

STREAM INVENTORY REPORT

Durphy Creek

INTRODUCTION

A stream inventory was conducted during 8/31/2006 to 9/6/2006 on Durphy Creek. The survey began at the confluence with South Fork Eel River and extended upstream 1.8 miles. A stream inventory and report was also completed for one tributary to Durphy Creek.

The Durphy Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Durphy Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for 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

Durphy Creek is a tributary to South Fork Eel River, is a tributary to Pacific Ocean, located in Humboldt County, California (Map 1). Durphy Creek's legal description at the confluence with South Fork Eel River is T05S R03E S13. Its location is 40°01'21.0" north latitude and 123°47'25.0" west longitude, LLID number 1237902400225. Durphy Creek is a 2nd order stream and has approximately 3.6 miles of blue line stream according to the USGS Garberville 7.5 minute quadrangle. Durphy Creek drains a watershed of approximately 2.4 square miles. Elevations range from about 420 feet at the mouth of the creek to 1,400 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is primarily state park and is managed for recreation. Vehicle access exists via off of Highway 101 take the Richardson Grove State Park exit, follow road to Durphy Creek.

METHODS

The habitat inventory conducted in Durphy 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.

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 Durphy 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". Durphy 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.

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

10. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is

twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

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

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Durphy Creek. In addition, 16 sites were electrofished using a Smith-Root Model 12 electrofisher. These sampling 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

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Durphy 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 8/31/2006 to 9/6/2006 was conducted by Sean K. McSmith (WSP) and Dave Heaton (WSP). The total length of the stream surveyed was 9,294 feet.

Stream flow was estimated to be 0.8 cfs during the survey period.

Durphy Creek is a B3 channel type for 7,229 feet of the stream surveyed (Reach 1), and an A2 channel type for 2,065 feet of the stream surveyed (Reach 2).

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. A2 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and boulder dominant substrates.

Water temperatures taken during the survey period ranged from 56 to 63 degrees Fahrenheit. Air temperatures ranged from 56 to 75 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 39% riffle units, 35% pool units, 22% flatwater units, 2% dry units and 2% culvert units (Graph 1). Based on total length of Level II habitat types there were 50% riffle units, 32% flatwater units, 13% pool units, 4% dry units and 1% culvert units (Graph 2).

Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 29% low gradient riffle units, 19% mid-channel pool units, and 18% step run units (Graph 3). Based on percent total length 34% were low gradient riffle units, 29% step run units, and 15% high gradient riffle units.

A total of 45 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 69% (Graph 4), and comprised 84% 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 45 pools (13%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 45 pool tail-outs measured, 6 had a value of 1 (13.3%); 27 had a value of 2 (60%); 10 had a value of 3 (22.2%); 2 had a value of 5 (4.4%) (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 31, flatwater habitat types had a mean shelter rating of 2, and pool habitats had a mean shelter rating of 15 (Table 1). Of the pool types, the scour pools had a mean shelter rating of 23, main channel pools had a mean shelter rating of 10 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Durphy Creek. Graph 7 describes the pool cover in Durphy Creek. Boulders are 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. Small cobble was observed in 60% of pool tail-outs, gravel was observed in 13% of pool tail-outs, and large cobble was observed in 13% of pool tail-outs.

The mean percent canopy density for the surveyed length of Durphy Creek was 72%. Twenty-eight percent of the canopy was open. The mean percentages of hardwood and coniferous trees were 71% and 29%, respectively. Graph 9 describes the mean percent canopy in Durphy Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 83%. The mean percent left bank vegetated was 78%. The dominant elements composing the structure of the stream banks consisted of 33% bedrock, 1% boulder, 7% cobble/gravel, and 59% sand/silt/clay, (Graph 10). Hardwood trees were the dominant vegetation type observed in 65% of the units surveyed. Additionally, 31% of the units surveyed had coniferous trees as the dominant vegetation type, 2% had brush as the dominant vegetation and 2% had grass as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Sixteen sites were electrofished for species composition and distribution in Durphy Creek on October 31, 2006. Water temperatures taken during the electrofishing period ranged from 48 to 50 degrees Fahrenheit. Air temperatures ranged from 46 to 50 degrees Fahrenheit. The sites were sampled by Trevor Tollefson (DFG), Sean K. McSmith (WSP) and Jodie Pixely (WSP).

In reach one, which comprised the first 7,229 feet of stream, 11 sites were sampled. Sites sampled in this reach yielded 69 young-of-the-year steelhead/rainbow trout (SH/RT), 8 age 1+ SH/RT and 2 age 2+ SH/RT.

In reach two, five sites were sampled starting approximately 7,229 feet from the confluence and continuing upstream 2,065 feet. Sites sampled in this reach yielded 8 young-of-the-year SH/RT and 6 age 1+ SH/RT.

The following chart details the site by site capture information:

2006 Durphy Creek e-fish observations

Date	Site #	Hab. Unit #	Hab. Type	Approx. Dist. from mouth (ft.)	Coho		SH/RT		
					YOY	1+	YOY	1+	2+
Reach 1 B3 Channel Type									
10/31/06	1	012	PLP	1054	0	0	4	4	0
10/31/06	2	021	LSL	1696	0	0	4	0	0
10/31/06	3	025	MCP	1991	0	0	8	1	0
10/31/06	4	032	MCP	2620	0	0	20	0	0
10/31/06	5	042	MCP	3047	0	0	2	1	1
10/31/06	6	046	MCP	3468	0	0	8	0	0
10/31/06	7	059	STP	3983	0	0	8	1	1
10/31/06	8	068	SRN	4336	0	0	4	0	0
10/31/06	9	071	PLP	4468	0	0	2	0	0
10/31/06	10	079	STP	5363	0	0	8	0	0
10/31/06	11	110	MCP	7229	0	0	1	1	0
Reach 2 A2 Channel Type									
10/31/06	12	115	PLP	7635	0	0	0	1	0
10/31/06	13	118	SRN	8312	0	0	4	3	0
10/31/06	14	122	MCP	8634	0	0	2	2	0
10/31/06	15	128	PLP	9157	0	0	0	0	0
10/31/06	16	u/s of EOS	PLP	9307	0	0	2	0	0

DISCUSSION

Durphy Creek is a B3 channel type for the first 7,229 feet of stream surveyed and an A2 channel type for the remaining 2,065 feet. The suitability of B3 and A2 channel types for fish habitat improvement structures is as follows: B3 channels are excellent for plunge weirs, boulder clusters, bank placed boulders, log cover and single and opposing wing-deflectors. A2 channel types are generally not suitable for habitat improvement structures.

The water temperatures recorded on the survey days 8/31/2006 to 9/6/2006, ranged from 56 to 63 degrees Fahrenheit. Air temperatures ranged from 56 to 75 degrees Fahrenheit. To make any 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 32% of the total length of this survey, riffles 50%, and pools 13%. The pools are relatively shallow, with only 6 of the 45 (13%) pools having 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 for Reach one.

Thirty-three of the 45 pool tail-outs measured had embeddedness ratings of 1 or 2. Ten of the pool tail-outs had embeddedness ratings of 3 or 4. Two 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 Murphy Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Thirty-three of the 45 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 15. The shelter rating in the flatwater habitats was 2. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Murphy Creek. Boulders are 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 72%. Reach 1 had a canopy density of 70.1%, Reach 2 had a canopy density of 88.6%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 83% and 78%, 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) Durphy 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) 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.
- 4) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from boulders. Adding high quality complexity with woody cover in the pools is desirable.
- 5) 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.
- 6) 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.
- 7) The stream crossings at 100' and 697' have been noted as potential impediments to fish passage. The crossings should be surveyed and evaluated using FishXing software to determine their ability to pass fish.
- 8) Increase the canopy on Durphy Creek by planting appropriate native vegetation like willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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 Habitat Comments:

(ft.): Unit:

0 0001.00 Start of survey at the confluence with the South Fork Eel River.

100 0002.00 Culvert, 5.9' high x 9.0' wide x 53' long; natural bottom; metal culvert in fair condition; no plunge.

Position Habitat Comments:

(ft.): Unit:

- 426 0004.00 Concrete box culvert over Highway 101; 6.0' high x 95' wide x 12' long; natural bottom.
- 697 0007.00 Bridge to Madrone Campground; 70' wide; 8.0' high x 8.0' long; one 8.0' culvert with a 4.5' culvert above; natural bottom; no plunge on bottom culvert; metal culverts in fair condition.
- 1024 0012.00 Plunge 1.8' high.
- 1024 0012.00 Log debris accumulation (LDA), 5.5' high x 25' wide x 4' long; composed of 4 pieces of LWD water flows subsurface; retaining 3 feet of sediment.
- 1054 0012.00 First electrofishing site.
- 1696 0021.00 Plunge 3.4' high.
- 1696 0021.00 Second electrofishing site.
- 1991 0025.00 Third electrofishing site.
- 2517 0031.00 Left bank erosion, 80' high x 120' long; contributing gravel to large cobble.
- 2620 0032.00 Fourth electrofishing site.
- 2933 0039.00 Plunge 1.5' high.
- 3047 0042.00 Fifth electrofishing site.
- 3468 0046.00 Sixth electrofishing site.
- 3536 0048.00 Plunge 1.2' high.
- 3586 0051.00 Left bank erosion, 90' long, contributing fines to large cobble.
- 3983 0059.00 Seventh electrofishing site.
- 4056 0061.00 Plunge 1.0' high.
- 4336 0068.00 Eighth electrofishing site.
- 4468 0071.00 Plunge 1.7' high; Two 1+ steelhead observed.
- 4468 0071.00 Ninth electrofishing site.
- 4638 0074.00 Right bank dry tributary.
- 5363 0079.00 Tenth electrofishing site.
- 5457 0081.00 Left bank erosion, 40' long x 80' high, contributing fines to large cobble.
- 5855 0092.00 Right bank dry tributary.
- 5974 0093.00 Plunge 1.5' high.
- 6438 0100.00 Trail access on the right bank.
- 6526 0102.00 Left bank tributary. Dry for the first 90 feet. Above that the water was 62°F and fish were observed.
- 6689 0105.00 Right bank tributary. Flowing with a water temperature of 59°F. Not accessible to fish due to a slope of 32%.
- 6689 0105.00 Erosion on both banks.
- 6747 0106.00 LDA, 15' long x 24' wide x 7' high; composed of 10 pieces of LWD; retaining 5 feet of sediment.
- 7214 0110.00 Channel type change from B3 to A2.

Position Habitat Comments:

(ft.): Unit:

7229 0110.00 Eleventh electrofishing site.

7635 0115.00 Log plunge 3.0' high.

7635 0115.00 Twelfth electrofishing site.

7818 0117.00 Left bank dry tributary.

8312 0118.00 Left bank dry tributary.

8312 0118.00 Thirteenth electrofishing site.

8483 0120.00 Plunges of 1', 2', and 2.5' high.

8634 0122.00 Fourteenth electrofishing site.

8864 0124.00 Boulder plunge 1.8' high. Observed three otters.

8904 0126.00 Right bank tributary. Flowing with a water temperature of 58°F. No fish access.

9157 0128.00 Bedrock plunge 2.0' high.

9157 0128.00 Fifteenth electrofishing site.

9166 0129.00 Tributary, flowing with a water temperature of 58°F. No fish access.

9294 0130.00 End of survey due to a gradient of 13-16%.

9307 Sixteenth electrofishing site.

REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE

Low Gradient Riffle	(LGR)	[1.1]	{ 1 }
High Gradient Riffle	(HGR)	[1.2]	{ 2 }

CASCADE

Cascade	(CAS)	[2.1]	{ 3 }
Bedrock Sheet	(BRS)	[2.2]	{24}

FLATWATER

Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

MAIN CHANNEL POOLS

Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}

SCOUR POOLS

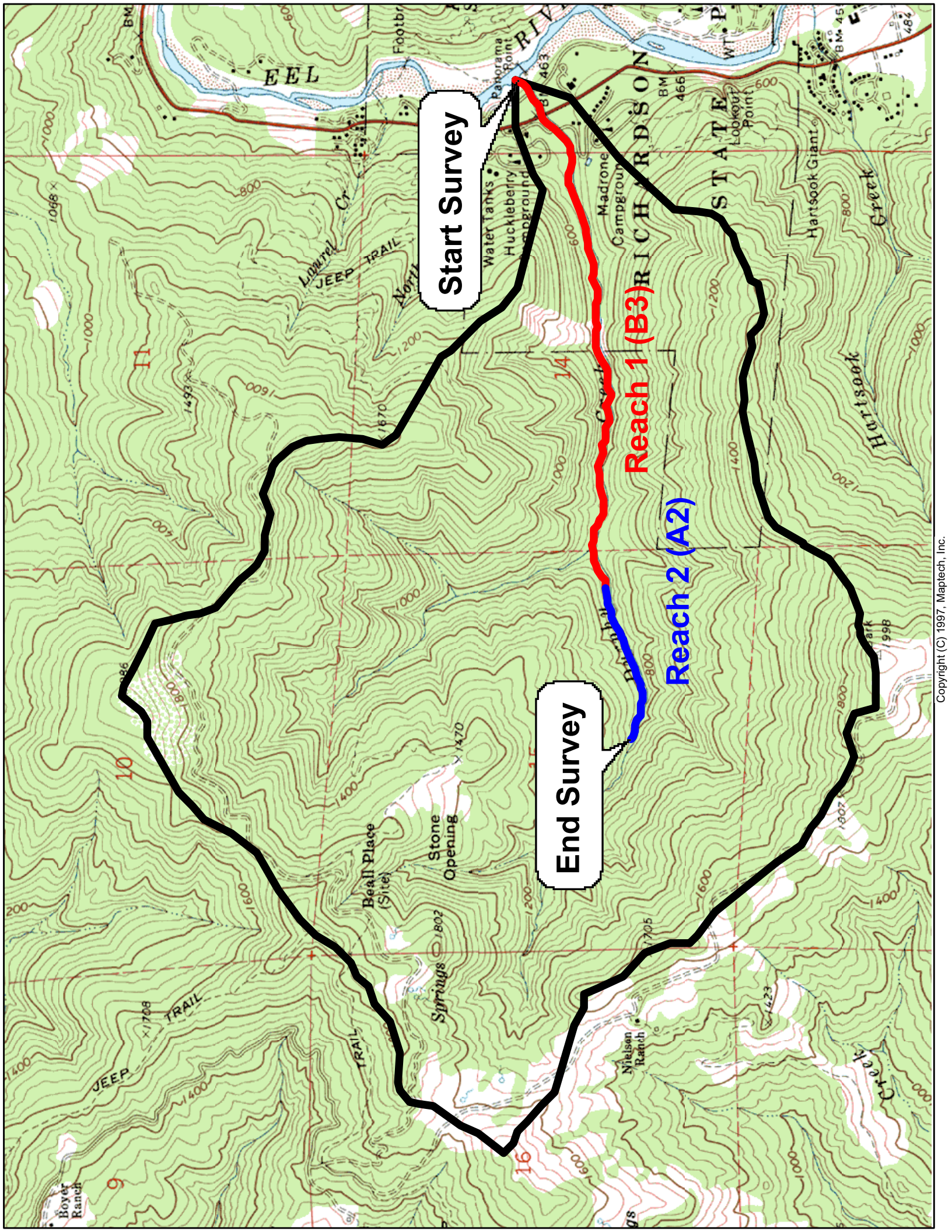
Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

BACKWATER POOLS

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

ADDITIONAL UNIT DESIGNATIONS

Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	



Start Survey

End Survey

Reach 1 (B3)

Reach 2 (A2)

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

Stream Name: Durphy Creek

LLID: 1237902400225 Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE Legal Description: T05SR03ES13 Latitude: 40:01:21.0N Longitude: 123:47:25.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
2	1	CULVERT	1.5	62	124	1.3	8.0	0.8	1.2	568	1136	454	909		0
3	0	DRY	2.3	129	388	4.2									
29	3	FLATWATER	22.3	102	2966	31.9	4.2	0.4	0.9	299	8675	106	3061		2
45	45	POOL	34.6	26	1165	12.5	7.6	0.7	1.4	170	7641	154	6951	123	9
51	9	RIFFLE	39.2	91	4651	50.0	5.4	0.3	0.7	135	6874	45	2303		31
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
130	58				9294					24326			13223		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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 (%)
38	7	LGR	29.2	83	3172	34.1	6	0.3	1	158	5986	52	1987		34	70
11	1	HGR	8.5	123	1351	14.5	6	0.4	0.8	72	792	29	317		0	70
2	1	CAS	1.5	64	128	1.4	3	0.3	0.8	38	77	12	23		40	82
6	1	RUN	4.6	40	239	2.6	3	0.5	0.9	192	1152	96	576		5	56
23	2	SRN	17.7	119	2727	29.3	5	0.4	0.9	353	8113	110	2538		0	83
25	25	MCP	19.2	27	666	7.2	7	0.6	3	185	4613	152	3794	118	5	74
6	6	STP	4.6	51	308	3.3	6	0.6	1.9	242	1453	204	1222	159	10	73
3	3	LSR	2.3	20	59	0.6	10	1.0	2.6	136	407	198	594	174	25	68
1	1	LSBk	0.8	11	11	0.1	8	0.7	1.4	87	87	78	78	61	0	73
10	10	PLP	7.7	12	121	1.3	9	0.8	3	108	1081	126	1262	106	14	82
3	0	DRY	2.3	129	388	4.2										
2	1	CUL	1.5	62	124	1.3	8	0.8	1.2	568	1136	454	909		0	35

Total Units
130

Total Units Fully Measured
58

Total Length (ft.)
9294

Total Area (sq.ft.)
24896

Total Volume (cu.ft.)
13300

Table 3 - Summary of Pool Types

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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
31	31	MAIN	69	31	974	84	6.9	0.6	196	6066	126	3898	6
14	14	SCOUR	31	14	191	16	9.3	0.9	112	1574	117	1641	15

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
45	45	1165	7641	5540

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

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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
25	MCP	56	5	20	17	68	2	8	1	4	0	0
6	STP	13	1	17	5	83	0	0	0	0	0	0
3	LSR	7	1	33	1	33	1	33	0	0	0	0
1	LSBk	2	0	0	1	100	0	0	0	0	0	0
10	PLP	22	1	10	7	70	1	10	1	10	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
45	8	18	31	69	4	9	2	4	0	0

Mean Maximum Residual Pool Depth (ft.): 1.4

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Dry Units: 3

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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
38	7	LGR	0	0	9	0	0	0	3	3	0
11	1	HGR	0	0	0	0	0	0	0	0	0
2	1	CAS	0	0	0	0	0	0	0	100	0
51	9	TOTAL RIFFLE	0	0	7	0	0	0	2	13	0
6	1	RUN	0	0	0	0	0	0	0	100	0
23	2	SRN	0	0	0	0	0	0	0	0	0
29	3	TOTAL FLAT	0	0	0	0	0	0	0	33	0
25	25	MCP	4	10	8	8	4	0	0	18	0
6	6	STP	0	0	0	0	3	0	3	52	25
3	3	LSR	18	7	20	22	0	0	0	33	0
1	1	LSBk	0	0	0	0	0	0	0	0	0
10	10	PLP	30	1	1	6	0	0	12	10	0
45	45	TOTAL POOL	10	6	6	7	3	0	3	22	4
2	1	CUL	0	0	0	0	0	0	0	0	0
130	58	TOTAL	8	5	6	6	2	0	3	21	3

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Dry Units: 3

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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
38	7	LGR	0	14	14	57	0	0	14
11	1	HGR	0	0	0	0	0	100	0
2	1	CAS	0	0	0	0	0	100	0
6	1	RUN	0	0	0	0	100	0	0
23	2	SRN	0	0	50	50	0	0	0
25	25	MCP	0	44	36	8	4	0	8
6	6	STP	0	0	0	17	17	17	50
3	3	LSR	33	0	67	0	0	0	0
1	1	LSBk	0	0	0	0	100	0	0
10	10	PLP	0	40	40	10	0	0	10

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
72	29	71	1	83	78

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: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

Legal Description: T05SR03ES13

Latitude: 40:01:21.0N

Longitude: 123:47:25.0W

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	24	13	33.0
Boulder	1	0	0.9
Cobble / Gravel	3	5	7.1
Sand / Silt / Clay	28	38	58.9

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	2	1.8
Brush	2	0	1.8
Hardwood Trees	28	45	65.2
Coniferous Trees	26	9	31.3
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Durphy Creek

LLID: 1237902400225

Drainage: Eel River - South Fork

Survey Dates: 8/31/2006 to 9/6/2006

Confluence Location: Quad: GARBERVILLE

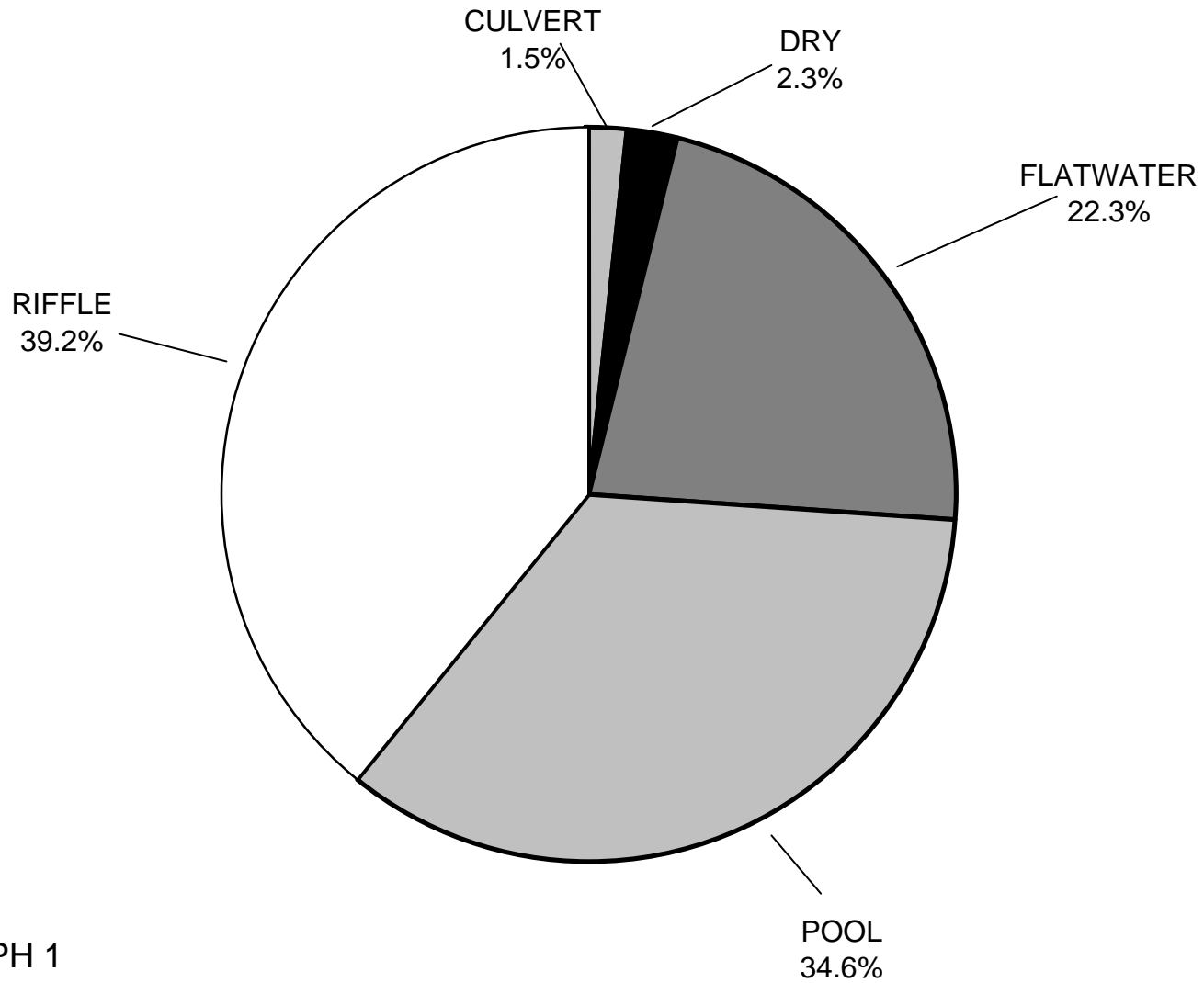
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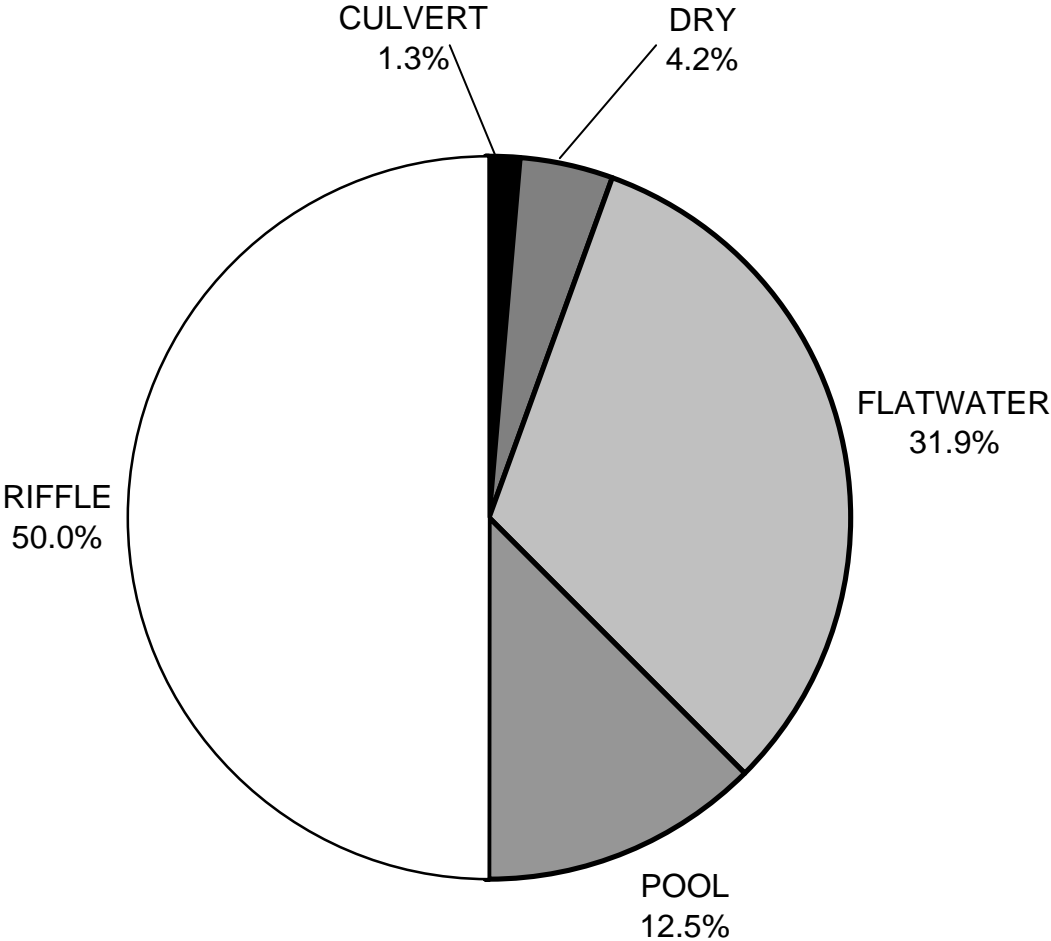
	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	10
SMALL WOODY DEBRIS (%)	0	0	6
LARGE WOODY DEBRIS (%)	7	0	6
ROOT MASS (%)	0	0	7
TERRESTRIAL VEGETATION (%)	0	0	3
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	2	0	3
BOULDERS (%)	13	33	22
BEDROCK LEDGES (%)	0	0	4

DURPHY CREEK 2006 HABITAT TYPES BY PERCENT OCCURRENCE



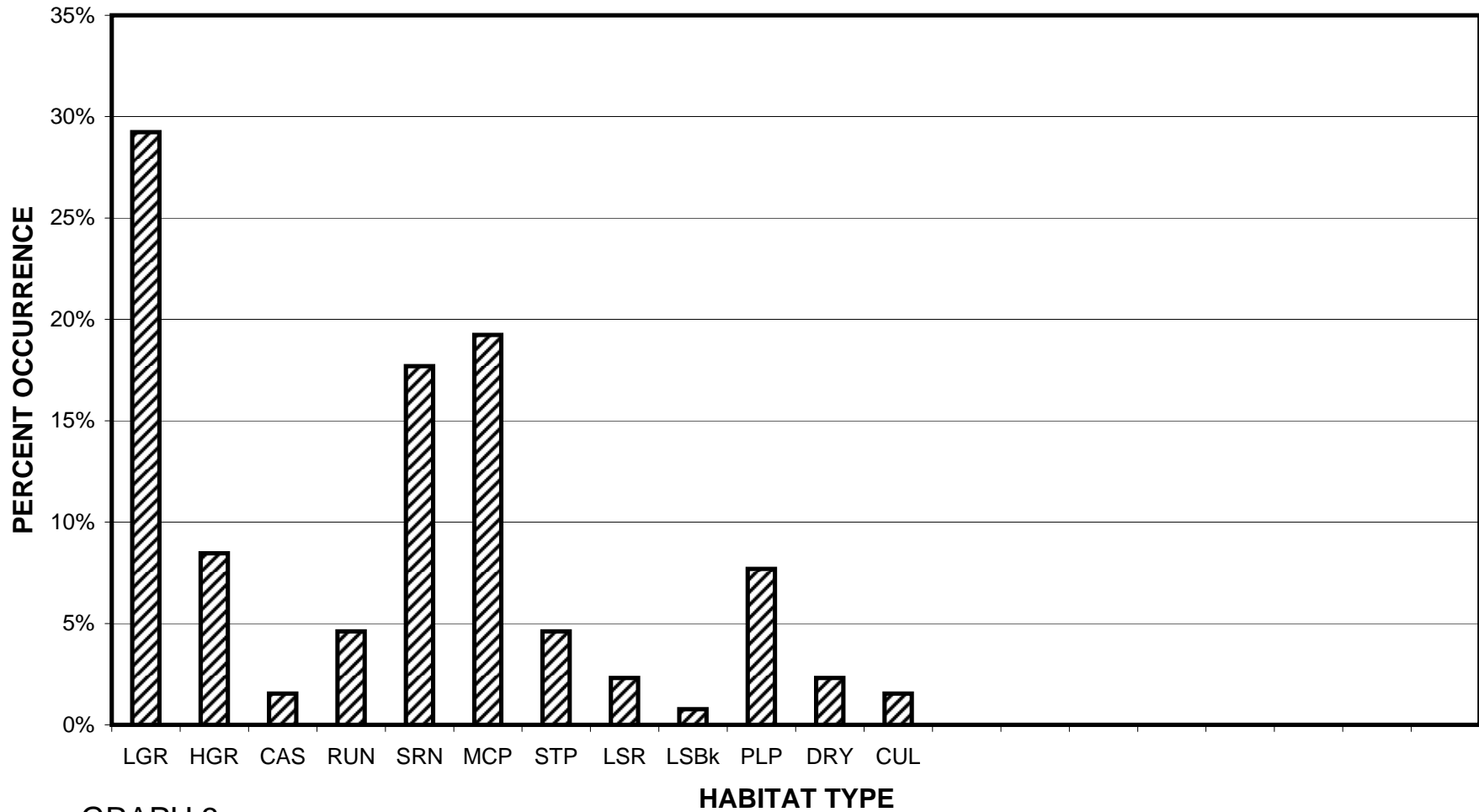
GRAPH 1

**DURPHY CREEK 2006
HABITAT TYPES BY PERCENT TOTAL LENGTH**



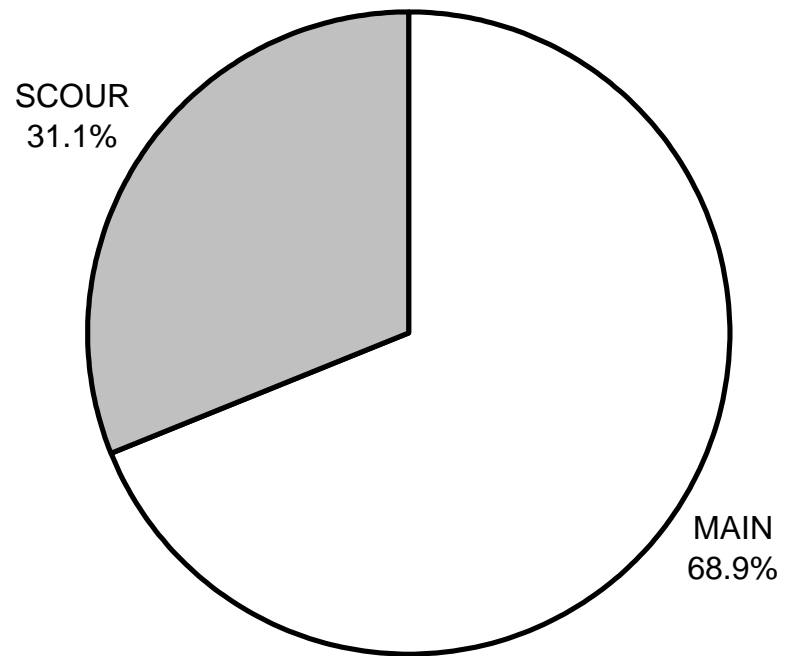
GRAPH 2

DURPHY CREEK 2006 HABITAT TYPES BY PERCENT OCCURRENCE



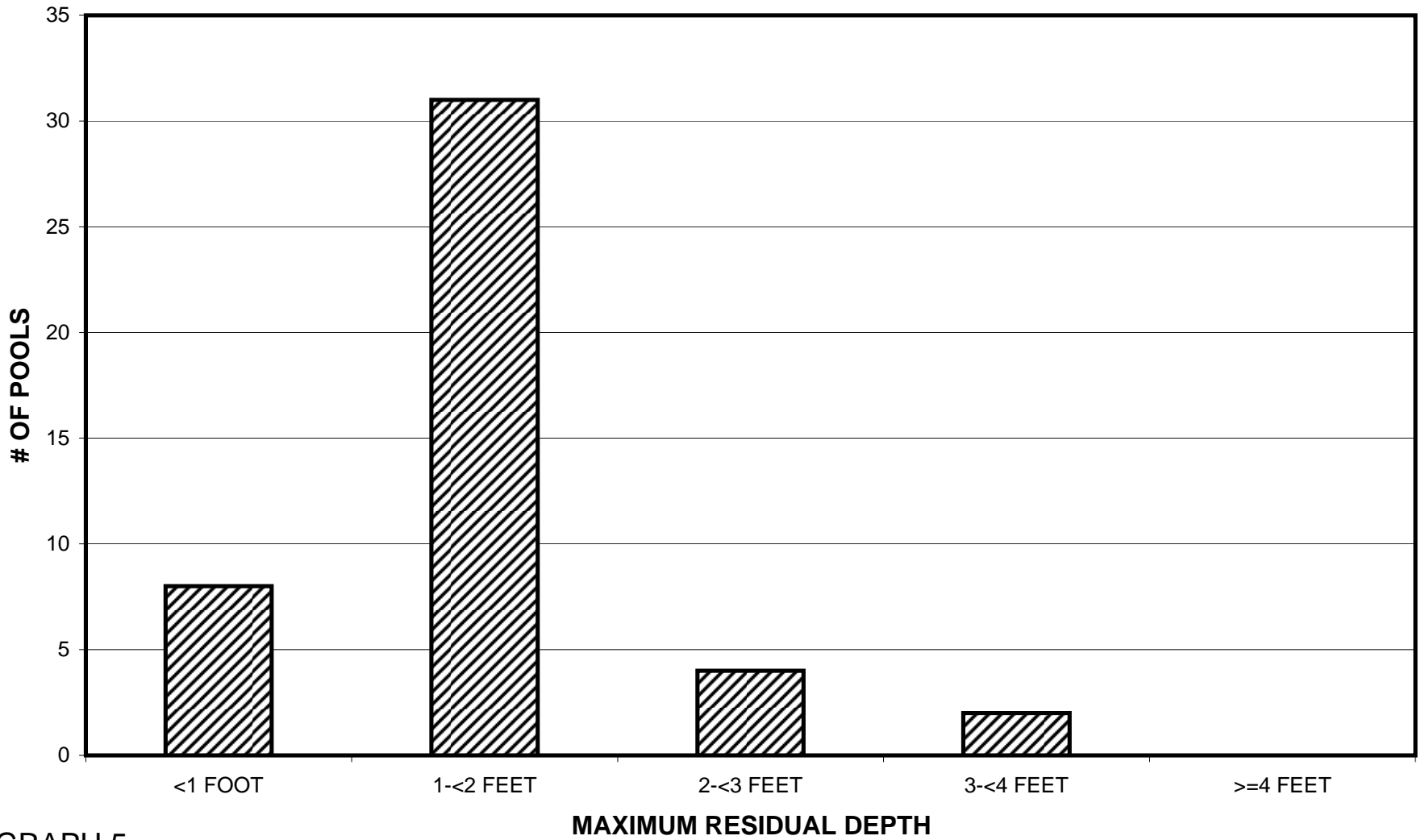
GRAPH 3

**DURPHY CREEK 2006
POOL TYPES BY PERCENT OCCURRENCE**



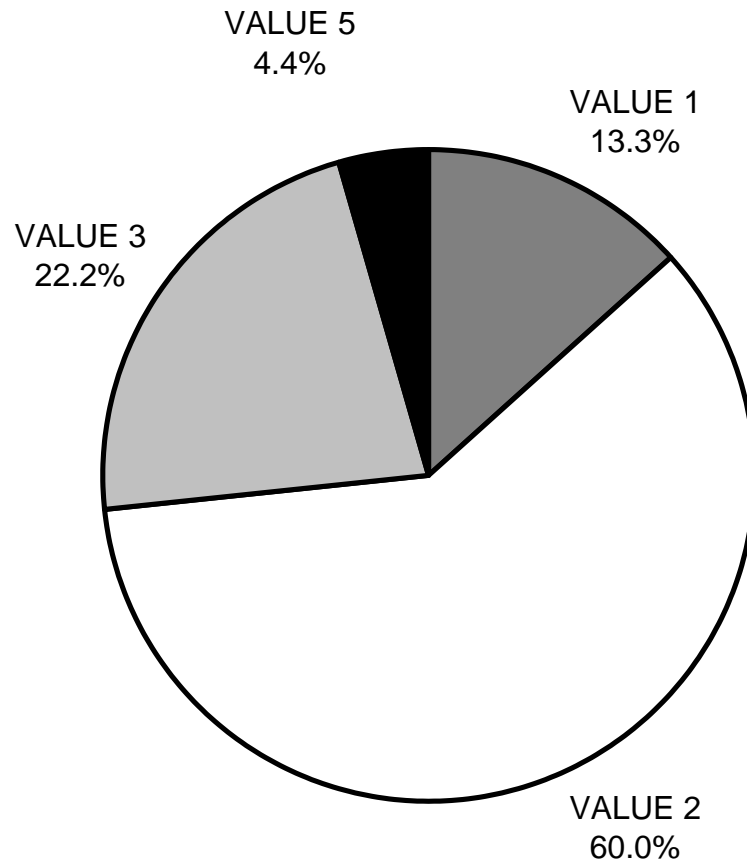
GRAPH 4

DURPHY CREEK 2006 MAXIMUM DEPTH IN POOLS



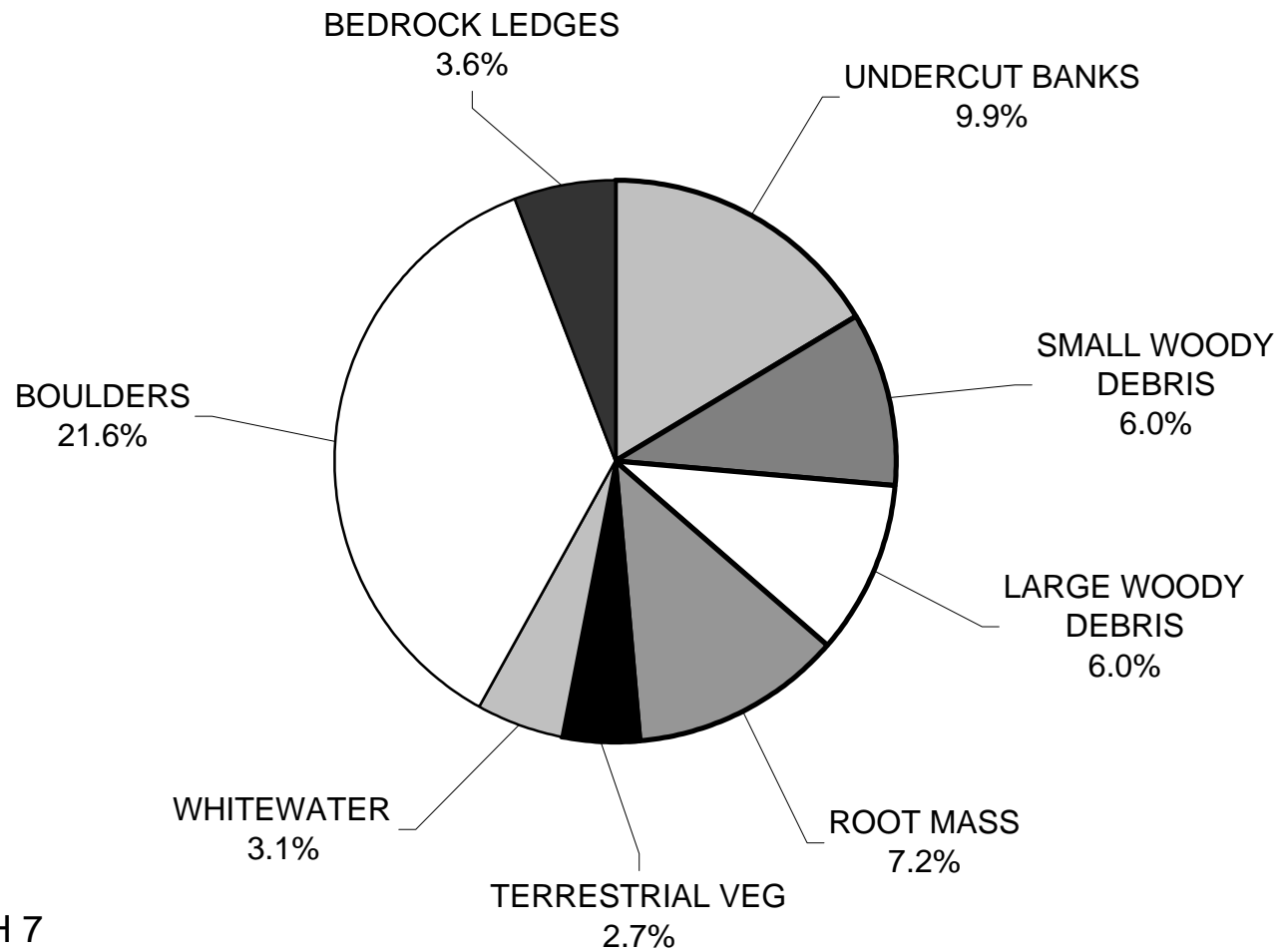
GRAPH 5

DURPHY CREEK 2006 PERCENT EMBEDDEDNESS



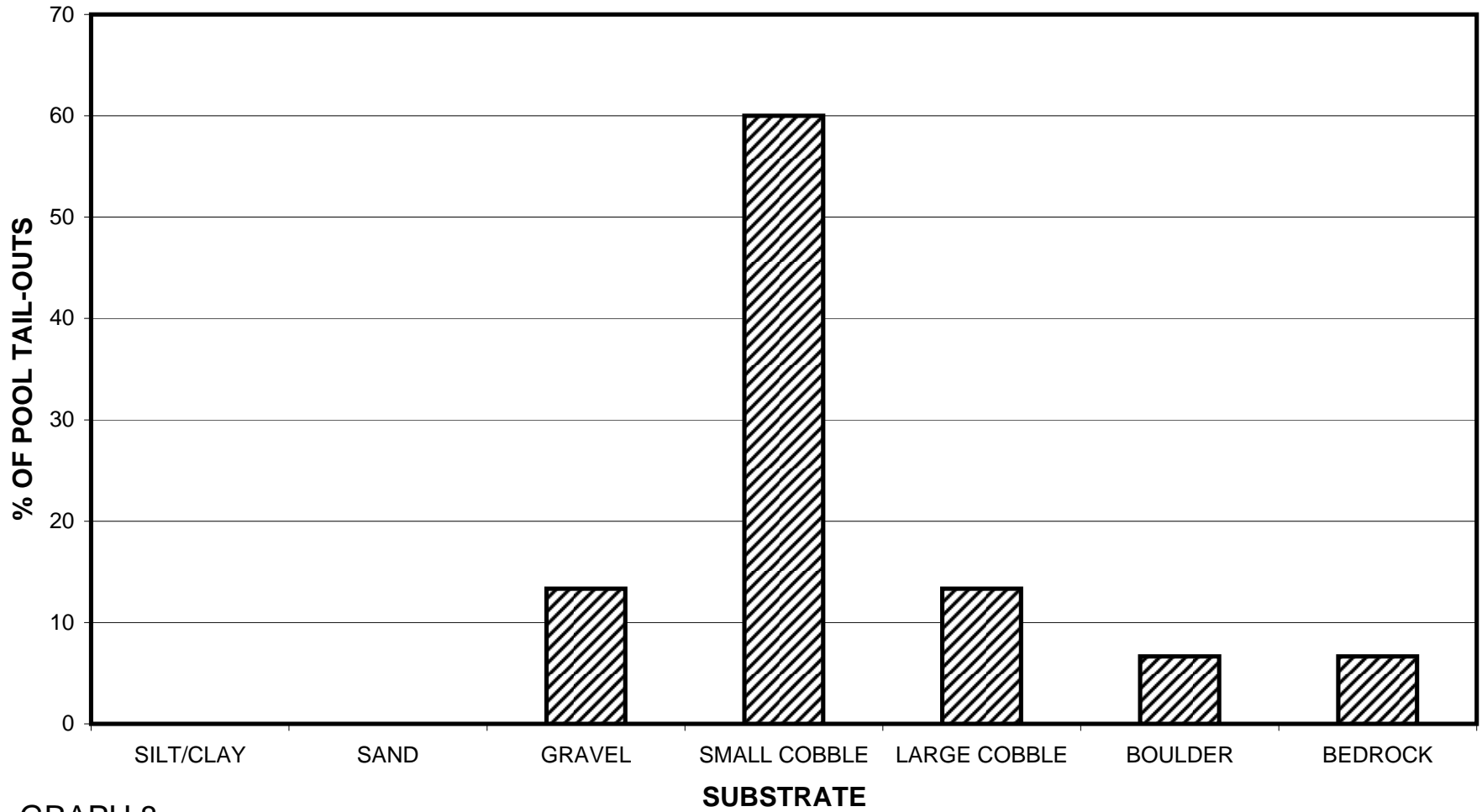
GRAPH 6

DURPHY CREEK 2006 MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

DURPHY CREEK 2006 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



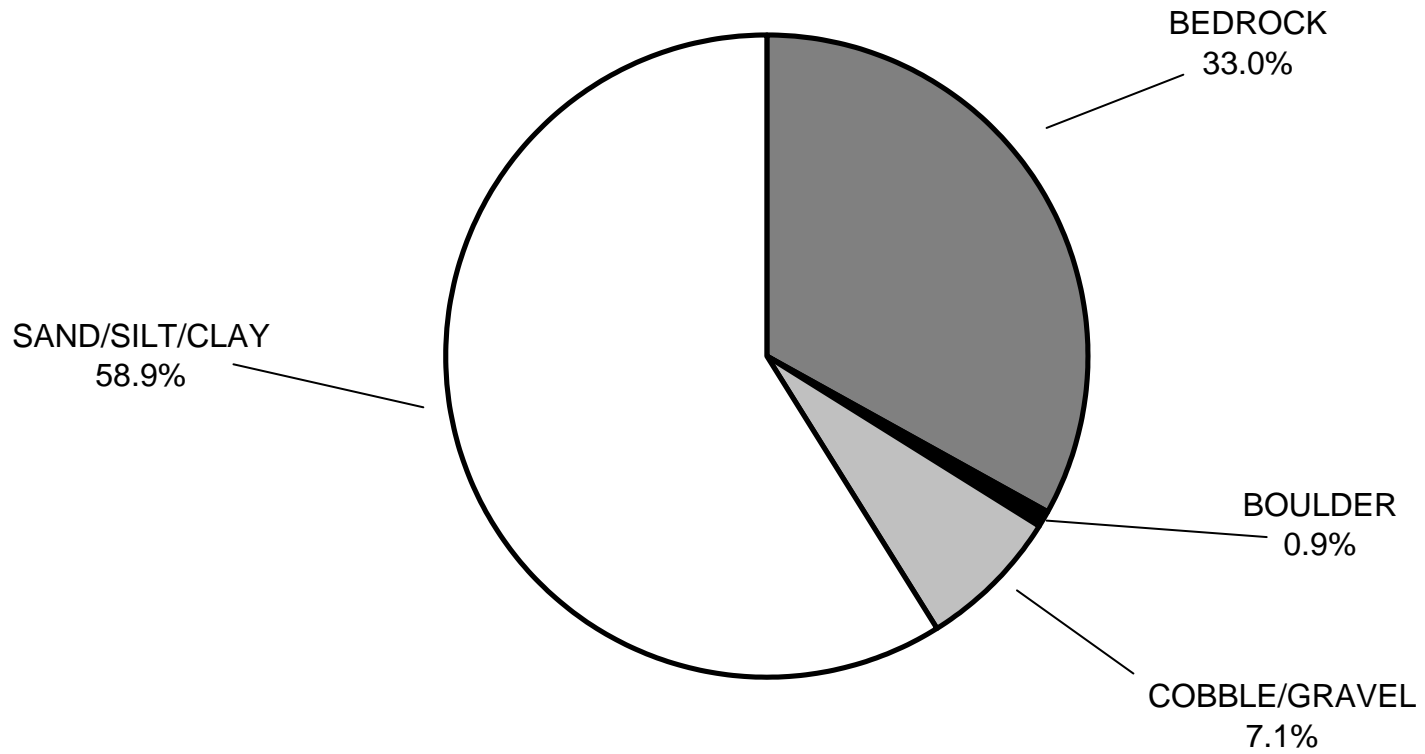
GRAPH 8

DURPHY CREEK 2006 MEAN PERCENT CANOPY



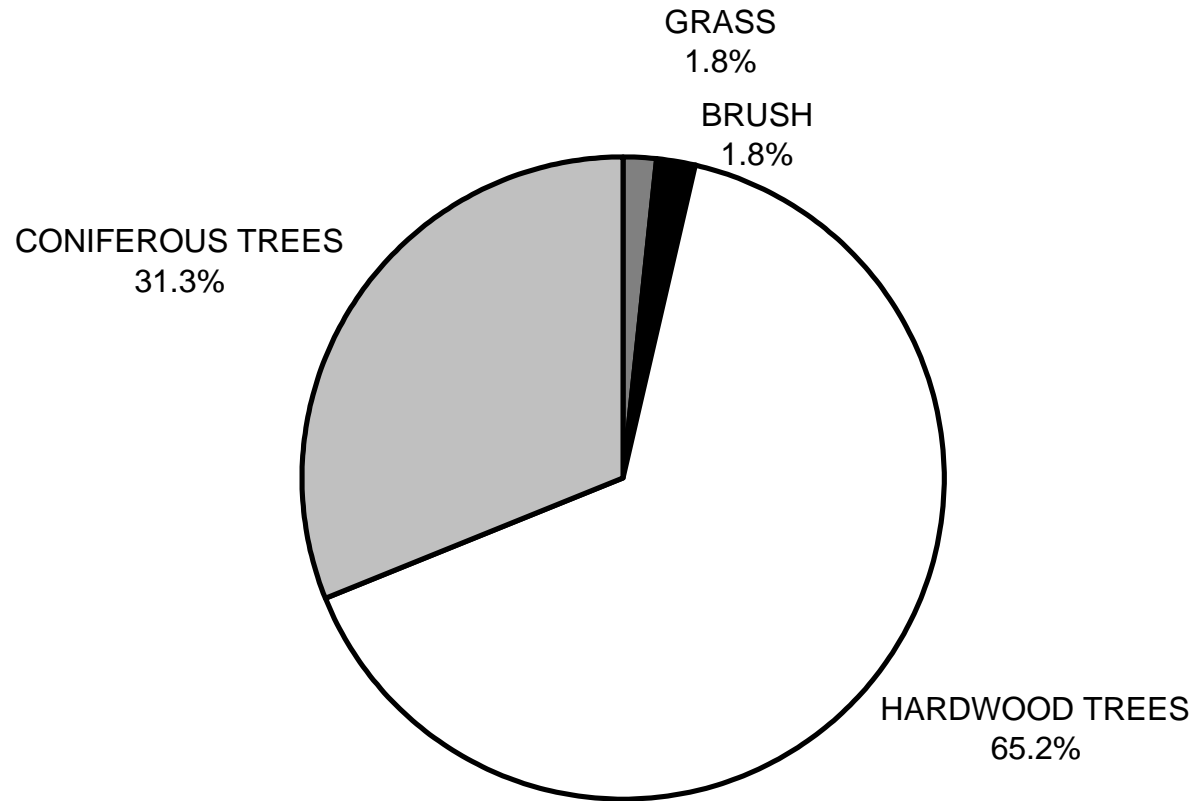
GRAPH 9

**DURPHY CREEK 2006
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

DURPHY CREEK 2006 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11