

STREAM INVENTORY REPORT

Slaughterhouse Gulch

INTRODUCTION

A stream inventory was conducted from August 11 to August 19, 2008 on Slaughterhouse Gulch. The survey began at the confluence with South Fork Cottaneva Creek and extended upstream 1.0 miles.

The Slaughterhouse Gulch 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 Slaughterhouse Gulch. 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 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

Slaughterhouse Gulch is a tributary to South Fork Cottaneva Creek, tributary to Cottaneva Creek, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Slaughterhouse Gulch's legal description at the confluence with South Fork Cottaneva Creek is T22N R17W S19. Its location is 39.7443° north latitude and 123.8013° west longitude, LLID number 1238002397444. Slaughterhouse Gulch is an ephemeral stream and has no blue line stream according to the USGS Westport 7.5 minute quadrangle. Slaughterhouse Gulch drains a watershed of approximately 1.2 square miles. Elevations range from about 100 feet at the mouth of the creek to 1,300 feet in the headwater areas. Redwood forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Highway 1 at Rockport north of Fort Bragg.

METHODS

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

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and

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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 Slaughterhouse Gulch to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

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

2. Channel Type:

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

3. Temperatures:

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

4. Habitat Type:

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

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5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Slaughterhouse Gulch, 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 Slaughterhouse Gulch, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Slaughterhouse Gulch, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood trees.

9. Bank Composition and Vegetation:

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

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10. Large Woody Debris Count:

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

11. Average Bankfull Width:

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

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 Slaughterhouse Gulch. In addition, underwater observations were made at 29 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.18, 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

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for Slaughterhouse Gulch include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- 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 August 11 to August 19, 2008 was conducted by J. Braren and E. Hicks (WSP). The total length of the stream surveyed was 5,096 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.17 cfs on August 11, 2008.

Slaughterhouse Gulch is an E4 channel type for 874 feet of the stream surveyed (Reach 1), an E3 channel type for 2,220 feet of the stream surveyed (Reach 2), and an A3 channel type for the remaining 2,002 feet of the stream surveyed (Reach 3). E4 channels are low gradient, meandering riffle/pool streams with low width/depth ratios and little deposition. They are very efficient and stable with a high meander width ratio and gravel-dominant substrates. E3 channels are low gradient, meandering riffle/pool streams with low width/depth ratios and little deposition. They are very efficient and stable with a high meander width ratio and cobble-dominant substrates. A3 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 54 to 58 degrees Fahrenheit. Air temperatures ranged from 54 to 67 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 42% pool units, 31% flatwater units, 26% riffle units and 2% no survey units (Graph 1). Based on total length of Level II habitat types there were 57% flatwater units, 22% pool units, 20% riffle units and 1% no survey units (Graph 2).

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Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 21%; low gradient riffle units, 21%; and step run units, 16% (Graph 3). Based on percent total length, step run units made up 42%, low gradient riffle units 17%, and run units 15%.

A total of 66 pools were identified (Table 3). Main-channel pools were the most frequently encountered at 67% (Graph 4), and comprised 72% 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. Five of the 66 pools (8%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 66 pool tail-outs measured, 25 had a value of 1 (38%); 29 had a value of 2 (44%); 11 had a value of 3 (17%); and 1 had a value of 5 (2%) (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 22, flatwater habitat types had a mean shelter rating of 21, and pool habitats had a mean shelter rating of 32 (Table 1). Of the pool types, scour pools had the highest mean shelter rating at 33, main channel pools had a mean shelter rating of 32, and backwater pools had a mean shelter rating of 5 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 53% of pool tail-outs. Small cobble was the next most frequently observed dominant substrate and occurred in 45% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Slaughterhouse Gulch was 93%. Seven percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 28% and 72%, respectively. Graph 9 describes the mean percent canopy in Slaughterhouse Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 91%. The mean percent left bank vegetated was 98%. The dominant elements composing the structure of the stream banks consisted of 86% cobble/gravel and 14% sand/silt/clay (Graph 10). Coniferous trees were the dominant vegetation type observed in 70% of the units surveyed. Additionally, 14% of the units surveyed had brush as the dominant vegetation type, 10% had deciduous trees as the dominant vegetation type, and 5% had grass as the dominant vegetation type (Graph 11).

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BIOLOGICAL INVENTORY RESULTS

Twenty-nine sites were snorkeled for species composition and distribution in Slaughterhouse Gulch on August 26, 2008. Water temperatures taken during the dive survey period of 1145 to 1605 ranged from 54 to 56 degrees Fahrenheit. Air temperatures ranged from 59 to 68 degrees Fahrenheit. The sites were sampled by I. Mikus and S. McSmith (DFG).

In reach 1, which comprised the first 874 feet of stream, 9 sites were sampled. The reach sites yielded 18 young-of-the-year steelhead/rainbow trout (SH/RT), 3 age 1+ SH/RT, and 9 unidentified sculpin.

In reach 2, 10 sites were sampled starting approximately 1,142 feet from the confluence with South Fork Cottaneva Creek and continuing upstream 1,802 feet. The reach sites yielded 21 young-of-the-year SH/RT, and 3 age 1+ SH/RT.

In reach 3, 10 sites were sampled starting approximately 3,197 feet from the confluence with South Fork Cottaneva Creek and continuing upstream 1,843 feet. The reach sites yielded 2 age 1+ SH/RT.

The following chart displays the information yielded from these sites:

2008 Slaughterhouse Gulch underwater observations.

| Date | Site # | Hab. Unit # | Hab. Type | Approx. Dist. from mouth (ft.) | Coho | | SH/RT | | |
|--------------------------|--------|-------------|-----------|--------------------------------|------|----|-------|----|----|
| | | | | | YOY | 1+ | YOY | 1+ | 2+ |
| Reach 1: E4 Channel Type | | | | | | | | | |
| 08/26/08 | 1 | 007 | 5.2 | 138 | 0 | 0 | 3 | 0 | 0 |
| 08/26/08 | 2 | 011 | 4.2 | 243 | 0 | 0 | 5 | 0 | 0 |
| 08/26/08 | 3 | 016 | 5.2 | 453 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 4 | 018 | 4.2 | 510 | 0 | 0 | 1 | 1 | 0 |
| 08/26/08 | 5 | 020 | 4.2 | 550 | 0 | 0 | 2 | 1 | 0 |
| 08/26/08 | 6 | 024 | 4.2 | 592 | 0 | 0 | 4 | 0 | 0 |
| 08/26/08 | 7 | 026 | 4.2 | 634 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 8 | 031 | 5.6 | 703 | 0 | 0 | 1 | 1 | 0 |
| 08/26/08 | 9 | 033 | 4.2 | 796 | 0 | 0 | 2 | 0 | 0 |

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| Date | Site # | Hab. Unit # | Hab. Type | Approx. Dist. from mouth (ft.) | Coho | | SH/RT | | |
|--------------------------|--------|-------------|-----------|--------------------------------|------|----|-------|----|----|
| | | | | | YOY | 1+ | YOY | 1+ | 2+ |
| Reach 2: E3 Channel Type | | | | | | | | | |
| 08/26/08 | 10 | 039 | 4.2 | 1142 | 0 | 0 | 1 | 0 | 0 |
| 08/26/08 | 11 | 041 | 4.4 | 1252 | 0 | 0 | 5 | 1 | 0 |
| 08/26/08 | 12 | 045 | 4.2 | 1542 | 0 | 0 | 2 | 0 | 0 |
| 08/26/08 | 13 | 049 | 4.2 | 1632 | 0 | 0 | 1 | 0 | 0 |
| 08/26/08 | 14 | 057 | 4.2 | 1757 | 0 | 0 | 3 | 0 | 0 |
| 08/26/08 | 15 | 063 | 4.2 | 2025 | 0 | 0 | 7 | 0 | 0 |
| 08/26/08 | 16 | 071 | 4.2 | 2288 | 0 | 0 | 2 | 0 | 0 |
| 08/26/08 | 17 | 079 | 5.2 | 2650 | 0 | 0 | 0 | 1 | 0 |
| 08/26/08 | 18 | 083 | 5.2 | 2706 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 19 | 091 | 4.2 | 2944 | 0 | 0 | 0 | 1 | 0 |
| Reach 3: A3 Channel Type | | | | | | | | | |
| 08/26/08 | 20 | 100 | 4.2 | 3197 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 21 | 101 | 4.4 | 3229 | 0 | 0 | 0 | 1 | 0 |
| 08/26/08 | 22 | 121 | 5.6 | 3978 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 23 | 127 | 4.2 | 4249 | 0 | 0 | 0 | 1 | 0 |
| 08/26/08 | 24 | 135 | 4.2 | 4449 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 25 | 140 | 4.2 | 4547 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 26 | 142 | 5.2 | 4623 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 27 | 148 | 4.2 | 4781 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 28 | 150 | 5.6 | 4829 | 0 | 0 | 0 | 0 | 0 |
| 08/26/08 | 29 | 157 | 5.6 | 5040 | 0 | 0 | 0 | 0 | 0 |

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DISCUSSION

Slaughterhouse Gulch is an E4 channel type for the first 874 feet of stream surveyed and an E3 channel type for the next 2,220 feet and an A3 channel type for the remaining 2,002 feet. The suitability of E4, E3, and A3 channel types for fish habitat improvement structures is as follows: E3 and E4 channel types are good for bank-placed boulders and fair for opposing wing-deflectors. A3 channel types are generally not suitable for fish habitat improvement structures.

The water temperatures recorded on the survey days August 11 to August 19, 2008 ranged from 54 to 58 degrees Fahrenheit. Air temperatures ranged from 54 to 67 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 57% of the total length of this survey, riffles 20%, and pools 22. Five of the 66 (8%) 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 in the E4 and E3 channel types.

Fifty-four of the 66 pool tail-outs measured had embeddedness ratings of 1 or 2. Eleven of the pool tail-outs had embeddedness ratings of 3 or 4. One of the pool tail-outs had a rating of 5, which is considered 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 Slaughterhouse Gulch should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Sixty-five of the 66 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 32. The shelter rating in the flatwater habitats was 21. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Slaughterhouse Gulch. Large woody debris is the dominant cover type in pools followed by small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover 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 93%. Reach 1 had a canopy density of 94%, Reach 2 had a canopy density of 92%, and Reach 3 had a canopy density of 89%.

The percentage of right and left bank covered with vegetation was 91% and 98%, 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.

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RECOMMENDATIONS

- 1) Slaughterhouse Gulch should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 3) 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 small woody debris. Adding high quality complexity with woody cover in the pools is desirable.
- 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.

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 | Begin survey at the confluence with South Fork Cottaneva Creek. Channel type is an E4, Reach 1 begins. |
| 94 | 0005.00 | Log Debris Accumulation (LDA) #01 contains two pieces of large woody debris (LWD) and measures 5' high x 11' wide x 5 long and has water flowing through with no visible gaps. Fish were observed above the LDA. |
| 243 | 0011.00 | Salmonid young-of-the-year (YOY) and 1+ were observed. |
| 301 | 0014.00 | A channel type of E4 was taken at this location. Reach 1 extends to Habitat Unit #035. |
| 634 | 0026.00 | LDA #02 contains three pieces of LWD and measures 8' high x 26' wide x 15' long and has water flowing through with no visible gaps. |

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|------|---------|---|
| | | Sediment retention ranges from silt to gravel and measures 9' wide x 21' long x and 2' deep. |
| 642 | 0027.00 | Unsurveyable unit due to dense small wood and LDA cover. |
| 874 | 0035.00 | Reach 2 begins at the bottom of this unit, it is an E3 channel type. |
| 1282 | 0042.00 | LDA #03 contains 5 pieces of LWD and measures 8' high x 20' wide x 16' long and has water flowing through with visible gaps. Sediment retention ranges from silt to gravel and measures 8' wide x 8' long x and 1' deep. Fish were observed above this LDA. |
| 1576 | 0047.00 | There is an erosion site on the right bank measuring 20' high x 15' wide. |
| 1643 | 0050.00 | LDA #04 contains 5 pieces of LWD and measures 8' high x 20' wide x and 19' long with water flowing through and visible gaps. Sediment retention ranges from sand to small cobble and measures 8' wide x 8' long x and 1' deep. Fish were observed above this LDA. |
| 1699 | 0053.00 | LDA #05 contains 3 pieces of LWD and measures 6' high x 23' wide x 6' long with water flowing through and no visible gaps. Sediment retention ranges from silt to small cobble and measures 20' wide x 6' long x and 5' deep. There is a 2.5' high cascade. |
| 1735 | 0055.00 | LDA #06 contains 3 pieces of LWD and measures 6' high x 25' wide x 15' long with water flowing through and no visible gaps. Sediment retention ranges from silt to small cobble and measures 5' wide x 8' long x and 3' deep. There is a 3.2' high plunge. |
| 1769 | 0058.00 | Unsurveyable unit due to LDA. LDA #07 contains 4 pieces of LWD and measures 8' high x 25' wide x 32' long with water flowing through and visible gaps. Sediment retention ranges from silt to small cobble and measures 12' wide x 22' long x and 3' deep. |
| 1801 | 0059.00 | A channel type of E3 was taken at this location. Reach 2 extends to Habitat Unit #096. There is a piece of large woody debris (LWD) measuring 1' high. There was salmonid YOY observed. |
| 2496 | 0076.00 | LDA #07 contains 4 pieces of LWD and measures 5' high x 25' wide x 6' long with water flowing through and no visible gaps. Sediment retention ranges from silt to small cobble and measures 5' wide x 5' long x and 3' deep. There is a 3' high plunge. |
| 2577 | 0078.00 | There is an erosion site on the right bank measuring 9' high x 30' long. |

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| | | |
|------|---------|---|
| 2735 | 0084.00 | There is a series of waterfalls with a 2.2' high plunge and a 1' high plunge which may serve as a possible juvenile barrier. |
| 2795 | 0085.00 | The pool is unsurveyable due to LWD cover. |
| 2856 | 0088.00 | There is a dry tributary on the right bank. |
| 3094 | 0097.00 | Reach 3 begins at the bottom of this unit, it is an A3 channel type. |
| 3242 | 0102.00 | There is a 2.2' high plunge over a notched log. |
| 3309 | 0104.00 | LDA #08 consists of 6 pieces of LWD and measures 9' high x 30' wide x and 15' long with visible gaps and water flowing through. Sediment retention ranges from silt to small cobble and measures 3.5' high x 5' long x and 5' wide. |
| 3582 | 0108.00 | There is a waterfall with a 3.4' high plunge. |
| 3820 | 0116.00 | There is a 1.5' jump. |
| 3963 | 0120.00 | There is a 3.8' high plunge. |
| 4105 | 0124.00 | There is a waterfall with a 3' high plunge. |
| 4123 | 0125.00 | LDA #09 measures 4.6' high x 22' wide x and 16' long with water flowing through and no visible gaps. Sediment retention measures 2' high x 4.4' wide x and 15.5' long. |
| 4489 | 0137.00 | LDA #10 measures 15' wide x 7' high x and 16' long with water flowing through and no visible gaps that serves as a possible barrier. |
| 4532 | 0139.00 | There is a waterfall with a 2' high plunge. |
| 4680 | 0143.00 | A channel type of A3 was taken at this location. Reach 3 extends to Habitat Unit #160. |
| 4723 | 0145.00 | LDA #11 consists of four pieces of LWD measuring 18' wide x 14' high x and 4.6' long that is retaining sediment measuring 2.4' high. |
| 4781 | 0148.00 | LDA #12 measures 6.5' high x 10' long x 18' wide with a 2' jump. |
| 5010 | 0156.00 | There is a waterfall with a 2.4' plunge. |
| 5070 | 0159.00 | Unsurveyable pool due to congestion of LWD. LDA #13 measures 10' high x 141' long x 24' wide with a 9' jump and is a possible fish barrier. |

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5096 0160.00 End of survey due to end of anadromy: LDA barrier and increased gradient and sediment retention. Water continues 40' above LDA and then runs subsurface.

REFERENCES

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

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LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE

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

CASCADE

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

FLATWATER

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

MAIN CHANNEL POOLS

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

SCOUR POOLS

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

BACKWATER POOLS

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

ADDITIONAL UNIT DESIGNATIONS

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

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

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444 Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

| 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 |
|--------------------|-----------------------------------|--------------|------------------------|-------------------|---------------------------|------------------|------------------|------------------|----------------------|----------------------------|-------------------------------|----------------------|---------------------------------|---------------------------------|---------------------|
| 49 | 7 | FLATWATER | 30.8 | 59 | 2895 | 56.8 | 5.5 | 0.3 | 0.7 | 271 | 13275 | 96 | 4718 | | 21 |
| 3 | 0 | NOSURVEY | 1.9 | 22 | 67 | 1.3 | | | | | | | | | |
| 66 | 66 | POOL | 41.5 | 17 | 1129.4 | 22.2 | 9.3 | 0.8 | 1.3 | 157 | 10346 | 175 | 11563 | 142 | 32 |
| 41 | 10 | RIFFLE | 25.8 | 25 | 1005 | 19.7 | 5.1 | 0.5 | 0.5 | 108 | 4418 | 103 | 4210 | | 22 |
| Total Units | Total Units Fully Measured | | | | Total Length (ft.) | | | | | Total Area (sq.ft.) | | | Total Volume (cu.ft.) | | |
| 159 | 83 | | | | 5096.4 | | | | | 28038 | | | 20491 | | |

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444 Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT Legal Description: T22NR17WS19 Latitude: 39:44:40.0N Longitude: 123:48:01.0W

| 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 (%) |
|---------------|----------------------|--------------|------------------------|-------------------|--------------------|------------------|------------------|------------------|-----------------|--------------------|-------------------------------|----------------------|---------------------------------|---------------------------------|---------------------|-----------------|
| 34 | 7 | LGR | 21.4 | 25 | 865 | 17.0 | 5 | 0.6 | 0.6 | 125 | 4263 | 138 | 4692 | | 15 | 93 |
| 5 | 1 | HGR | 3.1 | 26 | 131 | 2.6 | 6 | 0.3 | 1 | 167 | 837 | 50 | 251 | | 10 | 89 |
| 2 | 2 | CAS | 1.3 | 4 | 9 | 0.2 | 4 | 0.3 | 1 | 16 | 32 | 5 | 10 | | 50 | 94 |
| 23 | 3 | RUN | 14.5 | 33 | 764 | 15.0 | 5 | 0.3 | 0.8 | 102 | 2351 | 35 | 800 | | 13 | 93 |
| 26 | 4 | SRN | 16.4 | 82 | 2131 | 41.8 | 6 | 0.4 | 1 | 397 | 10334 | 142 | 3703 | | 26 | 93 |
| 33 | 33 | MCP | 20.8 | 16 | 524 | 10.3 | 9 | 0.9 | 2.9 | 154 | 5069 | 173 | 5701 | 140 | 31 | 93 |
| 11 | 11 | STP | 6.9 | 27 | 293 | 5.7 | 8 | 0.8 | 2.4 | 209 | 2298 | 232 | 2548 | 189 | 37 | 93 |
| 1 | 1 | CRP | 0.6 | 8 | 9 | 0.2 | 9 | 0.4 | 0.7 | 77 | 77 | 46 | 46 | 31 | 5 | 91 |
| 10 | 10 | LSL | 6.3 | 16 | 156 | 3.1 | 9 | 0.7 | 2 | 149 | 1492 | 159 | 1585 | 129 | 33 | 95 |
| 2 | 2 | LSR | 1.3 | 12 | 23 | 0.5 | 8 | 0.8 | 1.3 | 88 | 177 | 93 | 187 | 73 | 53 | 93 |
| 8 | 8 | PLP | 5.0 | 14 | 112 | 2.2 | 10 | 1.0 | 1.9 | 143 | 1143 | 177 | 1415 | 146 | 32 | 94 |
| 1 | 1 | BPL | 0.6 | 13 | 13 | 0.3 | 7 | 0.8 | 1 | 91 | 91 | 82 | 82 | 73 | 5 | 91 |
| 3 | 0 | NS | 1.9 | 22 | 67 | 1.3 | | | | | | | | | | |

Total Units
159

Total Units Fully Measured
83

Total Length (ft.)
5096.4

Total Area (sq.ft.)
28163

Total Volume (cu.ft.)
21020

Table 3 - Summary of Pool Types

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

| 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 |
|---------------|----------------------|--------------|------------------------|-------------------|--------------------|------------------|------------------|---------------------------|--------------------|-------------------------------|---------------------------------|-------------------------------------|---------------------|
| 44 | 44 | MAIN | 67 | 19 | 817 | 72 | 9.1 | 0.9 | 167 | 7367 | 152 | 6680 | 32 |
| 21 | 21 | SCOUR | 32 | 14 | 299 | 26 | 9.6 | 0.8 | 138 | 2888 | 125 | 2629 | 33 |
| 1 | 1 | BACKWATER | 2 | 13 | 13 | 1 | 7.0 | 0.8 | 91 | 91 | 73 | 73 | 5 |

| Total Units | Total Units Fully Measured | Total Length (ft.) | Total Area (sq.ft.) | Total Volume (cu.ft.) |
|-------------|----------------------------|--------------------|---------------------|-----------------------|
| 66 | 66 | 1129.4 | 10346 | 9382 |

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

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

| 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 |
|---------------|--------------|------------------------|---------------------------------|-----------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|----------------------------------|------------------------------|
| 33 | MCP | 50 | 7 | 21 | 23 | 70 | 3 | 9 | 0 | 0 | 0 | 0 |
| 11 | STP | 17 | 1 | 9 | 9 | 82 | 1 | 9 | 0 | 0 | 0 | 0 |
| 1 | CRP | 2 | 1 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | LSL | 15 | 2 | 20 | 7 | 70 | 1 | 10 | 0 | 0 | 0 | 0 |
| 2 | LSR | 3 | 1 | 50 | 1 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | PLP | 12 | 0 | 0 | 8 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | BPL | 2 | 0 | 0 | 1 | 100 | 0 | 0 | 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 |
|-------------|---------------------------------|-----------------------------|----------------------------------|------------------------------|----------------------------------|------------------------------|----------------------------------|------------------------------|----------------------------------|------------------------------|
| 66 | 12 | 18 | 49 | 74 | 5 | 8 | 0 | 0 | 0 | 0 |

Mean Maximum Residual Pool Depth (ft.): 1.3

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Dry Units: 0

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

| 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 |
|---------------|----------------------|--------------|-----------------------|------------|------------|------------------|-------------------------|---------------------------|--------------------|-----------------|-----------------------|
| 34 | 7 | LGR | 25 | 27 | 16 | 0 | 32 | 0 | 0 | 0 | 0 |
| 5 | 1 | HGR | 0 | 0 | 70 | 0 | 0 | 0 | 30 | 0 | 0 |
| 2 | 2 | CAS | 0 | 10 | 65 | 0 | 0 | 0 | 25 | 0 | 0 |
| 41 | 10 | TOTAL RIFFLE | 18 | 21 | 31 | 0 | 23 | 0 | 8 | 0 | 0 |
| 23 | 3 | RUN | 50 | 15 | 30 | 0 | 0 | 0 | 5 | 0 | 0 |
| 26 | 5 | SRN | 5 | 19 | 52 | 10 | 6 | 0 | 4 | 4 | 0 |
| 49 | 8 | TOTAL FLAT | 18 | 18 | 46 | 7 | 4 | 0 | 4 | 3 | 0 |
| 33 | 33 | MCP | 13 | 22 | 46 | 11 | 2 | 0 | 3 | 4 | 0 |
| 11 | 11 | STP | 9 | 26 | 40 | 14 | 0 | 0 | 8 | 3 | 0 |
| 1 | 1 | CRP | 0 | 50 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 10 | LSL | 15 | 25 | 56 | 5 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | LSR | 40 | 5 | 15 | 35 | 0 | 0 | 0 | 5 | 0 |
| 8 | 8 | PLP | 0 | 13 | 52 | 19 | 1 | 0 | 16 | 0 | 0 |
| 1 | 1 | BPL | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 50 | 0 |
| 66 | 66 | TOTAL POOL | 11 | 21 | 46 | 12 | 1 | 0 | 5 | 3 | 0 |
| 3 | 0 | NS | | | | | | | | | |
| 159 | 84 | TOTAL | 13 | 21 | 45 | 10 | 4 | 0 | 5 | 3 | 0 |

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Dry Units: 0

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

| 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 |
|---------------|----------------------|--------------|----------------------------|-----------------------|-------------------------|-------------------------------|-------------------------------|--------------------------|--------------------------|
| 34 | 7 | LGR | 0 | 0 | 43 | 57 | 0 | 0 | 0 |
| 5 | 1 | HGR | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 2 | 2 | CAS | 0 | 0 | 50 | 0 | 50 | 0 | 0 |
| 23 | 3 | RUN | 0 | 0 | 67 | 33 | 0 | 0 | 0 |
| 26 | 3 | SRN | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 33 | 30 | MCP | 7 | 37 | 33 | 23 | 0 | 0 | 0 |
| 11 | 10 | STP | 0 | 30 | 40 | 30 | 0 | 0 | 0 |
| 1 | 1 | CRP | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| 10 | 10 | LSL | 30 | 30 | 30 | 10 | 0 | 0 | 0 |
| 2 | 2 | LSR | 50 | 0 | 50 | 0 | 0 | 0 | 0 |
| 8 | 8 | PLP | 0 | 38 | 25 | 38 | 0 | 0 | 0 |
| 1 | 1 | BPL | 0 | 100 | 0 | 0 | 0 | 0 | 0 |

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444 Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT Legal Description: T22NR17WS19 Latitude: 39:44:40.0N Longitude: 123:48:01.0W

| Mean Percent Canopy | Mean Percent Conifer | Mean Percent Hardwood | Mean Percent Open Units | Mean Right Bank % Cover | Mean Left Bank % Cover |
|---------------------------|----------------------------|-----------------------------|-------------------------------|-------------------------------|------------------------------|
| 93 | 72 | 28 | 0 | 91 | 98 |

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.

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

| | | |
|--|---|---|
| Channel Type: A3 | Canopy Density (%): 92.0 | Pools by Stream Length (%): 24.1 |
| Reach Length (ft.): 2002.2 | Coniferous Component (%): 90.9 | Pool Frequency (%): 44.4 |
| Riffle/Flatwater Mean Width (ft.): 5.4 | Hardwood Component (%): 9.1 | Residual Pool Depth (%): |
| BFW: | Dominant Bank Vegetation: Coniferous Trees | < 2 Feet Deep: 86 |
| Range (ft.): 13 to 20 | Vegetative Cover (%): 95.6 | 2 to 2.9 Feet Deep: 14 |
| Mean (ft.): 17 | Dominant Shelter: Large Woody Debris | 3 to 3.9 Feet Deep: 0 |
| Std. Dev.: 3 | Dominant Bank Substrate Type: Cobble/Gravel | >= 4 Feet Deep: 0 |
| Base Flow (cfs.): 0.2 | Occurrence of LWD (%): 50 | Mean Max Residual Pool Depth (ft.): 1.5 |
| Water (F): 54 - 57 | Air (F): 55 - 60 | LWD per 100 ft.: |
| Dry Channel (ft): 0 | Riffles: 9 | Pools: 12 |
| | Flat: 5 | |
| Pool Tail Substrate (%): Silt/Clay: 0 | Sand: 4 | Gravel: 43 |
| | Sm Cobble: 54 | Lg Cobble: 0 |
| | Boulder: 0 | Bedrock: 0 |
| Embeddedness Values (%): 1. 32.1 | 2. 46.4 | 3. 17.9 |
| | 4. 0.0 | 5. 3.6 |

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT

Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

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 | 0 | 0 | 0.0 |
| Boulder | 0 | 0 | 0.0 |
| Cobble / Gravel | 73 | 69 | 85.5 |
| Sand / Silt / Clay | 10 | 14 | 14.5 |

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 | 4 | 5 | 5.4 |
| Brush | 14 | 10 | 14.5 |
| Hardwood Trees | 12 | 5 | 10.2 |
| Coniferous Trees | 53 | 63 | 69.9 |
| No Vegetation | 0 | 0 | 0.0 |

Total Stream Cobble Embeddedness Values: 2

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

StreamName: Slaughterhouse Gulch

LLID: 1238002397444

Drainage: Rockport

Survey Dates: 8/11/2008 to 8/19/2008

Confluence Location: Quad: WESTPORT

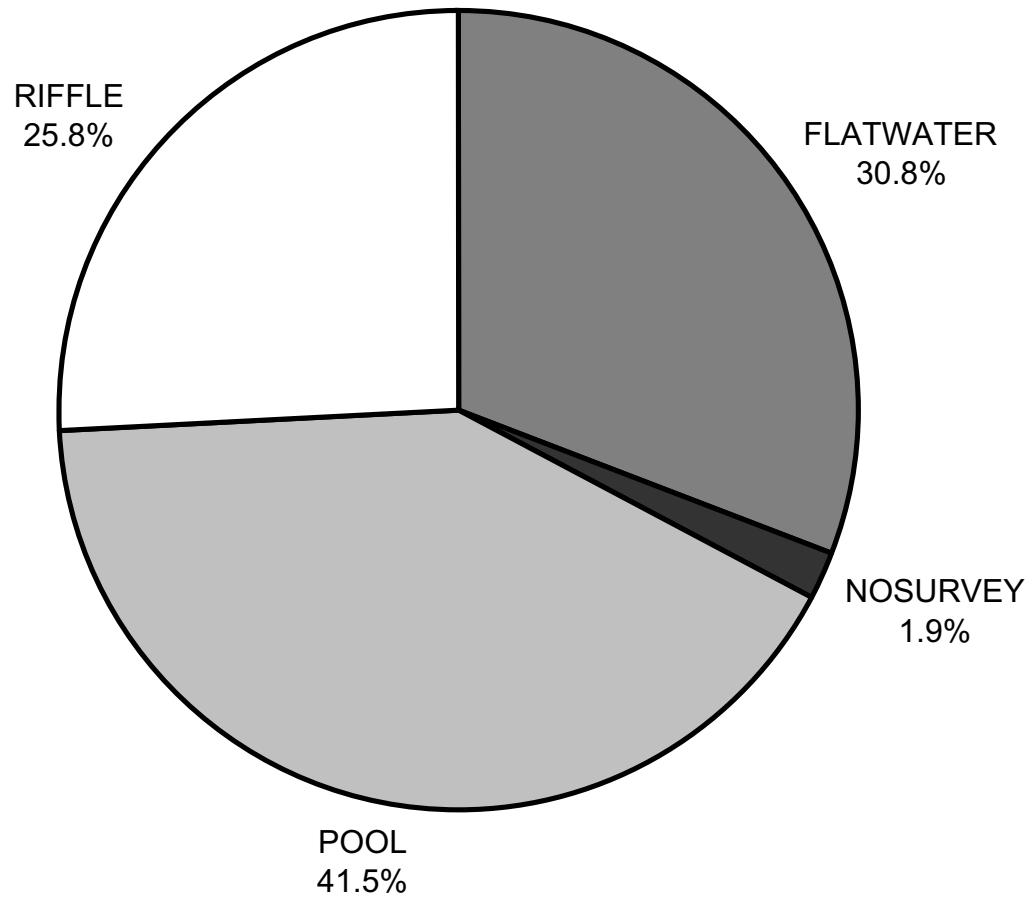
Legal Description: T22NR17WS19

Latitude: 39:44:40.0N

Longitude: 123:48:01.0W

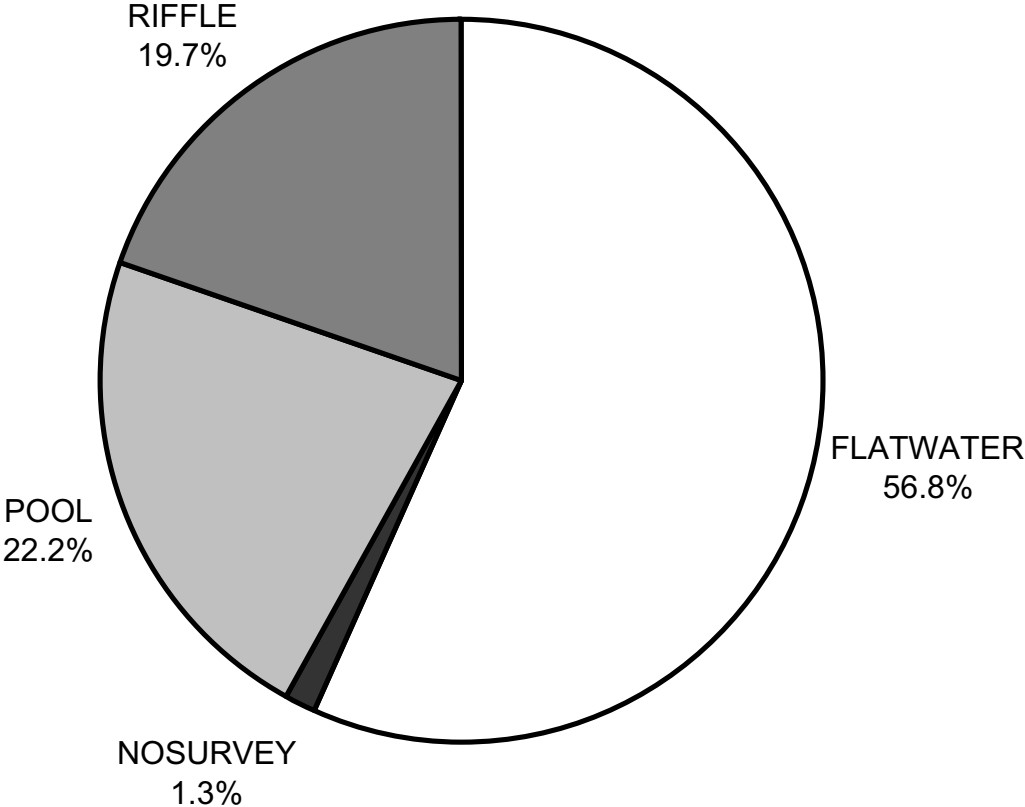
| | Riffles | Flatwater | Pools |
|----------------------------|----------------|------------------|--------------|
| UNDERCUT BANKS (%) | 18 | 18 | 11 |
| SMALL WOODY DEBRIS (%) | 21 | 18 | 21 |
| LARGE WOODY DEBRIS (%) | 31 | 46 | 46 |
| ROOT MASS (%) | 0 | 7 | 12 |
| TERRESTRIAL VEGETATION (%) | 23 | 4 | 1 |
| AQUATIC VEGETATION (%) | 0 | 0 | 0 |
| WHITEWATER (%) | 8 | 4 | 5 |
| BOULDERS (%) | 0 | 3 | 3 |
| BEDROCK LEDGES (%) | 0 | 0 | 0 |

SLAUGHTERHOUSE GULCH 2008 HABITAT TYPES BY PERCENT OCCURRENCE



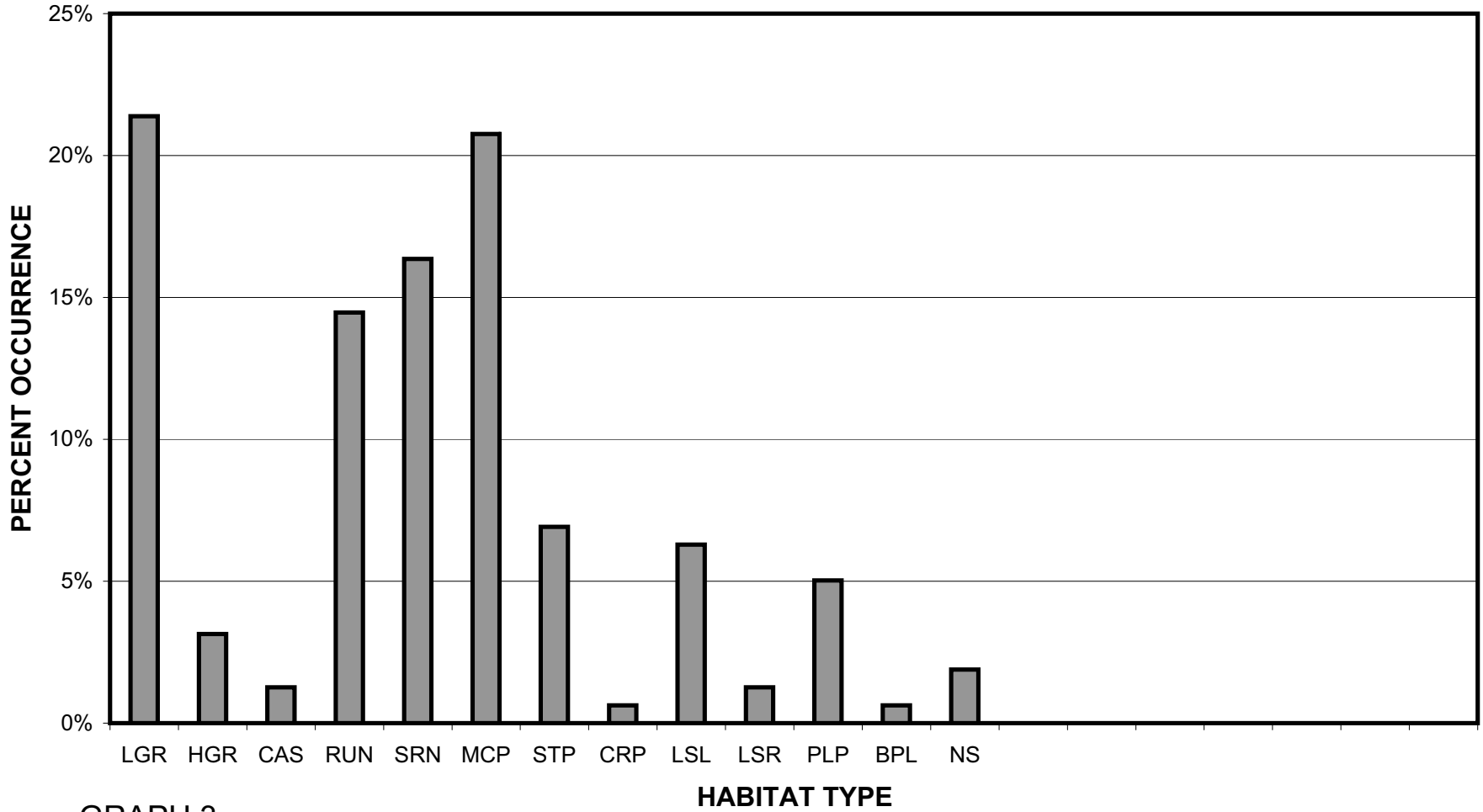
GRAPH 1

**SLAUGHTERHOUSE GULCH 2008
HABITAT TYPES BY PERCENT TOTAL LENGTH**



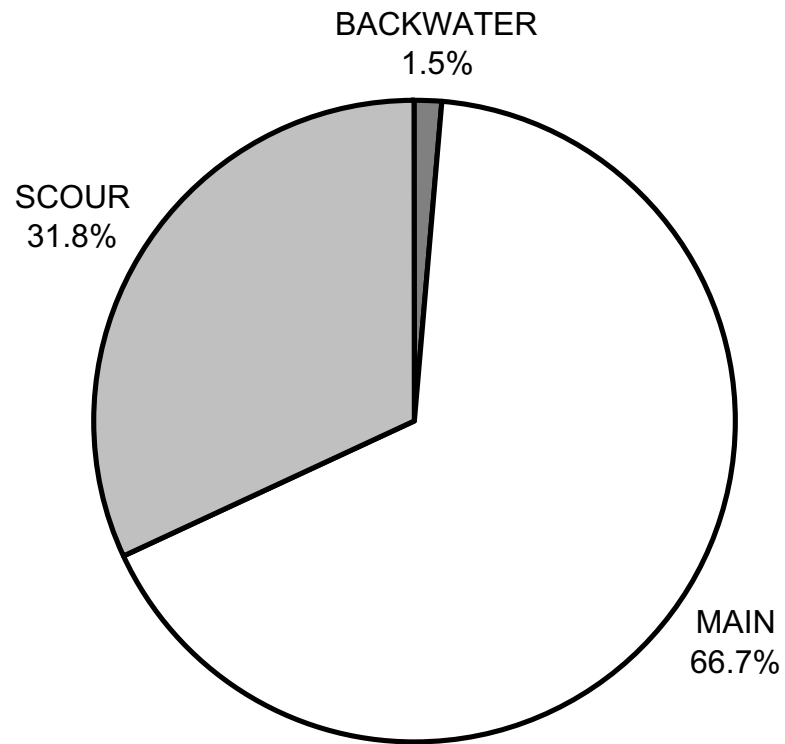
GRAPH 2

SLAUGHTERHOUSE GULCH 2008 HABITAT TYPES BY PERCENT OCCURRENCE



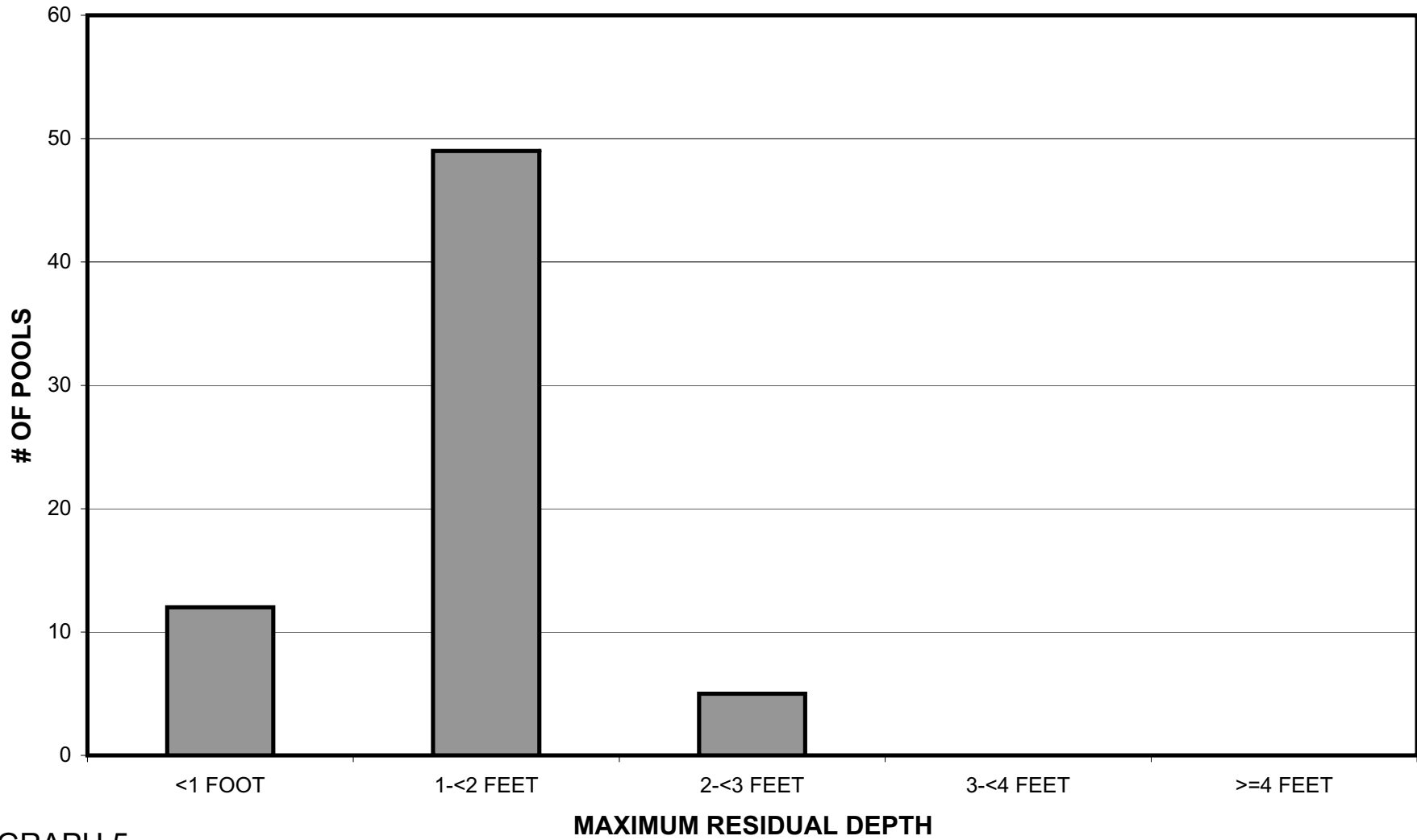
GRAPH 3

SLAUGHTERHOUSE GULCH 2008 POOL TYPES BY PERCENT OCCURRENCE



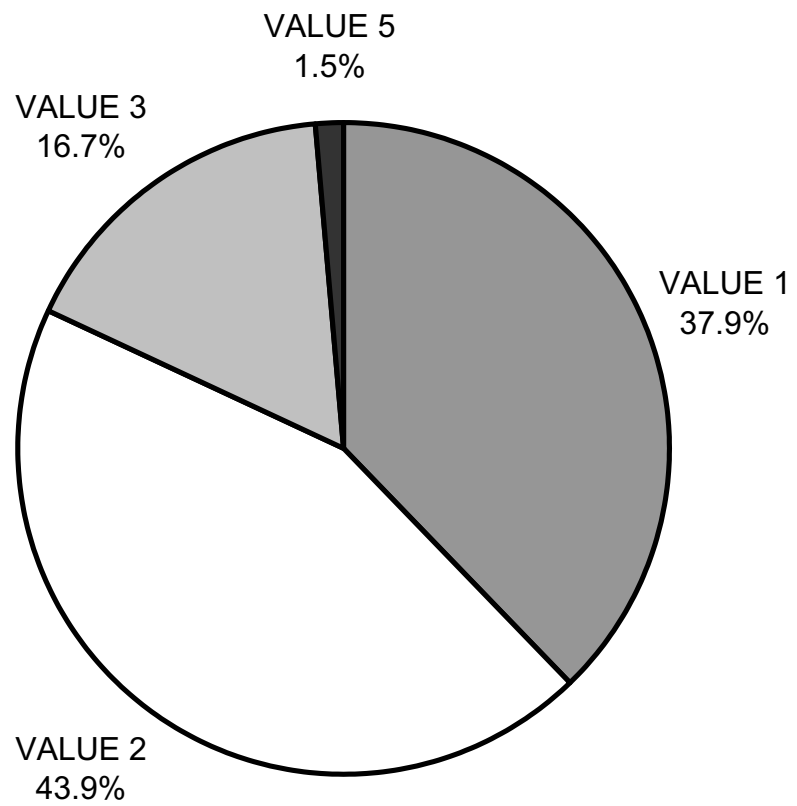
GRAPH 4

SLAUGHTERHOUSE GULCH 2008 MAXIMUM DEPTH IN POOLS



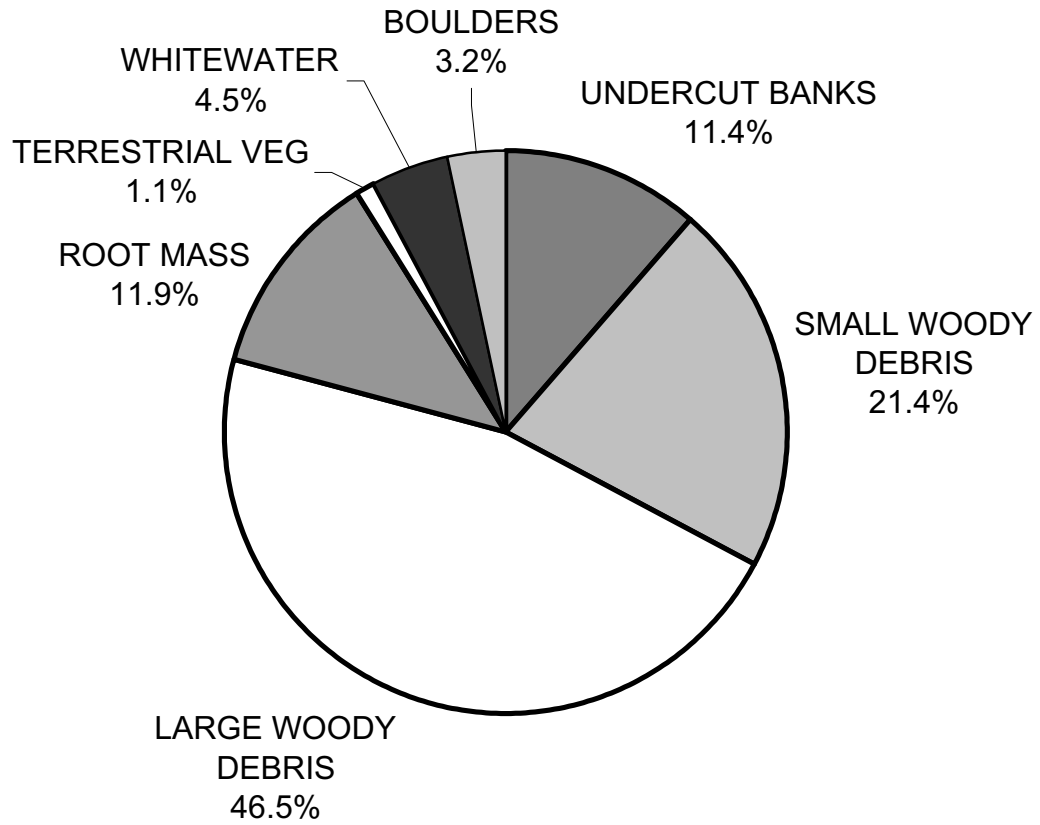
GRAPH 5

SLAUGHTERHOUSE GULCH 2008 PERCENT EMBEDDEDNESS



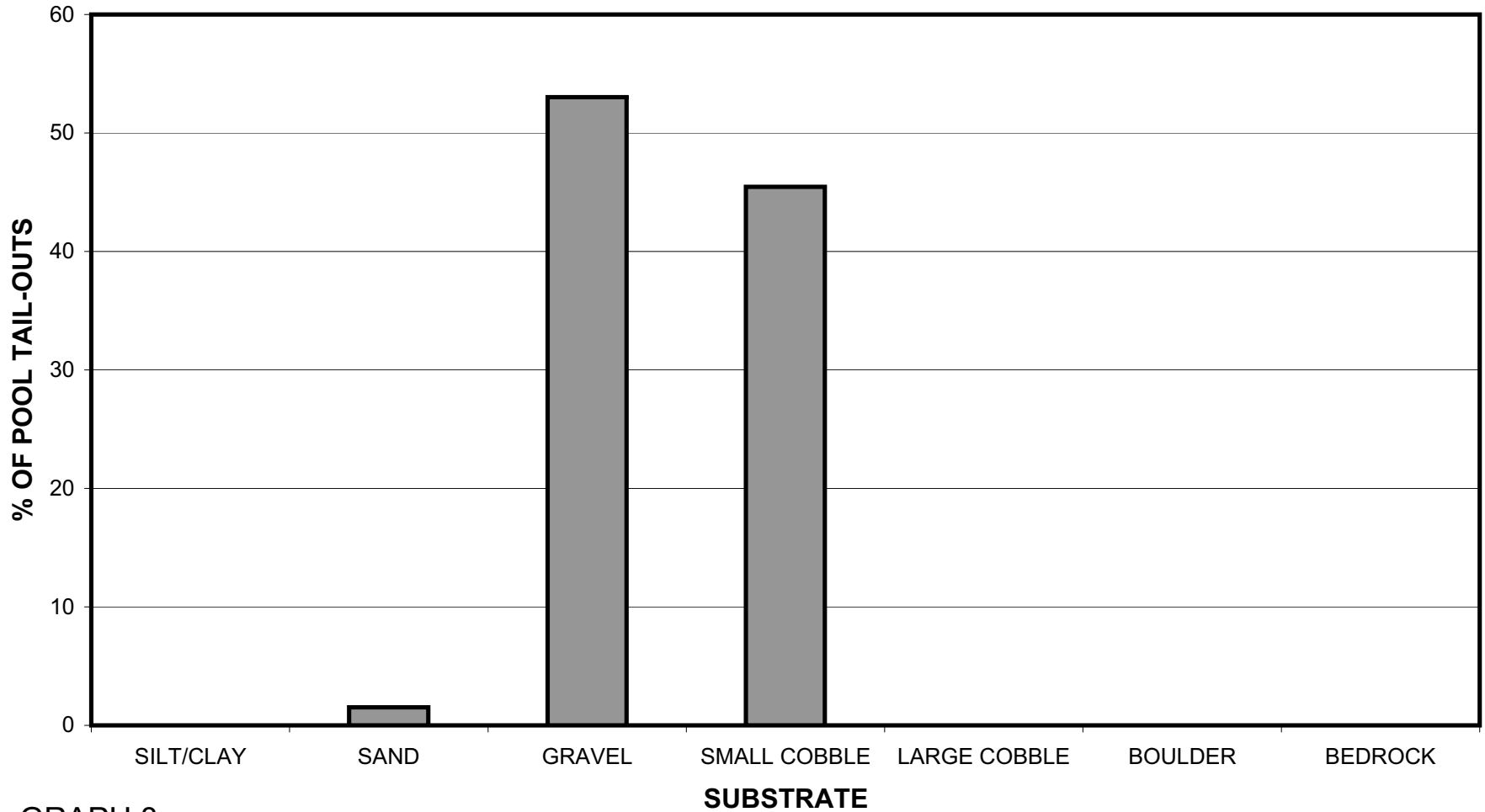
GRAPH 6

SLAUGHTERHOUSE GULCH 2008 MEAN PERCENT COVER TYPES IN POOLS



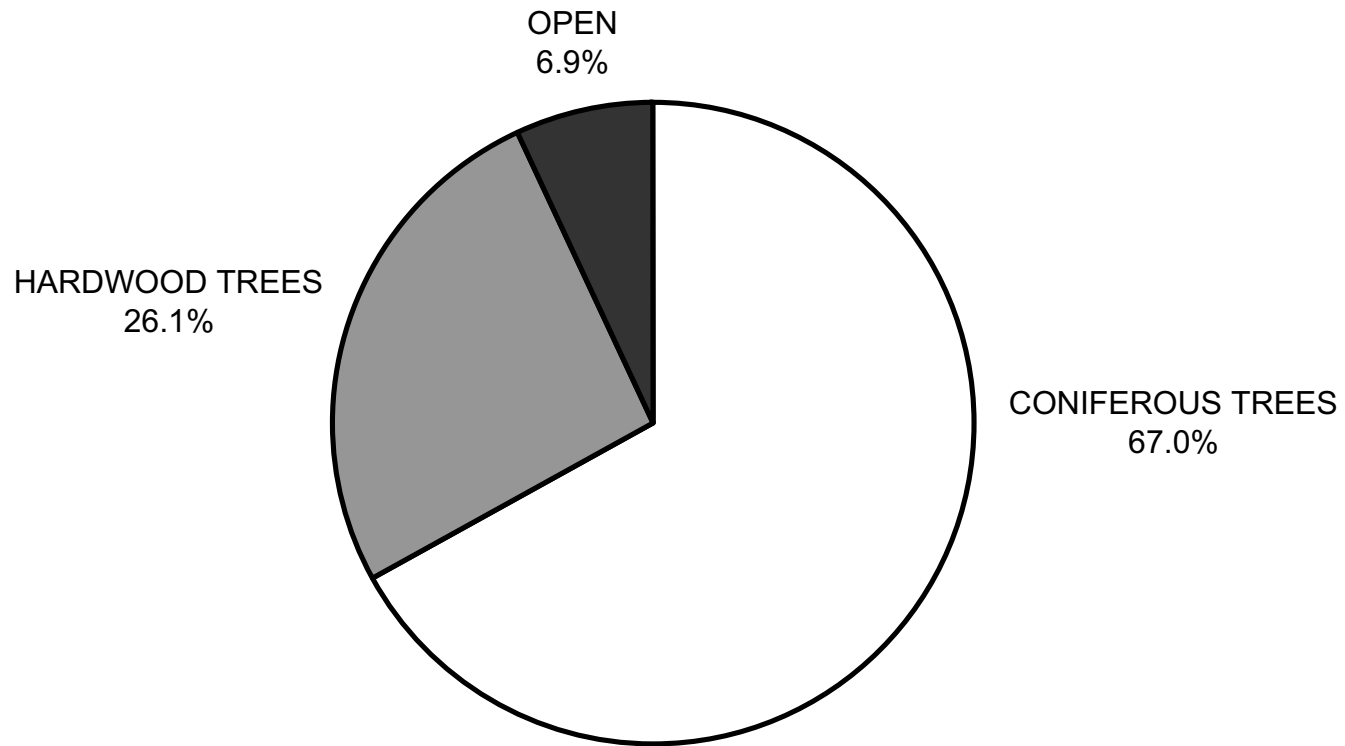
GRAPH 7

SLAUGHTERHOUSE GULCH 2008 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



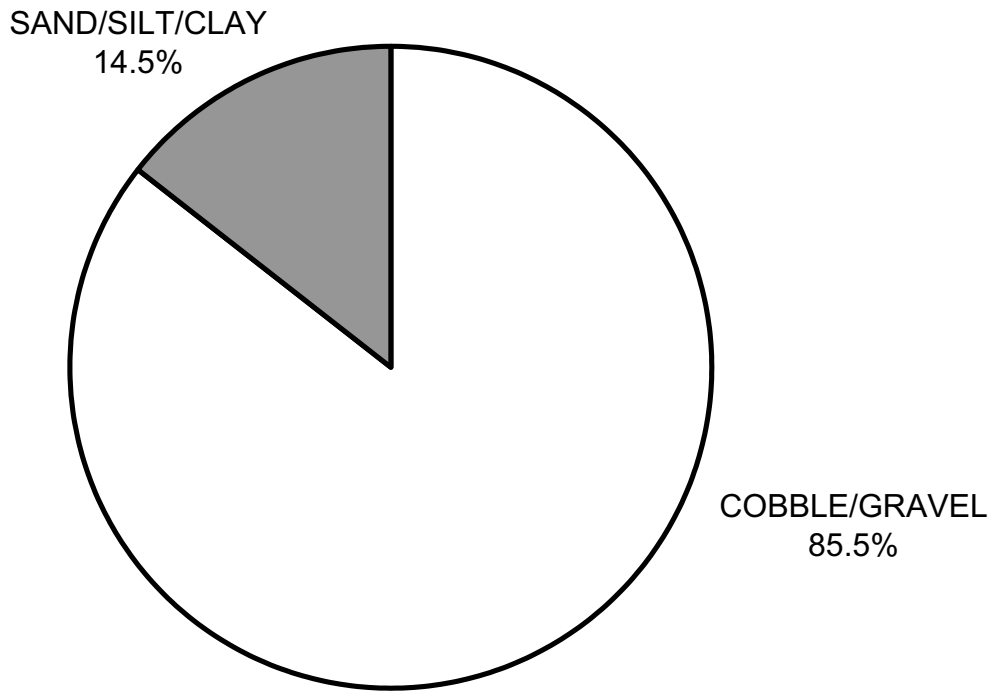
GRAPH 8

**SLAUGHTERHOUSE GULCH 2008
MEAN PERCENT CANOPY**



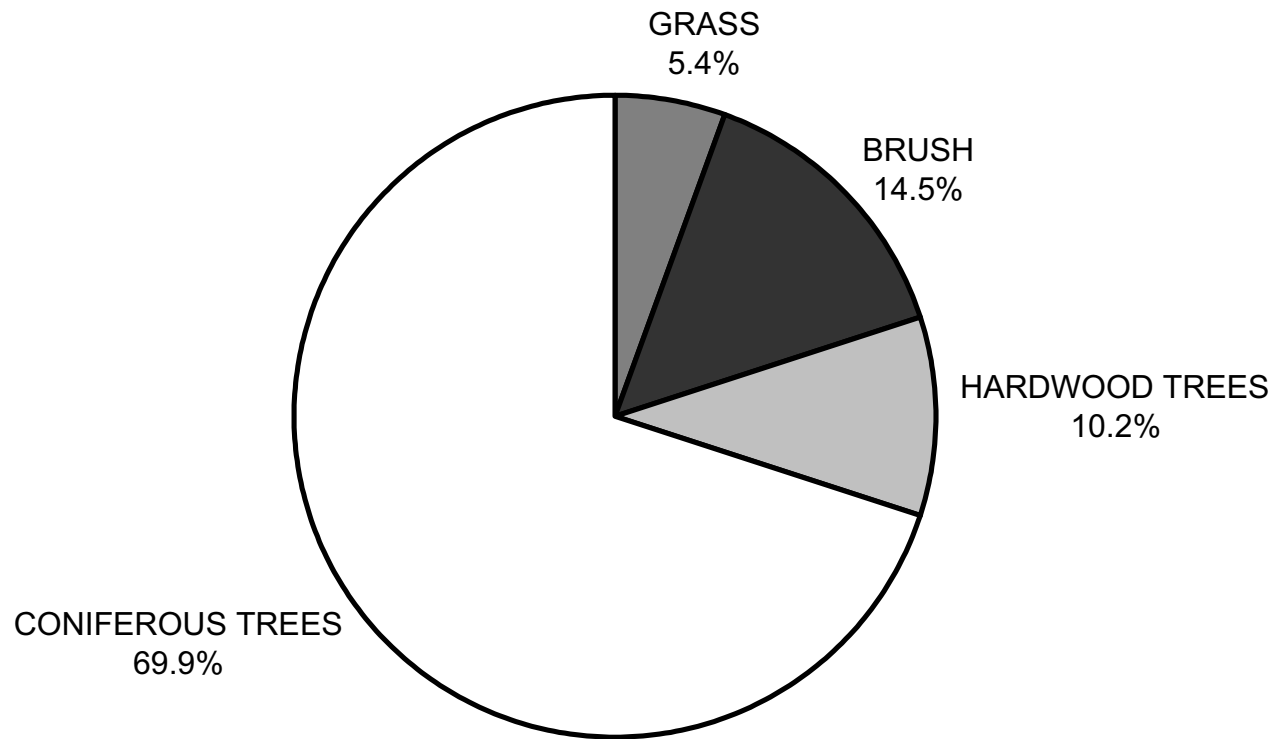
GRAPH 9

**SLAUGHTERHOUSE GULCH 2008
DOMINANT BANK COMPOSITION IN SURVEY REACH**



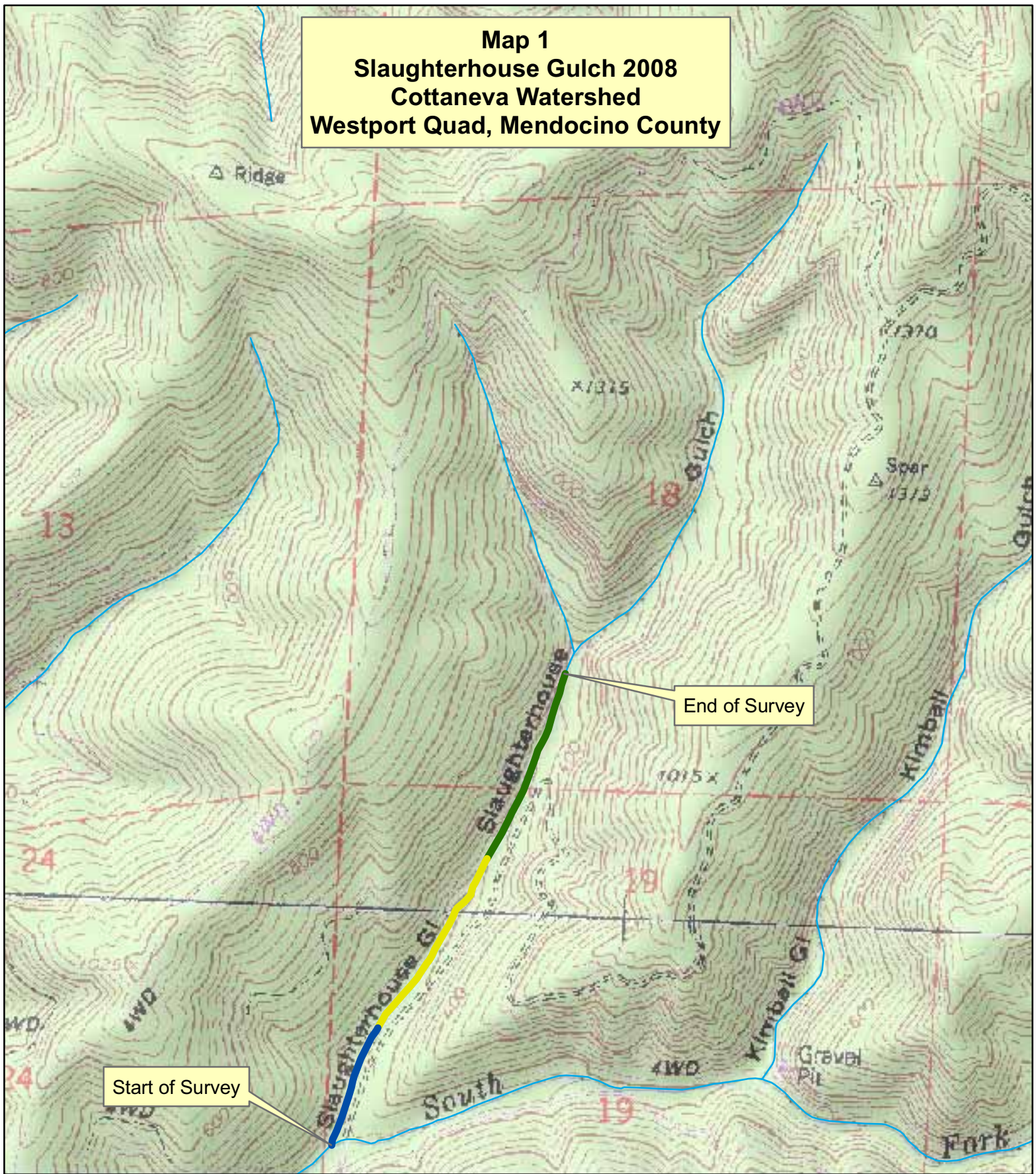
GRAPH 10

SLAUGHTERHOUSE GULCH 2008 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11




Map 1
Slaughterhouse Gulch 2008
Cottaneva Watershed
Westport Quad, Mendocino County



Start of Survey

End of Survey

Legend

-  Reach 1, E4 Channel Type
-  Reach 2, E3 Channel Type
-  Reach 3, A3 Channel Type

