

STREAM INVENTORY REPORT

Low Gap Creek

INTRODUCTION

A stream inventory was conducted during September 11, 2007 to September 26, 2007 on Low Gap Creek. The survey began at the confluence with South Fork Eel River and extended upstream 2.5 miles.

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

A biological survey of Low Gap Creek was last conducted in 2003 to document the presence of juvenile salmonid species. Findings from that survey will also be included in this report.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for Chinook salmon, 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 South Fork Eel River, tributary to Eel River which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Low Gap Creek's legal description at the confluence with South Fork Eel River is T23N R16W S19. Its location is 39.8234 north latitude and 123.6790 west longitude, LLID number 1236779398235. Low Gap Creek is a second order stream and has approximately 2.99 miles of blue line stream according to the USGS Leggett 7.5 minute quadrangle. Low Gap Creek drains a watershed of approximately 3.9 square miles. Elevations range from about 800 feet at the mouth of the creek to 1,650 feet in the headwater areas. Redwoods primarily dominate the lower watershed, while mixed conifers dominate the upper watershed. The watershed is primarily privately owned and is managed for timber production. Vehicle access exists via the Highway 271 exit off of Highway 101.

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 Conservation Corps (CCC) Technical Advisors and 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.

Low Gap Creek

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.

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.

Low Gap Creek

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 unsuited 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 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. 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 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.

Low Gap Creek

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 is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks during habitat typing in Low Gap Creek. Detailed biological sampling (electrofishing and/or underwater observation) was not conducted on Low Gap Creek during the 2007 survey. Data from a June 11, 2003 snorkel survey is listed in the Biological Inventory Results section of this report. Underwater observation techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Low Gap Creek

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
- 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 September 11, 2007 to September 26, 2007, was conducted by L. Lee (WSP) and M. Cavin (WSP). The total length of the stream surveyed was 13,256 feet with an additional 131 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.18 cubic feet per second (cfs) on September 17, 2007.

Low Gap Creek is a B3 channel type for the entire 13,256 feet of the stream surveyed.

B3 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks on moderate gradients with low width/depth ratios and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 51 to 60 degrees Fahrenheit. Air temperatures ranged from 50 to 72 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 41% riffle units, 31% pool units, 26% flatwater units, and 2% dry units (Graph 1). Based on total length of Level II habitat types there were 52% riffle units, 26% flatwater units, 20% pool units, and 1% dry units (Graph 2).

Nine Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 30% high gradient riffle units, 29% mid-channel pool units, and 14% run units (Graph 3). Based on percent total length, high gradient riffle units made up 41%, mid-channel pool units 19%, and step run units 17%.

A total of 90 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 99% (Graph 4), and comprised 99% of the total length of all pools (Table 3).

Low Gap Creek

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Twenty-three of the 89 fully sampled pools (26%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 89 fully sampled pool tail-outs measured, 28 had a value of 1 (31.5%); 34 had a value of 2 (38.2%); 16 had a value of 3 (18%); 10 had a value of 4 (11.2%); 1 had a value of 5 (1.1%) (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 unsuited 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 59, flatwater habitat types had a mean shelter rating of 28, and pool habitats had a mean shelter rating of 49 (Table 1). Of the pool types, main channel pools had a mean shelter rating of 50 and scour pools had a mean shelter rating of 30 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Terrestrial vegetation is the dominant cover type in Low Gap Creek. Graph 7 describes the pool cover in Low Gap Creek. Terrestrial vegetation is the dominant pool cover type followed by boulders.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 58% of pool tail-outs and small cobble was observed in 26% of pool tail-outs.

The mean percent canopy density for the surveyed length of Low Gap Creek was 80%. Twenty percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 72% and 28%, respectively. Graph 9 describes the mean percent canopy in Low Gap Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 84%. The mean percent left bank vegetated was 87%. The dominant elements composing the structure of the stream banks consisted of 82% sand/silt/clay, 11% bedrock, 6% cobble/gravel, and 1% boulder (Graph 10). Deciduous trees were the dominant vegetation type observed in 56% of the units surveyed. Additionally, 26% of the units surveyed had coniferous trees as the dominant vegetation type, 12% had brush as the dominant vegetation, and 5% had grass as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Low Gap Creek was biologically sampled on June 11, 2003, by the California Department of Fish and Game for fish presence and identification. Using underwater observation techniques, 12 coho and 25 steelhead trout were captured and identified during the survey. The snorkel survey started at the confluence with South Fork Eel River and extended upstream approximately 1,192 feet.

Low Gap Creek

DISCUSSION

Low Gap Creek is a B3 channel type for the entire 13,387 feet of stream surveyed. The suitability of B3 channel types for fish habitat improvement structures is as follows: B3 channels are excellent for plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days September 11, 2007 to September 26, 2007, ranged from 51 to 60 degrees Fahrenheit. Air temperatures ranged from 50 to 72 degrees Fahrenheit. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 26% of the total length of this survey, riffles 52% and pools 20%. Twenty-three of the 89 (26%) pools had a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended.

Sixty-two of the 89 fully measured pool tail-outs had embeddedness ratings of 1 or 2. Twenty-six of those pool tail-outs had embeddedness ratings of 3 or 4. One 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.

Seventy-five of the 89 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 was 49. The shelter rating in the flatwater habitats was 28. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by terrestrial vegetation in Low Gap Creek. Terrestrial vegetation is the dominant cover type in pools followed by boulders. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover 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 80%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 84% and 87%, 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.

Low Gap Creek

RECOMMENDATIONS

- 1) Low Gap Creek should be managed as an anadromous, natural production stream.
- 2) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from terrestrial vegetation. Adding high quality complexity with woody cover in the pools is desirable.
- 4) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.
- 5) 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 the South Fork Eel River. There were two metal culverts at the start of the survey. Measurement of the first culvert was 2' high x 1.5' wide x 21' long. The second was 0.5' high x 1' wide x 21' long. Both culverts diameter was 12" with a plunge height 2". The maximum depth within 5' of the outlet was 0.4'. The slope of the culvert ranged from 2% to 3%. The general condition of the culverts was reported as rusty.
1803	0037.00	Right bank slide; partially revegetated with grass and brush.
2827	0058.00	Left bank slide caused water to flow subsurface.
3262	0065.00	A tributary (trib#01) entered from the left bank. The flow was estimated to be less than 0.1 cfs. The Low Gap Creek water temperature upstream and downstream of the confluence was 56 degrees Fahrenheit, as was the temperature of the tributary. The crew performed a visual observation roughly 500' upstream and found that the tributary was possible inaccessible to fish due to several log debris accumulations and subsurface flow. No fish were observed. The slope was 25%.

Low Gap Creek

3971	0078.00	A right bank slide was 22' long x 12' high; contributing gravel substrate.
4589	0090.00	There was a slide on the left bank slide that measured 90' long x 200' high. Log debris accumulation (LDA) #02 was 6' high x 23' wide x 80' long and contained 12 pieces of large woody debris (LWD). Water was not flowing through, there were visible gaps and it was a possible barrier to adult and juvenile salmonids. Salmonids were observed above it.
5842	0122.00	There was a slide on the left bank that measured 40' long x 100' high.
6697	0141.00	A tributary (trib#02) entered from the left bank. The estimated flow was less than 0.1 cfs. The temperature of the tributary was 53 degrees Fahrenheit, while the temperature of Low Gap Creek both upstream as well as downstream of the confluence was 55 degrees Fahrenheit. The tributary was inaccessible to fish due to a 25% slope the first 450'. No fish were observed.
6899	0145.00	LDA #03 was 8' high x 37.5' wide x 65' long and had 15 pieces of LWD. There were visible gaps with water flowing through them. Sediment was not being retained and fish were observed upstream.
7319	0151.00	Tributary (trib#03) entered from the right bank. The estimated flow of the tributary was 0.8 cfs. The temperature of the tributary was 56 degrees Fahrenheit. Low Gap Creek's temperature upstream and downstream of the confluence was 55 degrees Fahrenheit. The crew performed a visual observation 350' up the tributary; the slope was 20% and no fish were observed.
7999	0162.00	There was a weir made of boulders. The cables were breaking and the boulders were separating.
8226	0165.00	A slide on the right bank was 14' long x 100' high.
8637	0175.00	A slide on the left bank was 26' long x 30' high.
8941	0181.00	Tributary (trib#04) entered from the left bank. The estimated flow was 0.8cfs. The temperature of the tributary was 56 degrees Fahrenheit. Low Gap Creek's temperature upstream as well as downstream of the confluence was 55 degrees Fahrenheit. The crew performed a visual observation 300' up the tributary. The slope was 15% and no fish were observed. A log debris accumulation on the tributary was noted.
9048	0184.00	Log debris accumulation (LDA#04) was 8' high x 40' wide x 55' long had 24 pieces of large woody debris (LWD). There were visible gaps and water was flowing through the LDA. There was sediment retention; it measured 15' wide x 20' long x 4' deep. The retained substrate ranged in size from gravel-small cobbles.

Low Gap Creek

10560	0220.00	Tributary #5 enters right bank and flows at an estimated 0.09 cfs. Temperature of the tributary, as well as downstream and upstream of the tributary was 52 Fahrenheit. Tributary was accessible to fish and salmonids were observed for ~500' into tributary.
11810	0249.00	There was a left bank slide that was 30' high x 30' long.
12083	0258.00	There was a right bank slide that was 40' long x 30' high.
12267	0263.00	Tributary (trib#06) entered from the right bank. The estimated flow was less than 0.1 cfs. The temperature of the tributary, as well as downstream and upstream of the tributary was 55 degrees Fahrenheit. The crew performed a visual observation 500' up the tributary; fish were observed and the slope was 3%.
13167	0288.00	Young-of-the-year as well as 1+ and 2+ salmonids were observed throughout the entire survey.
13256	0291.00	Survey ended because the streambed was dry. Visual observation proved that 1000' up the dry channel was an extensive log debris accumulation.

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.

Low Gap Creek

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 }

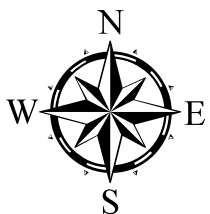
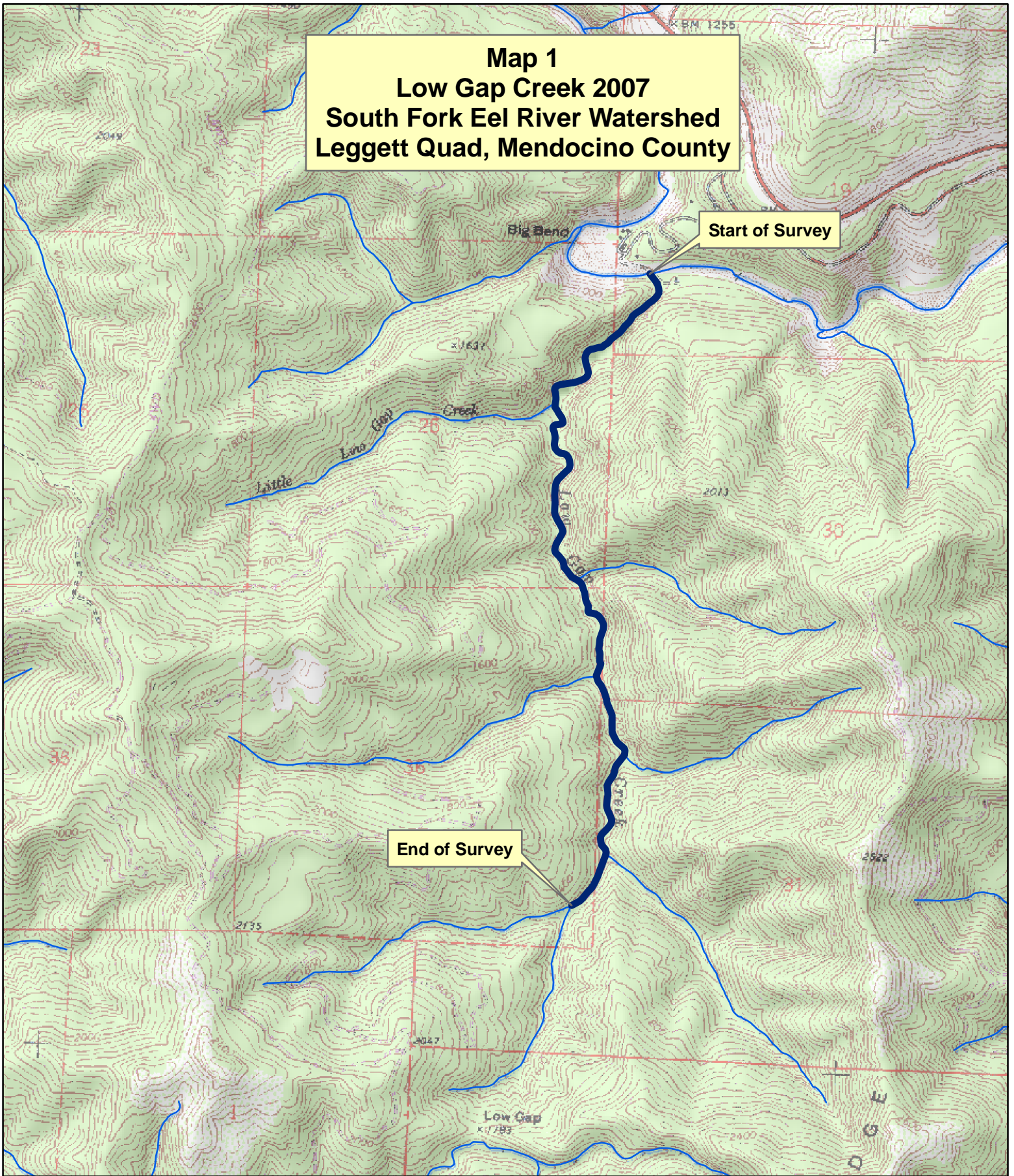
BACKWATER POOLS

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]	

Map 1
Low Gap Creek 2007
South Fork Eel River Watershed
Leggett Quad, Mendocino County



Legend

 Reach 1, B3 Channel Type

0 850 1,700 3,400 Feet




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

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
5	0	DRY	1.7	35	176	1.3									0
77	11	FLATWATER	26.4	46	3538	26.4	8.5	0.6	1.2	392	30148	234	18010		28
90	89	POOL	30.8	30	2683	20.0	11.2	0.5	1.6	332	29879	385	34610	196	49
120	16	RIFFLE	41.1	58	6990	52.2	12.9	0.4	0.9	562	67433	295	35350		59
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
292	116				13387					127460			87971		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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 (%)
33	6	LGR	11.3	44	1449	10.8	13	0.4	1.1	705	23249	443	14633		46	72
87	10	HGR	29.8	64	5541	41.4	13	0.4	1.5	476	41447	205	17859		67	80
42	7	RUN	14.4	29	1232	9.2	9	0.7	1.7	241	10136	168	7039		21	77
35	4	SRN	12.0	66	2306	17.2	8	0.5	1.6	654	22904	350	12248		41	77
1	1	TRP	0.3	38	38	0.3	8	1.4	2.2	304	304	578	578	426	5	71
85	84	MCP	29.1	29	2484	18.6	11	0.5	3.8	320	27237	362	30749	182	49	83
3	3	STP	1.0	42	125	0.9	14	0.3	2	535	1606	655	1965	197	73	65
1	1	PLP	0.3	36	36	0.3	20	1.5	2.9	720	720	1296	1296	1080	30	75
5	0	DRY	1.7	35	176	1.3									0	70

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
292	116	13387	127602	86366

Table 3 - Summary of Pool Types

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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
89	88	MAIN	99	30	2647	99	11.1	0.5	328	29154	186	15976	50
1	1	SCOUR	1	36	36	1	20.0	1.5	720	720	1080	1080	30
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)		Total Volume (cu.ft.)	
90	89				2683					29874		17056	

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

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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
1	TRP	1	0	0	0	0	1	100	0	0	0	0
84	MCP	94	14	17	50	60	15	18	5	6	0	0
3	STP	3	0	0	2	67	1	33	0	0	0	0
1	PLP	1	0	0	0	0	1	100	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
89	14	16	52	58	18	20	5	6	0	0

Mean Maximum Residual Pool Depth (ft.): 1.6

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Dry Units: 5

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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
33	6	LGR	0	9	1	0	56	11	2	22	0
87	10	HGR	0	11	8	0	29	10	4	40	0
120	16	TOTAL RIFFLE	0	10	5	0	39	10	3	33	0
42	7	RUN	0	11	4	0	49	0	0	36	0
35	4	SRN	0	29	11	0	38	0	3	20	0
77	11	TOTAL FLAT	0	18	7	0	45	0	1	30	0
1	1	TRP	0	0	0	0	100	0	0	0	0
85	83	MCP	3	13	20	3	29	0	2	29	0
3	3	STP	0	35	17	0	22	0	5	22	0
1	1	PLP	5	0	0	0	45	0	10	40	0
90	88	TOTAL POOL	3	13	20	3	30	0	2	28	0
292	116	TOTAL	2	13	16	2	32	2	2	29	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Dry Units: 5

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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
33	6	LGR	0	0	0	67	17	17	0
87	10	HGR	0	0	10	10	30	50	0
42	7	RUN	0	0	14	71	14	0	0
35	4	SRN	0	0	25	50	25	0	0
1	1	TRP	0	0	0	0	0	0	100
85	84	MCP	6	1	31	26	24	11	1
3	3	STP	0	0	67	0	0	33	0
1	1	PLP	0	0	0	0	0	0	100

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
80	28	72	0	84	87

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: Low Gap Creek LLID: 1236779398235 Drainage: Eel River - South Fork
Survey Dates: 9/11/2007 to 9/26/2007 Survey Length (ft.): 13387 Main Channel (ft.): 13256 Side Channel (ft.): 131
Confluence Location: Quad: LEGGETT Legal Description: T23NR16WS19 Latitude: 39:49:25.0N Longitude: 123:40:40.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B3	Canopy Density (%): 79.6	Pools by Stream Length (%): 20.0
Reach Length (ft.): 13256	Coniferous Component (%): 28.0	Pool Frequency (%): 30.8
Riffle/Flatwater Mean Width (ft.): 11.1	Hardwood Component (%): 72.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 74
Range (ft.): 11 to 32	Vegetative Cover (%): 85.4	2 to 2.9 Feet Deep: 20
Mean (ft.): 20	Dominant Shelter: Terrestrial Veg.	3 to 3.9 Feet Deep: 6
Std. Dev.: 5	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.2	Occurrence of LWD (%): 17	Mean Max Residual Pool Depth (ft.): 1.6
Water (F): 51 - 60 Air (F): 50 - 72	LWD per 100 ft.:	Mean Pool Shelter Rating: 49
Dry Channel (ft): 176	Riffles: 1	
	Pools: 4	
	Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 1 Sand: 6 Gravel: 58 Sm Cobble: 26 Lg Cobble: 8 Boulder: 0 Bedrock: 1		
Embeddedness Values (%): 1. 31.5 2. 38.2 3. 18.0 4. 11.2 5. 1.1		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

Legal Description: T23NR16WS19

Latitude: 39:49:25.0N

Longitude: 123:40:40.0W

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	16	9	10.7
Boulder	1	2	1.3
Cobble / Gravel	10	3	5.6
Sand / Silt / Clay	90	103	82.5

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	10	2	5.1
Brush	16	12	12.0
Hardwood Trees	66	66	56.4
Coniferous Trees	25	37	26.5
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Low Gap Creek

LLID: 1236779398235

Drainage: Eel River - South Fork

Survey Dates: 9/11/2007 to 9/26/2007

Confluence Location: Quad: LEGGETT

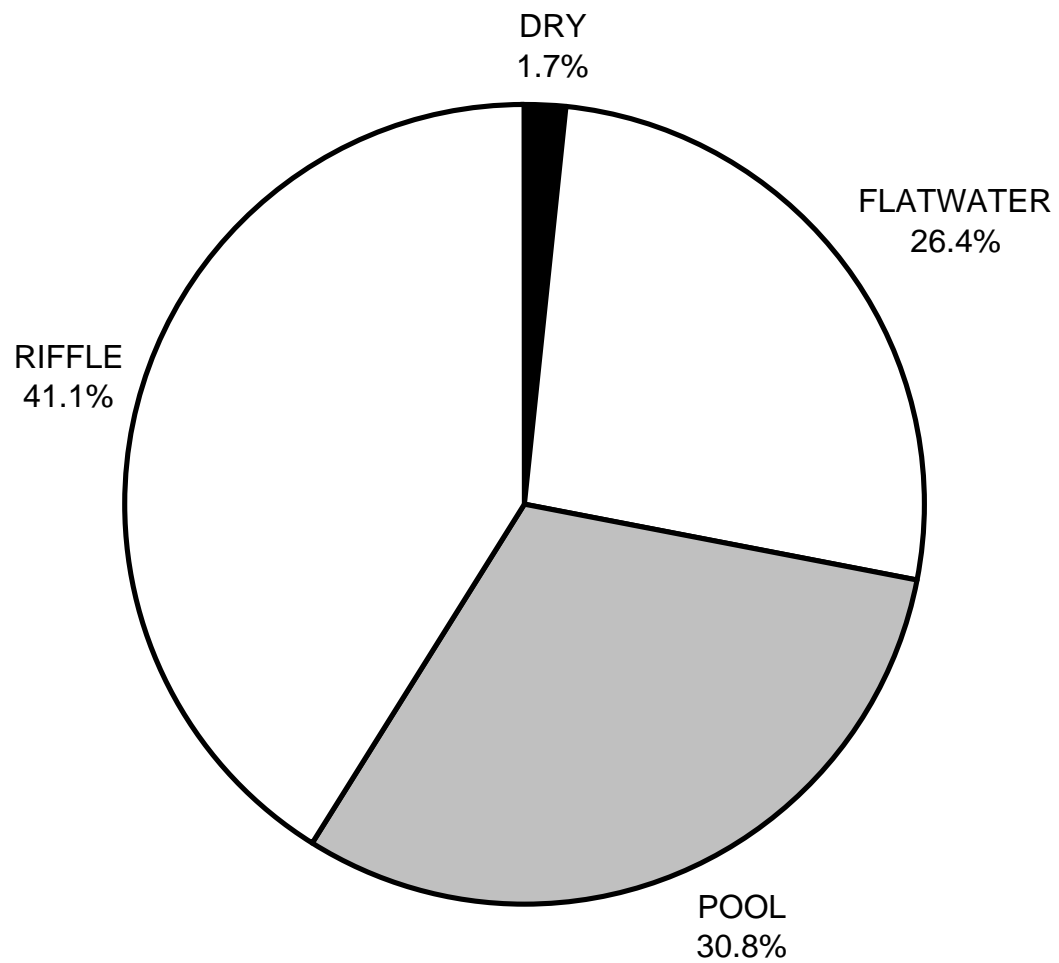
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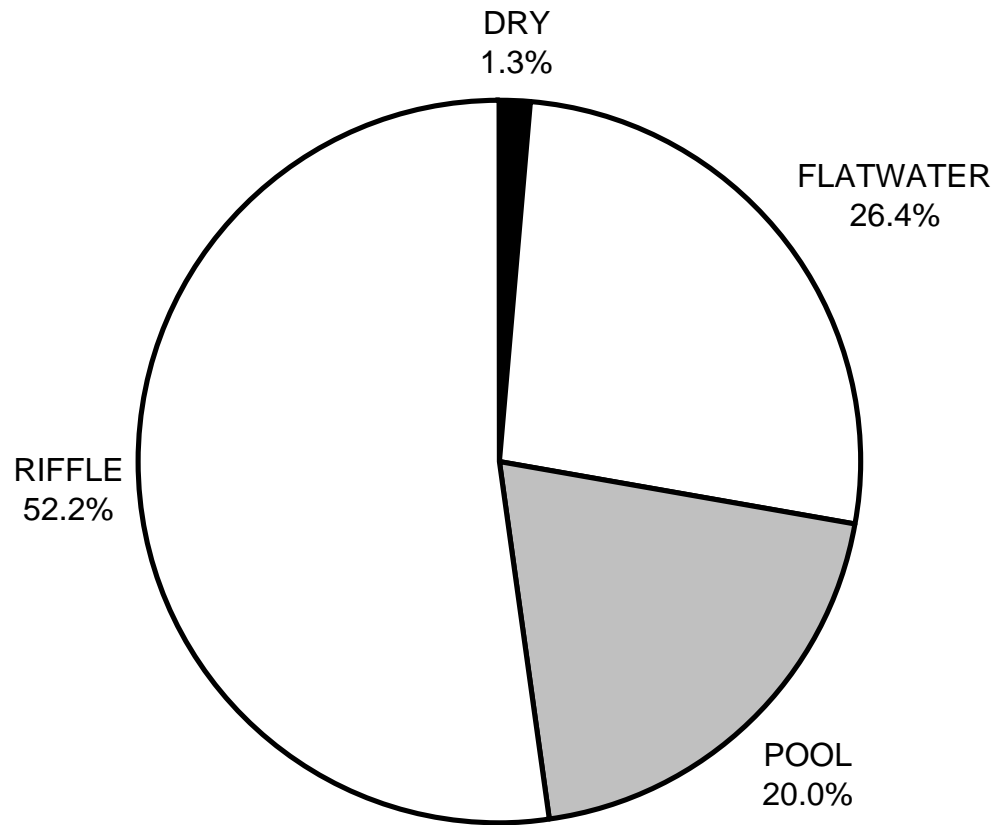
	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	0	3
SMALL WOODY DEBRIS (%)	10	18	13
LARGE WOODY DEBRIS (%)	5	7	20
ROOT MASS (%)	0	0	3
TERRESTRIAL VEGETATION (%)	39	45	30
AQUATIC VEGETATION (%)	10	0	0
WHITEWATER (%)	3	1	2
BOULDERS (%)	33	30	28
BEDROCK LEDGES (%)	0	0	0

LOW GAP CREEK 2007
HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

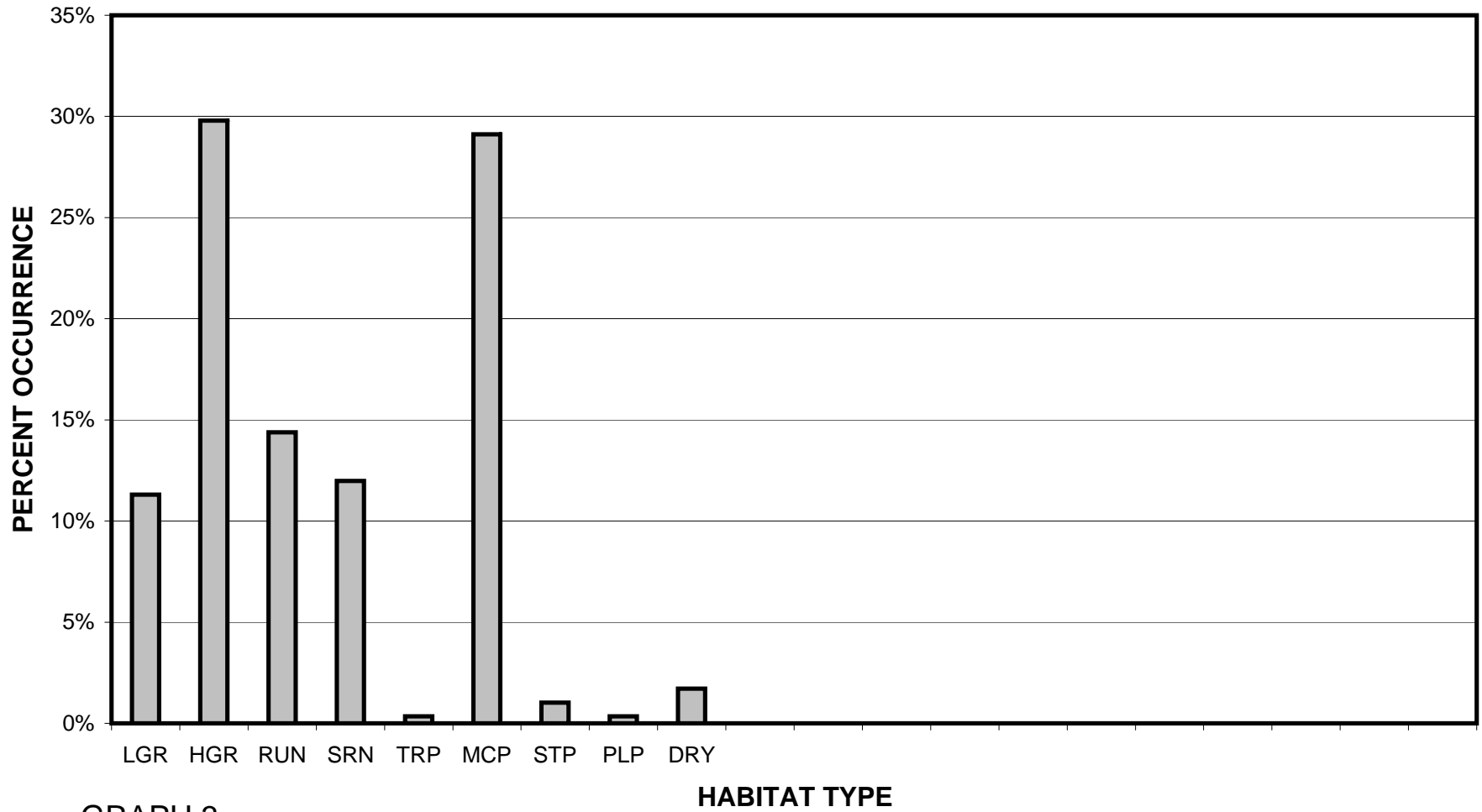
LOW GAP CREEK 2007
HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

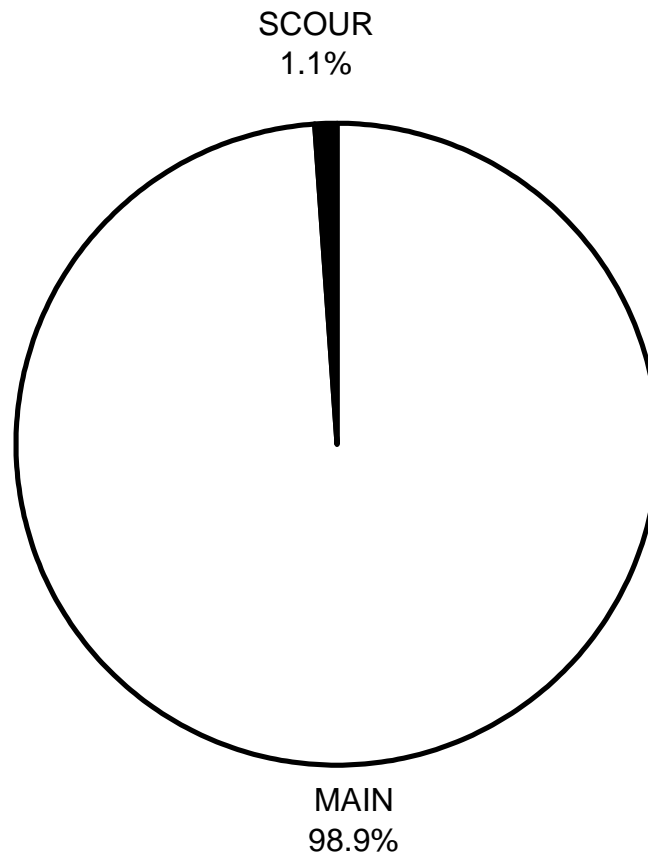
LOW GAP CREEK 2007

HABITAT TYPES BY PERCENT OCCURRENCE



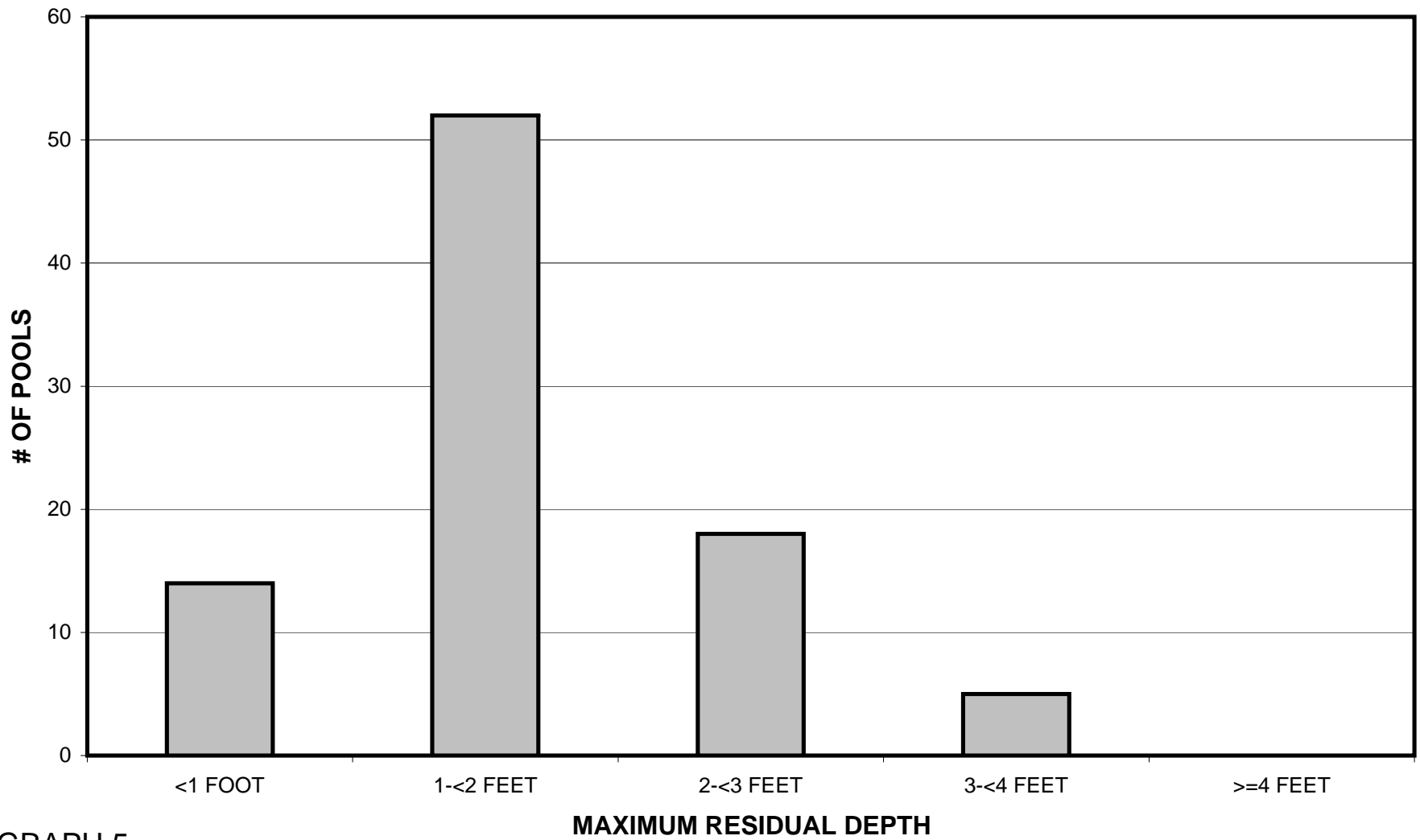
GRAPH 3

LOW GAP CREEK 2007
POOL TYPES BY PERCENT OCCURRENCE



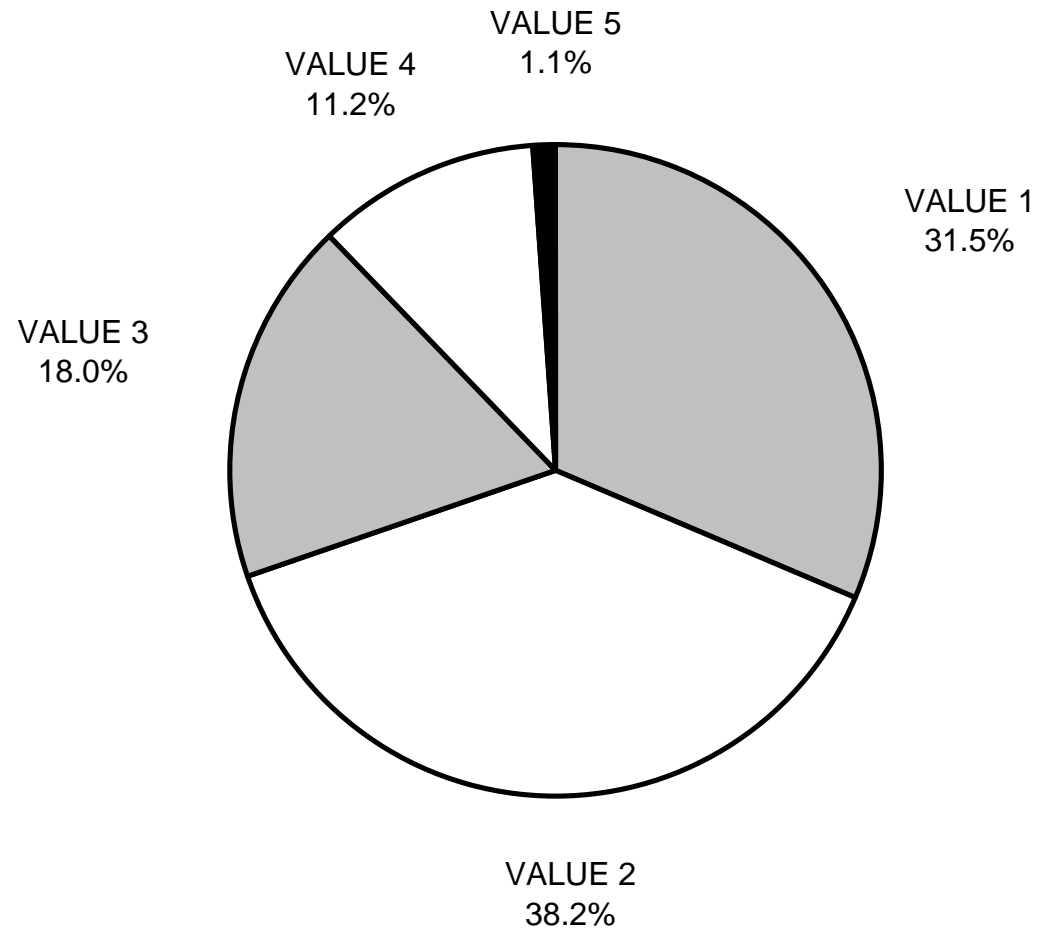
GRAPH 4

LOW GAP CREEK 2007 MAXIMUM DEPTH IN POOLS



GRAPH 5

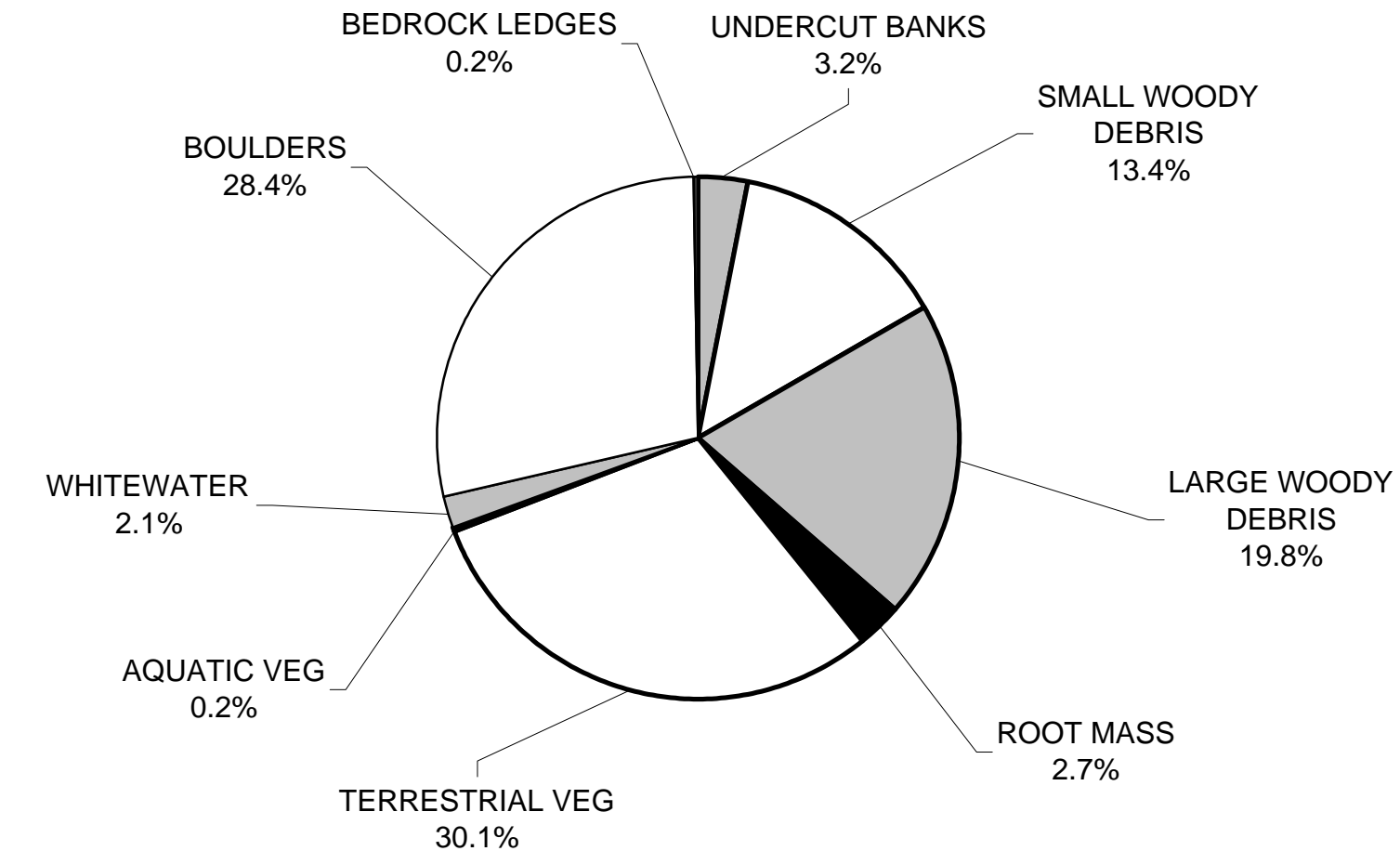
LOW GAP CREEK 2007 PERCENT EMBEDDEDNESS



GRAPH 6

LOW GAP CREEK 2007

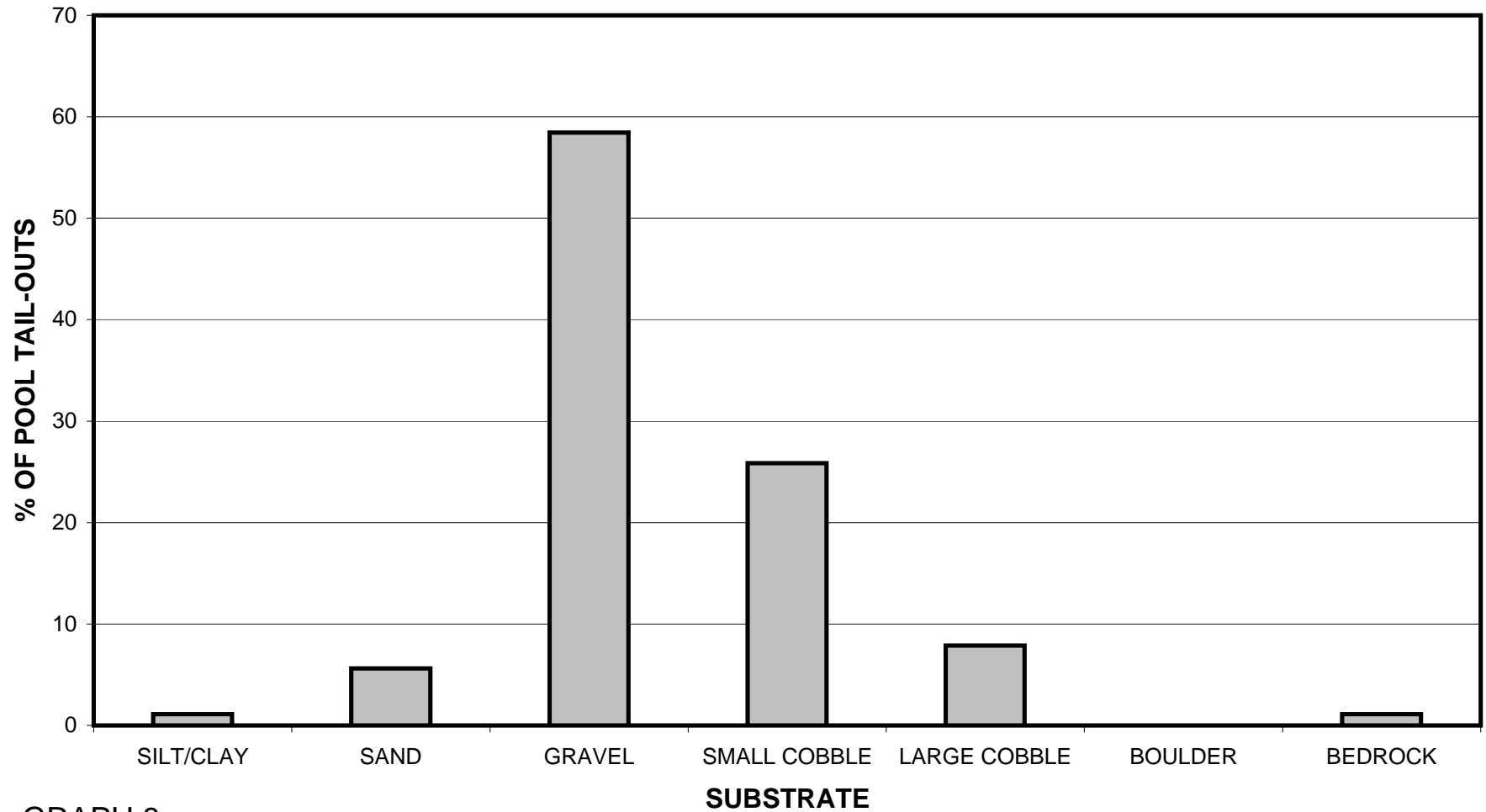
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

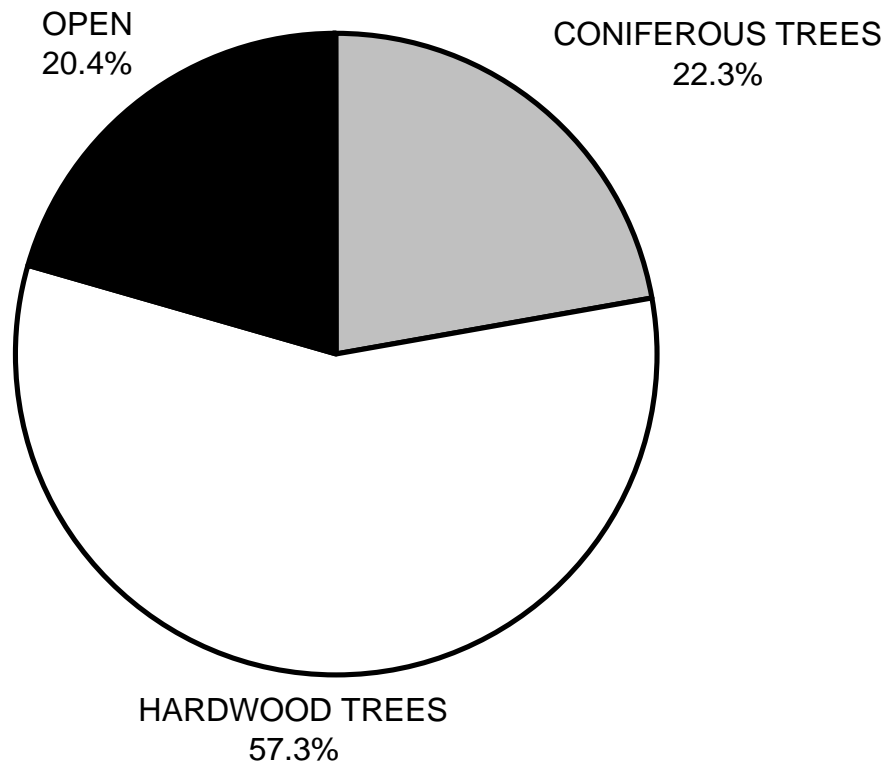
LOW GAP CREEK 2007

SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



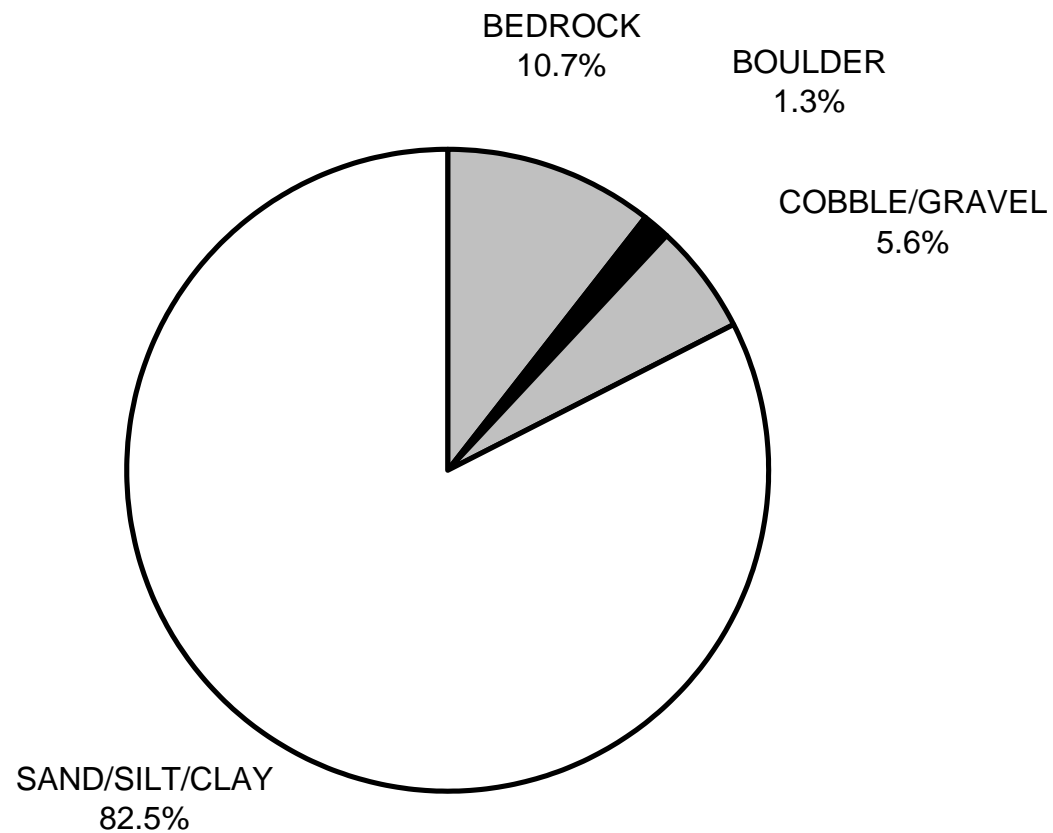
GRAPH 8

**LOW GAP CREEK 2007
MEAN PERCENT CANOPY**



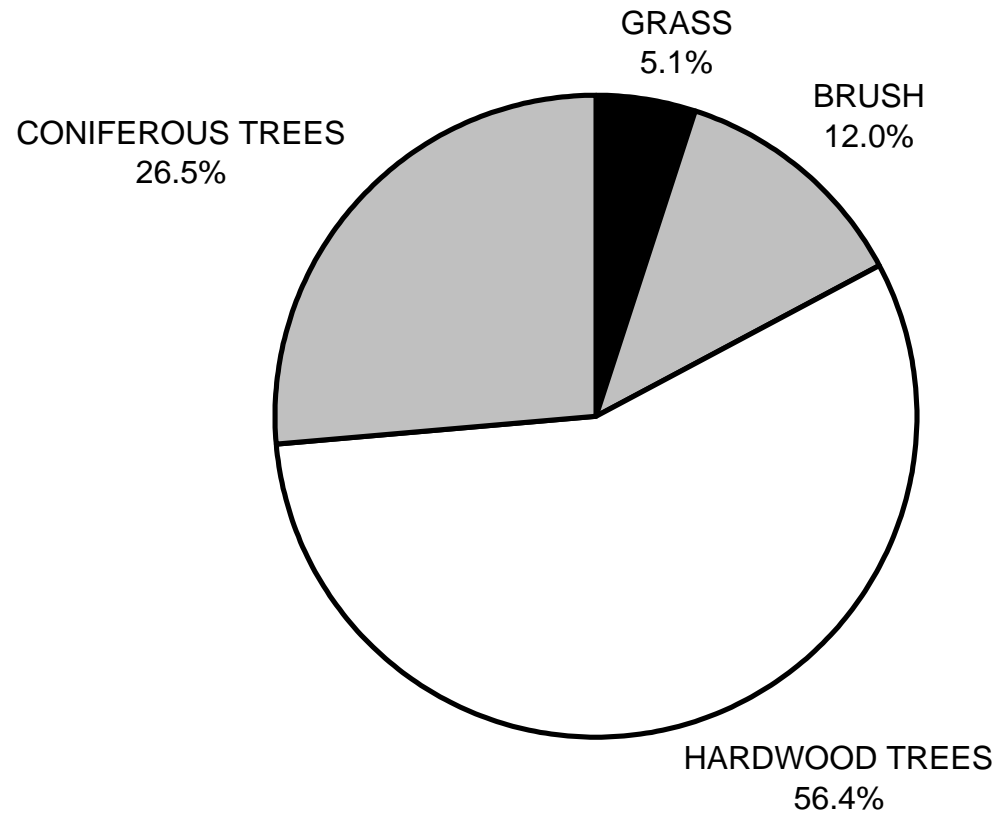
GRAPH 9

LOW GAP CREEK 2007
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

LOW GAP CREEK 2007
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11