CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Dutcher Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1998

INTRODUCTION

A stream inventory was conducted during the summer of 1998 on Dutcher Creek starting at the Dry Creek Road crossing. 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 Dutcher 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 Chinook salmon, coho salmon and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

Dutcher Creek is a tributary to Dry Creek, which flows into the Russian River, located in Sonoma County, California (see Dutcher Creek map, page 2). The legal description at the confluence with the Dry Creek is T10N, R10W, S21. Its location is 38°42'28" N. latitude and 122°58'22" W. longitude. Year round vehicle access exists from Highway 101 near Healdsburg, via Dutcher Creek Road via Dry Creek Road.

Dutcher Creek and its tributaries drain a basin of approximately 3.0 square miles. Dutcher Creek is a second order stream and has approximately 3.6 miles of blue line stream, according to the USGS Geyserville and Warm Springs Dam 7.5 minute quadrangles. Tributaries include eight unnamed tributaries, which were not surveyed due to lack of flow. Summer flow was measured as approximately 0.2 cfs at Dry Creek Road. Elevations range from about 120 feet at the mouth of the creek to 800 feet in the headwaters. The watershed is dominated by an oak-grass association, with the riparian vegetation consisting of alder, willow, oak, and Himalayan blackberry. The watershed is entirely privately owned and is primarily managed for vineyard and urban development.

METHODS

The habitat inventory conducted in Dutcher Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998). 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 California Salmonid Stream Habitat Restoration Manual. This form was used in Dutcher 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 (1985 rev. 1994). This methodology is described in the California Salmonid Stream Habitat Restoration Manual. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity.

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 are 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". Dutcher 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 Dutcher Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), 76 - 100% (value 4) or "not suitable" (value 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 Dutcher 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 ocularly estimated using a list of seven size classes.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the California Salmonid Stream Habitat Restoration Manual, 1998. Canopy density relates to the amount of stream shaded from the sun. In Dutcher Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of 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 Dutcher 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 Habitat, a dBASE IV data entry program developed CDFG. 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 Dutcher 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:

No historical stream surveys exist for Dutcher Creek.

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 18 - 22, 1998 was conducted by Jennifer Jenkins and Janet Lester (AmeriCorps) with supervision and analysis by CDFG. The survey began upstream of the confluence with Dry Creek at the crossing of Dutcher Creek Road and Dry Creek Road. The survey extended up Dutcher Creek 13648 feet to the end of anadromy. An additional 38 feet of side channel was also inventoried.

Flow was estimated to be 0.2 cfs during the survey period, at Dry Creek Road.

This section of Dutcher Creek has 1 channel type, from the Dry Creek Road crossing to 13648 feet a B4. B4 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 gravel substrate.

Water temperatures ranged from 60°F to 75°F. Air temperatures ranged from 61°F to 89°F. Summer temperatures were also measured using a remote temperature recorder placed in a pool (see Temperature Summary graph at end of report). A recorder placed on the downstream end of Dutcher Road Bridge logged temperatures every 2 hours from July 15 - September 22, 1998. The highest temperature recorded was 70°F in July/August and the lowest was 59°F in August.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 51% flatwater units, 35% pool units and 6% dry streambed units. Based on total length there were 41% flatwater units, 29% dry streambed units and 12% pool units (Graph 1).

One hundred-thirty six habitat units were measured and 12% were completely sampled. Seven Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent occurrence were mid-channel pools at 29%, runs 29%, glides 15% and step runs 8% (Graph 2). By percent total length, dry streambed made up 29%, runs 20%, glides 13%, and step runs 9%.

Forty-eight pools were identified (Table 3). Main Channel pools were most often encountered at 83%, and comprised 72% 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. 30 of the 48 pools (63%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 8% of the total length of stream habitat.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Flatwater types had the highest shelter rating at 19. Pools rated 15 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 20 and main channel pools rated 13 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were root masses at 51%, undercut banks 16%, small woody debris 15%, and terrestrial vegetation 13%. Graph 5 describes the pool shelter in Dutcher Creek.

Table 6 summarizes the dominant substrate by habitat type. There were no low gradient riffles found during the survey, but in run type habitats, gravel was the dominate substrate. No mechanical gravel sampling was conducted in 1998 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 48 pool tail-outs measured, eighteen had a value of 1 (38%); nine had a value of 2 (19%); eight had a value of 3 (17%); and six had a value of 4 (13%). Seven (15%) pool tail-outs rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries. Gravel was the dominant substrate observed at pool tail-outs.

The mean percent canopy density for the stream reach surveyed was 92%. The mean percentages of deciduous and evergreen trees were 99% and 1%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 98% and the mean percent left bank vegetated was 99%. For the habitat units measured, the dominant vegetation types for the stream banks were: 63% deciduous trees and 38% brush. The dominant substrate for the stream banks was 100% silt/clay/sand (Graph 10).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

On September 10, 1998 a biological inventory was conducted in two sites of Dutcher Creek to document the 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 63°F to 64°F and the water temperature from 62°F to 64°F. The observers were Janet Lester and Paul Retherford (AmeriCorps).

The inventory of Reach 1 started approximately 2701 feet upstream of the Dry Creek Road crossing and continued for approximately 308 feet. In pool, run, and glide habitat types twelve 0+ and four 1+ steelhead were observed along with ten sculpin. This survey site was located below two dams that were further upstream.

The inventory of Reach 1 was continued starting approximately 9797 feet upstream of the Dry Creek Road crossing and ending approximately 170 feet upstream. In pool and glide habitat types one bass, four sunfish, and two sculpin were observed. No salmonids were observed. This survey site started at the shallow end of a pond created by a dam. The crew noted that there was also another dam located further downstream of this site.

During the habitat inventory, no salmonids were observed upstream of the first of two flashboard dams.

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

Table 1. Species Observed in Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced
1998	Steelhead	DFG	N
1998	Sculpin	DFG	N
1998	Bass	DFG	I
1998	Sunfish	DFG	I

Historical records reflect that fish rescue operations occurred in 1958 from Dutcher Creek.

Table 2. Summary of fish rescue operations from Dutcher Creek

YEAR	LOCATION	SOURCE	SPECIES	#	SIZE
1958	Warm Springs Creek	Dutcher Creek	SH	850	FING

SH = steelhead

ADULT SURVEYS:

On March 5, 1999 a spawning/carcass survey was conducted starting at the mouth of Dutcher Creek and ending approximately 1.7 miles upstream at the Dutcher Creek Road culvert. The air temperature was 45°F and the water temperature was 47°F. The observers were Sean Higgins and Mike Lucas (AmeriCorps). Two culverts observed at Dry Creek Road/Dutcher Road were determined to be possible low flow barriers. A flashboard dam (4'H x 50'W) was observed 120 feet upstream of habitat unit #050 and was determined to be a barrier. The

Dutcher Creek Road culvert (habitat unit #053) was also determined to be at least a partial barrier. There is a six foot jump to the culvert lip with no jump pool downstream of the culvert. One redd and two possible redds were observed throughout the survey; although no fish or carcasses were observed.

DISCUSSION

Dutcher Creek has one channel type, a B4 (13648 ft.).

There is 13648 feet of B4 channel type in Reach 1. According to the DFG Salmonid Stream Habitat Restoration Manual, B4 channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. They are also good for medium-stage plunge weirs.

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.

The water temperatures recorded on the survey days August 18 - 22, 1998 ranged from 60°F to 75°F. Air temperatures ranged from 61°F to 89°F. The warmer water temperatures were recorded in Reach 1. These temperatures, if sustained, are above the threshold stress level (65°F) for salmonids.

Summer temperatures measured using remote temperature recorders placed in pools ranged from 59° to 70°F for Reach 1. The Temperature Summary graph shows that for much of the summer (July through August) the lower watershed exhibited temperatures above the optimal for salmonids.

Pools comprised 12% of the total length of this survey. In first and second order streams a primary pool is defined to have a maximum depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. In Dutcher Creek, the pools are relatively deep with 63% having a maximum depth of at least 2 feet. However, these pools comprised only 8% of the total length of stream habitat. In coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length.

The mean shelter rating for pools was 15. 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 root masses (51%), undercut banks (16%), small woody debris (15%), and terrestrial vegetation (13%). 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.

There were no low gradient riffles identified and measured with existing flow because much of the stream was dry. These habitats typically provide the gravel or small cobble dominant substrates necessary for salmonid spawning. Gravel was the dominant substrate in run habitats observed.

Twenty-nine percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 38% 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.

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. In Dutcher Creek Reach 1, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

The mean percent canopy for the survey was 92%. This is very good, since 80 percent is generally considered desirable. However, the riparian buffer is thin or nearly absent in areas with agriculture and urban development. Riparian removal and vineyard development within the riparian corridor could all lead to less stream canopy and channel incision causing bank erosion and higher water temperatures.

GENERAL MANAGEMENT RECOMMENDATIONS

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

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

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1) Access for migrating salmonids is a potential problem in Dutcher Creek, therefore, fish passage should be evaluated, and improved where possible. Baffles should be installed in several culverts to facilitate easier fish access. The jump pool below the existing private flashboard dams should be improved as well. Several culverts are undermining and are fish barriers except under high flows and will have to be replaced.

2) **Reach 1 would benefit from the utilizing bio-technical vegetative techniques to re-establish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.**

3) **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 the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.**

4) **Spawning gravels on Dutcher Creek are fairly limited in Reach 1. Structures to decrease channel incision and recruit spawning gravel (using vortex weirs) should be installed to trap, sort and expand redd distribution in the stream.**

5) **Where feasible, design and engineer pool enhancement structures to increase the number of pools in the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.**

PROBLEM SITES AND LANDMARKS - DUTCHER 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 Unit #	Stream Length(ft)	Comments
1.00	464	BEGIN SURVEY AT DUTCHER CREEK RD. AND DRY CREEK RD. LANDOWNER DID NOT GIVE ACCESS AT MOUTH
2.00	510	CULVERT DUTCHER CREEK RD. DOUBLE CULVERT 6'H X 12'W X 46'L EACH. 3' JUMP TO CULVERT LIP.
3.00	740	+70 CMP CULVERT ON L/B. LOOKS LIKE DRAINAGE DITCH. DRY.
4.00	765	TRIPLE CMP CULVERT. 4'H X 4'W X 25'L EACH. ALL ARE DRY. RUSTLINE 2'H. 1.5' JUMP AT LIP. AT END OF CULVERT MIDDLE ONE IS BLOCKED WITH WOOD AND SANDBAGS. 2 OF THE CULVERTS ARE COMPLETELY RUSTED THROUGH.
5.00	1598	CONCRETE BLOCK RIP-RAP AT BEGIN OF UNIT 93'L. +65' L/B UNSCREENED PIPE. +602 L/B DRY TRIB

		+650 RR TIES AND STEEL BRIDGE (DRIVEWAY) 7'H X 24'L X 50'W.
6.00	1646	WATER BARELY FLOWING.
13.00	1849	YOY IN POOL.
15.00	2108	+13 RD. XING.
16.00	2135	2' UNDERCUT BANK.
17.00	2216	+0 R/B BARN
19.00	2250	L/B CLEARED LOT.
20.00	2271	+21 PIPE AND CONCRETE HOLDING TANK R/B.
22.00	2357	+23 L/B FAILURE. RIP RAP FALLEN INTO CHANNEL.
25.00	2576	L/B AND R/B CLEARED LOTS
27.00	2834	+19 DIRT RD. XING.
34.00	3653	VINEYARDS/HOME ON R/B.
36.00	3932	+118 FENCE ACROSS CREEK, 4'H.
37.00	3962	R/B HOME ENDS.
48.00	4374	HOME/BARN ON R/B AT END OF UNIT.
51.00	4565	+43 BARN ON L/B. 7' JUMP AT END OF UNIT. CREEK IS DAMMED WITH A FOOTBRIDGE ABOVE DAM. DAM IS 4'H X 50'W, MADE OF FLASHBOARD BOLTED TO 3'H CEMENT BLOCKS. LITTLE WATER IS COMING THROUGH, LEFT SIDE IS ABOUT TO BREAK. HOUSE ON L/B ON OTHER SIDE OF DAM, WATER IS 4'DEEP.
52.00	4965	NOT SURVEYED BECAUSE "POND" IS INACCESSIBLE AND IN LANDOWNERS' BACKYARD.
53.00	5025	RIP-RAP 6'JUMP TO LIP OF CONCRETE CULVERT. CULVERT DIMENSIONS= 10'W X 60'L X 6'H. NO REAL JUMP POOL, JUST RIP-RAP. NO BAFFLES. CULVERT MAY BE UNDERSIZED. LANDOWNER ON UPSTREAM SIDE SAID CULVERT WAS FILLED TO TOP WITH WATER DURING WINTER HIGH FLOWS.
54.00	5073	+8 USGS GAUGE STATION. +27 R/B SANDBAG AND CAR EROSION CONTROL.
55.00	5138	VERY BRUSHY, GOOD COVER.
58.00	5249	L/B CONCRETE BANKS.
60.00	5300	L/B HOUSE AT END OF UNIT.
62.00	5351	+29 FOOTBRIDGE 9'H X 14.5'W X 9'L. 1' JUMP OVER CONCRETE
63.00	5503	+152' R/B HOUSE, L/B DUTCHER CR. RD.
66.00	5638	+36 CONCRETE/COBBLE DRAINAGE CULVERT ON R/B. YOY IN POOL.

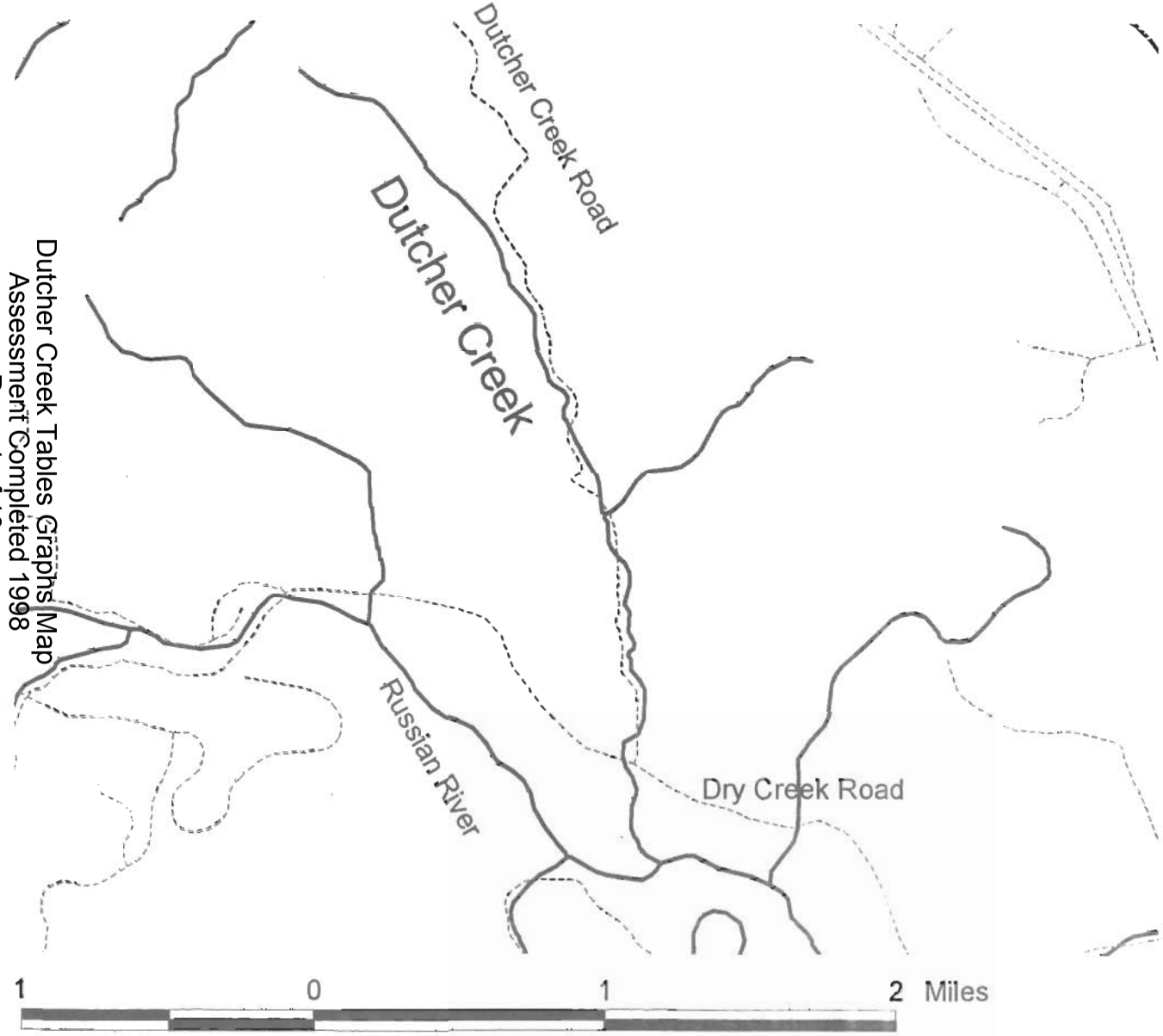
68.00	5722	L/B ENTIRELY CONCRETE, ROAD EROSION CONTROL THROUGH ENTIRE UNIT.
72.00	6009	+24 L/B CULVERT.
74.00	6070	YOY OBSERVED
76.00	6156	6'H X 12'W X 51'L (CULVERT DIMENSIONS). 4.5' WOODEN SWINGING FENCE ON DOWNSTREAM END. REMOVABLE
78.00	6207	AFTER THE POOL IN #77 THERE IS AN ODD STRUCTURE. IT IS MADE OF CONCRETE AND COBBLES. 3'H JUMP INTO A 1' DEEP RESERVOIR TYPE THING. IN THE MIDDLE OF THE RESERVOIR THERE IS A FISH LADDER TYPE STRUCTURE WITH A 1.5' JUMP AND 1' JUMP UP STEPS. STAIRS COME FROM L/B SIDE INTO RESERVOIR. ABOVE STRUCTURE WATER BARELY MOVING AND THERE IS A LOT OF ALGAE.
79.00	6495	+91' L/B TRIB. +281' R/B CULVERT AND TRIB. 3' DIAMETER. TRIB SMELLS SULPHUROUS.
80.00	6502	POOL FORMED BY BOULDER AND CONCRETE WEIR THAT IS BLOCKING FLOW EXCEPT FOR SMALL HOLE UNDER WATER.
86.00	6982	+31' WOODEN FOOTBRIDGE 5.5'H X 30'W X 2'L
87.00	7020	STREAM BECOMING OVERGROWN WITH BLACKBERRY.
91.00	7400	STREAM OVERGROWN WITH WILLOW AND BLACKBERRY. SMALL DEBRIS ACCUMULATION 5'H X 8'W X 4'L, NOT A BARRIER. +62' LDA 4'H X 10'W X 4'L +118' TWO 1' HIGH SWD RETAINING GRAVEL. GRAVEL IS 2'H BEHIND SWD.
96.00	7549	POOL FORMED BY DROP FROM CULVERT.
97.00	7614	CONCRETE CULVERT, DUTCHER CREEK RD. XING. 3'H JUMP FROM WATER TOP TO CULVERT BOTTOM. HANGING WOODEN FENCE ACROSS CULVERT ENTRY 4'H X 12'W. CULVERT DIMENSIONS= 6.5'H X 12'W X 65'L. NO BAFFLES.
102.00	7845	PRIVATE DRIVE ALONG R/B
103.00	7918	CONCRETE BRIDGE 5.5'H X 20'W X 73'L.
105.00	9516	NO ACCESS
106.00	9538	RESTART SURVEY AT RESIDENCE BRIDGE OFF OF DUTCHER CR RD.

108.00	9614	FLASHBOARD DAM AT END OF UNIT. 4.4'H. BRIDGE OVER IS 7'H.
109.00	9759	NOT SURVEYED BECAUSE OF MARSHY POND CREATED BY DAM. WATER IS AVG 2.8' DEEP AND 20'WIDE. RUNS THROUGH RESIDENTIAL BACKYARD. +134'PICNIC TABLES AND BBQ.
111.00	10036	+33LAWN CLIPPINGS IN CREEK. +64 OLD FENCE POSTS.
118.00	10287	ROOTS ACROSS TAILOUT.
119.00	10439	+70' R/B SLIDE 40'L X 30'H. 1'DEEP SEDIMENT IN CREEK BED.
120.00	10464	+25 L/B RIP-RAP FALLING IN CREEK.
121.00	10551	+15' L/B CMP CULVERT 2' DIAMETER, DRY.
125.00	10922	+170 FAILED L/B/R/B RIP-RAP. ALL FALLEN IN CREEK 60'L.
127.00	11026	+56' CONCRETE BLOCK IN STREAM BED, 1'H X 10'L. APPROX 15'L RIP-RAP BOULDERS AT TOP OF CONCRETE BLOCK.
129.00	11283	+13'CONCRETE BLOCK IN CHANNEL. 1'H 10'W X 10'L. RIP-RAP BOULDER AT TOP. +80' BRIDGE, WOODEN W' CONCRETE WING WALLS 8'H X 16'W.
130.00	11319	WATER IS ORANGE AND SMELLS SULPHUROUS. NO GRAVEL IN STREAM BED. IT IS MUD AND MOSS. +36' RIP-RAP BOULDERS AGAIN, 20'L (WATER NOT FLOWING OVER)THEN A 4' DROP TO A POOL.
133.00	11905	+350 R/B FUEL TANKS AND EQUIPMENT (ON FRITZ VINEYARD PROPERTY). DIRT RD RUNS ALONG R/B AND L/B, VINEYARDS ON L/B. +521' WOODEN BRIDGE 11'H X 16'W X 11'L, CONCRETE/ WOODEN WING WALLS. PAVED DRIVEWAY XING IS WINERY ENTRY.
135.00	13648	+356 WALKING ALONG DIRT RD ON L/B, CHANNEL IS DRY AND COMPLETELY OVERGROWN WITH BLACKBERRIES AND WILLOW. VINEYARDS ALSO RUNNING ALONG R/B NOW. GRAPES NOW ALSO OVERGROW THE CHANNEL. GRAVEL SUBSTRATE NOW INSTEAD OF MUD. +1565' FENCE XING 15'H BAR/BED WIRE. +1580' L/B DRY TRIB ENTERS +1700' END OF SURVEY: CREEK HAS

BEEN DRY OFF AND ON FOR LAST ½ MILE. NO FISH HAVE BEEN OBSERVED SINCE CREEK BECAME SO SILTY AND SULFUROUS.

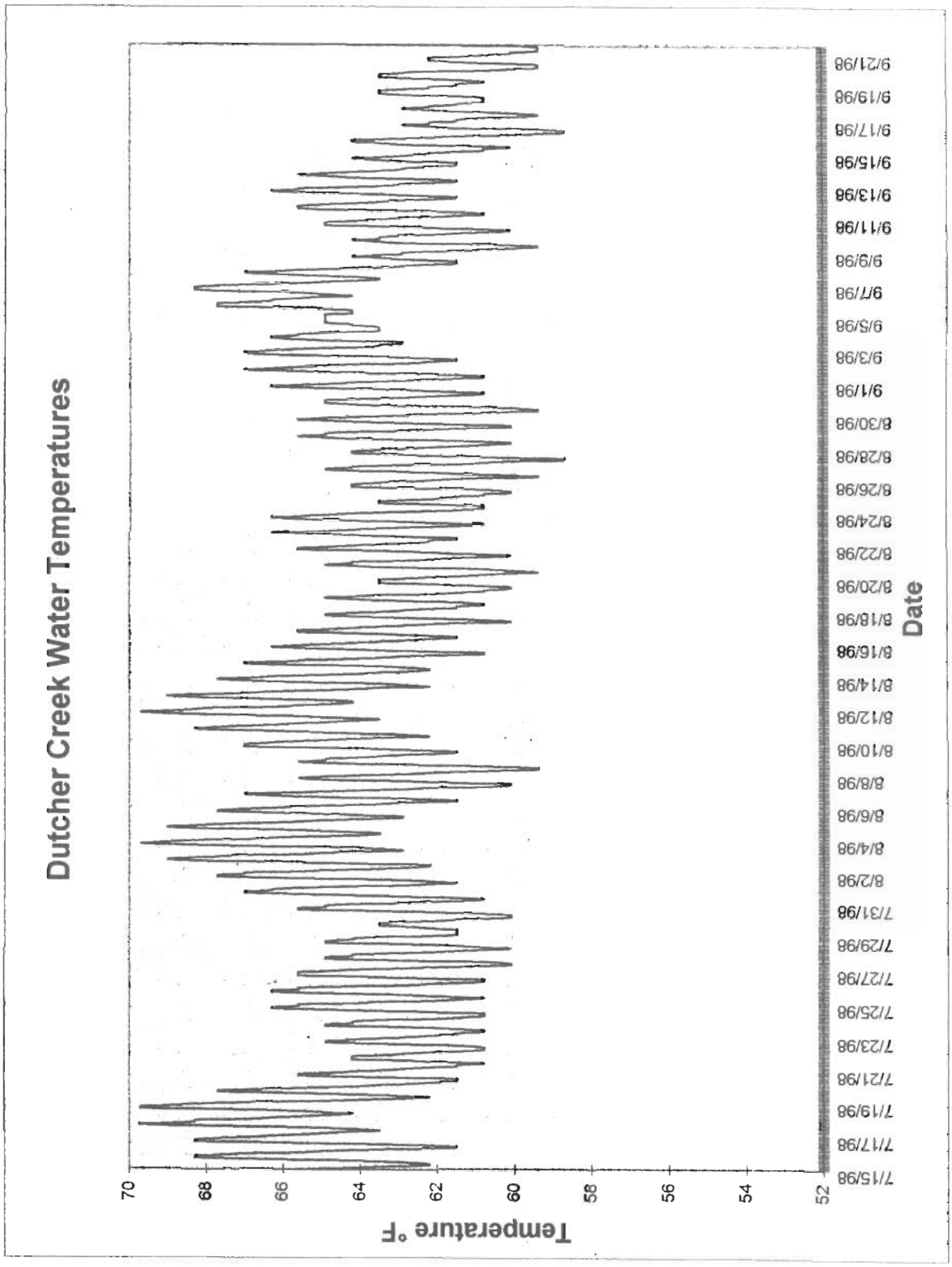
END OF SURVEY

Dutcher Creek Habitat Inventory



Roads
Dutcher.dbf
Streams

N
W
E
S


Dutcher Creek Water Temperatures
Temperature °F
70
68
66
64
62
60
58
56
54
52
Date
7/15/98
7/17/98
7/19/98
7/21/98
7/23/98
7/25/98
7/27/98
7/29/98
7/31/98
8/2/98
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8/24/98
8/26/98
8/28/98
8/30/98
9/1/98
9/3/98
9/5/98
9/7/98
9/9/98
9/11/98
9/13/98
9/15/98
9/17/98
9/19/98
9/21/98

DUTCHER CREEK

Drainage: Dry Creek, Russian River

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

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
70	10	FLATWATER	51	81	5644	41	6.2	0.4	705	49375	419	29353	0	19
48	6	POOL	35	34	1628	12	8.7	1.4	300	14384	438	21028	378	15
8	0	DRY	6	493	3944	29	0.0	0.0	0	0	0	0	0	0
6	0	CULVERT	4	53	320	2	8.0	0.0	356	2136	0	0	0	0
4	0	NO SURVEY	3	538	2150	16	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
136	16	13686	65895	50381

DUTCHER CREEK

Drainage: Dry Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
20	3	GLD	15	87	1740	13	6	0.5	1.5	786	15720	512	10236	0	25	83
39	6	RUN	29	69	2687	20	6	0.3	1.0	676	26361	347	13532	0	17	93
11	1	SRN	8	111	1217	9	8	0.9	1.4	640	7040	576	6336	0	8	98
40	4	MCP	29	29	1167	9	8	1.4	3.2	245	9780	360	14416	313	13	96
7	2	CRP	5	63	440	3	10	1.5	3.1	622	4352	901	6309	768	20	91
1	0	PLP	1	21	21	0	12	1.2	1.5	252	252	302	302	252	0	100
8	0	DRY	6	493	3944	29	0	0.0	0.0	0	0	0	0	0	0	65
6	0	CUL	4	53	320	2	8	0.0	0.0	356	2136	0	0	0	0	73
4	0	NS	3	538	2150	16	0	0.0	0.0	0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
136	16	13686	65641	51132

DUTCHER CREEK

Drainage: Dry Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
40	4	MAIN	83	29	1167	72	8.4	1.4	245	9780	360	14416	313	13
8	2	SCOUR	17	58	461	28	9.9	1.5	576	4604	826	6612	703	20

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
48	6	1628	14384	21028

DUTCHER CREEK

Drainage: Dry Creek, Russian River

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

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

UNITS MAX DPTH MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
40	MCP	83	0	0	15	38	21	53	4	10	0	0
7	CRP	15	0	0	2	29	4	57	1	14	0	0
1	PLP	2	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
48

DUTCHER CREEK

Drainage: Dry Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	% TOTAL UNDERCUT BANKS	% TOTAL SWD	% TOTAL LWD	% TOTAL ROOT MASS	% TOTAL TERR. VEGETATION	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
20	3	GLD	6	9	0	32	45	9	0	0	0
39	6	RUN	0	9	0	0	91	0	0	0	0
11	1	SRN	0	0	0	0	80	0	0	20	0
40	5	MCP	17	31	6	19	26	0	0	0	0
7	2	CRP	16	0	0	80	0	4	0	0	0
1	0	PLP	0	0	0	0	0	0	0	0	0
8	0	DRY	0	0	0	0	0	0	0	0	0
6	0	CUL	0	0	0	0	0	0	0	0	0
4	0	NS	0	0	0	0	0	0	0	0	0
136	17	ALL HABITAT TYPES	3	10	0	12	73	2	0	1	0
48	7	POOLS ONLY	16	15	3	51	13	2	0	0	0

DUTCHER CREEK

Drainage: Dry Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 08/18/98 to 08/22/98

Confluence Location: QUAD: GEYSERVILL LEGAL DESCRIPTION: T10NR10WS21 LATITUDE: 38°41'58" LONGITUDE: 122°58'23"

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
20	3	GLD	0	0	100	0	0	0	0
6	6	RUN	0	0	100	0	0	0	0
1	1	SRN	100	0	0	0	0	0	0
5	5	MCP	60	0	40	0	0	0	0
2	2	CRP	50	0	50	0	0	0	0
0	0	PLP	0	0	0	0	0	0	0
0	0	DRY	0	0	0	0	0	0	0
0	0	CUL	0	0	0	0	0	0	0
0	0	NS	0	0	0	0	0	0	0

DUTCHER CREEK

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

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Deciduous	Mean Right bank % Cover	Mean Left Bank % Cover
91.57	0.60	99.40	97.81	99.38

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	7	5	37.50
Deciduous Trees	9	11	62.50
Evergreen Trees	0	0	0
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: DUTCHER CREEK
SAMPLE DATES: 08/18/98 to 08/22/98
SURVEY LENGTH:
MAIN CHANNEL: 13648 ft. SIDE CHANNEL: 38 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: GEYSERVILL Latitude: 38°41'58"
Legal Description: T10NR10WS21 Longitude: 122°58'23"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-135)

Channel Type: B4	Mean Canopy Density: 92%
Main Channel Length: 13648 ft.	Evergreen Component: 1%
Side Channel Length: 38 ft.	Deciduous Component: 99%
Riffle/Flatwater Mean Width: 6.2 ft.	Pools by Stream Length: 12%
Pool Mean Depth: 1.4 ft.	Pools >=2 ft. Deep: 63%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 10%
Water: 60-75°F Air: 61-89°F	Mean Pool Shelter Rtn: 15
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Terrestrial Veg.
Bank Vegetative Cover: 99%	Occurrence of LOD: 20%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 3944 ft.

Embeddness Value: 1. 38% 2. 19% 3. 17% 4. 13% 5. 15%