MORRO BAY WATERSHED STEELHEAD RESTORATION PLANNING PROJECT

STREAM INVENTORY REPORT

DAIRY CREEK, 2001

Prepared to:
Coastal San Luis Resource Conservation District

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STREAM INVENTORY REPORT

DAIRY CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 2001 on Dairy Creek. The survey began at the confluence with Chorro Creek and extended upstream 4.4 miles. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Dairy Creek.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's coastal streams.

WATERSHED OVERVIEW

Dairy Creek is a tributary to Chorro Creek, which drains to Morro Bay. Dairy Creek is located in San Luis Obispo County, California (Map 1). Dairy Creek's legal description at the confluence with Chorro Creek is T30S R12E (no section number). Its location is 35°19′28″ north latitude and 120°44′01″ west longitude. Dairy Creek is a second order stream and has approximately 4.65 miles of blue line stream according to the USGS San Luis Obispo 7.5 minute quadrangle. Dairy Creek drains a watershed of approximately 2.64 square miles. Elevations range from 230 feet at the mouth of the creek to 1400 feet in the headwater areas. Valley grassland, coastal scrub, and oak savanna dominate the watershed, with mixed conifer forest and oak woodlands dominating the upper elevations of the watershed. The watershed is primarily state and county owned and is managed for timber production, livestock grazing, campgrounds, recreation, military training, urbanization, and both paved and unpaved roads. Foot and vehicle access to the mouth of Dairy Creek exists via Colousa Avenue, located off Highway 1 North and Hollister Avenue on the Camp San Luis Obispo National Guard base.

METHODS

The habitat inventory conducted in Dairy Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi and Reynolds, 1991 rev. 1994). California Conservation Corps (CCC) members and a volunteer from the Morro Bay National Estuary Program (MBNEP) conducted the inventory and were trained in standardized habitat

inventory methods by the California Department of Fish and Game (CDFG). This inventory was conducted by a three to four-person team. Quality Assurance was provided by CDFG trained members of the CCC, the Coastal San Luis Resource Conservation District (CSLRCD), MBNEP, and consultation with CDFG habitat inventory specialists.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach (Hopelain, 1994). 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, dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are further 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 Dairy Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using standard flow measuring equipment, if available. In some cases flows are estimated. Flow information was provided by MBNEP staff.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 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 dimensions were measured using a clinometer, hand level, 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 (1988). 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". Dairy 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. Channel dimensions were measured using, tape measures, and stadia rods. All units were measured for mean length; additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were sampled for all features on the sampling form (Hopelain, 1995). Pool tail crest depth at each pool unit was measured in the thalweg. All measurements were in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Dairy 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 particle size, having a bedrock tail-out, or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide 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. 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 Dairy 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.

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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 Dairy Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every tenth unit in addition to every fully-described unit, giving an approximate 10% sub-sample. However, canopy readings in Dairy Creek were taken in 44% of the total number of units in the survey. In addition, the area of canopy was estimated ocularly into percentages of coniferous or deciduous 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 Dairy 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 was estimated and recorded.

GPS Data Collection:

In addition to the nine components of the habitat inventory, a variety of other stream characteristics were located using a Global Positioning System (GPS). Locations included: the creek thalweg, bank erosion sites, pool tail crests, fish species seen in pools, log jams, culverts, drain pipes, invasive plants, barriers to steelhead passage, and landmarks such as bridges, trails, and fences. A more detailed list of attributes to each layer is attached to the end of this report. A Trimble ® Pathfinder Pro-XR GPS unit was used to record locations. Latitude and longitude measurements recorded with this unit are accurate to within one meter. The Quality Assurance Project Plan for the Morro Bay Watershed GPS Survey provides a detailed description of device settings and other information related to the GPS data collection methods (Close, 2001).

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DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat 8.4, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following six tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Graphics are produced from the tables using Corel. Graphics developed for Dairy Creek include:

- Riffle, flatwater, pool habitats by percent occurrence
- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence
- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in the pool tail outs
- Percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

HABITAT INVENTORY RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of June 29, July 9, 10, 11, 12, 16, 17, August 13, 14, and 15, 2001, was conducted by a team of three to four members including Adam Howell (CCC), Paul Corsi (CCC), Stacey Smith (CCC), Charlie Johnck (CCC), Bobby Jo Close (CCC), and Julie Thomas (MBNEP Volunteer). The total length of the stream surveyed was 23,309 feet with an additional 904 feet of side channel.

Stream flow was measured at the bottom of the survey reach with a Gurley flowmeter at 0.115 cfs on July 24, 2001 by MBNEP volunteers.
Starting from the mouth and continuing upstream, Dairy Creek is a G4 channel type for the first

2,386 feet of stream, F4 for the next 5,144 feet, B6 for the next 1,573 feet, F4 for the next 7,676 feet, B4 for the next 1,919 feet, and A2 for the final 3,707 feet of stream surveyed. G4 channels are entrenched "gully" step-pool and low width/depth ratio on moderate gradient and gravel-dominant substrates. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. B6 channel types are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools, very stable plan and profile, stable banks and silt/clay-dominate substrates. B4 channel types are morphologically similar to B6 channel types, but have gravel-dominant substrates. A2 channel types are steep, narrow, cascading, step-pool streams with high energy/debris transport associated with depositional soils and boulder-dominated substrates.

Reach 1 (G4) also displays characteristics of an F channel type. Both F and G channel types are highly entrenched, but F channels have a higher width to depth ratio. Repeated channel typing efforts yielded a width to depth ratio of the G channel type. However, the channel is predominately a combination of pools and riffles, which is typical of an F channel type rather than the step pool morphology of a typical G channel. There are several places within Reach 1 where point-bars have accumulated with young willows and other vegetation colonization. This is characteristic of neither a G or F channel, but possibly the evolution from the highly entrenched F channel to an E channel. These discrepancies may be the result of transitioning between channel types in this reach, and could warrant first hand investigation by a CDFG habitat inventory specialist.

Water temperatures taken during the survey period ranged from 54 to 70 degrees Fahrenheit. Air temperatures ranged from 59 to 77 degrees Fahrenheit. Reach 2 and 3 had higher water temperature ranges relative to the other reaches in Dairy Creek.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 39% riffle units, 30% flatwater units, and 31% pool units (Graph 1). Based on total **length** of Level II habitat types there were 40% riffles, 36% flatwaters, and 22% pools (Graph 2).

Twenty-two Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were low gradient riffle units, 26%; run units, 22%; and mid-channel pool units, 19% (Graph 3). Based on percent total **length** there were 29% low gradient riffles, 25% runs, 14% mid-channel pools, 9% high gradient riffles, 9% step-runs, 2% of the following: cascades, glides, lateral scour pool-root wad enhanced units, lateral scour pools-bedrock enhanced, and 1% of the following: step-pools, corner pools, plunge-pools, and culverts.

A total of 186 pools were identified (Table 3). Main-channel pools were most frequently encountered, at 66%, and comprised 69% of the total length of all pools (Graph 4, Table 3).

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Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirty-nine of the 186 pools (21%) had a depth of two feet or greater (Graph 5, calculated from Table 4).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 186 pool tail-outs measured, twenty-five had a value of 1 (13%); fifty-eight had a value of 2 (31%); sixty-one had a value of 3 (33%); fourteen had a value of 4 (8%) and twenty-eight had a value of 5 (15%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate and a value of 5 indicates the tail-out is not suitable for spawning. In Dairy Creek, seven of the twenty-eight pool tail-outs which were valued at 5 had silt/clay/sand or gravel too small to be suitable for spawning as the substrate. The other tail-outs were unsuitable for spawning due to the tail-outs being comprised of large cobble, boulder, bedrock or wood.

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 14, flatwater habitat types had a mean shelter rating of 16, and pool habitats had a mean shelter rating of 6 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at 24. Scour pools had a mean shelter rating of 8 and main channel pools had a mean shelter rating 4 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Dairy Creek. Undercut bank is the next common cover type. Graph 7 describes the pool cover in Dairy Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 101 of the 186 pool tail outs measured (54%). Small cobble was the next most frequently observed dominant substrate type and occurred in 21% of the pool tail outs (Graph 8).

The mean percent canopy density for the stream reach surveyed was 79%. The mean percentages of deciduous and coniferous trees were 70% and 30%, respectively. Graph 9 describes the canopy in Dairy Creek.

For the stream length surveyed, the mean percent right bank vegetated was 39%. The mean percent left bank vegetated was 40%. The dominant elements composing the structure of the stream banks consisted of 9% bedrock, 10% boulder, 8% cobble/gravel, and 73% sand/silt/clay (Graph 10). Deciduous trees were the dominant vegetation type observed in 46% of the units surveyed. Additionally, 21% of the units surveyed had grass as the dominant vegetation type, and 21% had coniferous trees as the dominant vegetation, including down trees, logs, and root wads (Graph 11). Areas of eroded banks along Dairy Creek are shown on Map 1.

Numerous sightings of Sacramento pike minnows in pools downstream of the Highway 1 culvert

suggest a predatory impact on the juvenile steelhead population in this section of Dairy Creek. No sightings of the Sacramento pike minnow were made upstream of the Highway 1 culvert.

Especially high amounts of algae were also observed in Reach 2, beginning approximately 2,900 feet upstream of the mouth (near Golf Course area) and extending into Reach 3.

DISCUSSION

Dairy Creek is a G4 channel type for the first 2,386 feet of stream, a F4 for the next 5,144 feet, a B6 for the next 1,573 feet, a F4 for the next 7,676 feet, a B4 for the next 1,919 feet, and an A2 for the final 3,707 feet of stream surveyed. The suitability of G4, F4, B6, B4, and A2 channel types for fish habitat improvement structures is as follows: G4 channel types are good for bank-placed boulders; and are fair for plunge weirs, opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders, plunge weirs, single and opposing wing-deflectors, channel constrictors and log cover. B6 channel types are good for bank-placed boulders, log cover, plunge weirs, single and opposing wing-deflectors, channel constrictors, and boulder clusters. B4 channel types are good for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. A2 channel types are generally not suitable for structures because they are high energy streams with stable stream banks, and poor gravel retention capabilities.

The water temperatures recorded on the survey days June 29, July 9, 10, 11, 12, 16, 17, August 13, 14, and 15, 2001**,** ranged from 54 to 70 degrees Fahrenheit. Air temperatures ranged from 59 to 77 degrees Fahrenheit. This is a fair to warm water temperature range for salmonids. Water temperatures in Dairy Creek are also monitored throughout the year by the Regional Water Quality Control Board (Regina Wilson, personal communication). Maximum water temperatures from 1995 to 1999, respectively, were as follows: 67°F, 69°F, 69°F, 68°F, and 64°F. These temperatures are within the tolerance range of salmonids. Reaches 3 and 4 had higher water temperatures and amount or algae in the creek than the other reaches. To make any further conclusions, temperatures should be monitored in these areas throughout the warm summer months, and biological sampling would need to be conducted.

Flatwater habitat types comprised 36% of the total length of this survey, riffles 40%, and pools 22%. The pools are relatively shallow, with only thirty-nine of the 186 (21%) pools having a maximum 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 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 locations where their installation will not be threatened by high stream energy.

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Twenty-five of the 186 pool tail-outs measured had an embeddedness rating of 1. Fifty-eight of the pool tail-outs had an embeddedness rating 2, and 75 pool tail-outs had ratings of 3 or 4. Twenty-eight of the pool tail-outs had a rating of 5 or were considered unsuitable for spawning. Seven of the 28 were unsuitable for spawning due to the dominant substrate being silt/sand/clay or gravel being too small to be suitable. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. In Dairy Creek, sediment sources should be mapped and rated according to their potential sediment yields, and control measures should be taken. Two large road headcuts were observed along Dairy Creek. They are located less than .5 miles upstream of the Camp San Luis Obispo Military Reservation boundary line in Reach 4. They appear to be active and contributing sediment to the creek where they enter the stream. Stream banks are steeply eroded just downstream of the location that the headcuts connect to the stream channel. The first headcut is located 14,766 feet from the mouth; its average dimensions are: 101 feet long x 10 feet high x 20 feet wide. The second headcut is located 15,074 feet upstream of the mouth, and is 180 feet long x 13 feet high x 31 feet wide. These areas should be investigated by erosion control specialists and consultation with the military base for potential control measures. An effort to map sediment sources is currently underway by the Morro Bay National Estuary Program.

The mean shelter rating for pools was very low with a rating of 6. The shelter rating in the flatwater habitats was slightly better, but still low at 16. A pool shelter rating of approximately 100 is desirable. The relatively small amount of cover that now exists is being provided primarily by boulders in all habitat types. Additionally, root wads contribute a small amount. Log and root wad cover structures in the pool and flatwater habitats are needed to improve 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.

Seventy-five percent of the pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean percent canopy density for the stream was 79%. This is a relatively low percentage of canopy. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 39% and 40%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended. Eroded banks along Dairy Creek are also likely contributing sediment to spawning gravels. Map 1, which shows locations of eroded banks and their maximum height classes, can help prioritize stream bank stabilization projects in the future.

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Frequent sightings of the Sacramento pike minnow downstream of the Highway 1 culvert in Reach 1 suggest a predatory impact on the juvenile steelhead population in this section of Dairy Creek. A biological survey of fisheries species abundance and distribution would provide more complete data to assess the predatory threat to steelhead in the creek, and to help determine the potential likelihood that the Highway 1 culvert is functioning as a barrier to Sacramento pike minnows. If possible, direct removal of Sacramento pike minnow in Reach 1 are recommended in conjunction with habitat improvement practices which favor salmonid habitat conditions. Habitat improvement projects would include planting riparian species along the banks where canopy is lacking in Reach 1 to reduce water temperatures, and adding log cover structures where feasible to provide more shelter for steelhead.

RECOMMENDATIONS

1) Dairy Creek should be managed as an anadromous, natural production stream.

2) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from boulders. Adding high quality complexity with woody cover is desirable.

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) 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) 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. Two large headcuts located in Reach 4 should be investigated and appropriate control measures should be taken with the voluntary consent of landowner.

6) The limited water temperature data available suggest that maximum temperatures are within/above 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.

7) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives should be explored with the grazier and developed if possible.

8) Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and improved where

possible.

COMMENTS AND LANDMARKS

*COMMENTS LOCATED AT THE END OF THE REPORT.

REFERENCES

Close, Bobby Jo. 2001. Quality Assurance Project Plan: Habitat Typing GPS Data Collection. California Conservation Corps, San Luis Obispo, California.

Flosi, G., and F. Reynolds. 1994. California salmonid stream habitat restoration manual, 2nd edition. California Department of Fish and Game, Sacramento, California.

Hopelain, J. 1995. Sampling levels for fish habitat inventory, unpublished manuscript. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California.

Valentine, B. 1995. Stream substrate quality for salmonids: guidelines for sampling, processing, and analysis, unpublished manuscript. California Department of Forestry and Fire Protection, Santa Rosa, California.

PERSONAL COMMUNICATIONS

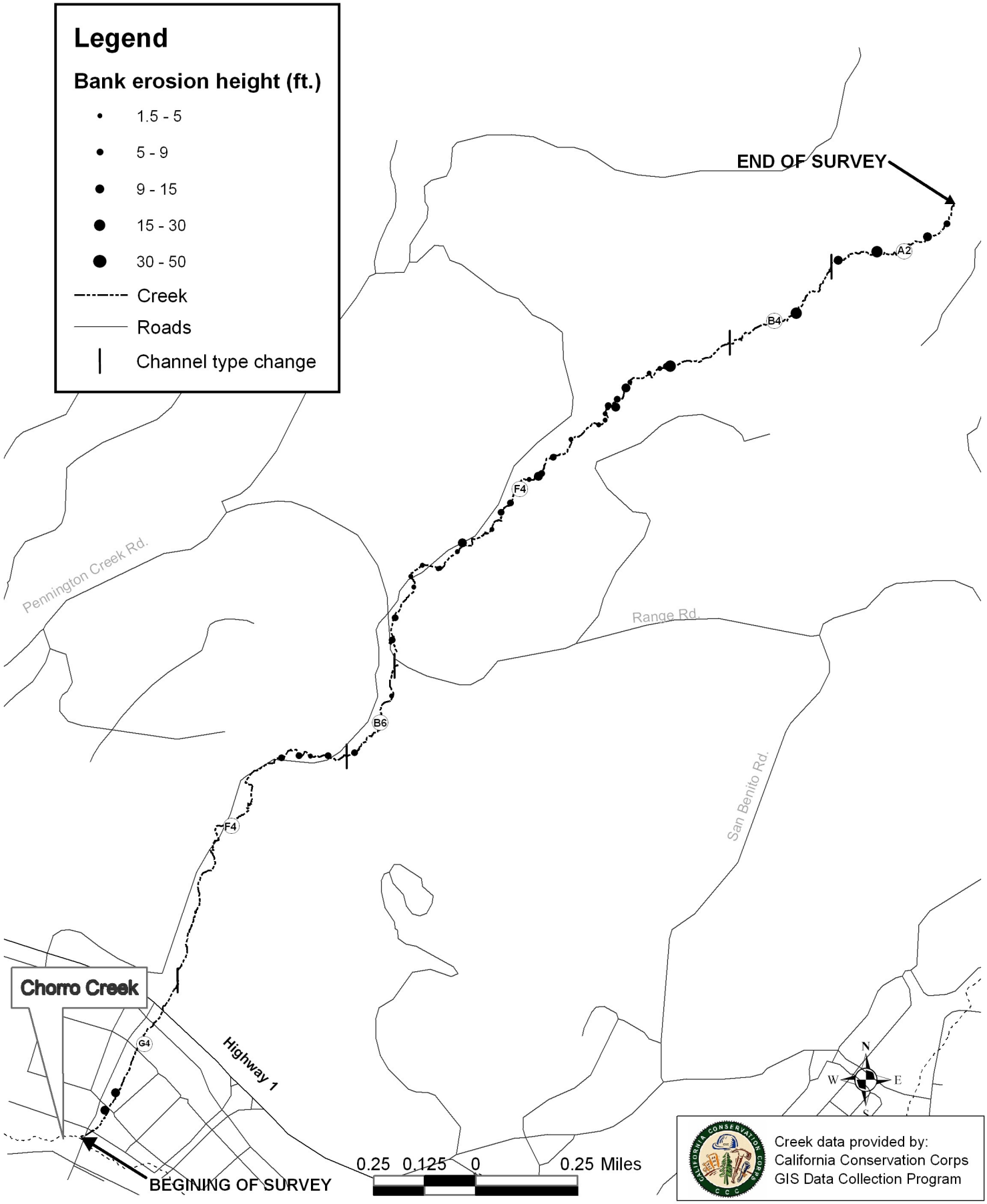
Regina Wilson, Morro Bay National Estuary Program. Personal communication via email. October 2001.

LEVEL III and LEVEL IV HABITAT TYPE KEY

HABITAT TYPE	LETTER	NUMBER
RIFFLE		
Low Gradient Riffle	[LGR]	1.1
High Gradient Riffle	[HGR]	1.2
CASCADE		
Cascade	[CAS]	2.1
Bedrock Sheet	[BRS]	2.2
FLATWATER		
Pocket Water	[POW]	3.1
Glide	[GLD]	3.2
Run	[RUN]	3.3
Step Run	[SRN]	3.4
Edgewater	[EDW]	3.5
MAIN CHANNEL POOLS		
Trench Pool	[TRP]	4.1
Mid-Channel Pool	[MCP]	4.2
Channel Confluence Pool	[CCP]	4.3
Step Pool	[STP]	4.4
SCOUR POOLS		
Corner Pool	[CRP]	5.1
Lateral Scour Pool - Log Enhanced	[LSL]	5.2
Lateral Scour Pool - Root Wad Enhanced	[LSR]	5.3
Lateral Scour Pool - Bedrock Formed	[LSBk]	5.4
Lateral Scour Pool - Boulder Formed	[LSBo]	5.5
Plunge Pool	[PLP]	5.6
BACKWATER POOLS		
Secondary Channel Pool	[SCP]	6.1
Backwater Pool - Boulder Formed	[BPB]	6.2
Backwater Pool - Root Wad Formed	[BPR]	6.3
Backwater Pool - Log Formed	[BPL]	6.4
Dammed Pool	[DPL]	6.5

DAIRY CREEK

Channel Types & Stream Bank Erosion Sites



COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are in approximate feet are taken from the beginning of the survey reach.

0'	Begin survey at the confluence of Chorro Creek. This is Reach 1, a G4 channel type. Steep, eroded left (lt) and right (rt) banks.
37'	Partial debris jam
183'	9" crayfish, Sacramento Pike, 8" drain pipe
350'	Bridge #1, Camp SLO
404'	Drainpipe 7.5" tall, 1.5' diameter, bridge #1, dead turtle, cement riprap.
518'	Drain pipe, eroding bank 11'H, pike
602'	Channel type location.
729'	Drainpipe 60' H and 2.5' diameter.
773'	Coniferous canopy is bridge #2, Erosion 30'L x 12'H. Bridge 34'L x 61'W x 19'H
1016'	Steelhead young of year (yoy) and pike
1170'	Steelhead yoy
1623'	Large wooden bridge #3, 26'L x 15'H x 56'W
1658'	Drainpipe 18" left bank, 6.5' off ground
1681'	Drain pipe on right bank
1753'	Riprap along entire length, off left bank and into channel
1891'	Pike
2158'	Left bank culvert 4.5', from bank full 12" diameter, pike
2206'	HWY 1 underpass, bridge #5 125'L x 12'W x 10'H, channel change, end of reach 1
2331'	Start reach 2

2492'	Culvert, right bank, 5.2'D, round corrugated metal
2510'	Road crossing to poppy reservation area, culvert length 76.8
2824'	Steelhead yoy
2846'	Algae clouds, steelhead yoy
2919'	Channel type B4
3237'	Bridge 12'H x 4.5'L x 54'W
3556'	Riprap right bank
3637'	Speckled Dace, Steelhead yoy
4058'	Tributary rt bank
4693'	Dry side channel
5211'	Gate for Dairy creek, walk in campground
5267'	Algae
5357'	Algae
6481'	Erosion 7'H x 106.5'L
6755'	Right bank erosion 7.5'H x 140'L
6790'	Algae cloud
6819'	Beehive warning
6838'	Access point underneath footbridge
6961'	Right bank erosion 4'H
7195'	Left bank erosion 8.5'H
7227'	Erosion continues and ends
7305'	End of reach 2
7351'	Start of reach 3, left bank erosion 4.4'H (Begins halfway through unit)

7457'	Erosion continues
7521'	Small side channel is not connecting to main channel
7588'	Dace, right bank erosion 8'H x 11'6L
7689'	Dace
8067'	Blown out barbed wire fence
8092'	Right bank erosion, aqueduct, water pipe
8179'	Cow access, excessive algae
8297'	Cattle crossing near oak woodland, trail head start
8342'	Livestock fence floating across creek, livestock crossing creek
8467'	Erosion begins 81.2'L
8581'	Erosion ends
8711'	Tree planting on left bank
8760'	Dry tributary left bank
9025'	Channel change, end of reach #3
9059'	Start reach #4
9440'	Algae
9490'	Left bank erosion 90'L x 6.8'H
9862'	Left bank erosion 51.7'L x 18.6'H
10055'	Wood bridge 22.5'L x 38.7'W x 15'H
10304'	Tributary left bank
10333'	Barbed wire fence at 31', right bank erosion 51'L x 3.5'H
10496'	Erosion 88.4'L x 4.2'H

10526'	Algae cover for 342'L of stream
10699'	Left bank erosion 144.4'L x 4'H
10752'	Tributary on right bank, bank heavily eroded from cattle crossing
10913'	Old concrete foundation erosion, right bank, 33.6"l x .5'H, algae cover
11307'	Root wad partially blocking channel, 7.6'H x 18'L x 10'W
11325'	Barbed wire fence upstream of debris; jam is approx 30' enclosure
11413'	Right bank erosion 14'H x 26.4'L
11494'	Right bank erosion 142'L x 15' H
11550'	Algae
11588'	Left bank erosion
11739'	Tree planting on left bank, algae
11927'	Dace
11976'	Left bank erosion 8'L x 5' H, algae
12285'	Right bank erosion 72'L x 9'H
12366'	Barbed wire fence, left bank wiring enclosure
12427'	Cow access, erosion on left and right bank 54.7'L x 6'H
12521'	Enclosures begin, wire fence, cattle crossing
12886'	Restricted by barbed wire fence, tree planting on left bank, algae
12903'	Locked gate, road crossing with access gate, tributary right bank with water.
13122'	Left bank erosion
13493'	Algae
13787'	Channel type location, algae
13954'	Access point

13983'	Barbed wire fence
14178'	Cow access
14274'	Algae
14337'	Right and left bank erosion; unused culverts and cattle gate on left bank
14371'	Left bank erosion ends; right bank erosion begins 44.5'L x 4'H
14614'	Right bank erosion end
14627'	Cow access
14676'	Right bank erosion starts 7.5'H
14755'	Left bank road head cut #1 entering stream
14792'	Left bank erosion start 6'H
14970'	Left bank road head cut #2 entering stream
15099'	Right bank erosion end
15152'	Right bank erosion start 4'H
15432'	Right bank erosion start
15680'	Large woody debris in creek, 14'L x 2'D; end of erosion on left bank
15728'	4WD road crossing; right bank erosion 18'L x 3'H
15795'	Right bank erosion start 9'H
15823'	Left bank erosion start 30'H
16049'	Gate across creek
16572'	Trail crosses creek
16761'	End reach 4
16798'	Start channel change B4

16826'	Eroded left bank from roots of bay tree overhang
17071'	Left bank erosion start
17125'	Cow crossing
17294'	Steelhead yearlings, left and right bank erosion
17550'	Left bank erosion start 6'H x 30'L
17700'	Trail crosses creek
17728'	Right bank erosion ends
17741'	Left bank erosion ends
17765'	Channel type location (B4)
17822'	Left bank erosion start 7'H
17941'	Right bank erosion start
18095'	Trail crosses creek
18384'	Dry tributary left bank
18656'	End B4 channel
18697'	Plunge height 2.8'H, start channel change A2
18842'	Trail crosses creek
18894'	Erosion on left bank begins at 13.6'H; Trail crossing, Dry tributary on right bank
18955'	Bedrock banks, erosion on left bank ends
18984'	Steelhead yoy, bedrock on left bank
18997'	Bedrock on left bank
19022'	Steelhead yoy
19120'	Waterfall 4'H
19161'	Cascade 4'H

19498'	Right bank erosion starts 21'H
19518'	Right bank erosion ends
19567'	Tributary on right bank, hiked up 65', no fish, little water flow
20225'	Trail crosses creek
20274'	Right bank erosion begins 14'H
20291'	Right bank erosion ends; Channel type unit
20483'	Log jam and debris, no barrier, 4'H x 10'L x 14'W, channel change
20541'	Left bank erosion begins, log and debris creating side channel on right bank
20846'	Left bank erosion ends
21515'	Dry tributary left bank
21838'	Potential fish barrier
21883'	Channel type location
21997'	Tributary on left bank, low flow, no fish, too shallow for temp, not accessible to fish, slope 45
22397'	End of Survey. End of anadromy due to fish barrier. Waterfall approximately 40'H.

DAIRY

Drainage: CHORRO

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN 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
237	45	RIFFLE	39	40	9410	40	6.9	0.3	206	48853	60	14225	0	14
181	36	FLATWATER	30	46	8395	36	6.9	0.4	324	58566	158	28688	0	16
186	184	POOL	31	28	5198	22	7.9	1.1	234	43529	274	51006	213	6
3	0	DRY	0	35	104	0	0.0	0.0	0	0	0	0	0	0
2	2	CULVERT	0	101	202	1	7.9	0.8	848	1695	437	874	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
609	267	23309	152643	94792

DAIRY

Drainage: CHORRO

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
158	30	LGR	26	42	6657	29	7	0.3	4.0	238	37584	68	10703	0	14	83
60	7	HGR	10	37	2198	9	8	0.3	0.9	199	11949	56	3381	0	16	72
14	6	CAS	2	35	485	2	5	0.3	1.2	110	1546	40	561	0	12	87
5	2	BRS	1	14	71	0	4	0.4	0.1	42	208	17	84	0	5	61
8	3	GLD	1	54	435	2	10	0.6	1.0	591	4728	363	2905	0	20	91
137	23	RUN	22	42	5750	25	6	0.4	1.4	269	36913	126	17330	1	15	80
35	9	SRN	6	62	2184	9	7	0.4	1.3	385	13486	183	6393	0	18	78
1	1	EDW	0	27	27	0	13	0.3	0.5	211	211	63	63	0	0	60
117	115	MCP	19	28	3332	14	8	1.1	5.6	248	29017	305	35739	236	4	82
6	6	STP	1	47	279	1	7	0.8	2.0	311	1868	250	1499	167	7	71
3	3	CRP	0	52	157	1	8	1.0	1.9	439	1317	464	1393	330	12	56
1	1	LSL	0	25	25	0	9	1.1	1.6	215	215	237	237	215	30	100
17	17	LSR	3	28	477	2	9	0.9	3.6	259	4409	264	4482	212	6	66
17	17	LSBk	3	28	470	2	6	1.0	2.7	175	2968	170	2894	130	6	70
6	6	LSBo	1	19	114	0	8	0.8	2.3	146	878	114	684	63	4	79
12	12	PLP	2	19	228	1	10	1.0	3.2	188	2251	224	2684	184	13	89
1	1	SCP	0	14	14	0	3	0.2	0.4	43	43	9	9	0	5	95
2	2	BPB	0	14	27	0	6	0.7	1.3	86	171	61	122	52	8	51
1	1	BPR	0	16	16	0	5	12.0	1.7	80	80	954	954	906	60	100
2	2	BPL	0	15	29	0	6	1.3	1.8	74	148	90	180	83	40	68
1	1	DPL	0	29	29	0	7	1.0	1.6	193	193	193	193	174	5	68
3	0	DRY	0	35	104	0	0	0.0	0.0	0	0	0	0	0	0	70
2	2	CUL	0	101	202	1	8	0.8	1.4	848	1695	437	874	0	0	100

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
609	267	23309	151876	93363

DAIRY

Drainage: 'CHORRO

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
123	121	MAIN	66	29	3612	69	7.9	1.1	251	30891	303	37232	233	4
56	56	SCOUR	30	26	1470	28	8.3	0.9	215	12037	221	12373	171	8
7	7	BACKWATER	4	17	116	2	5.6	2.5	91	635	208	1458	193	24

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
186	184	5198	43564	51063

DAIRY

Drainage: CHORRO

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
117	MCP	63	7	6	84	72	18	15	7	6	1	1
6	STP	3	0	0	5	83	1	17	0	0	0	0
3	CRP	2	0	0	3	100	0	0	0	0	0	0
1	LSL	1	0	0	1	100	0	0	0	0	0	0
17	LSR	9	0	0	13	76	3	18	1	6	0	0
17	LSBk	9	1	6	14	82	2	12	0	0	0	0
6	LSBo	3	0	0	5	83	1	17	0	0	0	0
12	PLP	6	0	0	7	58	4	33	1	8	0	0
1	SCP	1	1	100	0	0	0	0	0	0	0	0
2	BPB	1	0	0	2	100	0	0	0	0	0	0
1	BPR	1	0	0	1	100	0	0	0	0	0	0
2	BPL	1	0	0	2	100	0	0	0	0	0	0
1	DPL	1	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS

186

DAIRY

Drainage: CHORRO

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
158	30	LGR	17	13	53	10	7	0	0
60	7	HGR	0	0	57	0	0	29	14
14	6	CAS	0	17	17	0	0	0	67
5	2	BRS	0	0	0	0	0	0	100
8	3	GLD	33	33	33	0	0	0	0
137	23	RUN	26	30	35	4	0	4	0
35	9	SRN	22	11	44	0	0	11	11
1	1	EDW	0	0	100	0	0	0	0
117	23	MCP	30	39	26	0	0	4	0
6	3	STP	0	33	33	0	0	33	0
3	3	CRP	67	0	33	0	0	0	0
1	1	LSL	100	0	0	0	0	0	0
17	5	LSR	60	40	0	0	0	0	0
17	7	LSBk	57	14	14	0	0	14	0
6	3	LSBo	33	33	33	0	0	0	0
12	6	PLP	33	0	33	0	0	0	33
1	1	SCP	100	0	0	0	0	0	0
2	2	BPB	100	0	0	0	0	0	0
1	1	BPR	100	0	0	0	0	0	0
2	2	BPL	0	100	0	0	0	0	0
1	1	DPL	0	100	0	0	0	0	0
3	2	DRY	50	0	0	0	0	50	0
2	2	CUL	50	0	0	0	0	0	50

DAIRY

Drainage: CHORRO

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE

Survey Dates: 06/29/01 to 08/15/01

Confluence Location: QUAD: SLO LEGAL DESCRIPTION: T30SR12ES LATITUDE:35°19'28" LONGITUDE:120°44'1"

UNITS MEASURED	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
158	29	LGR	9	4	0	4	9	9	2	55	0
60	6	HGR	0	4	0	0	10	2	2	83	0
14	6	CAS	0	0	0	0	17	2	11	58	13
5	2	BRS	0	0	0	0	0	0	0	50	50
8	3	GLD	20	0	0	33	30	17	0	0	0
137	22	RUN	4	4	0	8	28	8	0	47	0
35	9	SRN	2	17	0	12	6	6	3	54	0
1	0	EDW	0	0	0	0	0	0	0	0	0
117	22	MCP	22	8	0	6	19	5	5	32	4
6	3	STP	0	0	0	0	0	0	17	42	42
3	3	CRP	55	3	0	3	28	7	0	3	0
1	1	LSL	5	0	0	45	50	0	0	0	0
17	5	LSR	27	0	0	58	1	0	0	14	0
17	7	LSBk	23	6	0	11	19	0	7	19	14
6	3	LSBo	27	0	0	3	7	17	0	47	0
12	6	PLP	8	1	0	7	2	18	24	41	0
1	1	SCP	0	0	0	0	0	100	0	0	0
2	2	BPB	43	0	0	38	0	8	0	13	0
1	1	BPR	15	0	0	80	0	0	5	0	0
2	2	BPL	15	25	0	5	15	0	0	40	0
1	1	DPL	0	50	0	0	0	0	0	50	0
3	0	DRY	0	0	0	0	0	0	0	0	0
2	0	CUL	0	0	0	0	0	0	0	0	0

Summary of Mean Percent Vegetative Cover for Entire Stream

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Deciduous	Mean Percent Open units	Mean Right bank % Cover	Mean Left Bank % Cover
79	30	70	0	39.3	39.8

Note: Mean percent conifer and deciduous 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: DAIRY
SAMPLE DATES: 06/29/01 to 08/15/01
STREAM LENGTH: 22405 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: SAN LUIS O — Latitude: 35°19'28"
Legal Description: T30SR12ES — Longitude: 120°44'1"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: G4	Canopy Density: 82%
Channel Length: 2386 ft.	Coniferous Component: 14%
Riffle/flatwater Mean Width: 6 ft.	Deciduous Component: 86%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 25%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 5%
Water: 054- 066°F Air: 064-072°F	Mean Pool Shelter Rtn: 15
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Vegetative Cover: 78%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 5% 2.27% 3. 64% 4. 5% 5. 0%

STREAM REACH 2

Channel Type: F4	Canopy Density: 80%
Channel Length: 5144 ft.	Coniferous Component: 3%
Riffle/flatwater Mean Width: 7 ft.	Deciduous Component: 97%
Total Pool Mean Depth: 1.2 ft.	Pools by Stream Length: 36%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 6%
Water: 061- 070°F Air: 064-077°F	Mean Pool Shelter Rtn: 28
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Vegetative Cover: 77%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 14% 2.24% 3. 45% 4. 6% 5. 12%

STREAM REACH 3

Channel Type: B6	Canopy Density: 84%
Channel Length: 1573 ft.	Coniferous Component: 30%
Riffle/flatwater Mean Width: 9 ft.	Deciduous Component: 70%
Total Pool Mean Depth: 1.3 ft.	Pools by Stream Length: 33%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 29%
Water: 066- 070°F Air: 070-075°F	Mean Pool Shelter Rtn: 10
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Vegetative Cover: 76%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 19% 2.31% 3. 13% 4. 0% 5. 38%

STREAM REACH 4

Channel Type: F4	Canopy Density: 73%
Channel Length: 7676 ft.	Coniferous Component: 8%
Riffle/flatwater Mean Width: 7 ft.	Deciduous Component: 92%
Total Pool Mean Depth: 1.2 ft.	Pools by Stream Length: 19%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 2%
Water: 057- 068°F Air: 059-075°F	Mean Pool Shelter Rtn: 23
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders

Vegetative Cover: 80%
Dom. Bank Substrate: Silt/Clay/Sand
Occurrence of LOD: 0%
Dry Channel: 0 ft.

Embeddness Value: 1. 11% 2.42% 3. 29% 4. 9% 5. 9%

STREAM REACH 5

Channel Type: B4
Channel Length: 1919 ft.
Riffle/flatwater Mean Width: 6 ft.
Total Pool Mean Depth: 0.8 ft.
Base Flow: 0.1 cfs
Water: 057- 061°F Air: 068-072°F
Dom. Bank Veg.: Deciduous Trees
Vegetative Cover: 61%
Dom. Bank Substrate: Silt/Clay/Sand
Canopy Density: 87%
Coniferous Component: 88%
Deciduous Component: 12%
Pools by Stream Length: 10%
Pools >=3 ft.deep: 7%
Mean Pool Shelter Rtn: 13
Dom. Shelter: Boulders
Occurrence of LOD: 0%
Dry Channel: 0 ft.

Embeddness Value: 1. 6% 2.38% 3. 6% 4. 13% 5. 38%

STREAM REACH 6

Channel Type: A2
Channel Length: 3707 ft.
Riffle/flatwater Mean Width: 6 ft.
Total Pool Mean Depth: 0.8 ft.
Base Flow: 0.1 cfs
Water: 057- 061°F Air: 068-075°F
Dom. Bank Veg.: Deciduous Trees
Vegetative Cover: 74%
Dom. Bank Substrate: Silt/Clay/Sand
Canopy Density: 75%
Coniferous Component: 93%
Deciduous Component: 7%
Pools by Stream Length: 14%
Pools >=3 ft.deep: 0%
Mean Pool Shelter Rtn: 10
Dom. Shelter: Boulders
Occurrence of LOD: 0%
Dry Channel: 0 ft.

Embeddness Value: 1. 26% 2.22% 3. 19% 4. 7% 5. 26%

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	15	11	9.2
Boulder	11	17	9.9
Cobble/Gravel	11	12	8.2
Silt/clay	104	101	72.7

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	36	24	21.3
Brush	15	17	11.3
Decid. Trees	60	69	45.7
Conif. Trees	29	29	20.6
No Vegetation	1	2	1.1

Total stream average embeddedness value for pool 2.8

TABLE 10. MEAN PERCENT OF SHELTER COVER TYPES FOR ENTIRE STREAM

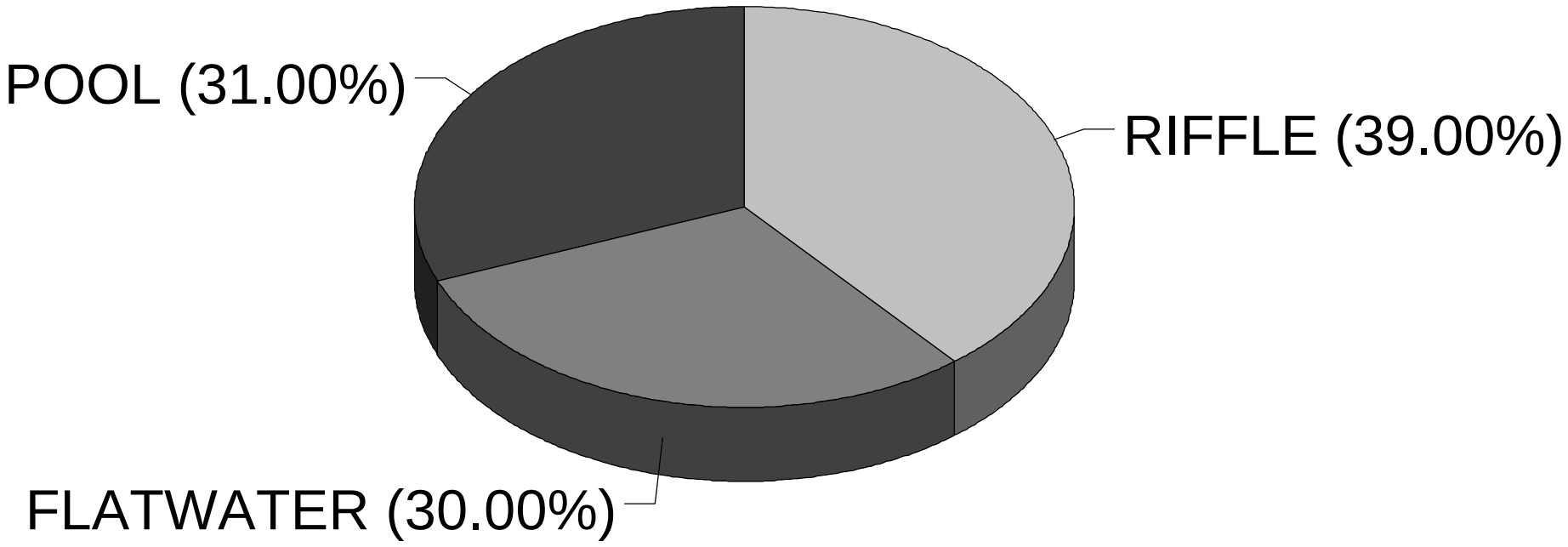
Stream: DAIRY Drainage: CHORRO

Survey Date: 06/29/01 to 08/15/01

	RIFFLES	FLATWATER	POOLS
UNDERCUT BANKS	11.7	4.3	19.8
SMALL WOODY DEBRIS	5.3	6.6	5.4
LARGE WOODY DEBRIS	0.1	0	0.2
ROOTS	9.2	10.4	12.6
TERRESTRIAL VEG	14.9	23.5	12.8
AQUATIC VEG	7.0	7.7	8.1
WHITEWATER	3.8	0.7	6.6
BOULDERS	42.9	46.8	29.3
BEDROCK LEDGES	3.6	0	5.2

DAIRY CREEK

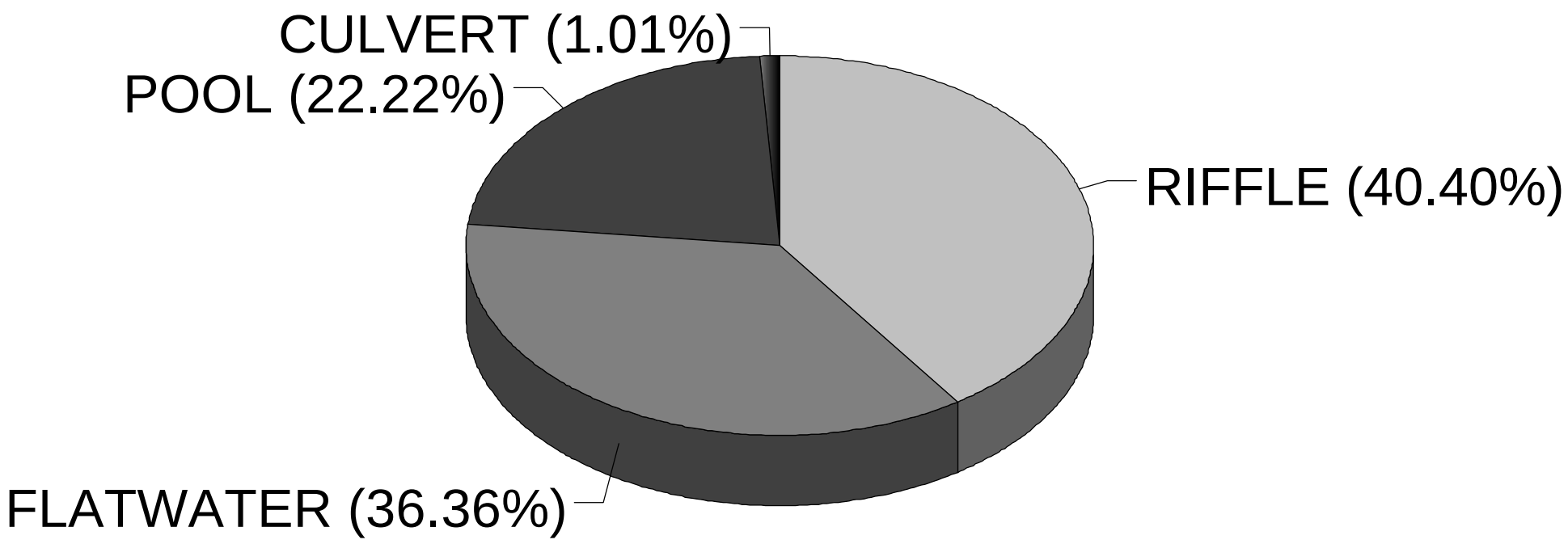
HABITAT TYPES BY PERCENT OCCURENCE



GRAPH 1

DAIRY CREEK

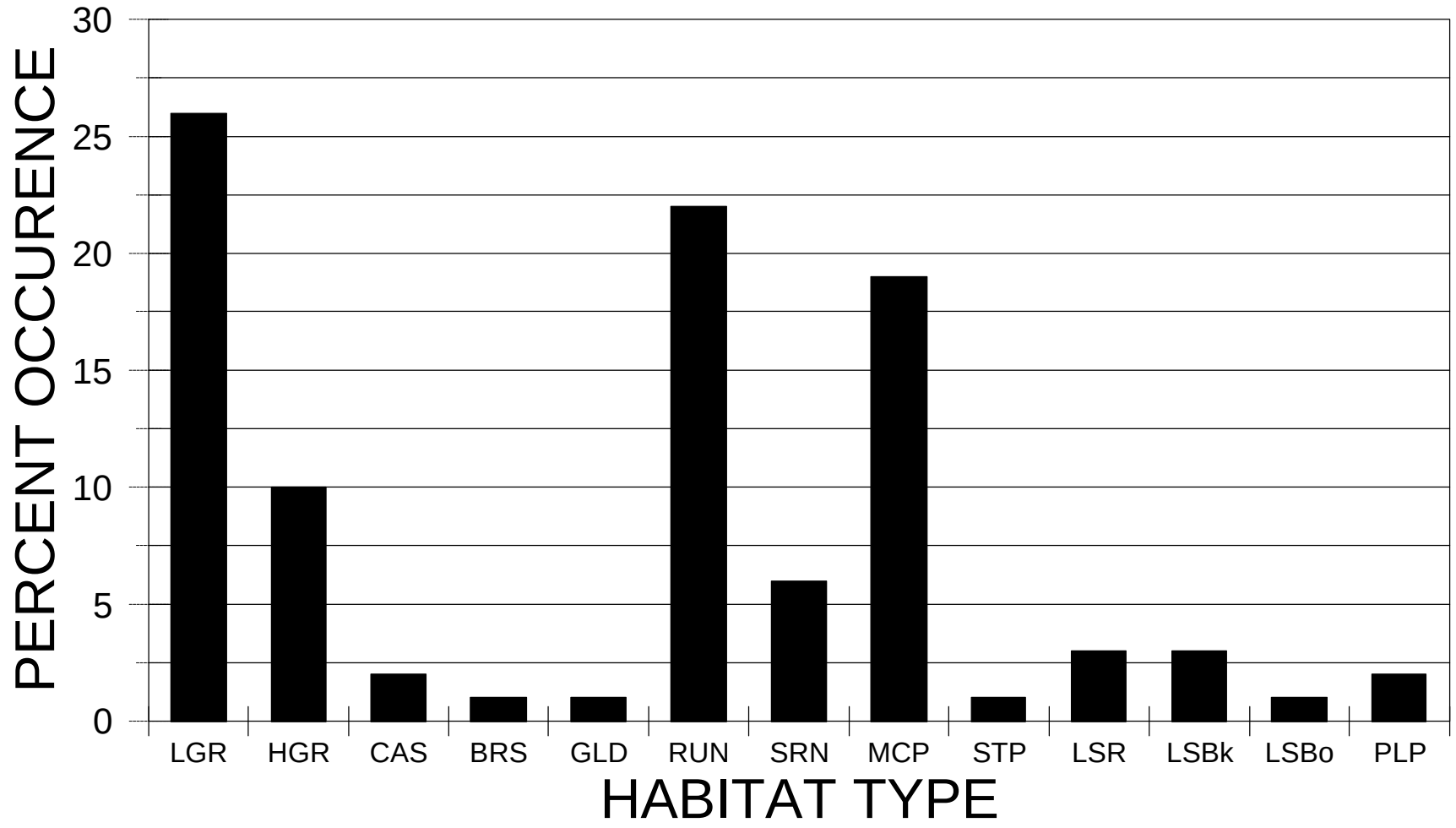
HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

DAIRY CREEK

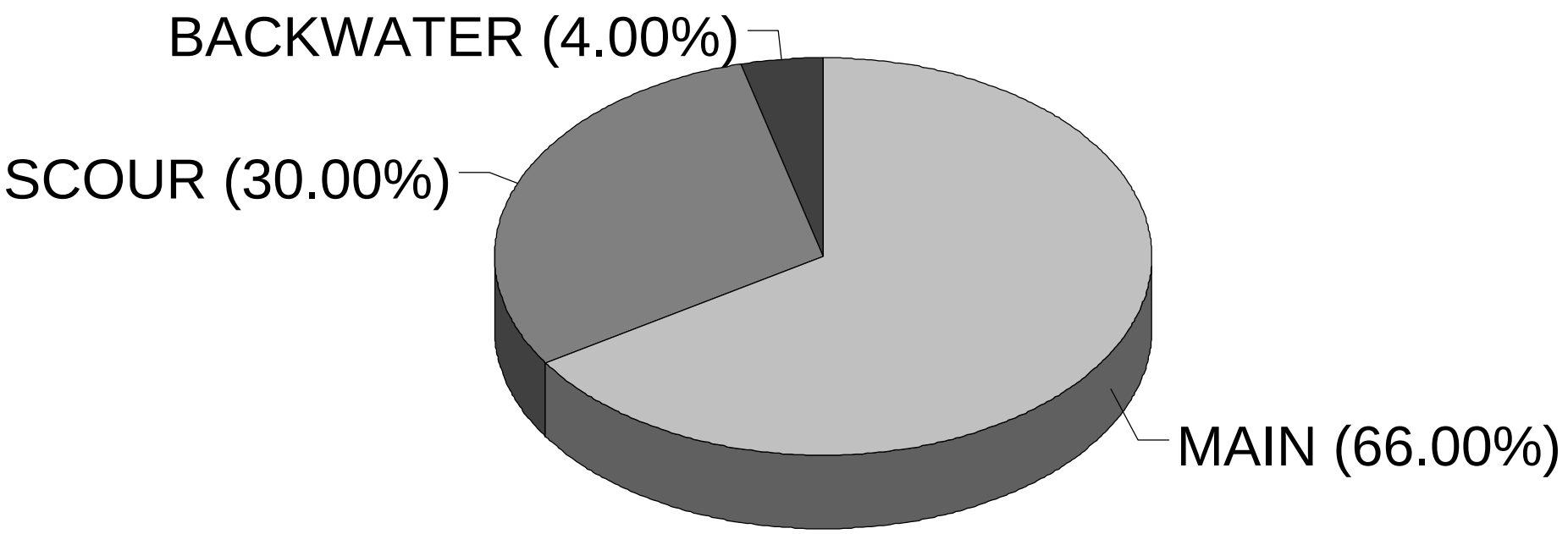
HABITAT TYPES BY PERCENT OCCURENCE



GRAPH 3

DAIRY CREEK

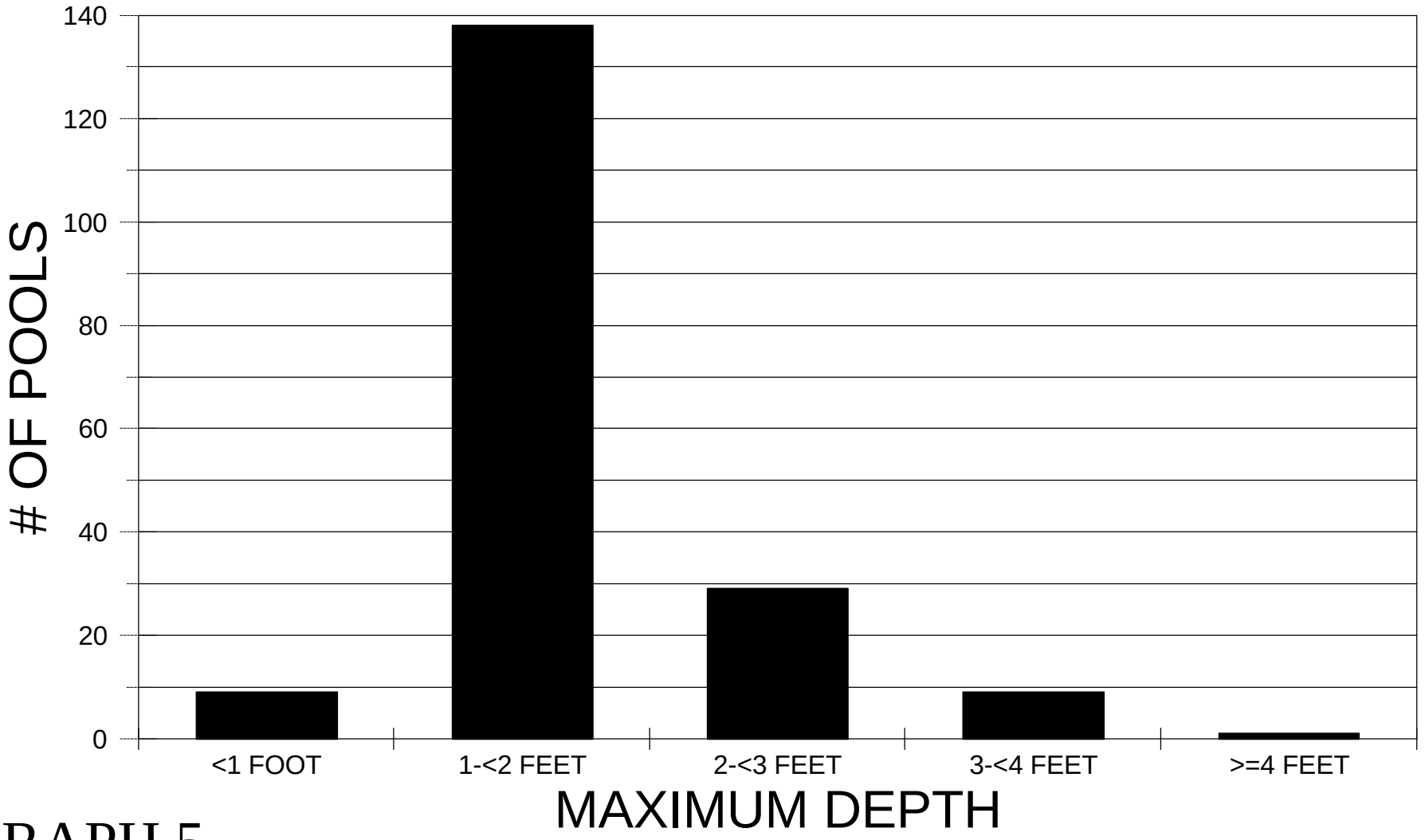
POOL HABITAT BY PERCENT OCCURENCE



GRAPH 4

DAIRY CREEK

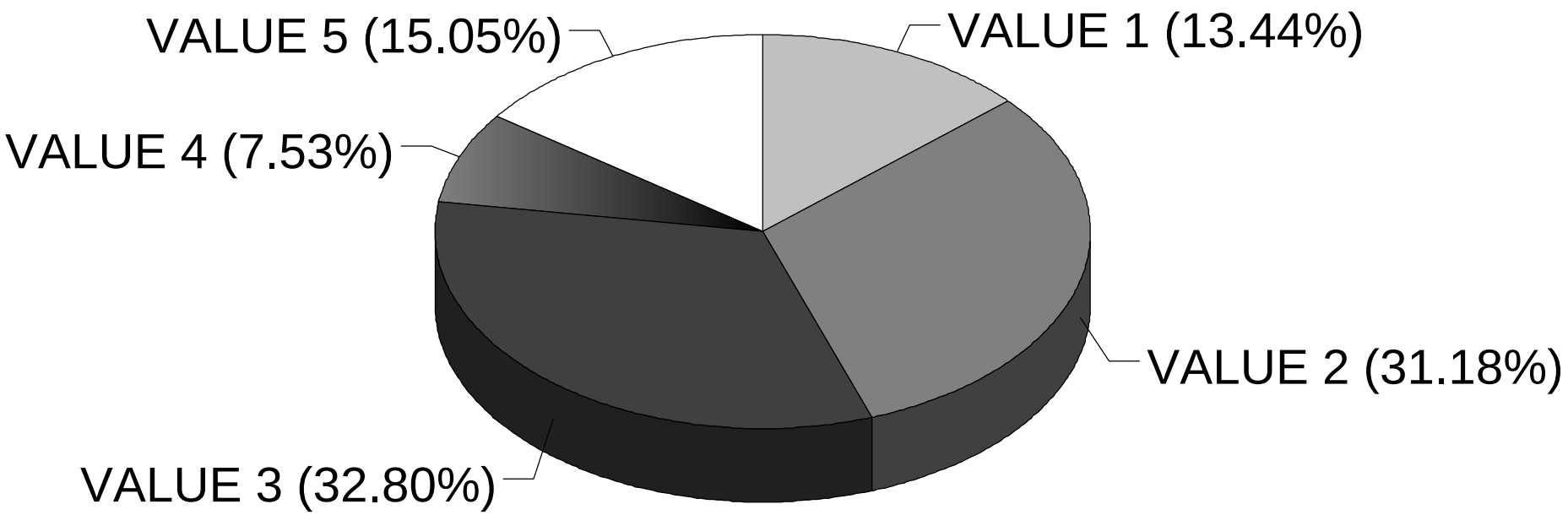
MAXIMUM POOL DEPTHS



GRAPH 5

DAIRY CREEK

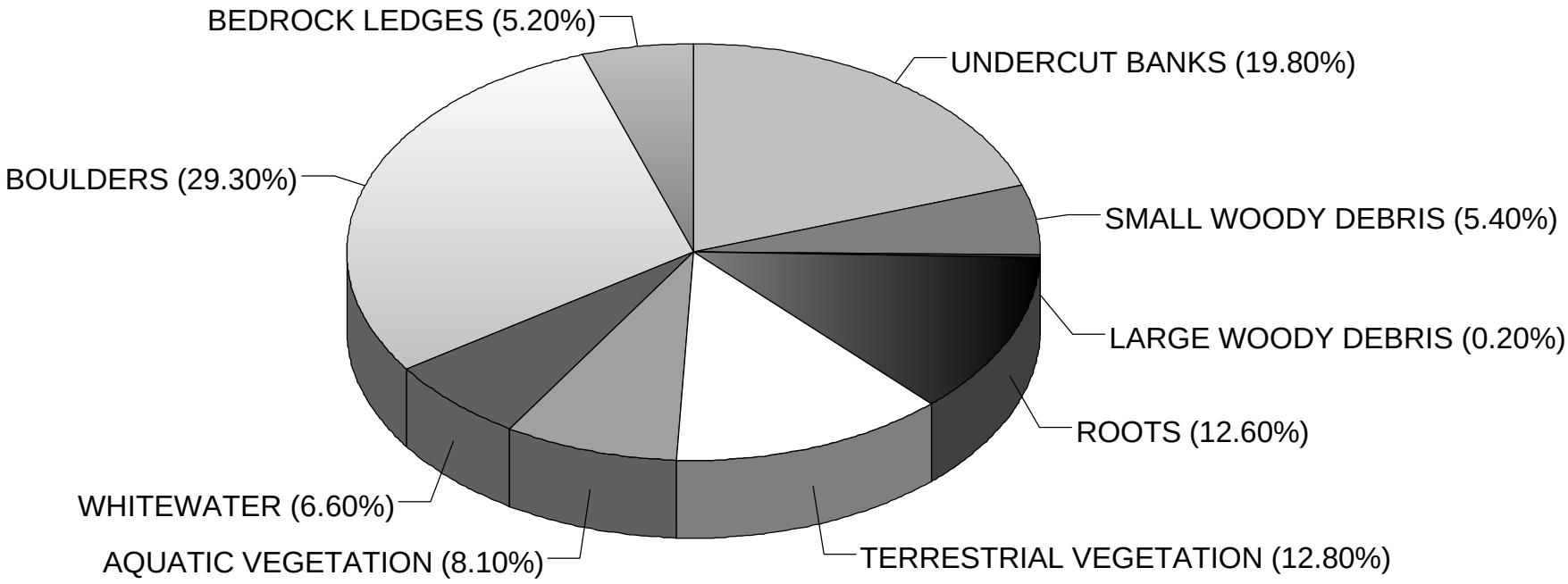
PERCENT EMBEDDEDNESS



GRAPH 6

DAIRY CREEK

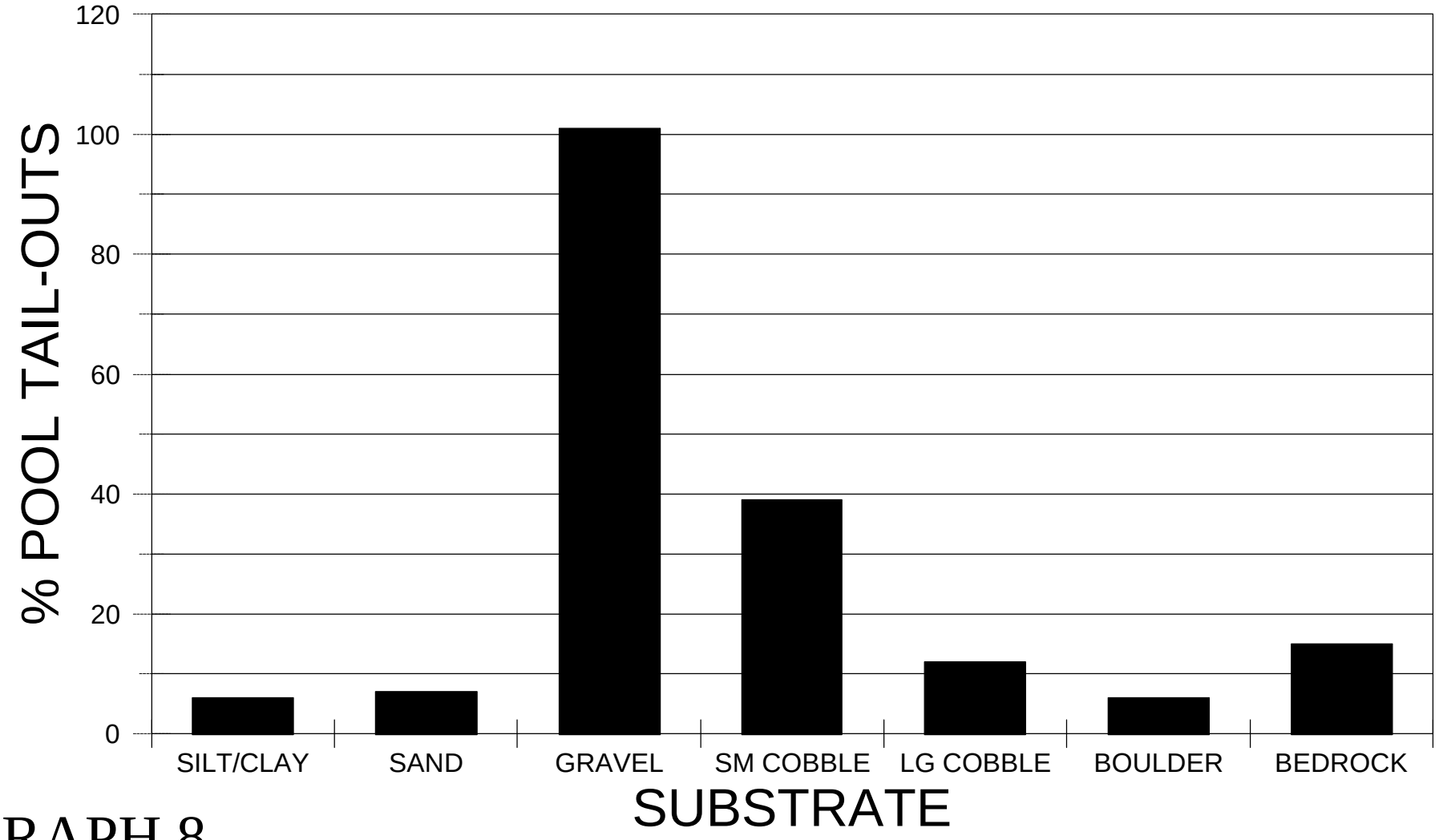
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

DAIRY CREEK

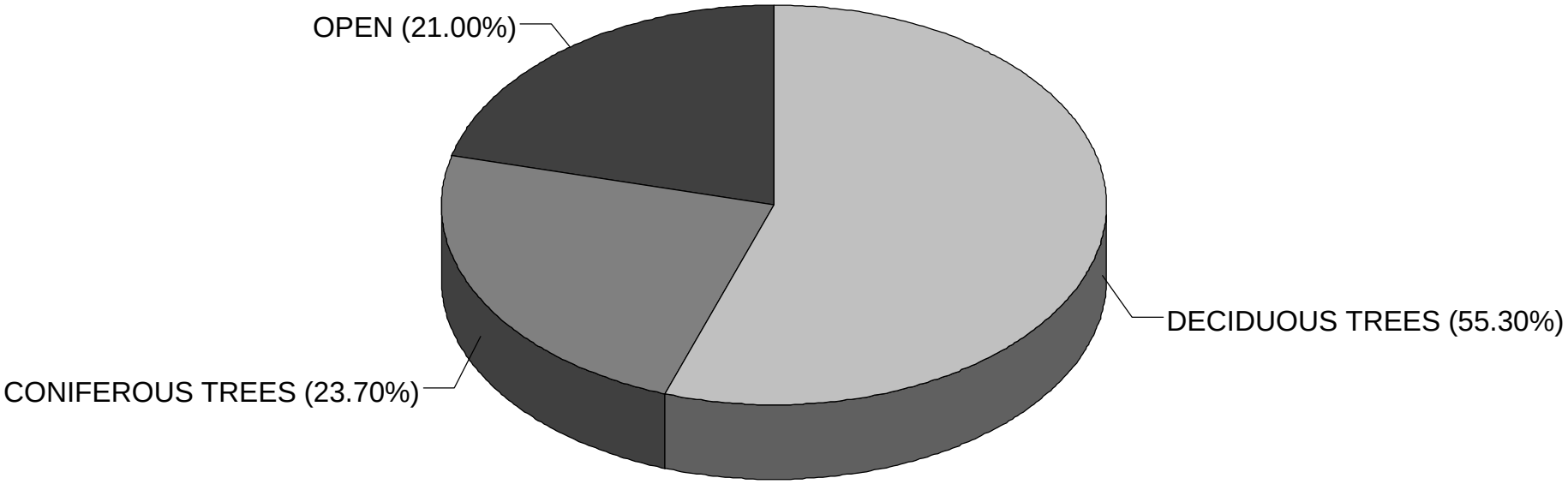
SUBSTRATE COMPOSITION IN POOL TAIL-OUT



GRAPH 8

DAIRY CREEK

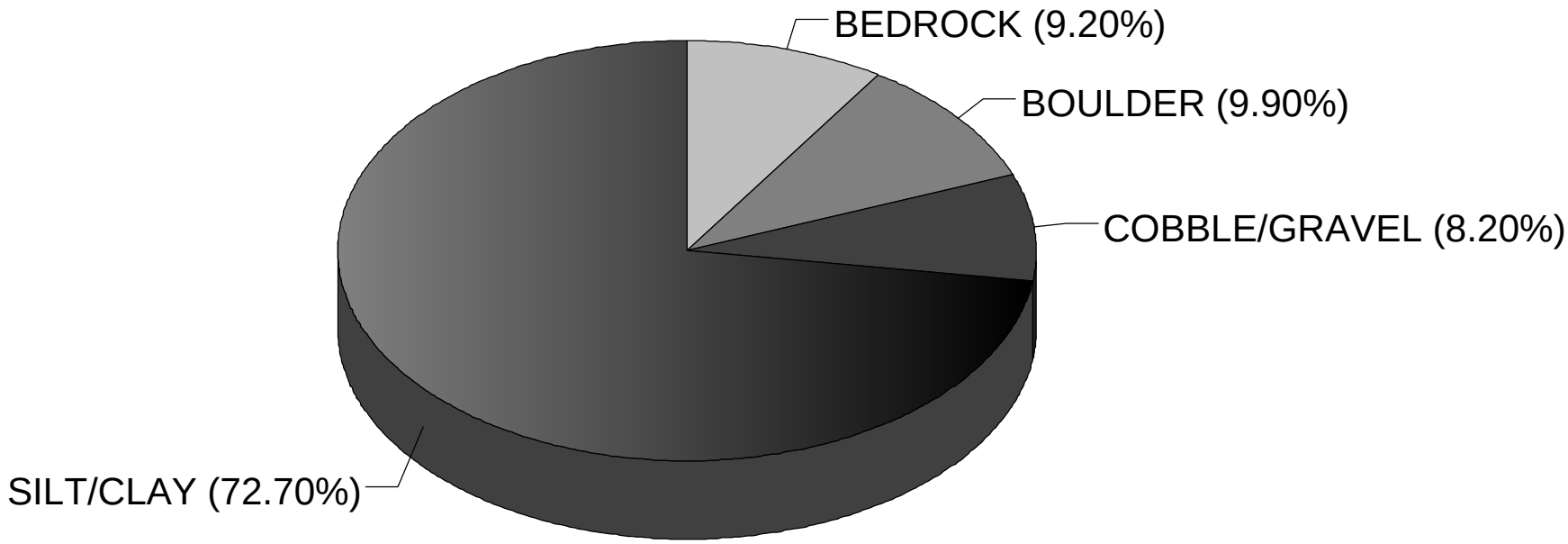
PERCENT CANOPY



GRAPH 9

DAIRY CREEK

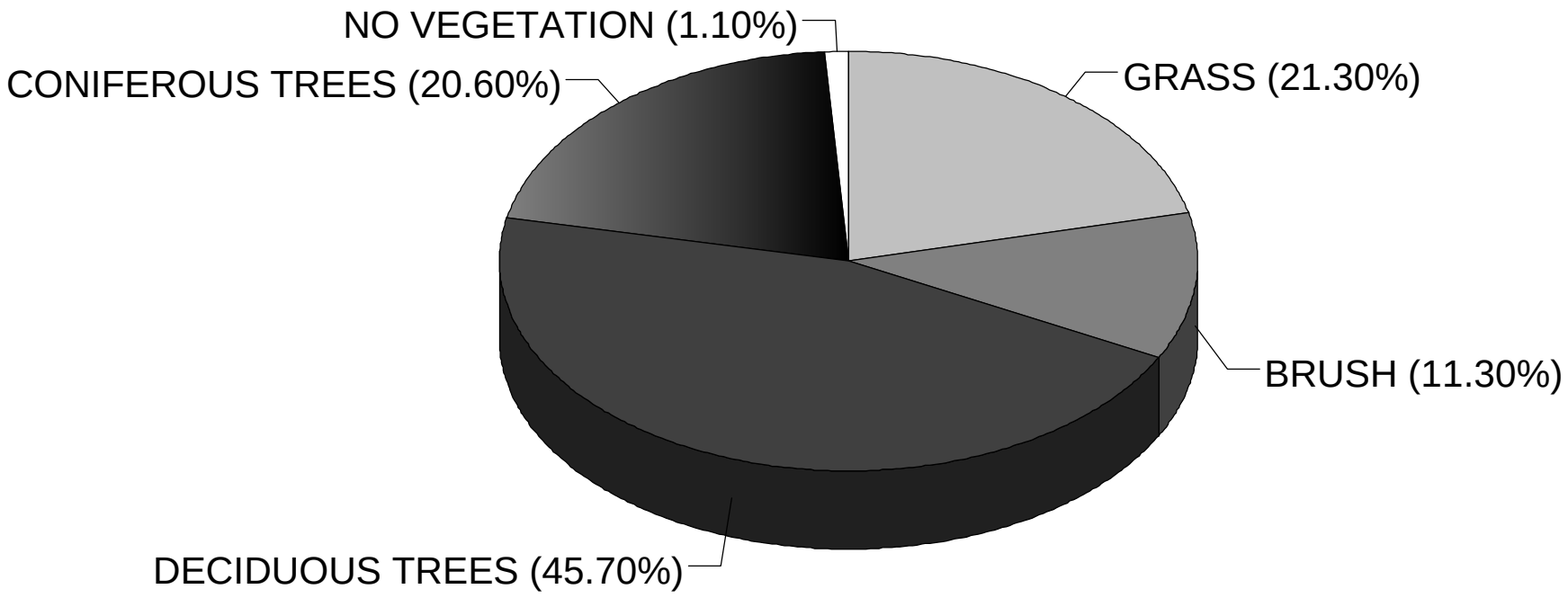
DOMINANT BANK COMPOSITION



GRAPH 10

DAIRY CREEK

DOMINANT BANK VEGETATION



GRAPH 11

Habitat Typing GPS Data Collection

Definitions

Point locations: Five stationary positions (recordings of latitude, longitude, and elevation) are averaged together to create one point.

Line locations: Continues positions taken while the operator walks along the feature.

GIS Layers

thalwag (line): The line connecting the lowest or deepest points along a streambed.

pool tail crest (point) This feature will include the habitat unit, habitat unit length (ft), fish type, present, date, and any additional comments that need to be made about the site.

log jam (point) This feature will include the log jam type (log, debris, or both), if there is gravel retention, the length of the log jam in feet, width, the culverts height, the habitat unit, date, and comment.

culvert (point) This feature will include the material the culvert is made out of, if it has baffles, if it has a fish barrier, the plunge height in feet, length, width, the culvert's height, the habitat unit, date and comments.

drainpipe (point) This feature will include the material the drainpipe is made out of including metal, concrete, or plastic, the height from bank full stage1 to the bottom of the drainpipe, the diameter, habitat unit, date, and comment.

bridge (point) This feature will include the name of the bridge, length, width, habitat unit, date and comment. A height was also measured, generally from the water at thalwag2 to the bottom of bridge.

barrier (point) This feature will include the type of barrier, length, width, and height measurements, the habitat unit, date and comment.

bank erosion (point) This feature will include the length, height from bank full stage to top of erosion, the habitat unit, slope (ranging from 0-30 degrees, 31-60 degrees, and 61-90 degrees), which bank(s) the erosion is located on in respect to looking downstream, comment, and date.

access (line) This feature will include the type of access (trail or road), surface of the access(dirt, paved, or gravel), width, date, and comment.

creek (line) This feature will include the name, date, and comment.

fence across creek (point) This feature will include the type of fence (for example, barbed wire, metal, etc. condition of fence (good, repair, remove), habitat unit, comment, and date.

tributary (point) This feature will include the habitat unit, comment, and date.

invasive plant (point) This feature will include the species (castor bean, arundo, pampas grass, cape ivy, other), comment, and date.