CALIFORNIA DEPARTMENT OF FISH AND GAME STREAM INVENTORY REPORT

Dutch Bill Creek Report Revised April 14, 2006 Report Completed 2000 Assessment Completed 1997

INTRODUCTION

A stream inventory was conducted during the summer of 1997 on Dutch Bill 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 Dutch Bill 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

Dutch Bill Creek is a tributary to the Russian River , located in Sonoma County, California (see Dutch Bill Creek map, page 2). The legal description at the confluence with the Russian River is T7N, R10W,S7. Its location is 38°27'56" N. latitude and 123°00'32" W. longitude. Year round vehicle access exists from Highway 101 taking Highway 12 West, via Bodega Hwy. to Bohemian Hwy., through the town of Occidental (headwaters), to the town of Monte Rio (mouth).

Dutch Bill Creek and its tributaries drain a basin of approximately 11.6 square miles. Dutch Bill Creek is a third order stream and has approximately 9.0 miles of blue line stream, according to the USGS Duncan Mills and Camp Meeker 7.5 minute quadrangles. Major tributaries included in this report are: Tyrone Gulch, Crawford Gulch, Duvoul Creek, Grub Creek, Alder Creek, Baumert Springs, and an unnamed tributary. Lancel Creek is described in a separate stream report. Summer flow was measured as approximately .18 cfs at the mouth. Elevations range from about 5 feet at the mouth of the creek to 1140 feet in the headwaters. An evergreen forest dominates the watershed, but there are zones of grassland and oakwoodland in the upper watershed. The watershed is entirely privately owned.

METHODS

The habitat inventory conducted in Dutch Bill Creek follows the methodology presented in the <u>California Salmonid Stream Habitat</u> <u>Restoration Manual</u> (Flosi et al., 1997). The AmeriCorps Volunteers 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 <u>California</u> <u>Salmonid Stream Habitat Restoration Manual</u>. This form was used in Dutch Bill 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 standard flow measuring equipment, if available. In some cases flows are estimated. Flows were also measured or estimated at major tributary confluences.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1996). This methodology is described in the <u>California Salmonid Stream Habitat Restoration</u> <u>Manual</u>. 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.

3. Temperatures:

Water and air temperatures, and time, are measured by crew members with hand held thermometers and recorded at each tenth unit typed. Temperatures are measured in Fahrenheit at the middle of the habitat unit and within one foot of the water surface. Temperatures were also recorded using remote temperature recorders which log temperature every two hours, 24 hours/day.

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". Dutch Bill 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 unit lengths were measured, additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were completely sampled (length, mean width, mean depth, maximum depth and pool tail crest depth). All measurements were in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Dutch Bill 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), 76 - 100% (value 4). A rating of "not suitable" (5) was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All shelter is then classified according to a list of nine shelter types. In Dutch Bill Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the shelter. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent covered. 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 measured habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the <u>California Salmonid</u> <u>Stream Habitat Restoration Manual</u>, 1997. Canopy density relates to the amount of stream shaded from the sun. In Dutch Bill 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:

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 Dutch Bill Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully measured unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation 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 <u>Habitat</u>, 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 Dutch Bill 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:

In October, 1954 Dutch Bill Creek was surveyed to document fish species, in connection with the chemical treatment of the Russian River tributaries to control the 'rough fish' population. Steelhead and coho salmon were observed, the ratio being about 10 to 1 in favor of steelhead. No 'rough' species were observed. The flow was estimated to be less than one cubic foot per second.

On July 18, 1996 the National Marine Fisheries Service (NMFS) conducted a snorkel survey estimation of fish species in Dutch Bill Creek. The inventory was taken from ten pool habitats beginning upstream of Camp Meeker. During their survey they found 276 young of the year (0+) steelhead (SH); 14 one year old (1+)SH; 5 resident SH/rainbow trout; 9 sculpin and 1 California roach.

HABITAT INVENTORY RESULTS

 \ast all tables and graphs are located at the end of the report \ast

The habitat inventory of Dutch Bill Creek was conducted from August 12 to September 10, 1997 by Jon Campo, Simone Watts, Marc Miller (AmeriCorps), and Lloyd Strecker (Volunteer). The survey began at the confluence with the Russian River and extended up Dutch Bill Creek to the end of anadromous fish passage at the town of Occidental. The total length of the stream surveyed was 38,871 feet.

A flow of 0.18 cfs was measured on 9/4/97 at habitat unit #072 with a Marsh-McBirney Model 2000 flowmeter.

Dutch Bill Creek has eight channel types: from the mouth to 16,253 feet an F4; next 1,320 feet an F3; next 2,825 feet an F2; next 1,637 feet an F3; next 631 feet an F1; next 4,694 feet an F3; next

10,983 feet an F2 and the upper 528 feet a G2.

F channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio. F4 types have a predominantly gravel substrate, F3 channel types have predominantly cobble substrate, F2 has predominantly boulder substrate and F1 has a predominantly bedrock substrate.

G2 channel types are characterized as well entrenched "gully" steppool channels with a low width/depth ratio, a moderate gradient (2-4%) and a predominantly boulder substrate.

Water temperatures ranged from $53^{\circ}F$ to $66^{\circ}F$. Air temperatures ranged from $58^{\circ}F$ to $68^{\circ}F$. Summer temperatures were also measured using remote temperature recorders placed in pools (see Temperature Summary graphs at end of report). A recorder in Reach 5 logged temperatures every two hours from July 2 - September 26, 1997. The highest temperature recorded was $64^{\circ}F$ in August and the lowest was $54^{\circ}F$ in September.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40% pool units, 27% flatwater units, 26% riffle units, and 7% dry streambed units. Based on total length there were 29% dry streambed units, 27% flatwater units, 26% pool units, and 18% riffle units (Graph 1).

Four hundred fifteen habitat units were measured and 21% were completely sampled. 21 Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent occurrence were low gradient riffles at 24%, runs 13%, root wad scour pools 12% and boulder scour pools 10% (Graph 2). By percent total length, dry streambed made up 29%, low gradient riffles 16%, step runs 14%, and runs 9%.

One hundred sixty-four pools were identified (Table 3). Scour pools were most often encountered at 70%, and comprised 59% 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. 37 of the 164 pools (23%) had a depth of three feet or greater (Graph 4). These deeper pools comprised 10% 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. Pool types had the highest shelter rating at 21. Riffle had the lowest rating with 0 and flatwater rated 4 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 25, backwater pools rated 18, and main channel pools rated 12 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 30%, root masses 29%, large woody debris 15%, and undercut banks 15%. Graph 5 describes the pool shelter in Dutch Bill Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in two of the 18 low gradient riffles measured. Small cobble was dominant in six of the low gradient riffles (Graph 6).

No mechanical gravel sampling was conducted in 1997 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 163 pool tail-outs measured, 21% had a value of 1; 58% had a value of 2; 11% had a value of 3; and 9% had a value of 4. 37% of the pool tail-out substrates were not suitable for spawning due to the natural geomorphology. On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 90%. The mean percentages of deciduous and evergreen trees were 48% and 52%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 78% and the mean percent left bank vegetated was 81%. For the habitat units measured, the dominant vegetation types for the stream banks were: 48% deciduous trees, 48% evergreen trees and 4% brush. The dominant substrate for the stream banks were: 83% silt/clay/sand, 11% bedrock, and 6% boulder (Graph 10).

HABITAT INVENTORY RESULTS FOR MAJOR TRIBUTARIES (Except Lancel Creek)

Results for the habitat inventories of Alder Creek, Baurmert Springs Creek, Crawford Gulch Creek, Duvoul Creek, Grub Creek, Tyrone Gulch Creek and an unnamed tributary are summarized in the table below.

Dutch Bill Tributary Results									
Creek	Length	High Temp (F)	% Pools Occurring	% Pools by Length	Mean Pool Shelter Rating	Dom. Pool Shelter	Dom. Embed.	Mean Canopy	Channel Types

Dutch Bill T	ributary Re	sults							
Alder	989'	61	25	3	16	Boulder	1/5	95%	A2
Baumert Springs	1023'	57	40	23	10	Boulder	1/5	94%	B2
Crawford Gulch	307'	59	13	5	60	Boulder	2	93%	A2
Duvoul	742'	63	30	18	23	Boulder	1/5	82%	B2
Grub	6206'	70	23	4	20	Boulder	3/5	79%	F2,G3, A2
Tyrone Gulch	723'	60	36	21	33	Undercut Bank	1/2	94%	B2,A3
Unnamed	1697'	58	36	25	29	Undercut Bank	2/3	95%	F3

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

On October 22, 23, and 27 1997 a biological inventory was conducted in ten sites of Dutch Bill Creek to document fish species composition and distribution. Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature ranged from 57°F to 64°F and the water temperature from 52°F. to 58°F. The observers were Bob Coey, Marc Miller, Todd Parlato, and Shamli Tarbell.

The inventory of Reach 1 started on the downstream side of bridge #1 (Bohemian Highway) and continued for approximately 1170 feet. In intermittent pool habitat types, no salmonids were observed. The species observed were: two Sacramento squawfish, 25 sculpin, and three Sacramento suckers.

The inventory of Reach 1 was continued starting at the confluence with Tyrone Gulch and ending approximately 845 feet upstream. In run and pool habitat types 25 0+, and three 1+ steelhead were observed along with two Sacramento squawfish, 60 sculpin, and two 6" Sacramento suckers.

The inventory of Reach 3 started 754 feet downstream of the fish ladder and ended approximately 754 feet upstream. In riffle, run, and pool habitat types 31 0+, and two 1+ steelhead were observed along with 90 sculpin, three Sacramento suckers, and one bluegill.

The inventory of Reach 4 was started 225 feet upstream from the top of the fish ladder and continued for approximately 657 feet. In pool, run, and riffle habitat types 31 0+, and 15 1+ steelhead were observed along with 61 sculpin and one bluegill.

The inventory of Reach 6 was started from the Westminster Bridge and continued for approximately 625 feet. In pool, run, and riffle habitat types 31 0+, 19 1+, three 2+ and one resident steelhead were observed along with 63 sculpin.

The inventory of Reach 7 was conducted 450 feet downstream from the confluence with Alder Creek and continued for approximately 450 feet. In pool, run, and riffle habitat types 43 0+ and three 1+ steelhead were observed along with 24 sculpin.

The inventory of Reach 7 was continued beginning at habitat unit #340 and ending at the confluence with Lancel Creek. In riffle and pool habitat types 52 0+, six 1+, and three 2+ steelhead were observed along with 25 sculpin, and one bluegill.

The inventory of Reach 7 was continued beginning at habitat unit #360 and ending at unit #370. In run and pool habitat types 25 0+ and one 1+ steelhead were observed along with 18 sculpin.

The inventory of Reach 8 was started from habitat unit #406 and ended at habitat unit #410. In pool, run, and riffle habitat types 63 0+, 8 1+, and two 2+ steelhead were observed.

The inventory of Reach 8 was continued beginning at dam #4 and continued for approximately 94 feet. In pool habitat types six 0+, one 1+, and two 2+ steelhead were observed.

Species Observed in Historical and Recent Surveys					
YEARS	SPECIES	SOURCE	Native/Introduced		
1954,1996,1 997	Steelhead	DFG,NMFS	Ν		
1954	Coho Salmon	DFG	N		
1996,1997	Sculpin	DFG,NMFS	N		
1997	Sacramento Squawfish	DFG	Ν		

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		
1997	Sacramento Sucker	DFG	Ν		
1996,1997	California Roach	DFG,NMFS	Ν		
1997	Bluegill	DFG	I		

NMFS = National Marine Fisheries Service

Historical records reflect coho salmon fingerlings were stocked in Dutch Bill Creek in 1969 and 1970, Table 2. Historical records also reflect that fish transfer/rescue operations occurred in 1955, 1956, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1970, and 1971.

Table 2. Summary of fish hatchery-stocking into Dutch Bill Creek					
YEAR	SPECIES	SOURCE	#	SIZE	
1969	SS	???	10000	YEAR	
1970	SS	Noyo River	10010	YEAR	

SS = coho (silver) salmon
YEAR = yearling

Table 3. Summary of fish hatchery - transfers/rescues from Dutch Bill Creek					
YEAR	LOCATION	SOURCE	SPECIES	#	SIZE
1955	Russian River	Dutch Bill	SH	10,400	FING
1956	Russian River	Dutch Bill	SH	5,992	FING
1958	Austin Cr	Dutch Bill	SH	6,694	FING
1959	Austin Cr	Dutch Bill	SH	41,494	FING
1960	Austin Cr	Dutch Bill	SH	7,690	FING
1961	Austin Cr	Dutch Bill	SH	18,527	FING

Table 3. Summary of fish hatchery - transfers/rescues from Dutch Bill Creek					
1962	Austin Cr	Dutch Bill	SH	5,651	FING
1963	Austin Cr	Dutch Bill	SH	2,624	FING
1963	Austin Cr	Dutch Bill	SS	????	FING
1964	Austin Cr	Dutch Bill	SH	13,520	FING
1966	Russian River	Dutch Bill	SH	15,680	FING
1967	Russian River	Dutch Bill	SH	23,867	FING
1968	Austin Cr	Dutch Bill	SS	30,032	FING
1968	Russian River	Dutch Bill	SS	8,194	FING
1969	Austin Cr	Dutch Bill	SS	29,684	FING
1970	Austin Cr	Dutch Bill	SS	4,277	FING
1970	Green Valley Cr	Dutch Bill	SH	1,170	FING
1970	Russian River	Dutch Bill	SH	5,106	FING
1970	Russian River	Dutch Bill	SS	1,768	FING
1971	Russian River	Dutch Bill	SS	1,800	FING

SH = steelhead SS = coho (silver) salmon FING = fingerling (lst year)

JUVENILE SURVEYS OF TRIBUTARIES

A summary of the juvenile surveys conducted in 1997 in Crawford Gulch Creek, Duvoul Creek, Grub Creek, and Tyrone Gulch Creek appears in the table below. Fair numbers of 0+, 1+, and 2+ steelhead were found in all the tributaries listed above, with the exception of Crawford Gulch Creek. Tyrone Gulch Creek had good numbers of 0+ and 1+ steelhead, but no 2+ steelhead. Tyrone Gulch Creek is a small, but important tributary.

Dutch Bill Tributary Data - Juvenile Surveys					
Creek	0+ Steelhead 1+ Steelhead 2+ Steelhead Other Species				
Crawford Gulch	0	0	0	pacific giant salamander, crawdad	
Duvoul	12	1	2	sculpin	

Dutch Bill Tributary Data - Juvenile Surveys					
Grub	9	11	1	pacific giant salamander	
Tyrone Gulch	36	5	0	pacific giant salamander, crawdad, sculpin	

ADULT SURVEYS:

A spawning survey was conducted in Dutch Bill Creek on February 3, 1998, beginning at habitat unit #022 (Reach 1) and extending into Tyrone Gulch. Two live steelhead, one male and one female, were observed near a redd. The steelhead pair were 24" to 28" in length and were located 200 yards below bridge #3. Two additional redds were observed, one located beneath bridge #3 and one located 70 yards upstream of bridge #3.

Another spawning/carcass survey was conducted in two sites of Dutch Bill Creek on February 27, 1998. This survey began at the Mt. Zion Bridge #5 (Reach 2) and extended to habitat unit #180 (Reach 4) approximately 2000 feet above the fish ladder. One redd was observed.

The survey continued starting from bridge #7 and ending at habitat unit #240 (Reach 6). Five adult steelhead were observed just downstream of dam #2 at Alliance Redwoods. Three of these were greater than 24", one was approximately 18", and one was approximately 12". A male and female pair were spawning and the smaller jacks were competing to be part of the act. Under bridge #9, one 28" steelhead was observed near a redd. Upstream of bridge #9, two steelhead, greater than 24" in length, were observed near a redd. One 12" steelhead was observed in the same vicinity. A total of five redds were observed.

DISCUSSION

Dutch Bill Creek has 8 channel types: F4 (16253 ft.), F3 (1320 ft.), F2 (2825 ft.), F3 (1637 ft.), F1 (631 ft.), F3 (4694 ft.), F2 (10983 ft.) and G2 (528 ft.).

There are 16253 feet of F4 channel type in Reach 1. According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u> F1 channel types are good for bank-placed boulders and fair for single wingdeflectors and log cover.

F2 channel types are fair for low-stage weirs, single and opposing wing-deflectors and log cover.

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.

F4 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover.

G2 channel types are fair for log cover.

Any work considered will require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days 08/12/97 to 09/10/97 ranged from $57^{\circ}F$ to $66^{\circ}F$. Air temperatures ranged from $58^{\circ}F$ to $68^{\circ}F$. These temperatures are within the threshold stress level ($65^{\circ}F$) for salmonids.

Summer temperatures measured using remote temperature recorders placed in pools ranged from 54° to 64° F for Reach 5. This thermal regime is favorable to salmonids.

Pools comprised 26% of the total length of this survey. In third and fourth order streams a primary pool is defined to have a maximum depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. In Dutch Bill Creek, the pools are relatively deep with 23% having a maximum depth of at least 3 feet. These pools comprised 10% of the total length of stream habitat. However, in coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length.

The mean shelter rating for pools was 21. However, a pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by boulders (30%), root masses (29%), large woody debris (15%), and undercut banks (15%). Log and root wad cover in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

Eight of the 18 low gradient riffles measured (44%) had either gravel or small cobble as the dominant substrate. This is generally considered fair for spawning salmonids.

Seventy-nine percent of the pool tail-outs measured had embeddedness ratings of either 1 or 2. Only 21% had a rating of 3

or 4. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead.

The higher the percent of fine sediment, the lower the probability that eggs will survive to hatch. This is due to the reduced quantity of oxygenated water able to percolate through the gravel, or because of fine sediment capping the redd and preventing fry emergence.

The mean percent canopy for the entire survey was 90%. This is very good, since 80 percent is generally considered desirable. Large trees contribute shade and provide a long term source of large woody debris needed for instream structure and bank stability.

DISCUSSION OF MAJOR TRIBUTARIES (Except Lancel Creek)

ALDER CREEK

Alder Creek has one channel type: A2 (989 ft.).

There are 989 feet of A2 channel type in Reach 1. A2 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly boulder substrate.

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u>, the high energy, steep gradient A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

Pools comprised only 3% of the total **length** of this survey. Therefore, installing structures that will increase pool habitat is recommended for 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 16. A pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by boulders (98%), large woody debris (2%), undercut banks (0%), and small woody debris (0%). Log and root wad cover structures in the pool and flatwater habitats are needed to improve both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

BAUMERT SPRINGS CREEK

This section of Baumert Springs has one channel type: 1023 feet.

There are 1023 feet of B2 channel type in Reach 1. B2 channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated channels, with infrequently spaced pools, a very stable plan and profile, stable banks and have a predominantly boulder substrate.

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u>, B2 channel types are excellent for low and medium-stage plunge weirs, single and opposing wing deflectors and bank cover.

Pools comprised 23% of the total length of this survey. The mean shelter rating for pools was 10. However, a pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by boulders (55%), undercut banks (17%), small woody debris (13%), and large woody debris (10%).

Fifty-eight percent of the pool tail-outs measured had an embeddedness rating of 5 which is considered unsuitable for spawning due to the natural geomorphology. Only 25% had a rating of 1. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead.

CRAWFORD GULCH CREEK

Crawford Gulch has one channel type: A2 (307 ft.).

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u>, the high energy, steep gradient A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

Pools comprised 5% of the total length of this survey. The mean shelter rating for the pool was 60. This is good since approximately 80 is desirable. The pool shelter that now exists is being provided primarily by undercut banks (40%), boulders (40%) and large woody debris (20%).

DUVOUL CREEK

Duvoul Creek has one channel type: B2 (742 ft.).

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u> B2 channel types are low and medium-stage plunge weirs, single and

opposing wing deflectors and bank cover.

GRUB CREEK

Grub Creek has 3 channel types: F2 (4113 ft.), G3 (1116 ft.) and A2 (978 ft.).

There are 4113 feet of F2 channel type in Reach 1. F2 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly boulder substrate.

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u>, F2 channel types are fair for low-stage weirs, single and opposing wing-deflectors and log cover.

There are 1116 feet of G3 channel type in Reach 2. G3 channel types are characterized as well entrenched "gully" step-pool channels with a low width/depth ratio, a moderate gradient (2-4%) and a predominantly cobble substrate. G3 channel types are good for bankplaced boulders and fair for low-stage weirs, opposing wingdeflectors and log cover.

In Reach 3 there is 978 feet of A2 channel type. The high energy, steep gradient A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

Many site specific projects can be designed within the (F2 and G3) channel types, especially to increase pool frequency, volume and shelter. These channel types have suitable gradients and the stable stream banks that are necessary for the installation of instream structures designed to increase pool habitat, trap spawning gravels, and provide protective shelter for fish. Any work considered will require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days 08/05/97 to 08/07/97 ranged from $60 \,\text{F}$ to $70 \,\text{F}$. Air temperatures ranged from $72 \,\text{F}$ to $94 \,\text{F}$. The warmer water temperatures were recorded in Reach 2. These temperatures, if sustained, are above the threshold stress level ($65 \,\text{F}$) for salmonids.

It is unknown if this thermal regime is typical, but our electrofishing samples found steelhead more frequently in the lower cooler sample sites. 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.

Neither of the two low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered poor for spawning salmonids.

Eighty-nine percent of the pool tail-outs measured had embeddedness ratings of either 3 or 5. An embeddedness rating of 5 is considered unsuitable for spawning due to the natural geomorphology. 0% had a rating of 1. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead.

TYRONE GULCH CREEK

Tyrone Gulch has two channel types: B2 (723 ft.) and A3 (917 ft.). There are 723 feet of B2 channel type in Reach 1.

According to the DFG <u>Salmonid Stream Habitat Restoration Manual</u>, B2 channel types are excellent for low and medium-stage plunge weirs, single and opposing wing deflectors and bank cover.

In Reach 2 there is 917 feet of A3 channel type. A3 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly cobble substrate. A3 channel types are good for bankplaced boulders and fair for low-stage weirs, opposing wingdeflectors and log cover.

UNNAMED TRIBUTARY

Unnamed tributary has one channel type: F3 (1697 ft.)

There are 1697 feet of F3 channel type in Reach 1. F3 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly cobble substrate.

According to the DFG <u>Salmonid</u> 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.

SUMMARY

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 and coho only intermittently. 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, fair numbers of steelhead (but no coho) were observed during the 1997 surveys. The 1998 spring surveys documented 0+ fish indicating successful spawning in the middle reaches of Dutch Bill Creek. Many 1+ fish were observed indicating good rearing conditions the year before or good holding-over conditions in general. Overall however, habitat conditions for both steelhead and coho have declined over time.

In general, Reaches 3-7 of Dutch Bill Creek are good for salmon and steelhead habitat. Some deep, sheltered sections of the stream occur in the mid and upper Reaches which may be used as rearing habitat. However, in the lower Reaches (1 and the lower portion of 2) pool shelter and frequency are lacking and portions are dry, limiting successful spawning and rearing. Portions of Dutch Bill have been channelized from road construction and urbanization along thus stream velocity has increased resulting the creek, in downcutting, streambank erosion and loss of mature riparian. Riffle habitat exists for spawning, but many areas are unsuitable for spawning due to high gravel embeddedness. Winter resting cover from high velocities and summer rearing habitat for juveniles is lacking. The effects of channelization limits instream habitat improvement alternatives, although some opportunity exists. Any work considered will require careful design, placement, and construction that must include protection for the unstable banks and high stream velocities. Reaches 2 and 4 are good for bankplaced boulders and single and opposing wing-deflectors. They are fair for low-stage (low profile) weirs, boulder clusters and channel constrictors. Log cover structures can be used to increase instream shelter.

GENERAL RECOMMENDATIONS

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

Shortly before the survey, winter storms brought down many large trees and other woody debris into the stream, which increased the number and quality of pools since drought years. This woody debris, if left undisturbed, would have provided fish shelter and rearing habitat, and offset channel incision. Recently, many logs were removed by flood control crews and historic tree and log removal were evident in the active channel during our survey. Efforts to increase flood protection or improve fish access in the short run, have led to long term problems in the system. Landowners should be sensitive and the city should be educated 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.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

- 1) Access for migrating salmonids is an ongoing potential problem, therefore, fish passage should be improved where possible. Baffles should be installed in several tributary culverts to facilitate easier fish access.
- 2) Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing shelter is from vegetation and undercut banks. Adding high quality complexity with larger woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations in all the reaches. Where feasible, design and engineer pool enhancement structures to increase the length and depth of pools in all reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 3) In Dutch Bill Creek, active and potential sediment sources related to the County road system need to be improved, and treated according to their potential for sediment yield to the stream and its tributaries. Maintenance of ditches, culverts, and inboard cutbank slides should be improved to decrease the potential of sediment delivery to Dutch Bill Creek. During storms, surface runoff over the road causes outboard cutbank slides, delivering sediment and threatening the road integrity. This is primarily due to the existing conditions of the road drainage network
- .4) Spawning gravels on Dutch Bill Creek are limited to relatively few reaches. Structures to decrease channel incision and recruit spawning gravel (using gravel retention structures), should be installed to trap, sort and expand redd distribution in the stream (particularly on Dutch Bill Creek Reaches 3-7)
- 5) Map sources of upslope and in-channel erosion, and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream. Near-stream riparian planting along any portion of the stream should be encouraged to provide bank stability and a buffering against urban runoff.

6) Access for migrating salmonids is an ongoing potential problem, therefore, fish passage should be monitored before and after improvements of culverts.

RESTORATION IMPLEMENTED

1) The fish ladder at Reach 3 should be improved to pass fish easier at all flows.

DUTCH BILL CREEK TRIBUTARY RECOMMENDATIONS

BAUMERT SPRINGS CREEK

1) Access for migrating salmonids is an ongoing potential problem in Reach 1, therefore, fish passage should be monitored, and improved where possible. An instream culvert located at habitat unit #030 is a possible fish barrier and needs to be repaired. Future design should include improved passage of gravel and fish passage as a first priority.

DUVOUL CREEK

1) Access for migrating salmonids is an ongoing potential problem in Reach 1, therefore, fish passage should be monitored, and improved where possible. A culvert located at habitat unit #001 is a possible fish barrier that should be analyzed for fish passage and baffles should be installed if necessary. A permanent barrier exists at 668' (30' high bedrock waterfall).

GRUB CREEK

- 1) Access for migrating salmonids is an ongoing potential problem in Reach 1, therefore, fish passage should be monitored, and improved where possible. The concrete box culvert at habitat unit #003 should be analyzed for fish passage and baffles should be installed if necessary.
- 2) There are at least 2 sections (Reach 2 and Reach 3) where the stream is being impacted from livestock in the riparian zone. Livestock in streams generally inhibit the growth of new trees, exasperate erosion, and reduce summertime survival of juvenile fish by defecating in the water. Alternatives to limit cattle access, control erosion and increase canopy, should be explored with the landowner, and developed if possible.
- 3) Near-stream riparian planting along any portion of the stream

should be encouraged to provide bank stability and a buffering against agricultural, grazing and urban runoff.

4) In Grub Creek, active and potential sediment sources related to the road system need to be mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

TYRONE GULCH CREEK

1) A culvert located at habitat unit #004 is a partial fish barrier that should be replaced with an arched culvert to improve passage.

PROBLEM SITES AND LANDMARKS - DUTCH BILL CREEK 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	STREAD	M COMMENTS
UNIT #	LEN (F	Г.)
1 0 0		
1.00	372	LG. ROOTWAD TUCKED UNDERNEATH
		BRIDGE, POSSIBLE FOR RESTORATION
3.00	537	USE
4.00	010	POSSIBLE RESTORATION MATERIALS; RT WAD, LWD
5.00	692	RIP RAP RB
6.00	816	CULVERT LB 18"
9.00	1009	0+
12.00	1176	RIP RAP, EROSION, 0+ SHD
13.00	1258	RUSTED CAR IN CR.
14.00	1288	0+ SHD
18.00	1525	0+, 1+, 2+ SHD
19.00	2447	BRIDGE AND CULVERT LB
20.00	2542	3 POOLS SERIES
27.00	4473	DOZER TRACKS IN CR.
28.00	4502	PUMP IN CR. CULVERT
29.00	7732	CULVERT ,TRIB
		PUMP @ 1800' RB
30.00	7764	MANY 0+
31.00	7922	PIPE ACROSS CR.
32.00	7962	0+, 1+, 2+;RB RETAINING WALL
33.00	8948	SEE YELLOW BK
		0+ SHD, RIP RAP
35.00		LONG RIP RAP UNIT RB
		0+SHD, 68 DEG. WATER; ALGAE
38.00	9500	SEE JOURNAL

39.00	11430	BRIDGE @ 600', BLOWOUT @ 1000'
41.00	11508	WET TRIB LB, 2 CULVERTS 0+SHD
43.00	11565	RETAINING WALL LB, 40'L X 8' H
44.00	11601	CONCRETE UTILITY BOX 0+ SHD
45.00	11661	RIPRAP LB 90'L
47.00	12097	RIPRAP LB 90'L
48.00	12132	0+SHD
50.00	12327	0+, 1+ SHD
51.00	12593	2 RETAINING WALLS 90'L LB
52.00	12623	CRAWFISH, 0+SHD
54.00	12806	50 0+SHD
55.00	12853	RIPRAP RB 50'L
56.00	12913	1+ SHD
60.00	13134	DRY TRIB LB W/CULVERT UNDER TYRONE
		RD. 0+, 1+ SHD
61.00	13154	DRY TRIB W/CULVERT LB
62.00	13190	0+ SHD
66.00	13401	227' VEGETATED GRAVEL BAR
68.00	13498	EROSION LB
69.00	13585	EROSION LB CAUSED BY ROAD RUNOFF
71.00	13696	12" CULVERT LB
72.00	13726	PUMP ON LB W/PUMP HOUSE
79.00	14051	6"CRAWFISH; LANDOWNER SAYS HE HAS
		SEEN SEVERAL 18" SHD
86.00	14551	BOULDERS = CONCRETE SLABS (4)
		CULVERT LB
87.00	14603	POSSIBLE RESTORATION SITE, SHELTER
		ENHANCEMENT
88.00	14660	WET TRIB LB
89.00	14742	DRY TRIB RB W/2 CULVERTS
95.00	15117	LANDOWNER TRAINBRIDGE
96.00	15160	LG AMOUNTS OF COBBLE
98.00	15300	PUMP ON RB; SHD SPAWNING PAIR
		PHOTOGRAPH - MR. FINER TOOK PHOTO
101.00	15606	RB 12" CULVERT
107.00	15893	JUV. SCULPIN
108.00	15972	LG COBBLE TRANSITION FROM GRAVEL
112.00	16153	RETAINING WALL RB
115.00	16290	CHANNEL CHANGE TO F3
120.00	16660	0+SHD
121.00	16731	LG CULVERT
123.00	16840	BRIDGE 5
125.00	17037	LB STORAGE ITEMS; FURNITURE , EMPTY
		DRUMS, METAL BOXES. ALL UNDERNEATH
		A TARP
129.00	17231	MANY SQUAWFISH
132.00	17425	0+SHD
135.00	17656	BEGINNING OF F2
138.00	17858	0+SHD

139.00	17955	1"PVC PIPE
140.00	18037	DRY TRIB LB
142.00	18180	EROSION RB 30'L X 15'W X 3'D
143.00	18616	18" CULVERT ON RB
145.00	19006	3 8" BLUEGILLS, 1+ SHD, SCULPIN,
		CRAYFISH
146.00	19200	DRY TRIB RB 18" CULVERT
147.00	19328	2+ SHD, BEGINNING OF FISH LADDER
148.00	19648	3 ½' JUMP UP TO SECOND STEP. END
		OF UNIT @ END OF LADDER. SEE BK
149.00	19709	RB RIPRAP, RETAINING WALL
155.00	20476	BEGINNING OF F3 CHANNEL TYPE
156.00	20516	OLD BRIDGE ABUTMENT , BLOWN OUT
		FOR SOME TIME
157.00	20595	DRY TRIB RB
164.00	21008	DRY TRIB RB
165.00	21048	SCULPIN
171.00	21351	MORE BEDROCK OBSERVED ON BANKS;
		0+ SHD
174.00	21501	CULVERT RB - NEEDS MAIN.
181.00	21932	DUVOUL TRIB RB; CULVERT (SEE FORM)
		MANY 0+, 1+; 1-2+ SHD
182.00	21970	RIPRAP RB
184.00	22043	SCULPIN AND CRAYFISH
186.00	22189	0+ SHD; BEDROCK = CONCRETE;
		80'L RETAINING WALL RB
		CHANNEL CHANGE TO F1
187.00	22259	A FEW 1+ AND 0+ SHD
188.00	22280	ACTIVE EROSION RB - 100'L
189.00	22394	10" CULVERT LB
191.00	22530	CULVERT LB
194.00	22698	POOL FORMED @ WESTMINSTER DAM;
		POSSIBLE RESTORATION SITE
195.00	23494	CHANNEL CHANGE TO F3; FOOTBRIDGE
		OVER DAM; POOL BACKED UP
197.00	23646	*POSSIBLE RESTORATION SITE*;
		GOOD POOL - NO SHELTER
198.00		12" CULVERT RB
199.00		PICNIC AREA LB
200.00		GRUB CREEK RB; PICNIC AREA LB
203.00		PUMP RB
205.00		0+ SHD
207.00		REMAINS OF OLD CONCRETE DAM
214.00	24813	MANY SHD; 0+, 1+, 2+,
		RES?- GREAT POOL
216.00		BRIDGE#7
219.00		0+, 1+,SHD
221.00	25253	WELL IN STREAM - 3' CORRUGATED
		STEEL; 1+, 0+ SHD

CRAWFISH 230.00 26255 CONCRETE DEFLECTOR WEIR; RIPRAP LB; BRIDCE #8 231.00 26291 RIPRAP LB 232.00 26388 WET TRIB LB W/CONCRETE WEIR ACTING AS A DAM W/ACTIVE PUMP 236.00 26672 Bridge #9 239.00 26897 LOTS OF BEDROCK 242.00 27190 1+ SHD 243.00 27210 1+ SHD 246.00 27392 *POSSIBLE RESTORATION* LACK OF LWD 247.00 27417 CHANNEL CHANGE TO F2 258.00 28072 1+ SHD 264.00 28376 18" CULVERT RB - ERODING 264.00 28376 18" CULVERT RB 269.00 28868 LOGJAM; 20" CULVERT RB 271.00 29244 PUMP RB W/PIPING EXTENDING UPSLOPE INTO DRY TRIB, CULVERT EXTENDING UNDER 272.00 29283 DRY TRIB LB; 0+ SHD 274.00 29370 2+ SHD 277.00 29453 0+ SHD 276.00 29526 EROSION RB - SEE EROSION FORM 288.00	224.00 2	5443	FOOT BRIDGE
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247.00 27417 CHANNEL CHANGE TO F2 258.00 28072 1+ SHD 264.00 28376 18" CULVERT RB - ERODING 268.00 28587 1+ SHD 269.00 2868 LOGJAM; 20" CULVERT RB 271.00 29244 PUMP RB W/PIPING EXTENDING UPSLOPE INTO DRY TRIB, CULVERT EXTENDING UNDER ROAD- (BOHE. HWY.) 0+ SHD 272.00 29283 DRY TRIB LB; 0+ SHD 274.00 29370 2+ SHD 277.00 29422 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 288.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 316.00 31176 0+ SHD 3175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	246.00 2	7392	*POSSIBLE RESTORATION*
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$\begin{array}{rcl} 264.00 & 28376 & 18" \ \mbox{CULVERT RB} - \ \mbox{ERODING} \\ 268.00 & 28587 & 1+ \ \mbox{SHO} \\ 269.00 & 28868 & \ \mbox{LOGJAM; } 20" \ \mbox{CULVERT RB} \\ 271.00 & 29244 \ \mbox{PUMP RB W/PIPING} \\ & \ \mbox{EXTENDING UPSLOPE INTO} \\ & \ \mbox{DRY TRIB, CULVERT EXTENDING UNDER} \\ & \ \mbox{ROAD-} & (BOHE. HWY.) \\ & \ \mbox{Othermality} \\ 0+ \ \mbox{SHD} \\ 272.00 & 29283 \ \mbox{DRY TRIB LB; } 0+ \ \mbox{SHD} \\ 274.00 & 29370 & 2+ \ \mbox{SHD} \\ 277.00 & 29453 & 0+ \ \mbox{SHD} \\ 277.00 & 29452 & 1+ \ \mbox{SHD} \\ 277.00 & 29452 & 1+ \ \mbox{SHD} \\ 278.00 & 29526 & \mbox{EROSION RB} - \ \mbox{SEE EROSION FORM} \\ 283.00 & 29868 \ \mbox{CEMENT WELL RB; WATER HOLDING TANK} \\ & \ \mbox{RB W/1" PVC RUNNING 15' OVER CREEK TO} \\ & \ \mbox{SPRING LB} \\ 286.00 & 30028 \ \mbox{ALDER CREEK TRIB RB} \\ & \ \mbox{COBBLE WALL LB W/12' CEMENT DRAINAGE} \\ & \ \mbox{CHUTE; DRAINAGE FROM TRIB WHICH FLOWS} \\ & \ \mbox{UNDER ROAD (BOHE. HWY.) IS DRY} \\ 296.00 & 30523 & 0+ \ \mbox{SHD} & 1+ \ \mbox{SHD} \\ 301.00 & 30795 & 0+ \ \mbox{SHD} \\ 306.00 & 31176 & 0+ \ \mbox{SHD} \\ 307.00 & 31269 & 0+ \ \mbox{SHD} & \ \mbox{SCULPIN} \\ 313.00 & 31626 & 2+ \ \mbox{SHD} & \ \mbox{SCULPIN} \\ 313.00 & 31626 & 2+ \ \mbox{SHD} & \ \mbox{SCULPIN} \\ 316.00 & 32175 \ \ \mbox{CULVERT RB; 2" PIPE LAYING LENGTHWISE} \\ & \ \mbox{IN CREEK EXTENDING 346' - \ \ \mbox{NOT IN USE} \\ 320.00 & 32373 \ \mbox{BRIDGE #10 @ TOWER RD. \\ \end{array}$	247.00 2	7417	CHANNEL CHANGE TO F2
$\begin{array}{llllllllllllllllllllllllllllllllllll$	258.00 2	8072	1+ SHD
269.00 28868 LOGJAM; 20" CULVERT RB 271.00 29244 PUMP RB W/PIPING EXTENDING UPSLOPE INTO DRY TRIB, CULVERT EXTENDING UNDER ROAD- (BOHE. HWY.) 0+ SHD 272.00 29283 DRY TRIB LB; 0+ SHD 274.00 29370 2+ SHD 276.00 29453 0+ SHD 277.00 29492 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29688 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30523 0+ SHD; 1+ SHD 297.00 30533 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 301.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175	264.00 2	8376	18" CULVERT RB - ERODING
271.0029244PUMP RB W/PIPING EXTENDING UPSLOPE INTO DRY TRIB, CULVERT EXTENDING UNDER ROAD- (BOHE. HWY.) 0 + SHD272.0029283DRY TRIB LB; 0 + SHD274.00293702 + SHD276.00294530 + SHD277.00294921 + SHD278.0029526EROSION RB - SEE EROSION FORM283.0029868CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB286.0030028ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY296.00305230 + SHD; 1 + SHD297.0030553OLD FRIDGE IN CREEK299.00306170 + SHD301.00307950 + SHD305.00311760 + SHD313.00316262 + SHD, 0 + SHD315.0031878WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3"316.0032175CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE320.0032373BRIDGE #10 @ TOWER RD.	268.00 2	8587	1+ SHD
EXTENDING UPSLOPE INTO DRY TRIB, CULVERT EXTENDING UNDER ROAD- (BOHE. HWY.) 0+ SHD 272.00 29283 DRY TRIB LB; 0+ SHD 274.00 29370 2+ SHD 276.00 29453 0+ SHD 277.00 29492 1+ SHD 277.00 29492 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 301.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	269.00 2	8868	LOGJAM; 20" CULVERT RB
$\begin{array}{rcrcrc} DRY TRIB, CULVERT EXTENDING UNDER \\ ROAD- (BOHE. HWY.) \\ 0+ SHD \\ 272.00 & 29283 DRY TRIB LB; 0+ SHD \\ 274.00 & 29370 & 2+ SHD \\ 276.00 & 29453 & 0+ SHD \\ 277.00 & 29492 & 1+ SHD \\ 278.00 & 29526 & EROSION RB - SEE EROSION FORM \\ 283.00 & 29868 CEMENT WELL RB; WATER HOLDING TANK \\ RB W/1" PVC RUNNING 15' OVER CREEK TO \\ SPRING LB \\ 286.00 & 30028 & ALDER CREEK TRIB RB \\ COBBLE WALL LB W/12' CEMENT DRAINAGE \\ CHUTE; DRAINAGE FROM TRIB WHICH FLOWS \\ UNDER ROAD (BOHE. HWY.) IS DRY \\ 296.00 & 30523 & 0+ SHD; 1+ SHD \\ 297.00 & 30553 & OLD FRIDGE IN CREEK \\ 299.00 & 30617 & 0+ SHD \\ 301.00 & 30795 & 0+ SHD \\ 306.00 & 31176 & 0+ SHD \\ 307.00 & 31269 & 0+ SHD, SCULPIN \\ 313.00 & 31626 & 2+ SHD, 0+ SHD \\ 315.00 & 31878 WET TRIB LB; 2" PVC PIPE FROM WET \\ TRIB OVER CREEK 3" \\ 316.00 & 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE \\ 320.00 & 32373 BRIDGE #10 @ TOWER RD. \\ \end{array}$	271.00 2	9244	PUMP RB W/PIPING
$\begin{array}{rcl} & \text{ROAD-} & (\text{BOHE.} & \text{HWY.}) \\ & 0 + & \text{SHD} \\ \hline \\ 272.00 & 29283 & \text{DRY TRIB LB;} & 0 + & \text{SHD} \\ 274.00 & 29370 & 2 + & \text{SHD} \\ 276.00 & 29453 & 0 + & \text{SHD} \\ 277.00 & 29492 & 1 + & \text{SHD} \\ \hline \\ 278.00 & 29526 & \text{EROSION RB} - & \text{SEE EROSION FORM} \\ \hline \\ 283.00 & 29868 & \text{CEMENT WELL RB; WATER HOLDING TANK} \\ & \text{RB W/1" PVC RUNNING 15' OVER CREEK TO} \\ & & \text{SPRING LB} \\ \hline \\ 286.00 & 30028 & \text{ALDER CREEK TRIB RB} \\ & & \text{COBBLE WALL LB W/12' CEMENT DRAINAGE} \\ & & \text{CHUTE; DRAINAGE FROM TRIB WHICH FLOWS} \\ & & & \text{UNDER ROAD (BOHE. HWY.) IS DRY} \\ \hline \\ 296.00 & & 30523 & 0 + & \text{SHD; } 1 + & \text{SHD} \\ \hline \\ 297.00 & & 30553 & \text{OLD FRIDGE IN CREEK} \\ \hline \\ 299.00 & & 30617 & 0 + & \text{SHD} \\ \hline \\ 301.00 & & 30795 & 0 + & \text{SHD} \\ \hline \\ 307.00 & & 31269 & 0 + & \text{SHD} \\ \hline \\ 313.00 & & 31626 & 2 + & \text{SHD, } 0 + & \text{SHD} \\ \hline \\ 315.00 & & & 31878 & \text{WET TRIB LB; } 2" & \text{PVC PIPE FROM WET} \\ & & & & & & & & \\ & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ 316.00 & & & & & & & & & \\ & & & & & & & & &$			EXTENDING UPSLOPE INTO
$\begin{array}{rcrcrc} 0+ \ {\rm SHD} \\ 272.00 & 29283 \ {\rm DRY \ TRIB \ LB; \ 0+ \ {\rm SHD} } \\ 274.00 & 29370 \ 2+ \ {\rm SHD} \\ 276.00 & 29453 \ 0+ \ {\rm SHD} \\ 277.00 & 29492 \ 1+ \ {\rm SHD} \\ 278.00 & 29526 \ {\rm EROSION \ RB \ - \ SEE \ {\rm EROSION \ FORM} } \\ 283.00 & 29868 \ {\rm CEMENT \ WELL \ RB; \ WATER \ HOLDING \ TANK \ RB \ W/1" \ {\rm PVC \ RUNNING \ 15' \ OVER \ CREEK \ TO \ SPRING \ LB \\ 286.00 & 30028 \ {\rm ALDER \ CREEK \ TRIB \ RB \ COBBLE \ WALL \ LB \ W/12' \ {\rm CEMENT \ DRAINAGE \ CHUTE; \ DRAINAGE \ FROM \ TRIB \ WHICH \ FLOWS \ UNDER \ ROAD \ (BOHE. \ HWY.) \ IS \ DRY \\ 296.00 & 30523 \ 0+ \ {\rm SHD}; \ 1+ \ {\rm SHD} \\ 297.00 & 30553 \ OLD \ {\rm FRIDGE \ IN \ CREEK \ 299.00 \ 30617 \ 0+ \ {\rm SHD} \\ 301.00 & 30795 \ 0+ \ {\rm SHD} \\ 301.00 & 30795 \ 0+ \ {\rm SHD} \\ 307.00 & 31269 \ 0+ \ {\rm SHD} \\ 307.00 & 31269 \ 0+ \ {\rm SHD} \\ 313.00 & 31626 \ 2+ \ {\rm SHD}, \ O+ \ {\rm SHD} \\ 315.00 & 31878 \ {\rm WET \ TRIB \ LB; \ 2" \ PVC \ PIPE \ FROM \ WET \ TRIB \ OVER \ CREEK \ 3" \\ 316.00 & 32175 \ CULVERT \ RB; \ 2" \ PIPE \ LAYING \ LENGTHWISE \ IN \ CREEK \ EXTENDING \ 346' \ - \ NOT \ IN \ USE \\ 320.00 & 32373 \ {\rm BRIDGE \ \#10 \ @ \ TOWER \ RD. \\ \end{array}$			DRY TRIB, CULVERT EXTENDING UNDER
 272.00 29283 DRY TRIB LB; 0+ SHD 274.00 29370 2+ SHD 276.00 29453 0+ SHD 277.00 29492 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD. 			ROAD- (BOHE. HWY.)
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 276.00 29453 0+ SHD 277.00 29492 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD. 	272.00 2	9283	DRY TRIB LB; 0+ SHD
277.00 29492 1+ SHD 278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	274.00 2	9370	2+ SHD
278.00 29526 EROSION RB - SEE EROSION FORM 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 $0+$ SHD; $1+$ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 $0+$ SHD 301.00 30795 $0+$ SHD 307.00 31269 $0+$ SHD, SCULPIN 313.00 31626 $2+$ SHD, $0+$ SHD 315.00 31878 WET TRIB LB; $2"$ PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; $2"$ PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	276.00 2	9453	0+ SHD
 283.00 29868 CEMENT WELL RB; WATER HOLDING TANK RB W/1" PVC RUNNING 15' OVER CREEK TO SPRING LB 286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 312.69 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD. 	277.00 2	9492	1+ SHD
$\begin{array}{rcl} & \operatorname{RB} \ \ensuremath{W}/1" \ \ensuremath{PVC}\ \ensuremath{RUNNING}\ \ 15' \ \ensuremath{OVER}\ \ \ensuremath{CREEK}\ \ \ensuremath{TRIB}\ \ \ensuremath{RE}\ \ \ensuremath{CPINE}\ \ \ensuremath{ROM}\ \ \ensuremath{POM}\ \ \ensuremath{ROM}\ \ \ensuremath{POM}\ \ \ensuremath{ROM}\ \ \ensuremath{ROM}\ \ \ensuremath{ROM}\ \ensuremath{ROM}\ \ \ensuremath{ROM}\ \ \ensuremath{ROM}\ \ \ensuremath{ROM}\ \ensuremath$	278.00 2	9526	EROSION RB - SEE EROSION FORM
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286.00 30028 ALDER CREEK TRIB RB COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.			
COBBLE WALL LB W/12' CEMENT DRAINAGE CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 306.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.			
CHUTE; DRAINAGE FROM TRIB WHICH FLOWS UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	286.00 3	0028	
UNDER ROAD (BOHE. HWY.) IS DRY 296.00 30523 0+ SHD; 1+ SHD 297.00 30553 OLD FRIDGE IN CREEK 299.00 30617 0+ SHD 301.00 30795 0+ SHD 306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.			
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<pre>306.00 31176 0+ SHD 307.00 31269 0+ SHD, SCULPIN 313.00 31626 2+ SHD, 0+ SHD 315.00 31878 WET TRIB LB; 2" PVC PIPE FROM WET TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.</pre>			
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TRIB OVER CREEK 3" 316.00 32175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.			•
316.0032175 CULVERT RB; 2" PIPE LAYING LENGTHWISE IN CREEK EXTENDING 346' - NOT IN USE320.0032373 BRIDGE #10 @ TOWER RD.	315.00 3	1878	
IN CREEK EXTENDING 346' - NOT IN USE 320.00 32373 BRIDGE #10 @ TOWER RD.	316.00 3	2175	
320.00 32373 BRIDGE #10 @ TOWER RD.	220.00 5	,,	
	320.00 3	2373	

326.00	33149	CAMP MEEKER DAM - SUMMER FLASHBOARD
327.00	33179	0+ SHD, DRY TRIB LB
332.00	33389	0+ SHD
334.00	33513	0+ SHD; BRIDGE #11 - BOHE. HWY.
336.00	33658	0+ SHD
		1 1/4" WATER DIVERSION PIPE (PVC)
		4.5' OVER CREEK
339.00	34060	0+ SHD
341.00	34254	0+ SHD
342.00	34482	0+ SHD; EROSION - SEE FORM
343.00	34509	0+ SHD
345.00	34705	(3) 2+ SHD(POSSIBLE RESIDENTS)
		NICE POOL
349.00	34938	0+ SHD
352.00	35189	LANCEL CREEK CONFLUENCE RB
353.00	35241	0+ SHD; 2+ SHD
356.00	35357	ABUNDANCE OF SMALL BLACK SNAILS
357.00	35388	2+ SHD, 0+ SHD
358.00	35456	1" PVC PIPE ACROSS CREEK;
		2' ABOVE CREEK
359.00	35494	0+ SHD
361.00	35555	CULVERT LB; EROSION LB;
		LOG JAM (SEE FORM)
365.00		
366.00	35751	0+ SH
374.00	36301	CULVERT LB - DRAINAGE FROM ROAD
381.00	36629	0+ SHD
382.00	36719	2.5' CULVERT RB - 110' OFF BANK
383.00	36748	0+ SHD
385.00	36833	0+ SHD
		0+ SHD
		0+ SHD
396.00		
397.00	37654	0+ SHD
404.00		0+ SHD
406.00		CHANNEL CHANGE TO G
410.00	38749	CULVERT - SEE FORM; 1 3/4" METAL
		PIPE RUNNING 7.5' ACROSS CREEK
414.00	39036	FLASHBOARD DAM 4 - SEE FORM;
		INSULATED 1" PIPE 4' OVER CREEK
416.00	39147	0+ SHD; BACKED UP BY ROCK WEIR;
		2 4" WATER PIPES 7' OVER CREEK;
		PUMPHOUSE RB; 1 1/4" PVC IN CREEL
		CULVERT LB - SEE FORM
		0+ SHD
		CULVERT LB - SEE FORM
		0+ SHD
		INSTREAM CULVERT - SEE FORM
429.00	40402	END OF SURVEY

PROBLEM SITES AND LANDMARKS - ALDER CREEK SURVEY COMMENTS HABITAT STREAM COMMENTS UNIT # LEN (FT.) 1.00 434 FIRST 148' CHANNELIZED BY 4 8'ROCK WALLS W/CONCRETE BOTTOM BRIDGE FORM 2 DRY TRIBS RB 3.00 695 BEDROCK CASCADE 14.5' JUMP . ROCK WALLS BOTH BANKS W/DECK LB. SERIES OF CASCADES 8.5', 8.5',11'.8" SEDIMENT SOURCE LB--SEE FIELD BOOK 8.00 991 OLD ROCK DAM-SHEET FILLED W/GRAVEL TO RIM DRY ABOVE TO HEADWATERS AREA. RD 40' ABOVE END OF SURVEY. #008 . SEE

PROBLEM SITES AND LANDMARKS - BAUMERT SPRINGS SURVEY COMMENTS

COMMENTS.

FIELD BK. #2 FOR ADDITIONAL

HABITAT UNIT #	DISTANCE UPSTREAM	COMMENTS
2	77	(4) 0+ SH
5	206	0+ SH
11	444	Bank Armorment LB
12	473	Rock
14	512	Pump piping found throughout creek on LB & RB
15	539	fish spotted above
23	755	Erosion Blowout
24	764	Culvert in stream.
25	799	<i>Culvert LB. Two massive water tanks on LB Dia= 17'</i>
30	1023	-Culvert -Instream Barrier: could be repaired. ****End of Survey****

PROBLEM	SITES	AND	LANDMARKS -	DUVOUL	CREEK	SURVEY	COMMENTS
	HAB	ITAT	STREAM	C	OMMENTS	5	
	UN_{-}	IT #	LEN (FT.)			

1.00	7 <i>9</i>	CULVERT
2.00	116	FRESHWATER SNAILS
6.00	617	BARRIER 80' ANGLE BEDROCK FALLS
		30.5' HIGH
8.00	668	Definite Barrier- 80 degree angle
		bedrock falls 30.5' high
9.00	674	Juvenile newts
10.00	744	*** unit #008
		****End of Survey****

PROBLEM SITES AND LANDMARKS - GRUB CREEK SURVEY COMMENTS

HABITAT UNIT #	STREAN LEN (F1	
1.00	126	1' of gravel aggraded at mouth
3.00		BEDROCK = CONCRETE BOX CULVERT, DEPTH LESS THAN .1, BUT STILL FLOWING
5.00	585	ROAD ENTER CREEK THEN LEAVES CR. 100' UPSTREAM . 2 LOG WEIRS RETAINING GRAVEL. INCREASING GRADE @ START OF UNIT. DRY TRIB LB
6.00	609	RD RUNS ALONG CR. LB . 3-4 0+ SHD
7.00	7 <i>92</i>	WATER DIVERSION PIPE OVER CR. 12" CULVERT LB NO MAINTENANCE . DRY TRIB RB
18.00	1404	DRY TRIB RB. RB BLOWOUT DOWN TO BEDROCK 25L X 50W X 10D
19.00	1421	12" CULVERT LB NO MAINT.
20.00	1440	DRY TRIB RB
21.00	1451	TADPOLES
22.00	1478	ACTIVE EROSION FROM ROAD LB 50L X 20H
23.00	1529	2 SM. FROGS
24.00	1562	12" CULVERT LB NO MAINT. 2+ SHD
32.00	2087	BLOWOUT RB
34.00	2229	1+ SHD
36.00	2368	DRY TRIB LB. ACTIVE EROSION ALONG RD. LB 30L X 10 H
38.00	3011	PLASTIC & METAL PIECES IN CR. DRY TRIB LB. 2 FORKS. CULVERT IN STREAM 12" CULVERT LB.
39.00	3030	OLD ROCK DAM RB. 2 LG PIECES OF DAM IN CR. BANK EROSION 370' INTO UNIT. RIPARIAN ZONE IS DEPLETED.
40.00	4115	OLD LAKE BED 1ST 600' OF UNIT LG.

		DRY TRIB RB. ARRUNDO DONAX LB 30'.
		CROSSING AFTER LAKE BED RD. INTO
		LAKE BED (DRY TRIB)
41.00	4126	DRY TRIB RB
42.00	4292	18" CULVERT LB. UNDERSIZED FOR
		TRIBS
43.00	4310	LOTS 'O' FROGS CULVERT INSTREAM @
		END OF UNIT
44.00	4908	DRY TRIB RB-2 DRY TRIB LB SM.
		SLIDE LB 35L X 40W X 10D
		BLANCHARD PROP. BEGINS FLOATING
		FENCE 370' INTO UNIT
47.00	4991	MACROINVERTEBRATES
48.00	5231	DRY TRIB RB. BANK SLUMP LB 60W X
		50L BOULDER CLOG AT END OF UNIT
50.00	5344	DRY TRIB LB. 2 BANK EROSION RB 30L
		X 30 W X 10 D EVIDENCE OF COWS
		IN CR.
52.00	5556	DRY TRIB RB COW TRAILS ALONG CR.
		LB/RB
53.00	5610	MACROINVERTEBRATES
56.00	5698	DRY TRIB LB
57.00	5866	BANK EROSION RB 30L x 40 W x 5D
		BANK EROSION LB SLIDE 25L X 40W X
		5D
60.00	6007	ERODED BANK LB 40L X 20W
63.00	6090	EVID. OF COWS IN CR. DRY TRIB LB
64.00	6184	BANK EROSION R/B 30L X 35W
66.00	6211	17.5' BEDROCK CASCADE
		AT HEADWATERS FORK.
		DRY ABOVE CHANNEL WIDTH LESS THAN
		3' NO FISH OBSERVED 8/7/97.
		END OF SURVEY***

PROBLEM SITES AND LANDMARKS - TYRONE GULCH CREEK SURVEY COMMENTS

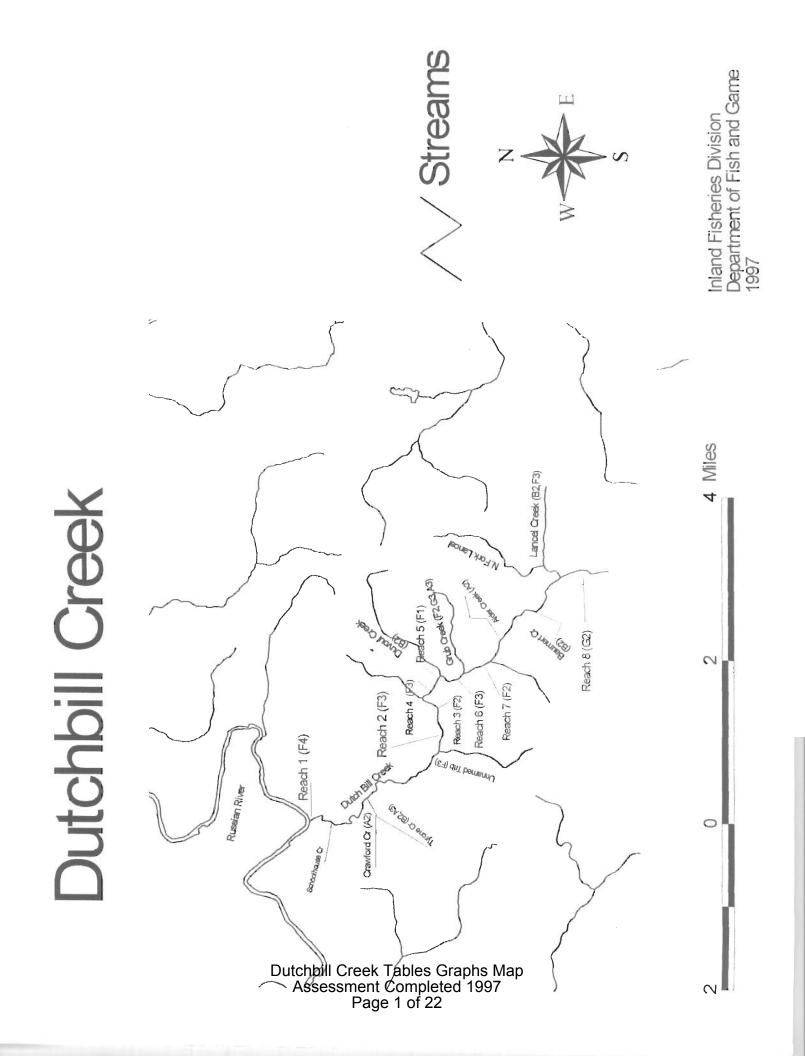
HABITAT	STREAM	COMMENTS
UNIT #	LEN (FT.)	

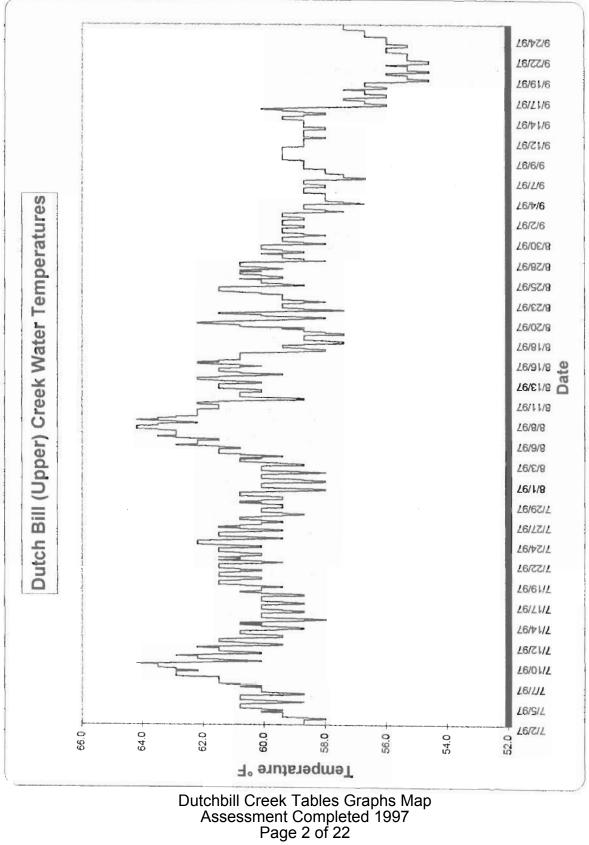
1.00	111	Culvert sheet, Hab unit#004 landowner says
		not as many prawns as in the
		past-or steelhead. He thinks the
		decline occurred when the culvert
		was placed. Flows under landowner
		porch; concrete weir; Oplus SHD
3.00	447	0 plus SHD
4.00	477	pump on r/b; 0 plus

8.00
633 confluence with Crawford Gulch tributary
11.00
795 Beginning of new channel
21.00
1331 Sculpin; 0 plus SHD; dry trib at r/b
26.00
1528 2 plus SHD; residents?
28.00
1640 END OF SURVEY**

PROBLEM SITES AND LANDMARKS - UNNAMED CREEK SURVEY COMMENTS

HABITAT	STREAM	I COMMENTS
UNIT #	LEN (FT	· .)
3.00	85	0 plus SHD
8.00	256	2 Oplus SHD; pumphouse on r/b
11.00	390	Sculpin; Oplus SHD
13.00	47 <i>2</i>	channel type
14.00	573	Channel Type
19.00	758	0 plus SHD
31.00	1164	0 plus SHD, Sculpin
32.00	1266	Dry trib at R/B
35.00	1521	Dry Trib RB
36.00	1697	Railroad tracks up above; fish
		- END OF SURVEY***





DUTCHBILL CREEK

Drainage: Rusian River

Survey Dates: 08/12/97 to 09/10/97 Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES

LATITUDE: 0°0'0" LONGITUDE: 0°0'0" LEGAL DESCRIPTION: Confluence Location: QUAD:

MEAN	RATING		0	4	21	0			
MEAN RESIDUAL	POOL VOL	(cu.ft.)	0	0	1452	0			
MEAN ESTIMATED DLUME TOTAL	VOLUME	(cu.ft.)	10564	53155	428508	32400	TOTAL VOL.	(cu. ft.)	524627
MEAN R	AREA (cu.ft.)		26	475	2613	1080	10	Ū	
ESTIMATED TOTAL	AREA	(sq.ft.)	30578	90248	173368	16200	TOTAL AREA	(sq. ft.)	310394
MEAN AREA	(sq.ft.)		281	806	1057	240			
MEAN DEPTH	(ft.)		0.3	0.6	1.3	2.0			
MEAN	(ft.)		6.3	10.5	12.5	12.0			
PERCENT	LENGTH		18	27	26	29			
Indus	(ft.)		6952	10725	10119	11475	TOTAL LENGTH	(ft.)	39271
MEAN LENGTH	(ft.)		64	96	62	383	TOTAL		
HABITAT PERCENT	OCCURRENCE		26	27	40	2			
HABITAT TYPE			RIFFLE	FLATWATER	POOL	DRY			
FULLY	MEASURED		15	13	59	0	TOTAL	UNITS	87
HABITAT	~		ۇ Du	tch As	nbi sse	⊮ III C ess	mer	π	5 Tables Graphs Ma Completed 1997 e 3 of 22

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS SURVEY Dates Confluence Location: GUAD: LEGAL DESCRIPTION: LATITUDE: 0° HABITAT UNITS HABITAT HABITAT MEAN TOTAL TOTAL MEAN MEAN MAXIMUM UNITS FULLY YYPE DOCURRENCE LENGTH LENGTH LENGTH WIDTH DEPTH DEPTH MEASURED	Survey Dates: 08/12/97 to 09/10/97 LATITUDE: 0°0'0" LONGITUDE: 0°0'	/97 to 09/10/97				
Location: QUAD: LEGAL DESCRIPTION: UNITS HABITAT HABITAT MEAN TOTAL TOTAL MEAN I FULLY TYPE OCCURRENCE LENGTH LENGTH LENGTH WIDTH DI ASLARED		71INF - 0°01C				
HABITAT HABITAT MEAN TOTAL TOTAL MEAN MEAN M TYPE OCCURRENCE LENGTH LENGTH LENGTH WIDTH DEPTH						
TYPE OCCURRENCE LENGTH LENGTH LENGTH WIDTH DEPTH	MEAN	TOTAL MEAN	TOTAL	MEAN MEAN	AN	MEAN
MEASURED	DEPTH AREA A	AREA VOLUME	VOLUME F	VOLUME RESIDUAL SHELTER		CANOPY
	u	EST.	EST. F	POOL VOL RATING	NG	
% ft. ft. % ft. ft.	ft. sq.ft. sq.	sq.ft. cu.ft.	cu.ft.	cu.ft.		%
11 LGR 24 64 6356 16 7 0.3	1.1 324 32	32100 110	10873	0	0	93
1 31 122 0	0.8 196	784 118	470	0	0	93
1 CAS 1 123 370 1 3 0.2	0.6 26	79 5	16	0	0	85
2 BRS 1 35 104 0 4 0.3	0.5 57	170 16	49	0	0	90
3 GLD 6 77 1772	1.2 1196 27	27503 793	18247	0	m	88
52 4 RUN 13 66 3423 9 10 0.5	1.3 536 27	27896 301	15667	0	2	56
37 6 SRN 9 149 5530 14 8 0.6	1.5 818 30	30257 424	15695	0	9	89
1 TRP 0 66 66 0 10 1.7	3.2 660	660 1122	1122	0	5	100
-	5.5 738 23	23606 1139	36448	1000	11	64
3 GGP 1 59 177 0 17 1.7	5.7 976 2	2927 1817	5451	1553	13	82
4 STP 2 88 793 2 10 1.2	4.2 662 5	5956 881	7927	117	18	63
1 CRP 1 61 244 1 9 0.9	3.2 524 2	2095 468	1871	558	13	92
48	4.5 885 1	1770 2099	4197	3630	40	88
12 54 2610 7	645	30969 920	44155	984	28	88
3 61 849 2	5.6 695 9	9733 1233	17266	1045	14	06
7 LSB9 10 46 1850 5 11 1.1	4.5 543 21	21716 747	29893	551	23	64
4 PLP 2 43 302 1 21 1.7	5.5 877 6	6136 2045	14314	1908	33	74
35	2.8 333	333 299	299	0	30	35
52	2.7 225	225 225	225	0	10	60
2 DPL 0 684 1367 3	9.8 33059 66	4444 L1199	260935	66864	15	60
30 0 DRY 7 383 11475 29 12 2.0	3.7 540 16	16200 1080	32400	0	0	87
TOTAL TOTAL LENGTH	AF	AREA TOTA	TOTAL VOL.			
UNITS UNITS (ft.)	(sq. ft)		(cu.ft)			
415 87 39271	307231	131	517520			

DUTCHBIL	DUTCHBILL CREEK						brain	nage: Ru	Drainage: Rusian River					
Table 3	- SUMMARY	Table 3 - SUMMARY OF POOL TYPES	s				SULV	ey Dates	Survey Dates: 08/12/97 to 09/10/97	to 09/10/	76			
Confluer	Confluence Location: QUAD:	n: QUAD:	LE	LEGAL DESCRIPTION:	TION:		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	10.0			
HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE O	HABITAT PERCENT OCCURRENCE	MEAN LENGTH	TOTAL LENGTH	TOTAL PERCENT ENGTH TOTAL LENGTH	MEAN WIDTH	MEAN DEPTH	MEAN AREA	TOTAL AREA EST.	MEAN VOLUME	TOTAL VOLUME EST.	MEAN RESIDUAL POOL VOL.	MEAN SHELTER RATING
				(ft.)	(ft.)		(ft.)	(ft.) (ft.)	(sq.ft.)	(sq.ft.) (sq.ft.) (cu.ft.) (cu.ft.) (cu.ft.)	(cu.ft.)	(cu.ft.)	(cu.ft.)	
S Du	17	MAIN	27	61	2741	27	12.8	1.3	737	33148	1132	20947	226	12
fch As	38	SCOUR	02	52	5951	59	11.8	1.2	628	72259	796	111163	912	25
⊸ nbill sses	4	BACKWATER	2	357	1427	14	30.3	2.4	16669	66675	65365	261459	66864	18
Creek Tables Graphs Map ssment Completed 1997 Page 5 of 22	TOTAL UNITS 59			TOTAL	TOTAL LENGTH (ft.) 10119				4	TOTAL AREA (sq.ft.) 172082	lee .	TOTAL VOL. (cu.ft.) 423569		

DUTCHBILL CREEK

Drainage: Rusian River

Survey Dates: 08/12/97 to 09/10/97 Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES

3-<4 FT. 3-<4 FOOT >=4 FEET >=4 FEET	MAXIMUM PERCENT MAXIMUM PERCENT	DEPTH OCCURRENCE DEPTH OCCURRENCE	1 100 0	2 6 3	0 0 1 33	0 0 1	1 33 0	0 0 1 50	9 19 3	2 14 2 14	4 10 1	1 14 3 43	0 0 0	0 0 0	0 0 2 100		
2-<3 FOOT 3-	PERCENT M	DEPTH OCCURRENCE	0	38	33	44	33	0	35	43	33	14	100	100	0		
	MAXIMUM	DEPTH O	0	12	-	4	-	0	17	9	13	-	-	-	0		
1-<2 FOOT 2-<3 FT.	PERCENT	OCCURRENCE	0	25	33	44	33	50	40	29	55	29	0	0	0		
1-<2 FT.	MAXIMUM	DEPTH	0	15	-	4	ſ	-	19	4	22	2	0	0	0		
<1 FOOT	PERCENT	OCCURRENCE	0	0	0	0	0	0	0	0	0	0	0	0	0	r	
<1 FOOT	MAXIMUM	DEPTH C	0	0	0	0	0	0	0	0	0	0	0	0	0		
HABITAT	PERCENT	OCCURRENCE	-	20	ίN.	5	ŝ	-	29	¢	24	4	-	-	~		
HABITAT	TYPE		TRP	MCP	ССР	STP	CRP	LSL LSL	LSR	LSBK	LSBO	PLP	BPR	BPL	DPL		
UNITS	MAX DPTH	MEASURED	- -	≌ Dut	∽ tch As	∘ nbi	™ (≥SS	∼ Cre	ee	≵ k nt(₽ Ta Co	⊳ ble	es ple	G	rap ed 1	hs N 997	

Table 5 - Summery of Shelter by Habitat Type Summery of Shelter by Habitat Type Table 5 - Summery of Shelter by Habitat Type Summery of Shelter by Habitat Type Continuence location: GUIO1 LIGGL DESCRIPTION: <													
Contribute Legal DESCRIPTION Lundle Contribute Contrit X contribute Contribute				f Sheiter	by Habita	t Type			Surve	y Dates: 08/'	12/97 to 09	/10/97	
WITS MAITAL X TOTAL X	Conflu	ence	-ocation	: QUAD:		LEGAL DESC	CRIPTION		LATIT	UDE: 0°0'0"	LONGI TUDE	"0.0°0 :	
MeASURED SHELTER TYPE UNDERCUT SH0 LU0 RRAL. AduATIC MITE BOULDERS 9 14 Liak 0	5	SIIN	UNITS	HABITAT	X TOTAL	% TOTAL %	C TOTAL	% TOTAL	% TOTAL	% TOTAL		% TOTAL	% TOTAL
MeANUED RMME MME MME MME MME MME 7 1 1 1 1 0	MEASU	URED	SHELTER	TYPE	UNDERCUT	OMS	R		TERR.	AQUATIC	WHITE	BOULDERS	BEDROCK
% 1 Luk 0		ž	EASURED		BANKS			MASS /	/EGETATION	VEGETATION	WATER		LEDGES
4 1 14(8) 0 <td></td> <td>8</td> <td>14</td> <td>LGR</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>100</td> <td></td>		8	14	LGR	0	0	0	0	0	0	0	100	
3 1 CAS 0	C	4	-	HGR	0	0	0	0	0	0	0	0	0
3 2 845 0	Dut	M	-	CAS	0	0	0	0	0	0	0	0	
23 3 6,0 0	tch	m	2	BRS	0	0	0	0	0	0	0	0	
22 6 Rui 0	nbi	23	M	GLD	0	10	90	0	0	0	0	0	
37 7 Skill 1 0 <td> (</td> <td>52</td> <td>9</td> <td>RUN</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>100</td> <td></td>	(52	9	RUN	0	0	0	0	0	0	0	100	
1 1	Cre	22	~	SRN	-	0	0	0	0	0	M	99	30
X2 31 MCP 29 6 1 34 2 0 0 0 2 2 X2 31 MCP 29 6 1 34 2 0 0 0 0 0 2 2 2 2 1 31 <th< td=""><td>ee</td><td>-</td><td>-</td><td>TRP</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>100</td></th<>	ee	-	-	TRP	0	0	0	0	0	0	0	0	100
3 3	k ⁻	32	31	MCP	29	6	-	34	2	0	0	28	0
9 8 8 7 0	Га	м	м	CCP	10	14	17	31	M	0	0	24	
4 3 CRP 63 8 0 0 3 0 0 26 4 3 CRP 63 8 0 0 3 0 0 26 4 4 5 14 13 15Rk 14 56 16 5 9 0 0 26 4.8 4.7 LSR 18 4 4 6.6 1 2 0 0 0 26 14 13 15Rk 10 5 0 12 0 0 2 2 2 2 2 2 2 2 2 2 1 4	ble	Q,	80	STP	0	0	0	4	0	0	0	92	
2 LSL 14 56 15 5 9 0 0 48 47 LSR 18 4 4 66 1 2 0 5 48 47 LSR 18 4 13 LSRk 10 5 0 12 0 0 5 7 7 7 11 1 BRo 2 1 4 5 0 28 12 0 59 4 4 56 1 2 0 59 12 12 12 12 12 0 0 0 0 0 0 50 0 0 50 12 14	es	4	м	CRP	63	8	0	0	м	0	0	26	
48 47 Lsk 18 4 66 1 2 0 5 14 13 138k 10 5 0 12 0 0 29 5 7 7 7 7 7 7 1 2 0 0 29 28 12 28 12 28 12 29 29 29 29 29 29 29 29 29 29 29 29 20 0 0 20 <t< td=""><td>G</td><td>er.</td><td>N</td><td>LSL</td><td>14</td><td>56</td><td>16</td><td>ŝ</td><td>6</td><td>0</td><td>0</td><td>0</td><td></td></t<>	G	er.	N	LSL	14	56	16	ŝ	6	0	0	0	
14 13 LSBk 10 5 0 12 0 29 4 7 7 7 1 1 2 1 4 13 LSBk 2 1 4 13 LSBk 2 1 4 13 LSBk 2 1 1 2 2 1 4 13 LSBk 2 0 0 0 29 4 28 12 N 4 13 LSBk 12 N 12	rap	6 ⁴ 8	47	LSR	18	4	4	66	-	N	0	2	0
40 38 LSB0 2 1 4 13 0 0 7 78 7 7 7 7 7 7 9 28 12 1 <t< td=""><td>oh</td><td>14</td><td>13</td><td>LSBk</td><td>10</td><td>5</td><td>0</td><td>12</td><td>0</td><td>0</td><td>0</td><td>29</td><td>77</td></t<>	oh	14	13	LSBk	10	5	0	12	0	0	0	29	77
7 7 1 1 29 28 12 1 1 1 1 1 20 0 0 20	s I	40	38	LSBO	2	-	4	13	0	0	0	78	-
1 1 BPR 0 0 0 0 0 20 1 1 BPL 0 0 0 50 0 0 0 2 2 DPL 18 0 42 20 0 0 0 0 0 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1	Ма	~	~	PLP	60	80	7	2	0	29	28	12	
1 1 BPL 0	р	-	-	BPR	0	0	0	80	0	0	0	20	_
2 2 DPL 18 0 42 20 0 20 30 0 RY 0 0 0 0 0 0 0 20 415 191 14 4 15 28 1 2 2 31		-	-	BPL	0	0	0	50	0	50	0	0	-
30 0 RY 0		2	2	DPL	18	0	42	20	0	0	0	20	-
415 191 14 4 15 28 1 2 2 31		30	0	DRY	0	0	0	0	0	0	0	0	-
HABITAF FYPES		415	191		14	4	15	28	-	2	2	31	M
	HABITAT TYPES	h.											

Total Line Curvey Dates: Curve Curvey Dates: Curve Curvey Dates: Curve Curve Curve Curve Curve Curve Curve Curve Curve Curve<	DUTCHBILL CREEK	. CREEK				Drainag	Drainage: Rusian River			
In contrion: Least Description: Latitude: OPOTION: Latitude: OPOTION: UNITS MARITAT X TOTAL SUBSTEART TYPE SILL X TOTAL	able 6 -		DOMINANT	SUBSTRATES BY	HABITAT TYPE	Survey 1	Jates: 08/12/97	to 09/10/97		
UNITS MARTAN X TOTAL X	confluenc	te Location:	auap:	LEGAL	DESCRIPTION:	LATITUDI		ITUDE: 0°0'0"		
SUBSTRATE TYPE SILUCLAT SAMD GRAVEL GRAVEL SAMD GRAVEL GR	TOTAL	UNITS	HABITAT	· · · · · · · · · · · · · · · · · · ·	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL
18 Lar 0 0 1 33 33 22 1 HKR 0 0 0 0 0 0 33 33 22 1 HKR 0 0 0 0 0 0 100 1 HKR 0 0 0 0 0 0 100 6 GLD 0 67 33 25 13 13 13 7 SRM 0 67 33 25 13 23 7 SRM 0 67 0 0 0 0 0 7 SRM 0 67 0 0 0 27 3 CCP 33 0 67 0 0 0 0 17 TRP 0 0 0 0 0 0 0 0 17 CRP 33 25	HABITAT	SUBSTRATE MEASURED	TYPE	SILT/CLAY DOMINANT	SAND DOMINANT	GRAVEL DOMINANT	SM COBBLE DOMINANT	LG COBBLE DOMINANT	BOULDER	BEDROCK DOMINANT
1 HR 0 0 0 0 10 1 EAS 0 0 0 0 0 10 1 EAS 0 0 0 0 0 0 0 10 1 EAS 0 67 33 0 0 0 0 0 10 2 SIN 0 67 33 0 0 0 0 0 0 0 0 0 0 0 0 11 13 25 13 14 14 14 14 14 14 14 14<	ڳو ا		LGR	0	0	11	33	33	22	0
1 C4S 0	Ĵ₫	1	HGR	0	0	0	0	0	100	0
1 RS 0	tcł As	-	CAS	0	0	0	0	0	100	0
6 GLD 0 67 33 0 0 67 33 0 </td <td>nbi sse</td> <td>1</td> <td>BRS</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>100</td>	nbi sse	1	BRS	0	0	0	0	0	0	100
8 RUN 0 25 13 25 13 25 13 7 7 RN 0 14 1 78 0 25 13 7 7 RN 0 14 29 MCP 0 14 29 33 3 CCP 33 0 67 11 0 14 29 33 4 STP 33 0 67 0 0 11 29 33 1 CRP 33 0 67 0 0 11 29 13 2 LSR 0 0 0 0 0 3 3 14	i P es	9	GLD	0	67	33	0	0	0	0
7 SRN 0 14 14 29 R/R 0 29 C 29 2	Cr sm	Ø	RUN	0	25	13	25	13	13	13
1 TRP 0 11 0 11 0 11 0 11 11 0 0 11 11 0 0 0 0 0 0 0 0 11<	ee ner	2	SRN	0	14	14	29	0	29	14
9 MCP 0 56 11 0 11 3 CCP 33 0 67 0 11 11 4 STP 0 0 67 0 0 0 0 0 1 CRP 33 0 67 0	k nt	-	TRP	0	0	0	0	0	0	100
3 CCP 33 0 67 0 0 0 67 0 0 1 1 CRP 0 0 0 0 0 0 0 50 <t< td=""><td>Га Сс</td><td>6</td><td>MCP</td><td>0</td><td>56</td><td>11</td><td>0</td><td>11</td><td>11</td><td>11</td></t<>	Га Сс	6	MCP	0	56	11	0	11	11	11
4 STP 0 0 0 0 0 0 1 50	blo	м	CCP	33	0	67	0	0	0	0
1 CRP 100 0 <td>es pl</td> <td>4</td> <td>STP</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>50</td> <td>50</td>	es pl	4	STP	0	0	0	0	0	50	50
2 ISL 0 50 50 0 0 0 19 LSR 5 42 26 26 0 0 0 6 LSBK 0 0 33 17 17 0 0 3 PLP 0 0 33 17 17 0 0 1 BPR 0 25 13 25 13 25 25 13 25 1 BPL 0 0 25 13 25	Ğ ete	-	CRP	100	0	0	0	0	0	0
19 LSR 5 42 26 26 0 0 6 LSBK 0 0 33 17 17 0 0 8 LSBo 0 0 33 17 17 0 0 3 PLP 0 25 13 25 13 25 25 1 BPL 0 26 0 0 0 0 0 25 1 BPL 0 0 100 0 0 0 0 0 25 1 BPL 100 0 0 0 0 0 0 0 25	ra ed	2	LSL	0	50	50	0	0	0	0
6 LSBK 0 0 33 17 17 0 8 LSBo 0 25 13 25 13 25 13 25 3 PLP 0 67 0 0 0 0 25 13 25 25 25 1 BPL 0 67 0 100 0 0 0 25 25 1 BPL 100 0 100 0 0 0 0 25 2	ph 19	19	LSR	5	42	26	26	0	0	0
8 LSB0 0 25 13 25 13 25 3 1 25 25 13 25 25 13 25 25 13 25 13 25 13 25 13 25 13 25 13 25 13 25 13 25 14 10 0 0 0 0 0 0 1 14 14 100 0 0 0 0 0 0 0 0 1 14 14 100 0 0 0 0 0 0 0 0 0 0 1 14	s [*] 99	6	LSBK	0	0	33	17	17	0	33
3 PLP 0 67 0 0 1 0 1 0	Mła 7		LSBO	0	25	13	25	13	25	0
1 BPR 0 0 100 0 <td>ap</td> <td></td> <td>PLP</td> <td>0</td> <td>67</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>33</td>	ap		PLP	0	67	0	0	0	0	33
1 BPL 100 0 0 0 0 0 0 0 2 2 PPL 0 </td <td>-</td> <td>۴</td> <td>BPR</td> <td>0</td> <td>0</td> <td>100</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	-	۴	BPR	0	0	100	0	0	0	0
2 DPL 0 50 0 0 50 0 20 21 DRY 0 24 76 0 0 0 0	-	-	BPL	100	0	0	0	0	0	0
21 DRY 0 24 76 0 0 0 0	2	2	DPL	0	50	0	0	50	0	0
	30	21	DRY	0	24	76	0	0	0	0

DUTCHBILL CREEK

Mean	Mean	Mean	Mean	Mean
Percent	Percent	Percent	Right bank	Left Bank
Canopy	Evergreen	Deciduous	% Cover	% Cover
90.17	52.10	47.90	78.31	

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	16	11	10.63
Boulder	7	8	5.91
Cobble/Gravel	0	1	0.39
Silt/clay	104	107	83.07

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	4	6	3.94
Deciduous Trees	67	55	48.03
Evergreen Trees	55	66	47.64
No Vegetation	1	0	0.39

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STREAM NAME: DUTCHBILL CREEK SAMPLE DATES: 08/12/97 to 09/10/97 SURVEY LENGTH: SIDE CHANNEL: 400 ft. MAIN CHANNEL: 38871 ft. MAIN CHANNEL: 388/1 IC. LOCATION OF STREAM MOUTH: Latitude: 0°0'0" USGS Quad Map: Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-114) Channel Type: F4 Main Channel Length: 16253 ft.Evergreen Component: 48%Side Channel Length: 288 ft.Deciduous Component: 52% Riffle/Flatwater Mean Width: 5.6 ft. Pools by Stream Length: 19% Pool Mean Depth: 1.3 ft.Pools >=2 ft. Deep: 68%Base Flow: 0.0 cfsPools >=3 ft. Deep: 30%Water: 59-64°F Air: 59-71°FMean Pool Shelter Rtn: 25Dom. Bank Veg.: Deciduous TreesDom. Shelter: Root massesBank Vegetative Cover: 86%Occurrence of LOD: 38% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 11345 ft. Embeddness Value: 1. 27% 2. 37% 3. 13% 4, 23%

STREAM REACH 2 (Units 115-134) Channel Type: F3 Main Channel Length: 1320 ft. Evergreen Component: 35% Side Channel Length: 0 ft. Deciduous Component: 65% Riffle/Flatwater Mean Width: 13.0 ft. Pools by Stream Length: 41% Pool Mean Depth: 1.3 ft. Pool Mean Depend DependPool Pool PoolBase Flow: 0.0 cfsPools >=3 It. Deep. 110Water: 60-60°F Air: 59-62°FMean Pool Shelter Rtn: 26Dom. Bank Veg.: Deciduous TreesDom. Shelter: Root massesBank Vegetative Cover: 82%Occurrence of LOD: 53% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft. Embeddness Value: 1. 0% 2. 78% 3. 22% 4. 0%

STREAM REACH 3 (Units 135-154) Channel Type: F2Mean Canopy Density: 82%Main Channel Length: 2825 ft.Evergreen Component: 52%Side Channel Length: 0 ft.Deciduous Component: 48% Riffle/Flatwater Mean Width: 13.4 ft. Pools by Stream Length: 21% Pool Mean Depth: 2.3 ft.Pools >=2 ft. Deep: 80%Base Flow: 0.0 cfsPools >=3 ft. Deep: 60%Water: 60-62°F Air: 61-72°FMean Pool Shelter Rtn: 35Dom. Bank Veg.: Deciduous TreesDom. Shelter: BouldersBank Vegetative Cover: 66%Occurrence of LOD: 0%Dom. Bank Substrate: Silt/Clay/SandDry Channel: 0 ft. Embeddness Value: 1. 0% 2. 60% 3. 0% 4. 40%

Mean Canopy Density: 89%

Mean Canopy Density: 87% Pools >=2 ft. Deep: 67%

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STREAM REACH 4 (Units 155-185) Channel Type: F3 Main Channel Length: 1637 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 11.3 ft. Pools by Stream Length: 21% Pool Mean Depth: 1.1 ft. Base Flow: 0.0 cfs Water: 58-62°F Air: 58-72°F Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Root masses Bank Vegetative Cover: 69% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft. Embeddness Value: 1. 22% 2. 78% 3. 0% 4. 0% STREAM REACH 5 (Units 186-194) Channel Type: F1 Main Channel Length: 631 ft. Side Channel Length: 0 ft.

Pool Mean Depth: 1.8 ft. Base Flow: 0.0 cfs Water: 58-66°F Air: 58-73°F Dom. Bank Veg.: Deciduous Trees Bank Vegetative Cover: 66% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft. Embeddness Value: 1. 0% 2. 33%

STREAM REACH 6 (Units 195-246) Channel Type: F3 Main Channel Length: 4694 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 8.7 ft. Pools by Stream Length: 41% Pool Mean Depth: 1.5 ft. Base Flow: 0.0 cfs Water: 60-66°F Air: 66-73°F Dom. Bank Veg.: Deciduous Trees Bank Vegetative Cover: 79% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft. Embeddness Value: 1. 28% 2. 28% 3. 0% 4. 44%

Mean Canopy Density: 90% Evergreen Component: 39% Deciduous Component: 61% Pools >=2 ft. Deep: 22% Pools >=3 ft. Deep: 11% Mean Pool Shelter Rtn: 23 Occurrence of LOD: 48%

Mean Canopy Density: 98% Evergreen Component: 31% Deciduous Component: 69% Riffle/Flatwater Mean Width: 9.3 ft. Pools by Stream Length: 25% Pools >=2 ft. Deep: 67% Pools >=3 ft. Deep: 33% Mean Pool Shelter Rtn: 8 Dom. Shelter: Bedrock Ledges Occurrence of LOD: 0% 3. 0% 4. 67%

> Mean Canopy Density: 89% Evergreen Component: 45% Deciduous Component: 55% Pools >=2 ft. Deep: 72% Pools >=3 ft. Deep: 33% Mean Pool Shelter Rtn: 17 Dom. Shelter: Undercut Banks Occurrence of LOD: 50%

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STREAM REACH 7 (Units 247-405) Channel Type: F2 Main Channel Length: 10983 ft. Side Channel Length: 112 ft. Riffle/Flatwater Mean Width: 6.1 ft. Pools by Stream Length: 31% Pool Mean Depth: 1.1 ft. Base Flow: 0.0 cfs Water: 57-62°F Air: 58-76°F Dom. Bank Veg.: Deciduous Trees Bank Vegetative Cover: 76% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 130 ft. Embeddness Value: 1. 0% 2. 22% 3. 3% 4. 72%

STREAM REACH 8 (Units 406-412) Channel Type: G2 Main Channel Length: 528 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 3.5 ft. Pools by Stream Length: 21% Pool Mean Depth: 1.3 ft. Base Flow: 0.0 cfs Water: 60-60°F Air: 686-686°F Dom. Bank Veg.: Deciduous Trees Bank Vegetative Cover: 87% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft. Embeddness Value: 1. 0% 2. 100% 3. 0% 4. 0%

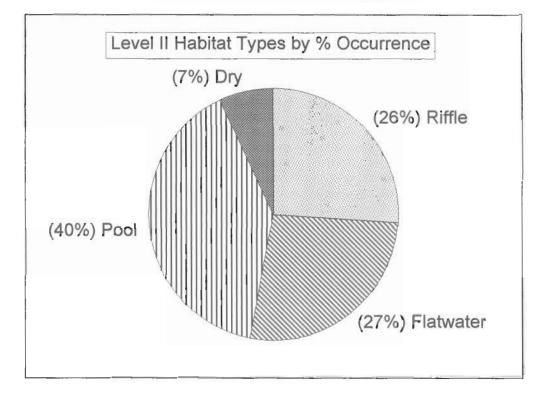
Mean Canopy Density: 92% Evergreen Component: 64% Deciduous Component: 36% Pools >=2 ft. Deep: 45% Pools >=3 ft. Deep: 13% Mean Pool Shelter Rtn: 18 Dom. Shelter: Boulders Occurrence of LOD: 24%

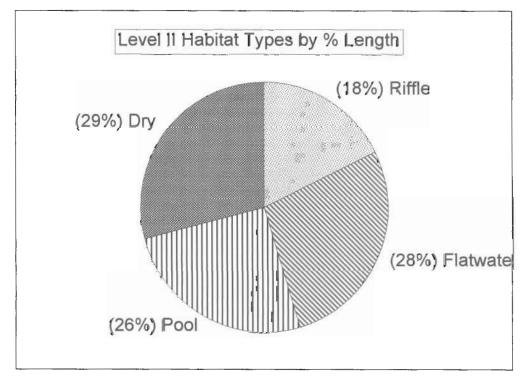
Mean Canopy Density: 98% Evergreen Component: 88% Deciduous Component: 12% Pools >=2 ft. Deep: 50% Pools >=3 ft. Deep: 50% Mean Pool Shelter Rtn: 13 Dom. Shelter: Bedrock Ledges Occurrence of LOD: 0%

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Dutch Bill Creek

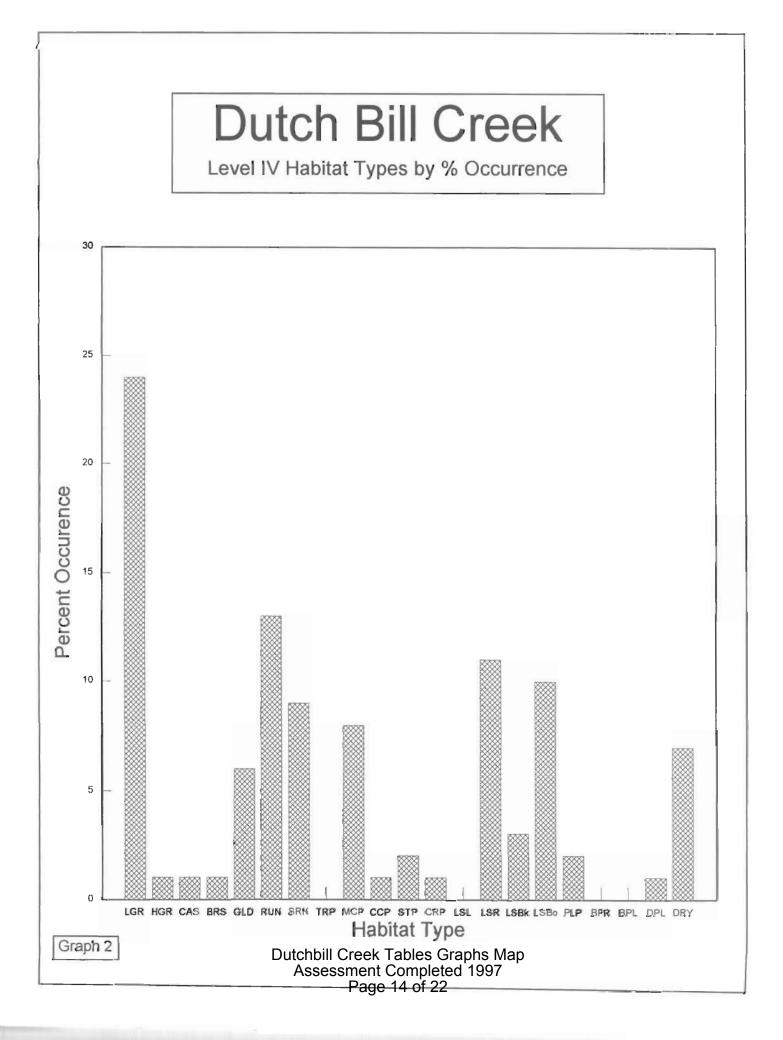
Level II Habitat Types

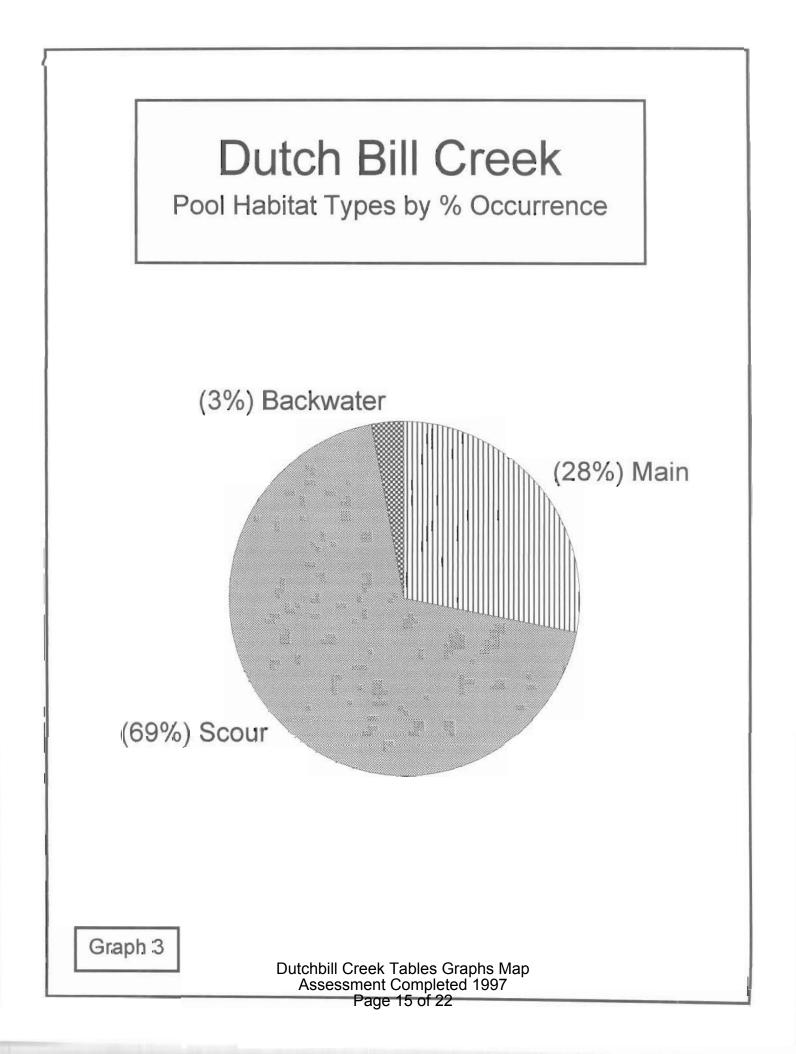


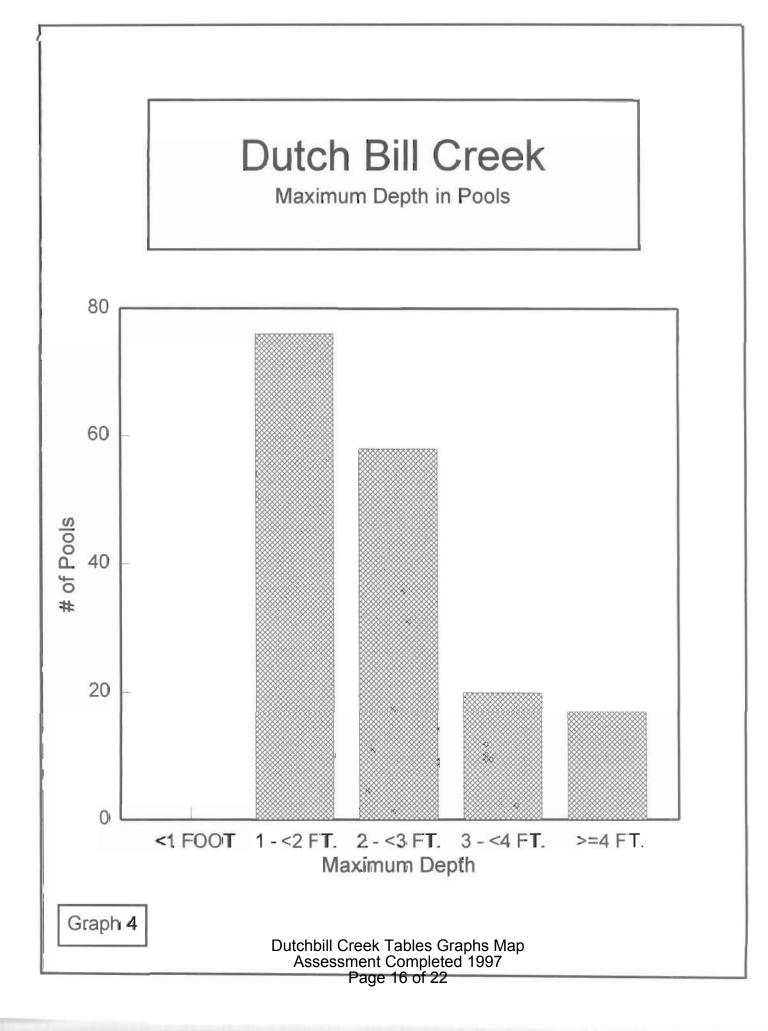


Graph 1

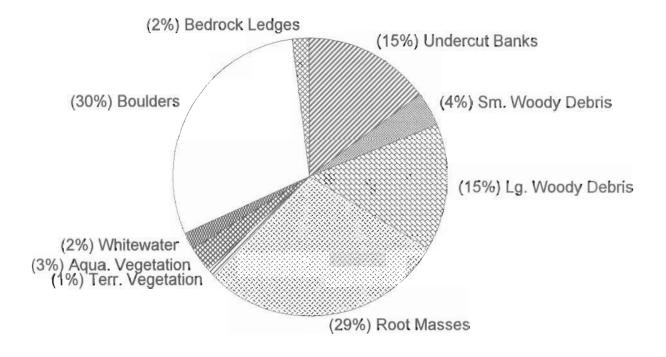
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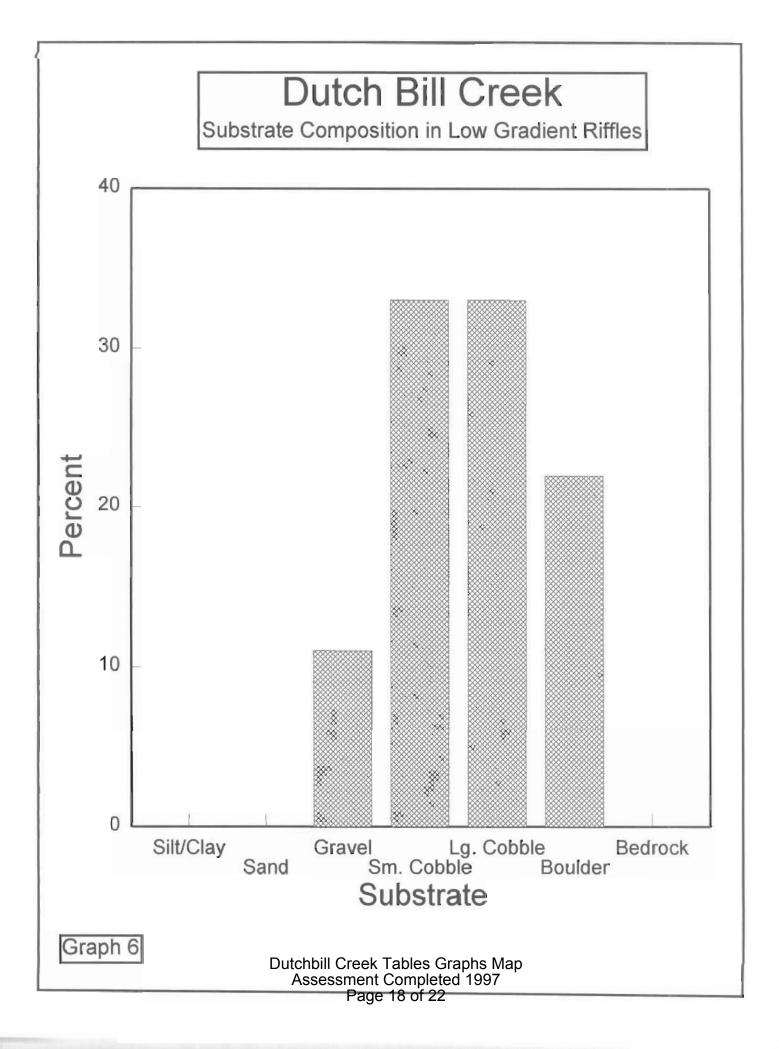






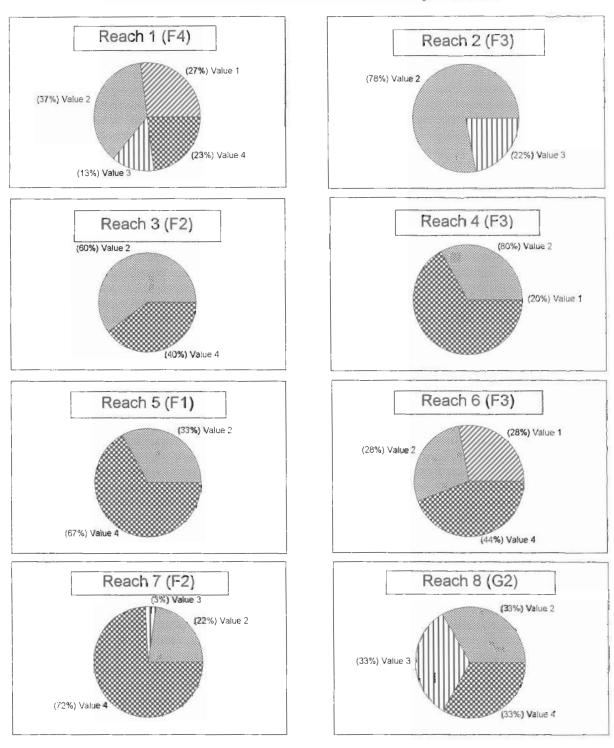






DUTCHBILL CREEK

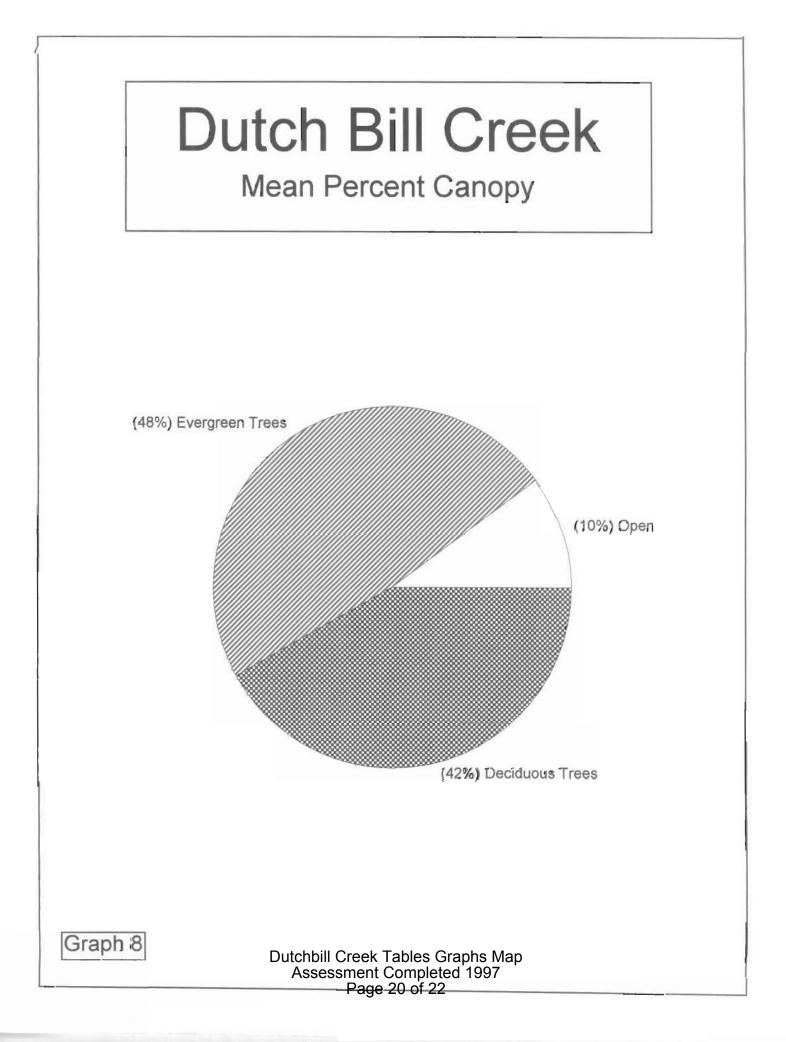
Percent Cobble Embeddedness by Reach



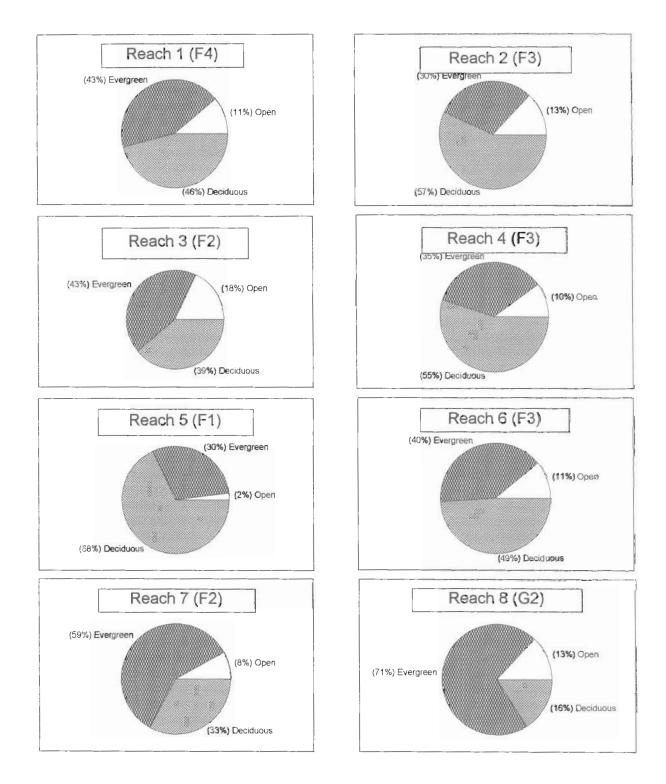
Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

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DUTCHBILL CREEK Percent Canopy By Reach

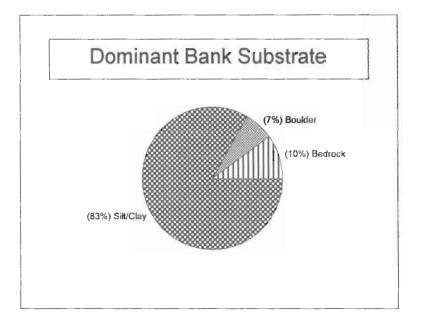


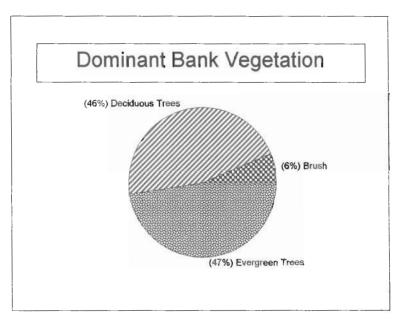
Graph 9

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Dutch Bill Creek

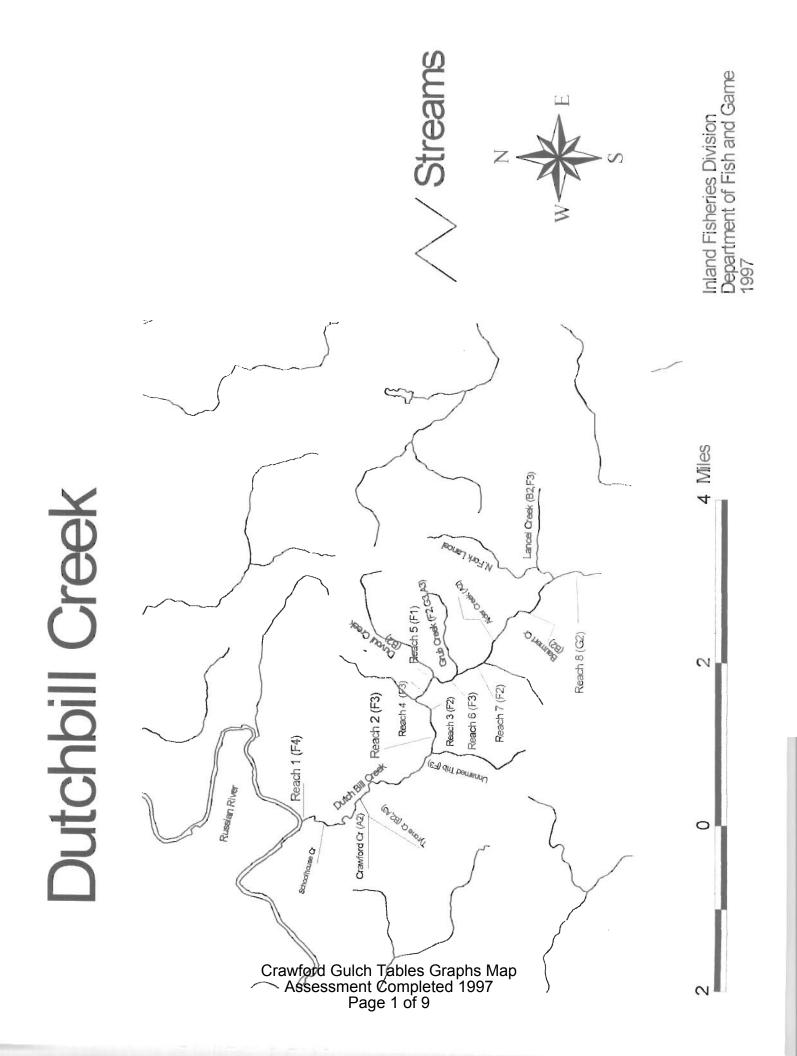
Percent Bank Composition







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Survey Dates: 09/11/97 Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES

Crawford Gulch

Drainage: Russian River

LATITUDE: 0°0'0" LONGITUDE: 0°0'0" LEGAL DESCRIPTION: Confluence Location: QUAD:

	CITNO	HABITAT	HABITAT	MEAN	TOTAL	TOTAL PERCENT	MEAN	MEAN	MEAN	ESTI		EST		MEAN
UNITS FU	FULLY	TYPE	PERCENT	LENGTH	LENGTH	TOTAL	WIDTH	DEPTH	AREA	F	VOLUME			RESIDUAL
MEASURED	RED		OCCURRENCE	(ft.)	(ft.)	(ft.) LENGTH	(ft.)	(ft.)	(sq.ft.)	AREA	AREA (cu.ft.)	VOLUME	POOL VOL	8
										(sq.ft.)		(cu.ft.)	(cu.ft.)	ft.
	3	RIFFLE	63	32	161	52	6.0	0.4	110					0
	-	FLATWATER	25	65	130	42	5.0	0.3	224	448	67	134		0
	-	Poot	13	16	16	S	8.0	1.7	128				~	205
10	TOTAL			TOTAL	TOTAL LENGTH					TOTAL AREA	-	TOTAL VOL.		
UN	UNITS				(ft.)					(sq. ft.)		(cu. ft.)		
80	'n				307					1125		639		

MEAN CANOPY 97 80 100 100 ж VOLUME RESIDUAL SHELTER MEAN 20 M 0 EST. POOL VOL RATING MEAN cu.ft. 0 0 205 cu.ft. TOTAL (cu.ft) 134 218 3 167 534 TOTAL VOL. LONGITUDE: 0°0:0" MEAN AREA VOLUME sq.ft. sq.ft. cu.ft. 5 84 67 218 TOTAL EST. 151 279 448 128 (sq.ft) AREA 1006 Drainage: Russian River Survey Dates: 09/11/97 MEAN AREA 50 140 224 128 LATITUDE: 0°0'0" DEPTH 0.3 2.0 2.9 f. MEAN MAXIMUM DEPTH 0.1 0.6 0.3 1.7 ft. MEAN HIDIM Ś in co ft. Ś . LENGTH TOTAL 34 18 42 5 ж Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS LEGAL DESCRIPTION: LENGTH TOTAL 105 56 130 16 LENGTH (ft.) 307 ft. OCCURRENCE LENGTH MEAN ft. 35 28 65 16 × 13 25 25 HABITAT HABITAT Confluence Location: QUAD: TYPE CAS SRN PLP LGR FULLY NITS UNITS N TOTAL ъ MEASURED Crawford Gulch Crawford Gulch Tables Graphs Map Assessment Completed 1997 Page 3 of 9 UNITS # ΜN HABITAT

Table 3 Confluen	Table 3 - SUMMARY OF POOL TYPES						3	nage: Ku	Drainage: Kussian Kiver	4				
Confluenc		OF POOL T	PES				SULV	ey Dates	Survey Dates: 09/11/97	N.				
	Confluence Location: QUAD:	n: QUAD:	Ļ	LEGAL DESCRIPTION:	: NOIL		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	10 · 0.			
HABITAT	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH	TOTAL	TOTAL PERCENT ENGTH TOTAL LENGTH	MEAN	MEAN DEPTH	MEAN AREA	TOTAL AREA EST.	MEAN	TOTAL VOLUME EST.	MEAN RESIDUAL POOL VOL.	MEAN SHELTER RATING
				(ft.)	(ft.)		(ft.)	(ft.)	(sq.ft.)	(ft.) (ft.) (sq.ft.) (sq.ft.) (cu.ft.) (cu.ft.) (cu.ft.)	(cu.ft.)	(cu.ft.)	(cu.ft.)	
.⊢ Cra	t	SCOUR	100	16	16	100	8.0	1.7	128	128	218	218	205	60
ofvorat				TOTAL	TOTAL LENGTH				F	TOTAL AREA	F	TOTAL VOL.		
DUNITS	UNITS				(ft.)					(sq.ft.)		(cu.ft.)		
Gulch Tables Graphs Mar Soment Completed 1997 Page 4 of 9					2					128		218		

						5	Drainage: Russian River	USSIAN KIVE				
Table 4 -		SUMMARY OF MAXIMUM POOL	OL DEPTHS	DEPTHS BY POOL HABITAT TYPES	SITAT TYPE		irvey Date	Survey Dates: 09/11/97				
Confluenc	Confluence Location: QUAD:	: QUAD :	LEG	LEGAL DESCRIPTION:	: NOI !	Γ	LATITUDE: 0°0'0"		LONGITUDE: 0°010"	H0 I 0.		
UNITS MAX DPTH MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH 0	FOOT <1 FOOT XIMUM PERCENT DEPTH OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FT. 1-<2 FOOT 2-<3 FT. 2-<3 FOOT MAXIMUM PERCENT MAXIMUM PERCENT DEPTH OCCURRENCE DEPTH OCCURRENCE	-2 FOOT 2-<3 FT. PERCENT MAXIMUM URRENCE DEPTH	G FT. 2-<3 FOOT XIMUM PERCENT DEPTH OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FT. 3-<4 FOOT MAXIMUM PERCENT DEPTH OCCURRENCE	>=4 FEET MAXIMUM DEPTH	FEET >=4 FEET XIMUM PERCENT DEPTH OCCURRENCE
- - -	٩٦٩	100	o	0	0	0	-	100	0	0	0	0
rawford Gulch Tables Graphs Assessment Completed 199												

s Map 97 Page 5 of 9

	u cu						Drait	Drainage: Russian River	River		
Table 5 - S	Summary o	f Shelter	of Shelter by Habitat Type	t Type			SULVE	Survey Dates: 09/11/97	11/97		
Confluence Locati		on: QUAD:		LEGAL DESCRIPTION:	RIPTION		LATI	LATITUDE: 0°0'0"	LONGITUDE: 0°0'0"	10.0.0 :	
ASURED	UNITS UNITS MEASURED SHELTER MEASURED	HABITAT TYPE	% TOTAL UNDERCUT BANKS	% TOTAL % TOTAL SWD LWD	LMD	% TOTAL ROOT MASS	0TAL % TOTAL ROOT TERR. MASS VEGETATION	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
'n	-	LGR	0	0	0	0	0	0	0	0	0
	2	CAS	0	0	0	0	0	0	0	100	0
2	Ļ	SRN	40	0	20	0	0	0	0	40	0
-	-	PLP	40	0	20	0	0	0	0	40	0
ITAT 8	ъ		35	o	17	o	0	0	•	48	o
ch fables Graphs M ent Completed 1997 Page 6 of 9	-		40	0	50	0	•	0	0	40	0

Crawford Gutch	Guteh				Drainag	Drainage: Russian River			
Table 6 -	Table 6 - SUMMARY OF DOMINANT SUBSTRATES	DOMINANT		BY HABITAT TYPE	Survey 1	Survey Dates: 09/11/97			
Confluenc	Confluence Location: QUAD:	: dAUP	LEGAL	LEGAL DESCRIPTION:	LATITUD	LATITUDE: 0°0'0" LONGITUDE: 0°0'0"	TUDE: 0°0'0"		
TOTAL HABITAT	UNITS SUBSTRATE	HABITAT TYPE	F % TOTAL SILT/CLAY	% TOTAL SAND	% TOTAL GRAVEL	% TOTAL SM COBBLE	% TOTAL LG COBBLE	% TOTAL BOULDER	% TOTAL BEDROCK
UNITS	MEASURED		DOMI NANT	DOMINANT	DOMINANT	DOMINANT	DOMINANT	DOMINANT	DOMINANT
~	-	LGR	0	0	0	0	100	0	0
Cra	N	CAS	0	0	0	0	0	0	100
aŵ A	٢	SRN	100	0	0	0	0	0	0
forc	-	PLP	100	0	0	0	0	0	0
l Gul ssme F									
ch T ent C Page									
Cor									

Crawford Gulch Tables Graphs Map Assessment Completed 1997 Page 7 of 9

Crawford Gulch

Mean	Mean	Mean	Mean	Mean
Percent	Percent	Percent	Right bank	Left Bank
Canopy	Evergreen	Deciduous	% Cover	% Cover
92.86	76.43	23.57	76.00	66.00

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	0	0	0
Boulder	0	0	Q
Cobble/Gravel	O	0	0
Silt/clay	5	5	100

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	0	0	Q
Deciduous Trees	1	.0	10
Evergreen Trees	4	4	80
No Vegetation	0	1	10

Crawford Gulch Tables Graphs Map Assessment Completed 1997 Page 8 of 9

STREAM NAME: Crawford Gulch SAMPLE DATES: SURVEY LENGTH: MAIN CHANNEL: 307 ft. LOCATION OF STREAM MOUTH: USGS Quad Map: Legal Description:

SIDE CHANNEL: 0 ft.

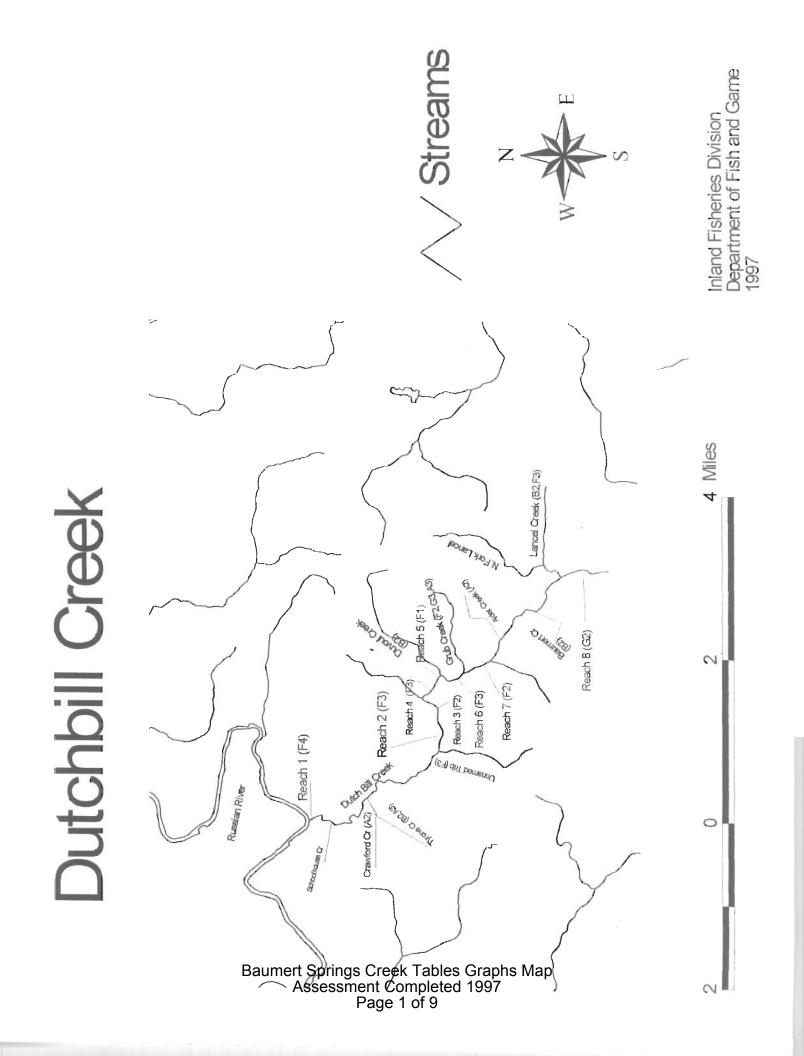
Latitude: 0°0'0" Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-8) Channel Type: A2 Main Channel Length: 307 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 5.8 ft. Pools by Stream Length: 5% Pool Mean Depth: 1.7 ft. Pools >=2 ft. Deep: 100% Pool Mean Depth: 1.7 ft.Pools >=2 ft. Deep: 1005Base Flow: 0.0 cfsPools >=3 ft. Deep: 0%Water: 59-59°F Air: 74-74°FMean Pool Shelter Rtn: 60Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 71%Occurrence of LOD: 20%Dom. Bank Substrate: Silt/Clay/SandDry Channel: 0 ft. Embeddness Value: 1. 0% 2. 100% 3. 0% 4. 0%

Mean Canopy Density: 93% Evergreen Component: 76% Deciduous Component: 24%

Crawford Gulch Tables Graphs Map Assessment Completed 1997 Page 9 of 9



RATING SHELTER MEAN TOTAL RESIDUAL POOL VOL (cu.ft.) 0 0 88 0 493 82 1177 0 (cu.ft.) VOLUME 1752 MEAN ESTIMATED (cu. ft.) TOTAL VOL. VOLUME AREA (cu.ft.) 35 41 98 0 LATITUDE: 0°0:0" LONGITUDE: 0°0:0" 1990 TOTAL ESTIMATED (sq.ft.) 1425 0 3684 TOTAL AREA (sq. ft.) Drainage: Russian River MEAN Survey Dates: 09/30/97 AREA 142 119 (sq.ft.) 0 MEAN (ft.) (ft.) 0.2 0.0 WIDTH DEPTH MEAN 4.8 6.1 0.0 4.7 TOTAL LENGTH TOTAL PERCENT 10 23 61 Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL MABITAT TYPES LENGTH (ft.) 234 99 621 (ft.) 1023 TOTAL LENGTH LEGAL DESCRIPTION: LENGTH (ft.) MEAN 3 2 4 5 PERCENT OCCURRENCE 7 4 7 7 40 7 40 HABITAT FLATWATER HABITAT RIFFLE Confluence Location: QUAD: TYPE POOL DRY UNITS Baurmert Springs FULLY M N 19 O TOTAL UNTTS 10 MEASURED HABITAT UNITS Baumert Springs Greek Tables Graphs Map Assessment Completed 1997 Page 2 of 9

MEAN

MEAN CANOPY VOLUME RESIDUAL SHELTER MEAN RATING EST. POOL VOL MEAN cu.ft. TOTAL cu.ft. 0 LATITUDE: 0°0'0" LONGITUDE: 0°0'0" MEAN AREA VOLUME sq.ft. sq.ft. cu.ft. 0 TOTAL EST. 0 Drainage: Russian River Survey Dates: 09/30/97 MEAN AREA 0 DEPTH ft. MEAN MAXIMUM DEPTH 0.0 ft. WIDTH MEAN ft. 0 LENGTH TOTAL х Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS LEGAL DESCRIPTION: OCCURRENCE LENGTH LENGTH f. TOTAL MEAN ft. ж HABITAT HABITAT Confluence Location: QUAD: TYPE LGR FULLY UNITS MEASURED Baurmert Springs UNITS HABITAT #

Survey Dates: 09/30/97 Location: 0.000: Lection: 0.000: Location: 0.00	Inpa	Baurmert Springs						Drail	nage: Ru	Drainage: Russian River					
Location: GND: Lead. DESCRIPTION: LATITUDE: 0°0'0° LONGITUDE: 0°0'0° UNITS HABITAT MABITAT MABITAT MABITAT MABITAT MEAM	Table 3		OF POOL T	YPES				Surve	ey Dates	: 09/30/9	•				
UNITS HABITAT HABITAT HEAN TOTAL HEAN	Conflue	nce Locatio	n: QUAD:	LE	GAL DESCRIF	: NOI L		LATI	rube: 0°		IGITUDE: 0°	0.0			
FULLY TYPE PERCENI LENGTH TOTAL MIDTH AREA AREA VOLUME ESTL COLUME ESTL ESTL POOL COLUME ESTL POOL COLUME ESTL POOL OOL COLUME ESTL POOL OOL Colume ESTL FESTL ESTL COLUME ESTL POOL OOL Colume ESTL Colume Colume<	HABITAT	UNITS	HABITAT	HABITAT	MEAN	TOTAL	PERCENT	MEAN	MEAN	MEAN	TOTAL	MEAN	TOTAL	MEAN	MEAN
(ft.) (ft.) (ft.) (ft.) (ft.) (ft.) (ft.) (g., ft.)	UNITS	A	TYPE	PERCENT	LENGTH	LENGTH			DEPTH	ARÉA	AREA EST.	VOLUME	VOLUME EST.	halle.	SHEL TER RATING
2 MiN 33 28 12 48 6.5 0.8 63 132 58 94 73 81 649 759 94 759 751 751 751 7117 7117 7117 </td <td>Ba</td> <td></td> <td></td> <td></td> <td>(ft.)</td> <td>(ft.)</td> <td></td> <td>(ft.)</td> <td>(ft.)</td> <td>(sq.ft.)</td> <td>(sq.ft.)</td> <td>(cu.ft.)</td> <td></td> <td>(cu.ft.)</td> <td></td>	Ba				(ft.)	(ft.)		(ft.)	(ft.)	(sq.ft.)	(sq.ft.)	(cu.ft.)		(cu.ft.)	
3 5COUR 67 15 122 52 5.9 0.8 % 73 81 649 TOTAL UNITS TOTAL LEMETH TOTAL LEMETH TOTAL AREA TOTAL VOL. 101AL VOL. J (ft.) 1 (ft.) 1 177 1117 J 234 234 1 1 1 1 1177	um		MAIN	33	28	112	48	6.5	0.8	168	673	132	528	98	14
TOTAL LENGTH TOTAL LENGTH TOTAL AREA (ft.) UNITS (ft.) (sq.ft.) 234 (sq.ft.) 1425	∞ ert As		SCOUR	67	15	122	52	5.9	0.8	64	753	81	679	62	6
UNITS (ft.) (sq.ft.) (cu. 5 234 1425 1425	Spr Sses				TOTAL	LENGTH				1-	OTAL AREA	F	OTAL VOL.		
2 3						(ft.)					(sq.ft.)		(cu.ft.)		
Creek Tables Graphs Map	₽ gs (ne					234					1425		1177		
Tables Graphs Map	Creek nt Co														
bles Graphs Map eted 1997	t Ta mpl														
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aphs Map	5 Gr 1 19														
ıs Map	aph 97														
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Confluence	- SUMMARY											
Confluenc		Table 4 - SUMMARY OF MAXIMUM POOL		DEPTHS BY POOL HABITAT TYPES	BITAT TYPE		ırvey Date	Survey Dates: 09/30/97				
INITE	ce Locati	Confluence Locati on: QUAD:	DEL	LEGAL DESCRIPTION:	: NOI 1	LA	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	=0.0		
MAX DPTH MEASURED	HABITAT TYPE	T HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH O	FOOT <1 FOOT XIMUM PERCENT DEPTH OCCURRENCE	1-<2 FT. MAXIMUM DEPTH (2 FT. 1-<2 FOOT XIMUM PERCENT DEPTH OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	3 FT. 2-<3 FOOT XIMUM PERCENT DEPTH OCCURRENCE	3-<4 FT. Maximum Depth	C4 FT. 3-<4 FOOT XIMUM PERCENT DEPTH OCCURRENCE	>=4 FEET MAXIMUM DEPTH (FEET >=4 FEET XIMUM PERCENT DEPTH OCCURRENCE
Baum	MCP	17	00	00		100	00	00	00	00	00	
	LSBK	80	0 0	0 0	ı ←	100) O	0) O	0	0	0
™ t S	LSBo	25	0	0	2	100	0	0	0	0	0	
⇒ prir	PLP	33	0	0	м	£	0	0	-	25	0	
ngs Creek Tables Graphs Ma sment Completed 1997 Page 5 of 9												

Drainage: Russian River Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE Baurmert Springs

Survey Dates: 09/30/97

UNITS HABITAT X TOTAL X TO SUBSTRATE TYPE SILT/CLAY SAND GRAVEL SM COB GRAVEL SM COB O LGR O	UNITSHABITATX TOTALX TOTALX TOTALX TOTALX TOTALX TOTALSUBSTRATETYPESILI/CLAYSANDGRAVELS TOTALX TOTALSUBSTRATETYPESILI/CLAYSANDGRAVELS MOBBLELG COBBLECLGRDDDDDDLGRDDDDD2HGRDDDDD1CASDDDDD1CASDDDDD1RUNDDDDD1RUNDDDDD1RUNDDDDD1STPDDDDD1STPDDDDD1STPDDDDD1STPDDDDD1STPDDDDD1LSBDDDDD1LSBDDDDD1LSBDDDDD2PLPDDDDD1LSBDDDDD1DYDDDDD1DDDDDD1LSBDD<	UNITSMABITATX TOTALX TOTALX TOTALX TOTALX TOTALX TOTALSUBSTRATETYPESILT/CLAYSANDGRAVELSMODGRAVELSMODGRAVELSMODNEASUREDTYPESILT/CLAYSANDGRAVELSMODGRAVELSMODGRAVELSMODGOULDER1LGR00000001002HGR0000001001CAS0000001001RUM0010000001RUM0100000001RUM0010000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00000001SIP00	UNTTS MABITAT X TOTAL	UNITS HABITAT & TOT SUBSTRATE TYPE SILT/CL/ MEASURED 0 LGR SILT/CL/ 1 CAS 1 CAS 1 RUN 1 RUN 1 SRN 1 SRN 1 LSB0 2 PLP 1 DRY		LATITUD	LATITUDE: 0°0'0" LONG	LONGITUDE: 0"0"0"		
SUBSTRATE TYPE SILT/CLAY SAND GRAVEL IC COBBLE LG COBBLE LG COBBLE MASURED DOMINANT DOMINANT </th <th>SUBSTRATETYPESILT/CLAYSANDGRAVELRAVELEN COBBLELG COBBLEMEASUREDDDMINANTDDMINANTDDMINANTDDMINANTDDMINANTDDMINANTDLGRD000001LGR0000001CAS001000001RUN0000001SRN0000001SRN0000001SRN0000001SRN0000001LSB0000001LSB010000001LSB0000001LSB0000001LSB0000001DRYDRY000001DRYDRYDRYDRYDRYDRYDRY1LSBDRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRY<tr< th=""><th>SUBSTRATE TYPE SILT/CLAY SAMD GRAVEL NA COBBLE LG COBBLE BOULDER HEASURED DOMINANT DOMINANT</th><th>SUBSTART TYPE SILT/CLAY SAND GRAVEL SM COBBLE LG COBLE BOULDER MEASURED DA DOMINANT DI <</th><th>SUBSTRATE TYPE SILT/CLA MEASURED D 2 HGR 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 2 HGR 1 SRN 1 SRN 1 SRN 1 LSBO 2 PLP 1 DRY</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th></tr<></th>	SUBSTRATETYPESILT/CLAYSANDGRAVELRAVELEN COBBLELG COBBLEMEASUREDDDMINANTDDMINANTDDMINANTDDMINANTDDMINANTDDMINANTDLGRD000001LGR0000001CAS001000001RUN0000001SRN0000001SRN0000001SRN0000001SRN0000001LSB0000001LSB010000001LSB0000001LSB0000001LSB0000001DRYDRY000001DRYDRYDRYDRYDRYDRYDRY1LSBDRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRY1DRYDRYDRYDRYDRYDRY <tr< th=""><th>SUBSTRATE TYPE SILT/CLAY SAMD GRAVEL NA COBBLE LG COBBLE BOULDER HEASURED DOMINANT DOMINANT</th><th>SUBSTART TYPE SILT/CLAY SAND GRAVEL SM COBBLE LG COBLE BOULDER MEASURED DA DOMINANT DI <</th><th>SUBSTRATE TYPE SILT/CLA MEASURED D 2 HGR 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 2 HGR 1 SRN 1 SRN 1 SRN 1 LSBO 2 PLP 1 DRY</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th><th>% TOTAL</th></tr<>	SUBSTRATE TYPE SILT/CLAY SAMD GRAVEL NA COBBLE LG COBBLE BOULDER HEASURED DOMINANT	SUBSTART TYPE SILT/CLAY SAND GRAVEL SM COBBLE LG COBLE BOULDER MEASURED DA DOMINANT DI <	SUBSTRATE TYPE SILT/CLA MEASURED D 2 HGR 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 2 HGR 1 SRN 1 SRN 1 SRN 1 LSBO 2 PLP 1 DRY	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL
MEASURED DOMINANT	MEASURED DOMINANT	HEAURED DOMINANT	MAAURED DOMINANT DOMINANT	MEASURED DOMINAN 2 HGR 1 CAS 1 CAS 1 CAS 1 CAS 1 CAS 2 HGR 1 SRN 1 SRN 1 LSBo 2 PLP 1 DRY	SAND	GRAVEL	SM COBBLE	LG COBBLE	BOULDER	BEDROCK
0 LGR 0 0 LGR 0 <th>0 LGR 0 0 LGR 0 0 2 HGR 0<!--</th--><th>0 LGR 0 0 2 HGR 0 0 0 1 KUN 0 0 0 0 1 KUN 0 0 0 0 0 1 SRN 0 0 0 0 0 0 1 SRN 0 <</th><th>0 Likk 0</th><th>C LGR HGR RUN SRN SRN SRN CAS SRN CAS SRN CAS SRN CAS SRN CAS CAS CAS CAS CAS CAS CAS CAS CAS CAS</th><th>DOMINANT</th><th>DOMINANT</th><th>DOMINANT</th><th>DOMINANT</th><th>DOMINANT</th><th>DOMINANT</th></th>	0 LGR 0 0 LGR 0 0 2 HGR 0 </th <th>0 LGR 0 0 2 HGR 0 0 0 1 KUN 0 0 0 0 1 KUN 0 0 0 0 0 1 SRN 0 0 0 0 0 0 1 SRN 0 <</th> <th>0 Likk 0</th> <th>C LGR HGR RUN SRN SRN SRN CAS SRN CAS SRN CAS SRN CAS SRN CAS CAS CAS CAS CAS CAS CAS CAS CAS CAS</th> <th>DOMINANT</th> <th>DOMINANT</th> <th>DOMINANT</th> <th>DOMINANT</th> <th>DOMINANT</th> <th>DOMINANT</th>	0 LGR 0 0 2 HGR 0 0 0 1 KUN 0 0 0 0 1 KUN 0 0 0 0 0 1 SRN 0 0 0 0 0 0 1 SRN 0 <	0 Likk 0	C LGR HGR RUN SRN SRN SRN CAS SRN CAS SRN CAS SRN CAS SRN CAS CAS CAS CAS CAS CAS CAS CAS CAS CAS	DOMINANT	DOMINANT	DOMINANT	DOMINANT	DOMINANT	DOMINANT
2 HGR 0	2 Hak 0 1 2 Hak 0 CAS Mak 0 1 CAS 0 0 0 TAS NUN 0 1 1 CAS 0 0 MCP NCP 0 100 0 0 0 0 0 MCP 0 0 100 0<	2 Hdk 0 1 I.MS 0 <td>2 HGR 0</td> <td>2 HGR 1 CAS 1 CAS 1 SRN 0 LSBk 2 PLP DRY</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	2 HGR 0	2 HGR 1 CAS 1 CAS 1 SRN 0 LSBk 2 PLP DRY	0	0	0	0	0	0
1 CAS 0	1 CAS 0	I CAS 0	I CMS 0	CAS RUN 3 RUN 4 CP 3 SRN 4 CP 4 CP 5 PLP 5 PLP	0	0	0	0	100	0
1 RUN 0 100 0 1 SRN 0 100 0 0 1 SRN 0 0 0 0 0 1 SRN 0 0 0 0 0 0 1 SRN 0 0 0 0 0 0 0 1 SRP 0 0 0 0 0 0 0 0 1 LSBA 0 0 0 0 0 0 0 10 1 LSBA 0 0 0 0 0 0 0 10 <	1 RUN 0 100 100 1 SRN 0 100 0 0 1 SRN 0 0 0 0 0 1 SRN 0 0 0 0 0 0 1 STP 0 0 0 0 0 0 0 0 1 STP 0 <t< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>RUN 2 SNN 0 SNN 2 SNN 0 SNN 0 100 0 0 LSS LSS 0 0 0 0 PLP 2 0 0 0 0 0 DNY 0 0 0 0 0 0 0 0 DNY 0</td><td>RUN SRN STP STP STP STP STP STP DRY</td><td>0</td><td>0</td><td>0</td><td>0</td><td>100</td><td>0</td></t<>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	RUN 2 SNN 0 SNN 2 SNN 0 SNN 0 100 0 0 LSS LSS 0 0 0 0 PLP 2 0 0 0 0 0 DNY 0 0 0 0 0 0 0 0 DNY 0	RUN SRN STP STP STP STP STP STP DRY	0	0	0	0	100	0
1 SRN 0 100 0 1 MCP 0 100 0 0 1 STP 0 100 0 0 0 1 STP 0 100 0 0 0 0 1 STP 0 0 0 0 0 0 0 1 LSBA 0 100 0 0 0 0 10 2 PLP 0 50 0 0 0 0 10 1 DRY 0 50 0 0 0 0 0 10	1 SRN 0 100 100 1 MCP 0 100 0 0 1 STP 0 0 0 0 0 1 STP 0 0 0 0 0 0 1 STP 0 0 0 0 0 0 0 1 LSBA 0 0 0 0 0 0 0 0 0 2 PLP 0 50 0	1 SRN 0 100 100 1 MCP 0 100 0 0 1 STP 0 100 0 0 0 1 STP 0 0 0 0 0 0 1 STP 0	1 SN 0 1 SN 0 1 KCP 0 0 0 0 0 0 1 STP 0 0 0 0 0 0 0 0 1 LSBA 0	1 SRN 1 MCP 2 PLP 1 LSBo	0	100	0	0	0	0
1 MCP 0 100 0 0 100 0 0 1 </td <td>1 MCP 0 100 0 0 1 STP 0 0 0 0 0 1 STP 0 0 0 0 0 0 1 LSBA 0 0 0 0 0 0 0 2 PLP 0 50 0 0 0 0 0 0 1 DRY 0 50 <td< td=""><td>1 MCP 0 100 0</td></td<><td>MCP 0 10 0</td><td>1 MCP 2 PLP 1 LSBo</td><td>0</td><td>100</td><td>0</td><td>0</td><td>0</td><td>0</td></td>	1 MCP 0 100 0 0 1 STP 0 0 0 0 0 1 STP 0 0 0 0 0 0 1 LSBA 0 0 0 0 0 0 0 2 PLP 0 50 0 0 0 0 0 0 1 DRY 0 50 0 <td< td=""><td>1 MCP 0 100 0</td></td<> <td>MCP 0 10 0</td> <td>1 MCP 2 PLP 1 LSBo</td> <td>0</td> <td>100</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	1 MCP 0 100 0	MCP 0 10 0	1 MCP 2 PLP 1 LSBo	0	100	0	0	0	0
1 STP 0 0 0 0 0 LSBk 0 0 0 0 0 1 LSBo 0 100 0 0 0 0 1 LSBo 0 100 0 0 0 100 100 1 DRY 0 0 0 0 0 100 100	1 STP 0 0 0 0 0 LSBk 0 0 0 0 0 1 LSBo 0 100 0 0 0 0 2 PLP 0 50 0 0 0 0 100 1 DRY 0 0 0 0 0 0 0	1 STP 0 0 0 0 0 LSBk 0 0 0 0 0 1 LSBo 0 100 0 0 0 0 2 PLP 0 50 0 0 0 0 1 1 DRY 0 0 100 0 0 0 0 0	1 STP 0	1 STP 0 LSBk 7 LSBo 2 PLP DRY	100	0	0	0	0	0
0 LSBk 0 0 0 10 0 10 0 10 0 10 0 10 0 10 0 1	0 LSBK 0 0 0 0 0 0 2 2 PLP 0 50 50 100 100 100 100 100 100 100 100	0 LSBK 0 0 0 100 0 128K 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 1	0 LSBk 1 LSBo DRY DRY	0	0	0	0	100	0
1 LSBo 0 100 0 0 0 0 10 <td>1 LSBo 0 100 0 0 0 100</td> <td>1 LSBo 0 100 0 0 0 0 0 0 100 0 100 0 100 0 100 0</td> <td>1 1280 0</td> <td>1 LSBo PLP DRY</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	1 LSBo 0 100 0 0 0 100	1 LSBo 0 100 0 0 0 0 0 0 100 0 100 0 100 0 100 0	1 1280 0	1 LSBo PLP DRY	0	0	0	0	0	0
2 PLP 0 50 50 0 0 1 DRY 0 0 0 1 100 0	2 PLP 0 50 50 0 1 DRY 0 0 0 100	2 PLP 0 50 50 0 0 100 0 1 DRY 0 0 0 100 0 0	2 PLP 0 0 0 100 0 0 100 0 0 100 0 0 0 0 0 0	2 PLP 1 DRY	100	0	0	0	0	0
1 DRY 0 0 0 100 0	1 DRY 0 0 0 100	1 DRY 0 0 100 0	1 DRY 0 10 10 0 0	DRY	50	50	0	0	0	0
		ples	ples Graphs M	oles Graphs M	0	0	100	0	0	0
es C ed 1	- C		phs M	phs M						
es Gra ed 199	Gra	ara 99	βM	s M						
es Graphs ed 1997	Graphs	Graphs								

Baurmert Springs

Mean	Mean	Mean	Mean	Mean
Percent	Percent	Percent	Right bank	Left Bank
Canopy	Evergreen	Deciduous	% Cover	% Cover
94.44	67.22	32.78	67.27	83.64

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	3	2	22.73
Boulder	0	1	4.55
Cobble/Gravel	0	0	0
Silt/clay	8	8	72.73

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	1	0	4.55
Deciduous Trees	2	:2	18.18
Evergreen Trees	7	9	72.73
No Vegetation	1	0	4.55

Baumert Springs Creek Tables Graphs Map Assessment Completed 1997 Page 8 of 9

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Baurmert Springs SAMPLE DATES: SURVEY LENGTH: MAIN CHANNEL: 1023 ft. SIDE CHANNEL: 0 ft. LOCATION OF STREAM MOUTH: USGS Quad Map: Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1(Units 1-30)Channel Type: B2Mean Canopy Density: 94%Main Channel Length: 1023 ft.Evergreen Component: 67%Side Channel Length: 0 ft.Deciduous Component: 33%Riffle/Flatwater Mean Width: 4.7 ft.Pools by Stream Length: 23%Pool Mean Depth: 0.8 ft.Pools >=2 ft. Deep: 8%Base Flow: 0.0 cfsPools >=3 ft. Deep: 8%Water: 56-57°F Air: 58-66°FMean Pool Shelter Rtn: 10Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 75%Occurrence of LOD: 25%Dom. Bank Substrate: Silt/Clay/SandDry Channel: 102 ft.Embeddness Value: 1. 25%2. 17%3. 0%4. 58%

Baumert Springs Creek Tables Graphs Map Assessment Completed 1997 Page 9 of 9

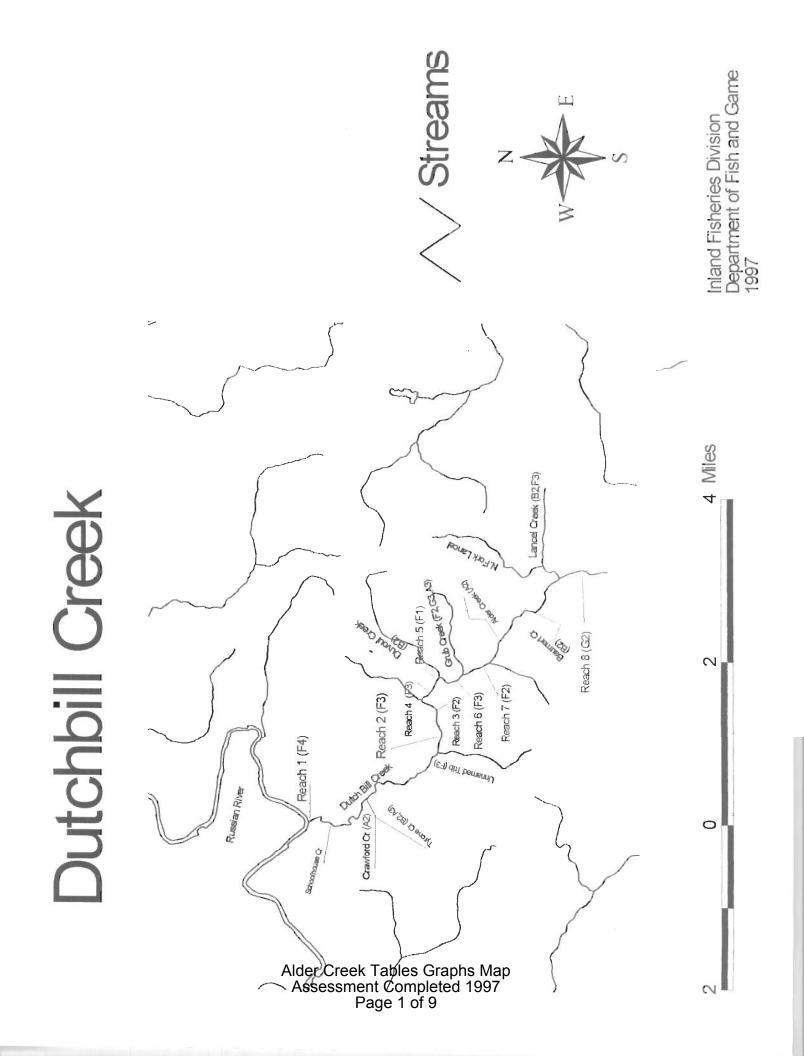


Table 1														
	- SUMMARY	Table 1 - SUMMARY OF RIFFLE, FLATWATER,		AND POOL HABITAT TYPES	BITAT TY	PES	SULV	sy Dates	Survey Dates: 08/06/97					
Confluer	Confluence Location: QUAD:	auAD:	LEGA	EGAL DESCRIPTION:	TION:		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	11 0 10			
HABITAT	UNITS	HABITAT	HABITAT	MEAN	TOTAL	TOTAL PERCENT		MEAN	MEAN	ESTIMATED		EST	MEAN	MEAN
ONITS	FULLY	TYPE	PERCENT	LENGTH	LENGTH	TOTAL		DEPTH	AREA	TOTAL	VOLUME		RESIDUAL	SHELTER
									(ad-1 ()	(sq.ft.)	ft.)	(cu.ft.)	(cu.ft.)	KALING
2	2	FLATWATER	25	41	83	80	3.3	0.9	12	143	\$	127	0	~~~
∾ Alc	2	POOL	22	15	30	m	11.3	0.9	92	185		169	0	16
⁺ ler	0	DRY	50	219	876	89	0.0	0.0	0	0	0	0	0	0
Cre	TOTAL			TOTAL	TOTAL LENGTH					TOTAL AREA		TOTAL VOL.		
stinek	UNITS				(ft.)					(sq. ft.)		(cu. ft.)		
∞ Tables Graphs Ma nt Completed 1997 age 2 of 9	4				989					327		296		

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River	
Russian	
Drainage	
CREEK	
CRE	
DER	

Survey Dates: 08/06/97 Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

LONGITUDE: 0°0'0"	
LATITUDE: 0°0'0"	
LEGAL DESCRIPTION:	
Confluence Location: QUAD:	

	FULLY	HABITAT TYPE	HABITAT DCCURRENCE	MEAN	TOTAL	TOTAL LENGTH	MEAN	MEAN 1 DEPTH	MEAN MAXIMUM DEPTH DEPTH	MEAN Area	P	OTAL MEAN AREA VOLUME	TOTAL	TOTAL MEAN MEAN VOLUME RESIDUAL SHELTER	MEAN	MEAN
MEA	MEASURED		24	ft.	ft.	24	ft.	ft.	ft.	sq.ft.	EST. sq.ft.	cu.ft.	EST. EST. EST. ft. sq.ft. sq.ft. cu.ft.	EST. POOL VOL RATING 1.ft. cu.ft.	RATING	ж
	-	RUN	13	32	32	м	4	0.3	1.4	<u>66</u>	99	20	20	0	0	95
	-	SRN	13	51	51	5	м	1.4	1.5	11		107	107	0	10	95
	-	STP	13	22	22	2	'n	0.8	2.0	11		62	62	0	30	<u> 9</u> 5
	-	PLP	13	6	6	-	18	1.0	2.7	107	107	107	107	0	2	95
	0	DRY	50	219	876	89	0	0.0	0.0	0	0	0	0	0	0	95
200	TOTAL				LENGTH						AREA	TOT	TOTAL VOL.			
_	NII TS				(ft.)					Ŭ	(sq.ft)		(cu.ft)			
00	4				989						327		296			

							5	nage. Nu	NLatinayer, Russian Arver					
aple	Table 3 - SUMMARY OF POOL TYPES	DF POOL TY	PES				SULVI	ey Dates	Survey Dates: 08/06/97	k				
conflue	Confluence Location: QUAD:	: dAD:	ĻĒ	LEGAL DESCRIPTION:	: NOI L		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	110100			
HABITAT	FULLY FULLY	HABITAT TYPE	PERCENT	MEAN LENGTH	TOTAL	TOTAL PERCENT ENGTH TOTAL	MEAN	MEAN DEPTH	MEAN AREA	TOTAL AREA FST	MEAN	TOTAL	MEAN RESIDUAL POOL VOL	MEAN SHELTER RATING
				(ft.)	(ft.)		(ft.)	(ft.) (ft.)	(sq.ft.)	(sq.ft.) (sq.ft.) (cu.ft.) (cu.ft.) (cu.ft.)	(cu.ft.)	(cu.ft.)	(cu.ft.)	
A	-	MAIN	50	22	22	22	4.5	0.8	11	17	62	62	0	30
ldei Ass	-	SCOUR	50	6	6	28	18.0	1.0	107	107	201	107	0	2
Cr	TOTAL			FOTAL	FOTAL LENGTH				⊢ •	TOTAL AREA		TOTAL VOL.		
	UNITS				(ft.)					(sq.ft.)		(cu.ft.)		
∾ ek Tables Graphs Ma nent Completed 1997 Page 4 of 9					20					185		169		

DEPTH OCCURRENCE 0 0 >=4 FEET PERCENT MUMIXAM 0 0 >=4 FEET 0 0 3-<4 F00T DEPTH OCCURRENCE PERCENT LONGITUDE: 0°0'0" 3-<4 FT. MAXIMUM 0 0 Drainage: Russian River Survey Dates: 08/06/97 1-<2 FT. 1-<2 FOOT 2-<3 FT. 2-<3 FOOT PERCENT DEPTH OCCURRENCE 100 LATITUDE: 0°0'0" PERCENT MAXIMUM - -DEPTH OCCURRENCE 0 0 Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES MUMIXAM 0 0 LEGAL DESCRIPTION: <1 FOOT 0 0 PERCENT DEPTH OCCURRENCE MAXIMUM 0 0 <1 F00T HABITAT PERCENT OCCURRENCE 50 Confluence Location: QUAD: HABITAT TYPE PLP ALDER CREEK Alder Creek Tables Graphs Map Assessment Completed 1997 Page 5 of 9 STINU MAX DPTH MEASURED --

Table 5 -	Summary of										
	I million		Shelter by Habitat Type	t Type			Surve	Survey Dates: 08/06/97	26/90		
Confluence Location:	Location	1: QUAD :		LEGAL DESCRIPTION:	CRIPTION		LATIT	LATITUDE: 0°0'0"	LONGITUDE: 0°0'0"	.0.0.0 :	
UNITS UNITS MEASURED SHELTER MEASURED	UNITS SHELTER MEASURED	НАВІТАТ ТҮРЕ	% TOTAL UNDERCUT BANKS	X TOTAL X TOTAL SWD LWD	% TOTAL	% TOTAL ROOT MASS	OTAL % TOTAL ROOT TERR. MASS VEGETATION	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
-	-	RUN	0	10	0	0	0	0	0	06	0
-	-	SRN	0	0	0	0	0	0	0	100	0
- А	-	STP	0	0	0	0	0	0	0	100	0
- Nd	-	PLP	0	0	25	0	0	0	0	52	0
• er (0	DRY	0	0	0	0	0	0	0	0	0
	4		0	-	2	0	0	0	0	26	0
ables Graphs Map	2		0	٥	N	0	0	٥	٥	88	0

Page 6 of 9

ALDER CREEK	EK				Drainag	Drainage: Russian River			
Table 6	SUMMARY OF	DOMINANT	Īable 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE	HABITAT TYPE	Survey	Survey Dates: 08/06/97			
Confluenc	Confluence Location: QUAD:	QUAD :	LEGAL	LEGAL DESCRIPTION:	LATITUD	LATITUDE: 0°0'0" LONGITUDE: 0°0'0"	11UDE: 0°0'0"		
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
-	-	RUN	0	100	0	0	0	0	0
7	۴	SRN	0	100	0	0	0	0	0
۸Īd A	-	STP	0	0	0	0	0	0	100
lēr ss	-	PLP	0	100	0	0	0	0	0
َ Čr ess	÷	DRY	0	0	0	0	0	100	0
eek T ment Pag									
able: Con je 7 (

Alder Creek Tables Graphs Map Assessment Completed 1997 Page 7 of 9

ALDER CREEK

Mean	Mean	Mean	Mean	Mear
Percent	Percent	Percent	Right bank	Left Bank
Canopy	Evergreen	Deciduous	% Cover	% Cover
95.00	77.86	22.14	50.00	49.00

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant	Number	Number	Percent
Class of	Units	Units	Total
Substrate	Right Bank	Left Bank	Units
Bedrock	1	3	40
Boulder	2	1	30
Cobble/Gravel	0	0	0
Silt/clay	2	1	30

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	0	0	0
Deciduous Trees	2	2	40
Evergreen Trees	3	3	60
No Vegetation	0	0	0

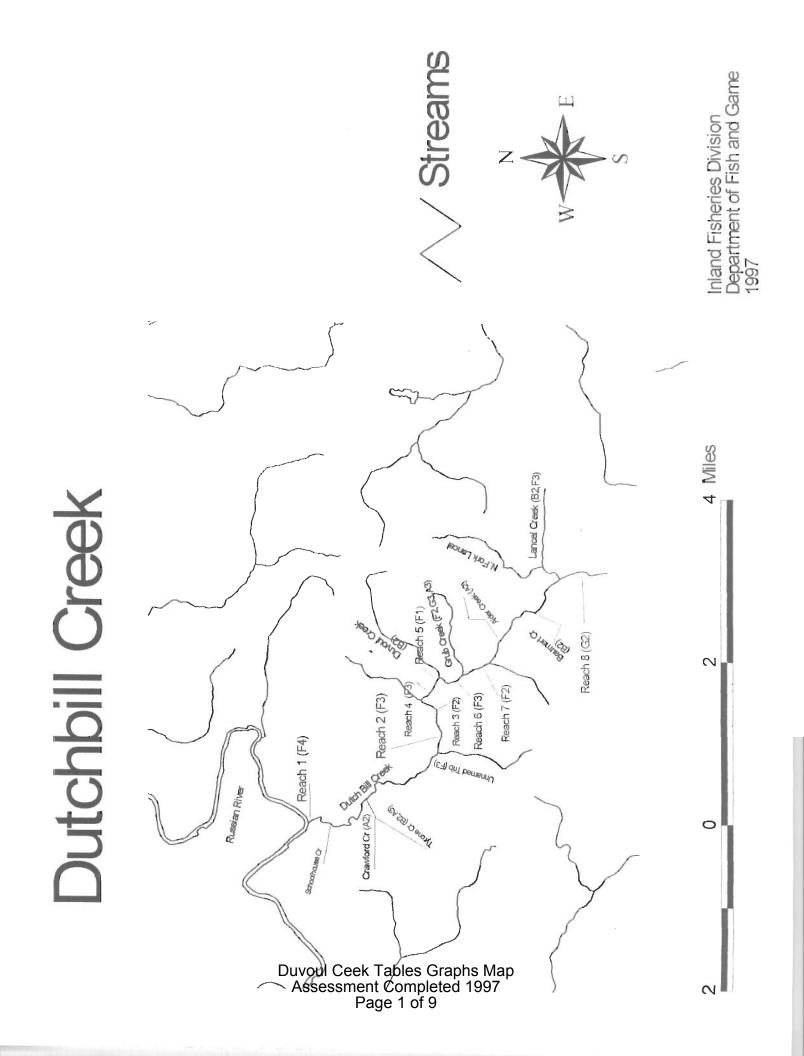
Alder Creek Tables Graphs Map Assessment Completed 1997 Page 8 of 9 STREAM NAME: ALDER CREEK SAMPLE DATES: SURVEY LENGTH: SIDE CHANNEL: 0 ft. MAIN CHANNEL: 989 ft. LOCATION OF STREAM MOUTH: Latitude: 0°0'0" USGS Quad Map: Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-8) Channel Type: A2 Main Channel Length: 989 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 3.3 ft. Pools by Stream Length: 3% Pool Mean Depth: 0.9 ft. Base Flow: 0.0 cfs Base Flow: 0.0 cfsPools >=3 ft. Deep: 0%Water: 61-61°F Air: 76-76°FMean Pool Shelter Rtn: 16Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 50%Occurrence of LOD: 25%Dom. Bank Substrate: BedrockDry Channel: 876 ft.Embeddness Value: 1. 50%2. 0%3. 0%

Mean Canopy Density: 95% Evergreen Component: 78% Deciduous Component: 22% Pools >=2 ft. Deep: 100% Pools >=3 ft. Deep: 0%

Alder Creek Tables Graphs Map Assessment Completed 1997 Page 9 of 9



Survey Dates: 07/29/97 Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL MABITAT TYPES

DEVOUL CREEK

Drainage: Russian River

LATITUDE: 0°0'0" LONGITUDE: 0°0'0" LEGAL DESCRIPTION: Confluence Location: QUAD:

HABITAT		HABITAT	HABITAT	MEAN	TOTAL	TOTAL PERCENT	MEAN	MEAN	MEAN	ESTIMATED		MEAN ESTIMATED	MEAN	MEAN
SLIND	FULLY	TYPE	PERCENT	LENGTH	LENGTH		HIDIM	DEPTH	AREA	TOTAL	N	TOTAL	RESIDUAL	SHELTER
	MEASURED		OCCURRENCE	(ft.)	(ft.)	LENGTH	(ft.)	(ft.)	(sq.ft.)	AREA	AREA (cu.ft.)	VOLUME	POOL VOL	RATING
										(sq.ft.)		(cu.ft.) (c	(cu.ft.)	
M	m	RIFFLE	30	74	223	30	2.5	0.2	130	390				3
2	-	FLATWATER	20	54	101	14	2.8	0.2	127	254	35	02	0	0
m	-	Pool	30	95	137	18	9.8	1.0	307	922			66	23
2	0	DRY	20	138	276	37	0.0	0.0	0	0	0	0	0	0
OTAL	TOTAL			FOTAL	FOTAL LENGTH					TOTAL AREA		OTAL VOL.		
NITS	UNITS				(ft.)					(sq. ft.)		(cu. ft.)		
₽ able	5				742					1565		998		
-														

Graphs Map leted 1997 9

Drainage: Russian River	Survey Dates: 07/29/97
	F HABITAT TYPES AND NEASURED PARAMETERS
DEVOUL CREEK	Table 2 - SUMMARY OF

n0:0.0
LONGI TUDE:
110.0.0
LATITUDE:
EGAL DESCRIPTION:
LEG
Location: QUAD:
Cont Lience

the second s	HABITAT	-	MEAN	TOTAL	TOTAL	MEAN	MEAN	MEAN MAXIMUM	MEAN	TOTAL	MEAN	TOTAL	MEAN	MEAN	MEAN
	OCCURRENCE LEN	Ē	LENGTH	LENGTH	LENGTH	VIDTH	DEPTH	DEPTH	AREA		AREA VOLUME EST.	VOLUME EST.	RESIDUAL SHELTE POOL VOL RATING	RATING	CANOPY
*			ft.	ft.	*	ft.	ft.	ft.	sq.ft.	sq.ft.	sq.ft. sq.ft. cu.ft.	cu.ft.	cu.ft.		*
			16	16	2	ß	0.1	0.2	28	28	м	S	0	0	52
10 1		-	5	173	23	4	0.3	0.9	345	345	104	104	0	10	20
		()	35	35	ŝ	-	0.1	0.2	17	17	2	2	0	0	20
		m		37	ŝ	2	0.1	0.8	33	33	м	м	0	0	95
10 70		2	_	02	6	4	0.3	1.0	221	221	99	99	0	0	£
20 12		12		54	M	1	1.1	2.4	101	201	86	172	99	40	К
•	•	113		113	15	80	0.9	1.8	721	721	649	649	0	5	90
20 138	•	138		276	37	0	0°0	0.0	0	0	0	0	0	0	95
				LENGTH						AREA	TOT	TOTAL VOL.			
				(ft.)						(sq.ft)		(su.ft)			
				742						1565		866			

Take 3 - summer of pol. TYPE aurvey bates: 07/29/91 Confluence Location: 01/00: LEGAL DESCRIPTION: LATITUDE: 0°0.01 Confluence Location: 01/00: LEGAL DESCRIPTION: LATITUDE: 0°0.01 MailTAT MailTAT MailTAT MailTAT MailTAT LEGAL DESCRIPTION: LATITUDE: 0°0.01 MailTAT	DEVOUL CREEK	CREEK						Drai	nage: Ru	Drainage: Russi an River	er				
Optituence Locationi UNITS Latitude: 0~010 ⁴ Latitude: 0~010 ⁴ Latitude: 0~010 ⁴ MailTAI UNITS MailTAI Mail	Table 3	- SUMMARY	OF POOL T	YPES				Surv	ey Dates	:: 07/29/9	2				
Mailtra	Conflue	nce Locatio	n: QUAD:	LE	GAL DESCRI	PTION:		LATI	TUDE: 0°		NGI TUDE: 0	ıı0ı0.			
(ft.) (ft.) (ft.) (ft.) (sq.ft.) (sq.ft.	HABITAT UNITS	MEA	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH	TOTAL	- A-	MEAN		MEAN AREA	-		TOTAL VOLUME EST.		MEAN SHELTER RATING
3 1 MAIN 100 45 137 100 203 223 820 10714 T074 T074 T074 T074 T074 101 <th></th> <th></th> <th></th> <th></th> <th>(ft.)</th> <th>(ft.)</th> <th></th> <th>(ft.)</th> <th></th> <th>(sq.ft.)</th> <th>(sq.ft.)</th> <th>(cu.ft.)</th> <th>(cu.ft.)</th> <th>(cu.ft.)</th> <th></th>					(ft.)	(ft.)		(ft.)		(sq.ft.)	(sq.ft.)	(cu.ft.)	(cu.ft.)	(cu.ft.)	
Total Length Total Length 137 137 137 137 137 137 137 137	™ Du	-	MAIN	100	46	137	100	9.8	1.0	307			820	8	3
(TT) STINU S	IOVI				TOTA	L LENGTH					FOTAL AREA		DIAL VOL.		
ti T M Ceek Tables Graphs Map	STINUTS					(ft.)					(sq.ft.)		(cu.ft.)		
k Tables Graphs Map	m Cee	-				137					922		820		
ables Graphs Map	k T														
es Graphs Map	abl														
Graphs Map	es														
aphs Map	Gra														
s Map	aphs														
ар	s Ma														
	ар														

0 0 >=4 FEET DEPTH OCCURRENCE PERCENT MAXIMUM 0 0 >=4 FEET 3-<4 F00T 0 0 PERCENT DEPTH OCCURRENCE LATITUDE: 0°0'0" LONGITUDE: 0°0'0" 3-<4 FT. MAXIMUM 0 0 Drainage: Russian River Survey Dates: 07/29/97 100 0 2-<3 FOOT PERCENT DEPTH OCCURRENCE 1-<2 FT. 1-<2 FOOT 2-<3 FT. ~ 0 MAXIMUM PERCENT DEPTH OCCURRENCE 0 01 Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES MUMIXAM 0 -LEGAL DESCRIPTION: <1 F00T PERCENT DEPTH OCCURRENCE 0 0 MUMIXAM 0 0 <1 F00T 67 OCCURRENCE HABITAT PERCENT Confluence Location: QUAD: HABITAT TYPE MCP STP DEVOUL CREEK Duvoul Ceek Tables Graphs Map Assessment Completed 1997 Page 5 of 9 UNITS MAX DPTH 7 5 MEASURED

			X TOTAL BEDROCK LEDGES	O	0	0 0	0	£	0	0	0	6
		-0.0.0 ·	% TOTAL BOULDERS	0	80	0 0	0	25	15	0	51	18
River	16/6	LONGITUDE: 0°0'0"	% TOTAL WHITE WATER	0	0 (0 0	0	0	0	0	0	o
Drainage: Russian River	Survey Dates: 07/29/97	LATITUDE: 0°0'0"	% TOTAL AQUATIC VEGETATION	0	0 0	0 0	0	0	0	0	o	0
Drain	Surve	LATITU	OTAL % TOTAL ROOT TERR. MASS VEGETATION	0	0	0 0	0	0	0	0	υ	0
			% TOTAL ROOT MASS V	0	ις (0 0	0	0	0	0	M	0
		RIPTION	LWD	0	0 0	0 0	0	0	0	0	0	0
	t Type	LEGAL DESCRIPTION:	% TOTAL % TOTAL SWD LWD	0	Ś	0 0	0	0	0	0	M	o
	Summary of Shelter by Habitat Type		X TOTAL UNDERCUT BANKS	0	0 0		0	Û	85	ø	30	63
	f Shelter	ion: QUAD:	HABITAT TYPE	LGR	HGR	RUN	SRN	MCP	STP	DRY		
¥	ummary o	location	UNITS SHELTER MEASURED	. .		- 0	-	۴-	۴-	0	\$	5
DEVOUL CREEK	Table 5 - Si	Confluence locat	UNITS UNITS MEASURED SHELTER MEASURED	-			-	2	-	2	10 S	M
DEVC	Tabl	Conf	ME			Du A	vo \ss	ul ses	Ce ssi	eek ner Pa	Tables Cont Comple age 6 of 9	Graphs Map eted 1997

EVOUL CREEK					Drainage	Drainage: Russian River			
able 6 - SUMMARY OF DOMINANT	RY OF D	OMINANT S	SUBSTRATES BY HABITAT TYPE	HABITAT TYPE	Survey Da	Survey Dates: 07/29/97			
onfluence Location: QUAD:	ition: 0	: GAU :	LEGAL	LEGAL DESCRIPTION:	LATITUDE	ATITUDE: 0°0'0" LONGITUDE: 0°0'0"	TUDE: 0°0'0"		
TOTAL U	UNITS	HABITAT	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL	*
HARITAT SURCTOATE	DATE	TVDE	CTI T JPI AV	SAND	CDAVEL	CM CODDI L	Lingood		

ce Location: QUAD: UNITS HABITAT	12127		
ITAT % TOTAL % TOTAL % TOTAL	IONGITIDE 00000		
UNITS HABITAT % TOTAL % TOTAL % TOTAL			
	TAL % TOTAL	% TOTAL	% TOTAL
HABITAT SUBSTRATE TYPE SILT/CLAY SAND GRAVEL SM COBBLE UNITS MEASURED DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT	BLE LG COBBLE ANT DOMINANT	BOULDER	BEDROCK
1 1 LGR 0 0 100	0	0	o
1 HGR 0	0	100	0
	0	0	100
	100 0	0	0
	0	0	100
1 MCP 0 100 0	0	0	0
0 1 STP 0 100 0			
	0	0	0

DEVOUL CREEK

Mean	Mean	Mean	Mean	Mear
Percent	Percent	Percent	Right bank	Left Bank
Canopy	Evergreen	Deciduous	% Cover	% Cover
82.22	60.00	40.00	25.56	20.56

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Unit s Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	5	6	61.11
Boulder	0	0	0
Cobble/Gravel	1	0	5.56
Silt/clay	3	3	33.33

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Unit s
Grass	0	0	0
Brush	0	0	O
Deciduous Trees	1	2	16.67
Evergreen Trees	4	4	44.44
No Vegetation	4	3	38.89

Duvoul Ceek Tables Graphs Map Assessment Completed 1997 Page 8 of 9 STREAM NAME: DEVOUL CREEK SAMPLE DATES: SURVEY LENGTH: MAIN CHANNEL: 742 ft. LOCATION OF STREAM MOUTH: USGS Quad Map: Legal Description:

SIDE CHANNEL: 0 ft.

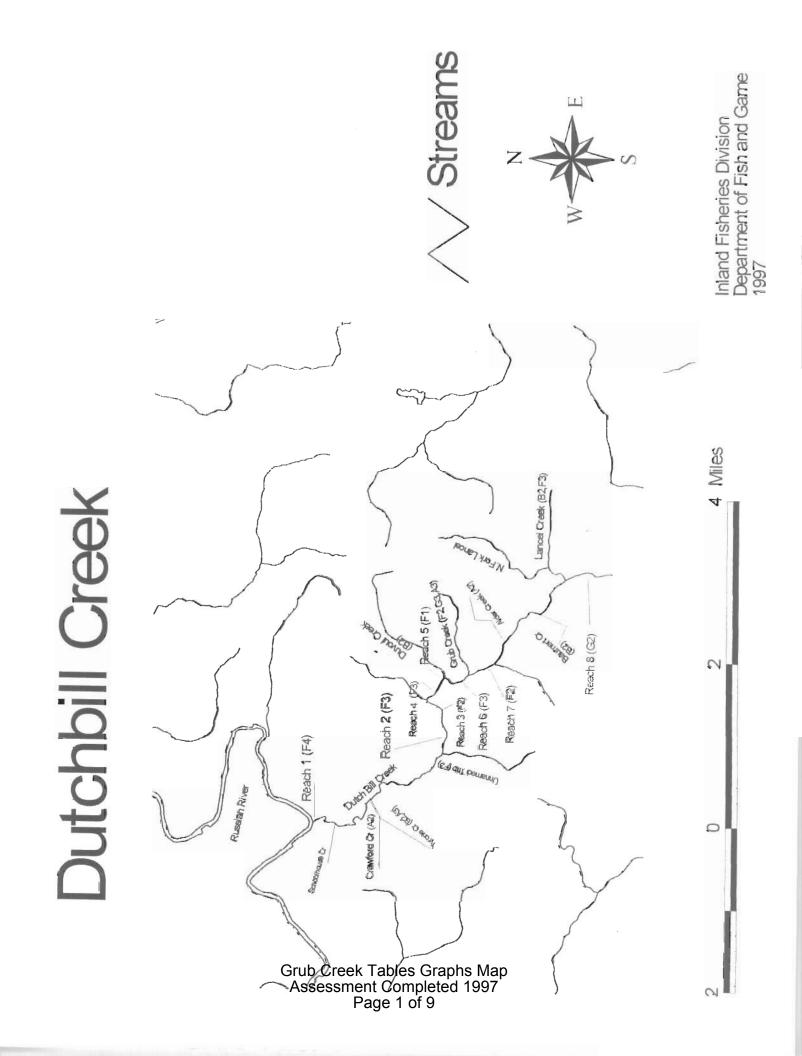
Latitude: 0°0'0" Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-10) Channel Type: B2 Main Channel Length: 742 ft. Evergreen Component: 60% Side Channel Length: 0 ft. Deciduous Component: 40% Side Channel Length: 0 ft. Deciduous Component: 40% Riffle/Flatwater Mean Width: 2.6 ft. Pools by Stream Length: 18% Pool Mean Depth: 1.0 ft. Base Flow: 0.0 cfs Base Flow: 0.0 cfsPools >=3 ft. Deep: 0%Water: 63-63°F Air: 65-65°FMean Pool Shelter Rtn: 23Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 23%Dom. Shelter: BouldersDom. Bank Substrate: BedrockDry Channel: 276 ft.Embeddness Value: 1. 50%2. 0%3. 0%

Mean Canopy Density: 82% Pools >=2 ft. Deep: 67% Pools >=3 ft. Deep: 0%

Duvoul Ceek Tables Graphs Map Assessment Completed 1997 Page 9 of 9



			IMATED MEAN	TOTAL RESIDUAL
		0	MEAN ESTIMATED	VOLUME
2	to 08/07/97	GITUDE: 0°0'	ESTIMATED	TOTAL
n Rive	/05/97	LON	MEAN	AREA
Drainage: Russian River	Survey Dates: 08/05/97 to 08/07/97	LATITUDE: 0°0'0" LONGITUDE: 0°0'0"	MEAN	DEPTH
Draiı	Surve	LATI	MEAN	WIDTH
	YPES		TOTAL PERCENT	LENGTH LENGTH TOTAL WIDTH DEPTH
	IBITAT T	:NOI1	TOTAL	LENGTH
	D POOL HA	LEGAL DESCRIPTION:	MEAN	LENGTH
	FLATMATER, AND POOL HABITAT TYPES	LEGA	HABITAT	PERCENT
	JE RIFFLE,	: QUAD:	HABITAT	TYPE
¥	Table 1 - SUMMARY OF RIFFLE,	Confluence Location: QUAD:	STINU	FULLY
Grub Creek	Table 1 -	Confluenc	HABITAT	UNITS

MEAN SHELTER RATING	20 20 20
MEAN RESIDUAL POOL VOL (cu.ft.)	0 0 7 0 0 7
MEAN ESTIMATED MEAN DLUME TOTAL RESIDUAL ft.) VOLUME POOL VOL (cu.ft.) (cu.ft.)	334 745 2341 0 0 101AL VOL. (cu. ft.) 3419
ATED MEAN E OTAL VOLUME AREA (cu.ft.) ft.)	58 155 0 0 1 1 0
ESTIMATED TOTAL AREA (sq.ft.)	1818 1557 1796 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
MEAN AREA (sq.ft.)	303 92 0 120
MEAN DEPTH (ft.)	0.5 1.2 0.0
MEAN WIDTH (ft.)	6.6 0.0
TOTAL PERCENT ENGTH TOTAL (ft.) LENGTH	v∞ 4 03
TOTAL LENGTH (ft.)	55 329 29 488 19 278 183 5112 10TAL LENGTH (ft.) 6206
MEAN LENGTH (ft.)	55 29 183 TOTAL
HABITAT PERCENT OCCURRENCE	23 42
HABITAT TYPE	RIFFLE FLATWATER POOL DRY
UNITS FULLY MEASURED	2 5 6 0 101AL UNITS 13
HABITAT UNITS	° ⊑ ≌ ੴ Grub Creek Tābles Graphs Map Assessment Completed 1997 Page 2 of 9

		-
River	5/97 to 08/07/97	LONGITUDE: 0°0'0
Drainage: Russian River	Survey Dates: 08/05/97 to 08/07/97	LATITUDE: 0°0'0" LONGITUDE: 0°0'0"
	OF HABITAT TYPES AND MEASURED PARAMETERS	LEGAL DESCRIPTION:
Grub Creek	Table 2 - SUMMARY OF HABITAT TYPES	Confluence Location: QUAD:

VOLUME RESIDUAL EST. POOL VOL Cu.ft. cu.ft. 194 0 362 0 362 0 371 0 1424 172 1424 172 1444 174 1444 174 1444 174 1444 174 1444 174 1444 1744 17	HABITAT	UNITS	HABITAT	HABITAT	MEAN	TOTAL	TOTAL	MEAN	MEAN	MEAN MAXIMUM	MEAN	TOTAL	MEAN	TOTAL	MEAN	MEAN	MEAN
#FASURED $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	STINU	FULLY	TYPE	OCCURRENCE	LENGTH	LENGTH	LENGTH	HIDIM		DEPTH	AREA		VOLUME	VOLUME	RESIDUAL	SHELTER	CANOPY
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		MEASURED										EST.		EST.		RATING	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	*			*	ft.	ft.	ж	ft.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.			*
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5	-	LGR	ß	53	264	4	2	0.2	0.7	365	1825	39	194	0	2	82
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	-	-	CAS	2	65	65	•	9	0.5	0.7	179	621	89	89	0	5	80
7 1 SN 9 42 250 4 4 0.5 1.1 137 821 62 371 0 7 1 MCP 11 20 138 2 7 1.3 3.2 151 1059 203 1424 172 2 1 LISIK 3 2.6 1 6 1.0 7.0 76 153 76 153 76 153 0 172 171 172 172 172 173 172 171 174 172 174 172 173 173 173 173 173 <td< td=""><td>ς Grι</td><td>4</td><td>RUN</td><td>17</td><td>22</td><td>238</td><td>4</td><td>4</td><td>0.5</td><td>1.2</td><td>\$</td><td>602</td><td>33</td><td>362</td><td>0</td><td>11</td><td>83</td></td<>	ς Grι	4	RUN	17	22	238	4	4	0.5	1.2	\$	602	33	362	0	11	83
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	∿ ∕	-	SRN	6	42	250	4	4	0.5	1.1	137	821	62	371		5	6
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	⊳ Ci	-	MCP	11	20	138	2	2	1.3	3.2	151	1059	203	1424		25	76
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	∾ ree	-	LSBK	M	23	46	-	4	0.1	2.0	276	153	92	153	0	5	6
4 3 PLP 6 15 62 1 7 1.3 2.6 114 456 163 650 101 2 28 0 DRY 42 183 5112 82 0 10 1111	∾ ek	-	LSBo	м	16	32	-	9	1.0	1.9	80	159	81	162	0	13	8
28 0 DRY 42 183 5112 82 0 0.0 <	⊸ Ta	M	PLP	9	1	62	-	2	1.3	2.6	114	456	163	650	101	21	õ
Construction LengTH LengTH AREA TOTAL AREA TOTAL LengTH AREA TOTAL AREA TOTAL (ft.) (cutor) (sq.ft) (cutor) AREA TOTAL 5206 5361 (cutor) (cutor)	able	0	DRY	42	183	5112	82	0	0.0	0.0	0	0	0	0	0	0	17
MITS UNITS (cu (sq.ft) (sq	Total	TOTAL				LENGTH						AREA	101	AL VOL.			
2361 5361 5361 5361 5361 5361 5361 5361 5	STINUTS	UNITS				(ft.)					0	sq.ft)		(cu.ft)			
ns M	apl	13				6206						5361		3405			
	hs Ma																

	Se M						Drai	nage: Ru	Drainage: Russian River	er				
Table 3	3 = SUMMARY OF POOL TYPES	DF POOL T	YPES				SULVI	ey Dates	:: 08/05/9	Survey Dates: 08/05/97 to 08/07/97	261.			
Confluer	Confluence Lecation: QUAD:	n: QUAD:	L	LEGAL DESCRIPTION:	:NOI10		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	110 1 0 a			
HABITAT	ULLY	HABITAT	HABITAT	MEAN LENGTH	TOTAL	TOTAL PERCENT ENGTH TOTAL	MEAN	MEAN DEPTH	MEAN	TOTAL	MEAN	TOTAL	MEAN	MEAN
	MEASURED		OCCURRENCE	(ft.)	(ft.)	LENGTH	(ft.)	(ft.)	(sq.ft.)	EST. EST. EST. POOL VO (sq.ft.) (sq.ft.) (cu.ft.) (cu.ft.)	(cu.ft.)	EST. (cu.ft.)	POOL VOL.	
	-	MAIN	47	50	138	50	7.4	1.3	151	1059	203	1424	172	25
∞ Gru	2	scoug	53	17	140	50	6.0	1.2	96	768	121	965	101	15
OTOTAL	TOTAL	- 		TOTAL	TOTAL LENGTH					TOTAL AREA		TOTAL VOL.		
slinne	NITS				(ft.)					(sq.ft.)		(cu.ft.)		
≌ ek	6				278					1827		2388		
Tables Graphs Ma nt Completed 1997 age 4 of 9														

e Location HABITAT TYPE MCP LSBk LSBo PLP					DF	ainage: R	Drainage: Russian River	L			
type HABITAT TYPE LSBk LSBo PLP	OF MAXIMUM PO	OL DEPTHS	BY POOL HAE	SITAT TYPE		rvey Date	Survey Dates: 08/05/97 to 08/07/97	to 08/07/	26/		
HABITAT TYPE MCP LSBK LSB0 PLP	n: qUAD:	LEG	LEGAL DESCRIPTION:	: NOI J	LA	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	ı=0 = 0.		
MCP LSBK PLP	PERCENT DCCURRENCE	<1 FOOT MAXIMUM DEPTH D	FOOT <1 FOOT XIMUM PERCENT DEPTH OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	2 FT. 1-<2 FOOT 2-<3 FT. XIMUM PERCENT MAXIMUM DEPTH OCCURRENCE DEPTH	2-<3 FT. MAXIMUM DEPTH	3 FT. 2-<3 F00T XIMUM PERCENT DEPTH OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	4 FT. 3-<4 FOOT XIMUM PERCENT DEPTH OCCURRENCE	>=4 FEET MAXIMUM DEPTH	FEET >=4 FEET XIMUM PERCENT
	47	0	0	м	43	м	43	-	14	0	0
	13	0	0	-	50	-	50	0	0	0	0
	13	0	0	2	100	0	0	0	0	0	0
تلا ^{۲۲} Ling Creek Tables Graphs Map	27	0	0	-	25	м	52	0	0	0	0
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Table 5 - Sumary of Shelter by Habitat Type Survey Dates: 04/05/97 to 08/07/97 Table 5 - Sumary of Shelter by Habitat Type Survey Dates: 04/05/97 to 08/07/97 Table 5 - Sumary of Shelter by Habitat Type Survey Dates: 04/05/97 to 08/07/97 Confiluence Location: QUAD: LINITUDE: 0°0'0'' LONGITUDE: 0°0'0'' UNITS UNITS MAITAT XTOTAL XTOTA	Grub Creek	reek								Drair	Drainage: Russian River	River		
Tech Lotation: GUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0' LONGITUDE: 0°0'0' TS WITS MADITAI X TOTAL X TOTAL <t< th=""><th>Table 5</th><th></th><th>ummary o</th><th>of Shelter</th><th>by Habita</th><th>t Tyr</th><th>8</th><th></th><th></th><th>Surve</th><th>ey Dates: 08/0</th><th>05/97 to 08</th><th>26/20/</th><th></th></t<>	Table 5		ummary o	of Shelter	by Habita	t Tyr	8			Surve	ey Dates: 08/0	05/97 to 08	26/20/	
ITS WHITS MARITAT X TOTAL <	Conflue	ence		1: QUAD:	-	LEGAL	DESCR	NOITGIN		LATI	TUDE: 0°0'0"	LONGITUDE	H0:0.0 :	
5 1 LGR 0 0 0 0 0 0 100 1 1 CAS 0 0 0 0 0 0 100 1 1 CAS 0 0 0 0 0 0 100 1 1 CAS 0 0 0 0 0 0 100 7 7 RUN 0 0 0 0 0 100 100 2 1 SNN 0 0 0 0 1 100 100 2 1 SNN 0 0 0 0 0 100 100 2 1 SNN 0 0 0 0 0 100 100 2 1 0 0 0 0 0 0 100 100 2 1 1 1 1 0 </th <th>MEASU</th> <th>URED</th> <th>SHELTE</th> <th>HABITAT TYPE</th> <th>% TOTAL UNDERCUT BANKS</th> <th>% 10</th> <th>DTAL % SWD</th> <th>TOTAL</th> <th>% TOTAL ROOT MASS 1</th> <th>% TOTAL TERR.</th> <th>% TOTAL AQUATIC VEGETATION</th> <th>% TOTAL WHITE WATER</th> <th>% TOTAL BOULDERS</th> <th>% TOTAL BEDROCK LEDGES</th>	MEASU	URED	SHELTE	HABITAT TYPE	% TOTAL UNDERCUT BANKS	% 10	DTAL % SWD	TOTAL	% TOTAL ROOT MASS 1	% TOTAL TERR.	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
1 1 CAS 0 0 15 0 65 0 15 0 65 0 100 <td></td> <td>5</td> <td>٢</td> <td>LGR</td> <td>0</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>100</td> <td>0</td>		5	٢	LGR	0		0	0	0	0	0	0	100	0
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7 7 7 7 7 0 0 19 2 2 1 0 0 0 0 0 10 2 2 1 0 0 0 0 0 10 10 2 2 1 0 0 0 0 0 10 10 4 4 PLP 0 12 26 45 0 0 17 28 0 0 1 1 1 0 17 28 0 0 0 0 0 0 17 28 0 0 1 1 1 1 17 29 23 0 3 7 4,1 1 0 17 6 15 0 0 0 0 0 0 17 6 15 0 1 1 0 5<	Gri	\$	-	SRN	0		0	0	0	0	0	0	100	
2 LSR 0 0 0 0 0 100 2 2 LSB 0 0 0 0 0 100 4 4 PLP 0 12 26 45 0 0 17 28 0 NY 0 12 26 45 0 0 17 6 22 0 3 7 41 1 0 5 38 6 22 0 3 7 41 1 0 5 38 6 15 0 4 9 52 0 0 0 0 17 15 15 0 4 9 52 0 0 30	Jp	2	7	MCP	0		0	0	71	0	0	0	19	10
2 2 LSBo 0 0 0 0 0 100 4 4 PLP 0 12 26 45 0 0 17 28 0 DNY 0 0 0 0 0 0 17 28 0 DNY 0 0 0 0 0 0 17 66 22 0 3 7 41 1 0 5 38 66 23 0 3 7 41 1 0 5 38 15 15 0 4 9 52 0 0 0 30	С	2	2	LSBK	0		0	0	0	0	0	0	100	
4 PLP 0 12 26 45 0 0 17 28 0 DRY 0 0 0 0 0 0 0 0 0 66 22 0 3 7 41 1 0 5 38 66 22 0 3 7 41 1 0 5 38 15 15 15 0 4 9 52 0 0 30	re	2	2	LSBo	0		0	0	0	0	0	0	100	
28 0 10<	ek	4	4	PLP	0		12	26	45	0	0	0	17	
66 22 0 3 7 41 1 0 5 38 15 15 0 4 9 52 0 0 0 30	Та		0	DRY	0		0	0	0	0	0	0	0	
15 15 0 4 9 52 0 0	blē		22		0		~	2	41	-	0	5	38	
15 15 0 4 9 52 0 0 0	succession of the second secon				·									
	s and and a		15		0		4	0	52	0	0	0	30	

Table 6 - SUMMARY OF DOHIMANT SUBSTRATES BY MARITAT TYPE Survey Dates: 08/05/97 to 08/07/97 Total Lecart Dome Location: QUDD: LOCATION: LIATION: LIATION: LIATION: LIATION: LIATION: A TOTAL X TOTAL X TOTAL Total Location: QUDD: LecarL DESCRIPTION: LIATIUDE: 0°0'0" LONITIUDE: 0°0'0" LONITIUDE: 0°0'0" Total List Units MABITAT X TOTAL X TOTAL X TOTAL X TOTAL Units UNITS UNITS USERRATE TPAL X TOTAL X TOTAL X TOTAL UNITS UNITS SUBSTRATE TPR SILT/CLAT X TOTAL X TOTAL X TOTAL UNITS SUBSTRATE TPR SILT/CLAT SAND GRAVEL NO COBBLE N MABITAT SUBSTRATE TPR SILT/CLAT X TOTAL X TOTAL X TOTAL MALT SUBSTRATE TPR DOMINANT DOMINANT DOMINANT DOMINANT MALT SUBSTRATE TPR 0 0 0 0 0 MALT N N N DOMINANT DOMINANT DOMINANT DOMINANT	Grub Creek	×				Drainag	Drainage: Russian River			
Image: Construction: GUAD: LEGAL DESCRIPTION: LATITUDE: 0°0'0" LONGITUDE: 0°0'0" UNUTS HABITAT X TOTAL X TOTAL X TOTAL X TOTAL UNUTS HABITAT X TOTAL X TOTAL X TOTAL X TOTAL UNUTS TYPE SILTYCLAY SAND GRAVEL SILTYCLAY SAND SUBSTRATE TYPE SILTYCLAY SAND GRAVEL SILTYCLAY SAND C LGR 0 0 0 0 0 0 1 CAS DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT 1 LSN 0 0 0 0 0 0 1 LSN 3 33 33 0 0 0 0 0 5 DR DR DR DR DR 0 0 0 0 1 LSN 0 0 0 0 0 0 0 0	Table 6 -	SUMMARY OF	DOMINANT		HABITAT TYPE	Survey I	Jates: 08/05/97	to 08/07/97		
UNITS HABITAT X TOTAL	Confluenc	e Location:	auap :	LEGAL	DESCRIPTION:	LATITUD		TUDE: 0°0'0"		
SIBSTRATE TYPE SILT/CLAY SAND GRAVEL SM COBBLE LG COBBLE LG COBBLE MEASURED DOMINANT DOMINAN	TOTAL	UNITS	HABITAT		% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL	% TOTAL
2 LGR 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 0	HABITAT	SUBSTRATE MEASURED	TYPE	SILT/CLAY DOMINANT	SAND	GRAVEL DOMINANT	SM COBBLE DOMINANT	LG COBBLE DOMINANT	BOULDER	BEDROCK DOMINANT
1 CAS 0 0 0 0 0 2 SRN 50 0 0 0 0 0 2 SRN 0 0 0 0 0 0 0 1 MCP 0 100 0 0 0 0 0 1 LSBK 0 100 0 0 0 0 0 3 PLP 33 33 33 0 0 0 0 0 0 5 DRY 0 0 20 20 0 0 0 0 0	5	2	LGR	0	0	0	0	50	0	50
4 RUN 50 0 0 0 0 2 SRN 0 0 0 0 0 0 1 INCP 0 100 0 0 0 0 1 LSRK 0 100 0 0 0 0 0 3 PLP 33 33 33 0 0 0 0 0 5 DRY 0 0 20 0	- (-	CAS	0	0	0	0	0	100	0
2 SRN 0 0 0 0 0 0 1 1 MCP 0 100 0 0 0 0 0 1 1 LSBk 0 100 0 <t< td=""><td>Э́ті А</td><td>4</td><td>RUN</td><td>50</td><td>0</td><td>0</td><td>0</td><td>0</td><td>25</td><td>25</td></t<>	Э́ті А	4	RUN	50	0	0	0	0	25	25
1 MCP 0 100 0 0 1 LSBK 0 100 0 0 3 PLP 33 33 33 5 DRY 0 0 20 0 0 0 20 20 20	uĥ ss	2	SRN	0	0	0	0	0	50	50
1 LSBk 0 100 0 0 1 LSBc 0 100 0 0 0 3 PLP 33 33 33 0 0 0 3 PLP 33 33 33 0 0 0 0 0 5 DRY 0 0 20 20 20 20 0 0	ි es	-	MCP	0	100	0	0	0	0	0
1 LSBo 0 100 0 0 3 PLP 33 33 0 0 0 5 DRY 0 0 20 0 0 0 5 DRY 0 0 20 20 20 20 20	re sn	-	LSBK	0	100	0	0	0	0	0
3 PLP 33 33 0 0 0 5 DRY 0 0 20 20 20	ek ne	-	LSBO	0	100	0	0	0	0	0
5 DRY 0 20 20	†a nt	£	did	33	33	0	0	0	33	0
es Graphs Maj	abl Co	5	DRY	0	0	20	20	20	40	0
Graphs Maj	∋s mp									
aphs Maj ed 1997	Gra									
s Maj 1997	aph ed									
	s IV 199									
p	lap 7									

Grub Creek

M		Mean	Mean	Mean	Mean
Perc		Percent	Percent	Right bank	Left Bank
Can		Evergreen	Deciduous	% Cover	% Cover
83	.21	61.92	38.08	46.25	50.24

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Unit s Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	6	3	21.43
Boulder	0	0	0
Cobble/Gravel	0	0	0
Silt/clay	15	18	78.57

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	2	1	7.14
Brush	0	0	0
Deciduous Trees	5	3	19.05
Evergreen Trees	12	16	66.67
No Vegetation	2	1	7.14

Grub Creek Tables Graphs Map Assessment Completed 1997 Page 8 of 9

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Grub Creek SAMPLE DATES: 08/05/97 to 08/07/97 SURVEY LENGTH: SIDE CHANNEL: 0 ft. MAIN CHANNEL: 6206 ft. LOCATION OF STREAM MOUTH: USGS Quad Maps Latitude: 0°0'0" USGS Quad Map: Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-40) Channel Type: F2 Main Channel Length: 4113 ft. Evergreen Component: 78% Side Channel Length: 0 ft. Deciduous Component: 22% Riffle/Flatwater Mean Width: 4.8 ft. Pools by Stream Length: 6% Pool Mean Depth: 1.2 ft. Pools >=2 ft. Deep: 54% Base Flow: 0.0 cfsPools >=3 ft. Deep: 8%Water: 60-65°F Air: 74-94°FMean Pool Shelter Rtn: 22Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 55%Occurrence of LOD: 35% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 3369 ft. Embeddness Value: 1. 0% 2. 13% 3. 50% 4. 38%

STREAM REACH 2 (Units 41-48) Channel Type: G3 Main Channel Length: 1116 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 4.0 ft. Pools by Stream Length: 2% Pool Mean Depth: 1.6 ft. Base Flow: 0.0 cfs Water: 70-70°F Air: 72-72°F Mean Pool Shelter Rtn: 5 Dom. Bank Veg.: Evergreen Trees Dom. Shelter: Boulders Bank Vegetative Cover: 58% Occurrence of LOD: 0% Bank Vegetative Cover: 58% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 1072 ft. Embeddness Value: 1. 2.

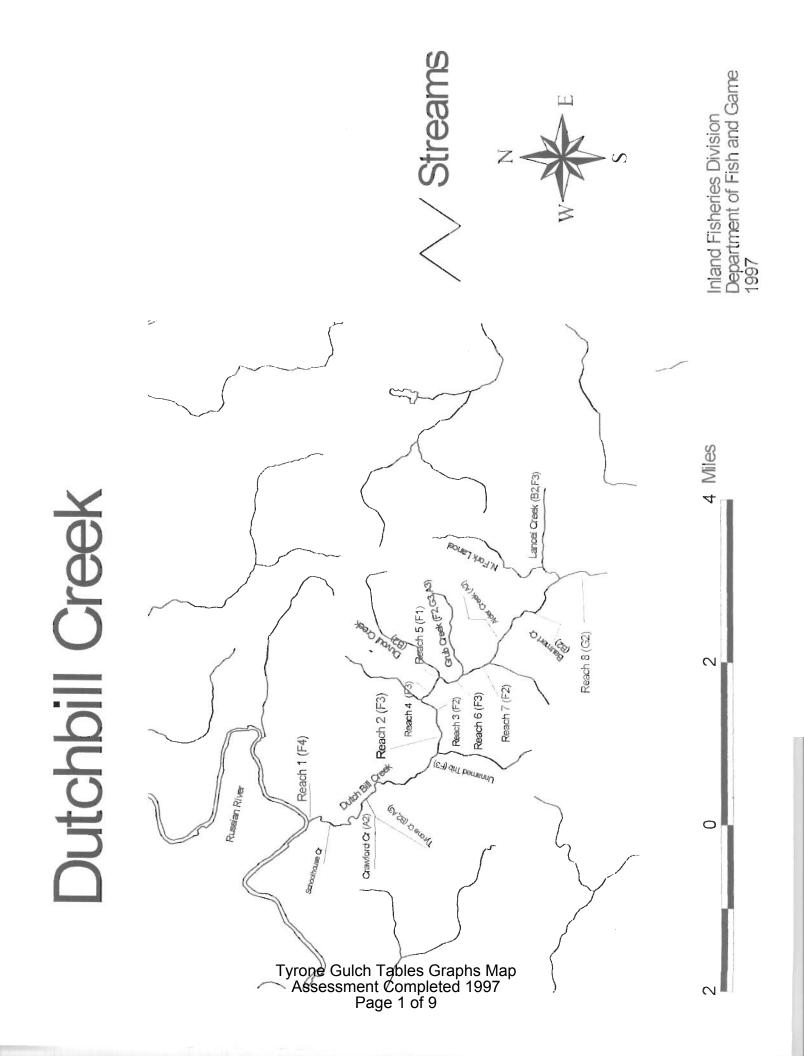
STREAM REACH 3 (Units 49-66) Channel Type: A2 Main Channel Length: 978 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 3.6 ft.Decladous Component: 58%Pool Mean Depth: 1.0 ft.Pools by Stream Length: 1%Pool Mean Depth: 1.0 ft.Pools >=2 ft. Deep: 0%Base Flow: 0.0 cfsPools >=3 ft. Deep: 0%Water: 66-NA°F Air: 72-88°FMean Pool Shelter Rtn: 10Dom. Bank Veg.: Evergreen TreesDom. Shelter: BouldersBank Vegetative Cover: 30%Occurrence of LOD: 0%Dom. Bank Substrate: Silt/Clay/SandDry Channel: 671 ft. Embeddness Value: 1. 0% 2. 0% 3. 0% 4. 100%

Mean Canopy Density: 89%

Mean Canopy Density: 76% Evergreen Component: 25% Deciduous Component: 75% Pools >=2 ft. Deep: 100% Pools >=3 ft. Deep: 0% Occurrence of LOD: 0% 3. 4.

Mean Canopy Density: 74% Evergreen Component: 42% Deciduous Component: 58%

Grub Creek Tables Graphs Map Assessment Completed 1997 Page 9 of 9



Drainage: Russian Ríver

Tyrone Gulch

Survey Dates: 09/11/97 Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES

LATITUDE: 0°0'0" LONGITUDE: 0°0'0" LEGAL DESCRIPTION: Confluence Location: QUAD:

HABITAT UNITS HABITAT															
5 FULIY TYPE PERCENT LENGTH TOTAL MIDTH AREA TOTAL RESIDUAL RALI MEASURED 0 0 1 Kt.) Kt.) Kt.) Kt.) Kt.) Kt.) Kall Kully Youume POOL VOL Kall 7 Riffle 43 5 66 795 48 3.2 0.3 195 2344 51 00L VOL RALI 7 8 1 8 344 21 5.6 0.3 334 347 217 117 117 1 Dr 7 7 0 7 21 2.2 21 7.2 212 137 117 117 Dr Dr 7 7 0 7 60 17 17 117 TOTAL Br 7 7 0 7 212 1517 117 117 TOTAL Dr 7 0 </th <th>HABITAT</th> <th>UNITS</th> <th>HABITAT</th> <th>HABITAT</th> <th>MEAN</th> <th>TOTAL</th> <th>PERCENT</th> <th>MEAN</th> <th>MEAN</th> <th>MEAN</th> <th></th> <th>MEAN</th> <th>ESTIMATED</th> <th>MEAN</th> <th>MEAN</th>	HABITAT	UNITS	HABITAT	HABITAT	MEAN	TOTAL	PERCENT	MEAN	MEAN	MEAN		MEAN	ESTIMATED	MEAN	MEAN
MABURED OCCURRANCE (ft.) (ft.) (ft.) (ft.) (ft.) (ft.) (ft.) NEA OULUME POOL VOL MATH 12 7 RIFFLE 43 66 795 48 3.2 0.3 195 2344 51 (cu.ft.)	UNITS		TYPE	PERCENT	LENGTH	LENGTH		MIDIM	DEPTH	AREA	TOTAL	VOLUME	TOTAL	RESIDUAL	SHELTER
12 7 RIFLE 43 66 795 48 3.2 0.3 195 2344 51 607 0 10 5 Pool 3 3 3 10 3 132 52 3 0		MEASURED		OCCURRENCE	(ft.)	(ft.)	LENGTH	(ft.)	(ft.)	(sq.ft.)	AREA	(cu.ft.)	VOLUME	POOL VOL	RATING
12 7 RIFLE 43 66 795 48 3.2 0.3 195 2344 51 607 0 2 7 14 86 344 21 5.6 0.4 385 132 528 0 17 2 5 600L 36 72 0.7 212 132 528 0 17 3 10 5 900L 36 37 212 120 12 12 17 117 10 7 76 151 9 2.0 0.1 40 80 4 8 0 0 10 10 7 76 151 9 2.0 0.1 40 80 4 8 0 0 10 10 10 40 80 4 8 0 16 17 117 117 117 117 117 117 117 117 117 117 116 116 116 116 116 16 16 16 <td></td> <td>(sq.ft.)</td> <td></td> <td>(cu.ft.)</td> <td>(cu.ft.)</td> <td></td>											(sq.ft.)		(cu.ft.)	(cu.ft.)	
4 2 FLATMATER 14 86 344 21 5.6 0.4 385 1539 132 528 0 2 5 BOUL 36 35 35 0.7 212 2120 152 1517 117 3 35 35 35 0.1 40 80 4 8 0 1 bry 7 76 151 9 2.0 0.1 40 80 4 8 0 1 bry 7 76 151 9 2.0 0.1 40 80 4 8 0 1 bry 7 76 151 9 2.0 0.1 40 80 4 8 0 201AL TOTAL TOTAL 171 40 80 4 8 0 0 28 15 15 15 164.0 164.0 164.1 164.1 164.1 164.1 164.1 164.1 164.1 164.1 164.1 164.1 164.1	₽ T	7	RIFFLE	43	66	262	87	3.2	0.3	195	2344	51	607	0	0
10 5 bot. 35 350 21 7.2 0.7 12 2120 152 1517 117 1 bry 7 76 151 9 2.0 0.1 40 80 4 8 0 1 bry 7 76 151 9 2.0 0.1 40 80 4 8 0 1 total total total 101AL TOTAL AREA TOTAL VOL. 101AL VOL. 117 101AL VOL. 117 117 117 117 117 117 117 117 117 114 114 114	√ yrc A	2	FLATWATER		86	344	21	5.6	0.4	385	1539	132	528		10
2 1 Dr 7 76 151 9 2.0 0.1 40 80 4 8 0 1 107AL TOTAL TOTAL TOTAL TOTAL A 16 17 17 17 17 17 16 8 0 1 10 16 10	₽ one	ŝ	Poot	36	35	350	21	7.2	0.7	212	2120	152	1517		30
Total Length Total Length (ft.) (ft.) 1640	∾ e G	-	DRY	7	76	151	0	2.0	0.1	40	80	4	80		0
(11) (1)) (1))	ulê	TOTAL			TOTAL	LENGTH					TOTAL AREA		OTAL VOL.		and the first state of the state
v S Tables Graphs Map	S	NITS				(ft.)					(sq. ft.)		(cu. ft.)		
	Tables Graphs Mar	5				1640					6083		2660		

Orainage: Russian River Table 2 = SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Tyrene Guich

Survey Dates: 09/11/97

Tyrone Gulch	ulch						Drair	nage: Ru	Drainage: Russian River	L				
Table 3	Table 3 - SUMMARY OF POOL TYPES	JF POOL TY	PES				Surve	ey Dates	Survey Dates: 09/11/97					
Confluen	Confluence Location: QUAD:	: GUAD:	LE	LEGAL DESCRIPTION:	:NOI1		LATI	LATITUDE: 0°0'0"		LONGITUDE: 0°0'0"	.0.0.			
NABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL I LENGTH	TOTAL PERCENT ENGTH TOTAL LENGTH Cft.)	MEAN WIDTH (ft.)	MEAN MEAN WIDTH DEPTH (ft.) (ft.)	MEAN AREA (sq.ft.)	MEAN TOTAL MEAN AREA AREA VOLUME EST. (sq.ft.) (sq.ft.) (cu.ft.)	MEAN VOLUME	TOTAL MEAN VOLUME RESIDUAL EST. POOL VO (cu.ft.) (cu.ft.)	MEAN RESIDUAL POOL VOL.	MEAN SHELTER RATING
Tyro As	3 10	MAIN SCOUR	50	49 21	247 103	29	5.6 8.8	0.6	261 163	1307 813	159	797 719	138 96	17 43
ne Gulch Tables Graphs Map sessment Completed 1997 Page 4 of 9	TOTAL UNITS 5			TOTAL	TOTAL LENGTH (ft.) 350					TOTAL AREA (sq.ft.) 2120 2120		TOTAL VOL. (cu.ft.) 1517		

0 0 0 0 0 >=4 FEET PERCENT DEPTH OCCURRENCE MAXIMUM >=4 FEET 0 0 0 0 0 3-<4 F00T DEPTH OCCURRENCE 0 0 0 0 0 PERCENT LONGITUDE: 0°0'0" MAXIMUM 3-<4 FT. 0 0 0 0 0 Drainage: Russian River Survey Dates: 09/11/97 0 0 100 33 2-<3 F00T PERCENT DEPTH OCCURRENCE LATITUDE: 0°0'0" 1-<2 FOOT 2-<3 FT. PERCENT MAXIMUM 000---DEPTH OCCURRENCE 100 001 00 00 70 Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES 1-<2 FT. MAXIMUM 4 - 0 N LEGAL DESCRIPTION: <1 F00T PERCENT DEPTH OCCURRENCE 0 0 0 0 0 MAXIMUM <1 F00T HABITAT PERCENT OCCURRENCE 10 10 30 Confluence Location: QUAD: HABITAT TYPE TRP STP CRP LSL PLP Tyrone Guich Tyrone Gulch Tables Graphs Map Assessment Completed 1997 Page 5 of 9 UNITS MAX DPTH MEASURED 4

	Summary o	of Shelter	of Shelter by Habitat Type	î Type			Surve	Survey Dates: 09/11/97	11/97		
Ce	Confluence Location:	n: QUAD:		LEGAL DESCRIPTION:	CRIPTION		LATIT	LATITUDE: 0°0'0"	LONGITUDE: 0°0'0"	··O·O.0 :	
UNITS	UNITS UNITS MEASURED SHELTER	HABITAT TYPE	X TOTAL UNDERCUT	% TOTAL % TOTAL SWD LWD	LMD LMD	% TOTAL ROOT	% TOTAL TERR.	% TOTAL AQUATIC	% TOTAL WHITE	% TOTAL BOULDERS	% TOTAL
-	MEASURED		BANKS			MASS	MASS VEGETATION	VEGETATION	WATER		LEDGES
ŝ	-	LGR	0	0	0	0	0	0	0	0	C
4	M	HGR	0	0	0	0	0	0	0	0	0 0
2	2	CAS	0	0	0	0	0	0	0	0	0
•	"	BRS	0	0	0	0	0	0	0	0	0
•	-	RUN	02	0	30	0	0	0	0	0	0
m	-	SRN	0	0	0	0	0	0	0	0	0
-	-	TRP	25	0	50	0	0	0	0	25	0
4	4	ŝīê	57	0	0	15	0	0	0	28	0
-	•	CRP	90	30	0	10	0	0	0	0	0
-	-	TST	50	0	50	0	0	0	0	Ð	0
m	m	PLP	47	2	6	28	0	0	0	0	0
~	-	DRY	0	0	0	0	0	0	0	0	0
28	20		54	2	19	10	0	0	o	1	0
10	10		53	~	18	5	0	0	0	12	0

Tyrone Gulch

Drainage: Russian River

Survey Dates: 09/11/97 Table 6 - SUMMARY OF DOWINANT SUBSTRATES BY HABITAT TYPE

% TOTAL	BEDROCK	DOMINANT	0	0	50	100	0	0	0	0	0	0	0	0			
% TOTAL	BOULDER	DOMINANT	0	100	50	0	0	0	0	100	0	0	0	50			
% TOTAL	LG COBBLE	DOMINANT	0	0	0	0	0	0	0	0	0	0	100	0			
% TOTAL	SM COBBLE	DOMINANT	100	0	0	0	100	100	0	0	100	0	0	50			
% TOTAL	GRAVEL	DOMINANT	0	0	0	0	0	0	0	0	0	0	0	0			
% TOTAL	SAND	DOMINANT	0	0	0	0	0	0	100	0	0	100	0	0			
% TOTAL	SILT/CLAY	DOMINANT	0	0	0	0	0	0	0	0	0	0	0	0			
HABITAT	TYPE		LGR	HGR	CAS	BRS	RUN	SRN	TRP	STP	CRP	LSL	PLP	DRY			
UNITS	SUBSTRATE	MEASURED	-	2	2	-	٢	٢	-	-	-	-	-	2			
TOTAL	MABITAT	CULTS	5	Ť	ÿř A	o'n Iss	é (ses	ຕິເ ssr	ulic ne P	h ^{††} ent Pag	Ta C ge	່ble on 7	es np of	Gra lete 9	aph d 1	าร 19	M 97

Tyrone Gulch

Mean Mean Mean Mean Mean Right bank Left Bank Percent Percent Percent % Cover % Cover Canopy Evergreen Deciduous 37.75 81.25 85.00 94.25 62.25

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

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	0	0	0
Boulder	0	0	0
Cobble/Gravel	0	0	0
Silt/clay	16	16	100

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	0	2	6.25
Deciduous Trees	9	3	37.50
Evergreen Trees	7	11	56.25
No Vegetation	0	0	0

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APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Tyrone Gulch SAMPLE DATES: SURVEY LENGTH: MAIN CHANNEL: 1640 ft. SIDE CHANNEL: 0 ft. LOCATION OF STREAM MOUTH: Latitude: 0°0'0" USGS Quad Map: Legal Description: Longitude: 0°0'0"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-10) Channel Type: B2 Main Channel Length: 723 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 5.4 ft. Pools by Stream Length: 17% Pool Mean Depth: 0.8 ft. Base Flow: 0.0 cfs Water: 59-59°F Air: 64-64°F Dom. Bank Veg.: Evergreen Trees Dom. Shelter: Undercut Banks Bank Vegetative Cover: 76% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 111 ft. Embeddness Value: 1. 0% 2. 100% 3. 0% 4. 0%

STREAM REACH 2 (Units 11-28) Channel Type: A3 Main Channel Length: 917 ft. Side Channel Length: 0 ft. Riffle/Flatwater Mean Width: 2.9 ft. Pools by Stream Length: 24% Pool Mean Depth: 0.7 ft. Base Flow: 0.0 cfs Base Flow: 0.0 ctsPools 2.3 ft. beep. 0.1Water: 59-60°F Air: 64-69°FMean Pool Shelter Rtn: 18Dom. Bank Veg.: Evergreen TreesDom. Shelter: Undercut BanksBank Vegetative Cover: 90%Occurrence of LOD: 20% Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 40 ft. Embeddness Value: 1. 17% 2. 67% 3. 0% 4. 17%

Mean Canopy Density: 95% Evergreen Component: 71% Deciduous Component: 29% Pools >=2 ft. Deep: 25% Pools >=3 ft. Deep: 0% Mean Pool Shelter Rtn: 48 Occurrence of LOD: 40%

> Mean Canopy Density: 94% Evergreen Component: 56% Deciduous Component: 44% Pools >=2 ft. Deep: 17% Pools >=3 ft. Deep: 0%

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