



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

STREAM INVENTORY REPORT

“Walton Gulch”

INTRODUCTION

A stream inventory was conducted from September 26 to September 28, 2016 on an unnamed tributary to Hare Creek, commonly known as, and herein after referred to as Walton Gulch. The survey began at the confluence with Hare Creek and extended upstream 0.5 miles.

The Walton 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 Walton 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

Walton Gulch is a tributary to Hare Creek, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Walton Gulch's legal description at the confluence with Hare Creek is T18N R17W S27. Its location is 39.3947° north latitude and 123.7394° west longitude, LLID number 1237395393948. Walton Gulch is a first order stream and has approximately 1.35 miles of blue line stream according to the USGS Noyo Hill 7.5 minute quadrangle. Walton Gulch drains a watershed of approximately 0.5 square miles. Elevations range from about 184 feet at the mouth of the creek to 596 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely owned by California Department of Forestry and Fire Protection and is managed for timber production and recreation. Vehicle access exists via off of Highway 20 near Fort Bragg.

METHODS

The habitat inventory conducted in Walton Gulch 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 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. Surveyors also take photos to document general habitat conditions (Appendix II).

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 Walton 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:

Water and air temperatures are measured and recorded at every tenth habitat unit using a hand-held thermometer. Both temperatures are taken in degrees Fahrenheit and the time of the measurement is also recorded. Air temperatures are recorded within one foot of the water surface, while water temperatures are recorded (where possible) in flowing water within the habitat unit.

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". Walton 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.

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 Walton 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 Walton 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 Walton 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 Walton 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.

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 Walton Gulch. In addition, underwater mask and snorkel 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 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 Walton 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 IN APPENDIX I *

The habitat inventory of September 26 to September 27, 2016, and was conducted by Ryan Bernstein and Nicole Bejar (CDFW). The total length of the stream surveyed was 2,772 feet.

Stream flow was not measured on Walton Gulch.

Walton Gulch is a G4 channel type for 2,772 feet of the stream surveyed. G4 channels are entrenched “gully” step-pool channels on moderate gradients with low width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 52° to 53° Fahrenheit. Air temperatures ranged from 51° to 72° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 37% flatwater units, 22% dry units, and 21% pool units (Graph 1). Based on total length of Level II habitat types there were 56% flatwater units, 19% dry units, and 14% pool units (Graph 2).

Six Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were run units, 31%; dry units, 22%; mid-channel pool units, 21% (Graph 3). Based on percent total length, run units made up 35%, step run units 21%, and dry units 19%. A total of 21 pools were identified (Table 3). Main channel pools were the most frequently encountered at 100% (Graph 4), and comprised 100% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Seven of the 21 pools (33%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 21 pool tail-outs measured, 5 had a value of 1 (23.8%); 12 had a value of 2 (57.1%); 1 had a value of 3 (4.8%); 3 had a value of 4 (14.3%) (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 unsuitable 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 8, and pool habitats had a mean shelter rating of 28 (Table 1). Of the pool types, the main-channel pools had the highest mean shelter rating of 28 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Walton Gulch. Graph 7 describes the pool cover in Walton Gulch. Large woody debris is the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the most dominant substrate observed in 90% of pool tail-outs. Small cobble was the next most frequently observed substrate in 10% of pool tail-outs.

The mean percent canopy density for the surveyed length of Walton Gulch was 97%. Three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 20% and 80%, respectively. Graph 9 describes the mean percent canopy in Walton Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 100%. The mean percent left bank vegetated was 100%. The dominant elements composing the structure of the stream banks consisted of 100% sand/silt/clay (Graph 10).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a mask and snorkel survey at 10 sites for species composition and distribution in Walton Gulch on September 25, 2016. The water temperature taken at 1015 was 52° Fahrenheit. The sites were sampled by Brian Starks (CDFW).

No fish were observed during the survey.

Table A. Summary of results for a fish composition and distribution survey within Walton Gulch, October, 2016.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	Steelhead Trout			Coho Salmon		Additional Aquatic Species Observed
					YOY	1+	2+	YOY	1+	
G4 Channel Type										
10/25/16	1	005	Run	250	0	0	0	0	0	
	2	011	Pool	455	0	0	0	0	0	
	3	014	Pool	497	0	0	0	0	0	
	4	017	Pool	556	0	0	0	0	0	
	5	019	Pool	577	0	0	0	0	0	
	6	022	Pool	768	0	0	0	0	0	
	7	024	Pool	798	0	0	0	0	0	
	8	028	Run	883	0	0	0	0	0	
	9	030	Pool	918	0	0	0	0	0	
	10	036	Pool	1031	0	0	0	0	0	

DISCUSSION

Walton Gulch is a G4 channel type for the entire 2,772 feet of stream surveyed. The suitability of G4 channel types for fish habitat improvement structures is as follows: G4 channels are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days September 26 to September 27, 2016, ranged from 52° to 53° Fahrenheit. Air temperatures ranged from 51° to 72° 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 56% of the total length of this survey, riffles 10%, and pools 14%. Seven of the 21 (33%) pools had a maximum residual depth greater than two 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.

Seventeen of the 21 pool tail-outs measured had embeddedness ratings of 1 or 2. Four 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.

All 21 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 28. The shelter rating in the flatwater habitats is 8. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Walton Gulch. Large woody debris is the dominant cover type in pools followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

The mean percent canopy density for the stream was 97%. The percentage of right and left bank covered with vegetation was 100% and 100%, respectively.

RECOMMENDATIONS

Walton Gulch should be managed as an anadromous, natural production stream. Recommendations for potential habitat improvement activities are based on target habitat values suitable for salmonids in California's north coast streams. Considering the results from this stream habitat inventory, factors that affect salmonid productivity and CDFW's professional judgment, the following list prioritizes habitat improvement activities in Walton Gulch. Keep in

mind, watershed and stream ecosystem processes, land use alterations, changes in land ownership, and other factors could potentially change the order of these recommendations or create the need to remove/add recommendations in the future.

- 1) 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 Hare Creek. Channel type is a G4.
30	0003.00	Culvert #1 is under road 450, and is 13.5' high x 15' wide x 72' long. It is composed of one culvert, and is made of 50% concrete, 50% CMP. Its plunge height is 0', and it has a maximum depth of 0.3' within 5' of the outlet. The slope is estimated at 1%, and its condition is good. It is not a possible barrier to juvenile and adult salmonids. The bottom of the culvert is natural and boulder filled with concrete banks.
235	0004.00	Dry Plunge. During high flows it would be a plunge pool.
413	0009.00	Log debris accumulation (LDA) #1 contains four pieces of large woody debris (LWD) and measures 5.5' high x 11' wide x 6' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to gravel and measures 3' wide x 4' long x 2.5' deep. Fish were not observed above the LDA. There are some gaps that fish can swim under and through the LDA.
472	0012.00	LDA #2 is 5.5' high x 11' wide x 6' long and contains 4 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 3' wide x 4' long x 2.5' deep. The sediment ranges in size from silt to gravel. The LDA is not a possible barrier to salmonids. Fish were not observed above the LDA. There is a dry riffle above the LDA.
497	0014.00	Water flows subsurface under large woody debris (LWD).
1227	0045.00	Increase in elevation of stream while still being very entrenched.

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1509	0052.00	Old rail-wood planks are in the creek.
2206	0086.00	Unit entrenched in clay substrate.
2217	0087.00	Unit is entrenched in clay substrate.
2313	0089.00	Unit is entrenched in clay substrate.
2463	0090.00	Dry 6' plunge into 0.2' of water.
2700	0099.00	End of survey due to an 8' cascade over bed rock. No fish observed on creek from start to end of anadromy. The creek started to get very entrenched with clay substrate on the walls and bottom and all clay creek beds. The substrate was not suitable for fish. The last unit was a 72' dry unit over a bedrock cascade. It was a very clear end of anadromy and survey. There was an 8' plunge of dry unit into dry bedrock cascade. The bedrock sheet is dry above the plunge.

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.

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

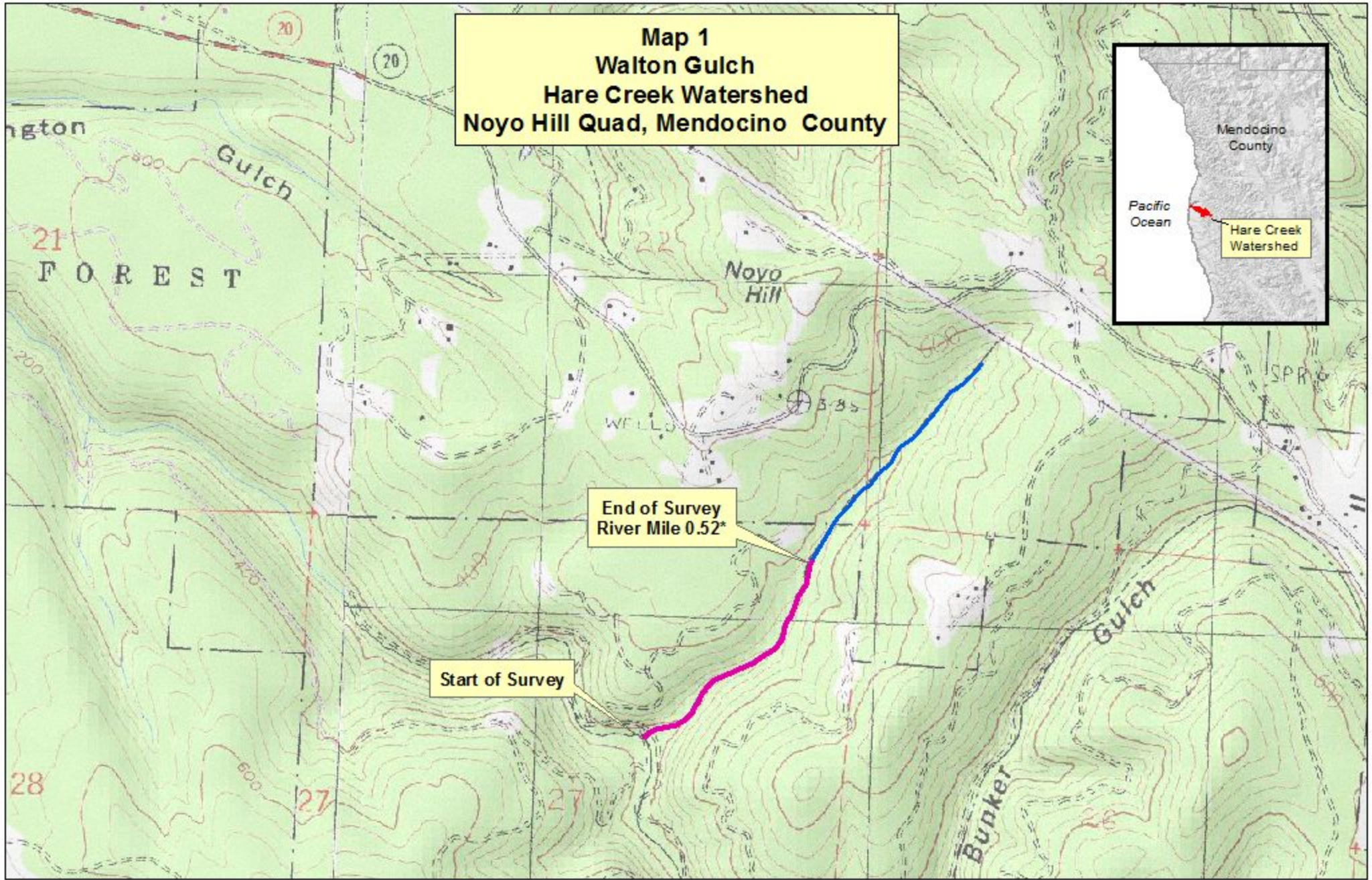
Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

BACKWATER POOLS

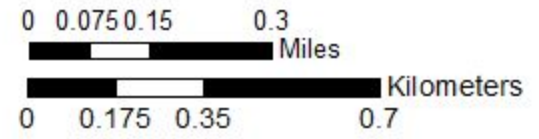
Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}

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]	



— Reach 1: G4 Channel Type — Walton Gulch



APPENDIX I

TABLES AND GRAPHS

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

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0

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
22	0	DRY	22.2	24	538	19.4									
37	5	FLATWATER	37.4	42	1543	55.7	4.3	0.3	0.8	124	4592	36	1321		8
21	21	POOL	21.2	19	400	14.4	7.3	0.8	1.8	134	2817	117	2467	107	28
19	2	RIFFLE	19.2	15	291	10.5	1.8	0.1	0.2	25	470	2	47		0
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
99	28				2772					7878			3835		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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 (%)
16	1	LGR	16.2	16	262	9.5	2	0.1	0.2	38	600	4	60		0	95
3	1	BRS	3.0	10	29	1.0	1	0.1	0.1	12	36	1	4		0	100
31	4	RUN	31.3	31	973	35.1	4	0.4	1	95	2940	33	1010		5	97
6	1	SRN	6.1	95	570	20.6	4	0.2	0.8	241	1447	48	289		20	100
21	21	MCP	21.2	19	400	14.4	7	0.8	2.8	134	2817	117	2467	107	28	98
22	0	DRY	22.2	24	538	19.4										92

Total Units
99

Total Units Fully Measured
28

Total Length (ft.)
2772

Total Area (sq.ft.)
7839

Total Volume (cu.ft.)
3830

Table 3 - Summary of Pool Types

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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
21	21	MAIN	100	19	400	100	7.3	0.8	134	2817	107	2242	28

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
21	21	400	2816	2242

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

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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	100	0	0	14	67	7	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
21	0	0	14	67	7	33	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.8

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Walton Gulch

LLID: 12373953948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Dry Units: 22

Confluence Location:

Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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
16	1	LGR	0	0	0	0	0	0	0	0	0
3	1	BRS	0	0	0	0	0	0	0	0	0
19	2	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
31	4	RUN	0	12	88	0	0	0	0	0	0
6	1	SRN	0	50	50	0	0	0	0	0	0
37	5	TOTAL FLAT	0	30	70	0	0	0	0	0	0
21	21	MCP	20	21	41	18	0	0	0	0	0
21	21	TOTAL POOL	20	21	41	18	0	0	0	0	0
99	28	TOTAL	17	22	45	16	0	0	0	0	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Dry Units: 22

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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
16	1	LGR	0	0	100	0	0	0	0
3	1	BRS	0	0	0	0	0	0	100
31	4	RUN	25	0	75	0	0	0	0
6	1	SRN	0	0	100	0	0	0	0
21	20	MCP	50	0	45	0	5	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
97	80	20	0	100	100

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: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Survey Length (ft.): 2772

Main Channel (ft.): 2772

Side Channel (ft.): 0

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27 Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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

Channel Type: G4

Canopy Density (%): 97.3

Pools by Stream Length (%): 14.4

Reach Length (ft.): 2772

Coniferous Component (%): 79.7

Pool Frequency (%): 21.2

Riffle/Flatwater Mean Width (ft.): 3.6

Hardwood Component (%): 20.3

Residual Pool Depth (%):

BFW:

Dominant Bank Vegetation: Coniferous Trees

< 2 Feet Deep: 67

Range (ft.): 5 to 11

Vegetative Cover (%): 100.0

2 to 2.9 Feet Deep: 33

Mean (ft.): 8

Dominant Shelter: Large Woody Debris

3 to 3.9 Feet Deep: 0

Std. Dev.: 2

Dominant Bank Substrate Type: Sand/Silt/Clay

>= 4 Feet Deep: 0

Base Flow (cfs.): 0.0

Occurrence of LWD (%): 29

Mean Max Residual Pool Depth (ft.): 1.8

Water (F): 52 - 53 Air (F): 51 - 72

LWD per 100 ft.:

Mean Pool Shelter Rating: 28

Dry Channel (ft): 538

Riffles: 1

Pools: 8

Flat: 3

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 90 Sm Cobble: 10 Lg Cobble: 0 Boulder: 0 Bedrock: 0

Embeddedness Values (%): 1. 23.8 2. 57.1 3. 4.8 4. 14.3 5. 0.0

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: 1237395393948

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR17WS27

Latitude: 39:23:41.0N

Longitude: 123:44:22.0W

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	0	0.0
Boulder	0	0	0.0
Cobble / Gravel	0	0	0.0
Sand / Silt / Clay	28	28	100.0

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	0	0	0.0
Hardwood Trees	6	5	19.6
Coniferous Trees	22	23	80.4
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

Stream Name: Walton Gulch

LLID: 1237395393948

Drainage: Noyo River

Survey Dates: 9/26/2016 to 9/27/2016

Confluence Location:

Quad: NOYO HILL

Legal Description: T18NR17WS27

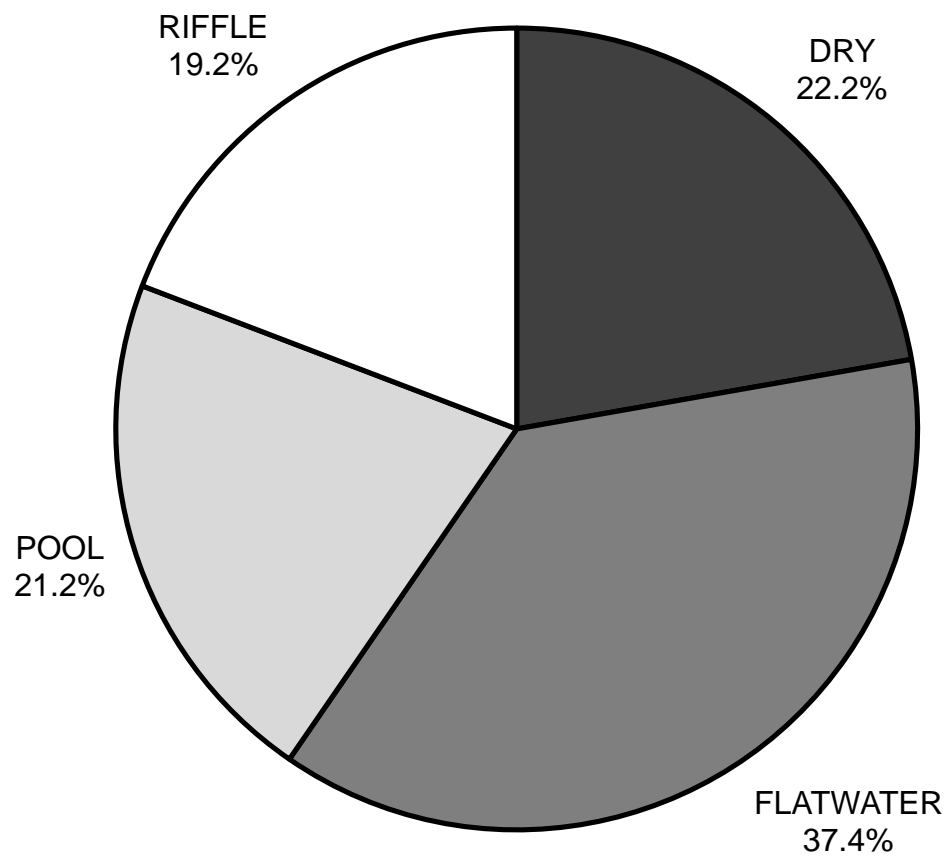
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Longitude: 123:44:22.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	20
SMALL WOODY DEBRIS (%)	0	30	21
LARGE WOODY DEBRIS (%)	0	70	41
ROOT MASS (%)	0	0	18
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITewater (%)	0	0	0
BOULDERS (%)	0	0	0
BEDROCK LEDGES (%)	0	0	0

WALTON GULCH 2016

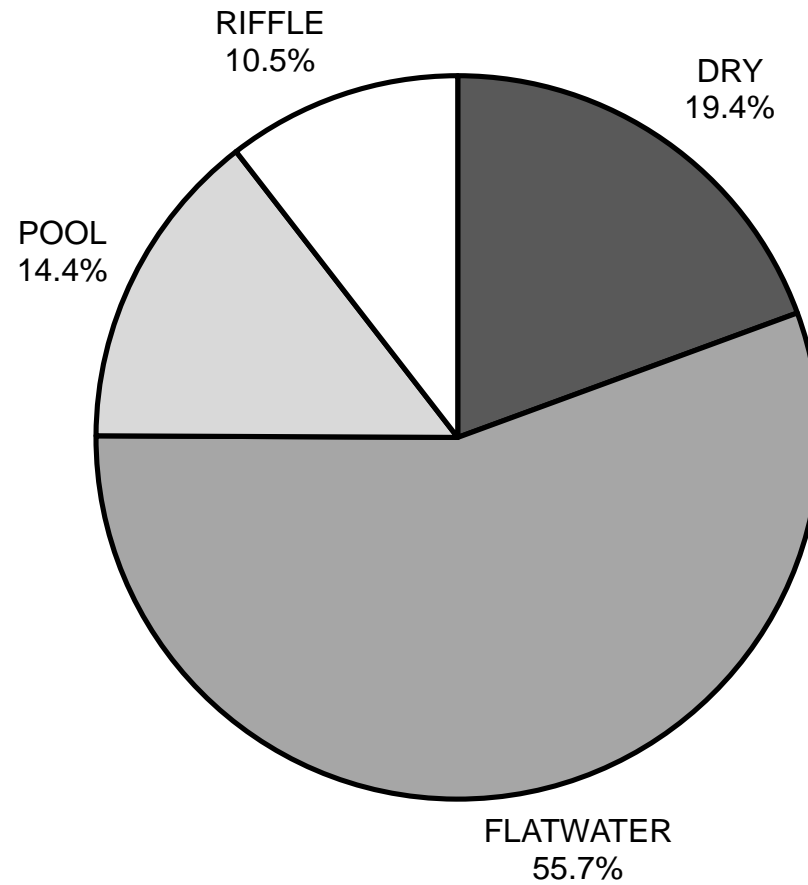
HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

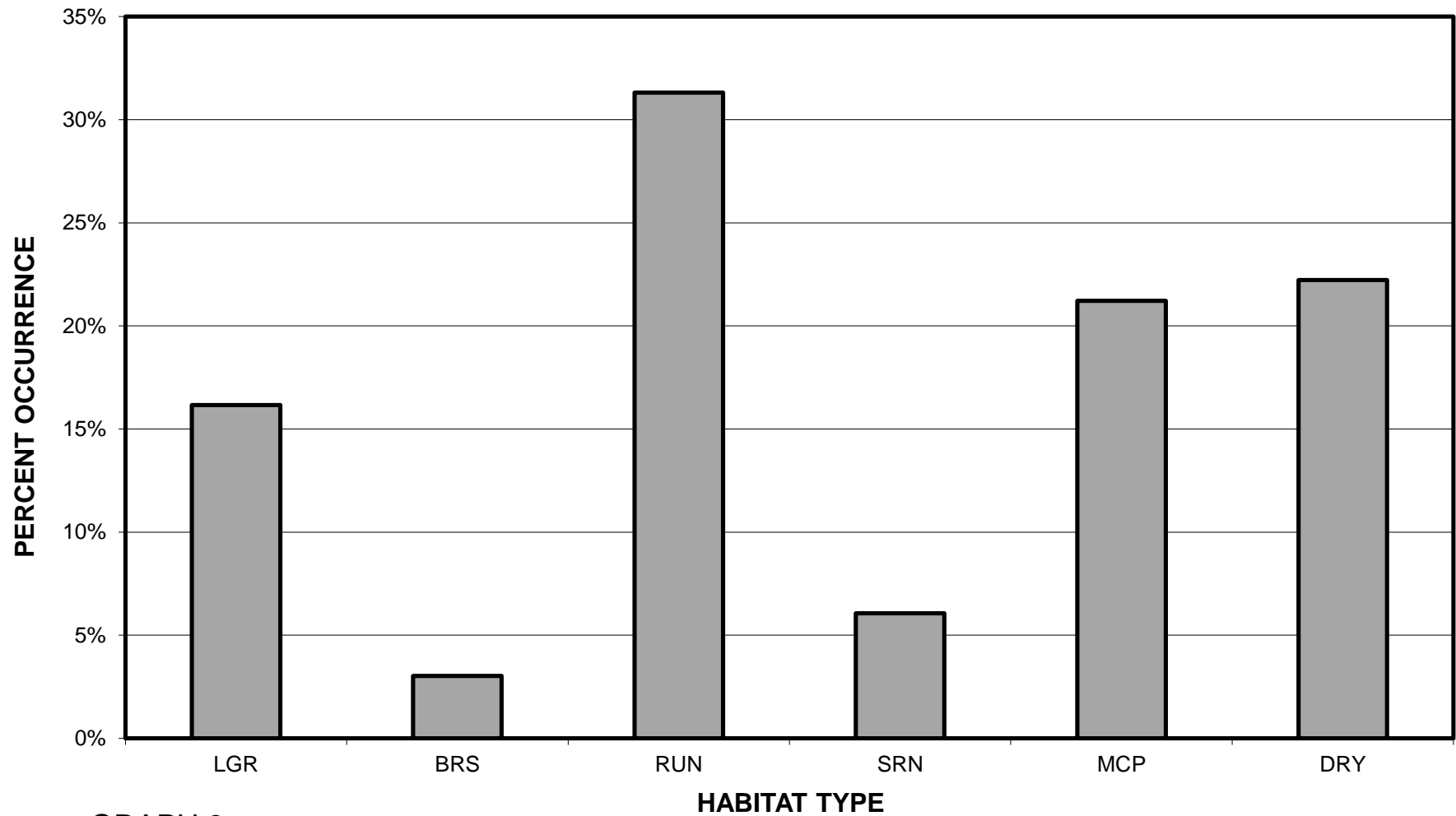
WALTON GULCH 2016

HABITAT TYPES BY PERCENT TOTAL LENGTH



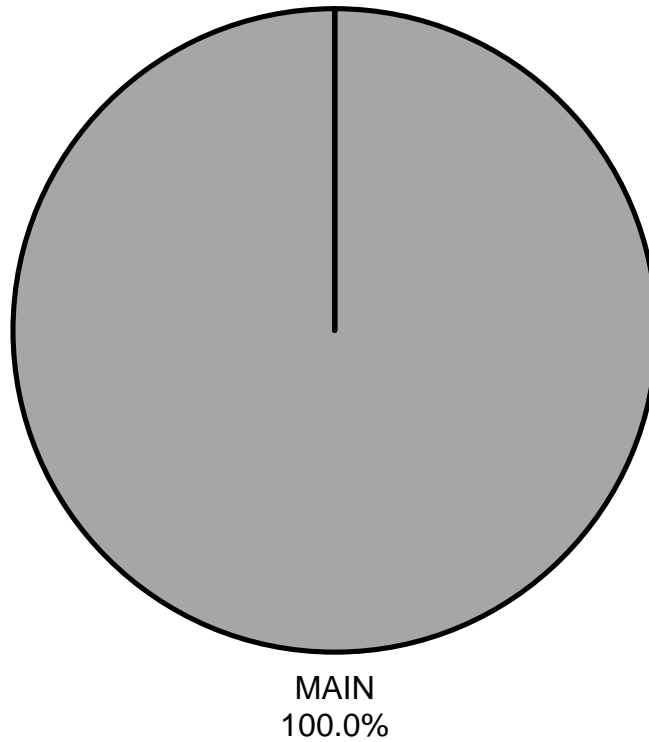
GRAPH 2

WALTON GULCH 2016
HABITAT TYPES BY PERCENT OCCURRENCE



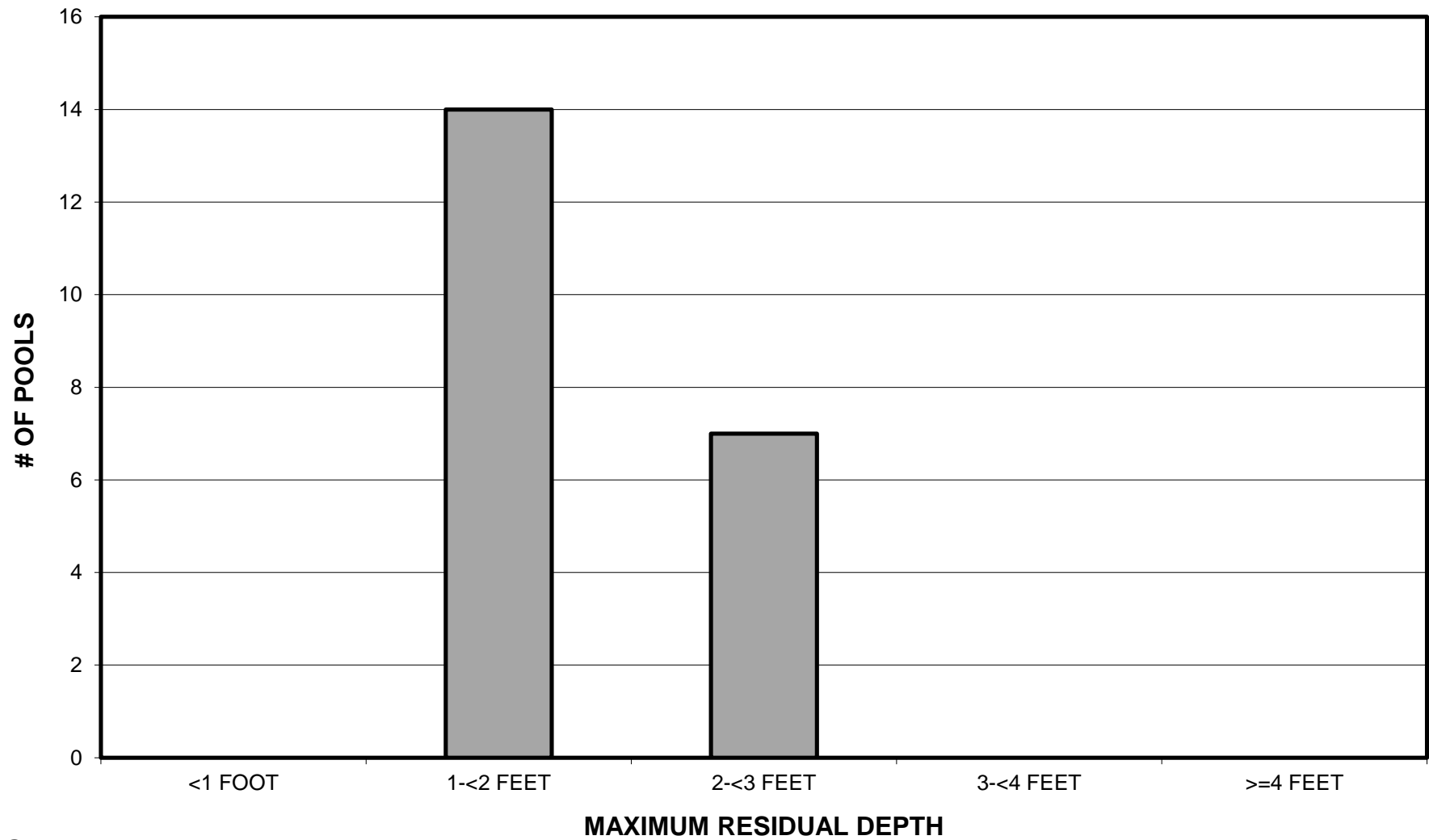
GRAPH 3

WALTON GULCH 2016
POOL TYPES BY PERCENT OCCURRENCE



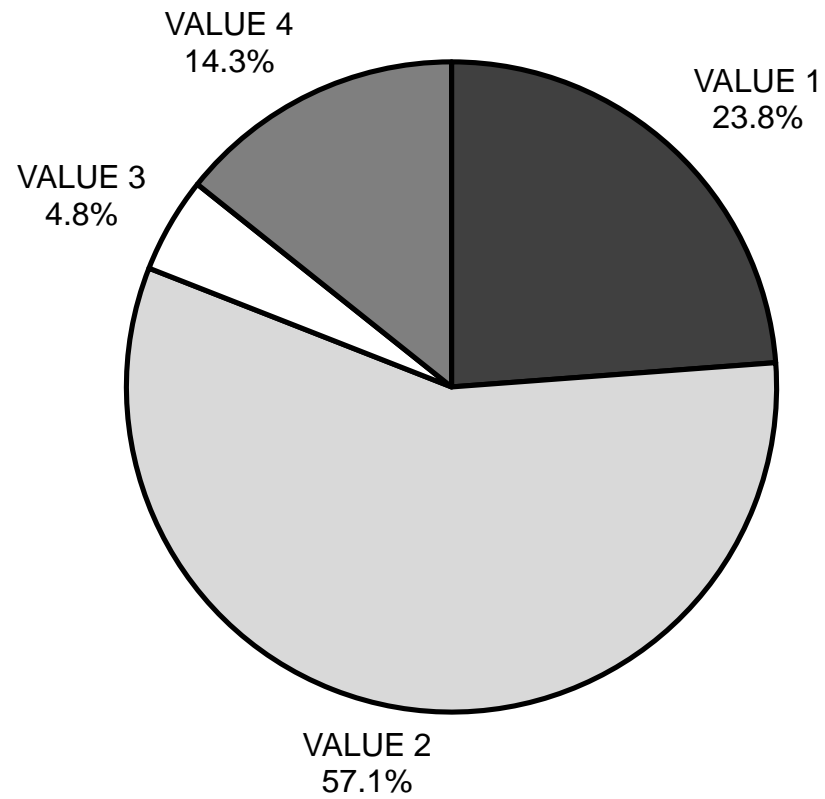
GRAPH 4

WALTON GULCH 2016 MAXIMUM DEPTH IN POOLS



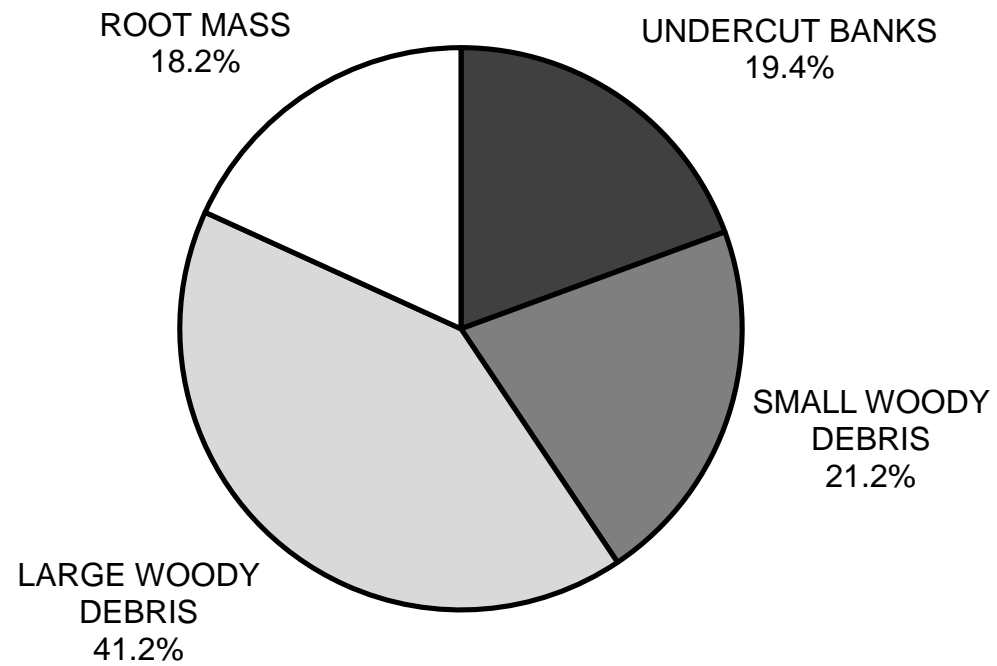
GRAPH 5

WALTON GULCH 2016 PERCENT EMBEDDEDNESS



GRAPH 6

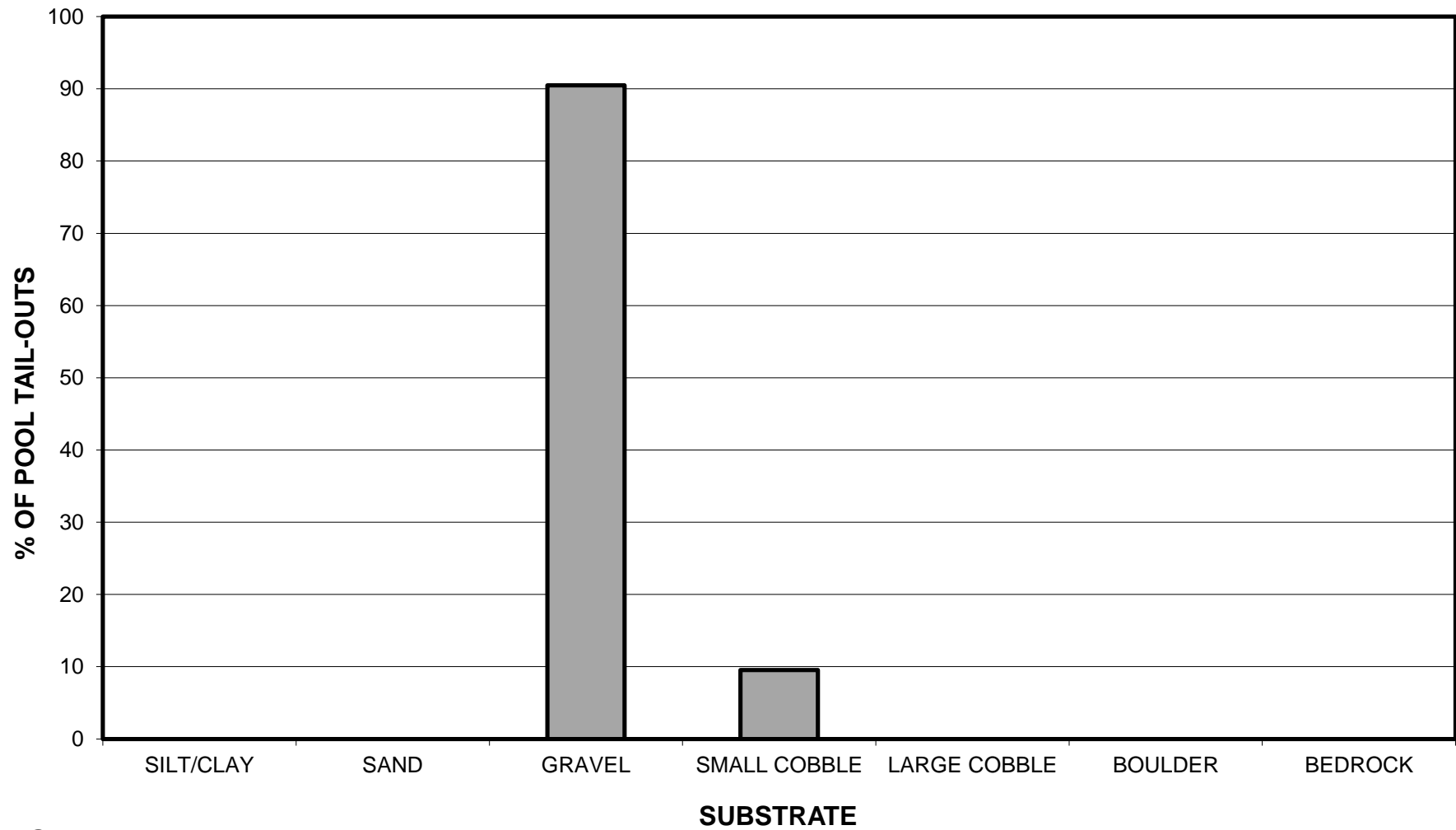
WALTON GULCH 2016
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

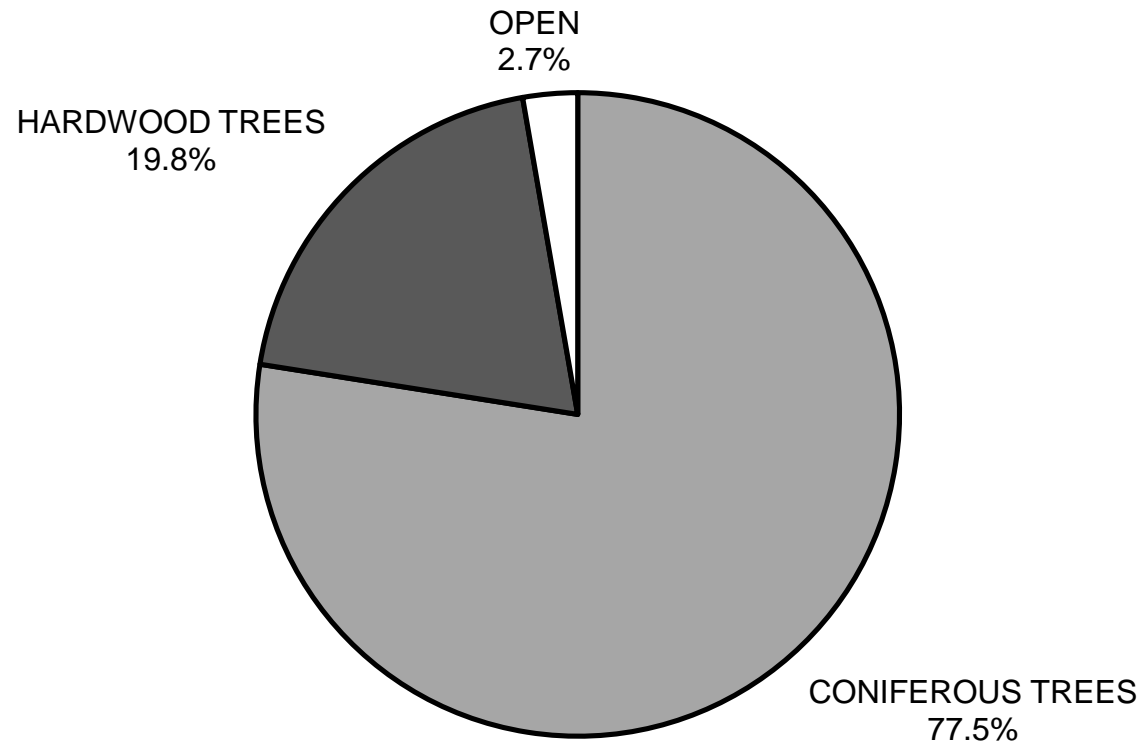
WALTON GULCH 2016

SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



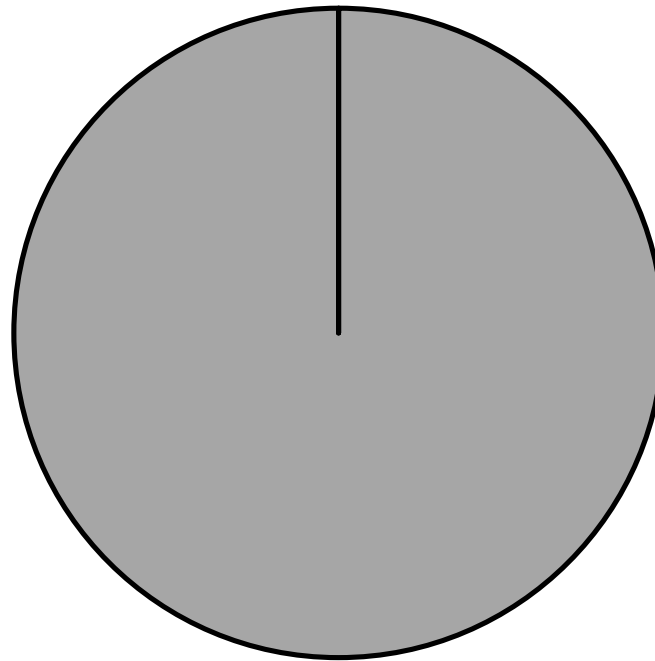
GRAPH 8

WALTON GULCH 2016 MEAN PERCENT CANOPY



GRAPH 9

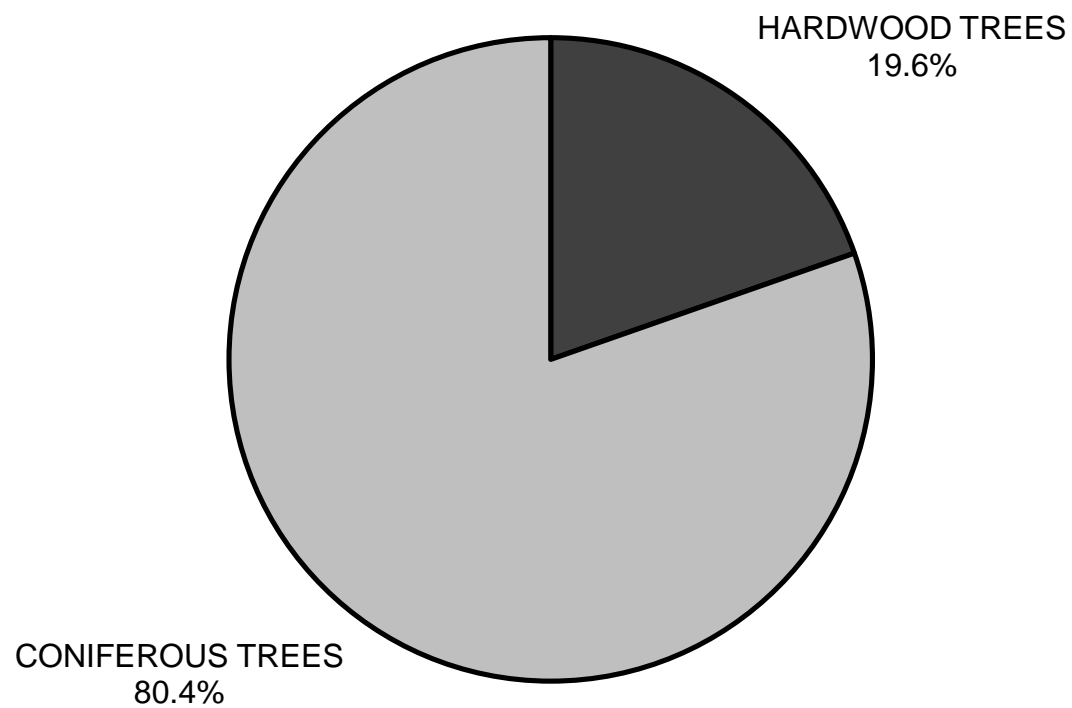
WALTON GULCH 2016
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

SAND/SILT/CLAY
100.0%

WALTON GULCH 2016
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

APPENDIX II

STREAM INVENTORY PHOTOS



Photo 1: Habitat unit #3, looking downstream through arch culvert on Walton Gulch, under JDSF Forest Road 400. Photo Taken by Brain Starks, 9/26/17.



Photo 2: Stream channel on Walton Gulch. Stream channel is deeply entrenched, which is representative of mid to upper portion of survey reach.



Photo 3: Stream channel (dry) on Walton Gulch, habitat unit # 14.



Photo 4: End of survey, 8 foot cascade over dry bedrock, habitat unit # 99 (Photo taken 9/27/16).