

STREAM INVENTORY REPORT

“Frykman Gulch”

INTRODUCTION

A stream inventory was conducted on July 6, 2011 on an unnamed tributary to East Branch North Fork Big River commonly known as, and herein after referred to, as Frykman Gulch. The survey began at the confluence with East Branch North Fork Big River and extended upstream 0.3 miles.

The Frykman Gulch 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 Frykman Gulch. 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

Frykman Gulch is a tributary to East Branch North Fork Big River, tributary to North Fork Big River, tributary to Big River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Frykman Gulch's legal description at the confluence with East Branch North Fork Big River is T17N R15W S23. Its location is 39.3240 degrees north latitude and 123.5115 degrees west longitude, LLID number 1235103393240. Frykman Gulch is an intermittent stream according to the USGS Comptche 7.5 minute quadrangle. Frykman Gulch drains a watershed of approximately 0.6 square miles. Elevations range from about 410 feet at the mouth of the creek to 1,100 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 State Route 20.

METHODS

The habitat inventory conducted in Frykman Gulch follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Game (DFG) personnel and Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the 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

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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 Frykman Gulch 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". Frykman Gulch habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

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5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Frykman Gulch, 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 Frykman Gulch, 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 Frykman Gulch, 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 Frykman Gulch, 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 Frykman Gulch. In addition, two underwater observations were made at two 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 Frykman Gulch 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 6, 2011 was conducted by A. Blessing and T. Anderson (WSP). The total length of the stream surveyed was 1,420 feet.

Stream flow was not measured on Frykman Gulch.

Frykman Gulch is a B4 channel type for the entire length of stream surveyed, 1,420 feet. 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.

Water temperatures taken during the survey period ranged from 54 to 55 degrees Fahrenheit. Air temperatures ranged from 59 to 62 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 46% pool units, 41% flatwater units, 9% riffle units, 2% dry units, and 2% no survey units (Graph 1). Based on total length of Level II habitat types there were 76% flatwater units, 19% pool units, 3% riffle units, 2% dry units, and 1% no survey units (Graph 2).

Six Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 36%; step run units, 32%; run units, 9%; low gradient riffle units, 9%; and plunge pool units, 9% (Graph 3). Based on percent total length, step run units made up 69%, mid-channel pool units 15%, and run units 7%.

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A total of 20 pools were identified (Table 3). Main channel pools were the most frequently encountered at 80% (Graph 4), and comprised 79% 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. Six of the 20 pools (30%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 20 pool tail-outs measured, five had a value of 1 (25%) and 15 had a value of 2 (75%); (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 0, flatwater habitat types had a mean shelter rating of 23, and pool habitats had a mean shelter rating of 24 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 26. Scour pools had a mean shelter rating of 18 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks are the dominant cover type in Frykman Gulch. Graph 7 describes the pool cover in Frykman Gulch. Undercut banks 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. Gravel was the dominant substrate observed in 65% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 20% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Frykman Gulch was 99%. One 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 Frykman Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 98%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 70% sand/silt/clay, 20% cobble/gravel, and 10% bedrock (Graph 10). Deciduous trees were the dominant vegetation type observed in 39% of the units surveyed. Additionally, 24% of the units surveyed had coniferous trees as the dominant vegetation type, and 24% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at two sites for species composition and distribution in Frykman Gulch on July 6, 2011. The sites were sampled by I. Mikus and M. Groff (DFG).

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In reach 1, which comprised the first 1,420 feet of stream, two sites were sampled. The reach sites yielded 17 young-of-the-year steelhead/rainbow trout (SH/RT) and one coho salmon.

The following chart displays the information yielded from these sites:

2011 Frykman Gulch underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
B4 Channel Type									
07/06/11	1	002	Pool	31	1	0	0	1	0
07/06/11	2	004	Pool	232	16	0	0	0	0

DISCUSSION

Frykman Gulch is a B4 channel type for the entire length of the survey, 1,420 feet (Reach 1). The suitability of B4 channel types for fish habitat improvement structures is as follows: B4 channels are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey day July 6, 2011, ranged from 54 to 55 degrees Fahrenheit. Air temperatures ranged from 59 to 62 degrees Fahrenheit. This is a suitable water temperature range 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 76% of the total length of this survey, riffles 3%, and pools 19%. Six of the 20 (30%) pools had a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended.

All of the 20 pool tail-outs measured had embeddedness ratings of 1 or 2. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead.

Seventeen of the 20 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

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The mean shelter rating for pools is 24. The shelter rating in the flatwater habitats is 23. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in Frykman Gulch. Undercut banks 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 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 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 98% and 99%, 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) Frykman Gulch 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) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 4) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from undercut banks. 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 #:	Comment:
0	0001.00	Start of survey at the confluence with East Branch North Fork Big River. The channel is a B4 for the entire length of the survey, 1,420 feet.

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- 559 0022.00 Log debris accumulation (LDA) #01 contains three pieces of large woody debris (LWD) and measures 7.5' high x 27' wide x 5' long. Water does not flow through the LDA and there are visible gaps in it. Retained sediment ranges from sand to gravel and measures 7.5' wide x 7.5' long x 4' deep. There is a 5' high plunge over the LDA. It is a possible barrier to juvenile and adult salmonids. No fish were observed above the LDA.
- 888 0030.00 There is a 3' high plunge.
- 1160 0036.00 LDA #02 contains seven pieces of LWD and measures 11' high x 11.5' wide x 23' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to gravel and measures 1' wide x 1' long x 0.5' deep. It is a possible barrier to juvenile and adult salmonids.
- 1200 0038.00 There is a 4.5' high plunge.
- 1252 0040.00 There is a 5' high plunge.
- 1404 0044.00 End of survey. The creek is dry for over 300'. There is no defined creek channel above this 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.

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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: 1235103393240

LLID: 1235103393240 Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE Legal Description: T17NR15WS14 Latitude: 39:19:26.0N Longitude: 123:30:37.0

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	DRY	2.3	34	34	2.4									
18	2	FLATWATER	40.9	60	1073	75.6	6.5	0.4	0.8	94	1695	38	678		23
1	0	NOSURVEY	2.3	10	10	0.7									
20	20	POOL	45.5	13	262	18.5	7.4	0.7	1.6	98	1952	97	1949	74	24
4	1	RIFFLE	9.1	10	41	2.9	3.5	0.2	0.3	38	151	8	30		0
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
44	23				1420					3799			2658		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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 (%)
4	1	LGR	9.1	10	41	2.9	4	0.2	0.3	38	151	8	30		0	96
4	1	RUN	9.1	24	97	6.8	8	0.4	0.9	78	314	31	125		15	98
14	1	SRN	31.8	70	976	68.7	6	0.4	0.7	110	1540	44	616		30	100
16	16	MCP	36.4	13	207	14.6	6	0.7	3	83	1326	74	1184	56	26	99
4	4	PLP	9.1	14	55	3.9	12	0.9	2.6	157	626	191	765	145	18	100
1	0	DRY	2.3	34	34	2.4										
1	0	NS	2.3	10	10	0.7										

Total Units
44

Total Units Fully Measured
23

Total Length (ft.)
1420

Total Area (sq.ft.)
3957

Total Volume (cu.ft.)
2721

Table 3 - Summary of Pool Types

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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
16	16	MAIN	80	13	207	79	6.3	0.7	83	1326	56	897	26
4	4	SCOUR	20	14	55	21	11.8	0.9	157	626	145	581	18

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
20	20	262	1952	1478

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

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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
16	MCP	80	1	6	11	69	3	19	1	6	0	0
4	PLP	20	0	0	2	50	2	50	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
20	1	5	13	65	5	25	1	5	0	0

Mean Maximum Residual Pool Depth (ft.): 1.6

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Dry Units: 1

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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
4	1	LGR	0	0	0	0	0	0	0	0	0
4	1	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
4	1	RUN	80	10	0	10	0	0	0	0	0
14	1	SRN	80	10	0	10	0	0	0	0	0
18	2	TOTAL FLAT	80	10	0	10	0	0	0	0	0
16	16	MCP	40	37	5	5	0	0	0	0	13
4	4	PLP	19	11	5	0	0	0	28	38	0
20	20	TOTAL POOL	36	32	5	4	0	0	6	8	10
1	0	NS									
44	23	TOTAL	40	30	5	5	0	0	5	7	9

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Dry Units: 1

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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
4	1	LGR	0	0	100	0	0	0	0
4	1	RUN	0	0	100	0	0	0	0
14	1	SRN	0	0	100	0	0	0	0
16	16	MCP	0	13	88	0	0	0	0
4	4	PLP	0	25	75	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
99	27	73	0	98	99

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: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Survey Length (ft.): 1420

Main Channel (ft.): 1420

Side Channel (ft.): 0

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

Summary of Fish Habitat Elements By Stream Reach**STREAM REACH: 1**

Channel Type: B4

Canopy Density (%): 99.0

Pools by Stream Length (%): 18.5

Reach Length (ft.): 1420

Coniferous Component (%): 27.2

Pool Frequency (%): 45.5

Riffle/Flatwater Mean Width (ft.): 5.5

Hardwood Component (%): 72.8

Residual Pool Depth (%):

BFW:

Dominant Bank Vegetation: Hardwood Trees

< 2 Feet Deep: 70

Range (ft.): 6 to 9

Vegetative Cover (%): 98.6

2 to 2.9 Feet Deep: 25

Mean (ft.): 7

Dominant Shelter: Undercut Banks

3 to 3.9 Feet Deep: 5

Std. Dev.: 1

Dominant Bank Substrate Type: Sand/Silt/Clay

>= 4 Feet Deep: 0

Base Flow (cfs.): 0.0

Occurrence of LWD (%): 5

Mean Max Residual Pool Depth (ft.): 1.6

Water (F): 54 - 55 Air (F): 59 - 62

LWD per 100 ft.:

Mean Pool Shelter Rating: 24

Dry Channel (ft): 34

Riffles: 2

Pools: 6

Flat: 2

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 15 Gravel: 65 Sm Cobble: 20 Lg Cobble: 0 Boulder: 0 Bedrock: 0

Embeddedness Values (%): 1. 25.0 2. 75.0 3. 0.0 4. 0.0 5. 0.0

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

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	2	3	10.9
Boulder	0	0	0.0
Cobble / Gravel	4	5	19.6
Sand / Silt / Clay	17	15	69.6

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	5	1	13.0
Brush	7	4	23.9
Hardwood Trees	6	12	39.1
Coniferous Trees	5	6	23.9
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: 1235103393240

LLID: 1235103393240

Drainage: Big River

Survey Dates: 7/6/2011 to 7/6/2011

Confluence Location: Quad: COMPTCHE

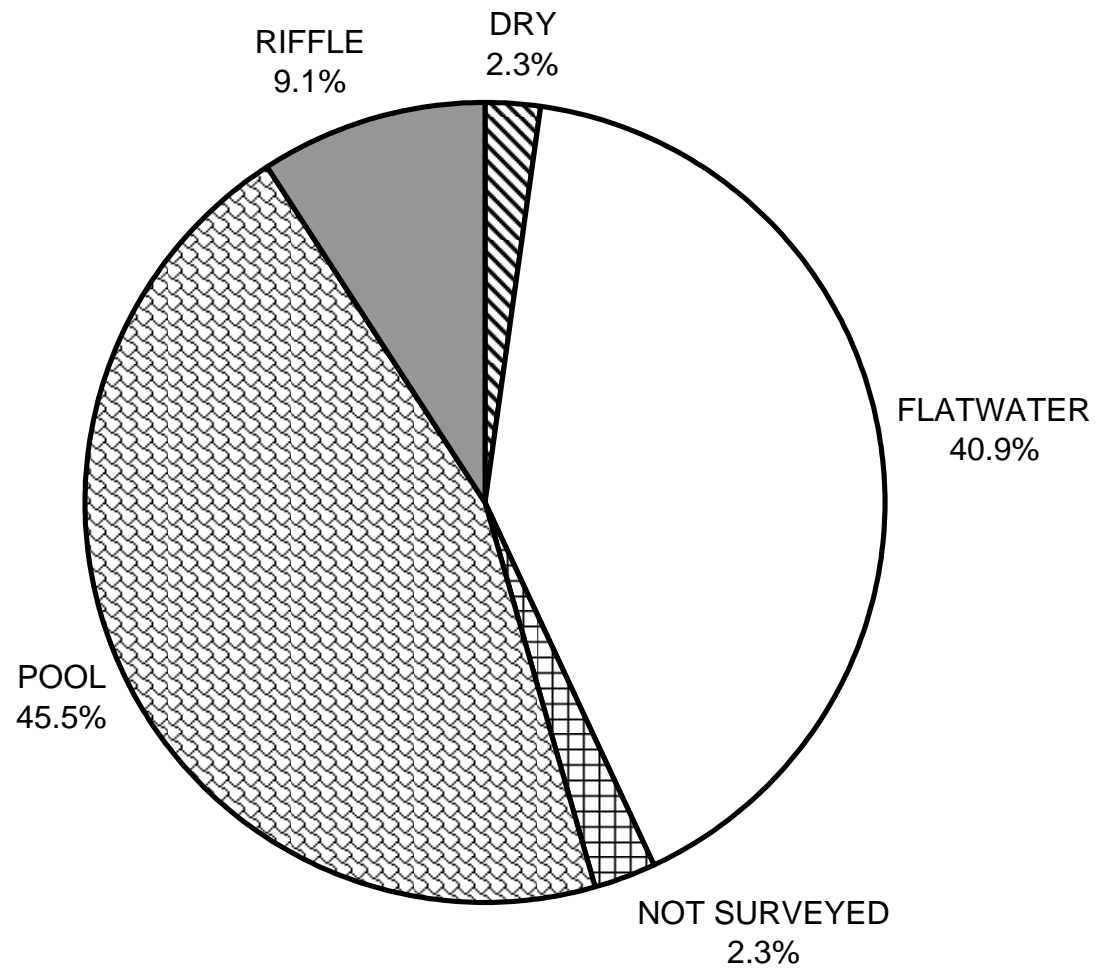
Legal Description: T17NR15WS14

Latitude: 39:19:26.0N

Longitude: 123:30:37.0W

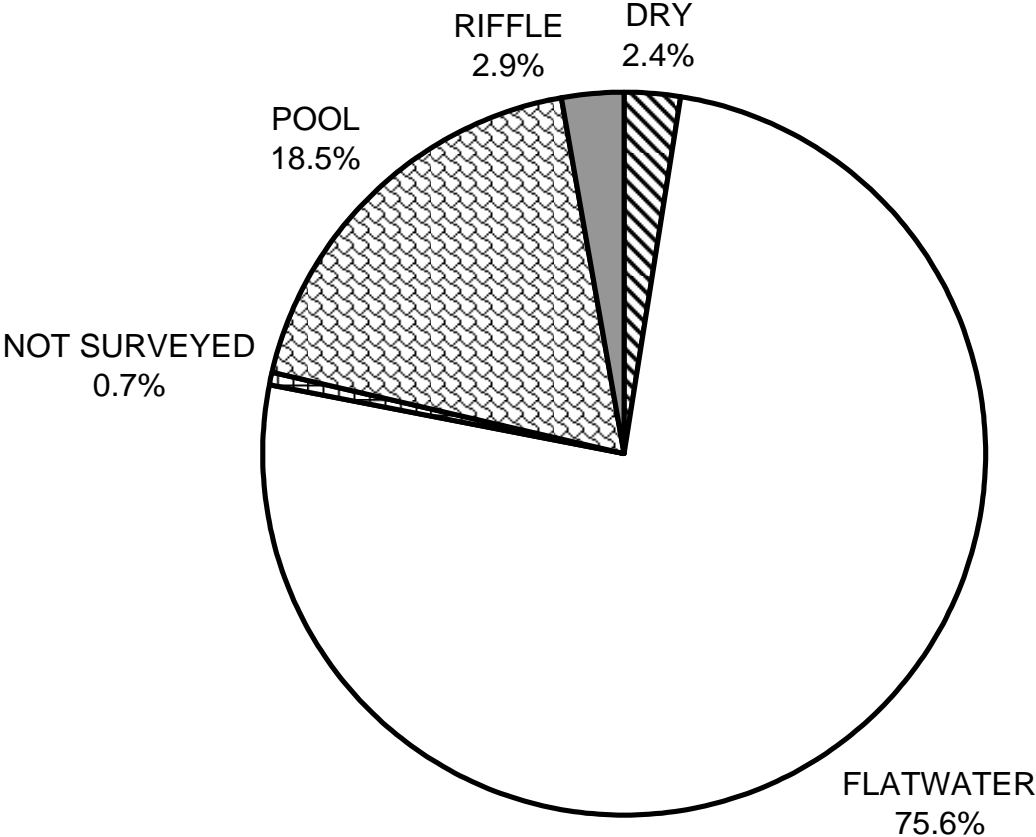
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	80	36
SMALL WOODY DEBRIS (%)	0	10	32
LARGE WOODY DEBRIS (%)	0	0	5
ROOT MASS (%)	0	10	4
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	6
BOULDERS (%)	0	0	8
BEDROCK LEDGES (%)	0	0	10

"Frykman Gulch" 2011 HABITAT TYPES BY PERCENT OCCURRENCE



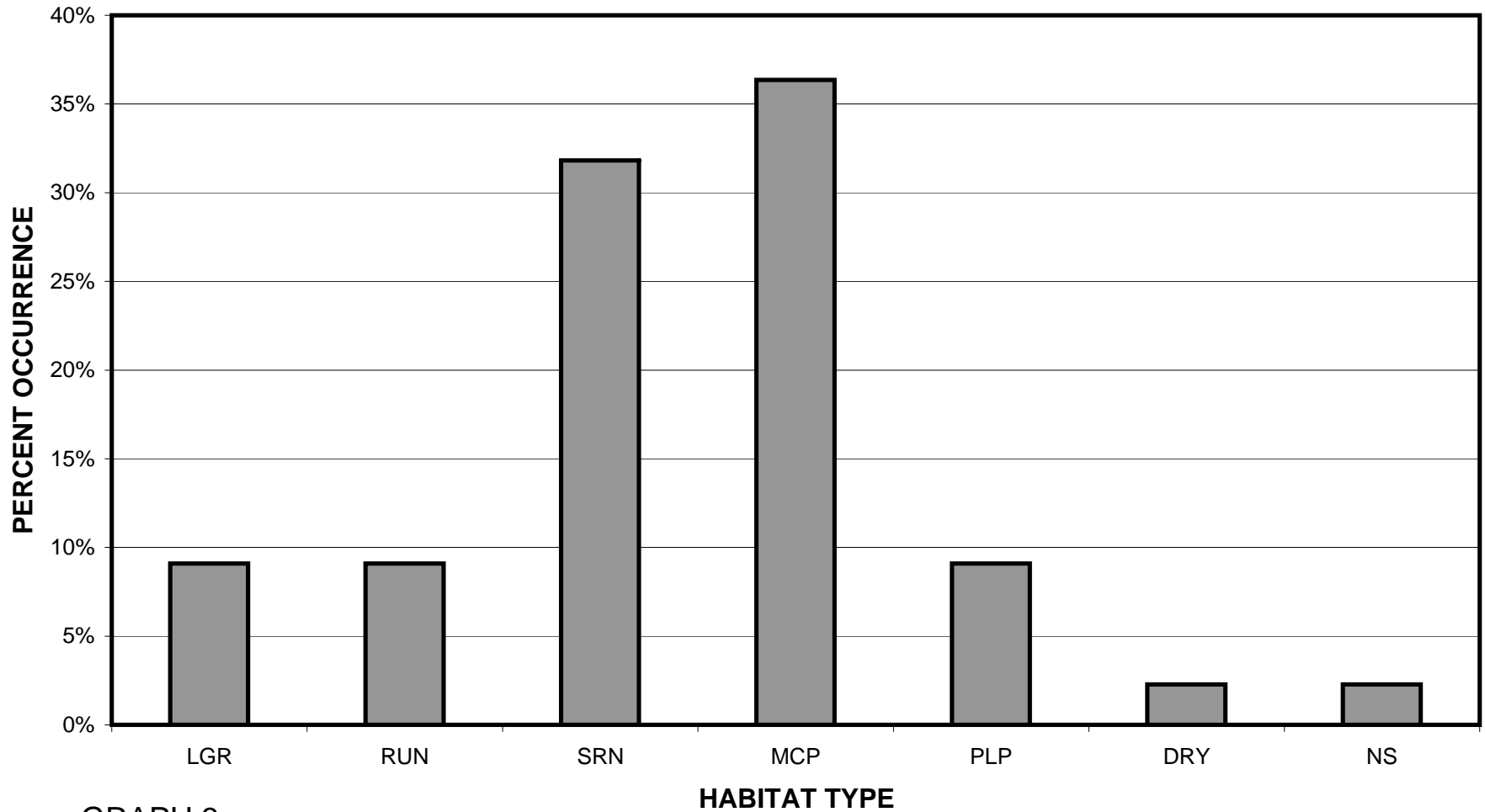
GRAPH 1

**"Frykman Gulch" 2011
HABITAT TYPES BY PERCENT TOTAL LENGTH**



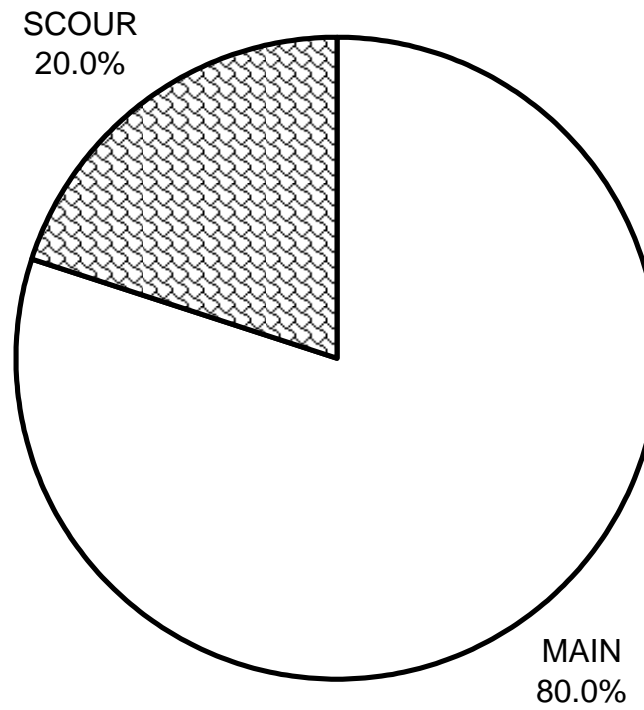
GRAPH 2

"Frykman Gulch" 2011
HABITAT TYPES BY PERCENT OCCURRENCE



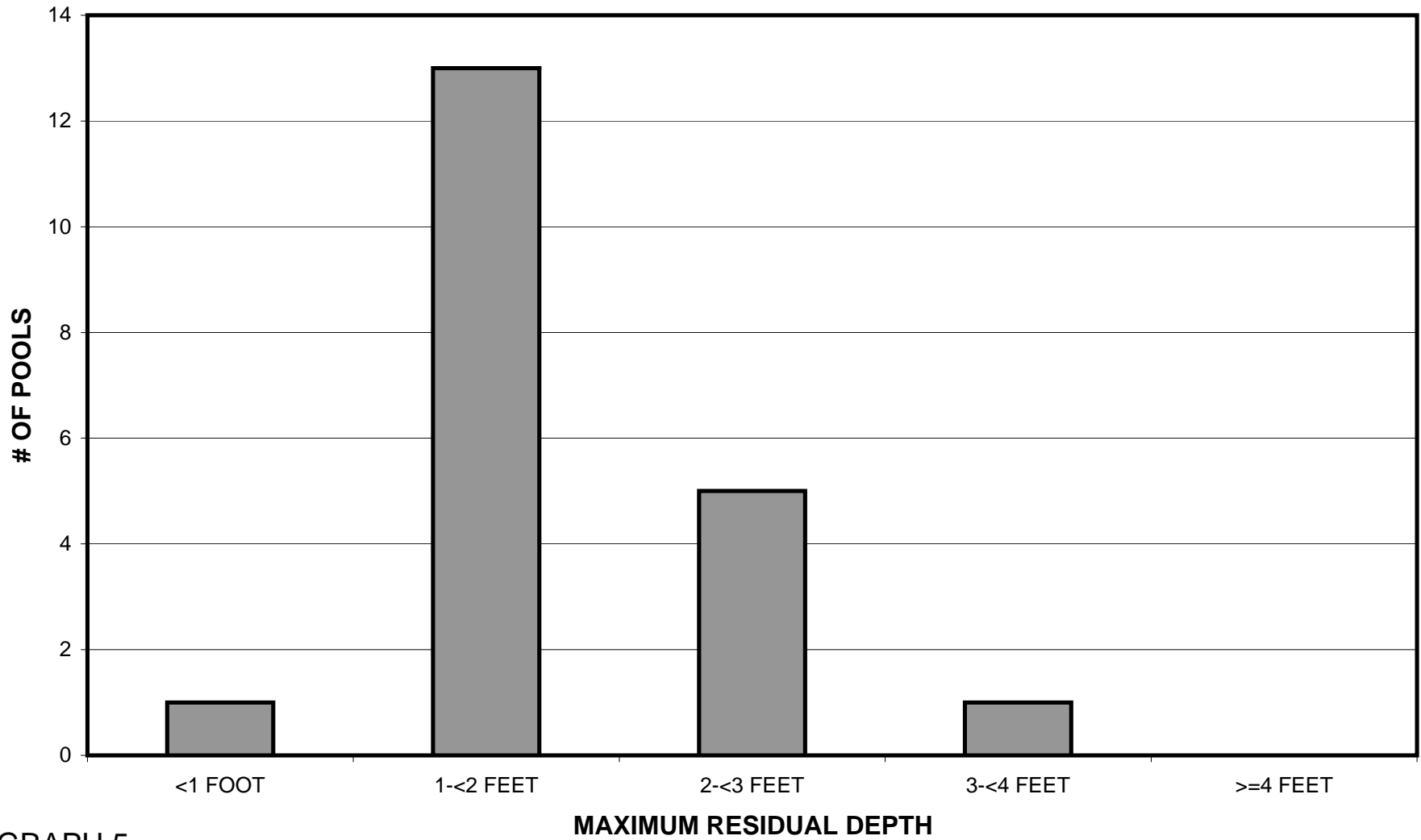
GRAPH 3

**"Frykman Gulch" 2011
POOL TYPES BY PERCENT OCCURRENCE**



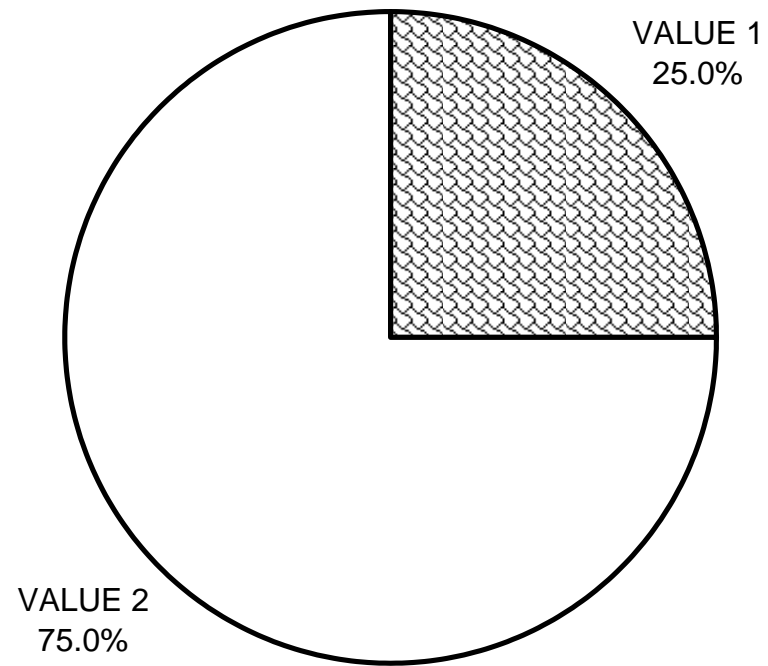
GRAPH 4

"Frykman Gulch" 2011 MAXIMUM DEPTH IN POOLS



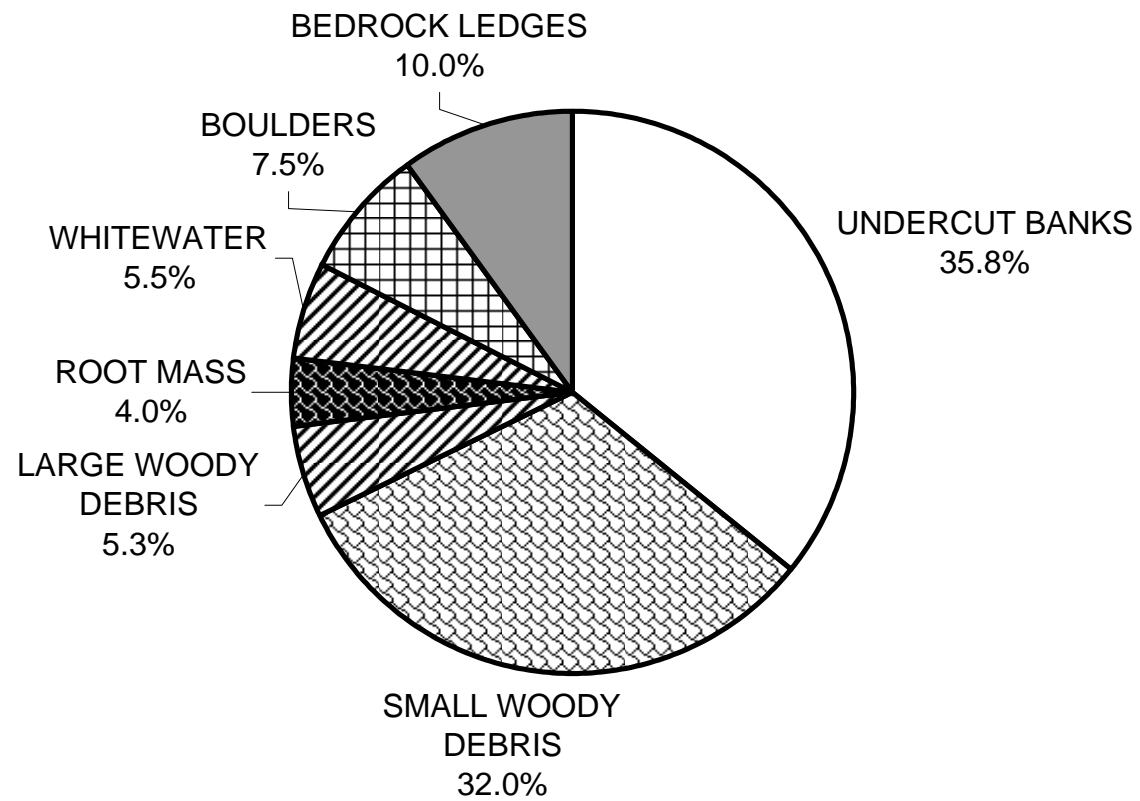
GRAPH 5

**"Frykman Gulch" 2011
PERCENT EMBEDDEDNESS**



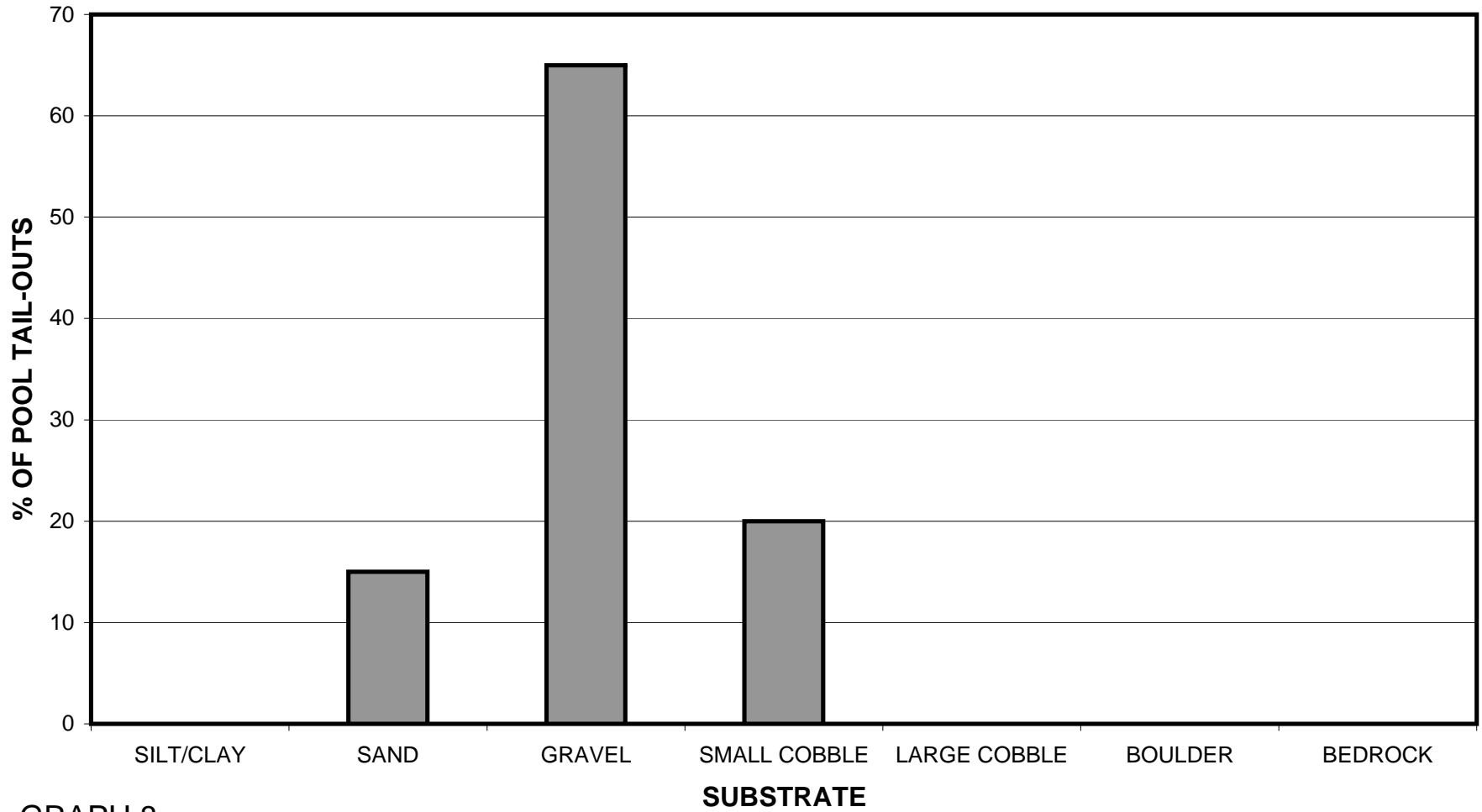
GRAPH 6

"Frykman Gulch" 2011 MEAN PERCENT COVER TYPES IN POOLS



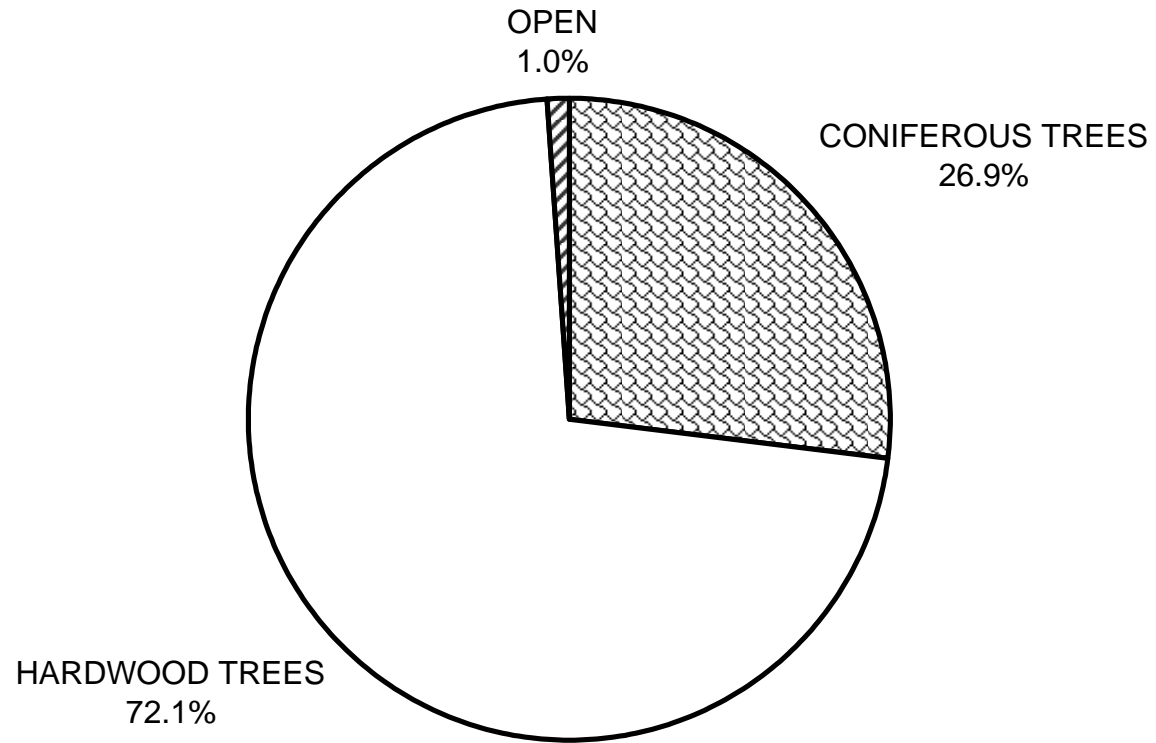
GRAPH 7

"Frykman Gulch" 2011
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



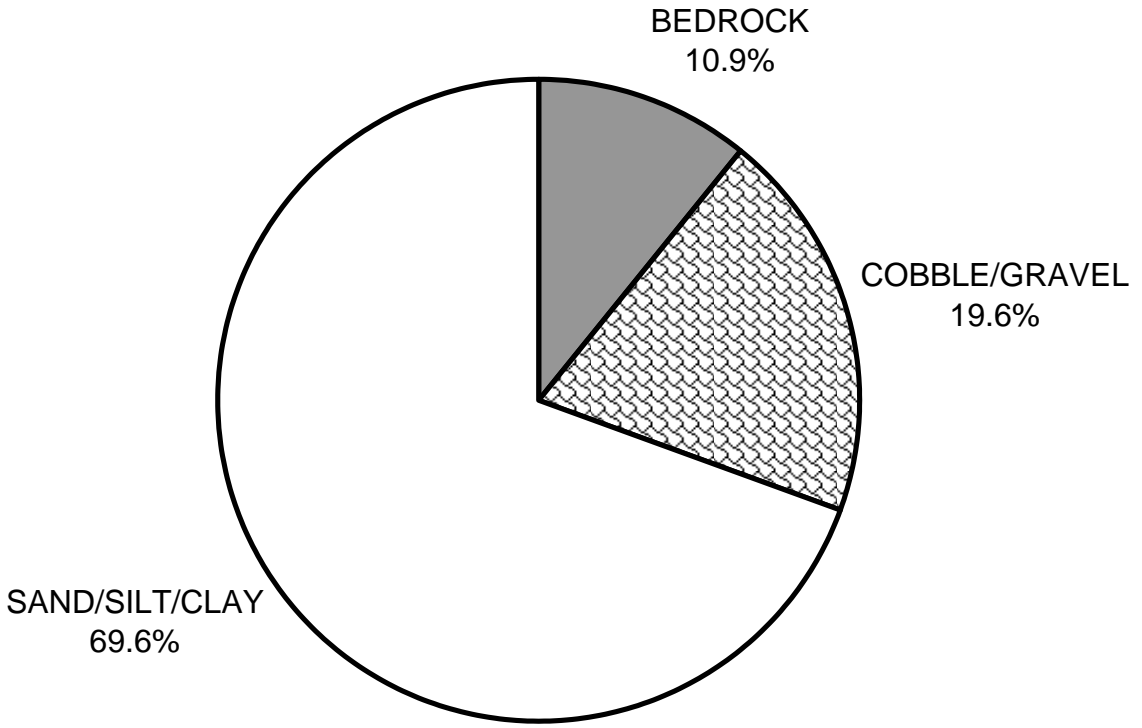
GRAPH 8

"Frykman Gulch" 2011 MEAN PERCENT CANOPY



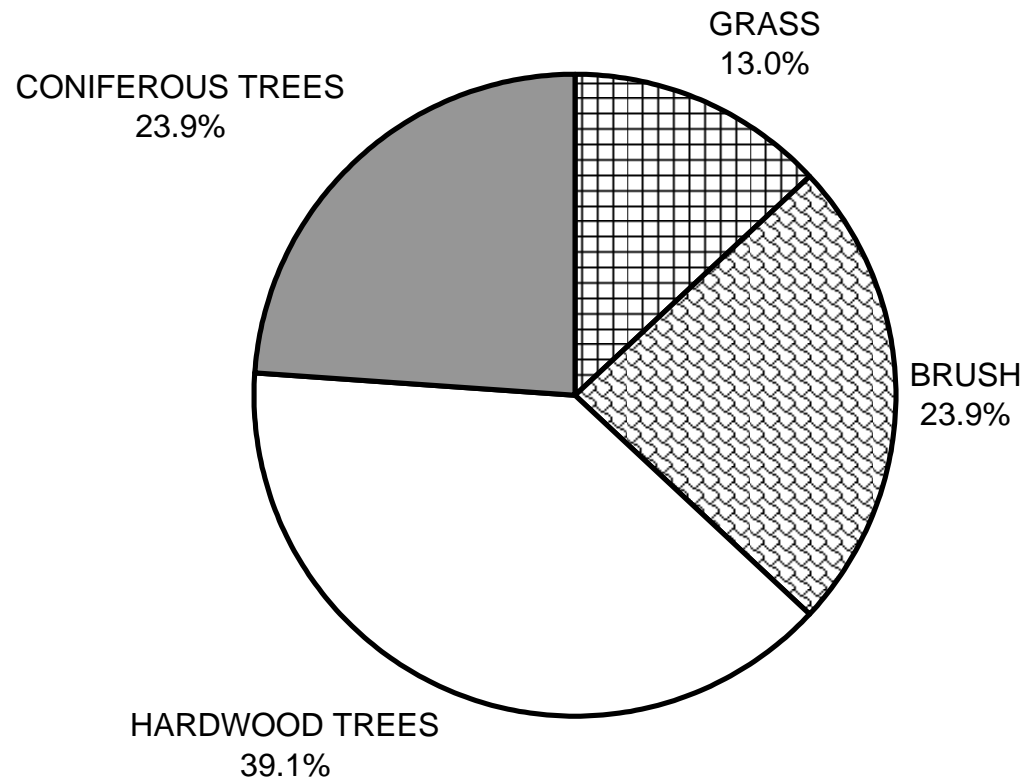
GRAPH 9

**"Frykman Gulch" 2011
DOMINANT BANK COMPOSITION IN SURVEY REACH**



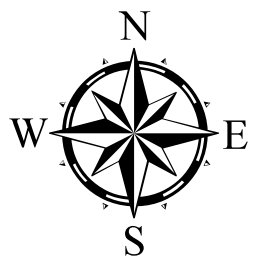
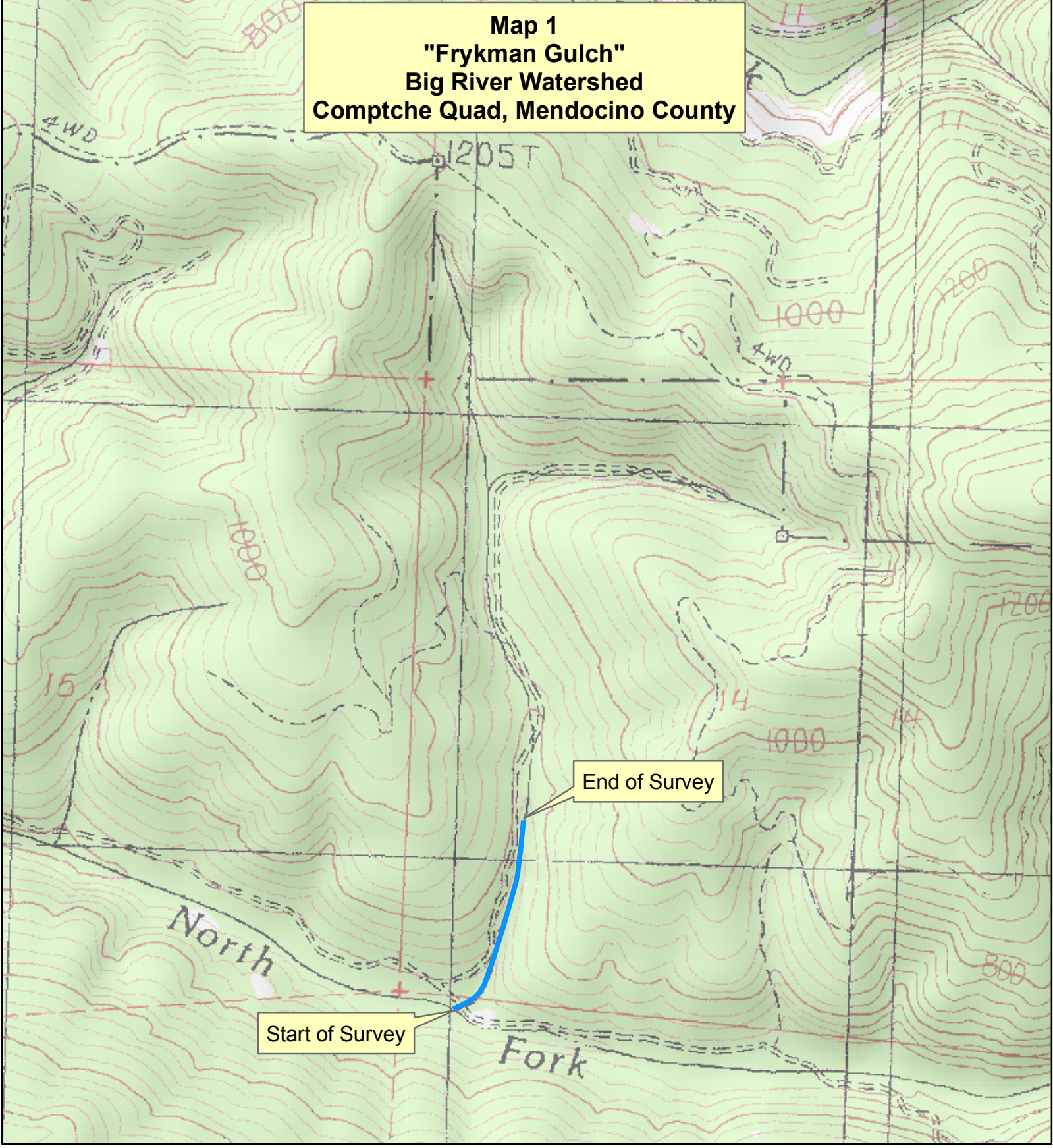
GRAPH 10

**"Frykman Gulch" 2011
DOMINANT BANK VEGETATION IN SURVEY REACH**




GRAPH 11

Map 1
"Frykman Gulch"
Big River Watershed
Comptche Quad, Mendocino County



Legend

 Reach 1, B4 Channel Type

