

STREAM INVENTORY REPORT

Low Gap Creek

INTRODUCTION

A stream inventory was conducted from August 5 to August 7, 2013 on Low Gap Creek. The survey began at the confluence with the South Branch North Fork Navarro River and extended upstream 0.6 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Low Gap Creek.

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

Low Gap Creek is a tributary to the South Branch North Fork Navarro River, tributary to the North Fork Navarro River, tributary to the Navarro River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Low Gap Creek's legal description at the confluence with the South Branch North Fork Navarro River is T15N R14W S23. Its location is 39.1430 degrees north latitude and 123.3750 degrees west longitude, LLID number 1233739391430. Low Gap Creek is a first order stream and has approximately 0.75 miles of blue line stream according to the USGS Orrs Springs 7.5 minute quadrangle. Low Gap Creek drains a watershed of approximately 2.6 square miles. Elevations range from about 920 feet at the mouth of the creek to 1,550 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production and rural development. Vehicle access exists via Masonite Industrial Road, west of Navarro, CA.

METHODS

The habitat inventory conducted in Low Gap Creek 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 and Watershed Stewards Project/AmeriCorps (WSP) members 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 Low Gap Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

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

2. Channel Type:

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

3. Temperatures:

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

4. Habitat Type:

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

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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 Low Gap Creek, 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 Low Gap Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. 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 Low Gap Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood trees.

9. Bank Composition and Vegetation:

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

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10. Large Woody Debris Count:

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

11. Average Bankfull Width:

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

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 Low Gap Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness

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- 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 August 5 to August 7, 2013 was conducted by M. Scott (CDFW), K. Reddy (WSP), and R. Spencer (CDFW). The total length of the stream surveyed was 3,377 feet.

Stream flow was not measured on Low Gap Creek.

Low Gap Creek is an F3 channel type for the entire length of the survey, 3,377 feet. F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 54 to 63 degrees Fahrenheit. Air temperatures ranged from 59 to 76 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 35% riffle units, 34% pool units, 27% flatwater units, 3% unsurveyed units, and 2% dry units (Graph 1). Based on total length of Level II habitat types there were 33% flatwater units, 31% pool units, 28% riffle units, 4% unsurveyed units, and 4% dry 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, 34%; low gradient riffle units, 29%; and run units, 21% (Graph 3). Based on percent total length, mid-channel pool units made up 31%, low gradient riffle units 21%, and run units 19%.

A total of 37 pools were identified (Table 3). All of the pools encountered were main channel pools.

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Ten of the 37 pools (27%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 37 pool tail-outs measured, nine had a value of 2 (24%); 23 had a value of 3 (62%); four had a value of 4 (11%); one had a value of 5 (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 not suitable for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

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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 0, and pool habitats had a mean shelter rating of 19 (Table 1).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Low Gap Creek. Graph 7 describes the pool cover in Low Gap Creek. 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. Small cobble was the dominant substrate observed in 51% of the pool tail-outs. Gravel was the next most frequently observed dominant substrate type and occurred in 41% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Low Gap Creek was 93%. Seven percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 53% and 47%, respectively. Graph 9 describes the mean percent canopy in Low Gap Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 92%. The mean percent left bank vegetated was 93%. The dominant elements composing the structure of the stream banks consisted of 50% cobble/gravel, 32% sand/silt/clay, 15% bedrock, and 3% boulders (Graph 10). Hardwood trees were the dominant vegetation type observed in 51% of the units surveyed. Additionally, 49% of the units surveyed had coniferous trees as the dominant vegetation type (Graph 11).

DISCUSSION

Low Gap Creek is an F3 channel type. The suitability of F3 channel types for fish habitat improvement structures is as follows: F3 channels are good for bank-placed boulders, single and opposing wing-deflectors and fair for plunge weirs, boulder clusters, channel constrictors and log cover.

The water temperatures recorded on the survey days August 5 to August 7, 2013 ranged from 54 to 63 degrees Fahrenheit. Air temperatures ranged from 59 to 76 degrees Fahrenheit. This is a suitable water temperature range for salmonids. However, 60 degrees F, if sustained, is near the threshold stress level 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 33% of the total length of this survey, riffles 28%, and pools 31%. Ten of the 37 (27%) 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

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flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended.

Nine of the 37 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty-seven of the pool tail-outs had embeddedness ratings of 3 or 4. One of the pool tail-outs had a rating of 5, which is considered not suitable 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 Low Gap Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Thirty-four of the 37 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 19. The shelter rating in the flatwater habitats is 0. 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 Low Gap Creek. 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 93%. The percentage of right and left bank covered with vegetation was 92% and 93%, respectively.

RECOMMENDATIONS

- 1) Low Gap Creek 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.

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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 South Branch North Fork Navarro River.
56	0004.00	A logging road crosses the channel. The crossing is a 16' wide x 13.5' long x 17' high railcar bridge.
392	0019.00	Log debris accumulation (LDA) #01 contains one piece of large woody debris (LWD) and measures 5' high x 6' wide x 4' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from gravel to cobble and is estimated to be 9' wide x 20' long x 4' deep. There is a 2' high plunge over the LDA. Fish were observed above it.
1448	0051.00	LDA #02 contains 20-25 pieces of LWD and measures 12' high x 25' wide x 88' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from silt to sand and is estimated to be 15' wide x 68' long x 3' deep. There is a plunge over the LDA. Fish were observed above it.
1750	0056.00	There is a 125' long dry section.
1978	0063.00	LDA #03 contains 10 pieces of LWD and measures 6' high x 39' wide x 15' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from sand to boulders and is estimated to be 12' wide x 53' long x 2' deep. There is a plunge over the LDA. Fish were observed above it. An erosion site on the right bank measures 16' long x 12' high.
2120	0068.00	LDA #04 contains 11 pieces of LWD and measures 5' high x 21' wide x 25' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from sand to large cobble and is estimated to be 13' wide x 30' long x 1' deep. There is a plunge over the LDA. Fish were observed above the LDA.
2362	0078.00	LDA #05 contains nine pieces of LWD and measures 9' high x 35' wide x 19' long. Water flows through the LDA and there are visible gaps in it. Retained sediment ranges from sand to cobble and is estimated to be 15' wide x 20' long x 2' deep. Fish were observed above the LDA.

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- 2781 0091.00 LDA #06 contains 10 pieces of LWD and measures 6' high x 24' wide x 17' long. Water flows through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to boulders and is estimated to be 5' wide x 25' long x 2' deep. There is a plunge over the LDA. Fish were observed above the LDA.
- 3341 0110.00 End of survey at Mendocino Redwood Company property line.

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: Low Gap Creek

LLID: 1233739391430 Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE Legal Description: T15NR14WS23 Latitude: 39:08:35.0N Longitude: 123:22:26.0W

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
2	0	DRY	1.8	70	139	4.1									
30	5	FLATWATER	27.3	37	1103	32.7	5.0	0.5	0.9	197	5924	82	2453		0
3	0	NOSURVEY	2.7	46	137	4.1									
37	37	POOL	33.6	29	1056	31.3	9.2	0.7	1.5	239	8860	217	8021	181	19
38	4	RIFFLE	34.5	25	942	27.9	6.3	0.2	0.4	31	1182	7	260		0
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
110	46				3377					15966			10735		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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 (%)
32	4	LGR	29.1	22	709	21.0	6	0.2	0.6	31	995	7	219		0	96
6	0	HGR	5.5	39	233	6.9										
23	2	RUN	20.9	28	643	19.0	4	0.6	1.4	124	2861	71	1642		0	93
7	3	SRN	6.4	66	460	13.6	6	0.4	0.9	246	1723	89	621		0	97
37	37	MCP	33.6	29	1056	31.3	9	0.7	3.5	239	8860	217	8021	181	19	93
2	0	DRY	1.8	70	139	4.1										
3	0	NS	2.7	46	137	4.1										

Total Units
110

Total Units Fully Measured
46

Total Length (ft.)
3377

Total Area (sq.ft.)
14440

Total Volume (cu.ft.)
10504

Table 3 - Summary of Pool Types

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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
37	37	MAIN	100	29	1056	100	9.2	0.7	239	8860	181	6715	19

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
37	37	1056	8860	6715

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

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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
37	MCP	100	7	19	20	54	8	22	2	5	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
37	7	19	20	54	8	22	2	5	0	0

Mean Maximum Residual Pool Depth (ft.): 1.5

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Dry Units: 2

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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
32	4	LGR	0	0	0	0	0	0	0	0	0
6	0	HGR									
38	4	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
23	2	RUN	0	0	0	0	0	0	0	0	0
7	3	SRN	0	0	0	0	0	0	0	0	0
30	5	TOTAL FLAT	0	0	0	0	0	0	0	0	0
37	37	MCP	28	31	38	0	2	0	0	0	0
37	37	TOTAL POOL	28	31	38	0	2	0	0	0	0
3	0	NS									
110	46	TOTAL	28	31	38	0	2	0	0	0	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Dry Units: 2

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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
32	4	LGR	0	0	50	50	0	0	0
6	0	HGR	0	0	0	0	0	0	0
23	2	RUN	0	0	50	50	0	0	0
7	3	SRN	0	0	33	33	0	0	33
37	37	MCP	3	11	73	11	3	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
93	47	53	0	92	93

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: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

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	10	4	15.2
Boulder	2	1	3.3
Cobble / Gravel	19	27	50.0
Sand / Silt / Clay	15	14	31.5

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	0	0	0.0
Hardwood Trees	22	25	51.1
Coniferous Trees	24	21	48.9
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 3

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

StreamName: Low Gap Creek

LLID: 1233739391430

Drainage: Navarro River

Survey Dates: 8/5/2013 to 8/7/2013

Confluence Location: Quad: BAILEY RIDGE

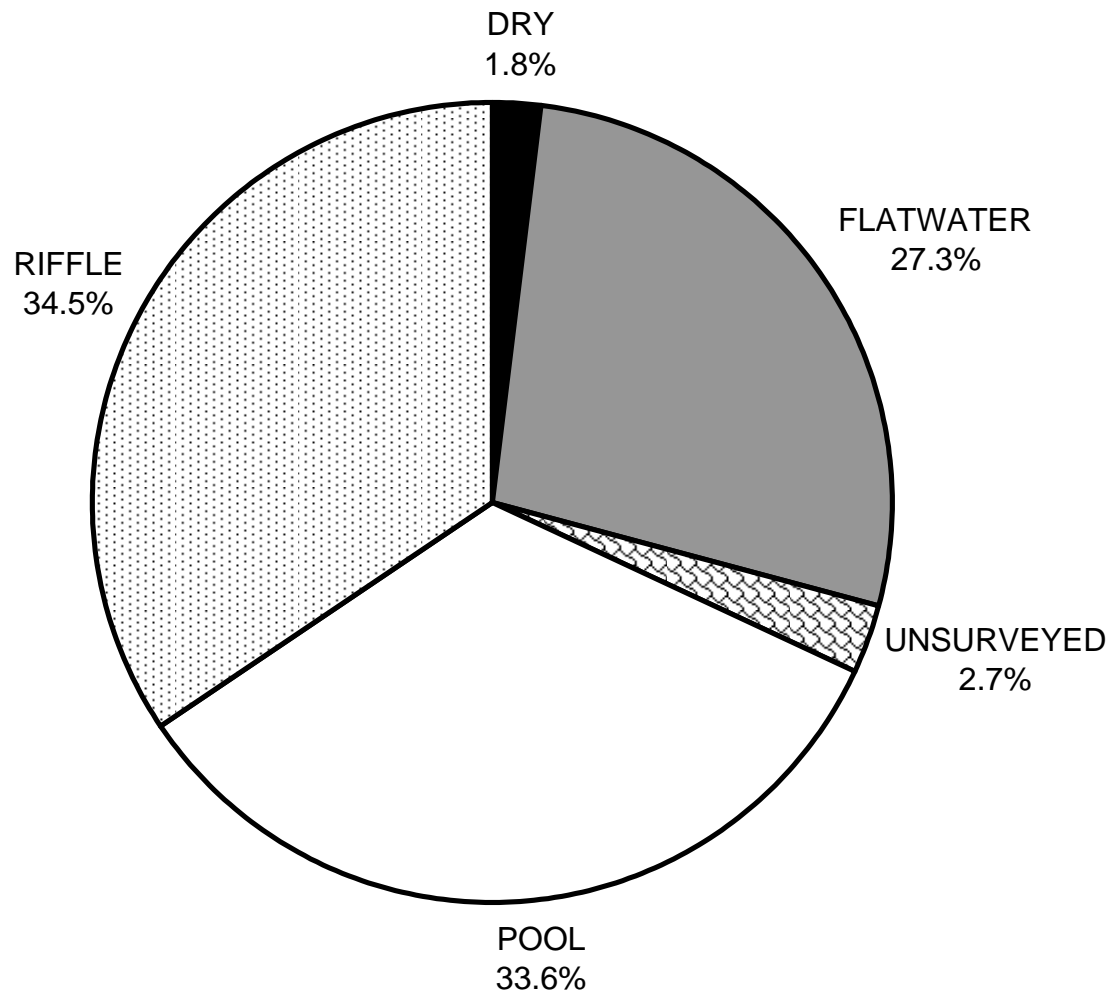
Legal Description: T15NR14WS23

Latitude: 39:08:35.0N

Longitude: 123:22:26.0W

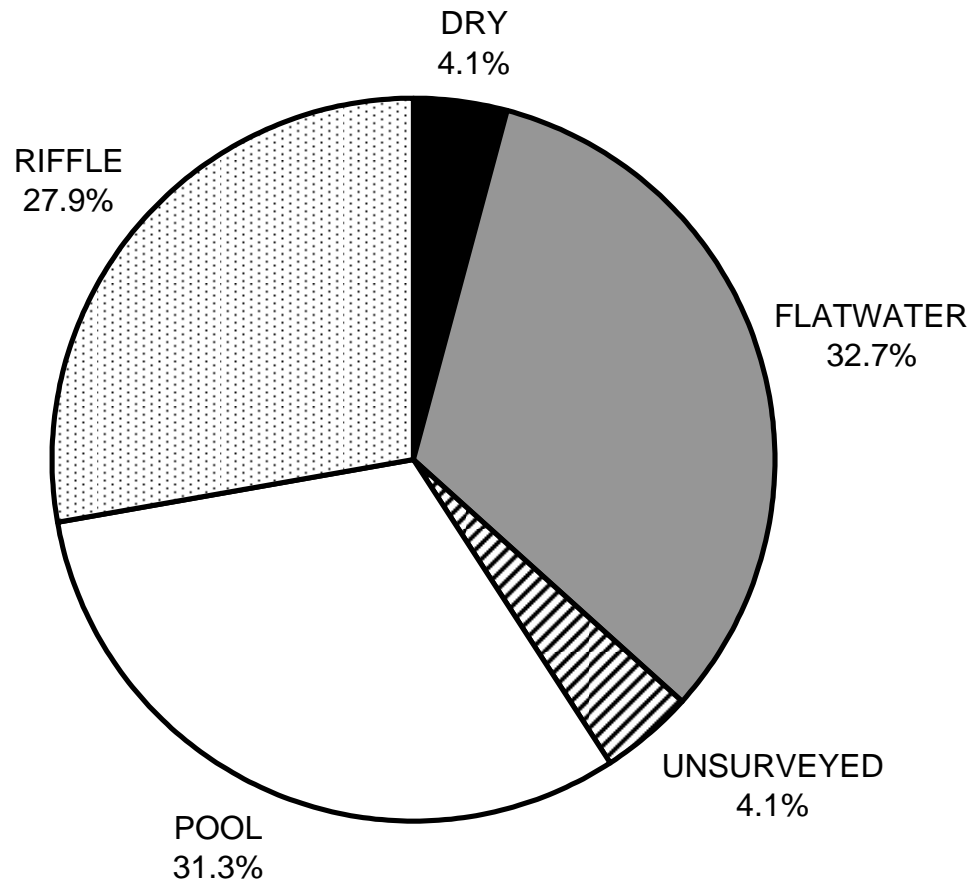
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	28
SMALL WOODY DEBRIS (%)	0	0	31
LARGE WOODY DEBRIS (%)	0	0	38
ROOT MASS (%)	0	0	0
TERRESTRIAL VEGETATION (%)	0	0	2
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	0	0
BEDROCK LEDGES (%)	0	0	0

LOW GAP CREEK 2013 HABITAT TYPES BY PERCENT OCCURRENCE



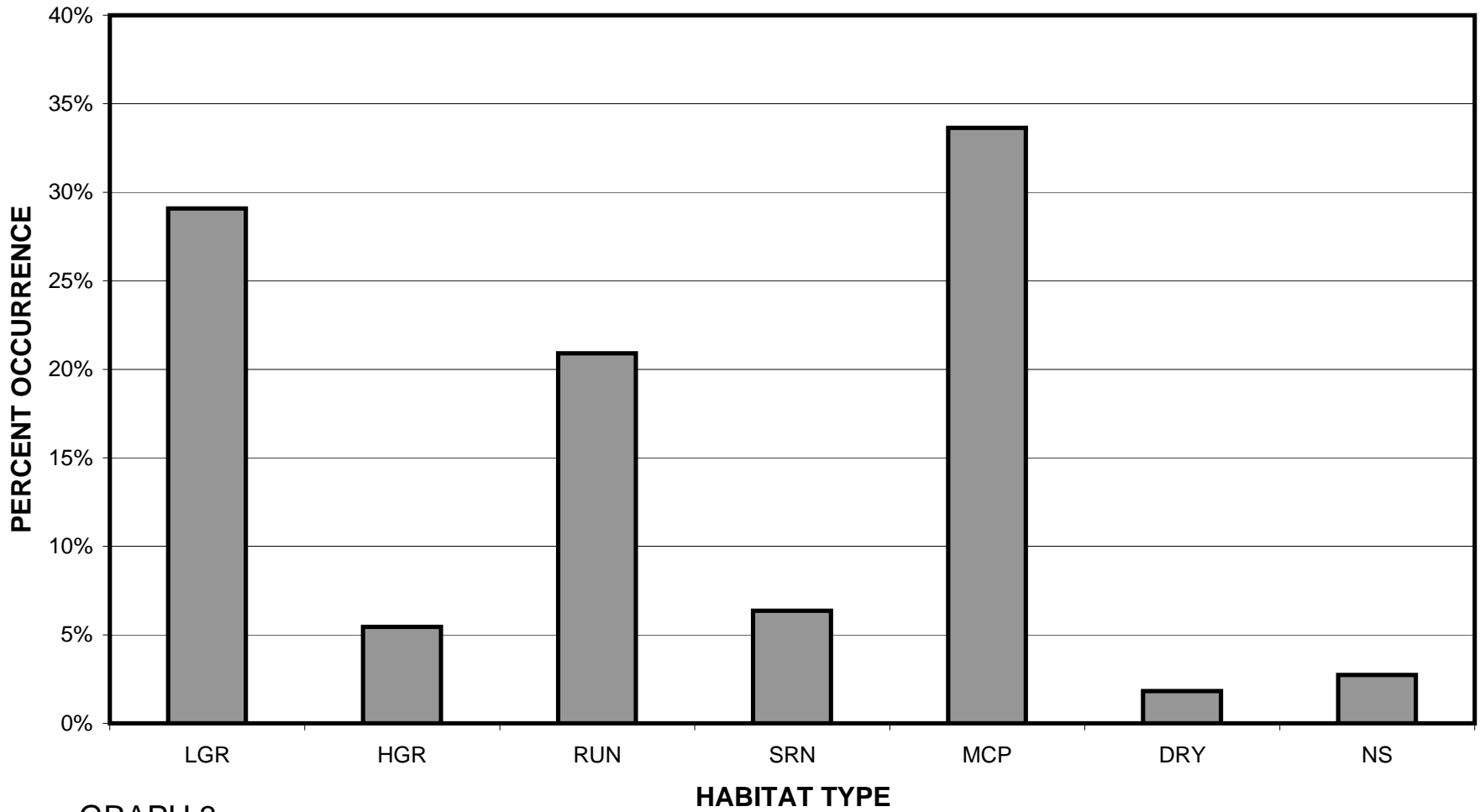
GRAPH 1

LOW GAP CREEK 2013 HABITAT TYPES BY PERCENT TOTAL LENGTH



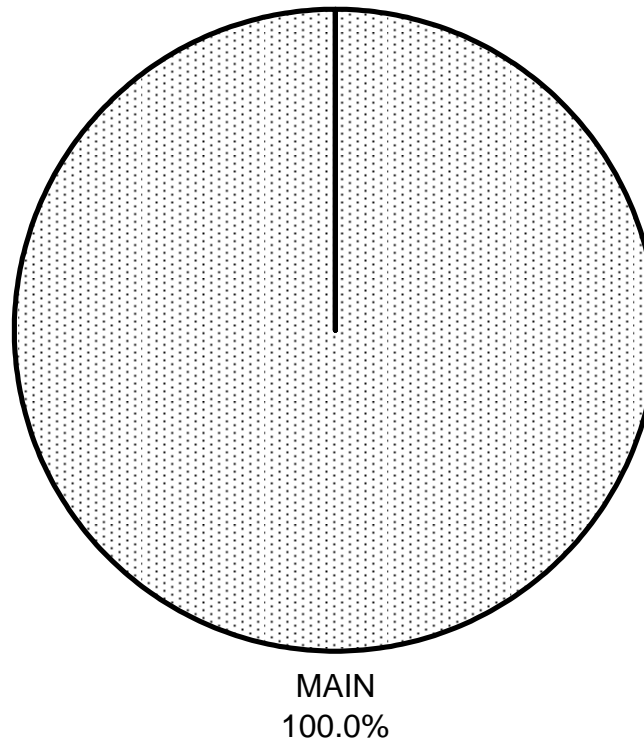
GRAPH 2

LOW GAP CREEK 2013 HABITAT TYPES BY PERCENT OCCURRENCE



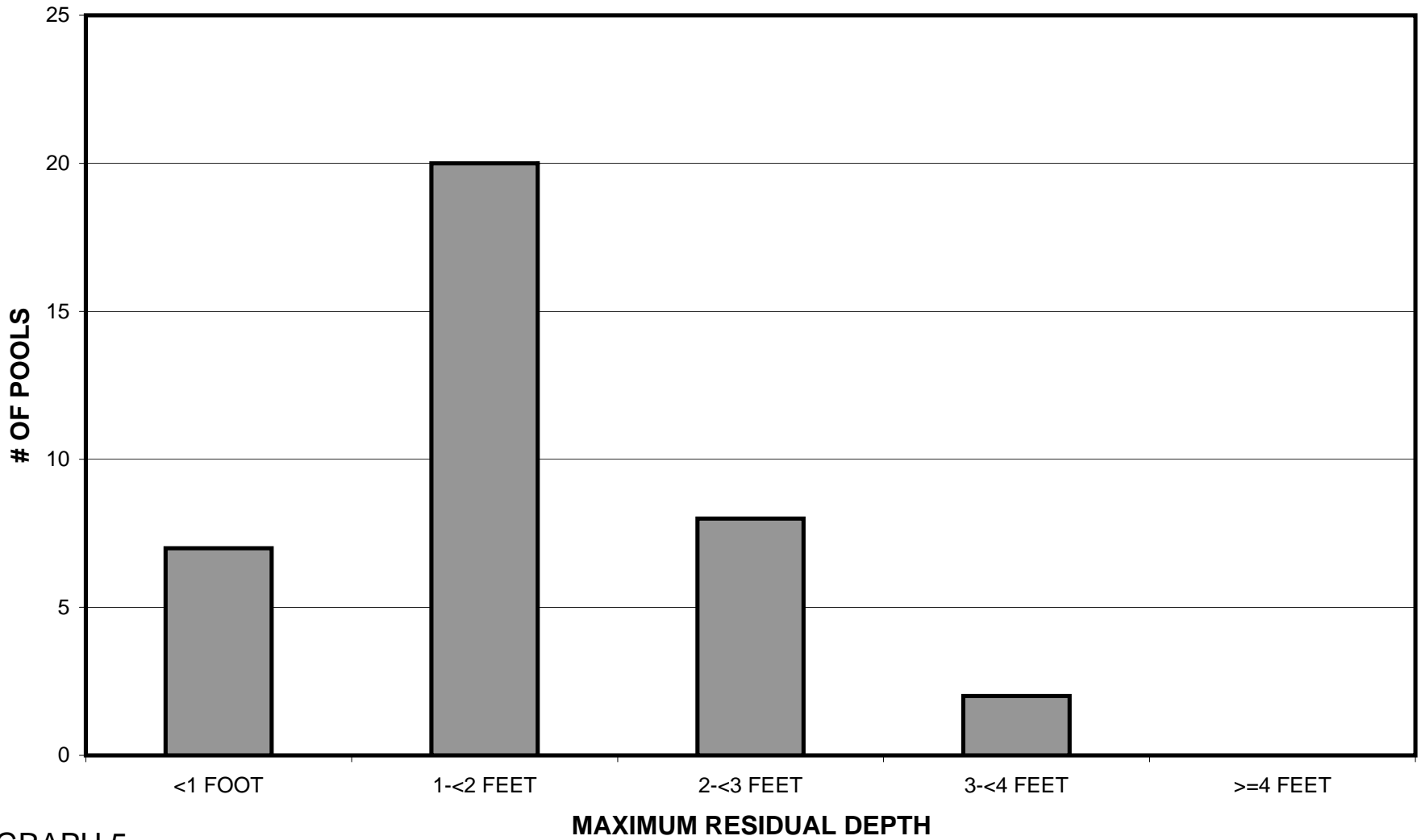
GRAPH 3

**LOW GAP CREEK 2013
POOL TYPES BY PERCENT OCCURRENCE**



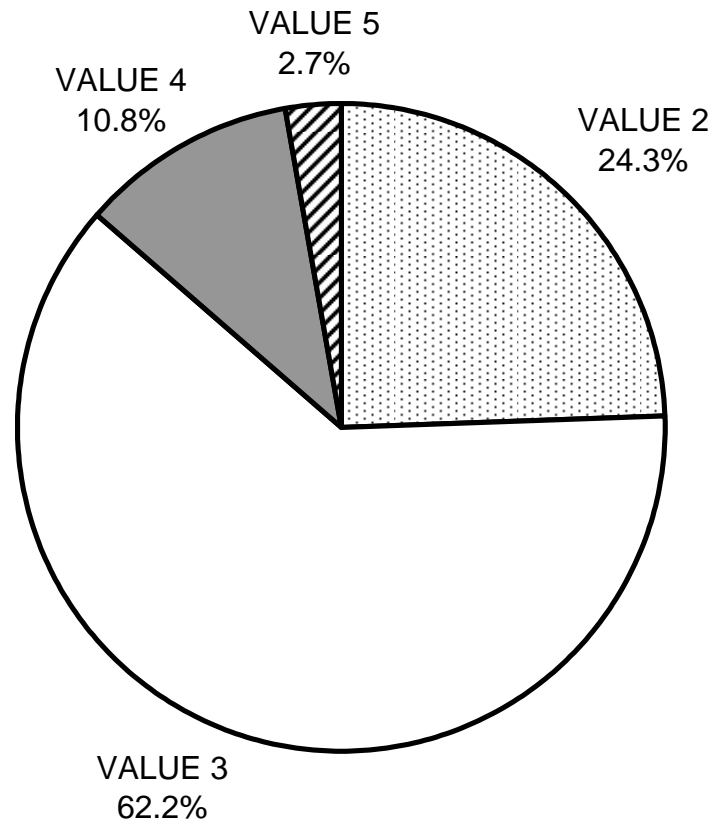
GRAPH 4

LOW GAP CREEK 2013 MAXIMUM DEPTH IN POOLS



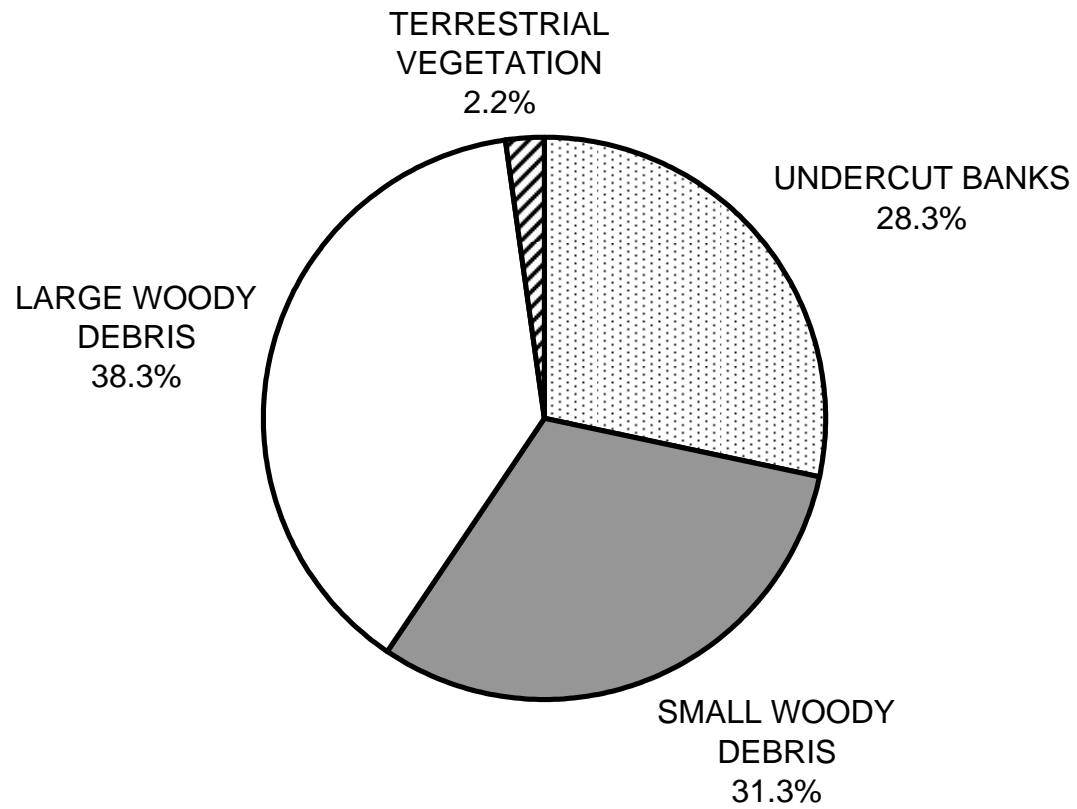
GRAPH 5

LOW GAP CREEK 2013 PERCENT EMBEDDEDNESS



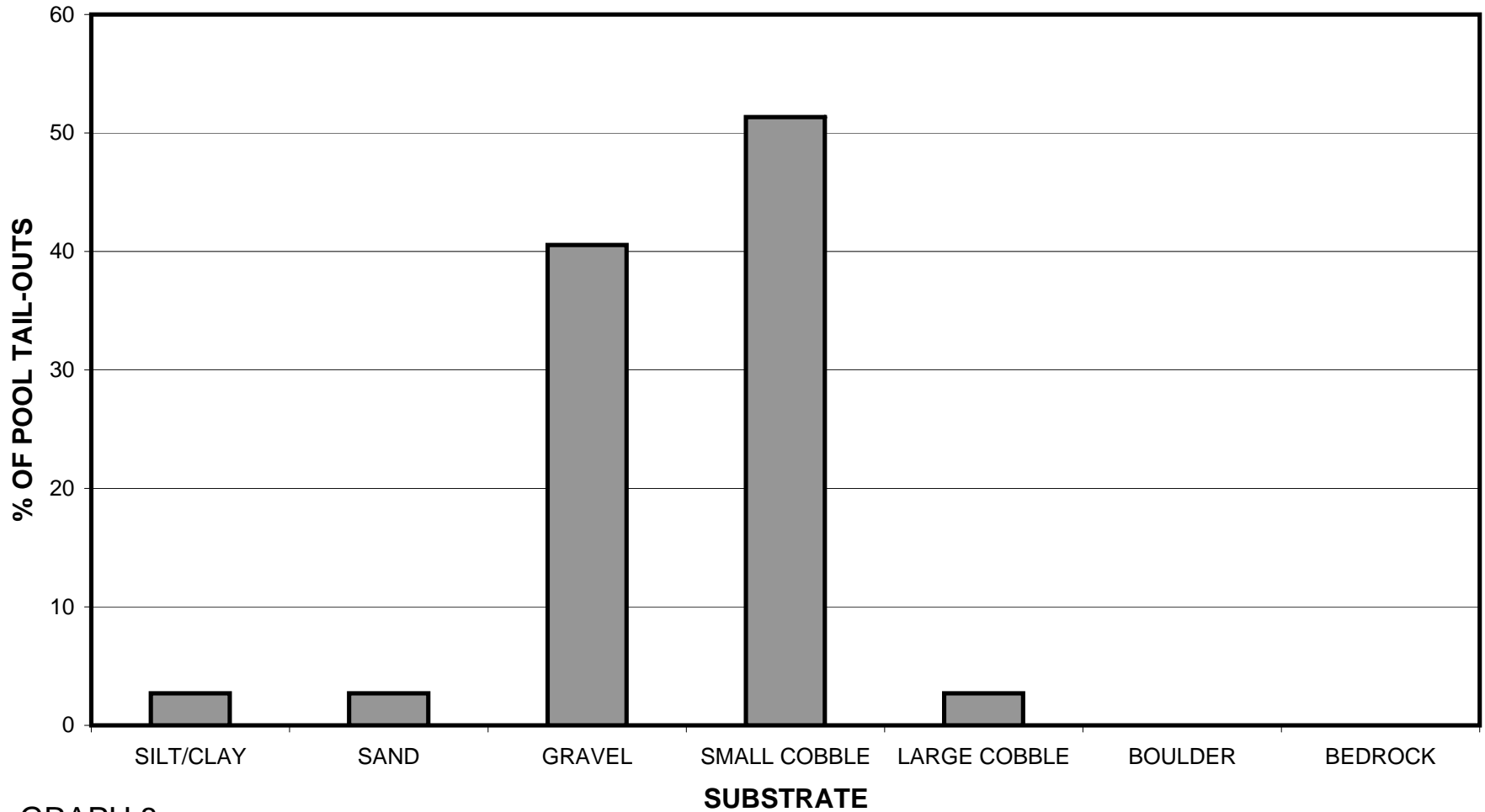
GRAPH 6

LOW GAP CREEK 2013 MEAN PERCENT COVER TYPES IN POOLS



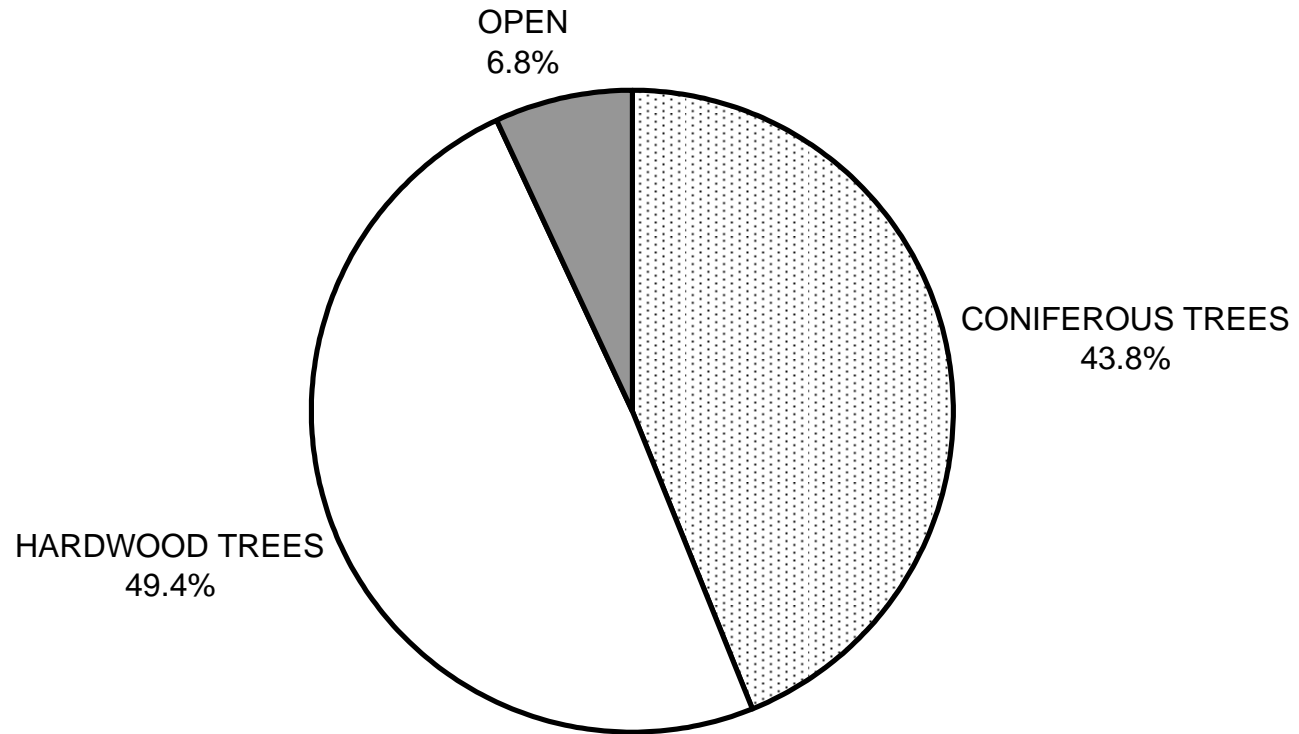
GRAPH 7

LOW GAP CREEK 2013 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



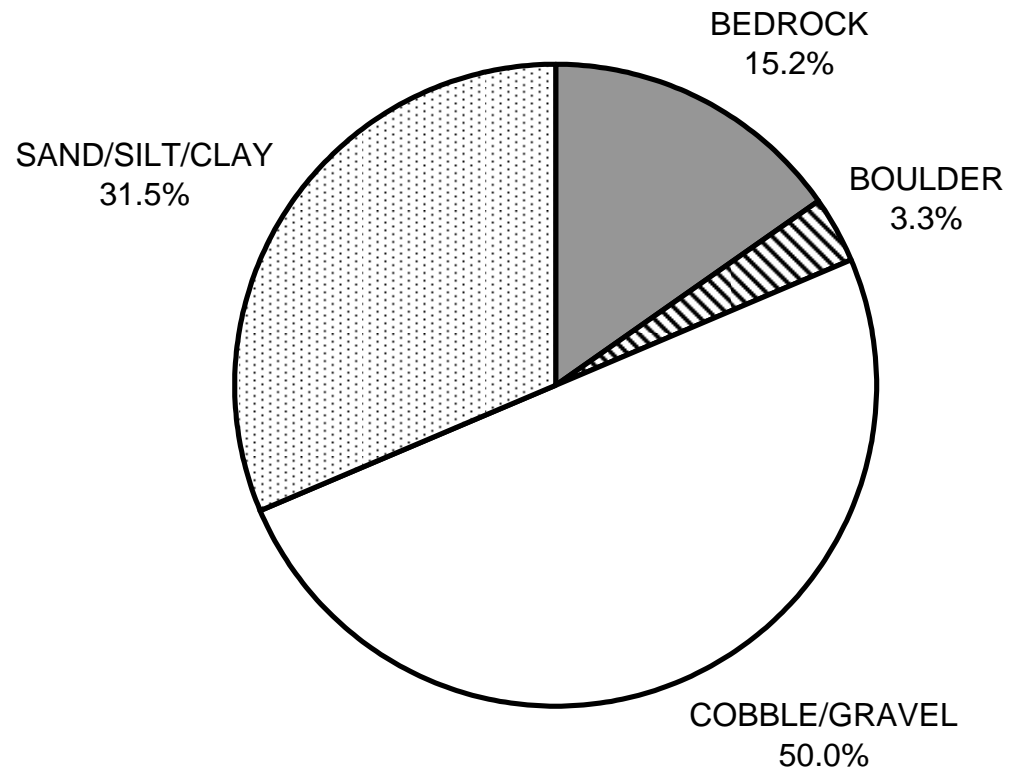
GRAPH 8

LOW GAP CREEK 2013 MEAN PERCENT CANOPY



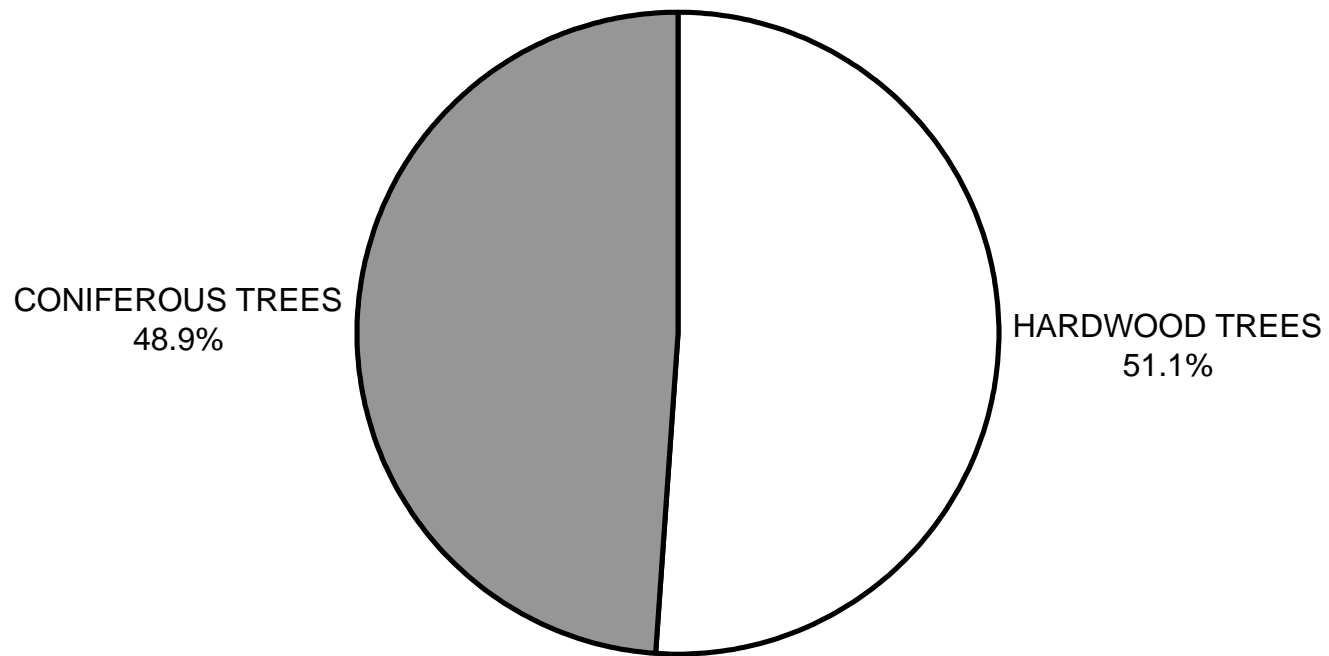
GRAPH 9

LOW GAP CREEK 2013 DOMINANT BANK COMPOSITION IN SURVEY REACH



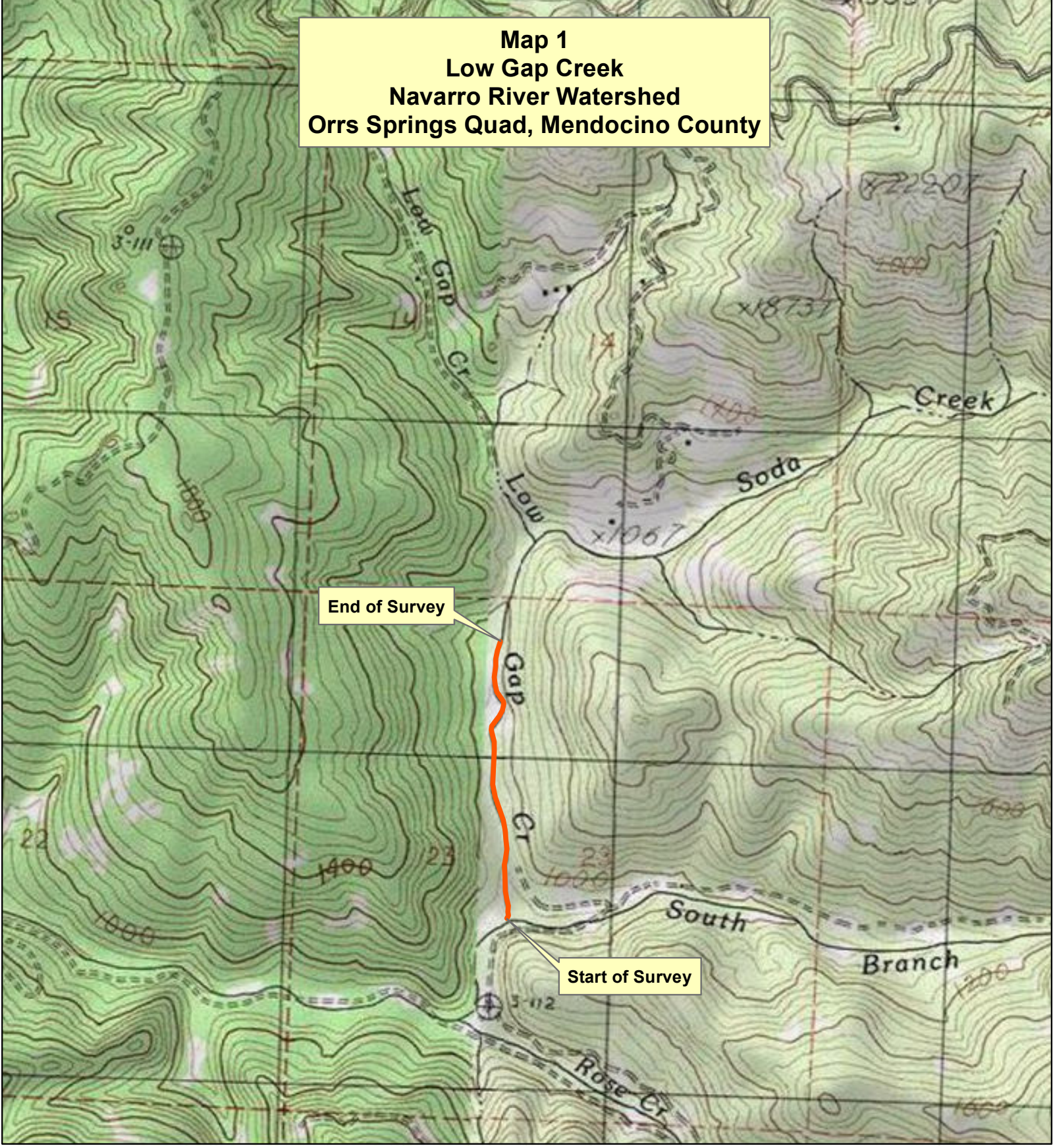
GRAPH 10

**LOW GAP CREEK 2013
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

Map 1
Low Gap Creek
Navarro River Watershed
Orrs Springs Quad, Mendocino County



End of Survey

Start of Survey

— Channel Type F3

