

STREAM INVENTORY REPORT

“Waldo Gulch”

INTRODUCTION

A stream inventory was conducted from July 8 to July 12, 2010 on an unnamed tributary to Parlin Creek commonly known as and hereinafter referred to as Waldo Gulch. The survey began at the confluence with Parlin Creek and extended upstream 0.3 miles.

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

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

Waldo Gulch is a tributary to Parlin Creek, a tributary to the South Fork Noyo River, a tributary to Noyo River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Waldo Gulch's legal description at the confluence with Parlin Creek is T18N R16W S33. Its location is 39.37876 degrees north latitude and 123.64775 degrees west longitude, LLID number 1236467393787. Waldo Gulch is an intermittent stream according to the USGS Noyo Hill 7.5 minute quadrangle. Waldo Gulch drains a watershed of approximately 0.35 square miles. Elevations range from about 210 feet at the mouth of the creek to 750 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is located within Jackson Demonstration State Forest and is managed for timber production. Vehicle access exists via California Division of Forestry and Fire Protection Road 340.

METHODS

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

SAMPLING STRATEGY

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

Waldo Gulch

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 Waldo 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". Waldo 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 Waldo Gulch, embeddedness was

Waldo Gulch

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 Waldo 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 densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Waldo 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 Waldo 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.

Waldo Gulch

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 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

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Waldo 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

Waldo Gulch

- 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 8 to July 12, 2010, was conducted by A. Villalobos and J. Coombes (WSP). The total length of the stream surveyed was 1,813 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.02 cfs on July 12, 2010.

Waldo Gulch is a G4 channel type for 1,813 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 54 to 57 degrees Fahrenheit. Air temperatures ranged from 56 to 67 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 31% pool units, 30% flatwater units, 22% dry units, 10% no survey units, and 8% riffle units (Graph 1). Based on total length of Level II habitat types there were 52% flatwater units, 27% pool units, 13% dry units, 4% riffle units, and 4% no survey units (Graph 2).

Fourteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were dry units, 22%; mid-channel pool units, 22%; and run units, 19% (Graph 3). Based on percent total length, step run units made up 32%, run units 20%, and mid-channel pool units 19%.

A total of 29 pools were identified (Table 3). Main channel pools were the most frequently encountered at 72% (Graph 4), and comprised 73% 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 29 pools (21%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 29 pool tail-outs measured, 4 had a value of 1 (13.8%); 3 had a value of 2 (10.3%); 2 had a value of 3 (6.9%); 9 had a value of 4 (31%); 11 had a value of 5 (37.9%) (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

Waldo Gulch

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 1, and pool habitats had a mean shelter rating of 27 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 29. Scour pools had a mean shelter rating of 24 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel and silt/clay substrate type were the dominant substrates, each observed 34% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Waldo Gulch was 97%. Three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 9% and 91%, respectively. Graph 9 describes the mean percent canopy in Waldo Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 68%. The mean percent left bank vegetated was 72%. The dominant elements composing the structure of the stream banks consisted of 89% sand/silt/clay and 11% bedrock (Graph 10). Brush was the dominant vegetation type observed in 46.1% of the units surveyed. Additionally, 42.1% of the units surveyed had coniferous trees as the dominant vegetation type, and 11.8% had deciduous trees as the dominant vegetation type (Graph 11).

DISCUSSION

Waldo Gulch is a G4 channel type for the entire 1,813 feet of stream surveyed. The suitability of G4 channel types for fish habitat improvement structures is as follows: G4 channel types 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 July 8 to July 12, 2010, ranged from 54 to 57 degrees Fahrenheit. Air temperatures ranged from 56 to 67 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 52% of the total length of this survey, riffles 4%, and pools 27%. Six of the 29 (21%) 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

Waldo Gulch

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 large wood that will increase or deepen pool habitat is recommended.

Seven of the 29 pool tail-outs measured had embeddedness ratings of 1 or 2. Eleven of the pool tail-outs had embeddedness ratings of 3 or 4. Eleven 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 Waldo Gulch should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Nineteen of the 29 pool tail-outs had silt, sand, large cobble, boulders or bedrock as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

The mean shelter rating for pools is 27. The shelter rating in the flatwater habitats is 1. 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 Waldo Gulch. Large woody debris is the dominant cover type in pools followed by undercut banks. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 97%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 68% and 72%, 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) Waldo 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) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large woody debris. Adding high quality complexity with woody cover in the pools is desirable.
- 4) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

Waldo Gulch

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 Parlin Creek.
42	0004.00	There is a 3' vertical jump to a cascade with a 45 degree slope.
65	0007.00	There is a 3.5' vertical jump to next unit.
122	0011.00	There is a 10' log across the channel that is retaining sediment.
141	0013.00	Root mass and cascade.
535	0031.00	Pool extends under two root wads.
752	0039.00	Flow goes under a root wad in the creek.
766	0041.00	There is a possible low flow barrier.
866	0046.00	Water flow reemerges under large woody debris (LWD). This is a possible low flow barrier.
1025	0060.00	There is a downed tree blocking the channel and causing the flow to go subsurface. This is a possible low flow barrier.
1032	0061.00	There is a downed tree that covers the channel. Water flows under the tree and goes subsurface.
1108	0066.00	Sand and silt dominate the substrate.
1201	0070.00	A downed tree blocks the channel. This is a possible low flow barrier.
1218	0071.00	Water flows under a log creating a low flow barrier.
1231	0072.00	There is a 1' high plunge.
1792	0092.00	There is a 2' high plunge.

Waldo Gulch

1813 0093.00 End of survey. The channel splits into two channels. Each channel has a slope greater than 30%. There is a 10' vertical jump in each direction with 0.1' water depth below.

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.

Waldo Gulch

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: 1236418393850

LLID: 1236418393850 Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL Legal Description: T18NR16WS28 Latitude: 39:23:06.0N Longitude: 123:38:30.0W

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
20	0	DRY	21.5	11	228	12.6									
28	5	FLATWATER	30.1	34	943	52.0	2.2	0.2	0.5	38	1071	8	225		1
9	0	NOSURVEY	9.7	9	80	4.4									
29	29	POOL	31.2	17	490	27.0	4.8	0.9	1.5	84	2439	95	2750	84	27
7	4	RIFFLE	7.5	10	72	4.0	2.0	0.2	0.3	11	80	2	13		0
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
93	38				1813					3591			2988		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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 (%)
3	1	LGR	3.2	14	41	2.3	3	0.1	0.1	15	44	1	4		0	98
1	1	HGR	1.1	11	11	0.6	3	0.2	0.3	17	17	3	3		0	96
2	1	CAS	2.2	4	9	0.5	1	0.1	0.1	4	7	0	1		0	97
1	1	BRS	1.1	11	11	0.6	1	0.2	0.6	11	11	2	2		0	98
1	1	GLD	1.1	4	4	0.2	2	0.4	0.6	8	8	3	3		0	97
18	3	RUN	19.4	20	362	20.0	2	0.2	0.8	21	371	4	76		2	96
9	1	SRN	9.7	64	577	31.8	3	0.2	0.4	122	1094	24	219		0	97
20	20	MCP	21.5	17	342	18.9	5	0.9	2.8	84	1677	91	1818	79	30	97
1	1	STP	1.1	18	18	1.0	3	0.9	1.1	43	43	43	43	39	10	98
1	1	CRP	1.1	24	24	1.3	5	0.5	1.2	120	120	72	72	60	20	91
3	3	LSL	3.2	17	51	2.8	6	1.1	2.6	112	336	137	410	124	20	98
1	1	LSR	1.1	24	24	1.3	4	0.7	1.1	96	96	77	77	67	20	96
3	3	PLP	3.2	10	31	1.7	5	1.2	3.1	56	167	110	330	102	30	96
20	0	DRY	21.5	11	228	12.6										98
9	0	NS	9.7	9	80	4.4										95

Total Units
93

Total Units Fully Measured
38

Total Length (ft.)
1813

Total Area (sq.ft.)
3990

Total Volume (cu.ft.)
3059

Table 3 - Summary of Pool Types

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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	72	17	360	73	4.6	0.9	82	1720	77	1626	29
8	8	SCOUR	28	16	130	27	5.3	1.0	90	719	101	805	24

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
29	29	490	2439	2430

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

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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
20	MCP	69	0	0	16	80	4	20	0	0	0	0
1	STP	3	0	0	1	100	0	0	0	0	0	0
1	CRP	3	0	0	1	100	0	0	0	0	0	0
3	LSL	10	0	0	2	67	1	33	0	0	0	0
1	LSR	3	0	0	1	100	0	0	0	0	0	0
3	PLP	10	1	33	1	33	0	0	1	33	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
29	1	3	22	76	5	17	1	3	0	0

Mean Maximum Residual Pool Depth (ft.): 1.5

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Dry Units: 20

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28 Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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
3	1	LGR	0	0	0	0	0	0	0	0	0
1	1	HGR	0	0	0	0	0	0	0	0	0
2	1	CAS	0	0	0	0	0	0	0	0	0
1	1	BRS	0	0	0	0	0	0	0	0	0
7	4	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
1	1	GLD	0	0	0	0	0	0	0	0	0
18	3	RUN	10	90	0	0	0	0	0	0	0
9	1	SRN	0	0	0	0	0	0	0	0	0
28	5	TOTAL FLAT	10	90	0	0	0	0	0	0	0
20	20	MCP	37	9	36	15	0	0	0	0	3
1	1	STP	50	0	0	50	0	0	0	0	0
1	1	CRP	100	0	0	0	0	0	0	0	0
3	3	LSL	0	3	97	0	0	0	0	0	0
1	1	LSR	0	0	0	100	0	0	0	0	0
3	3	PLP	50	10	0	40	0	0	0	0	0
29	29	TOTAL POOL	34	7	38	19	0	0	0	0	2
9	0	NS									
93	38	TOTAL	33	11	36	18	0	0	0	0	2

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Dry Units: 20

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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
3	1	LGR	0	0	100	0	0	0	0
1	1	HGR	0	0	0	0	0	0	100
2	1	CAS	0	0	100	0	0	0	0
1	1	BRS	0	0	0	0	0	0	100
1	1	GLD	0	100	0	0	0	0	0
18	3	RUN	33	33	33	0	0	0	0
9	1	SRN	0	100	0	0	0	0	0
20	20	MCP	25	65	5	0	0	0	5
1	1	STP	100	0	0	0	0	0	0
1	1	CRP	0	100	0	0	0	0	0
3	3	LSL	33	67	0	0	0	0	0
1	1	LSR	100	0	0	0	0	0	0
3	3	PLP	33	33	0	0	0	0	33

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
97	91	9	0	68	72

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: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Survey Length (ft.): 1813

Main Channel (ft.): 1813

Side Channel (ft.): 0

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28 Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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

Channel Type: G4

Canopy Density (%): 96.7

Pools by Stream Length (%): 27.0

Reach Length (ft.): 1813

Coniferous Component (%): 91.0

Pool Frequency (%): 31.2

Riffle/Flatwater Mean Width (ft.): 2.1

Hardwood Component (%): 9.0

Residual Pool Depth (%):

BFW:

Dominant Bank Vegetation: Brush

< 2 Feet Deep: 79

Range (ft.): 2 to 10

Vegetative Cover (%): 70.0

2 to 2.9 Feet Deep: 17

Mean (ft.): 6

Dominant Shelter: Large Woody Debris

3 to 3.9 Feet Deep: 3

Std. Dev.: 2

Dominant Bank Substrate Type: Sand/Silt/Clay

>= 4 Feet Deep: 0

Base Flow (cfs.): 0.0

Occurrence of LWD (%): 20

Mean Max Residual Pool Depth (ft.): 1.5

Water (F): 54 - 57 Air (F): 56 - 67

LWD per 100 ft.:

Mean Pool Shelter Rating: 27

Dry Channel (ft): 228

Riffles: 3

Pools: 6

Flat: 4

Pool Tail Substrate (%): Silt/Clay: 34 Sand: 24 Gravel: 34 Sm Cobble: 0 Lg Cobble: 0 Boulder: 0 Bedrock: 7

Embeddedness Values (%): 1. 13.8 2. 10.3 3. 6.9 4. 31.0 5. 37.9

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

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	5	3	10.5
Boulder	0	0	0.0
Cobble / Gravel	0	0	0.0
Sand / Silt / Clay	33	35	89.5

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	17	18	46.1
Hardwood Trees	5	4	11.8
Coniferous Trees	16	16	42.1
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 4

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

StreamName: 1236418393850

LLID: 1236418393850

Drainage: Noyo River

Survey Dates: 7/8/2010 to 7/12/2010

Confluence Location: Quad: NOYO HILL

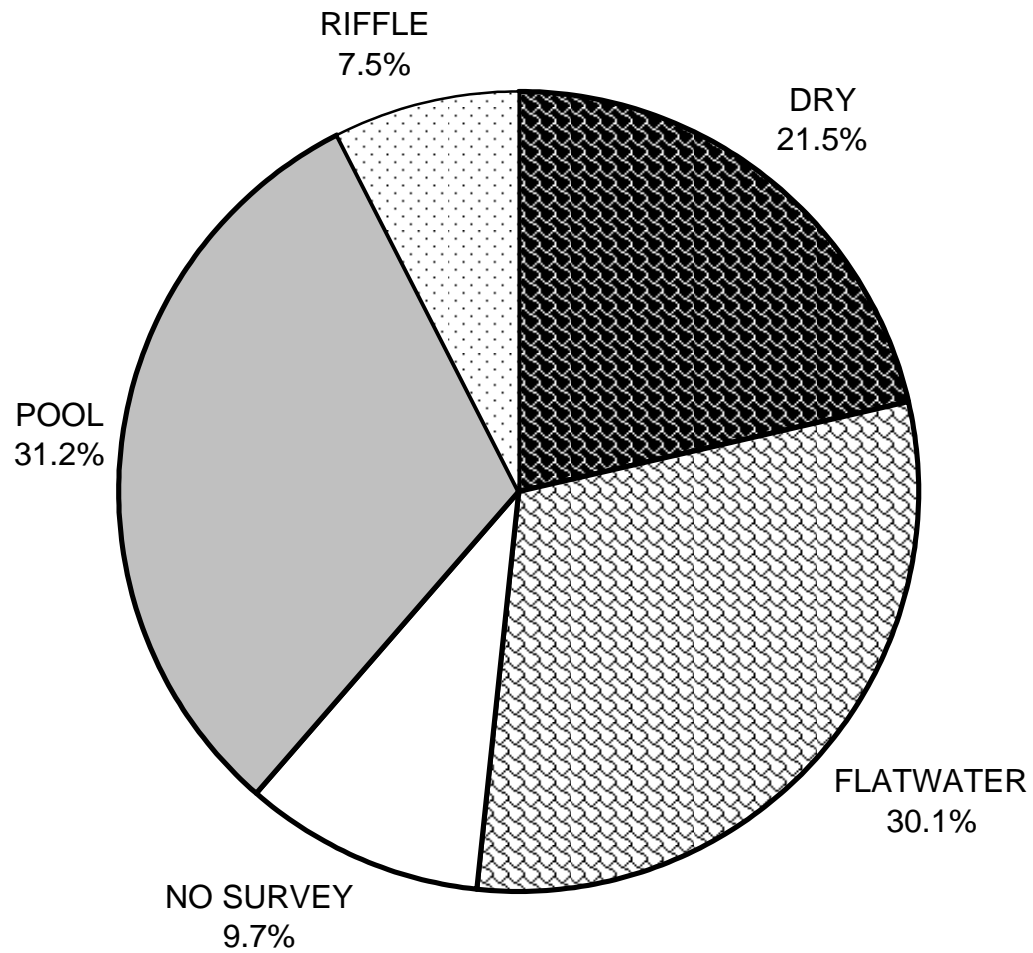
Legal Description: T18NR16WS28

Latitude: 39:23:06.0N

Longitude: 123:38:30.0W

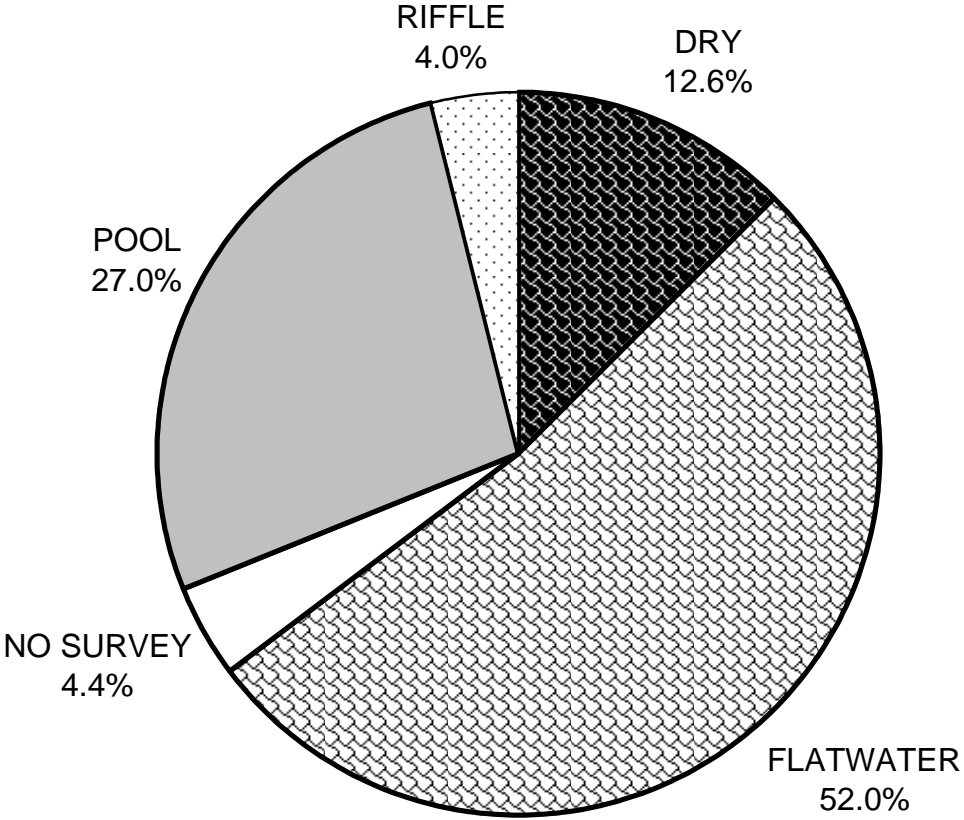
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	10	34
SMALL WOODY DEBRIS (%)	0	90	7
LARGE WOODY DEBRIS (%)	0	0	38
ROOT MASS (%)	0	0	19
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	0	0
BEDROCK LEDGES (%)	0	0	2

"Waldo Gulch" 2010 HABITAT TYPES BY PERCENT OCCURRENCE



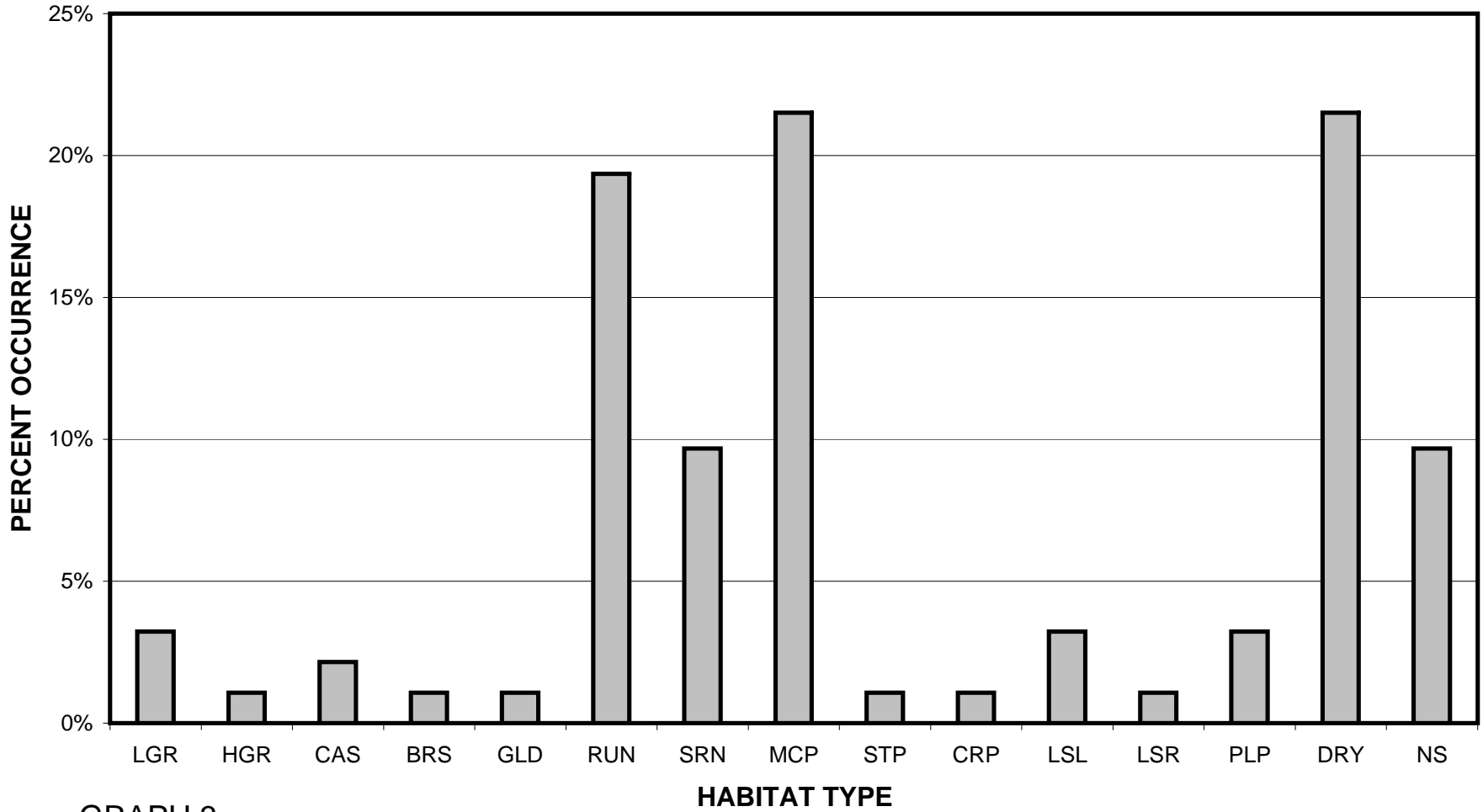
GRAPH 1

"Waldo Gulch" 2010
HABITAT TYPES BY PERCENT TOTAL LENGTH



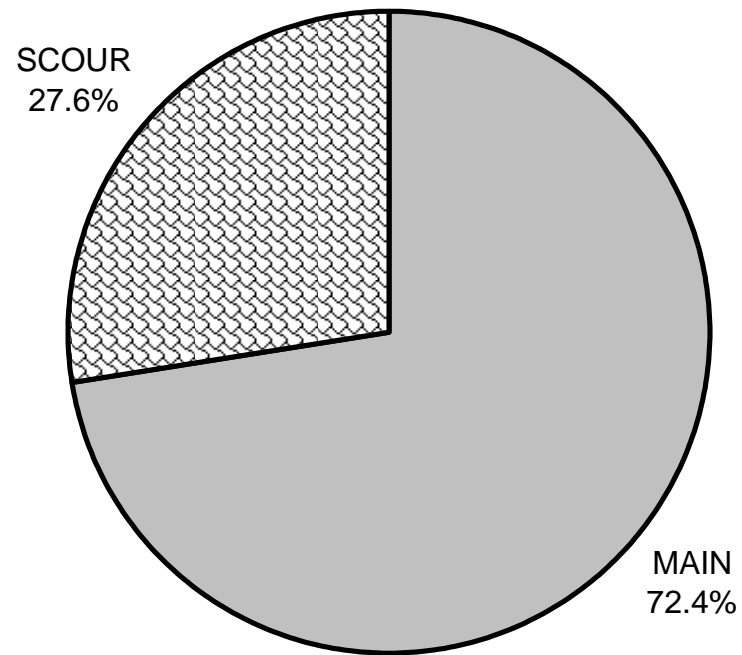
GRAPH 2

"Waldo Gulch" 2010
HABITAT TYPES BY PERCENT OCCURRENCE



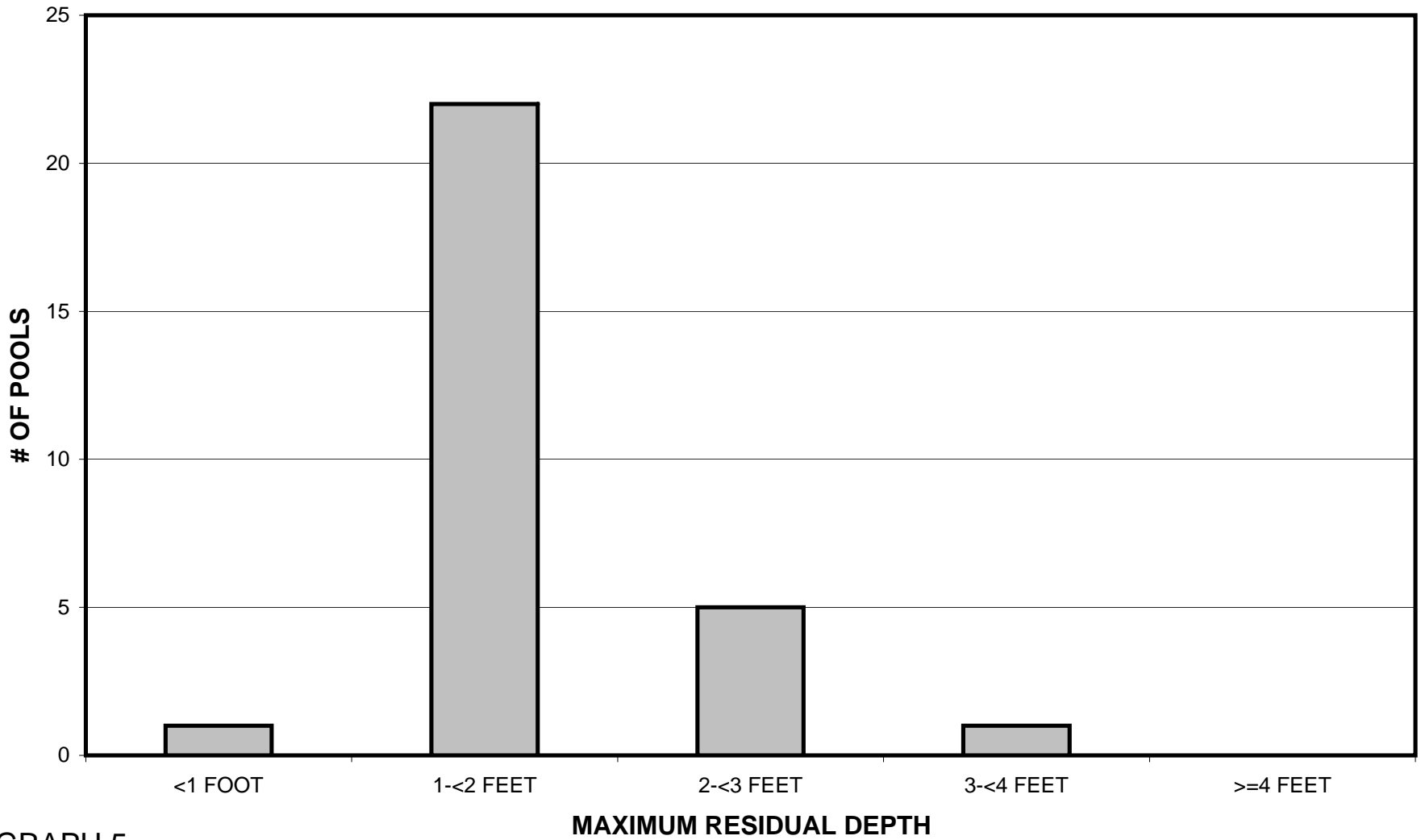
GRAPH 3

**"Waldo Gulch" 2010
POOL TYPES BY PERCENT OCCURRENCE**



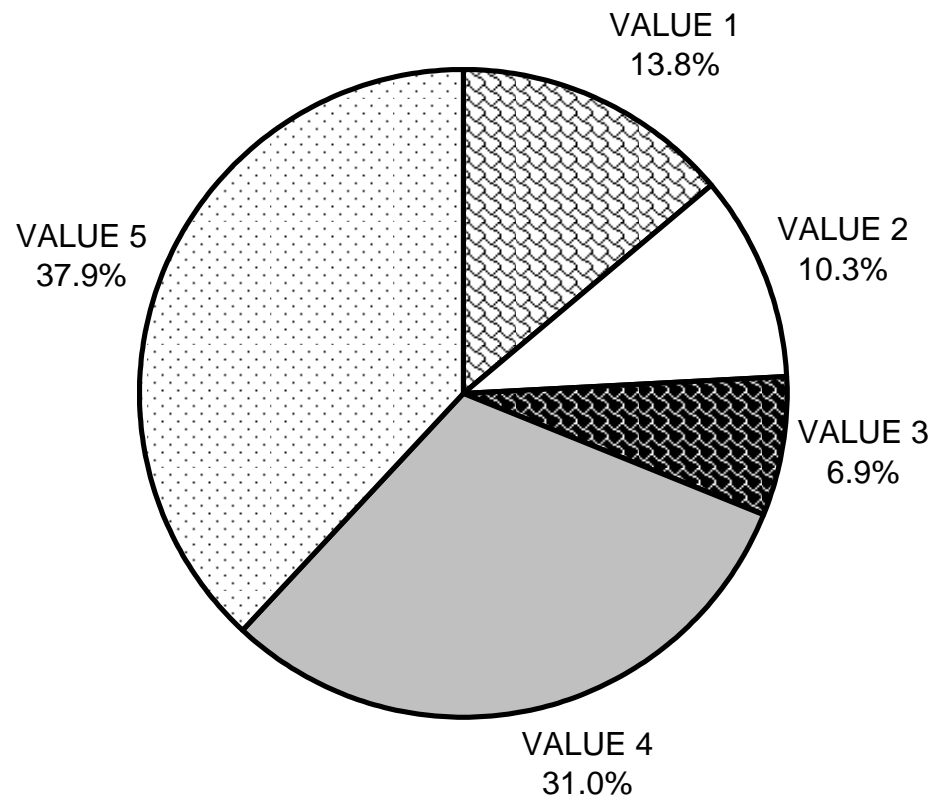
GRAPH 4

"Waldo Gulch" 2010 MAXIMUM DEPTH IN POOLS



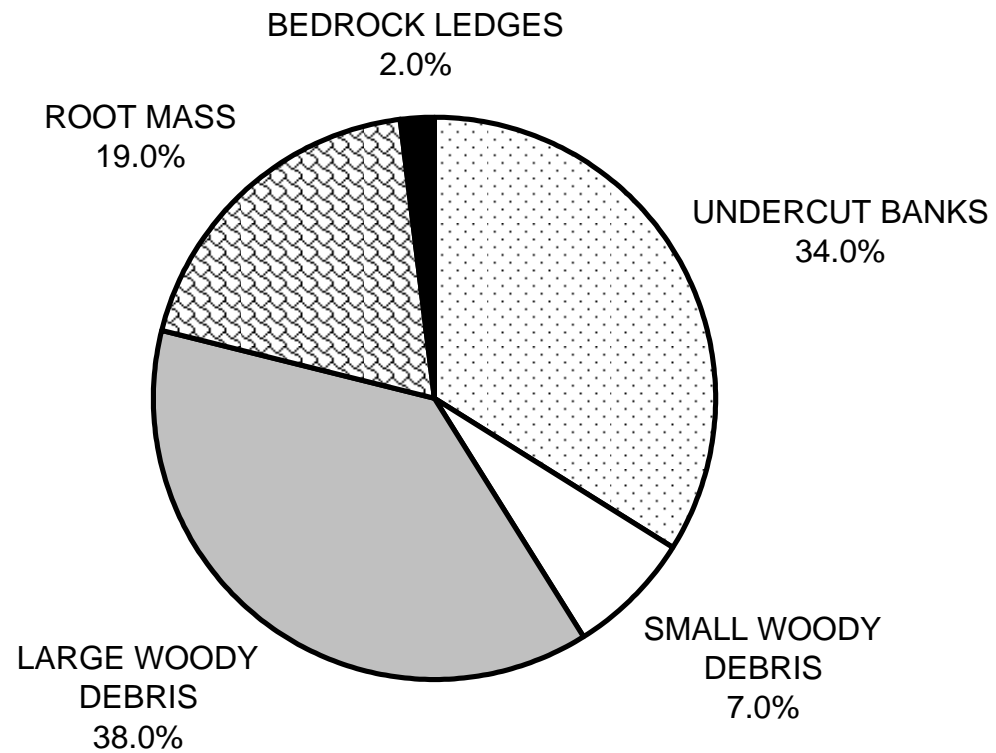
GRAPH 5

"Waldo Gulch" 2010 PERCENT EMBEDDEDNESS



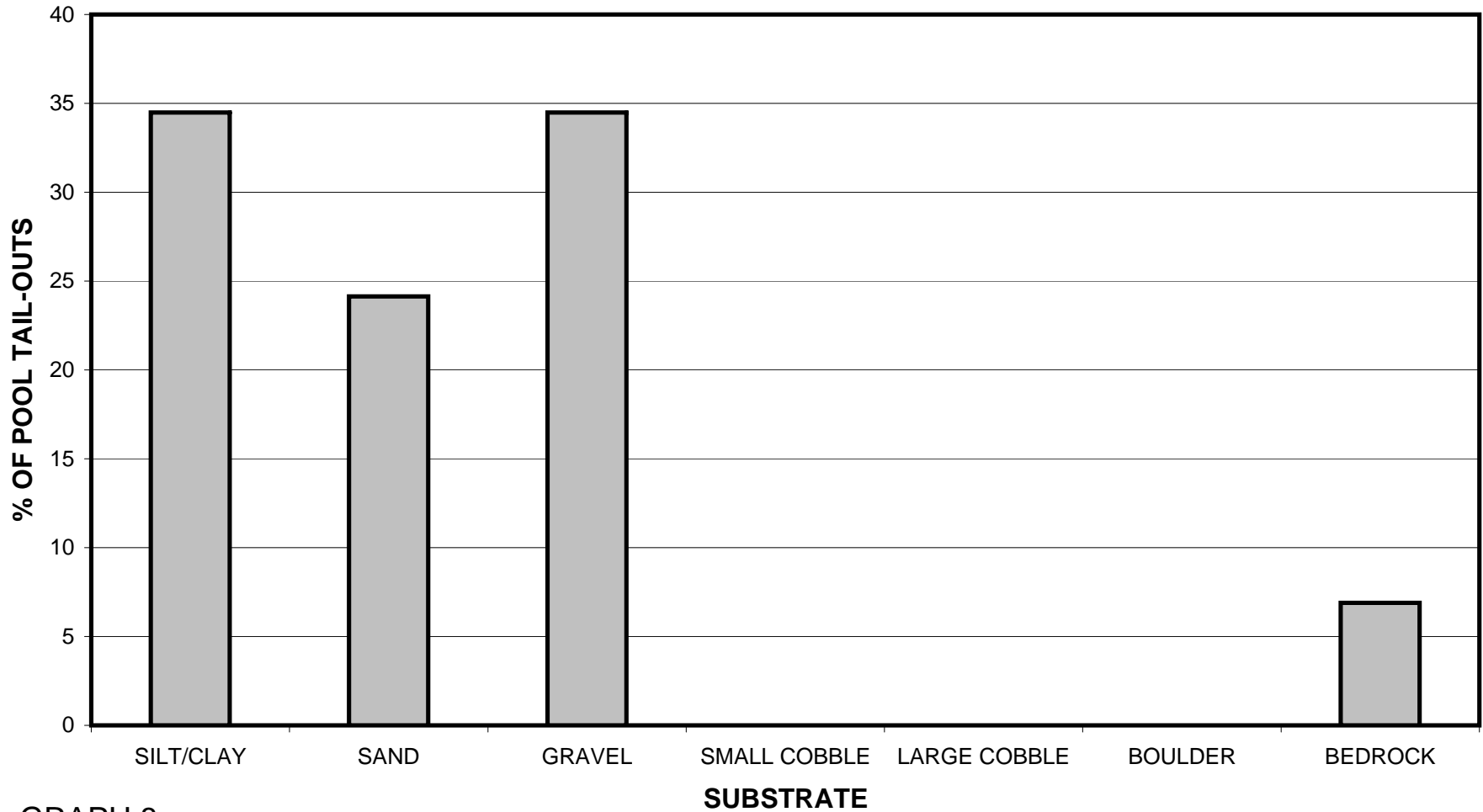
GRAPH 6

"Waldo Gulch" 2010 MEAN PERCENT COVER TYPES IN POOLS



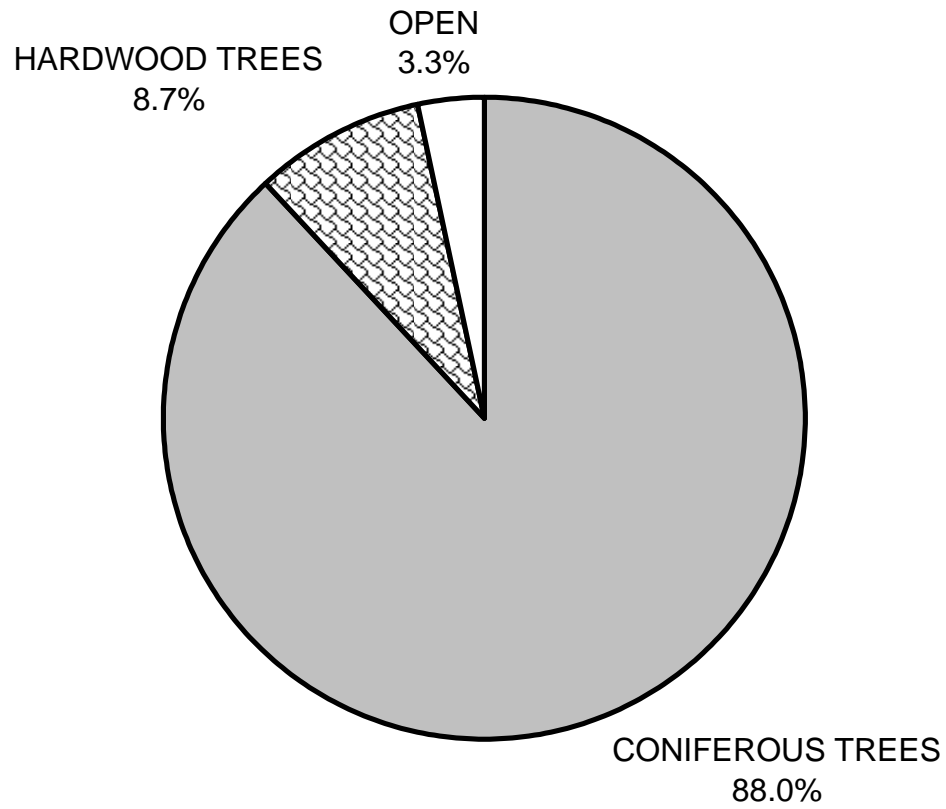
GRAPH 7

"Waldo Gulch" 2010
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



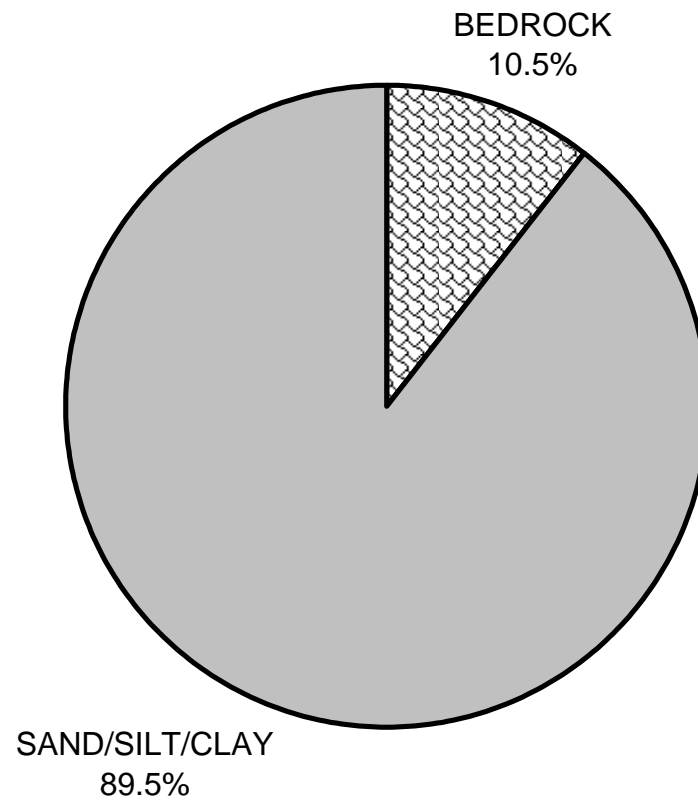
GRAPH 8

**"Waldo Gulch" 2010
MEAN PERCENT CANOPY**



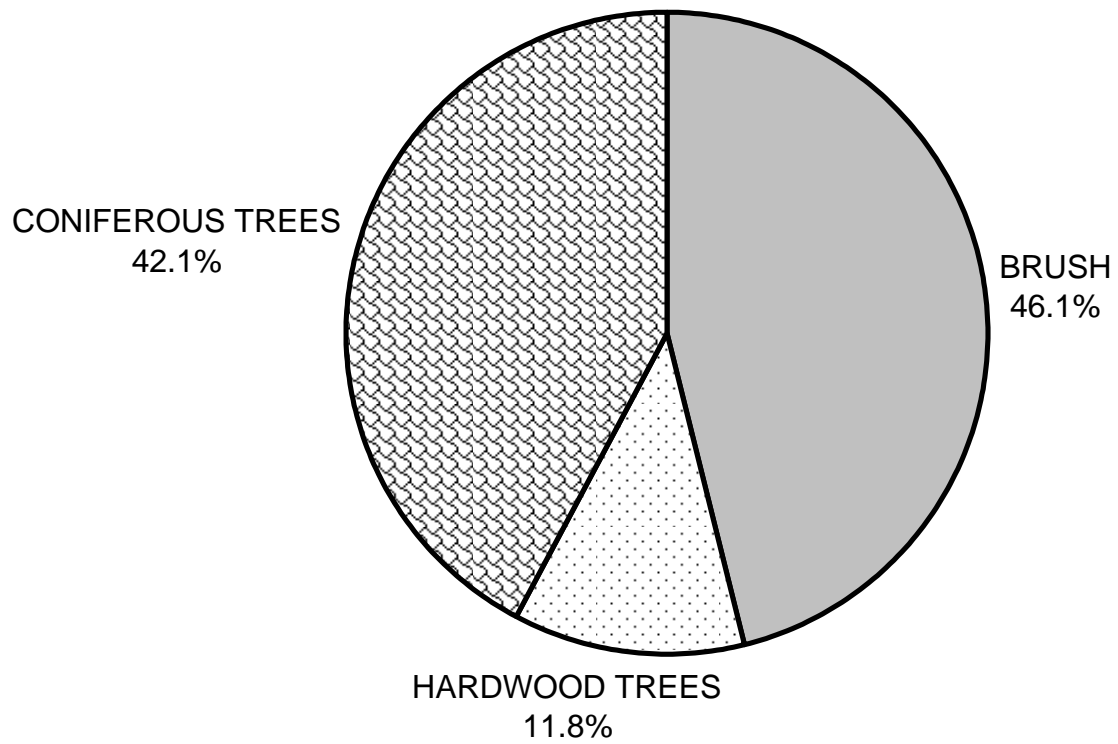
GRAPH 9

"Waldo Gulch" 2010
DOMINANT BANK COMPOSITION IN SURVEY REACH



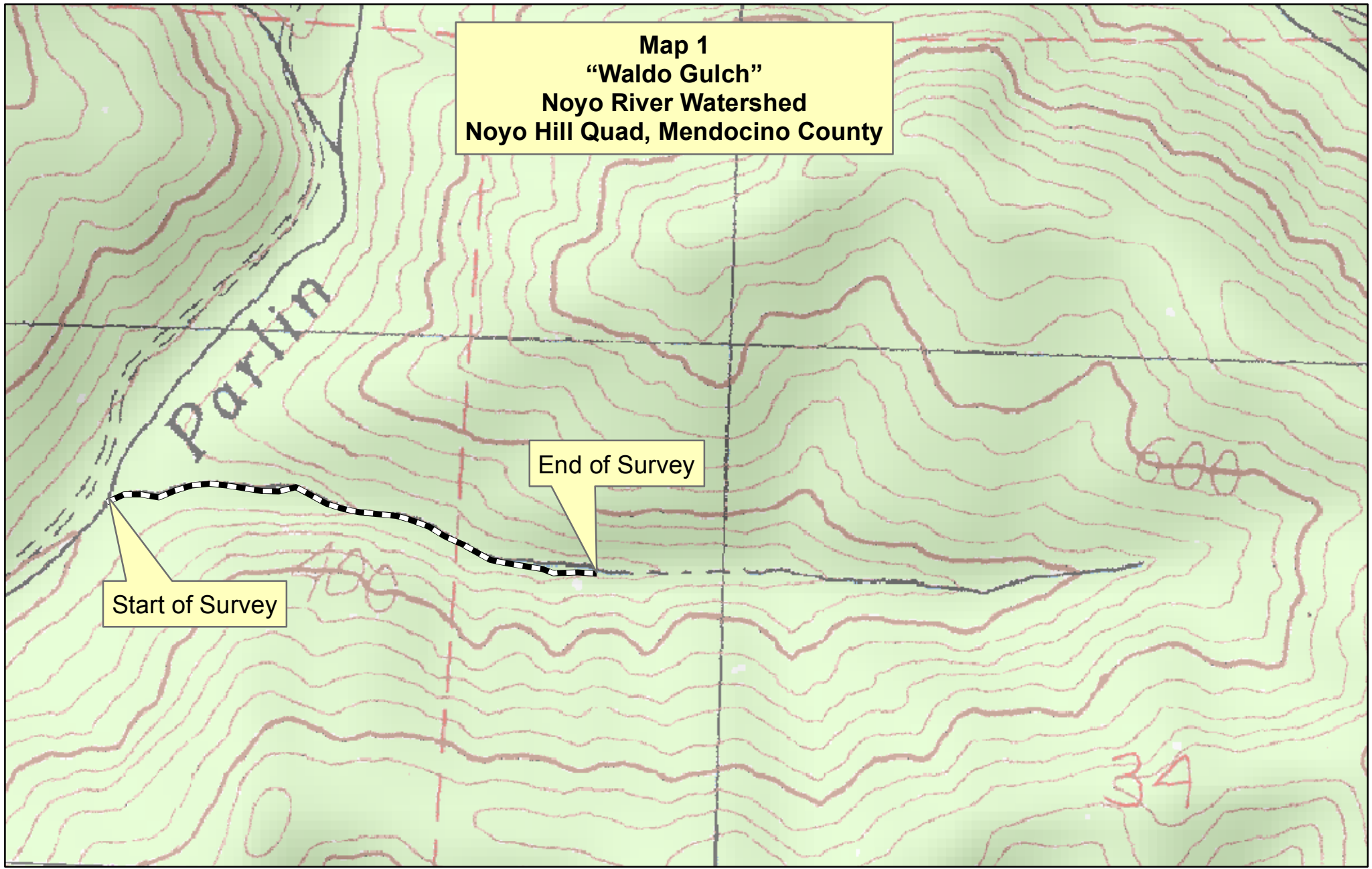
GRAPH 10

"Waldo Gulch" 2010
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Map 1
"Waldo Gulch"
Noyo River Watershed
Noyo Hill Quad, Mendocino County



Start of Survey

End of Survey



Legend

 Reach 1, Channel Type G4

