**CALIFORNIA DEPARTMENT OF FISH AND GAME**
**STREAM INVENTORY REPORT**
Devil Creek
*Report Revised April 14, 2006*
*Report Completed 2000*
*Assessment Completed 1996*


INTRODUCTION

A stream inventory was conducted during the summer of 1996 on Devil Creek.  The inventory was conducted in two parts: habitat inventory and biological inventory.  The objective of the habitat inventory was to document the amount and condition of available habitat to fish, and other aquatic species with an emphasis on anadromous salmonids in Devil Creek.   The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution.

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

Devil Creek is a tributary to East Austin Creek which flows into Big Austin Creek, a tributary of the Russian River, located in Sonoma County, California (see Devil Creek map, page 2).  The legal description at the confluence with East Austin Creek is T9N, R11W, S28.   Its location is 38°35'40" N. latitude and 123°4'19" W. longitude. Seasonal vehicle access exists via East Austin Creek Road (private), via Mill Creek Road, via Westside Rd near Healdsburg.  Vehicle access to reaches above 40' waterfall is possible by Jeep Rd from E. Austin Creek Rd. at habitat unit #50.

Devil Creek and its tributaries drain a basin of approximately 7.4 square miles.  Devil Creek is a second order stream and has approximately 4.5 miles of blue line stream, according to the USGS Cazadero 7.5 minute quadrangle.  An unnamed tributary referred to as "Angels Creek" was also inventoried and is included in this report.  Elevations range from about 440 feet at the mouth of the creek to 1,520 feet in the headwaters.

Devil Creek flows in a mountainous, highly forested steep sided

canyon in the eastern slopes of the East Austin Creek drainage. The creek flows entirely through a V shaped canyon.  The lower section is bordered by heavy stands of hardwoods, and the middle and upper sections also have mixed conifers.  The upper 1.2 miles shows evidence of past logging.  The watershed is entirely privately owned.  The Cedars Fairylantern (*Calochortus raichei*), a sensitive species, was listed in DFG's Natural Diversity Database for Devil Creek Watershed.

METHODS

The habitat inventory conducted in Devil Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1994).  The Neap Crew 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 and was supervised by Bob Coey, Russian River Basin Planner (DFG).

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 Devil Creek to record measurements and observations.  There are nine components to the inventory form: flow, channel type, temperatures, habitat type, embeddedness, shelter rating, substrate composition, canopy, and bank composition.

1.  Flow:

Flow is measured in cubic feet per second (cfs) at 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 (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 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 (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".  Devil Creek habitat typing used standard basin
level measurement criteria.  These parameters require that the
minimum length of a described habitat unit must be equal to or
greater than the stream's mean wetted width. All measurements are
in feet to the nearest tenth.  Habitat characteristics are
measured using a clinometer, hip chain, and stadia rod.

5.  Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas
is measured by the percent of the cobble that is surrounded or
buried by fine sediment.  In Devil Creek, embeddedness was
visually 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, bedrock, 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
Devil Creek, a standard qualitative shelter value of 0 (none), 1
(low), 2 (medium), or 3 (high) was assigned according to the
complexity of the cover.  Thus, shelter ratings can range from 0-

300 and are expressed as mean values by habitat types within a stream.

7.  Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements.  In all fully-described habitat units, dominant and sub-dominant substrate elements were visually 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 Devil Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample.  In addition, the area of canopy was estimated visually into percentages of evergreen 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 Devil Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form.  Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.


BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream.  Biological inventory is conducted using one or more of three basic methods: 1) stream bank observation, 2) underwater observation, 3) electrofishing.  These sampling techniques are discussed in the California Salmonid Stream Habitat Restoration Manual.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat, a dBASE IV 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 tables and appendices:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Shelter by habitat types
- Dominant substrates by habitat types
- Vegetative cover and dominant bank composition
- Fish habitat elements by stream reach

Graphics are produced from the tables using Lotus 1,2,3. Graphics developed for Devil Creek include:

- Level II Habitat Types by % Occurrence and % Total Length
- Level IV Habitat Types by % Occurrence
- Pool Habitat Types by % Occurrence
- Maximum Depth in Pools
- Pool Shelter Types by % Area
- Substrate Composition in Low Gradient Riffles
- Percent Cobble Embeddedness by Reach
- Mean Percent Canopy
- Mean Percent Canopy by Reach
- Percent Bank Composition and Bank Vegetation

HISTORICAL STREAM SURVEYS:

The Department of Fish and Game conducted surveys of Devil Creek in April 1962, and October 1977. The 1962 survey started at the mouth and continued to 0.3 miles upstream. The gradient was described as "extreme" in the headwater section and moderate in all other areas with a 6% gradient. Flows were described as continuous (1.5 cfs) throughout. Air temperature was noted at 75°F and water temperature at 59°F. The depth averaged 5' and ranged from 2-8'. The wetted width averaged 5' and ranged from 4-10'.

Pool development was generally good throughout the entire section and shelter consisted of roots, boulders, and overhanging vegetation. The substrate consisted primarily of gravel, as well as lesser amounts of cobble and boulders. Large deposits of 2"

gravel with little siltation was noted.  Spawning areas were considered to be good to excellent throughout the entire stream except for the extreme headwater section.  This creek was considered to be the best spawning tributary in the upper East Austin Creek drainage above Gilliam Creek.

Three log accumulations were located in the lower 0.5 miles of the stream.  Scattered log debris accumulations were noted throughout the upper section, but were not creating barriers.  No pollution or diversions were observed, and spring development was described as "good" throughout the entire section.

The 1977 survey started at the mouth and continued to 2.8 miles upstream.  The gradient was described as moderate throughout, a 4% gradient.  The air temperature was noted at 62°F and the water temperature at 59°F.  The average wetted width was 3' and ranged 2-4'.  The depth averaged 2-4" and ranged 3-6" in the riffles.

The majority of pools were formed by boulders, undercut banks and bedrock.  Shelter consisted of boulders, undercut banks, logs and streamside vegetation.  Canopy provided 60-85% overhead cover.  The substrate in the lower half consisted of 5% bedrock, 10% boulder, 25% large cobble, 30% small cobble, 20% gravel, 10% sand and silt. The upper half consisted of 10% bedrock, 15% boulder, 40% large rubble, 10% small rubble, 5% gravel, 25% dirt, silt and sand. Approximately 55% of the creek from the mouth to 0.7 miles upstream was considered to have good to excellent spawning gravel.  Above this area, spawning habitat was scarce and available gravel was silted and compacted.

No complete log jam barriers were observed, although 0.5 miles upstream from the mouth, a log jam created a partial barrier.  The log jam was located in a narrow gorge, 8' in height with bedload backed up 4' in height upstream from the logs.  The upper fish limit was formed by a steep gradient and unsuitable streambed.  No pollution or diversions were observed, and springs were well developed throughout the area surveyed.

HABITAT INVENTORY RESULTS

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

The habitat inventory of September 10 - October 1, 1996 was conducted by Mark Bolin and Mark Kipp (NEAP) and data analyzed by Ken Bunzel (DFG).  The survey began at the confluence with East Austin Creek and extended up Devil Creek to the end of the survey at a 40 foot waterfall.  The total length of the stream surveyed

was 15,371 feet, with an additional 39 feet of side channel.

This section of Devil Creek has three channel types:  from the mouth to 12,053 feet an F3; next 1,223 feet an A1 and the upper 2,095 feet an F2.

F3 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly cobble substrate.  F2 channels are similar except with a boulder substrate.

A1 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly bedrock substrate.

Water temperatures ranged from 56-71°F.  Air temperatures ranged from 57-81°F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types.  Based on frequency of **occurrence** there were 42% pool units, 39% flatwater units, and 19% riffle units.  Based on total **length** there were 58% flatwater units, 23% riffle units, and 20% pool units (Graph 1).

One hundred, seventy habitat units were measured and 23% were completely sampled.  Thirteen Level IV habitat types were identified.  The data is summarized in Table 2.  The most frequent habitat types by percent **occurrence** were step runs at 21%, bedrock scour pools 20%, runs 15% and low gradient riffles 13% (Graph 2).  By percent total **length**, step runs made up 38%, runs 18%, low gradient riffles 12%, and bedrock scour pools 9%.

Seventy-two pools were identified (Table 3).  Scour pools were most often encountered at 92%, and comprised 88% of the total length of pools (Graph 3).

Table 4 is a summary of maximum pool depths by pool habitat types.  Pool quality for salmonids increases with depth.  Fifty-two of the 72 pools (72%) had a depth of two feet or greater (Graph 4).  These deeper pools comprised 15% of the total length of stream habitat.

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.  Flatwater types had the highest shelter rating at 145.  Pools had the lowest rating with 107 and riffle rated 142 (Table 1).  Of the pool types, the main channel pools had the highest mean shelter rating at 161, scour pools rated 102 (Table

3).  No backwater pools were identified.

Table 5 summarizes fish shelter by habitat type.  By percent area, the dominant pool shelter types were boulders at 42% and undercut banks at 13%.  Graph 5 describes the pool shelter in Devil Creek.

Table 6 summarizes the dominant substrate by habitat type.  Gravel or small cobble were the dominant substrates observed in all of the three low gradient riffles measured (Graph 6).  The depth of cobble embeddedness was estimated at pool tail-outs.  Of the 72 pool tail-outs measured, all had a value of 2.

The mean percent canopy density for the surveyed section was 73%. Canopy density increased in an upstream direction. The mean percentages of deciduous and evergreen trees were 51% and 49%, respectively.  Graph 8 describes the canopy for the entire survey and graph 9 describes the canopy by reach.

For the entire stream reach surveyed, the mean percent right bank vegetated was 68% and the mean percent left bank vegetated was 77%.  For the habitat units measured, the dominant vegetation types for the stream banks were: 55% evergreen trees, 41% deciduous trees, 2% brush, and 1% grass.  The dominant substrate for the stream banks were:  40% bedrock, 23% cobble/gravel, 18% boulder and 18% silt/clay/sand (Graph 10).

*HABITAT INVENTORY RESULTS FOR UNNAMED TRIBUTARY ("ANGEL'S CREEK")*

*The habitat inventory of October 10, 1996 was conducted by Mark Bolin and Mark Kipp (NEAP) and data analyzed by Ken Bunzel (DFG). This unnamed tributary flows into Devil Creek approximately 1.1 miles upstream from its mouth.  The survey began at the confluence with Devil Creek and continued for 330 feet to a point where a massive landslide had buried the creek.*

*The surveyed section of this tributary had an A2 channel type. These channels are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly boulder substrate.  The water temperature was 61°F and the air temperature was 62°F.*

*Three habitat units were measured: two cascades and one bedrock scour pool.  The pool had a maximum depth of 2 feet and a shelter rating of 105, with shelter consisting primarily of boulders.*

*The mean percent canopy density for the surveyed section was 73%. The mean percentages of deciduous and evergreen trees were 37% and*

*63%, respectively.   The dominant vegetation for the stream banks
was evergreen trees.  The dominant substrates for the stream banks
were:  50% boulder, 25% bedrock, and 25% silt/clay/sand.*

## BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

In the April 1962 survey, an estimated many 0+, approximately 200
1+, and ten 2+ steelhead were observed along with one sculpin.  In
addition, "frogs, water snakes and salamanders" were noted.

In the October 1977 survey, 4 1+ steelhead were observed 0.7 miles
upstream from the mouth.  From the mouth to 0.5 miles upstream,
California Roach averaging 15/100' and Sacramento Suckers averaging
5/100' and ranging 2-5" in length were observed.  In addition,
"frogs and newts" were observed.

On October 8, 1996 a biological inventory was conducted in one site
of Devil Creek to document fish species composition and
distribution.  The site was single pass electrofished using one
Smith Root Model 12 electrofisher.  Fish were counted by species,
and returned to the stream.  The air temperature was 82°F and the
water temperature was 65°F.  The observers were Bolin, Kipp (NEAP)
Sanchez and Campo (Americorps).

The inventory of Reach 1 was conducted in habitat units 6-17 and
covered a total length of 1,026 feet.  In riffle and pool habitat
types 99 0+, nine 1+ and one 2+ steelhead (10/100') were observed
along with 8 Sacramento Pikeminnow, 74 roach, 18 sculpin (*Cottus
Sp*.), 19 Yellow-legged Frogs, and 6 Rough-skinned Newt.  It was
noted that salmonids were visually observed in the other two
reaches as well, and in the unnamed tributary ("Angels Creek").

A summary of historical and recent data collected appears in the table below.

| Species Observed in Historical and Recent Surveys | | | |
|---|---|---|---|
| **YEARS** | **SPECIES** | **SOURCE** | **Native/Introduced** |
| 1962, 1977, 1996 | Steelhead | DFG | N |
| 1977 | California Roach | DFG | N |
| 1962, 1996 | sculpin | DFG | N |
| 1996 | Sacramento Pikeminnow | DFG | N |
| 1977 | Sacramento Sucker | DFG | N |
| 1962, 1977, 1996 | Rough-skinned Newt | DFG | N |
| 1962, 1977, 1996 | Yellow-legged Frog | DFG | N |

No introduced fish species were found in any of the surveys and historical records indicate no fish hatchery stocking, transfers or rescues have occurred in the watershed.


DISCUSSION

Devil Creek has three channel types:  F3, A1 and F2.  There are 12,053 feet of F3 channel type in Reach 1.  According to the DFG Salmonid Stream Habitat Restoration Manual, F3 channel types are good for bank-placed boulders as well as single and opposing wing-deflectors.  They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover.

There are 1,223 feet of A1 channel type in Reach 2.  The high energy, steep gradient A1 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

There are 2,095 feet of F2 channel type in Reach 3.  These channel types are fair for low-stage weirs, single and opposing wing-

deflectors and log cover.  Many site specific projects can be designed in the F channel types, especially to increase pool frequency, volume and shelter.  Any work considered would require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days September 10 – October 1, 1996 ranged from 56-71°F.  These temperatures, if sustained, are above the threshold stress level (65°F) for salmonids.  To make any further conclusions, temperatures need to be monitored for a longer period of time through the critical summer months, and more extensive biological sampling conducted.

Pools comprised 20% of the total **length** of this survey.  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.  In Devil Creek, the pools are relatively deep with 72% having a maximum depth of at least 2 feet.  However these pools comprised only 15% of the total length of stream habitat.  In coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length.  Therefore, structures are needed to increase pool habitat in locations where their installation will not jeopardize any unstable stream banks, or subject the structures to high stream energy.

The mean shelter rating for pools was 107.  Shelter ratings in this stream were measured in regard to 0+ fish.  Shelter for 1+ fish is scarce.  The pool shelter is being provided primarily by boulders and undercut banks.

All of the low gradient riffles measured had either gravel or small cobble as the dominant substrate.  This is generally considered good for spawning salmonids.

All of the pool tail-outs measured had embeddedness ratings of 2.  This is considered "fair".  Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead.

The mean percent canopy for the survey was only 73%.  This is a slightly low percentage of canopy, since 80 percent is generally considered desirable.  Elevated water temperatures could be reduced by increasing stream canopy.  Cooler water temperatures are desirable in Devil Creek.  The large trees required for adequate stream canopy would also eventually provide a long term source of

large woody debris needed for instream structure and bank stability.

*DISCUSSION FOR UNNAMED TRIBUTARY ("ANGEL'S CREEK")*

*This tributary has 330 feet of A2 channel type in the surveyed section.  A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.*

*Although the water temperature recorded (61°F) is good for salmonids, the canopy density is slightly lower than desirable. There were two landslides located near the end of the survey, with one burying the creek and creating an unstable hill slope.  These slides were relatively massive for the size of the stream/canyon. Naturally unstable material and inaccessibility might rule out any restoration alternatives.*

*Salmonids were observed in the bedrock scour pool and shelter ratings were good throughout the survey.  However, this stream holds minimal salmonid habitat due to the boulder substrate, and little gravel available for spawning salmonids.  Probably should be considered just a feeder stream.*

*Biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were documented consistently during each past survey year while coho were not found during any of the surveys.  This is likely because physiological and environmental requirements for coho are more stringent than for steelhead, or coho were absent or present only in small numbers in some years.  Overall, large numbers of steelhead were observed during the 1962 survey, and few during the 1977 survey.  The 1996 fall survey documented many 0+ fish indicating successful spawning in Devil Creek, and holding-over conditions in general.  Habitat availability in "Angels Creek" were extremely limited for salmonids.*

*Shelter ratings are poor and relatively few pools of adequate depth exist for salmonid rearing habitat.  Stream shade canopy is low in Reaches 1-2 and water temperatures are high.  Spawning habitat is rated as fair and has declined since 1962.  In 1977, only the lower 0.7 miles near the mouth had good spawning habitat, while the few areas above this section with gravel had high levels of silt.  In addition, there is a lack of large woody debris shelter in Devil Creek.*

<u>GENERAL RECOMMENDATIONS</u>

Devil Creek should be managed as an anadromous, natural production stream.

The winter 1995/96/97 storms brought down many large trees and other woody debris into the stream, which increased the number and quality of pools since the drought years. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Signs of recent and historic tree and log removal were evident in the active channel during our survey. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged <u>not to remove woody debris</u> from the stream, except under extreme buildup and only under guidance by a fishery professional.

<u>SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS</u>

1)  There are two log debris accumulations present on Devil Creek that have the potential for impeding passage and causing bank erosion (Reach 1, habitat units 95 and 98). The modification of these debris accumulations may be but recommended but **it must be done carefully to preserve existing habitat provided by the woody debris.**

2)  Increase the canopy on Devil Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels (portions of Reaches 1-2 and "Angels Creek"). In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

3)  There are two sites in Devil Creek with bank erosion problems. These sites should be treated with bank stabilization structures to reduce the amount of fine sediment entering the stream. However these are massive landslides on very unstable hill slopes and inaccessible to heavy equipment.

4)  Monitor fish populations for steelhead index.

## PROBLEM SITES AND LANDMARKS - DEVIL SURVEY COMMENTS

The following landmarks and possible problem sites were noted.  All distances are approximate and taken from the beginning of the survey reach.
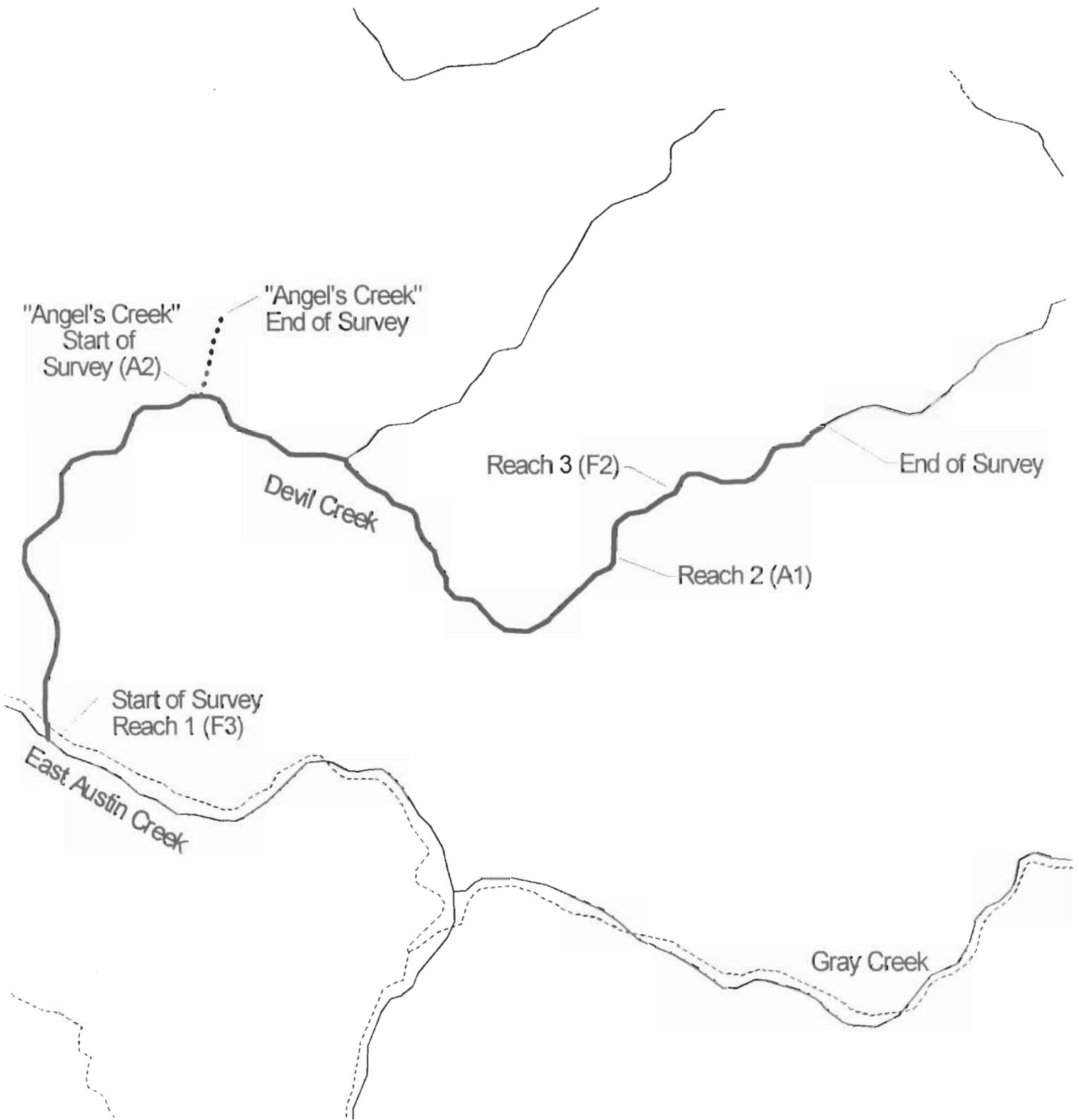
| HABITAT UNIT # | STREAM LEN (FT.) | COMMENTS |
|---|---|---|
| 2.00 | 135 | MUCH SILT FROM FORD |
| 3.00 | 172 | PIKEMINNOW |
| 4.00 | 237 | AUSTIN CREEK RD. FORD |
| 6.00 | 443 | SALMONIDS OLD ROAD FORD |
| 16.00 | 1198 | BLOWOUT RT BANK 70'W X 30'L X 3'D |
| 17.00 | 1271 | DEEP POOL STEEP RAVINE RT BANK SALMONIDS & PIKEMINNOW |
| 21.00 | 1412 | DRY TRIB LF BANK |
| 27.00 | 1862 | SLIDE INTO LF BANK |
| 28.00 | 2250 | SALMONIDS |
| 37.00 | 3123 | STEEP RAVINE LF BANK |
| 40.00 | 3586 | STEEP RAVINE RT BANK |
| 41.00 | 3617 | STEEP RAVINE RT BANK 100' STILL IN BEDROCK GORGE |
| 45.00 | 4212 | 4-5' CASCADE AT TOP OF UNIT |
| 52.00 | 4918 | DRY TRIB RT BANK |
| 55.00 | 6283 | SKID TRAIL RT BANK |
| 59.00 | 6702 | FEEDER STREAM CLASS III TOP OF UNIT |
| 60.00 | 6857 | CLASS III STREAM RT BNK 63°F AT CONFL |
| 61.00 | 6902 | SPRING RT BANK |
| 65.00 | 7428 | DISTINCTIVE RED ROCK BOULDERS, SALMONIDS |
| 66.00 | 7476 | SALMONIDS |
| 67.00 | 7525 | 2 POOLS W/ SM CASCADES; 2 BIG LOGS |
| 69.00 | 7596 | DRY RAVINE RT BANK TOP OF UNIT |
| 71.00 | 7799 | BLOW OUT # 72 |
| 72.00 | 7946 | DRY RAVINE LF BANK BOTTOM STEEP RAVINE W/ SPRING BEFORE BLOWOUT |
| 75.00 | 8079 | DEBRIS ACCUMULATION W/ HOLE SCOURED UNDER |
| 79.00 | 8446 | SPRING RT BANK |
| 83.00 | 9362 | DRY RAVINE LF BANK |
| 84.00 | 9391 | SPRING LF BANK |
| 85.00 | 9457 | NICE GRAVEL |
| 87.00 | 9579 | DRY TRIB RT BANK |
| 90.00 | 9887 | SALMONIDS |
| 91.00 | 9922 | CLASS III RT BANK 57°F |
| 94.00 | 10159 | SALMONIDS |

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 95.00        10299 OLD HUMBOLDT 8'D X 25'L X 65'W
 98.00        10468 9'D X 35'W X 16'L
100.00        10633 SALMONIDS
110.00        11981 FISH BECOMING SCARCE
116.00        14533 6 SHALLOW POOLS (LUMPED)
125.00        15458 SALMONIDS
130.00        15726 2 POOLS LG. ONE @ TOP
133.00        15966 NICE POOL W/ SALMONIDS
135.00        16611 GORGE COLLAPSED BOTH BANKS PLUGGED
                    INTERMITTENT POOLS W/ SALMONIDS
140.00        16909 DRY RAVINE
144.00        17191 3 POOLS
152.00        17624 DOZEN 2+ SALMONIDS DRY TRIB CLASS III
156.00        17725 NICE GRAVEL
158.00        17893 3 POOLS
164.00        18378 NICE GRAVEL
165.00        18416 2 SM WATERFALLS
169.00        18755 END OF SURVEY: STEEP GORGE W/ 40'
                    WATERFALL AT TOP. HIKED 500' PAST
                    WATERFALL.  CREEK GOES SUBTERRANEAN IN
                    PLACES.  SEVERAL GOOD POOLS, NO FISH.
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*PROBLEM SITES AND LANDMARKS - UNNAMED TRIBUTARY*
    *("ANGEL'S CREEK")SURVEY COMMENTS*

| *HABITAT UNIT #* | *STREAM LEN (FT.)* | *COMMENTS* |
|---|---|---|
| *1.00* | *175* | *CONFLUENCE WITH DEVIL'S CREEK AT HAB UNIT 60* |
| *2.00* | *182* | *SALMONIDS* |
| *3.00* | *330* | *RT BANK DAMP FEEDER TRIB; LF BANK BLOWOUT; BIG BLOWOUT RT BANK, BURIED CREEK; UNSTABLE HILL SLOPE; END OF SURVEY* |

# Devil Creek

"Angel's Creek"
Start of
Survey (A2)

"Angel's Creek"
End of Survey

Reach 3 (F2)

End of Survey

Devil Creek

Reach 2 (A1)

Start of Survey
Reach 1 (F3)

East Austin Creek

Gray Creek

"Angel's Creek" Survey
Devil Creek Survey
Roads
Streams
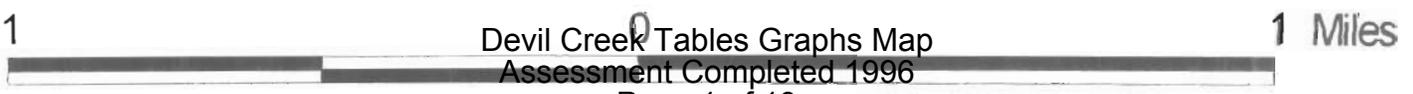
N

1                                                    0                                                    1  Miles

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES     Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO     LEGAL DESCRIPTION: 9NR11WS28     LATITUDE: 38°35'40"     LONGITUDE: 123°4'19"

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 5 | RIFFLE | 19 | 109 | 3474 | 23 | 6.7 | 0.4 | 356 | 11381 | 155 | 4950 | 0 | 142 |
| 66 | 13 | FLATWATER | 39 | 135 | 8927 | 58 | 10.1 | 0.5 | 831 | 54825 | 365 | 24096 | 0 | 145 |
| 72 | 21 | POOL | 42 | 42 | 3009 | 20 | 9.9 | 1.2 | 409 | 29474 | 510 | 36746 | 417 | 107 |

| TOTAL UNITS | | TOTAL LENGTH (ft.) | | TOTAL AREA (sq. ft.) | | TOTAL VOL. (cu. ft.) |
|---|---|---|---|---|---|---|
| 170 | | 15410 | | 95679 | | 65792 |

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO   LEGAL DESCRIPTION: 9NR11WS28   LATITUDE: 38°35'40"   LONGITUDE: 123°4'19"

| 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 % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 2 | LGR | 13 | 87 | 1916 | 12 | 7 | 0.2 | 0.7 | 367 | 8082 | 99 | 2178 | 0 | 40 | 46 |
| 5 | 1 | HGR | 3 | 205 | 1025 | 7 | 12 | 0.5 | 1.2 | 659 | 3297 | 330 | 1649 | 0 | 240 | 55 |
| 4 | 2 | CAS | 2 | 127 | 507 | 3 | 7 | 0.7 | 1.3 | 339 | 1357 | 226 | 903 | 0 | 195 | 92 |
| 1 | 0 | BRS | 1 | 26 | 26 | 0 | 2 | 0.1 | 0.3 | 49 | 49 | 5 | 5 | 0 | 0 | 65 |
| 4 | 1 | GLD | 2 | 78 | 313 | 2 | 14 | 0.4 | 1.2 | 1336 | 5342 | 534 | 2137 | 0 | 10 | 75 |
| 26 | 4 | RUN | 15 | 107 | 2783 | 18 | 14 | 0.5 | 1.1 | 608 | 15818 | 167 | 4343 | 0 | 111 | 67 |
| 36 | 8 | SRN | 21 | 162 | 5831 | 38 | 7 | 0.5 | 1.6 | 906 | 32634 | 443 | 15948 | 0 | 178 | 81 |
| 2 | 2 | CCP | 1 | 27 | 54 | 0 | 9 | 1.0 | 2.4 | 227 | 453 | 219 | 438 | 143 | 85 | 88 |
| 4 | 4 | STP | 2 | 75 | 301 | 2 | 12 | 1.7 | 4.2 | 696 | 2783 | 1478 | 5911 | 1342 | 199 | 74 |
| 2 | 1 | CRP | 1 | 37 | 74 | 0 | 7 | 0.9 | 2.1 | 254 | 509 | 220 | 441 | 169 | 113 | 100 |
| 12 | 4 | LSR | 7 | 40 | 483 | 3 | 8 | 1.2 | 3.5 | 345 | 4144 | 409 | 4906 | 345 | 156 | 84 |
| 34 | 6 | LSBk | 20 | 42 | 1444 | 9 | 11 | 1.2 | 5.7 | 450 | 15314 | 539 | 18318 | 423 | 78 | 76 |
| 18 | 4 | LSBo | 11 | 36 | 653 | 4 | 9 | 1.1 | 3.7 | 355 | 6394 | 379 | 6818 | 305 | 108 | 75 |

| TOTAL UNITS | TOTAL UNITS | LENGTH (ft.) | AREA (sq.ft) | TOTAL VOL. (cu.ft) |
|---|---|---|---|---|
| 170 | 39 | 15410 | 96177 | 63992 |

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO    LEGAL DESCRIPTION: 9NR11WS28    LATITUDE: 38°35'40"    LONGITUDE: 123°4'19"

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 6 | MAIN | 8 | 59 | 355 | 12 | 11.0 | 1.5 | 539 | 3236 | 1058 | 6349 | 943 | 161 |
| 66 | 15 | SCOUR | 92 | 40 | 2654 | 88 | 9.7 | 1.2 | 397 | 26201 | 458 | 30240 | 366 | 102 |

| TOTAL UNITS | TOTAL UNITS FULLY MEASURED | | | | TOTAL LENGTH (ft.) | | | | | TOTAL AREA (sq.ft.) | | TOTAL VOL. (cu.ft.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 21 | | | | 3009 | | | | | 29436 | | 36589 | | |

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES     Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO    LEGAL DESCRIPTION: 9NR11WS28    LATITUDE: 38°35'40"    LONGITUDE: 123°4'19"

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | CCP | 3 | 0 | 0 | 1 | 50 | 1 | 50 | 0 | 0 | 0 | 0 |
| 4 | STP | 6 | 0 | 0 | 0 | 0 | 2 | 50 | 1 | 25 | 1 | 25 |
| 2 | CRP | 3 | 0 | 0 | 1 | 50 | 1 | 50 | 0 | 0 | 0 | 0 |
| 12 | LSR | 17 | 0 | 0 | 2 | 17 | 8 | 67 | 2 | 17 | 0 | 0 |
| 34 | LSBk | 47 | 0 | 0 | 7 | 21 | 21 | 62 | 5 | 15 | 1 | 3 |
| 18 | LSBo | 25 | 0 | 0 | 9 | 50 | 4 | 22 | 5 | 28 | 0 | 0 |

TOTAL UNITS
72

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO   LEGAL DESCRIPTION: 9NR11WS28   LATITUDE: 38°35'40"   LONGITUDE: 123°4'19"

| UNITS MEASURED | UNITS SHELTER MEASURED | HABITAT TYPE | SQ. FT. UNDERCUT BANKS | SQ. FT. SWD | SQ. FT. LWD | SQ. FT. ROOT MASS VEGETATION | SQ. FT. TERR. VEGETATION | SQ. FT. AQUATIC VEGETATION | SQ. FT. WHITE WATER | SQ. FT. BOULDERS | SQ. FT. BEDROCK LEDGES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 2 | LGR | 0 | 30 | 0 | 0 | 10 | 0 | 0 | 261 | 0 |
| 5 | 1 | NGR | 0 | 0 | 0 | 0 | 0 | 0 | 377 | 1130 | 0 |
| 4 | 2 | CAS | 0 | 37 | 0 | 0 | 37 | 110 | 122 | 668 | 0 |
| 1 | 0 | BRS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | GLD | 89 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 26 | 4 | RUN | 76 | 38 | 38 | 6 | 6 | 48 | 25 | 828 | 69 |
| 36 | 8 | SRN | 489 | 355 | 262 | 160 | 1059 | 104 | 730 | 3886 | 0 |
| 2 | 2 | CCP | 0 | 27 | 0 | 4 | 4 | 4 | 0 | 108 | 0 |
| 4 | 4 | STP | 218 | 140 | 24 | 49 | 187 | 834 | 189 | 514 | 429 |
| 2 | 2 | CRP | 65 | 13 | 6 | 16 | 12 | 0 | 0 | 79 | 0 |
| 12 | 12 | LSR | 521 | 280 | 399 | 314 | 79 | 0 | 0 | 472 | 32 |
| 34 | 34 | LSBk | 332 | 290 | 32 | 182 | 466 | 41 | 65 | 2159 | 351 |
| 18 | 18 | LSBo | 286 | 54 | 28 | 46 | 125 | 0 | 44 | 1286 | 195 |
| TOTAL 170 | 90 | | 2076 | 1264 | 789 | 777 | 2044 | 1141 | 1552 | 11391 | 1076 |
| | | | 9% | 6% | 4% | 4% | 9% | 5% | 7% | 52% | 5% |
| TOTAL FOR POOLS 72 | 72 | | 1422 | 804 | 489 | 611 | 873 | 879 | 298 | 4618 | 1007 |
| | | | 13% | 7% | 4% | 6% | 8% | 8% | 3% | 42% | 9% |

Devil Creek

Drainage: East Austin Creek, Big Austin Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 09/10/96 to 10/01/96

Confluence Location: QUAD: CAZADERO  LEGAL DESCRIPTION: 9NR11WS28  LATITUDE: 38°35'40"  LONGITUDE: 123°4'19"

| TOTAL HABITAT UNITS | UNITS SUBSTRATE 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 |
|---|---|---|---|---|---|---|---|---|---|
| 22 | 3 | LGR | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| | 1 | HGR | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| | 2 | CAS | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| | 1 | BRS | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| | 1 | GLD | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| | 4 | RUN | 0 | 25 | 25 | 25 | 25 | 50 | 0 |
| | 8 | SRN | 0 | 0 | 0 | 25 | 50 | 25 | 0 |
| | 2 | CCP | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| | 4 | STP | 0 | 0 | 50 | 0 | 0 | 50 | 0 |
| | 1 | CRP | 0 | 0 | 75 | 0 | 100 | 0 | 0 |
| | 4 | LSR | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| | 6 | LSBk | 0 | 0 | 0 | 0 | 17 | 50 | 33 |
| | 4 | LSBo | 0 | 25 | 25 | 0 | 25 | 25 | 0 |

Devil Creek

APPENDIX A. Summary of Mean Percent Vegetative Cover for Entire Stream

| Mean Percent Canopy | Mean Percent Evergreen | Mean Percent Decidous | Mean Right bank % Cover | Mean Left Bank % Cover |
|---|---|---|---|---|
| 72.80 | 48.91 | 50.54 | 68.34 | 76.95 |

APPENDIX B.

Mean Percentage of Dominant Substrate

| Dominant Class of Substrate | Number Units Right Bank | Number Units Left Bank | Total Mean Percent |
|---|---|---|---|
| Bedrock | 18 | 15 | 40.24 |
| Boulder | 7 | 8 | 18.29 |
| Cobble/Gravel | 10 | 9 | 23.17 |
| Silt/clay | 6 | 9 | 18.29 |

Mean Percentage of Dominant Vegetation

| Dominant Class of Vegetation | Number Units Right Bank | Number Units Left Bank | Total Mean Percent |
|---|---|---|---|
| Grass | 1 | 0 | 1.22 |
| Brush | 0 | 2 | 2.44 |
| Deciduous Trees | 19 | 15 | 41.46 |
| Evergreen Trees | 21 | 24 | 54.88 |
| No Vegetation | 0 | 0 | 0 |

# APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Devil Creek
SAMPLE DATES: 09/10/96 to 10/01/96
STREAM LENGTH: 15371 ft.
LOCATION OF STREAM MOUTH:
  USGS Quad Map: CAZADERO              Latitude: 38°35'40"
  Legal Description: 9NR11WS28    Longitude: 123°4'19"

## SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

**STREAM REACH 1**

| | |
|---|---|
| Channel Type: F3 | Canopy Density: 67% |
| Channel Length: 12053 ft. | Evergreen Component: 55% |
| Riffle/Flatwater Mean Width: 12 ft. | Deciduous Component: 44% |
| Total Pool Mean Depth: 1.1 ft. | Pools by Stream Length: 18% |
| Base Flow: 0.0 cfs | Pools >=3 ft. deep: 18% |
| Water: 57 - 71 °F Air: 57 - 81 °F | Mean Pool Shelter Rtn: 89 |
| Dom. Bank Veg.: Evergreen Trees | Dom. Shelter: Boulders |
| Vegetative Cover: 74% | Occurrence of LOD: 17% |
| Dom. Bank Substrate: Bedrock | Dry Channel: 0 ft. |
| Embeddness Value: 1. 0%   2. 100%   3. 0%   4. 0% | |

**STREAM REACH 2**

| | |
|---|---|
| Channel Type: A1 | Canopy Density: 70% |
| Channel Length: 1223 ft. | Evergreen Component: 13% |
| Riffle/Flatwater Mean Width: 4 ft. | Deciduous Component: 88% |
| Total Pool Mean Depth: 1.6 ft. | Pools by Stream Length: 17% |
| Base Flow: 0.0 cfs | Pools >=3 ft. deep: 33% |
| Water: 57 - 60 °F Air: 64 - 70 °F | Mean Pool Shelter Rtn: 152 |
| Dom. Bank Veg.: Evergreen Trees | Dom. Shelter: Boulders |
| Vegetative Cover: 55% | Occurrence of LOD: 0% |
| Dom. Bank Substrate: Bedrock | Dry Channel: 0 ft. |
| Embeddness Value: 1. 0%   2. 100%   3. 0%   4. 0% | |

**STREAM REACH 3**

| | |
|---|---|
| Channel Type: F2 | Canopy Density: 93% |
| Channel Length: 2095 ft. | Evergreen Component: 43% |
| Riffle/Flatwater Mean Width: 5 ft. | Deciduous Component: 58% |
| Total Pool Mean Depth: 1.4 ft. | Pools by Stream Length: 27% |
| Base Flow: 0.0 cfs | Pools >=3 ft. deep: 27% |
| Water: 56 - 67 °F Air: 64 - 70 °F | Mean Pool Shelter Rtn: 158 |
| Dom. Bank Veg.: Evergreen Trees | Dom. Shelter: Boulders |
| Vegetative Cover: 82% | Occurrence of LOD: 8% |
| Dom. Bank Substrate: Bedrock | Dry Channel: 0 ft. |
| Embeddness Value: 1. 0%   2. 100%   3. 0%   4. 0% | |

# Devil Creek

## Level II Habitat Types



Level II Habitat Types by % Occurrence

(19%) Riffle

(42%) Pool

(39%) Flatwater



Level II Habitat Types by % Length

(20%) Pool

(23%) Riffle

(58%) Flatwater
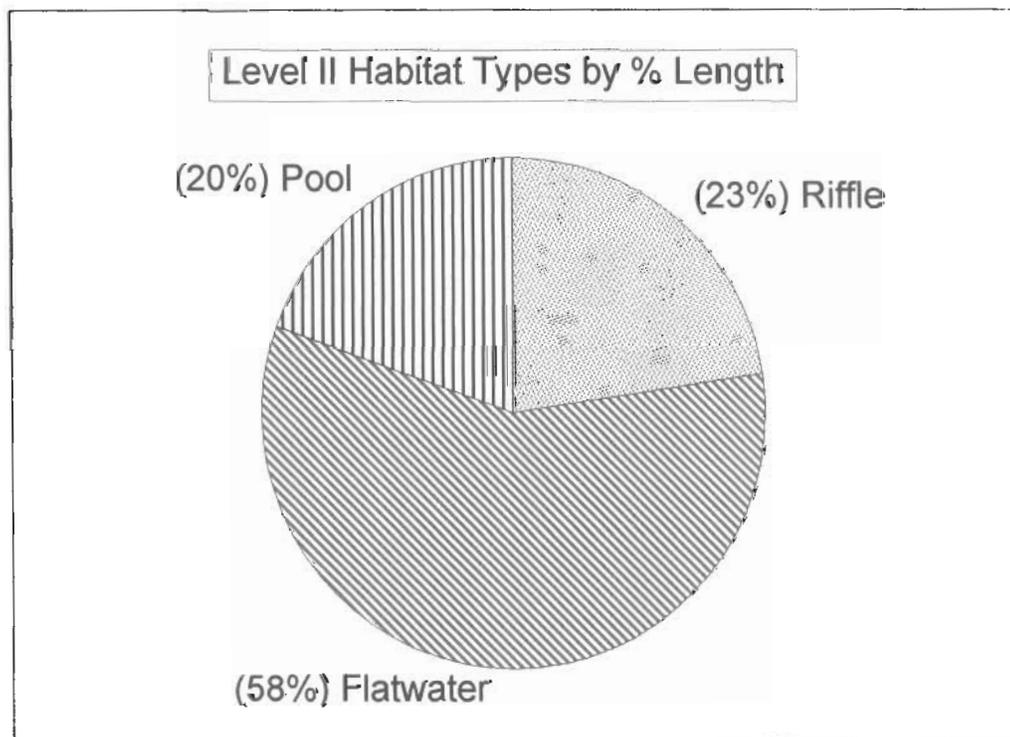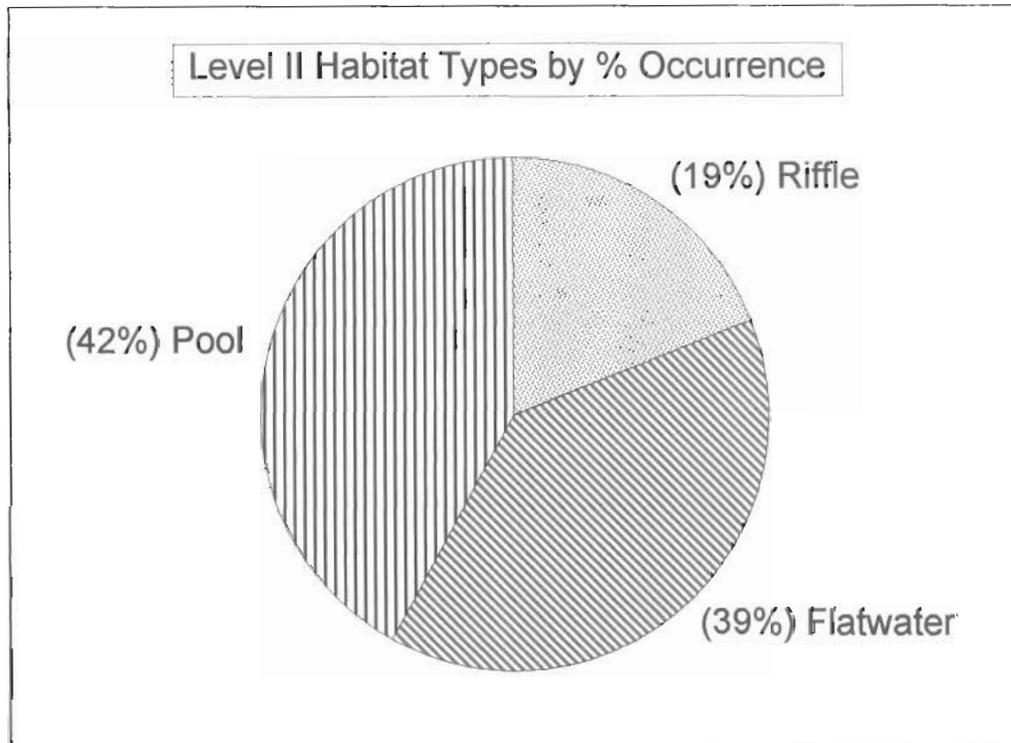
Graph 1

# Devil Creek

## Level IV Habitat Types by % Occurrence



Bar chart showing Percent Occurrence (y-axis, 0 to 25) by Habitat Type (x-axis). Habitat Types: 22, 5, 4, 1, 4, 26, 36, 2, 4, 2, 12, 34, 8.
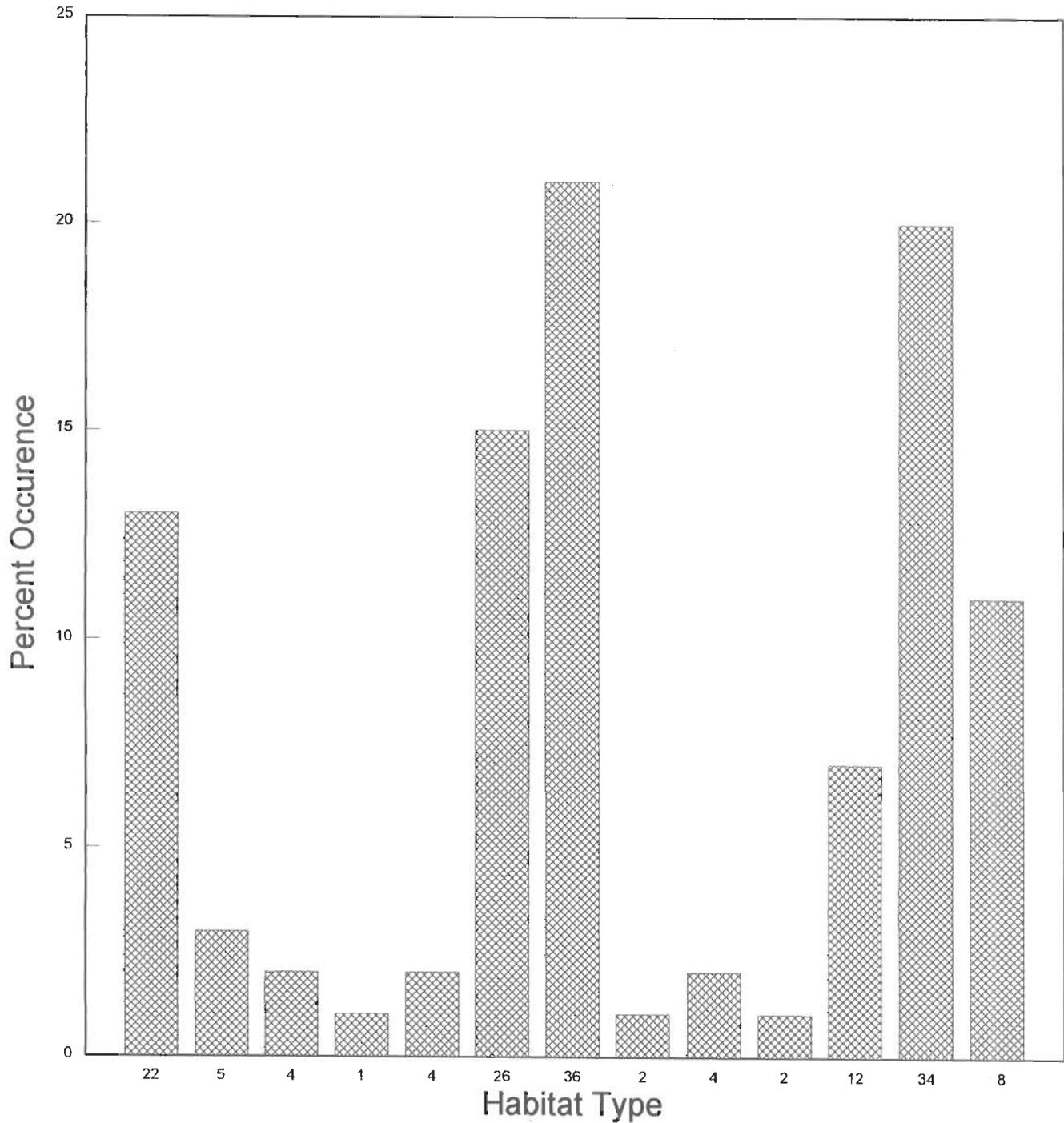
Graph 2

# Devil Creek
## Pool Habitat Types by % Occurrence

(8%) Main

(92%) Scour
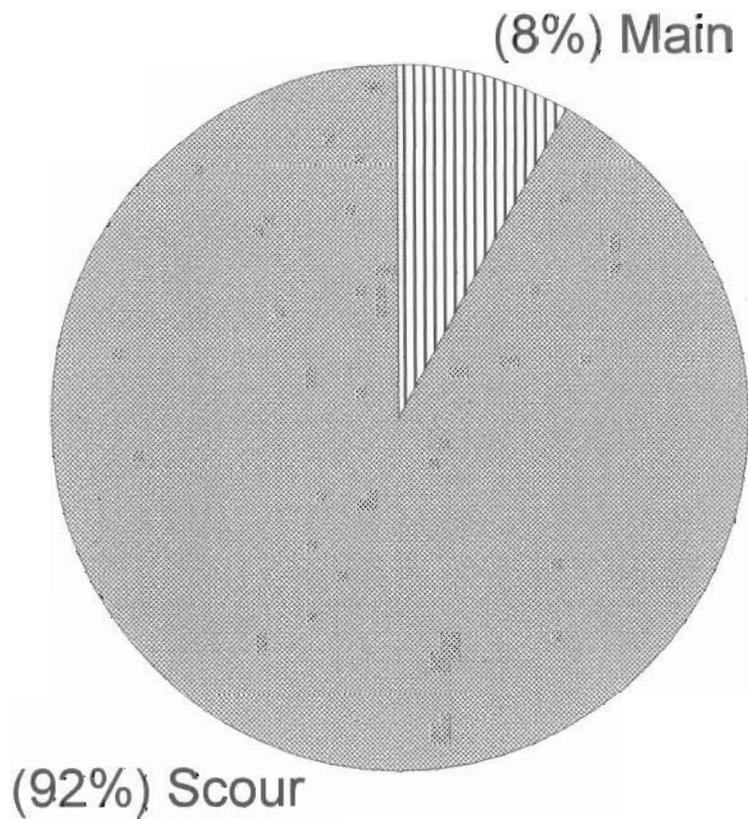
Graph 3

# Devil Creek

## Maximum Depth in Pools
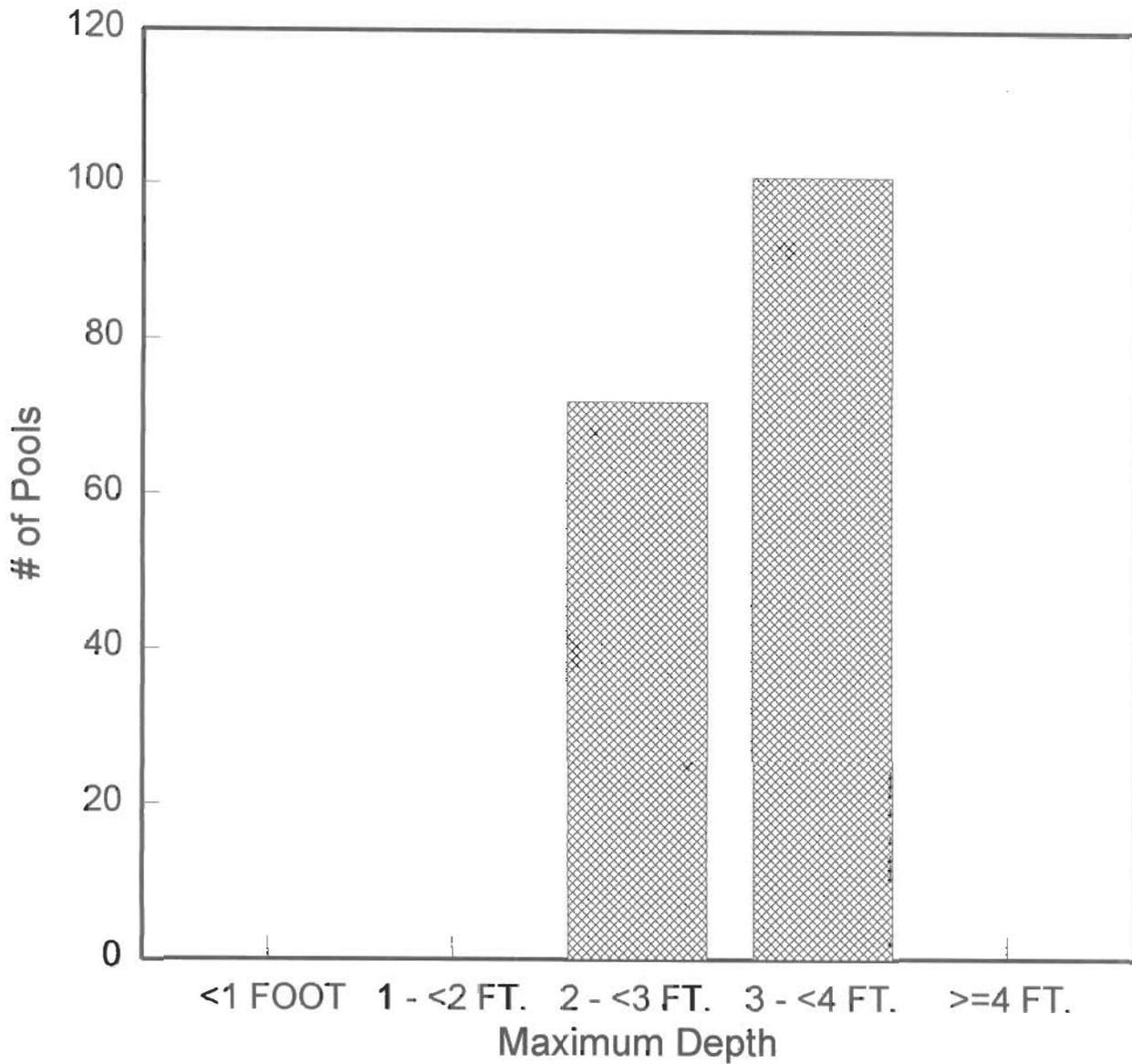


Graph 4

# Devil Creek

## Pool Shelter Types by % Area

(9%) Bedrock Ledges    (13%) Undercut Banks

(7%) Sm. Woody Debris

(4%) Lg. Woody Debris

(6%) Root Masses

(42%) Boulders

(8%) Terr. Vegetation

(8%) Aqua. Vegetation
(3%) Whitewater
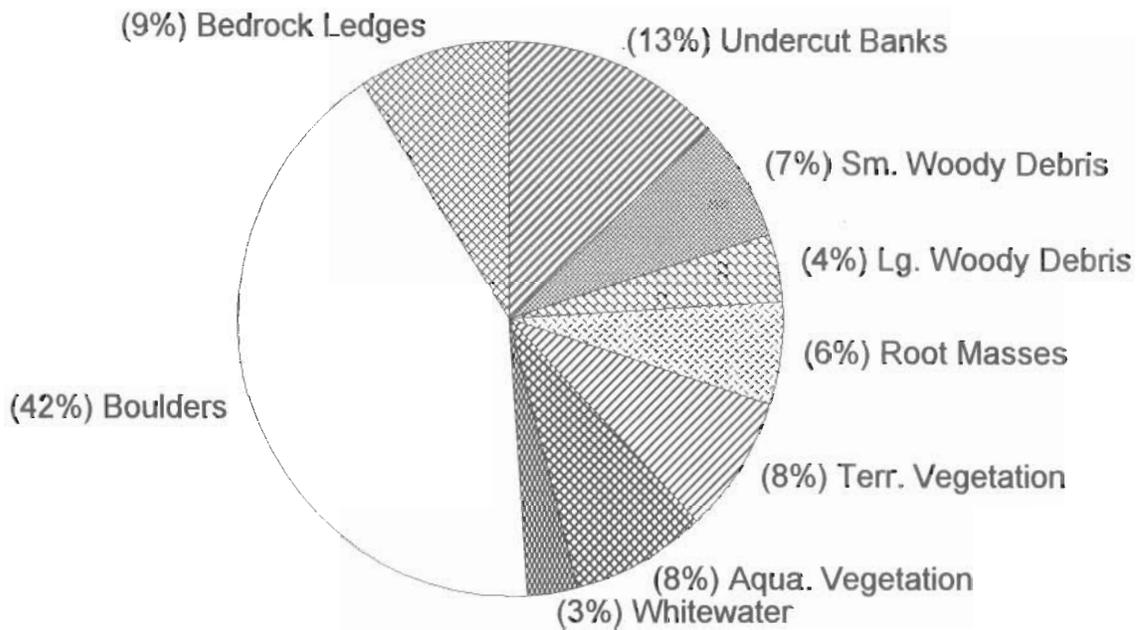
Graph 5

# Devil Creek
## Substrate Composition in Low Gradient Riffles
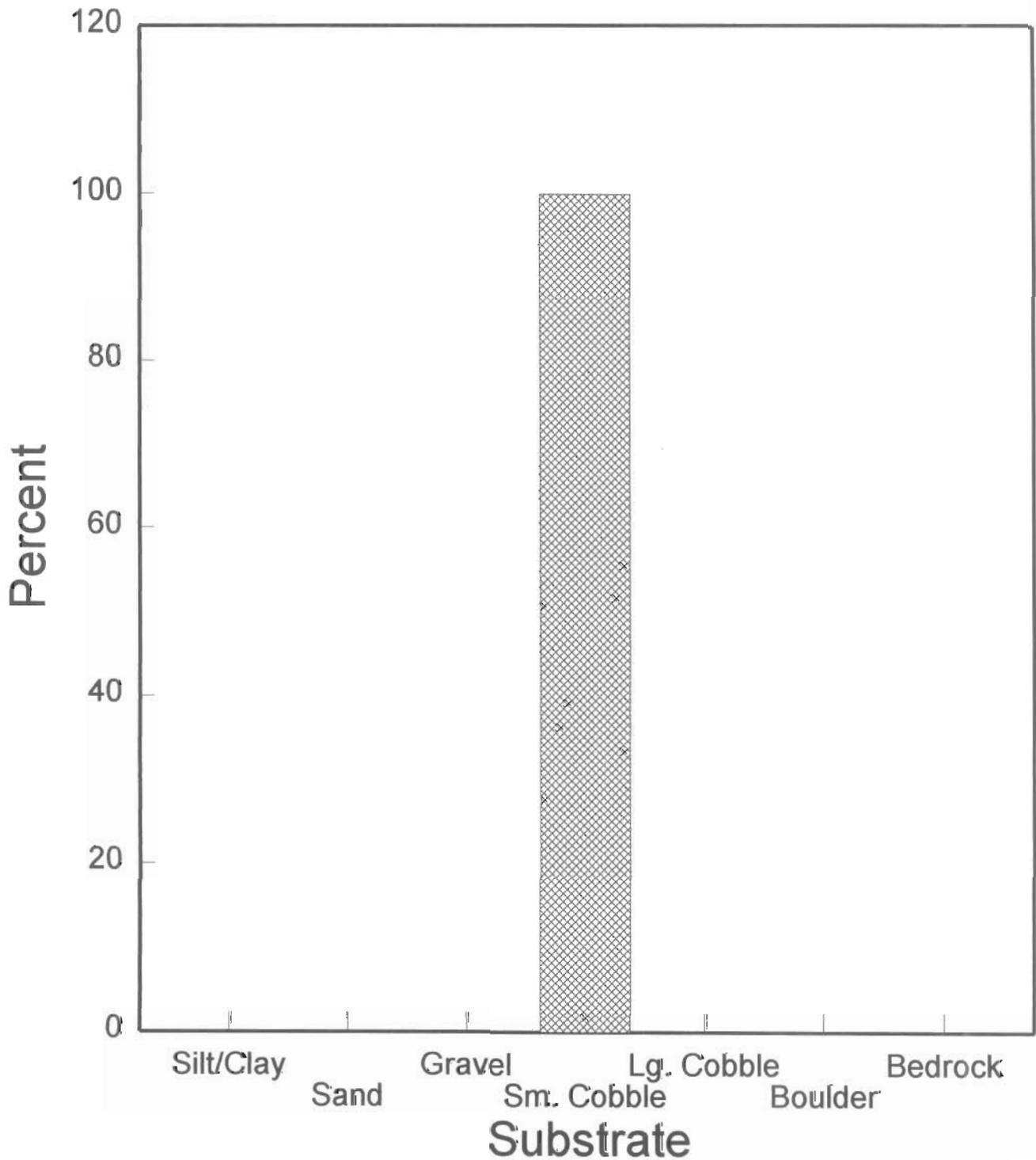


Graph 6

# Devil Creek

## Percent Cobble Embeddedness by Reach

Reach 1 (F3)

(100%) Value 2

Reach 2 (A1)

(100%) Value 2

Reach 3 (F2)
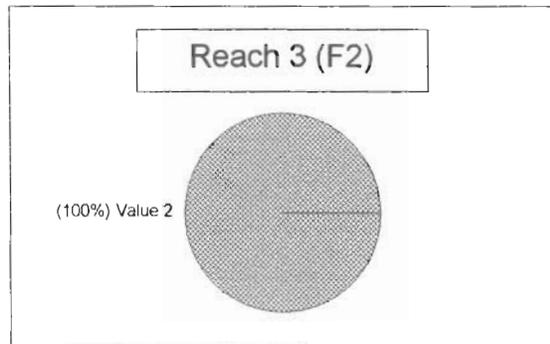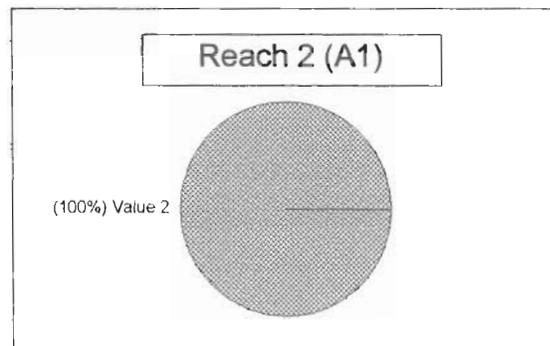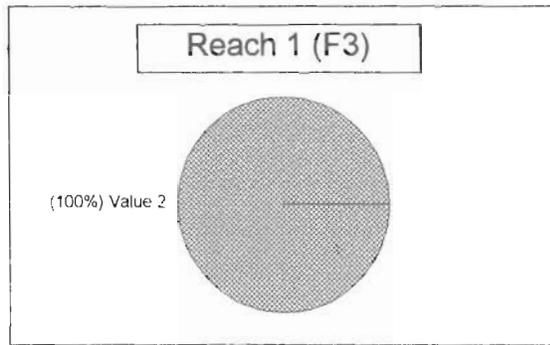
(100%) Value 2

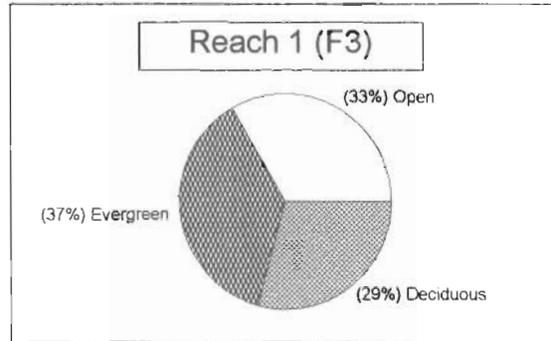Value 1 = <25%   Value 2 = 25-50%   Value 3 = 51-75%   Value 4 = >76%

Graph 7

# Devil Creek

## Mean Percent Canopy

(27%) Open

(36%) Evergreen Trees

(37%) Deciduous Trees
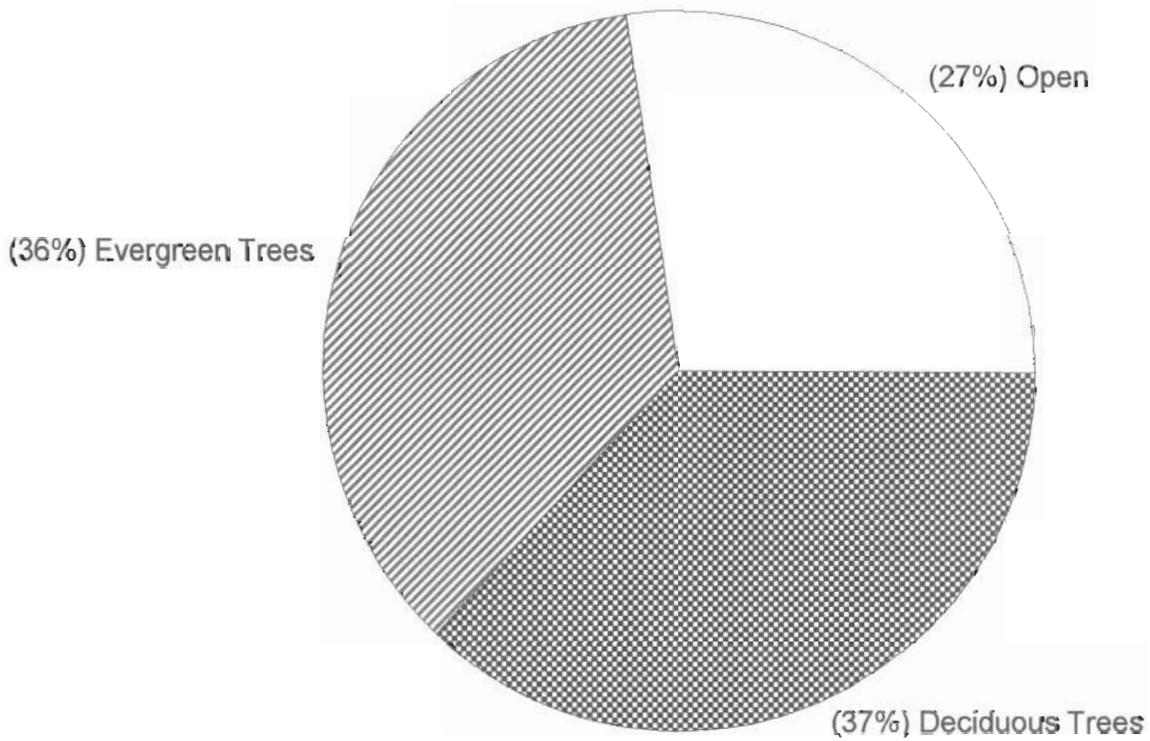
Graph 8

# Devil Creek
## Percent Canopy By Reach



Reach 1 (F3)

(33%) Open
(37%) Evergreen
(29%) Deciduous



Reach 2 (A1)

(9%) Evergreen
(30%) Open
(62%) Deciduous



Reach 3 (F2)

(40%) Evergreen
(7%) Open
(54%) Deciduous
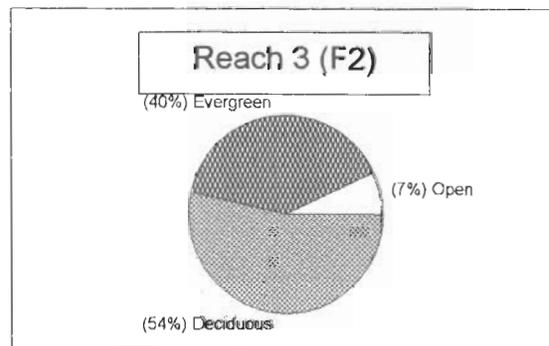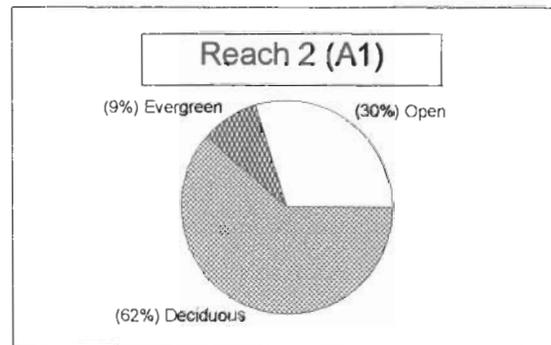
Graph 9

# Devil Creek

## Percent Bank Composition

### Dominant Bank Substrate

(40%) Bedrock

(18%) Boulder

(18%) Silt/Clay

(23%) Cobble/Gravel

### Dominant Bank Vegetation

(41%) Deciduous Trees

(2%) Brush
(1%) Grass

(55%) Evergreen Trees

Graph 10