

STREAM INVENTORY REPORT

Streeter Creek

INTRODUCTION

A stream inventory was conducted on July 28, 2009 on Streeter Creek. The survey began at the confluence with Tenmile Creek and extended upstream 0.9 miles.

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

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for 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

Streeter Creek is a tributary to Tenmile Creek, tributary to South Fork Eel River, tributary to Eel River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Streeter Creek's legal description at the confluence with Tenmile Creek is T22N R15W S22. Its location is 39.7458 north latitude and 123.5287 west longitude, LLID number 1235276397460. Streeter Creek is a first order stream and has approximately 3.7 miles of blue line stream according to the USGS Cahto Peak 7.5 minute quadrangle. Streeter Creek drains a watershed of approximately 4.8 square miles. Elevations range from about 1,459 feet at the mouth of the creek to 2,200 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned managed as rural residential. Vehicle access exists via private roads north of Laytonville.

METHODS

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

SAMPLING STRATEGY

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

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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 Streeter Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

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

2. Channel Type:

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

3. Temperatures:

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

4. Habitat Type:

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

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 Streeter Creek, embeddedness was

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ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

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

7. Substrate Composition:

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

8. Canopy:

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

9. Bank Composition and Vegetation:

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

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10. Large Woody Debris Count:

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

11. Average Bankfull Width:

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

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Streeter Creek. In addition, underwater observations were made at 10 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for Streeter Creek include:

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

HABITAT INVENTORY RESULTS

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

The habitat inventory of July 28, 2009, was conducted by J. Coombes and J. Ferreira (WSP). The total length of the stream surveyed was 4,879 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.09 cfs on July 29, 2009.

Streeter Creek is a F3 channel type for 4,879 feet of the stream surveyed (Reach 1). F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 64 to 71 degrees Fahrenheit. Air temperatures ranged from 64 to 94 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 47% pool units, 29% riffle units, and 21% flatwater units (Graph 1). Based on total length of Level II habitat types there were 57% pool units, 21% riffle units, and 21% flatwater units (Graph 2).

Nine Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 30%; low gradient riffle units, 29%; and run units 19% (Graph 3). Based on percent total length, mid-channel pool units made up 37%, low gradient riffle units 21%, and run units 15%.

A total of 33 pools were identified (Table 3). Main channel pools were the most frequently encountered at 73% (Graph 4), and comprised 75% of the total length of all pools (Table 3).

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Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirteen of the 33 pools (39%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 33 pool tail-outs measured, 19 had a value of 1 (57.6%); 12 had a value of 2 (36.4%); 2 had a value of 5 (6.1%) (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 unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 0, flatwater habitat types had a mean shelter rating of 4, and pool habitats had a mean shelter rating of 32 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 33. Scour pools had a mean shelter rating of 31 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Streeter Creek. Graph 7 describes the pool cover in Streeter Creek. Boulders are 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. Small cobble was the dominant substrate observed in 48% of the pool tail-outs. Gravel was the next most frequently observed dominant substrate type and occurred in 45% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Streeter Creek was 76%. Twenty-four percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 96% and 4%, respectively. Graph 9 describes the mean percent canopy in Streeter Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 86%. The mean percent left bank vegetated was 91%. The dominant elements composing the structure of the stream banks consisted of 94% sand/silt/clay, 5% cobble/gravel, and 1% bedrock (Graph 10). Hardwood trees were the dominant vegetation type observed in 94.9% of the units surveyed. Additionally, 3.8% of the units surveyed had coniferous trees as the dominant vegetation type, and 1.3% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 10 sites for species composition and distribution in Streeter Creek on July 30, 2009. Water temperatures taken during the sampling period of 1110 to 1300 ranged from 68 to 70 degrees Fahrenheit. Air temperatures ranged from 78 to 88 degrees Fahrenheit. The sites were sampled by S. McSmith (DFG).

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In reach 1, which comprised the entire 4,879 feet of the stream surveyed, 10 sites were sampled. The reach sites yielded 69 young-of-the-year steelhead/rainbow trout (SH/RT), 5 age 1+ SH/RT, 4 age 2+ SH/RT, 347 California roach, 2 green sunfish, 1 mosquito fish and 7 stickle back.

The following chart displays the information yielded from these sites:

2009 Streeter Creek underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
Reach 1: F3 Channel Type									
07/30/09	1	005	4.2	325	12	1	0	0	0
07/30/09	2	013	5.2	776	13	0	0	0	0
07/30/09	3	019	5.2	1103	7	0	0	0	0
07/30/09	4	030	4.2	2036	2	1	0	0	0
07/30/09	5	032	4.2	2253	6	1	0	0	0
07/30/09	6	038	4.2	2569	6	2	1	0	0
07/30/09	7	040	4.2	2649	7	0	2	0	0
07/30/09	8	044	4.2	2958	7	0	1	0	0
07/30/09	9	051	4.2	3570	7	0	0	0	0
07/30/09	10	068	4.2	4717	2	0	0	0	0

DISCUSSION

Streeter Creek is an F3 channel type for the entire 4,879 feet of the stream surveyed. The suitability of F3 channel types for fish habitat improvement structures is as follows: F3 channel types are good for bank-placed boulders, single and opposing wing-deflectors and fair for plunge weirs, boulder clusters, channel constrictors and log cover.

The water temperatures recorded on the survey days July 28, 2009, ranged from 64 to 71 degrees Fahrenheit. Air temperatures ranged from 64 to 94 degrees Fahrenheit. The upper range of these water temperatures is unsuitable for rearing juvenile coho salmon. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 21% of the total length of this survey, riffles 21%, and pools 57%. Thirteen of the 33 (39%) pools had a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined

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to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing large wood structures that will deepen pool habitat is recommended.

Thirty-one of the 33 pool tail-outs measured had embeddedness ratings of 1 or 2. None of the pool tail-outs had embeddedness ratings of 3 or 4. Two 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.

Thirty-one of the 33 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 4. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Streeter Creek. Boulders are the dominant cover type in pools followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 76%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 86% and 91%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Streeter Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures exceed the acceptable range for juvenile coho salmon. 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 boulders. Adding high quality complexity with woody cover in the pools is desirable.
- 4) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

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- 5) Increase the canopy on Streeter Creek by planting appropriate native vegetation like willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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 Tenmile Creek. The channel type is an F3.
156	0004.00	Boulder armoring on the left bank extends from Habitat Unit (HU#) #04 to HU #08. Right bank armor extends from HU#04 to HU#07.
406	0008.00	Out of the influence of Tenmile Creek.
554	0009.00	A steep cut on the left bank measures 10' high x 25' long.
680	0013.00	A steep cut on the right bank measures 20' tall x 120' long. It is 25% vegetated with hardwoods. The cut bank is contributing silt to small cobble. Boulder rip rap extends approximately 100' along the length of the right bank.
989	0018.00	A fold-up bridge spans 3/4 of the stream's width.
1812	0028.00	An unnamed road crosses the creek. Culvert #01 consists of two culverts separated by 2' of space. The first culvert is 1.3' high x 1.3' wide x 20' long and is plastic. The second culvert is 3.2' high x 3.2' wide x 20' long and is corrugated metal. The plunge heights of the two culverts are 1.1' and 0.4' respectively and there is a maximum depth of 0.6' within 5' of the outlet. The slope is 0.5%, and its condition is fair; both are collapse due to vehicle traffic on the road. The culverts are a possible high flow barrier to juvenile and adult salmonids.
1832	0029.00	There is erosion on the right bank that measures 15' tall x 30' long. There is no vegetation on the bank. It is contributing silt to large cobble to the channel.

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2852	0044.00	Two failed structures consisting of small boulders held together with chicken wire on the right bank.
2958	0045.00	There are seven sets of 3 pieces of large woody debris (LWD) stacked on top of each other. They are attached to each other with rebar and small woody debris (SWD). Small boulders are between the structures and the bank.
3077	0046.00	There is a right bank seep.
3235	0047.00	The right bank is armored with boulders.
3570	0052.00	There is a dry tributary on the left bank.
3771	0053.00	The right bank is armored with boulders.
3934	0056.00	The right bank armored with boulders.
3974	0057.00	A backwater pool has the majority of the shelter.
4067	0059.00	The left bank has boulder rip-rap.
4165	0060.00	A steep cut on the left bank measures 10' high x 60' long. It is contributing sediment ranging from silt to large cobble. The bank surface is less than five percent vegetated.
4621	0067.00	A steep cut on the right bank measures 75' high x 80' long. It is contributing sediment ranging in size from silt to gravel. The bank surface is fifteen percent vegetated with grass and hardwoods.
4839	0070.00	There is a dry tributary on the right bank.
4879	0070.00	End of survey due to lack of access.

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: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0

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
1	0	CULVERT	1.4	20	20	0.4									
1	0	DRY	1.4	22	22	0.5									
15	4	FLATWATER	21.4	67	1010	20.7	12.0	0.6	0.9	608	9121	349	5232		4
33	33	POOL	47.1	85	2796	57.3	13.4	0.8	2.1	1123	37061	1211	39948	973	32
20	2	RIFFLE	28.6	52	1031	21.1	7.0	0.1	0.2	267	5334	27	533		0
Total Units	Total Units Fully Measured			Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)			
70	39			4879						51516		45713			

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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 (%)
20	2	LGR	28.6	52	1031	21.1	7	0.1	0.2	267	5334	27	533		0	61
13	3	RUN	18.6	54	708	14.5	13	0.6	1.2	626	8133	391	5083		5	77
2	1	SRN	2.9	151	302	6.2	10	0.4	0.6	556	1111	222	444		0	96
21	21	MCP	30.0	87	1818	37.3	14	0.9	5.9	1242	26089	1484	31174	1211	31	77
3	3	STP	4.3	91	274	5.6	12	0.7	2.4	988	2963	810	2431	613	43	73
3	3	LSR	4.3	65	196	4.0	11	0.4	1.9	755	2264	416	1247	263	37	91
3	3	LSBk	4.3	84	253	5.2	11	0.6	1.4	910	2729	693	2078	546	23	57
3	3	LSBo	4.3	85	255	5.2	13	0.8	2.4	1006	3017	1006	3018	805	32	75
1	0	DRY	1.4	22	22	0.5										
1	0	CUL	1.4	20	20	0.4										

Total Units
70

Total Units Fully Measured
39

Total Length (ft.)
4879

Total Area (sq.ft.)
51639

Total Volume (cu.ft.)
46008

Table 3 - Summary of Pool Types

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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
24	24	MAIN	73	87	2092	75	14.0	0.9	1210	29051	1136	27267	33
9	9	SCOUR	27	78	704	25	11.6	0.6	890	8010	538	4842	31
Total Units 33	Total Units Fully Measured 33				Total Length (ft.) 2796					Total Area (sq.ft.) 37061		Total Volume (cu.ft.) 32109	

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

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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
21	MCP	64	1	5	10	48	4	19	5	24	1	5
3	STP	9	0	0	1	33	2	67	0	0	0	0
3	LSR	9	0	0	3	100	0	0	0	0	0	0
3	LSBk	9	0	0	3	100	0	0	0	0	0	0
3	LSBo	9	0	0	2	67	1	33	0	0	0	0

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Foot Max Resid. Depth	Total 1< 2 Foot % Occurrence	Total 2< 3 Foot Max Resid. Depth	Total 2< 3 Foot % Occurrence	Total 3< 4 Foot Max Resid. Depth	Total 3< 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
33	1	3	19	58	7	21	5	15	1	3

Mean Maximum Residual Pool Depth (ft.): 2.1

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Dry Units: 1

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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
20	2	LGR	0	0	0	0	0	0	0	0	0
20	2	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
13	3	RUN	0	15	20	0	0	20	0	45	0
2	1	SRN	0	0	0	0	0	0	0	0	0
15	4	TOTAL FLAT	0	15	20	0	0	20	0	45	0
21	21	MCP	11	17	8	14	4	13	0	33	0
3	3	STP	13	17	13	13	22	2	0	20	0
3	3	LSR	43	13	0	43	0	0	0	0	0
3	3	LSBk	13	15	0	0	7	33	0	32	0
3	3	LSBo	0	0	0	0	0	0	0	100	0
33	33	TOTAL POOL	13	15	6	14	5	12	0	35	0
1	0	CUL									
70	39	TOTAL	13	15	7	13	5	12	0	35	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Dry Units: 1

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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
20	2	LGR	0	0	0	100	0	0	0
13	3	RUN	0	0	33	33	33	0	0
2	1	SRN	0	0	0	100	0	0	0
21	21	MCP	0	0	33	33	33	0	0
3	3	STP	0	0	33	33	33	0	0
3	3	LSR	0	0	33	33	33	0	0
3	3	LSBk	0	0	0	67	33	0	0
3	3	LSBo	0	0	33	0	67	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
76	4	96	0	86	91

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.

Stream Name:	Streeter Creek	LLID:	1235276397460	Drainage:	Eel River - South Fork
Survey Dates:	7/28/2009 to 7/28/2009	Survey Length (ft.):	4879	Main Channel (ft.):	4879
				Side Channel (ft.):	0
Confluence Location:	Quad: CAHTO PEAK	Legal Description:	T22NR15WS22	Latitude:	39:44:46.0N
				Longitude:	123:31:39.0W

Summary of Fish Habitat Elements By Stream Reach

Channel Type:	F3	Canopy Density (%):	75.8	Pools by Stream Length (%):	57.3		
Reach Length (ft.):	4879	Coniferous Component (%):	4.2	Pool Frequency (%):	47.1		
Riffle/Flatwater Mean Width (ft.):	10.3	Hardwood Component (%):	95.8	Residual Pool Depth (%):			
BFW:		Dominant Bank Vegetation:	Hardwood Trees	< 2 Feet Deep:	61		
Range (ft.):	28 to 63	Vegetative Cover (%):	88.3	2 to 2.9 Feet Deep:	21		
Mean (ft.):	42	Dominant Shelter:	Boulders	3 to 3.9 Feet Deep:	15		
Std. Dev.:	12	Dominant Bank Substrate Type:	Sand/Silt/Clay	>= 4 Feet Deep:	3		
Base Flow (cfs.):	0.1	Occurrence of LWD (%):	6	Mean Max Residual Pool Depth (ft.):	2.1		
Water (F):	64 - 71	Air (F):	64 - 94	Mean Pool Shelter Rating:	32		
Dry Channel (ft):	22	Riffles:	1				
		Pools:	2				
		Flat:	1				
Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 0	Gravel: 45	Sm Cobble: 48	Lg Cobble: 6	Boulder: 0	Bedrock: 0
Embeddedness Values (%):	1. 57.6	2. 36.4	3. 0.0	4. 0.0	5. 6.1		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

Legal Description: T22NR15WS22

Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

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	0	1	1.3
Boulder	0	0	0.0
Cobble / Gravel	3	1	5.1
Sand / Silt / Clay	36	37	93.6

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	0	0.0
Brush	1	0	1.3
Hardwood Trees	35	39	94.9
Coniferous Trees	3	0	3.8
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values:

2

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

StreamName: Streeter Creek

LLID: 1235276397460

Drainage: Eel River - South Fork

Survey Dates: 7/28/2009 to 7/28/2009

Confluence Location: Quad: CAHTO PEAK

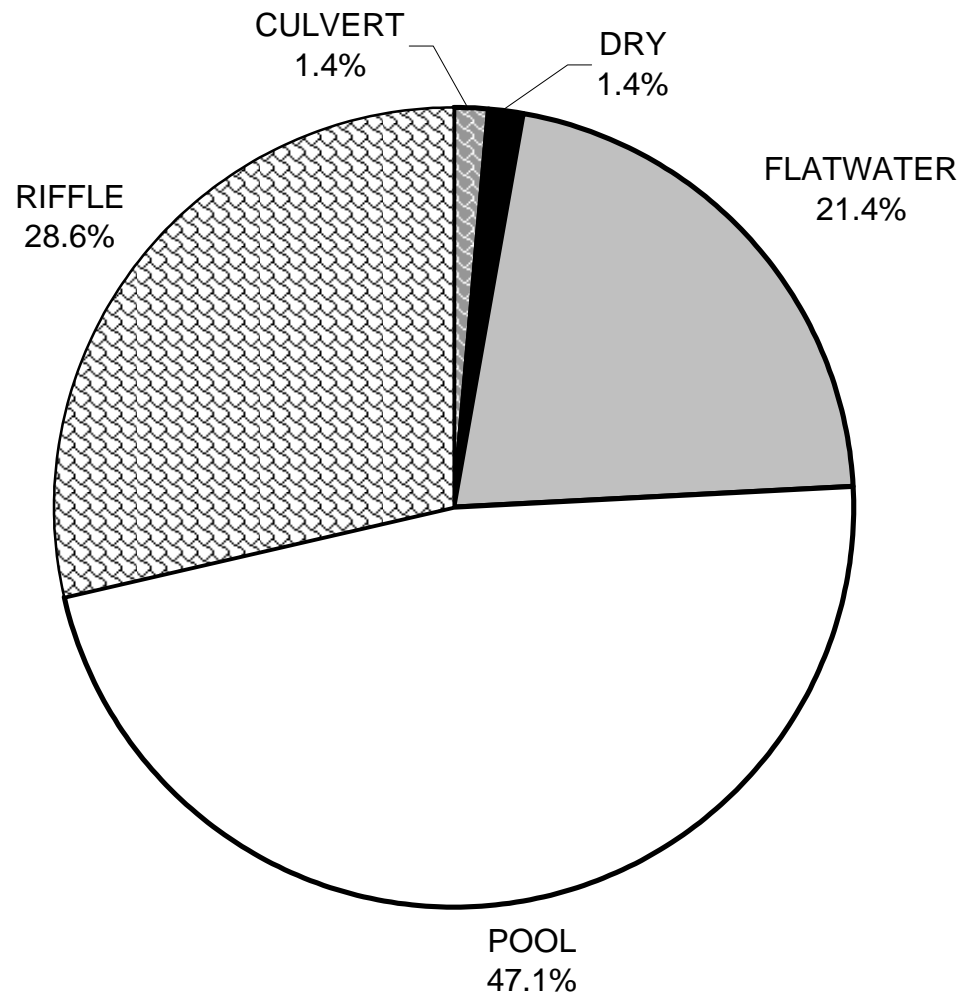
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Latitude: 39:44:46.0N

Longitude: 123:31:39.0W

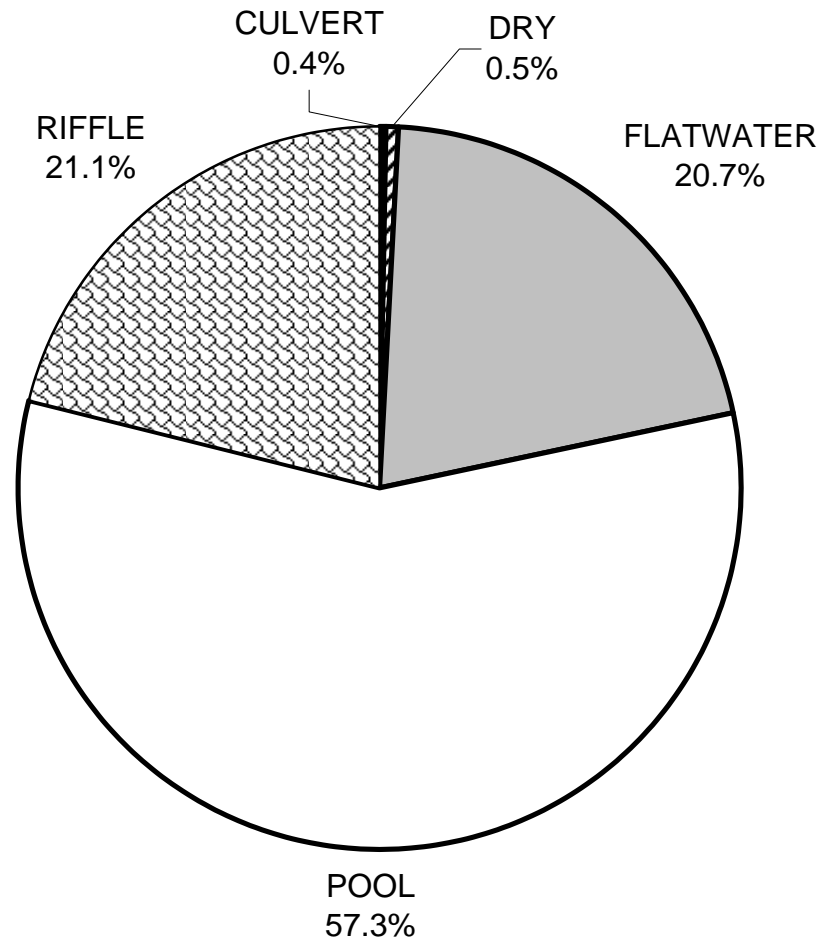
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	13
SMALL WOODY DEBRIS (%)	0	15	15
LARGE WOODY DEBRIS (%)	0	20	6
ROOT MASS (%)	0	0	14
TERRESTRIAL VEGETATION (%)	0	0	5
AQUATIC VEGETATION (%)	0	20	12
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	45	35
BEDROCK LEDGES (%)	0	0	0

STREETER CREEK 2009 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

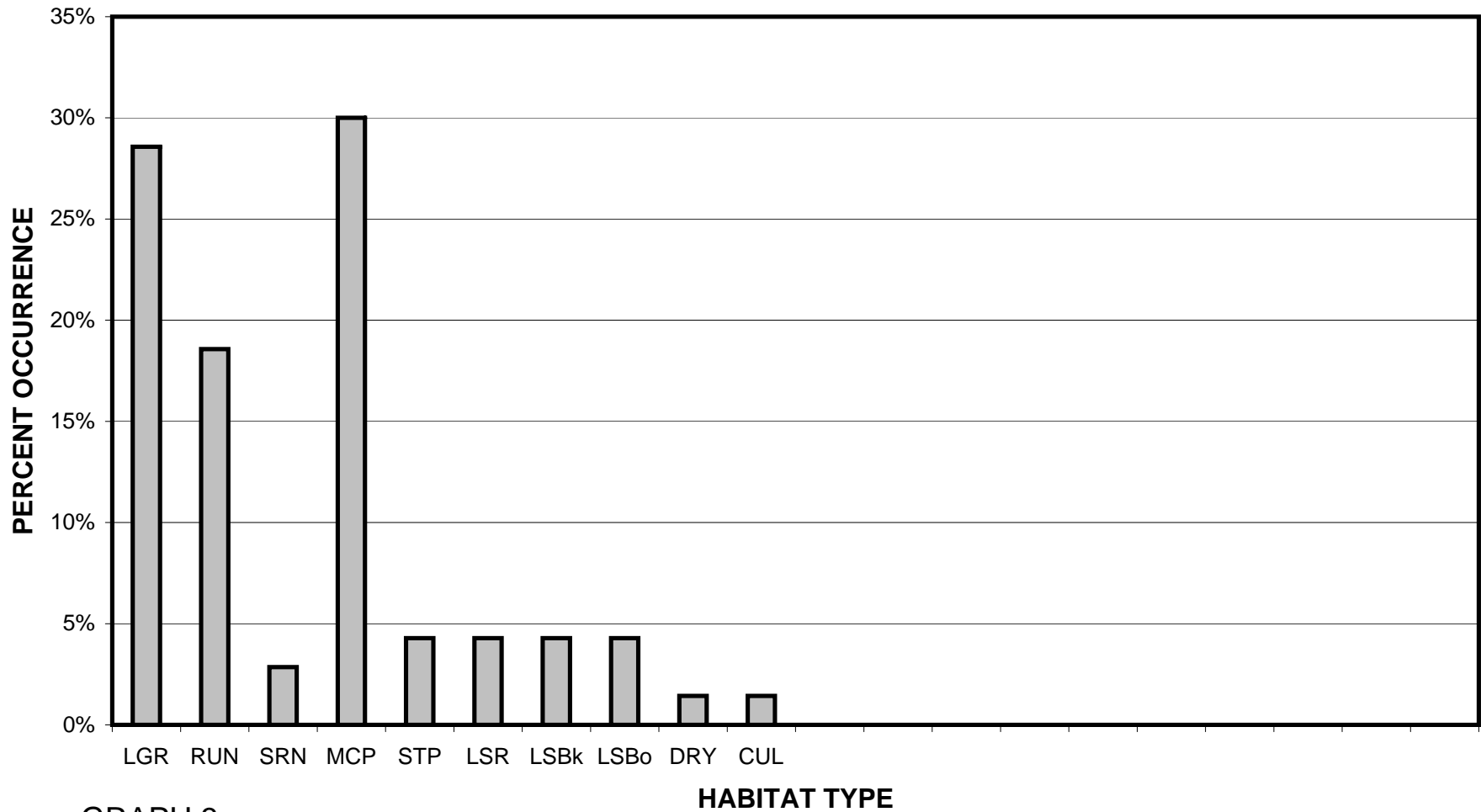
STREETER CREEK 2009 HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

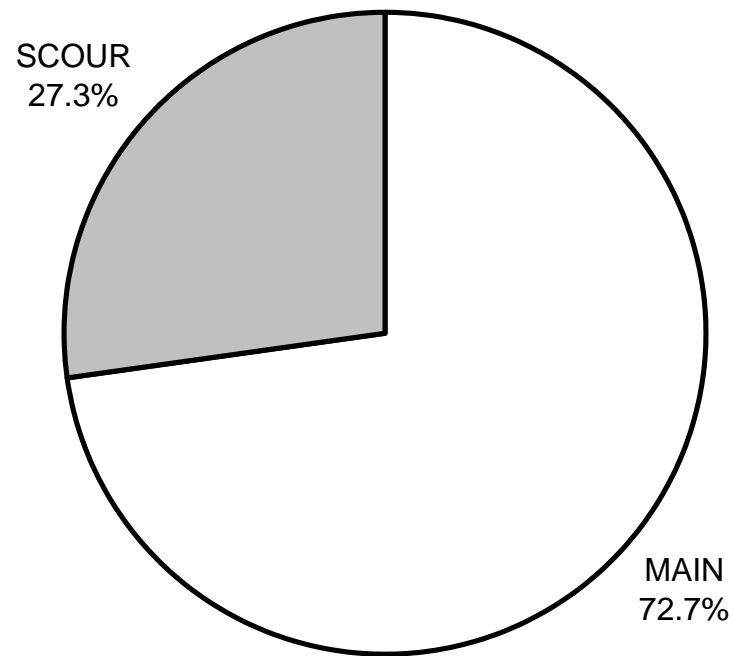
STREETER CREEK 2009

HABITAT TYPES BY PERCENT OCCURRENCE



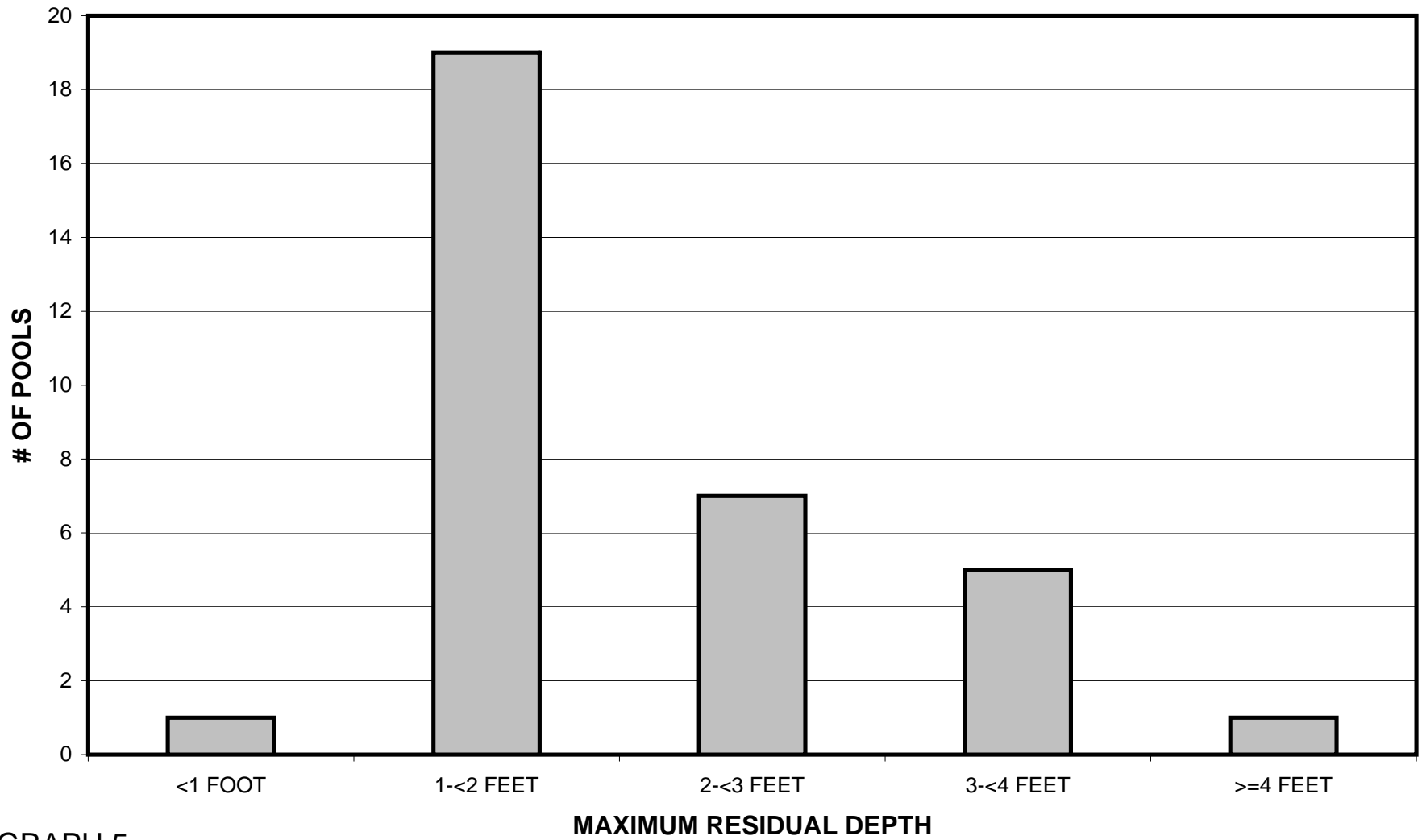
GRAPH 3

**STREETER CREEK 2009
POOL TYPES BY PERCENT OCCURRENCE**



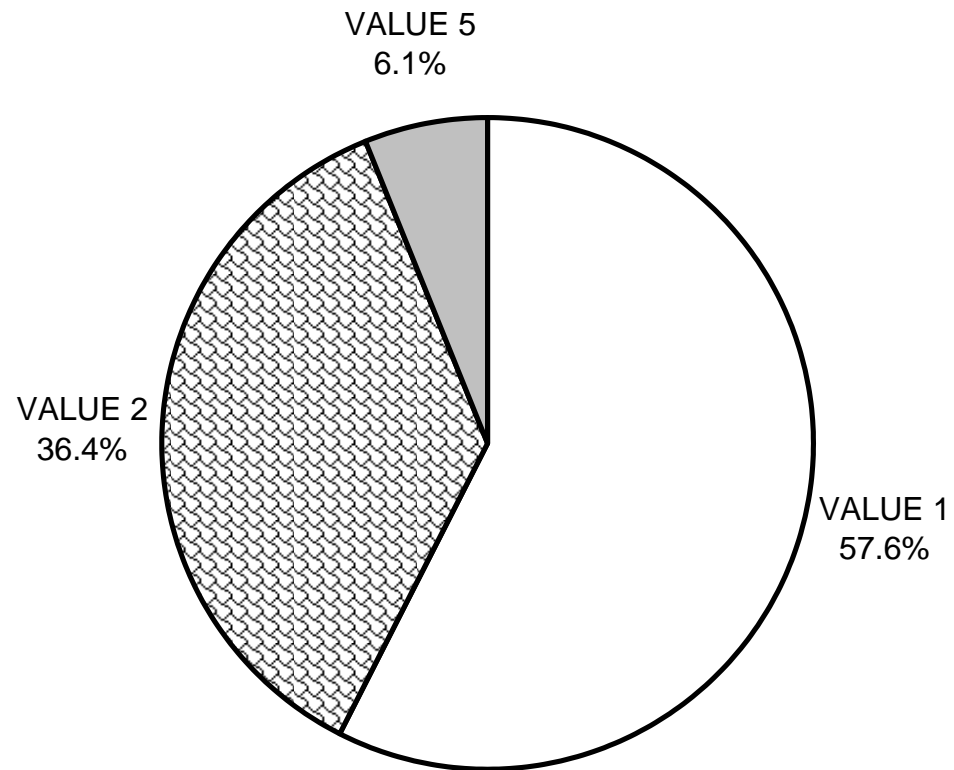
GRAPH 4

STREETER CREEK 2009 MAXIMUM DEPTH IN POOLS



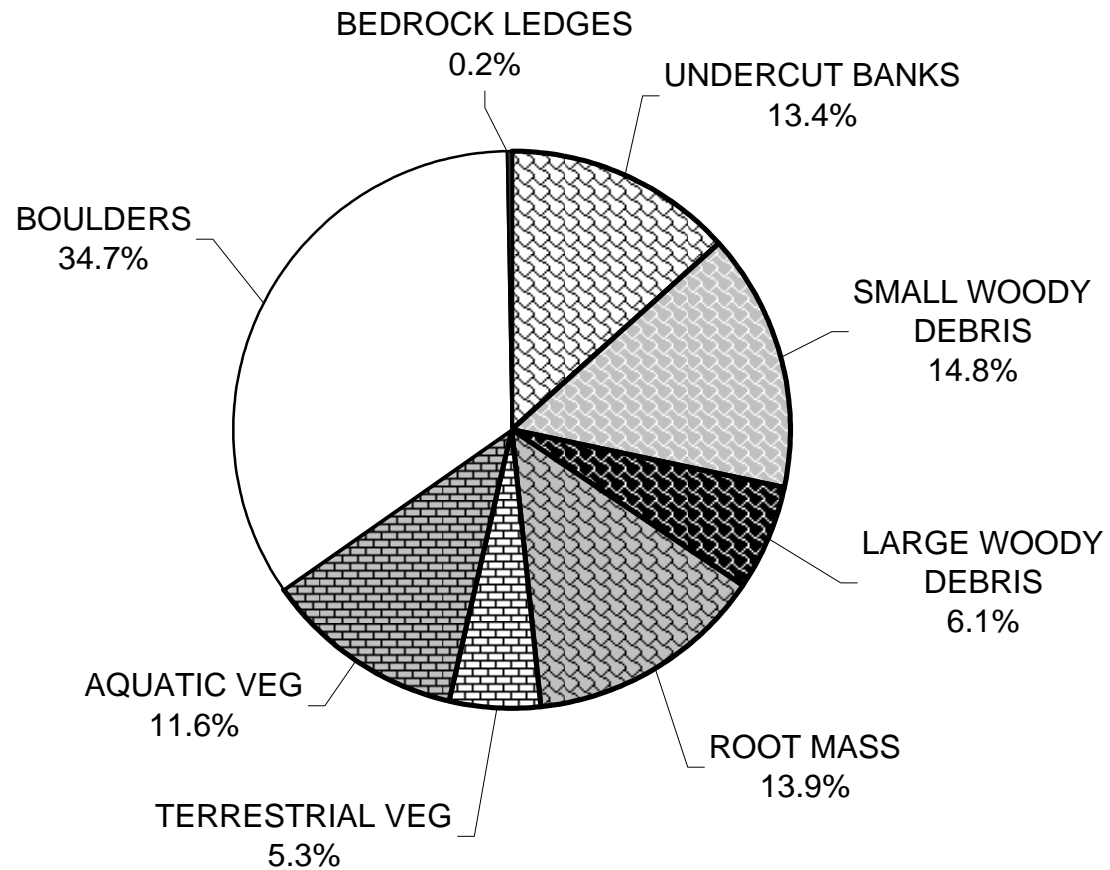
GRAPH 5

STREETER CREEK 2009 PERCENT EMBEDDEDNESS



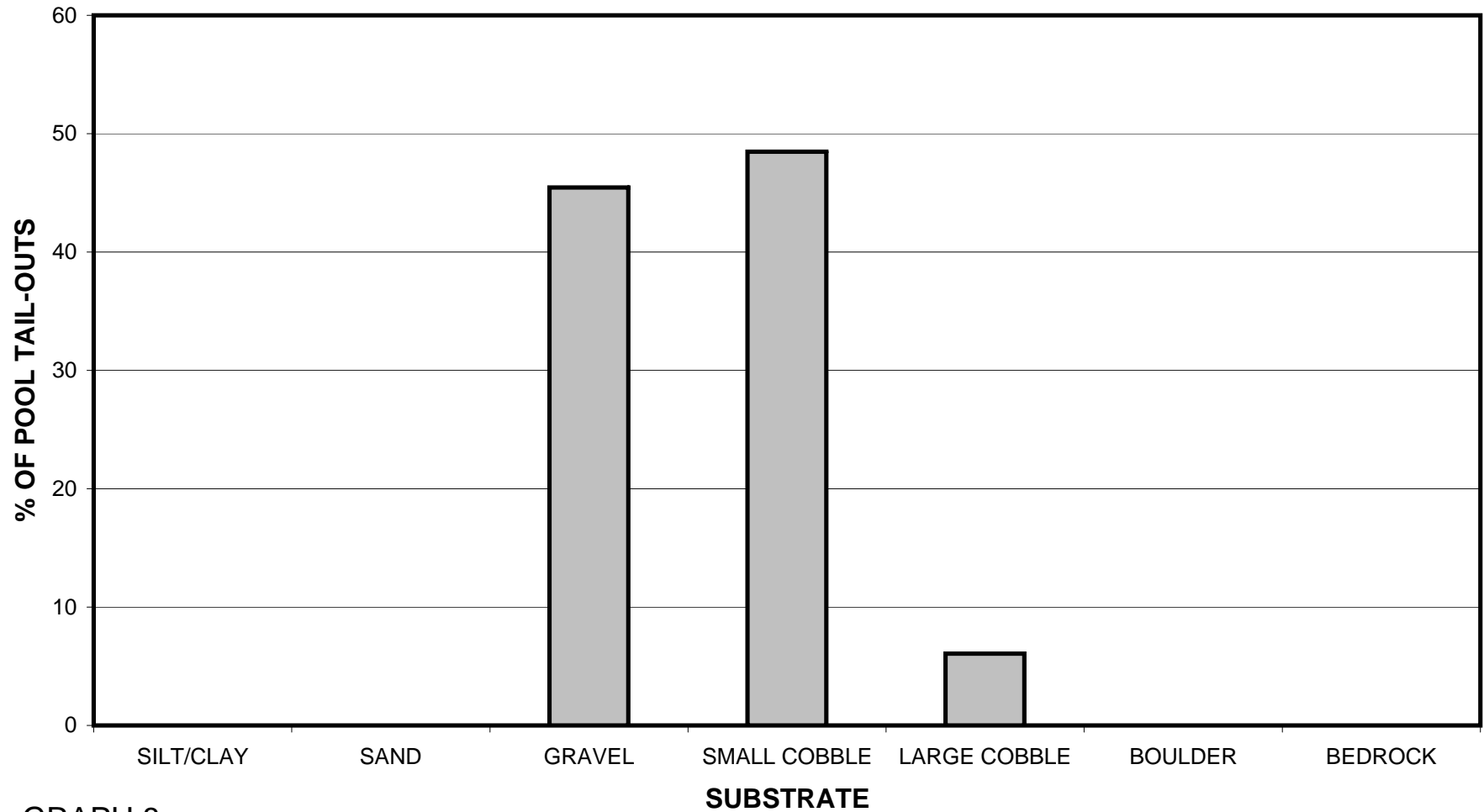
GRAPH 6

STREETER CREEK 2009 MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

STREETER CREEK 2009 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



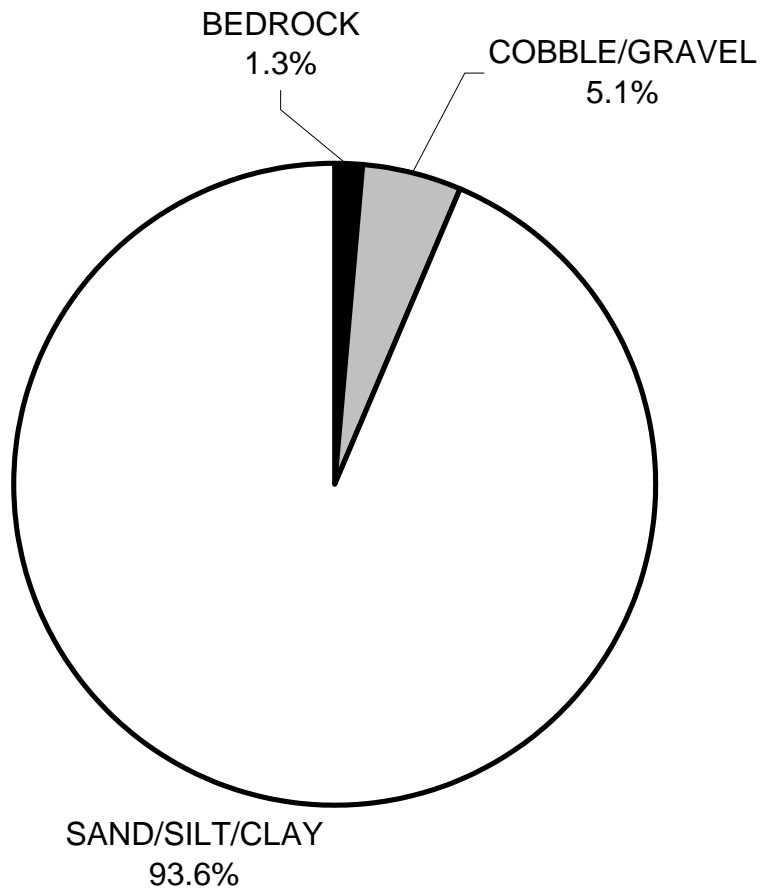
GRAPH 8

STREETER CREEK 2009 MEAN PERCENT CANOPY



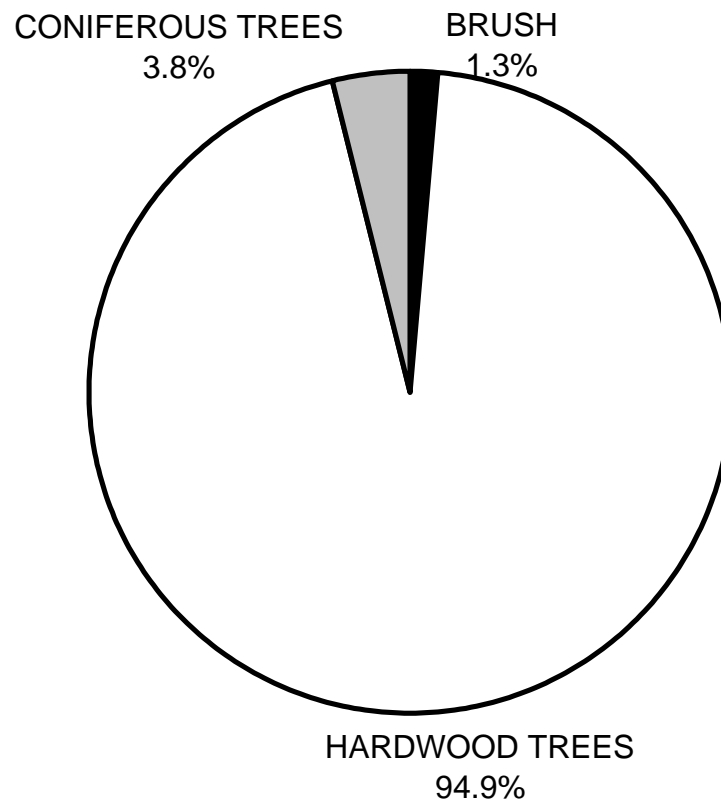
GRAPH 9

**STREETER CREEK 2009
DOMINANT BANK COMPOSITION IN SURVEY REACH**



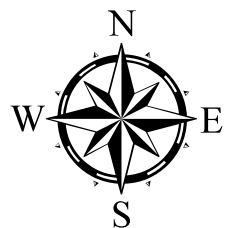
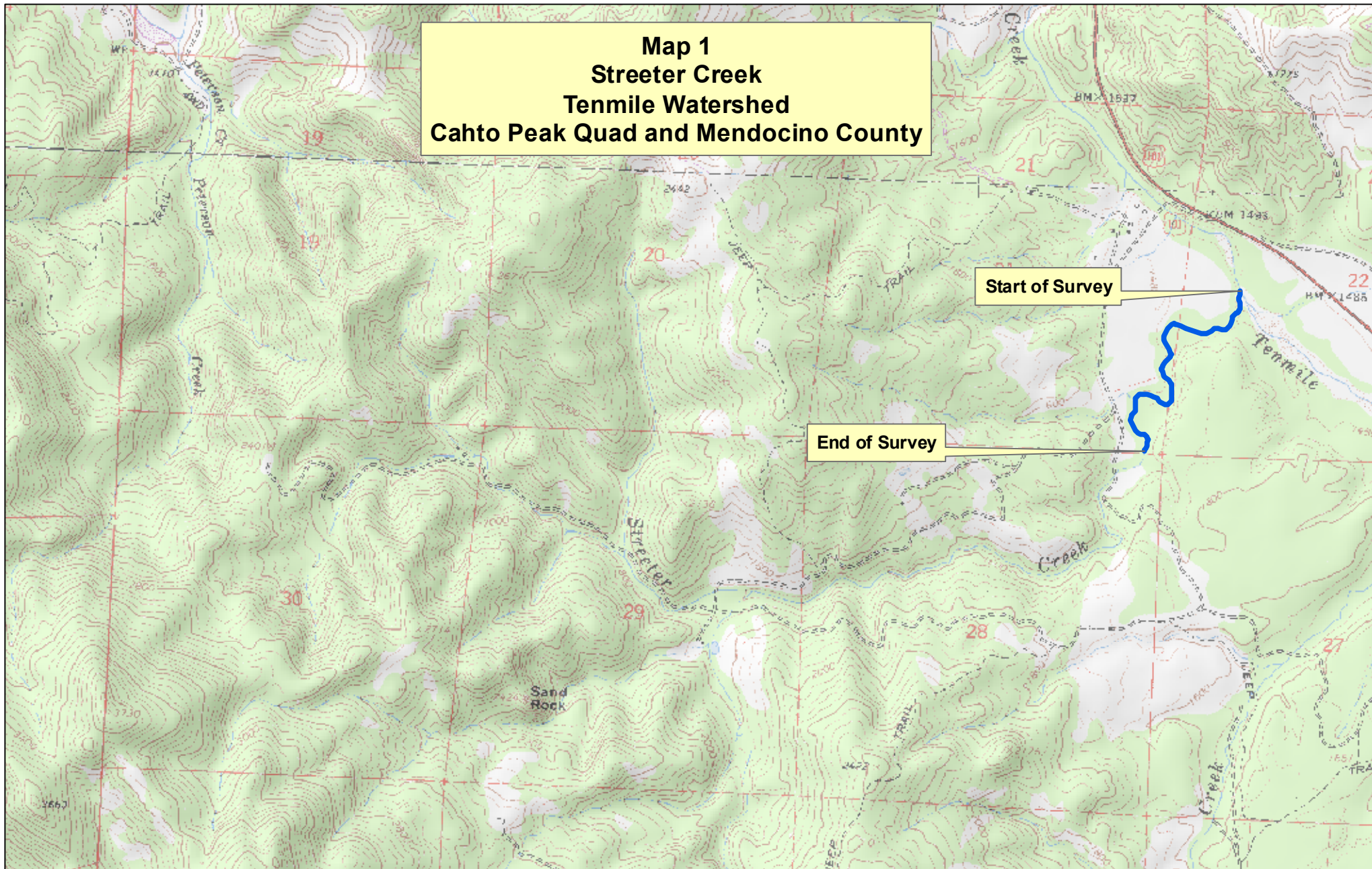
GRAPH 10

**STREETER CREEK 2009
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

Map 1
Streeter Creek
Tenmile Watershed
Cahto Peak Quad and Mendocino County



Legend

— Reach 1, F3 Channel Type

0 1,800 3,600 Feet

