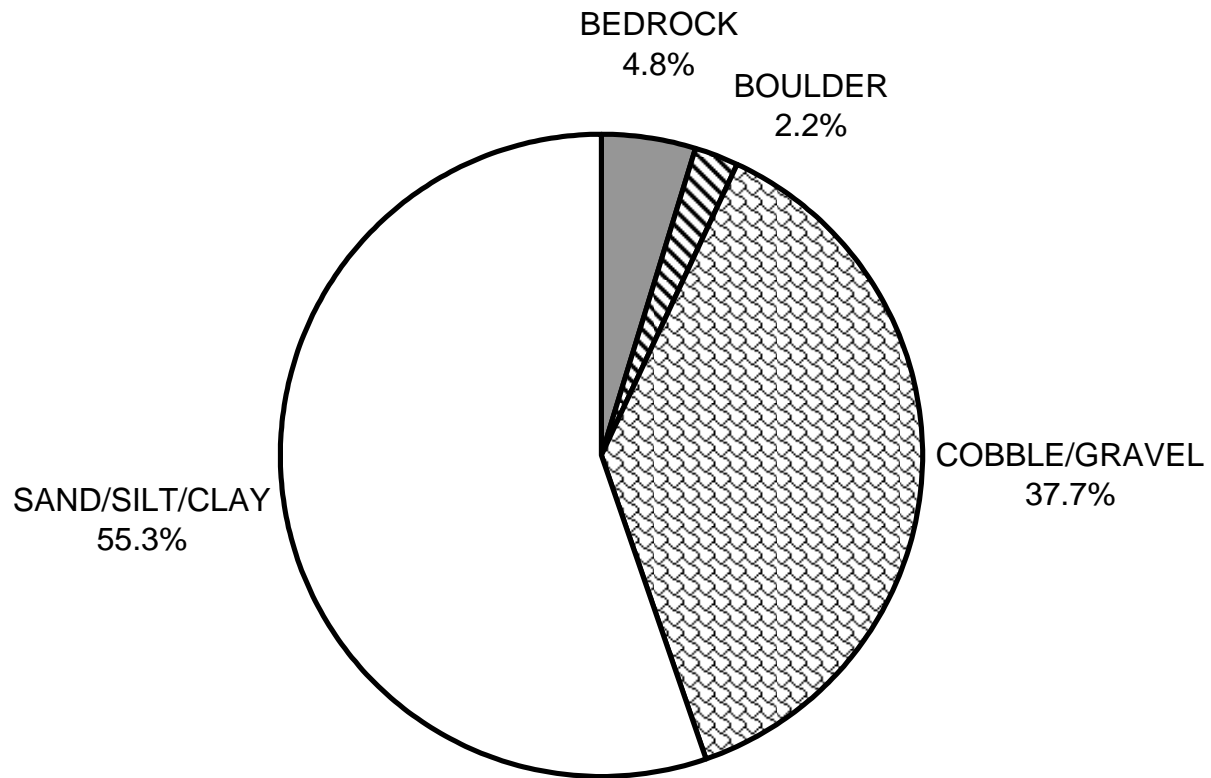
GRAPH 8

# SOUTH FORK TEN MILE RIVER 2012 MEAN PERCENT CANOPY



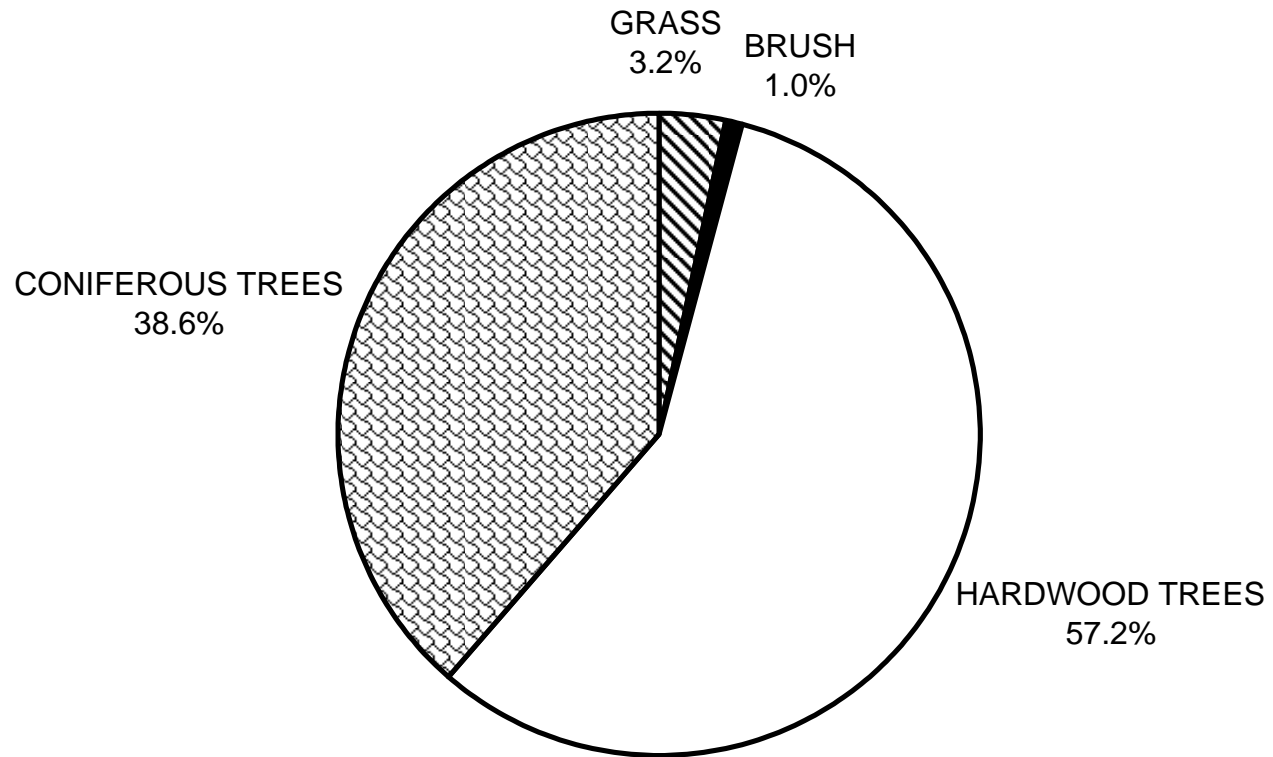
GRAPH 9

# SOUTH FORK TEN MILE RIVER 2012 DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

# SOUTH FORK TEN MILE RIVER 2012 DOMINANT BANK VEGETATION IN SURVEY REACH

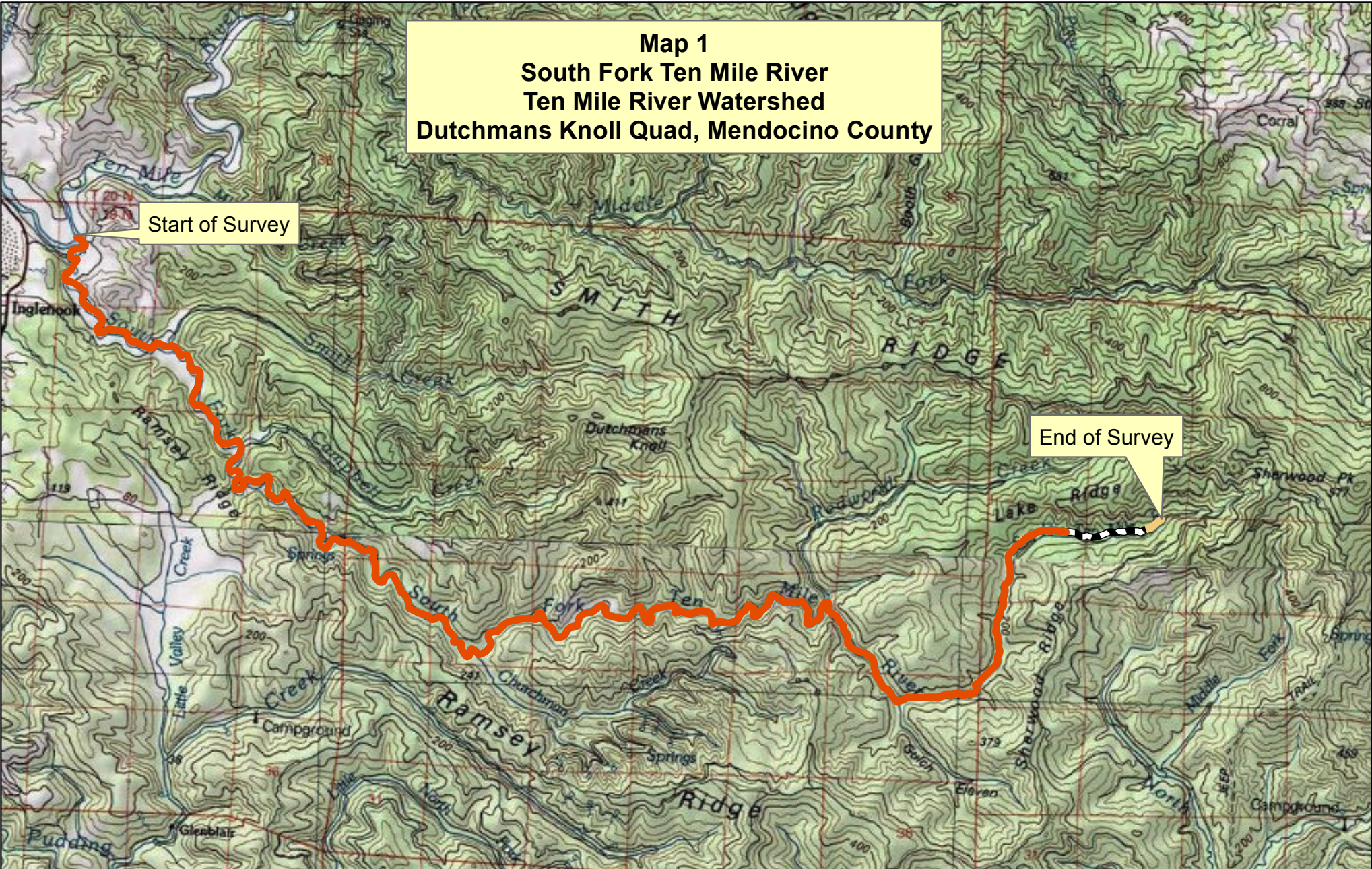





GRAPH 11

**Map 1**  
**South Fork Ten Mile River**  
**Ten Mile River Watershed**  
**Dutchmans Knoll Quad, Mendocino County**

Start of Survey

End of Survey



-  Reach 1, F4 Channel Type
-  Reach 2, B4 Channel Type
-  Reach 3, A3 Channel Type

