

# STREAM INVENTORY REPORT

## “Gulch 23”

### INTRODUCTION

A stream inventory was conducted from October 15 to October 16, 2012 on an unnamed tributary to Middle Fork Ten Mile River locally known as, and herein after referred to as, Gulch 23. The survey began at the confluence with Middle Fork Ten Mile River and extended upstream 0.3 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Gulch 23.

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

Gulch 23 is a tributary to Middle Fork Ten Mile River, a tributary Ten Mile River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Gulch 23's legal description at the confluence with Middle Fork Ten Mile River is T19N R16W S01. Its location is 39.5385 degrees north latitude and 123.5809 degrees west longitude, LLID number 1235796395384. Gulch 23 is an intermittent stream according to the USGS Sherwood Peak 7.5 minute quadrangle. Gulch 23 drains a watershed of approximately 1.1 square miles. Elevations range from about 440 feet at the mouth of the creek to 1,400 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Georgia-Pacific Industrial Road, north of Fort Bragg, CA.

### METHODS

The habitat inventory conducted in Gulch 23 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.

### 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 Gulch 23 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". Gulch 23 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 Gulch 23, 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 Gulch 23, 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 Gulch 23, 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 Gulch 23, 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.

## 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)
- 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 Gulch 23 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

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- 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 October 15 to October 16, 2012 was conducted by B. Leonard and T. Anderson (CDFW). The total length of the stream surveyed was 1,414 feet.

Stream flow was not measured on Gulch 23.

Gulch 23 is an A4 channel type for the entire length of the survey, 1,414. A4 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 50 to 51 degrees Fahrenheit. Air temperatures ranged from 58 to 61 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 37% flatwater units, 37% pool units, 15% riffle units, 10% dry units, and 2% unsurveyed units (Graph 1). Based on total length of Level II habitat types there were 53% flatwater units, 20% pool units, 17% dry units, 8% riffle units, and 2% unsurveyed 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, 37%; step run units, 27%; and low gradient riffle units, 12% (Graph 3). Based on percent total length, step run units made up 47%, mid-channel pool units 20%, and dry units 17%.

A total of 19 pools were identified (Table 3). All of the pools encountered were main channel pools (Graph 4).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. One of the 19 pools (5%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 19 pool tail-outs measured, one had a value of 2 (5.3%); 16 had a value of 3 (84.2%); two had a value of 4 (10.5%) (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

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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 18, and pool habitats had a mean shelter rating of 23 (Table 1).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Gulch 23. Graph 7 describes the pool cover in Gulch 23. Large 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. Small cobble was the dominant substrate observed in 53% of the pool tail-outs. Gravel 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 Gulch 23 was 97%. Three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 35% and 65%, respectively. Graph 9 describes the mean percent canopy in Gulch 23.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 65% cobble/gravel, 28% sand/silt/clay, 4% boulders, and 2% bedrock (Graph 10). Brush was the dominant vegetation type observed in 44% of the units surveyed. Additionally, 41% of the units surveyed had coniferous trees as the dominant vegetation type, and 15% had deciduous trees as the dominant vegetation type (Graph 11).

## **DISCUSSION**

Gulch 23 is an A4 channel type. A4 channels are generally not suitable for fish habitat improvement projects.

The water temperatures recorded on the survey days October 15 to October 16, 2012 ranged from 50 to 51 degrees Fahrenheit. Air temperatures ranged from 58 to 61 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 53% of the total length of this survey, riffles 8%, and pools 20%. One of the 19 (5%) 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

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flow channel, and be as long as the low flow channel width.

One of the 19 pool tail-outs measured had embeddedness ratings of 1 or 2. Eighteen of the pool tail-outs had embeddedness ratings of 3 or 4. None of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Gulch 23 should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Fourteen of the 19 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 23. The shelter rating in the flatwater habitats is 18. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Gulch 23. Large 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 97%. The percentage of right and left bank covered with vegetation was 97% and 99%, respectively.

## RECOMMENDATIONS

- 1) Gulch 23 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.

## 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 Middle Fork Ten Mile River. The channel is an A4 for the entire length of the survey.

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12	0002.00	Road 10000 crosses the channel. The crossing is a 13' wide x 50' long x 20' high metal railcar bridge.
196	0007.00	There is a 4' high plunge over old growth log.
228	0010.00	Two 4' high plunges over boulders.
401	0020.00	Log debris accumulation (LDA) #01 contains 11 pieces of large woody debris (LWD) and measures 7' high x 20' wide x 25' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from sand to boulders. Fish were not observed above the LDA.
555	0024.00	LDA #02 contains six pieces of LWD and measures 6' high x 13' wide x 10' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to boulders and measures 20' wide x 100' long x 6' deep.
1102	0042.00	LDA #03 contains 11 pieces of LWD and measures 10' high x 20' wide x 28' long. Water does not flow through the LDA; the channel is dry above it. There are visible gaps in the LDA. Retained sediment ranges from sand to boulders.
1185	0045.00	Spring on the right bank.
1390	0052.00	End of survey due to diminished habitat. The slope is 7.5% and the channel goes dry for 700'.

## 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: 1235796395384

LLID: 1235796395384 Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK Legal Description: T19NR16WS01 Latitude: 39:32:18.0N Longitude: 123:34:47.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
5	0	DRY	9.6	49	244	17.3									
19	2	FLATWATER	36.5	40	755	53.4	3.3	0.4	0.8	156	2966	47	895		18
1	0	NOSURVEY	1.9	28	28	2.0									
19	19	POOL	36.5	15	278	19.7	7.6	0.6	1.2	113	2148	100	1898	77	23
8	2	RIFFLE	15.4	14	109	7.7	3.0	0.1	0.3	17	136	2	14		0
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>			<b>Total Volume (cu.ft.)</b>		
52	23				1414					5250			2806		

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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK Legal Description: T19NR16WS01 Latitude: 39:32:18.0N Longitude: 123:34:47.0W

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 (%)
6	2	LGR	11.5	14	87	6.2	3	0.1	0.3	17	102	2	10		0	94
2	0	HGR	3.8	11	22	1.6										
5	1	RUN	9.6	19	94	6.6	0	0.4	0.9	5	25	2	10		15	100
14	1	SRN	26.9	47	661	46.7	6	0.3	0.6	307	4301	92	1290		20	100
19	19	MCP	36.5	15	278	19.7	8	0.6	2.6	113	2148	100	1898	77	23	97
5	0	DRY	9.6	49	244	17.3										
1	0	NS	1.9	28	28	2.0										

Total Units  
52

Total Units Fully Measured  
23

Total Length (ft.)  
1414

Total Area (sq.ft.)  
6576

Total Volume (cu.ft.)  
3208

**Table 3 - Summary of Pool Types**

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK

Legal Description: T19NR16WS01

Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

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
19	19	MAIN	100	15	278	100	7.6	0.6	113	2148	77	1462	23

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
19	19	278	2148	1462

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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK Legal Description: T19NR16WS01 Latitude: 39:32:18.0N Longitude: 123:34:47.0W

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
19	MCP	100	4	21	14	74	1	5	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
19	4	21	14	74	1	5	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.2

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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Dry Units: 5

Confluence Location: Quad: SHERWOOD PEAK

Legal Description: T19NR16WS01

Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

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
6	2	LGR	0	0	0	0	0	0	0	0	0
2	0	HGR									
8	2	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
5	1	RUN	0	0	0	0	0	0	0	100	0
14	1	SRN	0	15	15	0	0	0	0	70	0
19	2	TOTAL FLAT	0	8	8	0	0	0	0	85	0
19	19	MCP	7	20	36	6	0	0	0	32	0
19	19	TOTAL POOL	7	20	36	6	0	0	0	32	0
1	0	NS									
52	23	TOTAL	5	17	30	5	0	0	0	33	0

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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Dry Units: 5

Confluence Location: Quad: SHERWOOD PEAK

Legal Description: T19NR16WS01

Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

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
6	2	LGR	0	0	100	0	0	0	0
2	0	HGR	0	0	0	0	0	0	0
5	1	RUN	0	0	0	0	0	100	0
14	1	SRN	0	0	0	0	100	0	0
19	19	MCP	42	0	32	11	5	11	0

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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK

Legal Description: T19NR16WS01

Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

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Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
97	65	35	0	97	99

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

Open units represent habitat units with zero canopy cover.





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

Stream Name: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK Legal Description: T19NR16WS01

Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

**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	2.2
Boulder	0	2	4.3
Cobble / Gravel	14	16	65.2
Sand / Silt / Clay	9	4	28.3

**Mean Percentage of Dominant Stream Bank Vegetation**

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	0	0.0
Brush	11	9	43.5
Hardwood Trees	3	4	15.2
Coniferous Trees	9	10	41.3
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 3

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

StreamName: 1235796395384

LLID: 1235796395384

Drainage: Rockport

Survey Dates: 10/15/2012 to 10/16/2012

Confluence Location: Quad: SHERWOOD PEAK

Legal Description: T19NR16WS01

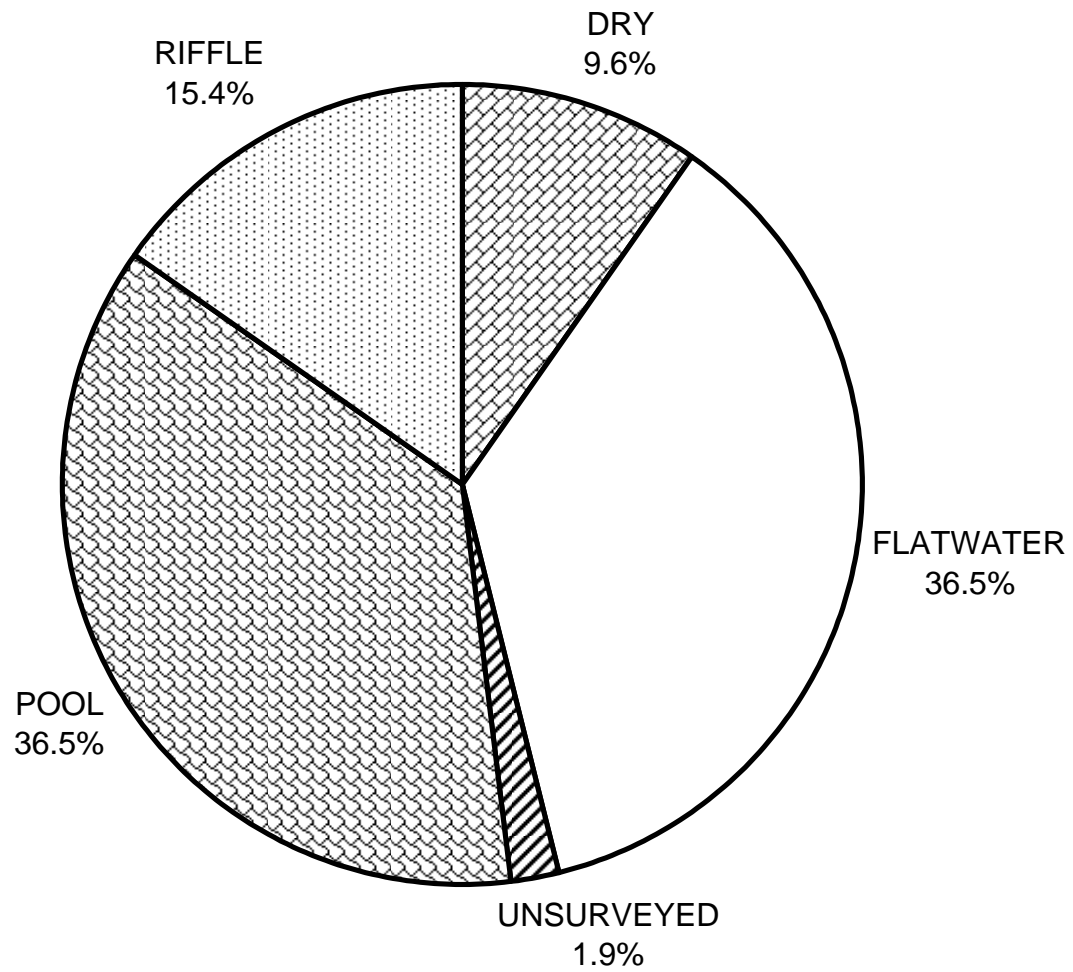
Latitude: 39:32:18.0N

Longitude: 123:34:47.0W

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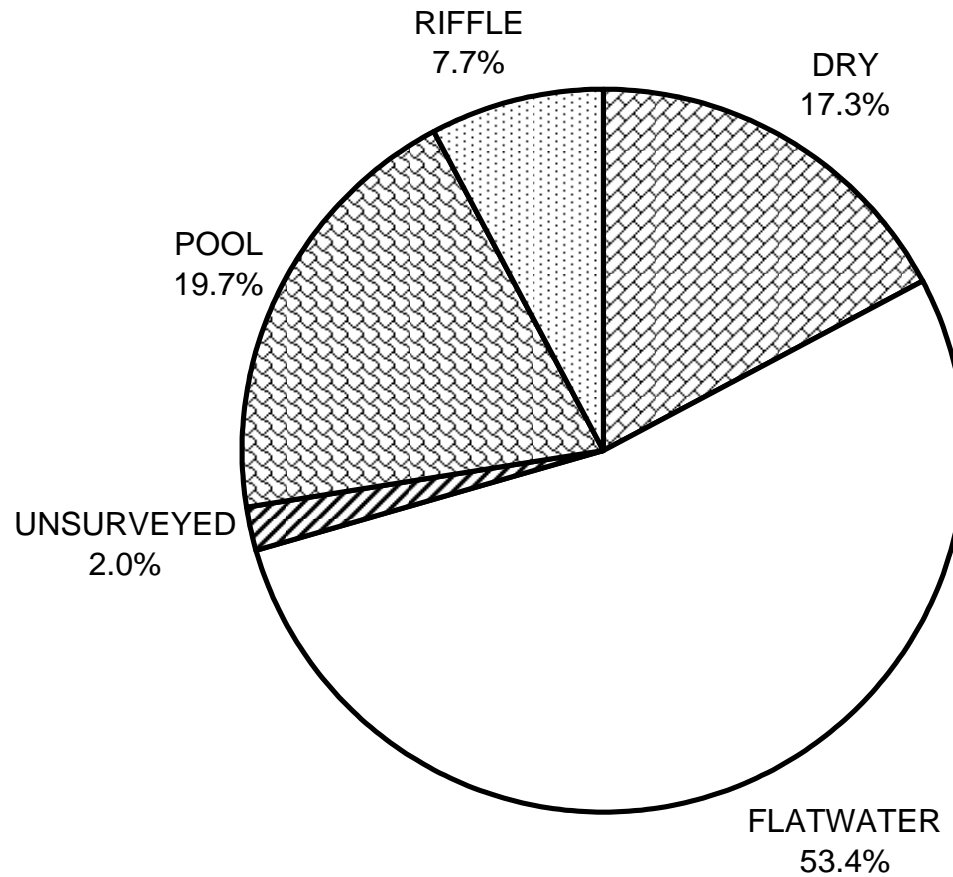
	<b>Riffles</b>	<b>Flatwater</b>	<b>Pools</b>
UNDERCUT BANKS (%)	0	0	7
SMALL WOODY DEBRIS (%)	0	8	20
LARGE WOODY DEBRIS (%)	0	8	36
ROOT MASS (%)	0	0	6
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	85	32
BEDROCK LEDGES (%)	0	0	0

# "GULCH 23" 2012 HABITAT TYPES BY PERCENT OCCURRENCE



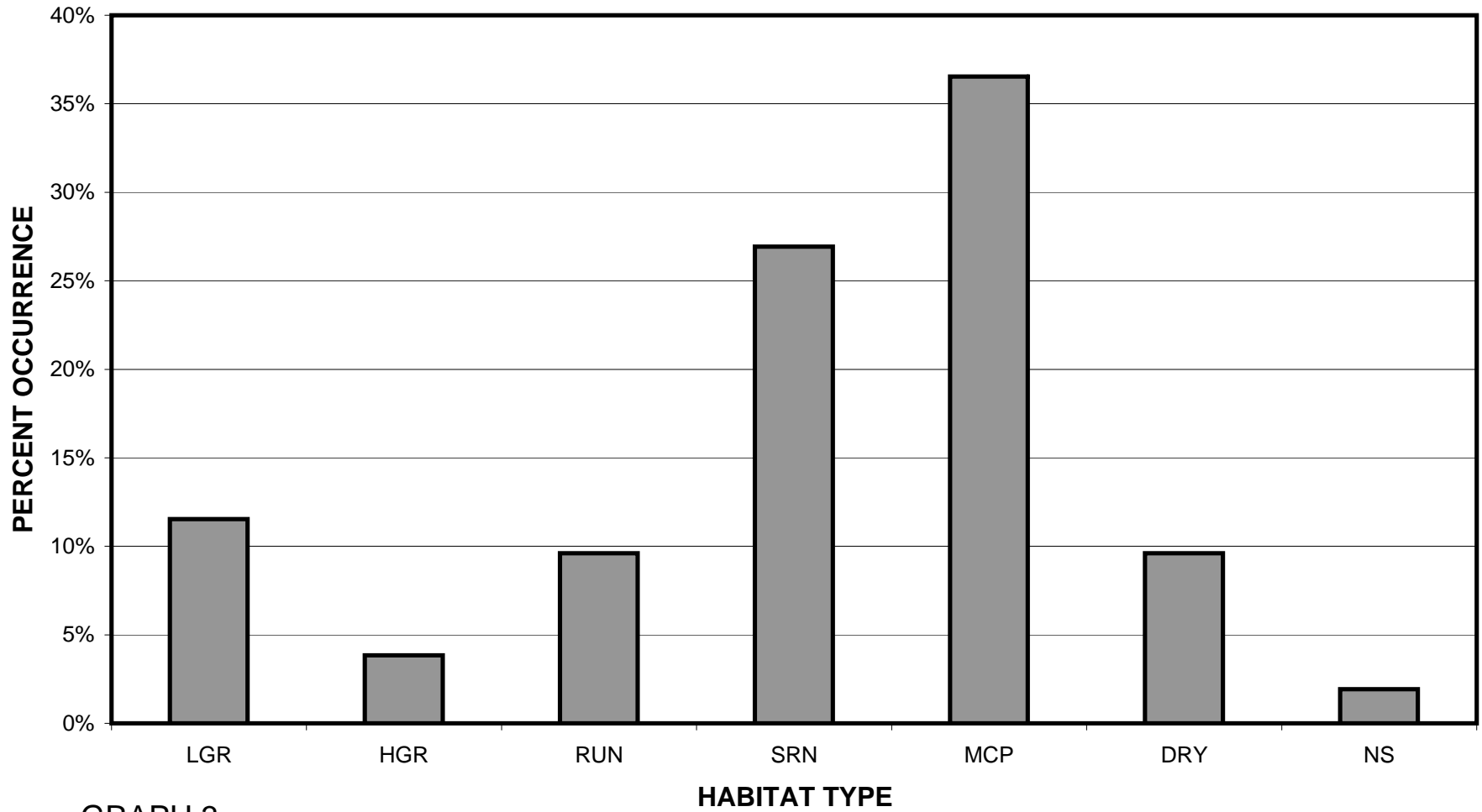
GRAPH 1

**"GULCH 23" 2012**  
**HABITAT TYPES BY PERCENT TOTAL LENGTH**



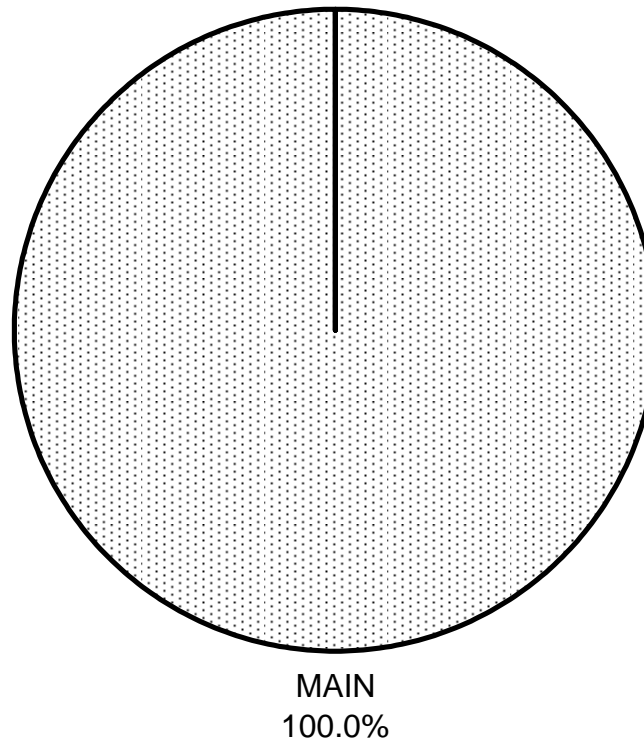
GRAPH 2

**"GULCH 23" 2012**  
**HABITAT TYPES BY PERCENT OCCURRENCE**



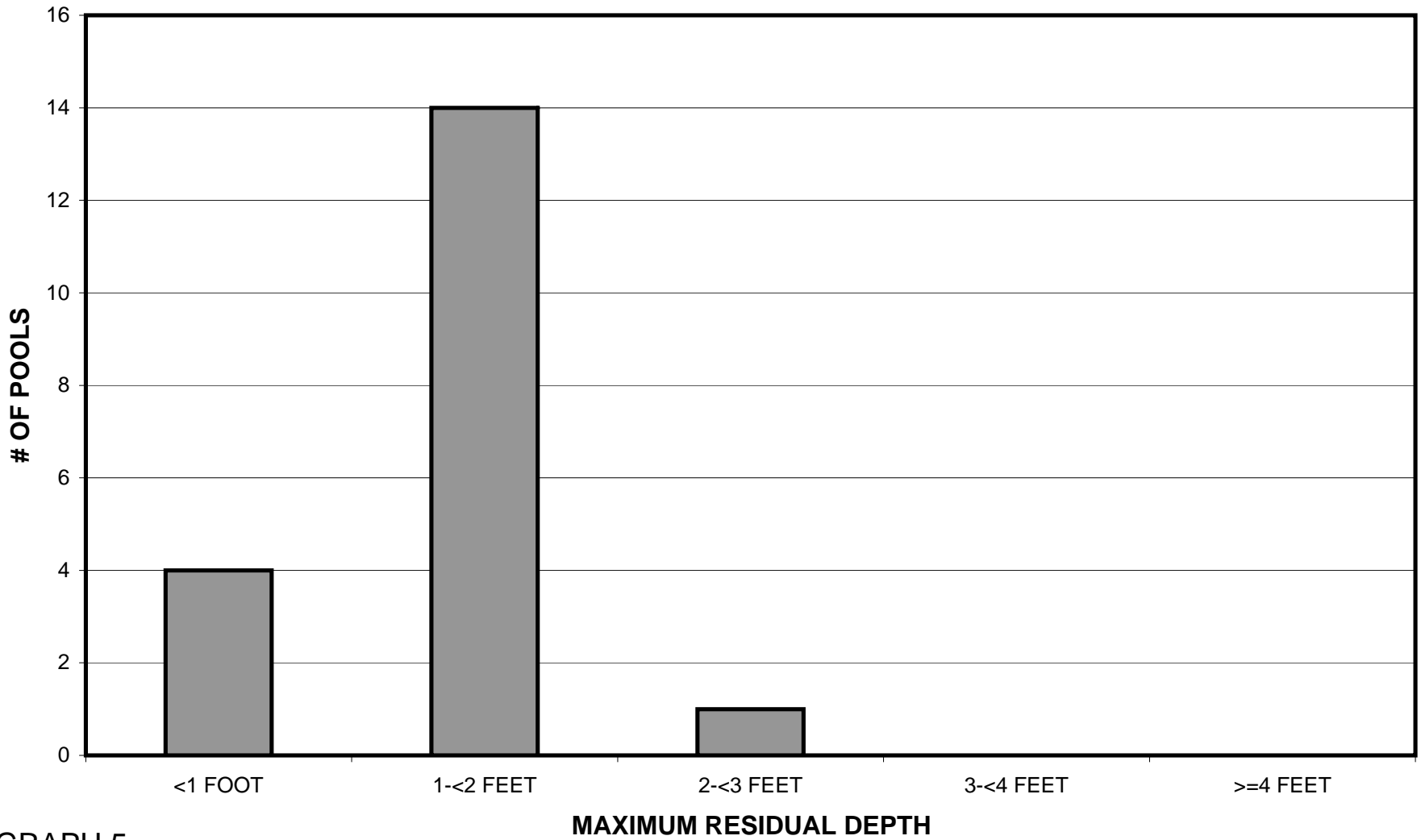
GRAPH 3

**"GULCH 23" 2012  
POOL TYPES BY PERCENT OCCURRENCE**



GRAPH 4

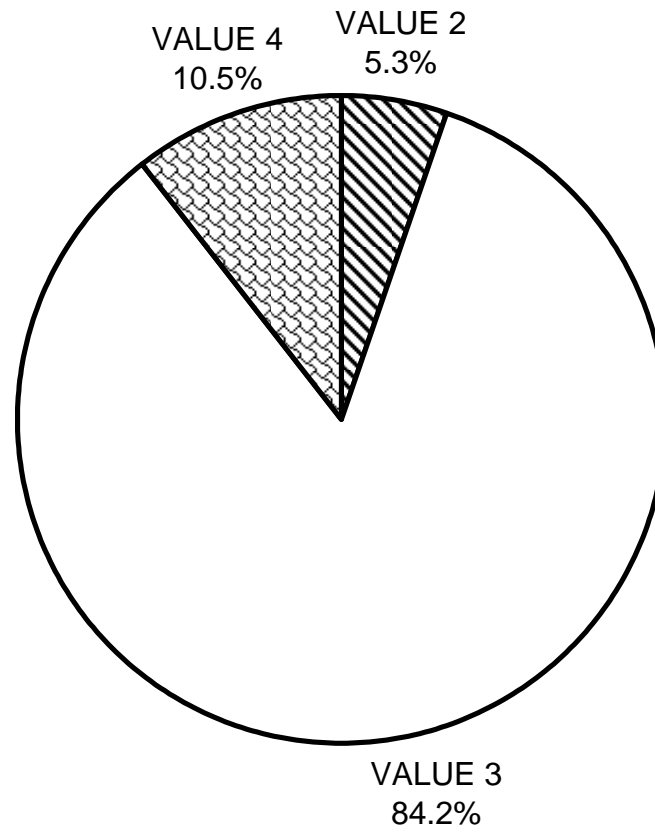
# "GULCH 23" 2012 MAXIMUM DEPTH IN POOLS



GRAPH 5

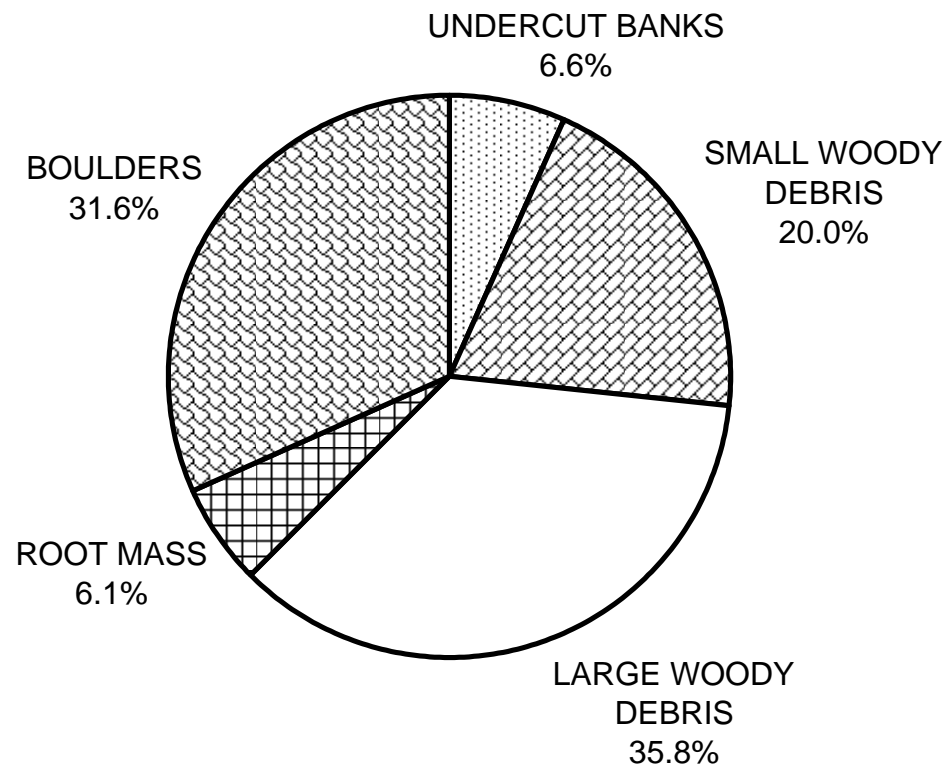


**"GULCH 23" 2012  
PERCENT EMBEDDEDNESS**



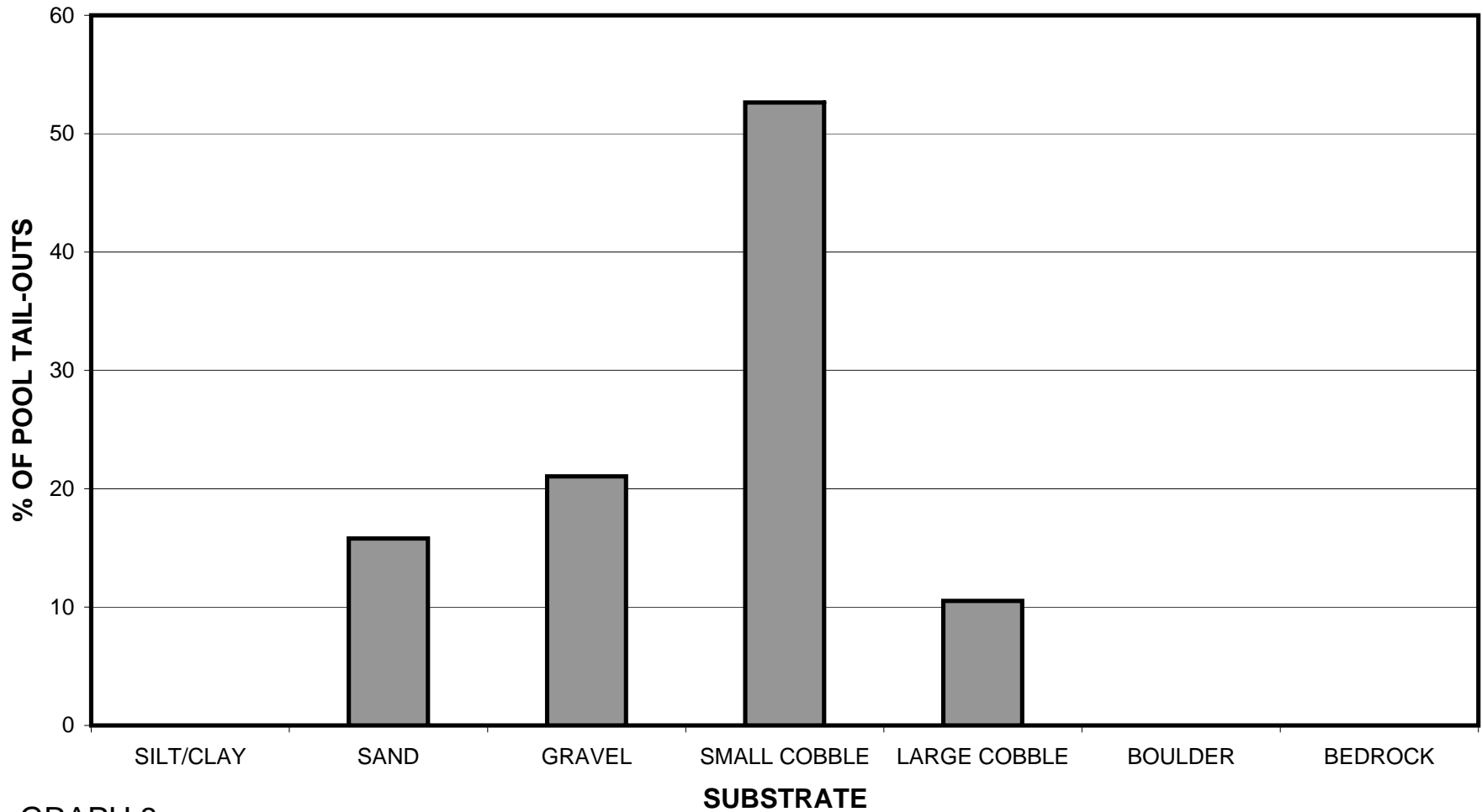
GRAPH 6

**"GULCH 23" 2012**  
**MEAN PERCENT COVER TYPES IN POOLS**



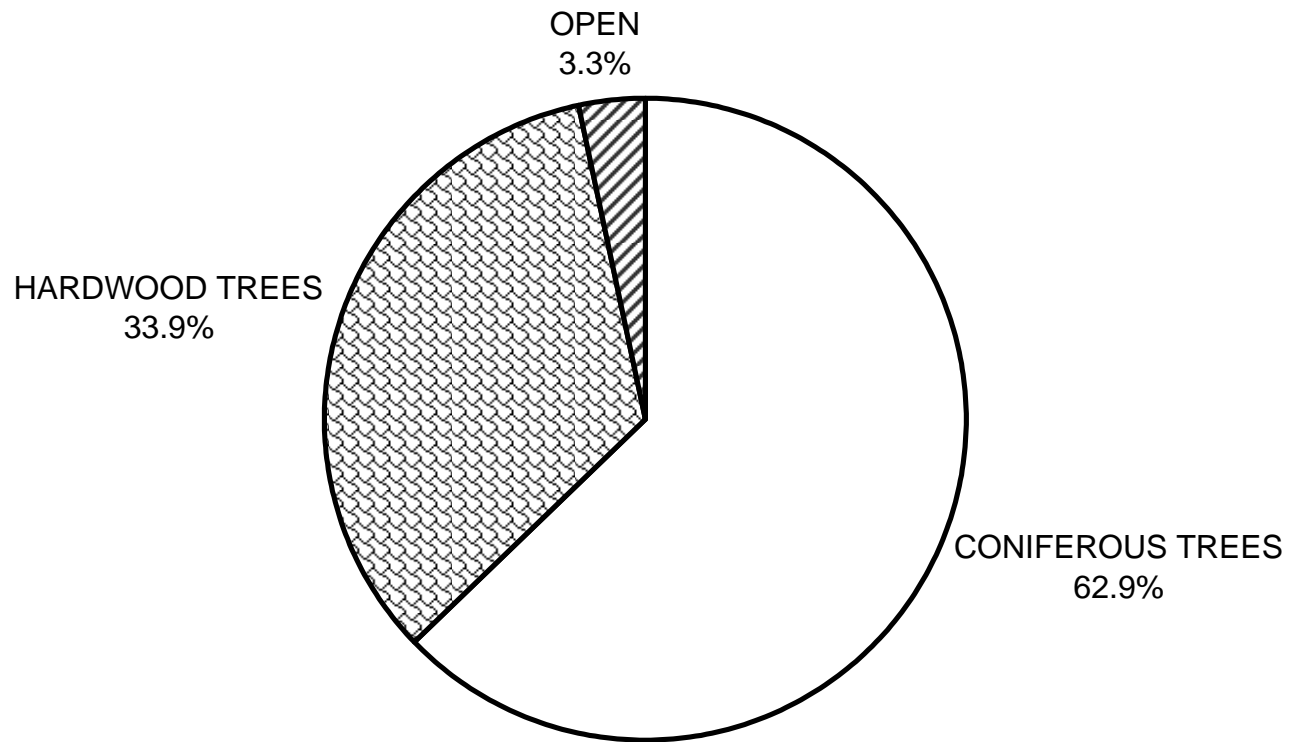
GRAPH 7

**"GULCH 23" 2012**  
**SUBSTRATE COMPOSITION IN POOL TAIL-OUTS**



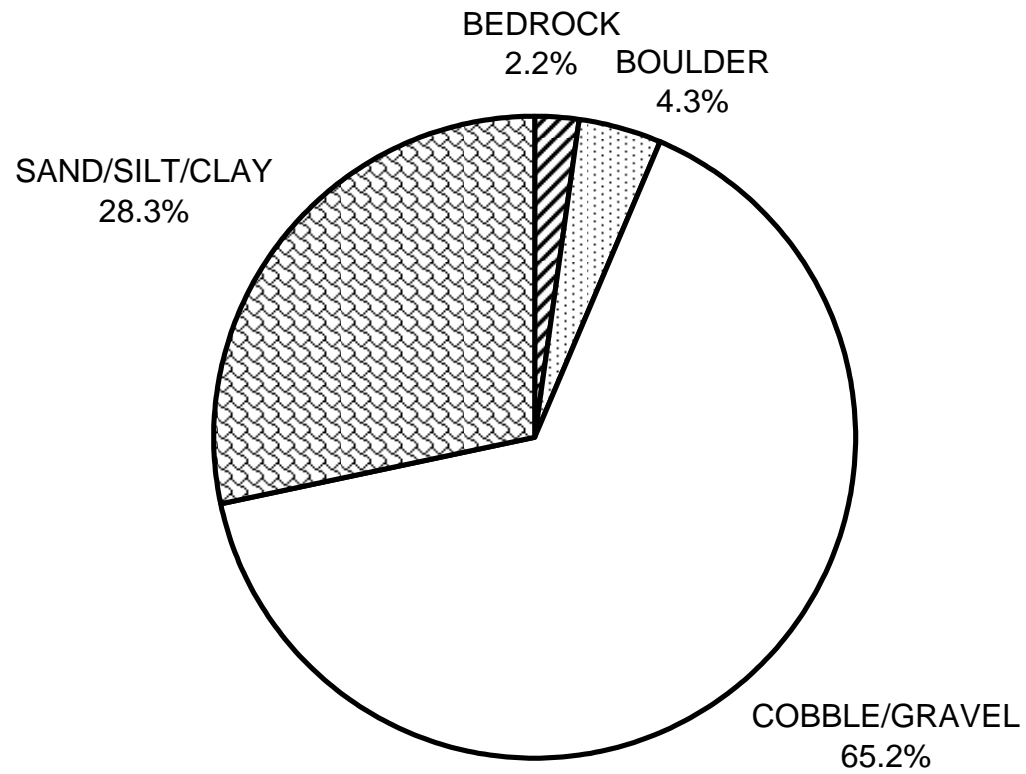
GRAPH 8

**"GULCH 23" 2012  
MEAN PERCENT CANOPY**



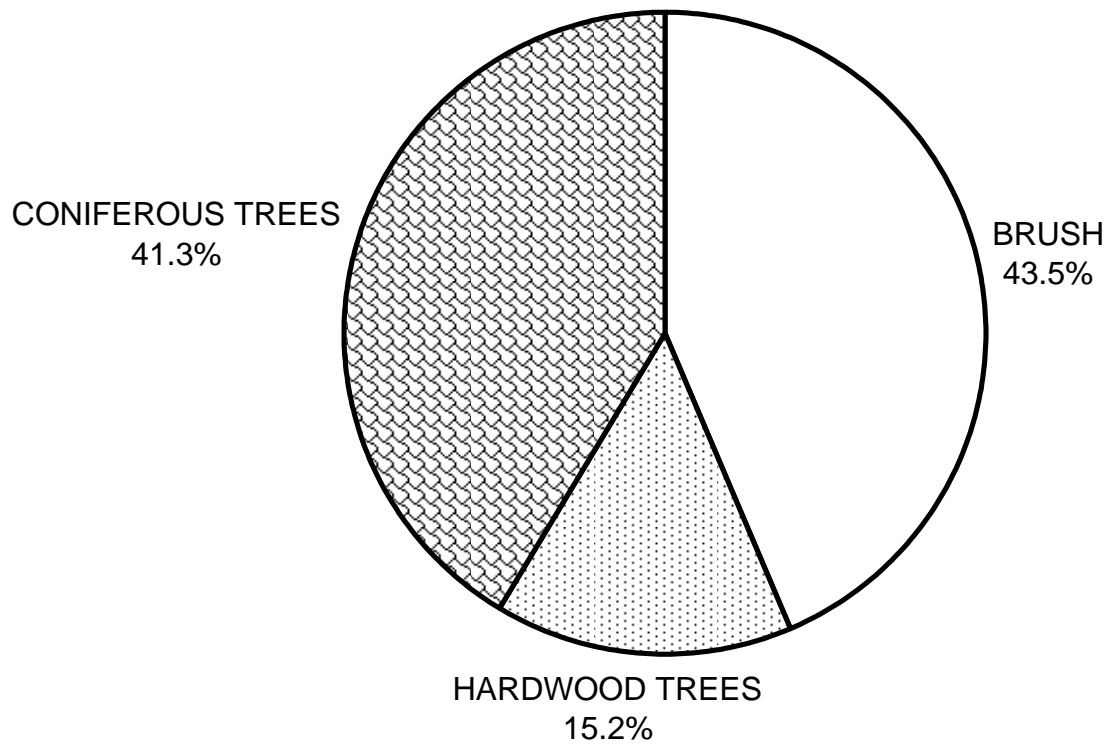
GRAPH 9

**"GULCH 23" 2012**  
**DOMINANT BANK COMPOSITION IN SURVEY REACH**



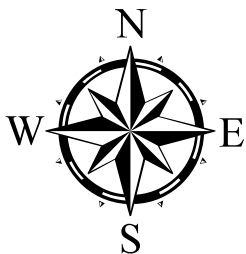
GRAPH 10


**"GULCH 23" 2012**  
**DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

**Map 1  
Gulch 23  
Ten Mile River Watershed  
Sherwood Peak Quad, Mendocino County**



 Channel Type A4

0 1,000 2,000 Feet

