

STREAM INVENTORY REPORT

Middle Fork Ten Mile River

INTRODUCTION

A stream inventory was conducted September 12 to October 16, 2012 on Middle Fork Ten Mile River. The survey began at the confluence with Ten Mile River and extended upstream 13.8 miles. Stream inventories and reports were also completed for seven tributaries to Middle Fork Ten Mile River.

The Middle 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 Middle 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

Middle 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). Middle Fork Ten Mile River's legal description at the confluence with Ten Mile River is T20N R17W S25. Its location is 39.5721 degrees north latitude 123.7099 degrees west longitude, LLID number 1237087395722. Middle Fork Ten Mile River is a third order stream and has approximately 15.7 miles of blue line stream according to the USGS Dutchmans Knoll 7.5 minute quadrangle. Middle Fork Ten Mile River drains a watershed of approximately 33.4 square miles. Elevations range from about 50 feet at the mouth of the creek to 1,700 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 Georgia-Pacific Industrial Road north of Fort Bragg, CA.

METHODS

The habitat inventory conducted in Middle Fork Ten Mile River follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Wildlife (CDFW) personnel that conducted the inventory were trained in standardized habitat inventory methods by the 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 Middle 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". Middle Fork Ten Mile River habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's

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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 Middle 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. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is classified according to a list of nine cover types. In Middle 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. The shelter rating is then calculated for each fully-described habitat unit by multiplying shelter value and percent 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 Middle 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 withstand winter flows. In Middle Fork Ten Mile River, the dominant composition type and the

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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 Middle Fork Ten Mile River. In addition, underwater observations were made at nine 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
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)

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- 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 Middle 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 September 12 to October 16, 2012 was conducted by C. Tiffany, M. Zee, T. Anderson, and R. Spencer (CDFW). The total length of the stream surveyed was 72,830 feet with an additional 109 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 5.1 cfs on October 22, 2012.

Middle Fork Ten Mile River is a C4 channel type for 23,143 feet of the stream surveyed (Reach 1), an F4 channel type for 23,037 feet of the stream surveyed (Reach 2), a B3 channel type for 24,001 feet of the stream surveyed (Reach 3), and an A2 channel type for 2,649 feet of the stream surveyed (Reach 4). C4 channels are meandering point-bar, riffle/pool, alluvial channels with broad well defined floodplain on low gradients and gravel-dominant substrates. F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. B3 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks and cobble-dominant substrates. A2 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and boulder-dominant substrates.

Water temperatures taken during the survey period ranged from 46 to 58 degrees Fahrenheit. Air temperatures ranged from 42 to 67 degrees Fahrenheit.

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Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 39% riffle units, 36% pool units, and 25% flatwater units (Graph 1). Based on total length of Level II habitat types there were 39% pool units, 32% riffle units, and 29% flatwater 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, 33%; low gradient riffle units, 28%; and run units, 20% (Graph 3). Based on percent total length, mid-channel pool units made up 34%, low gradient riffle units 21%, and run units 19%.

A total of 283 pools were identified (Table 3). Main channel pools were the most frequently encountered at 99% (Graph 4), and comprised 100% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. One hundred sixty-six of the 283 pools (59%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 283 pool tail-outs measured, 84 had a value of 1 (29.7%); 132 had a value of 2 (46.6%); 58 had a value of 3 (20.5%); six had a value of 4 (2.1%); three had a value of 5 (1.1%) (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 not suitable 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 3, flatwater habitat types had a mean shelter rating of 5, and pool habitats had a mean shelter rating of 10 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 20. Main channel pools had a mean shelter rating of 10 (Table 3).

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

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 61% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 21% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Middle Fork Ten Mile River was 91%. Nine percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 73% and 27%, respectively. Graph 9 describes the mean percent canopy in Middle Fork Ten Mile River.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 97%. The dominant elements composing the structure of the

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stream banks consisted of 69% sand/silt/clay, 20% bedrock, 7% cobble/gravel, and 5% boulders (Graph 10). Deciduous trees were the dominant vegetation type observed in 73% of the units surveyed. Additionally, 21% of the units surveyed had coniferous trees as the dominant vegetation type, and 6% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at nine sites for species composition and distribution in Middle Fork Ten Mile River on October 24, 2012. The sites were sampled by I. Mikus and B. Leonard (CDFW).

In Reach 1, which comprised the first 23,143 feet of stream, one site was sampled. The reach site yielded three young-of-the-year (YOY) steelhead/rainbow trout (SH/RT), one age 1+ SH/RT, and five YOY coho salmon.

In Reach 3, eight sites were sampled starting approximately 59,638 from the confluence with Ten Mile River and continuing upstream 5,891 feet. The reach sites yielded 54 YOY SH/RT, eight age 1+ SH/RT, eight age 2+ SH/RT, and three YOY coho salmon.

The following chart displays the information yielded from these sites:

2012 Middle 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: C4 Channel Type									
10/24/12	1	152	Pool	17,021	3	1	0	5	0
Reach 3: B3 Channel Type									
10/24/12	2	619	Pool	59,694	11	2	0	1	0
	3	621	Pool	59,835	4	1	0	1	0
	4	629	Pool	60,761	5	1	0	0	0
	5	632	Pool	60,811	7	1	1	0	0
	6	636	Pool	61,212	4	0	2	0	0
	7	638	Pool	61,344	6	2	1	1	0
	8	678	Pool	65,442	8	1	2	0	0
	9	679	Pool	65,529	9	0	2	0	0

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DISCUSSION

Middle Fork Ten Mile River is a C4 channel type for the first 23,143 feet of stream surveyed, an F4 channel type for the next 23,037 feet, a B3 channel type for the next 24,001 feet, and an A2 channel type for the remaining 2,649 feet. The suitability of C4, F4, B3, and A2 channel types for fish habitat improvement structures is as follows: C4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover. F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover. B3 channel types are excellent for plunge weirs, boulder clusters and bank-placed boulders, single and opposing wing-deflectors, and log cover. A2 channels are generally not suitable for fish habitat improvement projects.

The water temperatures recorded on the survey days September 12 to October 16, 2012 ranged from 46 to 58 degrees Fahrenheit. Air temperatures ranged from 42 to 67 degrees Fahrenheit. This is a good water temperature range for salmonids. To make any conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

Flatwater habitat types comprised 29% of the total length of this survey, riffles 32%, and pools 39%. One hundred sixty-six of the 283 (59%) pools had a maximum residual depth greater than three feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth order streams, a primary pool is defined to have a maximum residual depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

Two hundred sixteen of the 283 pool tail-outs measured had embeddedness ratings of 1 or 2. Sixty-four of the pool tail-outs had embeddedness ratings of 3 or 4. Three 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.

Two hundred thirty-three of the 283 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 10. 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 small woody debris in Middle Fork Ten Mile River. Small woody debris is the dominant cover type in pools followed by boulders. 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 91%. Reach 1 had a canopy density of 89%, Reach 2 had a canopy density of 93%, Reach 3 had a canopy density of 93%, and Reach 4 had a canopy density of 91%. The percentage of right and left bank covered with vegetation was

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97% and 97%, respectively.

RECOMMENDATIONS

- 1) Middle 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) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from small 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 a C4.
131	0003.00	A young-of-the-year (YOY) salmonid was observed from the bank.
13072	0117.00	Tributary #01 enters on the left bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is approximately 20%. It is not accessible to salmonids.
17108	0152.00	Bear Haven Creek (tributary #02) enters on the right bank. It contributes approximately 6% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. For more information, see the 2012 Bear Haven Creek Stream Habitat Inventory Report.
17720	0159.00	Erosion site measures approximately 20' long x 35' high.

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18604	0168.00	Tributary #03 enters on the left bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is approximately 7%. The first 70' of the tributary are accessible to salmonids, but no fish were observed.
23143	0219.00	The channel changes from a C4 to an F4.
24333	0232.00	Tributary #04 enters on the left bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is approximately 15%. The tributary may be accessible to salmonids during higher flows, but no fish were observed.
26201	0251.00	Seep.
26316	0252.00	Ten Mile haul road crosses the channel. The crossing is a 10' wide x 61' long x 17.5' high steel bridge.
26983	0259.00	Tributary #05 enters on the right bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 52 degrees Fahrenheit. The slope of the tributary is approximately 30%. The tributary is not accessible to salmonids.
31560	0304.00	Tributary #06 enters on the right bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 7%. The tributary is accessible to salmonids, but no fish were observed.
32883	0315.00	Ten Mile haul road crosses the channel. The crossing is an 18' wide x 90' long x 25' high steel bridge.
35391	0349.00	Little Bear Haven Creek (tributary #07) enters on the right bank. It contributes approximately 4% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit, the water temperature downstream of the tributary was 50 degrees Fahrenheit, and the water temperature upstream of the confluence was 49 degrees Fahrenheit. For more information, see the 2012 Little Bear Haven Creek Stream Habitat Inventory Report.

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38440	0379.00	Tributary #08 enters on the left bank. It contributes approximately 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 15%. The tributary is not accessible to salmonids.
43110	0440.00	"Pneumonia Gulch" (tributary #09) enters on the left bank. It contributes approximately 2% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 49 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 49 degrees Fahrenheit. The slope of the tributary is 4-6%. The first 400 feet of the tributary are accessible to salmonids. Salmonids were observed in the tributary.
45200	0462.00	"Gulch 16" (tributary #10) enters on the right bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 20%. The tributary is not accessible to salmonids.
46180	0474.00	The channel changes from an F4 to a B3.
46515	0478.00	Tributary #11 enters on the left bank. It contributes approximately 3% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 49 degrees Fahrenheit, the water temperature downstream of the tributary was 49 degrees Fahrenheit, and the water temperature upstream of the confluence was 50 degrees Fahrenheit. The slope of the tributary is 10-15%. There is a 12' high plunge approximately 20' upstream from the mouth.
47126	0482.00	There is a 150' high x 45' long landslide.
47852	0489.00	Tributary #12 enters on the right bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 20%. The tributary is not accessible to salmonids.
54275	0561.00	"Finger Gulch" (tributary #13) enters on the left bank. It contributes approximately 4% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 15%. The

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tributary is not accessible to salmonids.

57508	0592.00	"Gulch 21" Tributary #14 enters on the left bank. It contributes approximately 2% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 50 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is 30-40%. The tributary is not accessible to salmonids.
59645	0619.00	"Gulch 23" (tributary #15) enters on the right bank. It contributes less than 1% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 51 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 50 degrees Fahrenheit. The slope of the tributary is approximately 8%. The tributary is accessible to salmonids, but no fish were observed.
67580	0715.00	"Falk Gulch" (tributary #16) enters on the left bank. It contributes less than 1% to Middle 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 51 degrees Fahrenheit. The slope of the tributary is approximately 12%. The first 70 feet of the tributary are accessible to salmonids.
69094	0736.00	"Fox Gulch" (tributary #17) enters on the left bank. It contributes approximately 3% to Middle Fork Ten Mile River's flow. The water temperature of the tributary was 53 degrees Fahrenheit; the water temperature downstream and upstream of the tributary was 53 degrees Fahrenheit. The slope of the tributary is 2-3%. The tributary is accessible to salmonids. Salmonids were observed in the tributary.
70137	0748.00	Tributary #18 enters on the right bank. It contributes less than 1% to Middle 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 55 degrees Fahrenheit. The slope of the tributary is 4-6%. The tributary is accessible to salmonids. Salmonids were observed in the tributary.
70181	0749.00	The channel changes from a B3 to an A2.
72766	0781.00	There is a 2' high plunge.
72797	0782.00	End of survey at 25' high bedrock waterfall. Water fall is located at 39.54014 degrees north, 123.54196 degrees west.

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REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

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LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE

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

CASCADE

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

FLATWATER

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

MAIN CHANNEL POOLS

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

SCOUR POOLS

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

BACKWATER POOLS

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

ADDITIONAL UNIT DESIGNATIONS

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

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

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722 Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS Legal Description: T20NR17WS25 Latitude: 39:34:20.0N Longitude: 123:42:31.0

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
197	28	FLATWATER	25.1	108	21192	29.1	16.7	0.7	1.4	1822	358858	1462	287988		5
1	0	NOSURVEY	0.1	90	90	0.1									
283	283	POOL	36.1	100	28362	38.9	22.5	1.6	3.3	2411	682333	4734	1339619	3993	10
303	44	RIFFLE	38.6	77	23295	31.9	15.5	0.4	0.9	908	275124	351	106221		3
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
784	355				72939					1316315			1733828		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722 Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS Legal Description: T20NR17WS25 Latitude: 39:34:20.0N Longitude: 123:42:31.0W

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 (%)
219	31	LGR	27.9	70	15307	21.0	16	0.3	2.1	941	206104	352	77193		1	91
77	10	HGR	9.8	98	7517	10.3	13	0.4	1.6	959	73868	362	27896		6	94
6	2	CAS	0.8	75	450	0.6	16	0.7	1.8	485	2910	352	2112		15	95
1	1	BRS	0.1	21	21	0.0	12	0.8	2.1	214	214	171	171		5	82
1	0	POW	0.1	76	76	0.1										
157	22	RUN	20.0	90	14159	19.4	17	0.7	2.1	1392	218580	1054	165492		5	95
39	6	SRN	5.0	178	6957	9.5	17	0.7	2	3396	132445	2957	115326		4	94
261	261	MCP	33.3	95	24889	34.1	22	1.5	7.9	2284	596067	4427	1155419	3717	10	91
3	3	CCP	0.4	162	487	0.7	27	1.3	4.1	4397	13190	6387	19161	5085	12	94
17	17	STP	2.2	172	2922	4.0	23	1.6	6.6	4173	70946	9367	159232	8210	10	95
2	2	PLP	0.3	32	64	0.1	34	2.0	6.8	1065	2129	2904	5808	2517	20	89
1	0	NS	0.1	90	90	0.1										

Total Units Fully Measured
784 355

Total Length (ft.)
72939

Total Area (sq.ft.)
1316454

Total Volume (cu.ft.)
1727808

Table 3 - Summary of Pool Types

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T20NR17WS25

Latitude: 39:34:20.0N

Longitude: 123:42:31.0W

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
281	281	MAIN	99	101	28298	100	22.4	1.5	2421	680203	4003	1124959	10
2	2	SCOUR	1	32	64	0	33.5	2.0	1065	2129	2517	5033	20

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
283	283	28362	682333	1129992

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

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T20NR17WS25

Latitude: 39:34:20.0N

Longitude: 123:42:31.0W

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
261	MCP	92	1	0	24	9	84	32	95	36	57	22
3	CCP	1	0	0	0	0	2	67	0	0	1	33
17	STP	6	0	0	1	6	4	24	7	41	5	29
2	PLP	1	0	0	0	0	1	50	0	0	1	50

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
283	1	0	25	9	91	32	102	36	64	23

Mean Maximum Residual Pool Depth (ft.): 3.3

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Dry Units: 0

Confluence Location: Quad: DUTCHMANS

Legal Description: T20NR17WS25 Latitude: 39:34:20.0N

Longitude: 123:42:31.0W

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
219	31	LGR	0	41	0	0	0	0	0	59	0
77	10	HGR	0	14	0	0	0	0	24	61	0
6	2	CAS	0	0	0	0	0	0	43	58	0
1	1	BRS	0	0	0	0	0	0	0	85	15
303	44	TOTAL RIFFLE	0	19	0	0	0	0	18	62	1
1	0	POW	0	0	0	0	0	0	0	0	0
157	22	RUN	5	38	15	4	3	0	0	34	1
39	6	SRN	0	59	9	0	0	0	0	32	0
197	28	TOTAL FLAT	4	43	14	3	2	0	0	34	1
261	261	MCP	4	32	26	2	3	0	1	27	4
3	3	CCP	0	55	35	0	0	0	0	10	0
17	17	STP	1	30	31	1	3	0	3	24	7
2	2	PLP	0	5	20	0	0	0	23	33	20
283	283	TOTAL POOL	4	32	27	2	3	0	1	27	4
1	0	NS									
784	355	TOTAL	4	32	25	2	2	0	2	29	4

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Dry Units: 0

Confluence Location: Quad: DUTCHMANS

Legal Description: T20NR17WS25 Latitude: 39:34:20.0N

Longitude: 123:42:31.0W

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
219	31	LGR	0	0	71	10	16	3	0
77	10	HGR	0	0	40	20	0	40	0
6	2	CAS	0	0	0	0	0	100	0
1	1	BRS	0	0	0	0	0	0	100
1	0	POW	0	0	0	0	0	0	0
157	22	RUN	0	9	68	0	9	14	0
39	6	SRN	0	0	100	0	0	0	0
261	261	MCP	0	45	44	2	3	5	1
3	3	CCP	0	67	33	0	0	0	0
17	17	STP	0	24	59	0	0	18	0
2	2	PLP	0	0	50	0	0	50	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722 Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS Legal Description: T20NR17WS25 Latitude: 39:34:20.0N Longitude: 123:42:31.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
91	27	73	0	97	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: Middle Fork Ten Mile River LLID: 1237087395722 Drainage: Rockport
 Survey Dates: 9/12/2012 to 10/16/2012 Survey Length (ft.): 72939 Main Channel (ft.): 72830 Side Channel (ft.): 109
 Confluence Location: Quad: DUTCHMANS Legal Description: T20NR17WS25 Latitude: 39:34:20.0N Longitude: 123:42:31.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: C4	Canopy Density (%): 88.6	Pools by Stream Length (%): 46.6
Reach Length (ft.): 23143	Coniferous Component (%): 18.7	Pool Frequency (%): 38.6
Riffle/Flatwater Mean Width (ft.): 18.9	Hardwood Component (%): 81.3	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 2
Range (ft.): 36 to 66	Vegetative Cover (%): 96.3	2 to 2.9 Feet Deep: 29
Mean (ft.): 48	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 49
Std. Dev.: 8	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 19
Base Flow (cfs.): 5.1	Occurrence of LWD (%): 34	Mean Max Residual Pool Depth (ft.): 3.4
Water (F): 50 - 57 Air (F): 54 - 62	LWD per 100 ft.:	Mean Pool Shelter Rating: 11
Dry Channel (ft): 0	Riffles: 1	
	Pools: 3	
	Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 82 Sm Cobble: 18 Lg Cobble: 0 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 54.1 2. 32.9 3. 12.9 4. 0.0 5. 0.0		

STREAM REACH: 2

Channel Type: F4	Canopy Density (%): 92.9	Pools by Stream Length (%): 42.5
Reach Length (ft.): 23037	Coniferous Component (%): 17.3	Pool Frequency (%): 36.1
Riffle/Flatwater Mean Width (ft.): 13.9	Hardwood Component (%): 82.7	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 7
Range (ft.): 15 to 47	Vegetative Cover (%): 97.4	2 to 2.9 Feet Deep: 37
Mean (ft.): 31	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 29
Std. Dev.: 8	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 27
Base Flow (cfs.): 5.1	Occurrence of LWD (%): 26	Mean Max Residual Pool Depth (ft.): 3.5
Water (F): 46 - 54 Air (F): 42 - 66	LWD per 100 ft.:	Mean Pool Shelter Rating: 10
Dry Channel (ft): 0	Riffles: 0	
	Pools: 2	
	Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 2 Gravel: 70 Sm Cobble: 24 Lg Cobble: 4 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 19.6 2. 33.7 3. 40.2 4. 4.3 5. 2.2		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: B3	Canopy Density (%): 92.6	Pools by Stream Length (%): 30.1
Reach Length (ft.): 24001	Coniferous Component (%): 39.9	Pool Frequency (%): 33.8
Riffle/Flatwater Mean Width (ft.): 15.6	Hardwood Component (%): 60.1	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 17
Range (ft.): 15 to 43	Vegetative Cover (%): 97.5	2 to 2.9 Feet Deep: 29
Mean (ft.): 32	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 31
Std. Dev.: 7	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 23
Base Flow (cfs.): 5.1	Occurrence of LWD (%): 10	Mean Max Residual Pool Depth (ft.): 3.2
Water (F): 49 - 55	Air (F): 45 - 60	LWD per 100 ft.:
Dry Channel (ft): 0		Riffles: 0
		Pools: 1
		Flat: 1
Pool Tail Substrate (%): Silt/Clay: 0	Sand: 2	Gravel: 39
	Sm Cobble: 23	Lg Cobble: 20
	Boulder: 9	Bedrock: 8
Embeddedness Values (%): 1. 16.1	2. 69.9	3. 10.8
	4. 2.2	5. 1.1

STREAM REACH: 4

Channel Type: A2	Canopy Density (%): 91.0	Pools by Stream Length (%): 19.4
Reach Length (ft.): 2649	Coniferous Component (%): 57.5	Pool Frequency (%): 38.2
Riffle/Flatwater Mean Width (ft.): 16.3	Hardwood Component (%): 42.5	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 15
Range (ft.): 29 to 41	Vegetative Cover (%): 98.4	2 to 2.9 Feet Deep: 38
Mean (ft.): 35	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 31
Std. Dev.: 5	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 15
Base Flow (cfs.): 5.1	Occurrence of LWD (%): 9	Mean Max Residual Pool Depth (ft.): 3.1
Water (F): 55 - 58	Air (F): 57 - 67	LWD per 100 ft.:
Dry Channel (ft): 0		Riffles: 1
		Pools: 2
		Flat: 1
Pool Tail Substrate (%): Silt/Clay: 8	Sand: 0	Gravel: 31
	Sm Cobble: 15	Lg Cobble: 23
	Boulder: 23	Bedrock: 0
Embeddedness Values (%): 1. 38.5	2. 61.5	3. 0.0
	4. 0.0	5. 0.0

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS

Legal Description: T20NR17WS25

Latitude: 39:34:20.0N

Longitude: 123:42:31.0W

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	58	80	19.5
Boulder	21	12	4.7
Cobble / Gravel	20	27	6.6
Sand / Silt / Clay	255	235	69.2

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	1	0.1
Brush	15	27	5.9
Hardwood Trees	300	218	73.2
Coniferous Trees	39	108	20.8
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Middle Fork Ten Mile River

LLID: 1237087395722

Drainage: Rockport

Survey Dates: 9/12/2012 to 10/16/2012

Confluence Location: Quad: DUTCHMANS

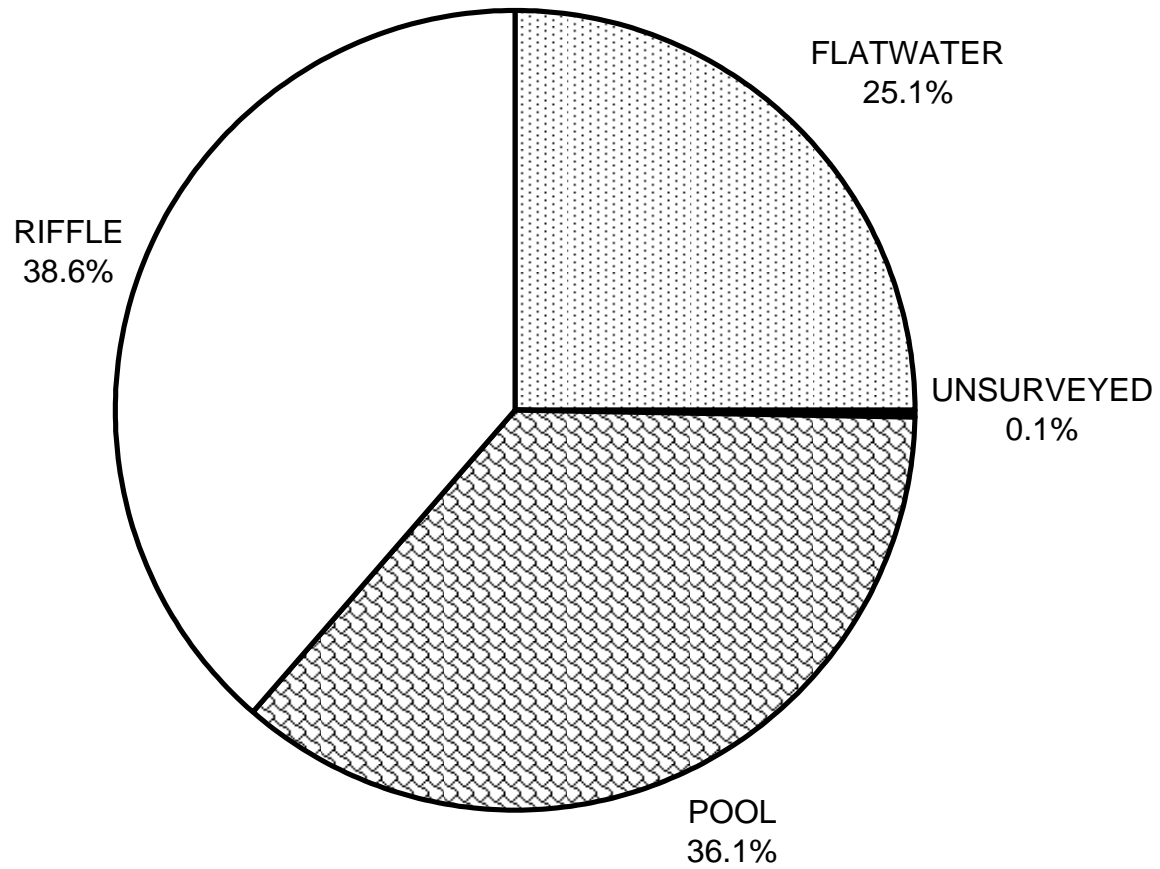
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Longitude: 123:42:31.0W

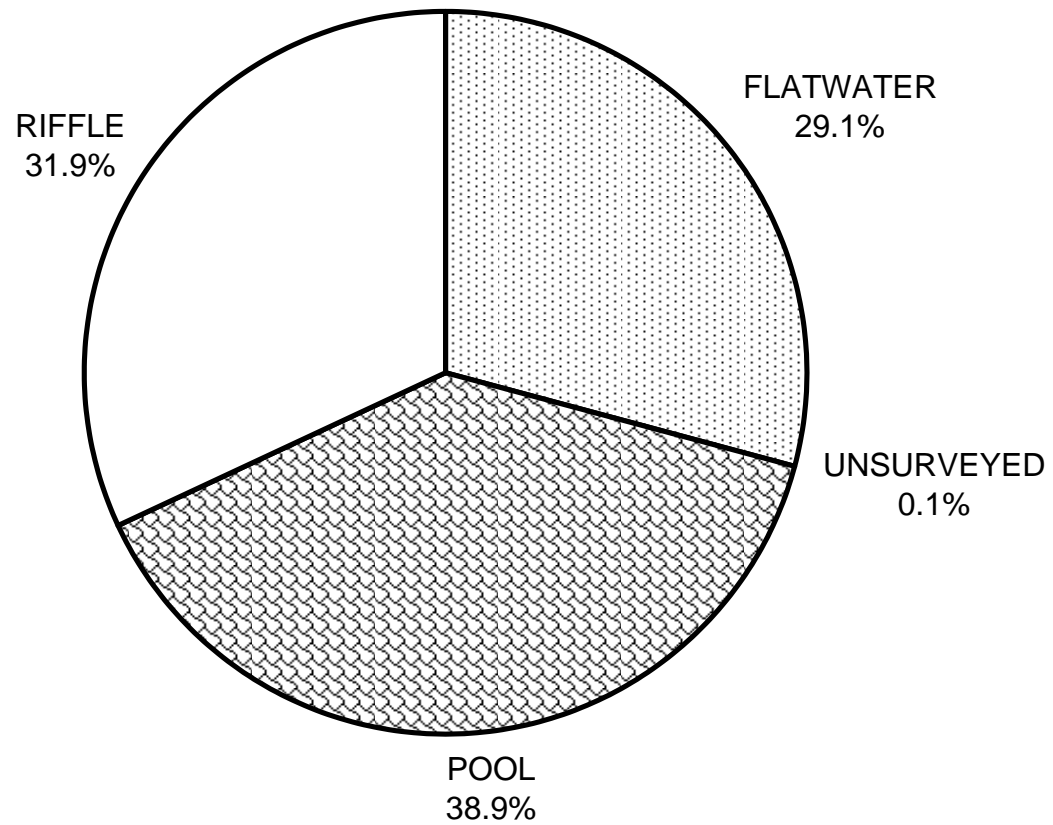
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	4	4
SMALL WOODY DEBRIS (%)	19	43	32
LARGE WOODY DEBRIS (%)	0	14	27
ROOT MASS (%)	0	3	2
TERRESTRIAL VEGETATION (%)	0	2	3
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	18	0	1
BOULDERS (%)	62	34	27
BEDROCK LEDGES (%)	1	1	4

MIDDLE FORK TEN MILE RIVER 2012 HABITAT TYPES BY PERCENT OCCURRENCE



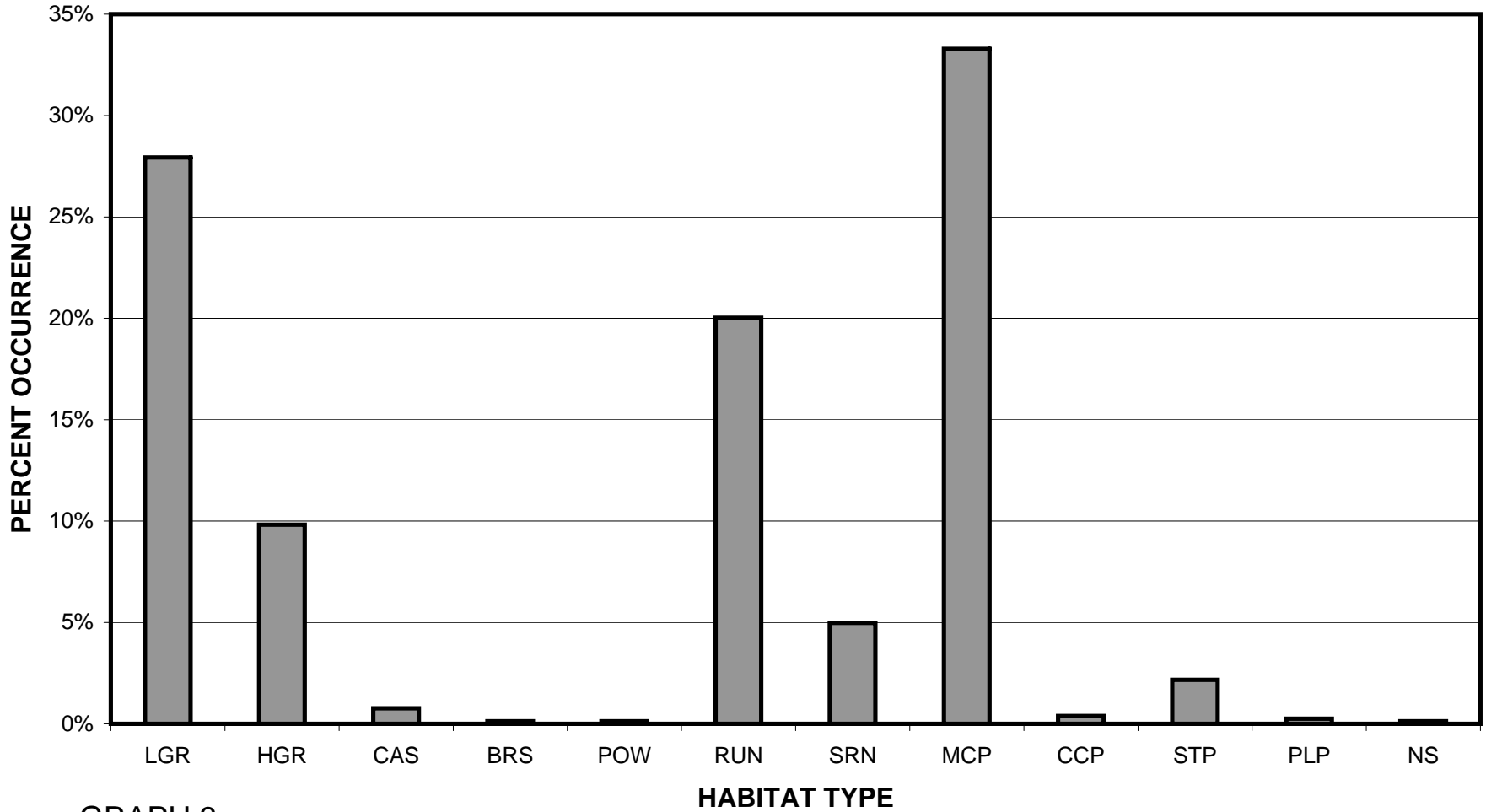
GRAPH 1

**MIDDLE FORK TEN MILE RIVER 2012
HABITAT TYPES BY PERCENT TOTAL LENGTH**



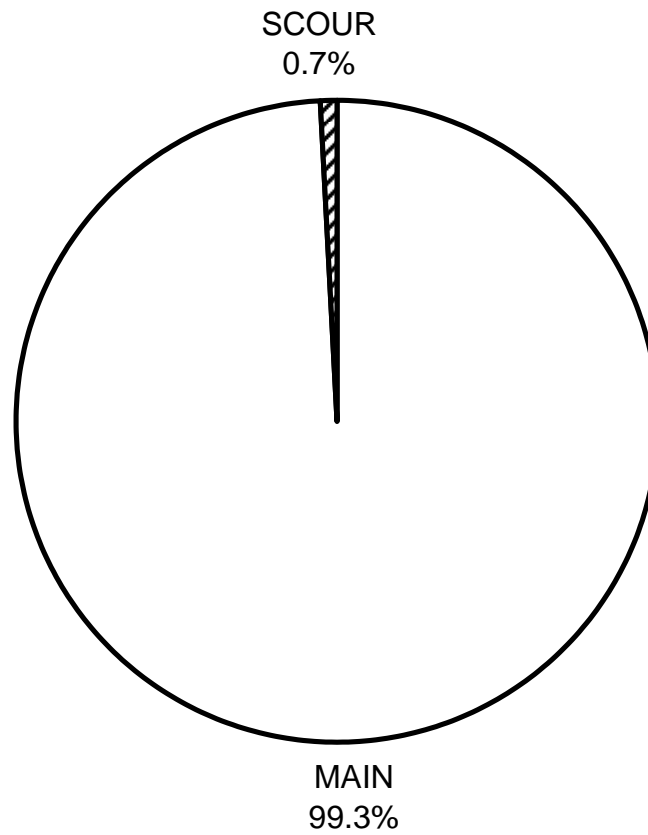
GRAPH 2

MIDDLE FORK TEN MILE RIVER 2012 HABITAT TYPES BY PERCENT OCCURRENCE



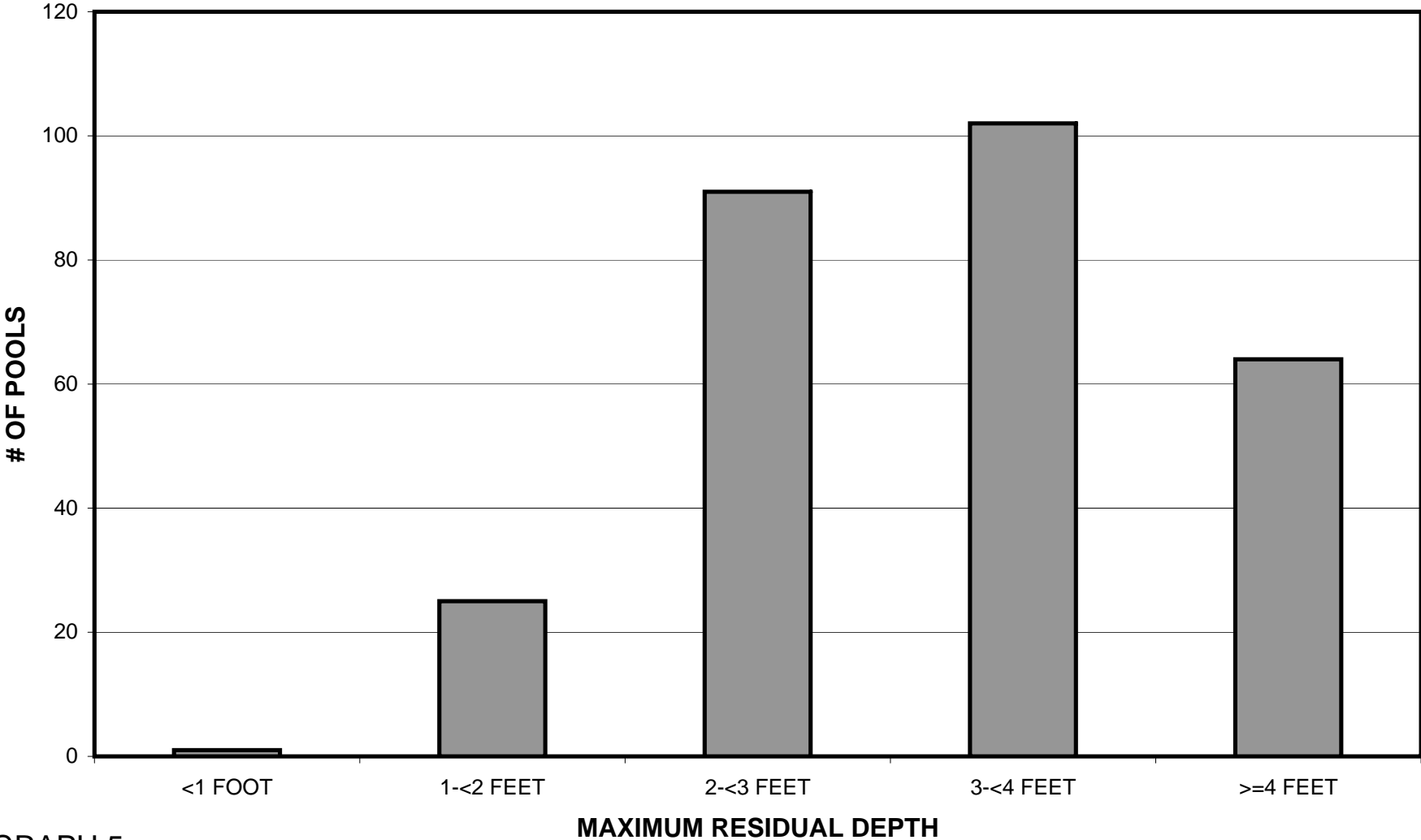
GRAPH 3

MIDDLE FORK TEN MILE RIVER 2012 POOL TYPES BY PERCENT OCCURRENCE



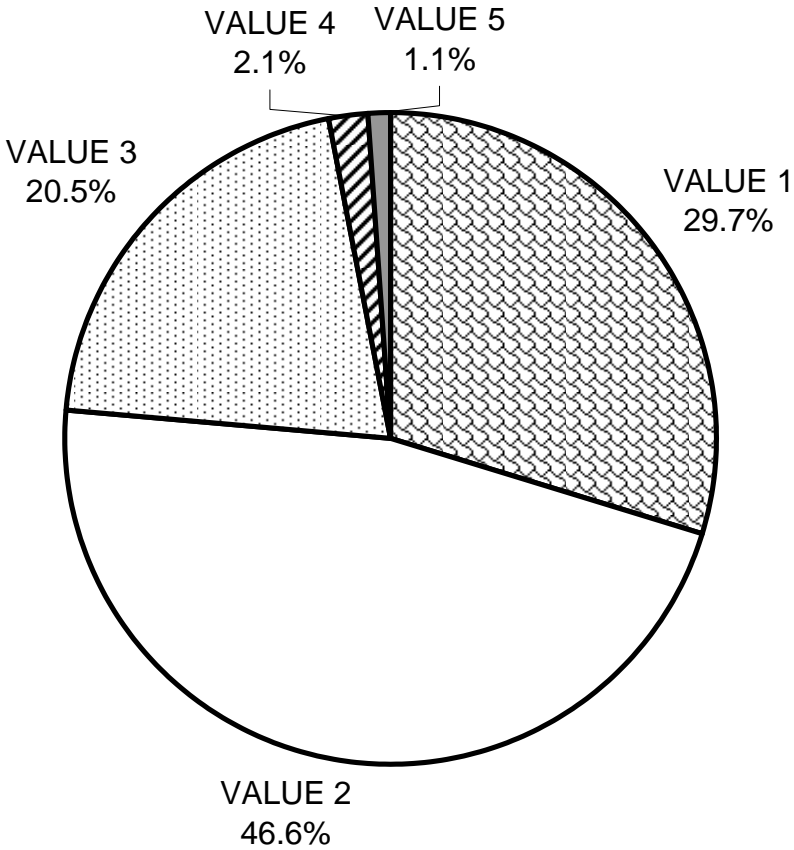
GRAPH 4

MIDDLE FORK TEN MILE RIVER 2012 MAXIMUM DEPTH IN POOLS



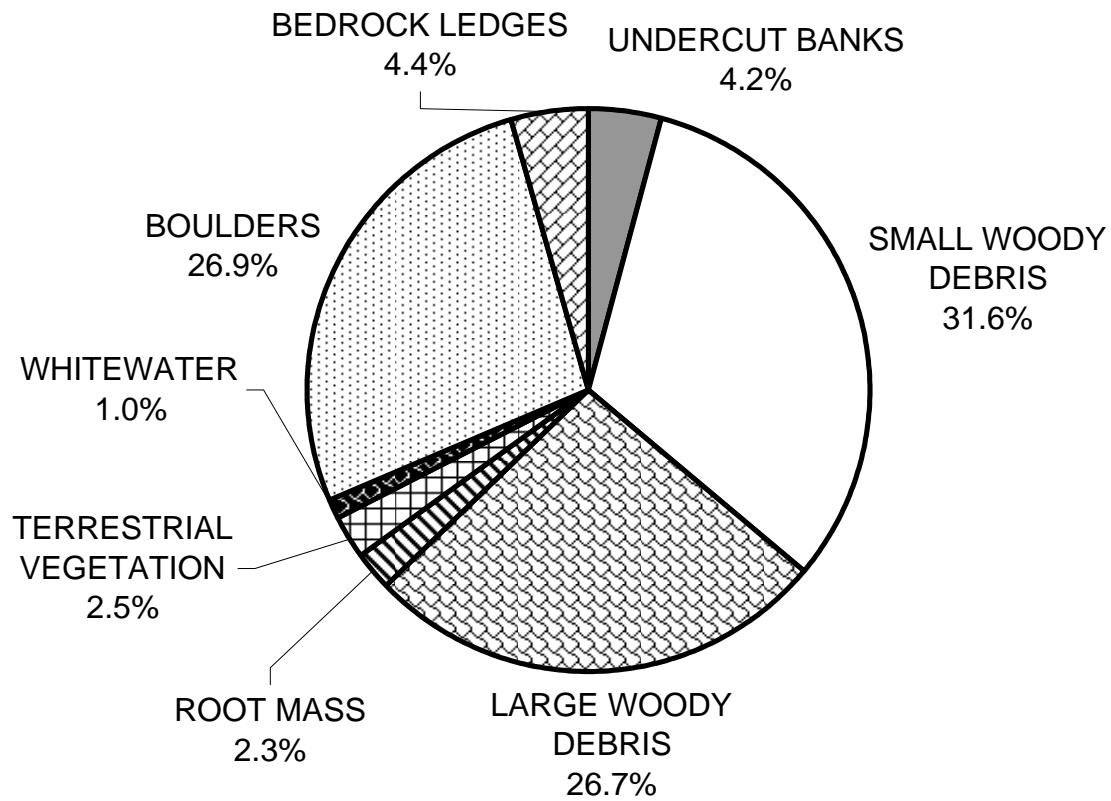
GRAPH 5

MIDDLE FORK TEN MILE RIVER 2012 PERCENT EMBEDDEDNESS



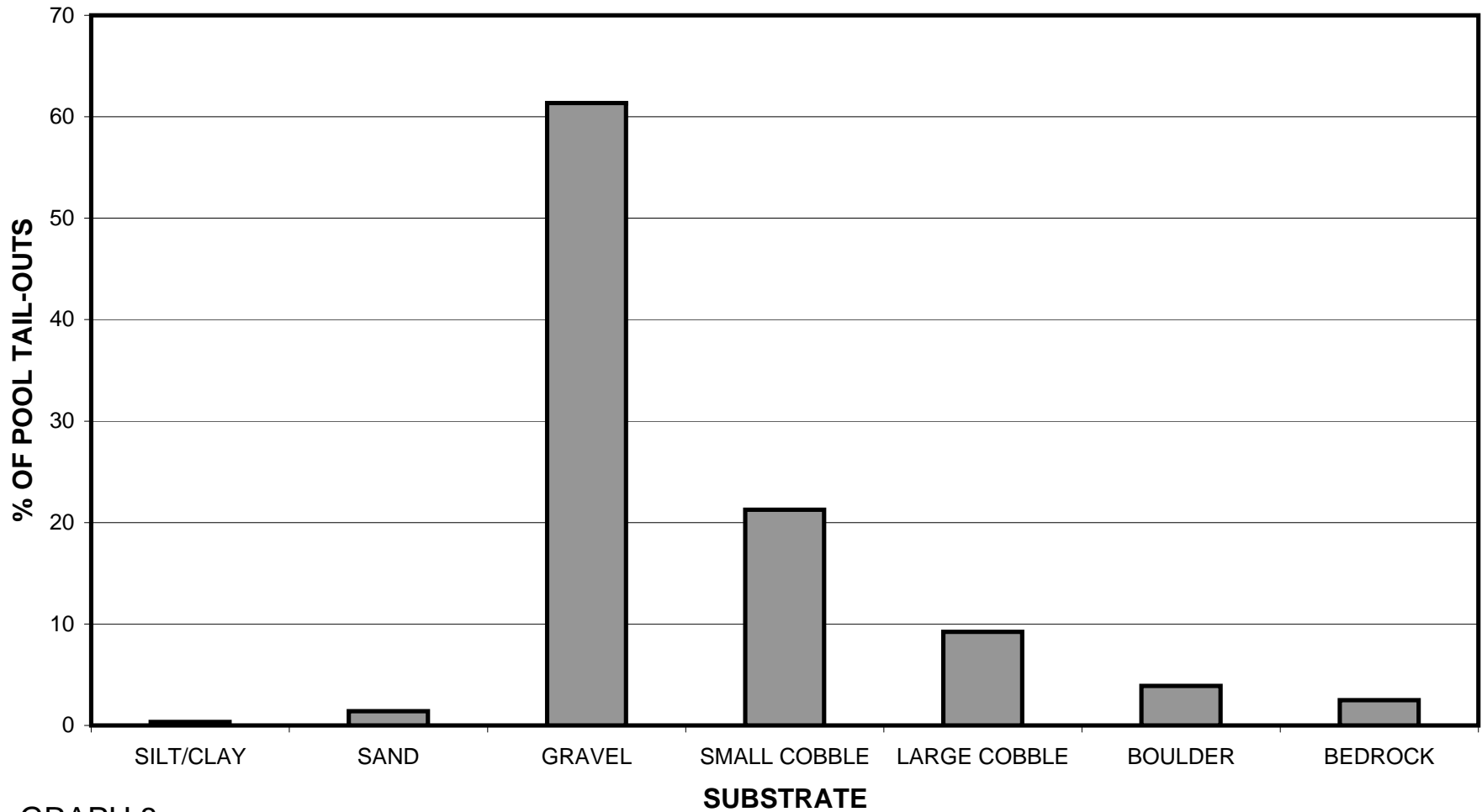
GRAPH 6

MIDDLE FORK TEN MILE RIVER 2012 MEAN PERCENT COVER TYPES IN POOLS



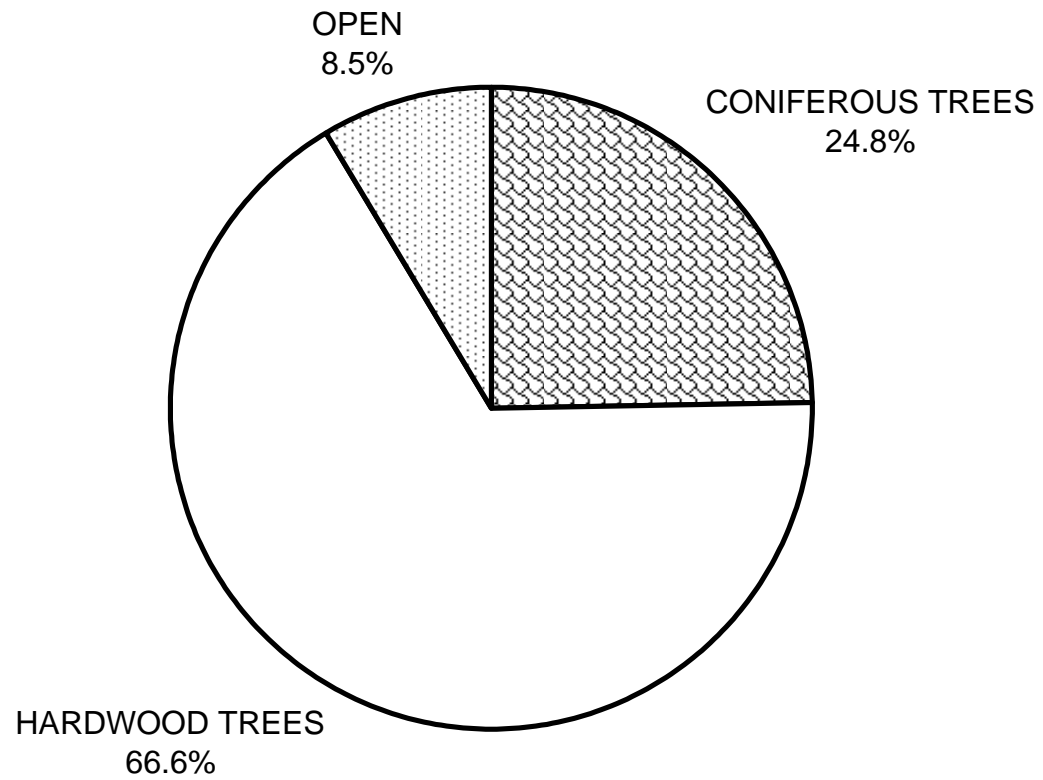
GRAPH 7

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



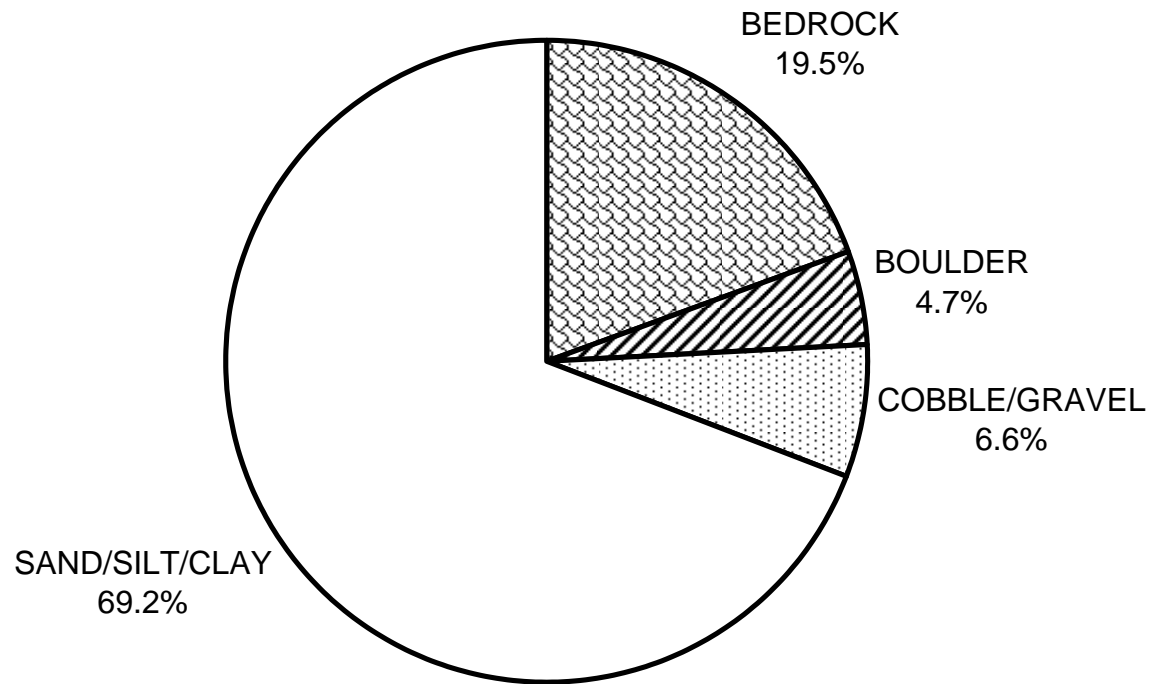
GRAPH 8

MIDDLE FORK TEN MILE RIVER 2012 MEAN PERCENT CANOPY



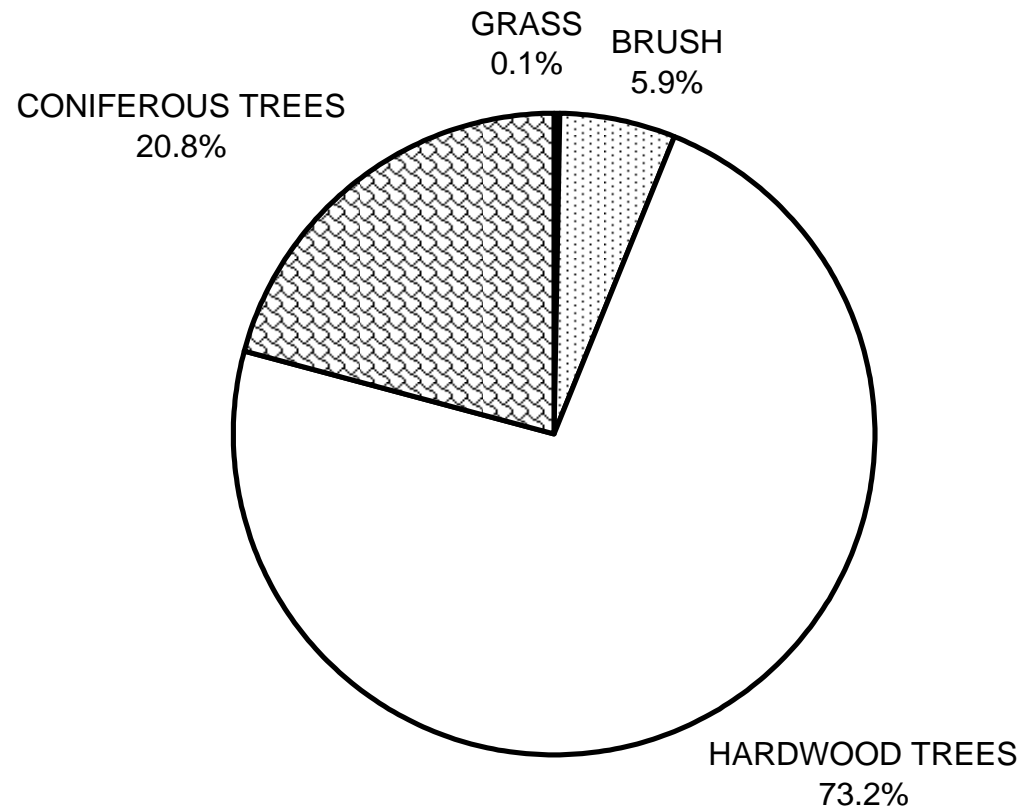
GRAPH 9

**MIDDLE FORK TEN MILE RIVER 2012
DOMINANT BANK COMPOSITION IN SURVEY REACH**



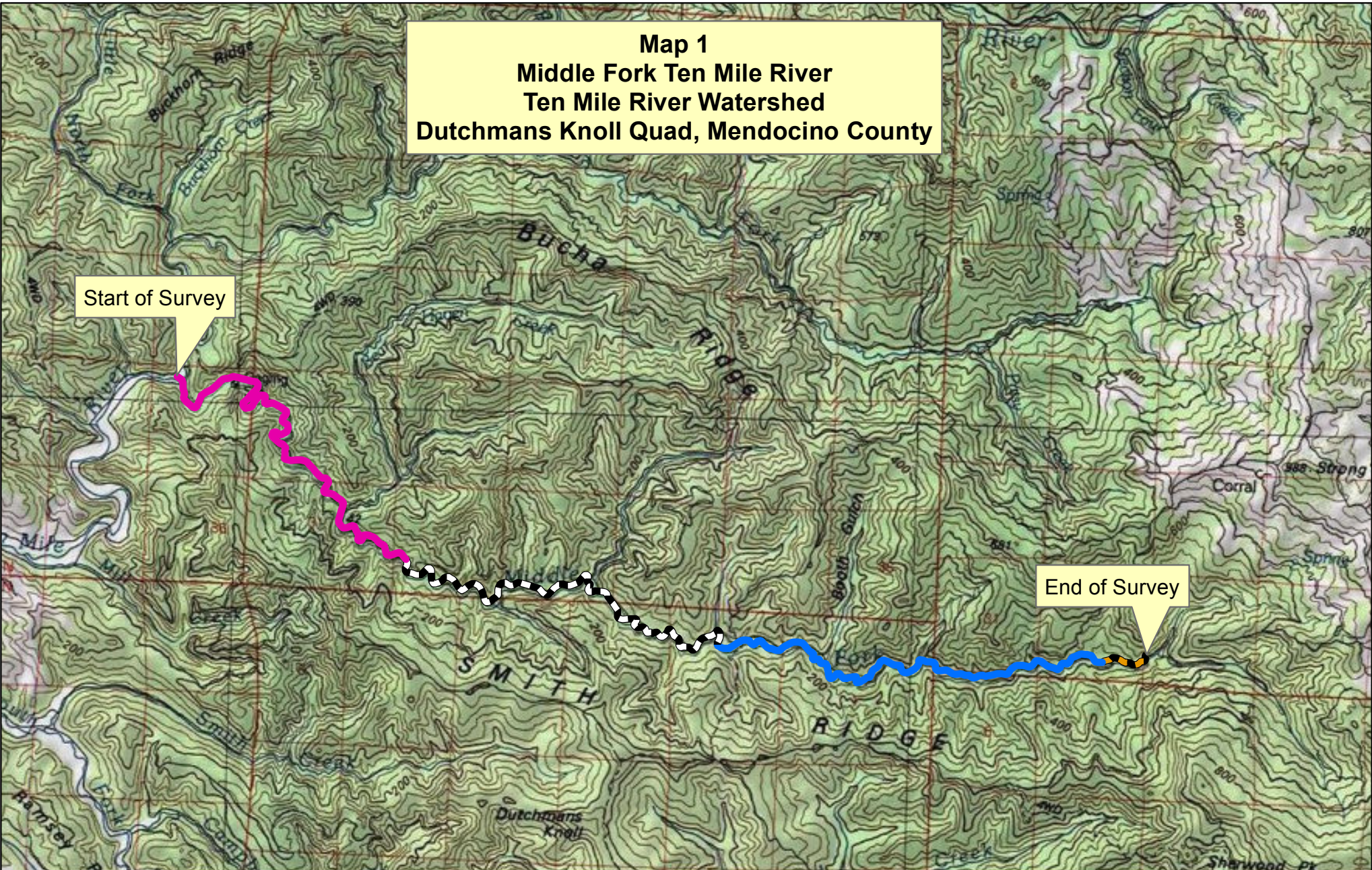
GRAPH 10

**MIDDLE FORK TEN MILE RIVER 2012
DOMINANT BANK VEGETATION IN SURVEY REACH**



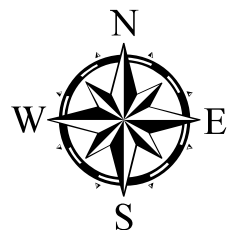
GRAPH 11





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



Start of Survey

End of Survey



-  Reach 1, Channel Type C4
-  Reach 2, Channel Type F4
-  Reach 3, Channel Type B3
-  Reach 4, Channel Type A2

