CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT

Pine Ridge Canyon Creek

Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1998

INTRODUCTION

A stream inventory was conducted during the summer of 1998 on Pine Ridge Canyon 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 Pine Ridge Canyon 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

Pine Ridge Canyon Creek is a tributary to Dry Creek which flows into the Russian River, located in Sonoma County, California (see Pine Ridge Canyon Creek map, page 2). The legal description at the confluence with Dry Creek is T09N, R09W, S20. Its location is 38°37'14" N. latitude and 122°53'21" W. longitude. Year round vehicle access exists from Highway 101 near Healdsburg, via Westside Road via West Dry Creek Road.

Pine Ridge Canyon Creek and its tributaries drain a basin of approximately 1.1 square miles. Pine Ridge Canyon Creek is a first order stream and has approximately 2.5 miles of blue line stream, according to the USGS Guerneville 7.5 minute quadrangle. Summer flow was not measured during the survey. Elevations range from about 40 feet at the mouth of the creek to 800 feet in the headwaters. The watershed is privately owned and is managed for urban and vineyard development.

METHODS

The habitat inventory conducted in Pine Ridge Canyon 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 Pine Ridge Canyon 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". Pine Ridge Canyon 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 Pine Ridge Canyon 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) 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 Pine Ridge Canyon 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 California Salmonid Stream Habitat Restoration Manual, 1998. Canopy density relates to the amount of stream shaded from the sun. In Pine Ridge Canyon 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 Pine Ridge Canyon 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 Pine Ridge Canyon 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 Pine Ridge Canyon Creek.

HABITAT INVENTORY RESULTS

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

The habitat inventory of November 9, 1998 was conducted by Paul Retherford and Chris Ramsey (AmeriCorps) with supervision and analysis by CDFG. The survey began at the confluence with

Dry Creek and extended up Pine Ridge Canyon Creek to the end of survey. The total length of the stream surveyed was 3917 feet.

Flows were not measured on Pine Ridge Canyon Creek.

The surveyed section of Pine Ridge Canyon Creek has two channel types: from the mouth to 400 feet an F6 and the upper 3517 feet a C4.

F6 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly silt/clay substrate.

C4 channel types are low gradient (<2%), meandering, point-bar, riffle/pool, alluvial channels with a broad, well defined floodplain and a predominantly gravel substrate.

Water temperatures ranged from 52°F to 54°F over the course of the survey. Air temperatures ranged from 61°F to 64°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 in a pool on Pine Ridge Creek logged temperatures every 2 hours from July 16 - August 2, 1998. The highest temperature recorded was 68°F in July and the lowest was 59°F in late July/early August.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 47% pool units, 20% riffle units, 20% flatwater units, and 13% dry streambed units. Based on total **length** there were 84% dry streambed units, 7% pool units, 6% flatwater units, and 3% riffle units (Graph 1).

Fifteen habitat units were measured and 47% were completely sampled. Eight 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 20%, mid-channel pools 20%, runs 13% and bedrock scour pools 13% (Graph 2). By percent total **length**, dry streambed made up 84%, step runs 3%, low gradient riffles 3%, and runs 3%.

Seven pools were identified (Table 3). Main Channel pools were most often encountered at 57%, and comprised 53% 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. Two of the 7 pools (29%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 1% 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 9. Flatwater and riffle had the lowest rating with 0 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 13 and main channel pools rated 7 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types

were root masses at 70%, small woody debris 18%, large woody debris 7%, and boulders 2%. Graph 5 describes the pool shelter in Pine Ridge Canyon Creek.

Table 6 summarizes the dominant substrate by habitat type. Neither gravel nor small cobble was the dominant substrate observed in the one low gradient riffle measured (Graph 6).

No mechanical gravel sampling was conducted in the 1998 survey.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the seven pool tail-outs measured, four had a value of 4 (57%). Three (43%) 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 86%. The canopy on Pine Ridge Creek was made up entirely of deciduous trees. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 83% and the mean percent left bank vegetated was 60%. For the habitat units measured, the dominant vegetation types for the stream banks were: 71% brush and 29% deciduous trees. The dominant substrate for the stream banks were: 86% silt/clay/sand and 14% bedrock (Graph 10).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

No biological inventory was conducted in 1998, and no fish were observed during the habitat inventory.

Historical records reflect that no hatchery stocking, transfers, or rescues have occurred in the watershed.

ADULT SURVEYS:

On February 3, 1999 a recent spawning/carcass survey was conducted starting at the West Dry Creek Bridge and ending at culvert #2 in habitat unit #010, approximately 2800 feet upstream. The air temperature was 60°F and the water temperature was 44°F. The observers were Dez Mikkelsen, Mike Lucas, Sean Higgins (AmeriCorps), and Bob Coey (DFG). The crew noted three possible barriers downstream of the West Dry Creek Bridge. One of the barriers appeared only to be passable at high flows and another barrier was a dam with the flashboards still in place. Two culverts were also noted upstream of the West Dry Creek Bridge, and they both appeared to cause no restrictions for fish passage. One juvenile steelhead was observed near culvert #2. No adult fish, carcasses, or redds were observed.

DISCUSSION

Pine Ridge Canyon Creek has two channel types: F6 (400 ft.) and C4 (3517 ft.).

There are 400 feet of F6 channel type in Reach 1. According to the DFG Salmonid Stream Habitat Restoration Manual, F6 channel types are good for bank-placed boulders and fair for low-stage weirs, boulder clusters, single and opposing wing deflectors and log cover. Any work considered in F channel types will require careful design, placement, and construction that must include protection for any unstable banks.

There are 400 feet of C4 channel type in Reach 2. According to the DFG Salmonid Stream Habitat Restoration Manual, C4 channel types are good for bank-placed boulders and log cover. They are fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover.

The water temperatures recorded on the survey day November 9, 1998 ranged from 52°F to 54°F. Air temperatures ranged from 61°F to 64°F. The warmer water temperatures were recorded in Reach 2. This temperature regime is favorable to salmonids.

Summer temperatures measured using remote temperature recorders placed in pools ranged from 59° to 68°F. The Temperature Summary graph shows that for much of the summer (July through August) the watershed exhibited temperatures near optimal for salmonids.

It is unknown if this thermal regime is typical, but our electrofishing samples found steelhead more frequently in the upper, 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\or more extensive biological sampling conducted.

Pools comprised 7% 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 Pine Ridge Canyon Creek, the pools are relatively shallow with 29% having a maximum depth of at least 2 feet. These pools comprised 1% 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 9. 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 (70%), small woody debris (18%), large woody debris (7%), and boulders (2%). 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.

The one low gradient riffle that was measured had neither gravel or small cobble as the dominant substrate. This is generally considered poor for spawning salmonids.

Fifty-seven percent of the pool tail-outs measured had embeddedness ratings of either 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. In Pine Ridge Canyon Creek Reach 2, 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 86%. This is good, since 80 percent is generally considered desirable.

SUMMARY

The best spawning and rearing habitat in the watershed exists within the lower portion of Pine Ridge Creek, however siltation from roads is high, and partial barriers exist at the mouth.

GENERAL MANAGEMENT RECOMMENDATIONS

Pine Ridge Canyon 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.

Pine Ridge Canyon Creek is predominately dry with little available over summering habitat for steelhead and coho salmon. 84% of the surveyed creek was dry, and the survey was ended due to lack of water. The mean canopy along the creek is desirable at 86%. More observations need to be made to determine why this creek is drying up (possible aggredation). This survey was conducted November 9th 1998, part way into the rainy season. Possibly this survey is portraying a more conservative estimate of the flow regime than in the heat of summer. A summertime biological survey is necessary to determine if steelhead and coho are surviving throughout the dry periods of summer. Winter biological assessments are needed to determine if chinook are utilizing Pine Ridge Canyon Creek during the winter. Before instream habitat improvements are conducted the fisheries value of this creek needs to be determined.

Note: If salmonids are determined to survive overwinter and instream habitat improvements will be implemented. The following order of priority is suggested:

#1 Remove barriers;
#2 Evaluate sediment load locations and fix;
#3 Add complex structure/ increase shelter value.

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1) Access for migrating salmonids is an ongoing potential problem in Reaches 1 and 2, therefore, fish passage should be improved where possible. The U.S. Army Corps of Engineers installed a number of concrete dams for grade control which should be notched, and jump pools should be installed downstream with weirs.

2) In Pine Ridge Canyon 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 Dry Creek.

3) Pine Ridge Canyon Creek 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.

4) 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. In some areas the material is at hand.

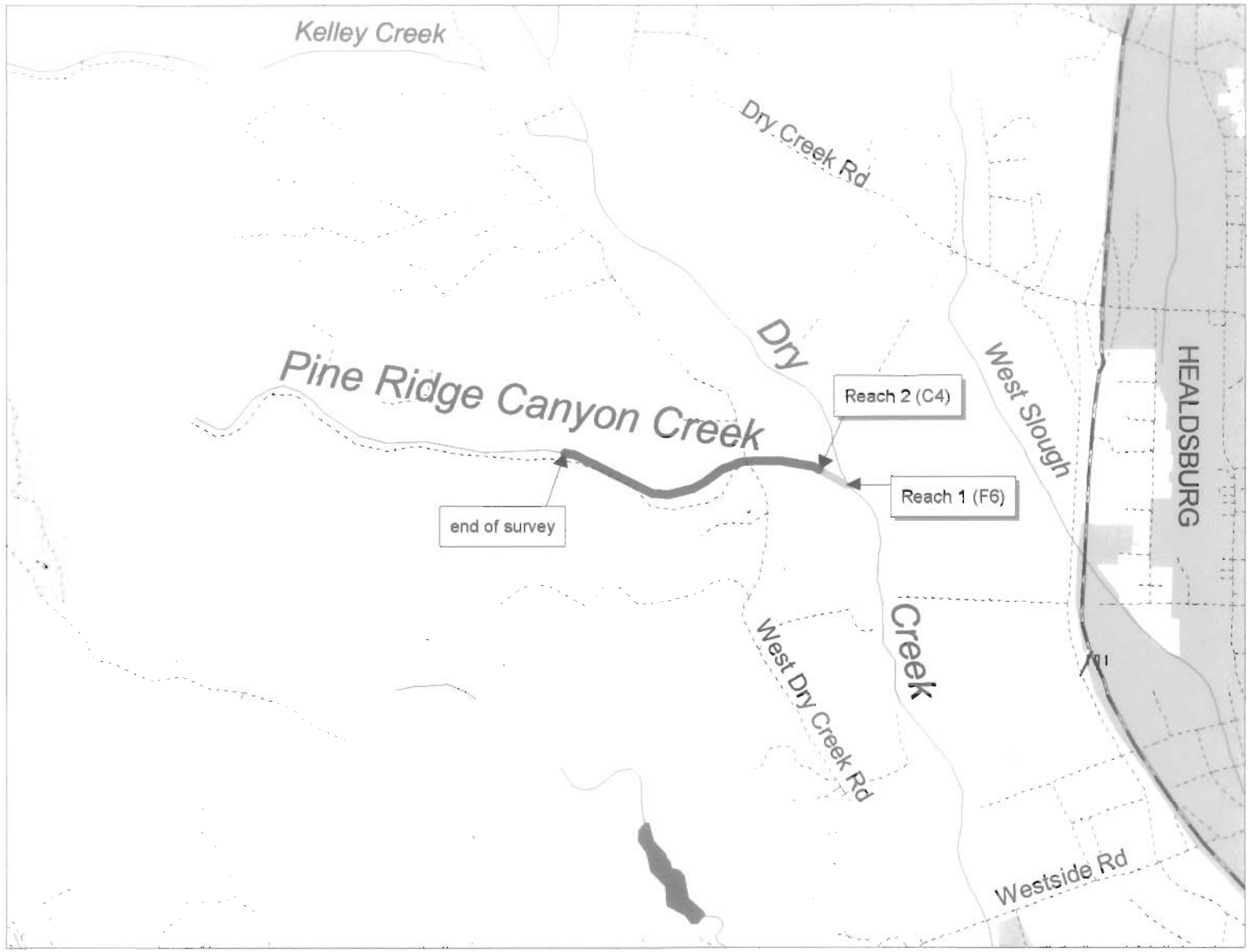
PROBLEM SITES AND LANDMARKS - PINE RIDGE CANYON CREEK SURVEY COMMENTS

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
REACH 1		
1.00	400	Begin @ confluence with Dry Creek; the first 200' would be a great place for tree planting. Probably the floodplain for Dry Creek, but still partially vegetated. +355'- cement dam 1'Lx16'Wx2'H
REACH 2		
2.00	3276	+194'- RB car bank stabilization 127'Lx6'H; +217'- cement dam ("k

		dam") 16'Lx1'Wx2'H; +376'- cement dam ("k dam") 1'Lx16'Wx2'H; +635'- W. Dry Creek Rd. Bridge 30'Lx24'Wx10'H; +1335'- Bridge crossing 14'Lx9'Wx8.5'H
3.00	3313	Extremely muddy pool
4.00	3446	+62'- Bridge crossing 14'Lx12'Wx6'H- not being used
8.00	3605	Road 50' up bank
14.00	3909	House LB- 10' up bank
15.00	3917	***END OF SURVEY***
		After habitat unit #015, the channel changes into a G4 channel type. At the end of the survey, stream becomes an A channel type.

Pine Ridge Canyon Creek



Central Coast Region
Department of Fish and Game

Pine Ridge Canyon Tables Graphs Map
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February 16, 2001
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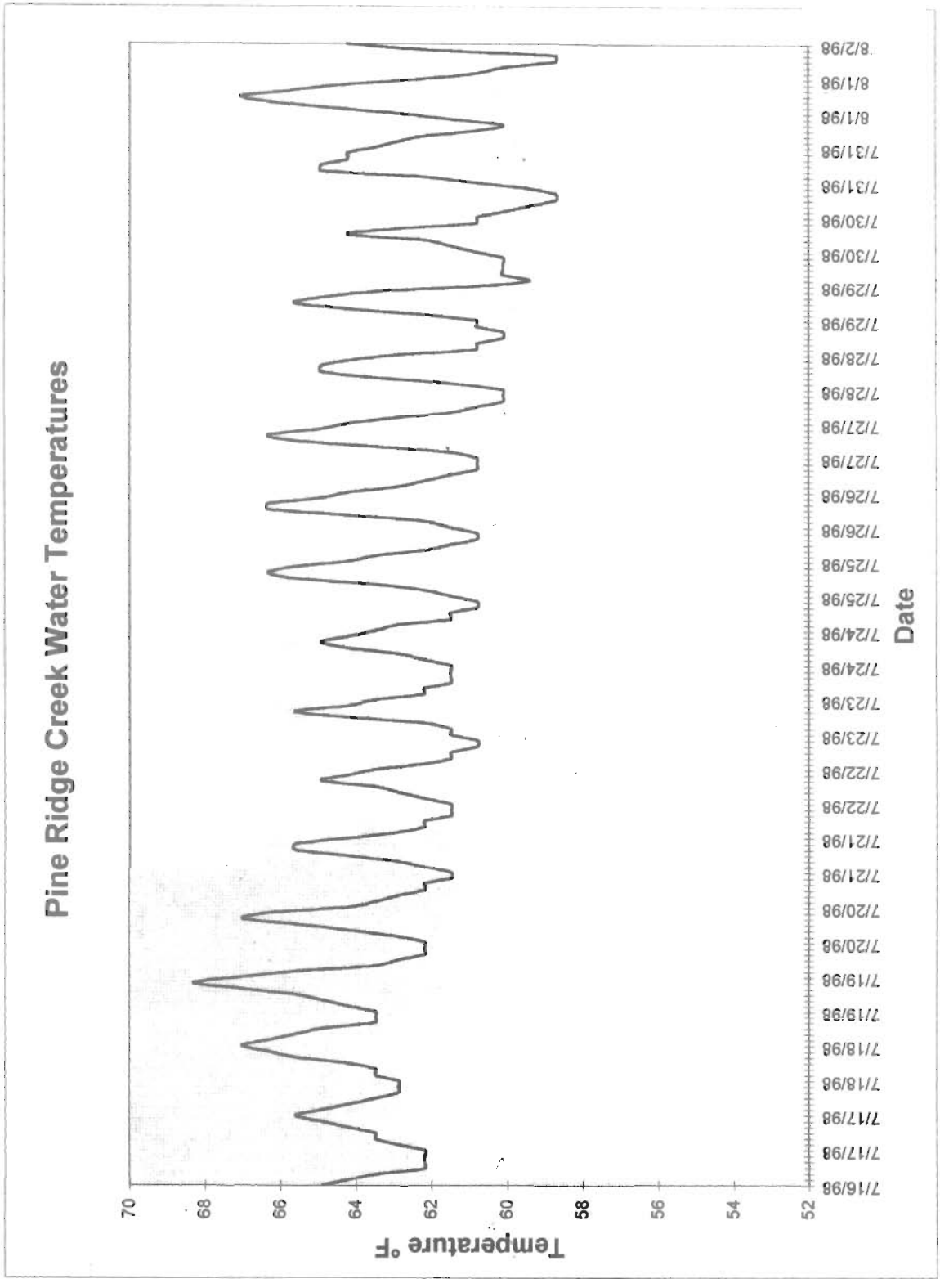
Pine Ridge Creek Water Temperatures
Temperature °F
70
68
66
64
62
60
58
56
54
52
Date
7/16/98
7/17/98
7/17/98
7/18/98
7/18/98
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7/29/98
7/29/98
7/30/98
7/30/98
7/31/98
7/31/98
8/1/98
8/1/98
8/2/98

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 11/09/98

Influence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

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
3	1	RIFFLE	20	43	130	3	4.0	0.1	52	155	5	16	0	0
3	2	FLATWATER	20	79	236	6	4.0	0.3	248	743	75	225	0	0
7	4	POOL	47	39	275	7	7.8	0.8	377	2641	299	2090	224	9
2	0	DRY	13	1638	3276	84	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.)
15	7	3917	3538	2331

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

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 %
3	1	LGR	20	43	130	3	6	0.1	0.2	52	155	5	16	0	0	52
2	1	RUN	13	52	103	3	4	0.4	0.9	256	511	102	204	0	0	99
1	1	SRN	7	133	133	3	4	0.2	0.7	239	239	48	48	0	0	97
1	1	TRP	7	75	75	2	5	0.8	1.1	375	375	300	300	150	10	99
3	1	MCP	20	24	72	2	6	0.9	2.3	222	666	200	599	178	5	91
1	1	LSR	7	39	39	1	9	0.7	1.3	351	351	246	246	176	15	99
2	1	LSBk	13	45	89	2	11	0.8	2.2	561	1122	449	898	393	10	48
2	0	DRY	13	1638	3276	84	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)
15	7	3917	3419	2311

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

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
4	2	MAIN	57	37	147	53	5.5	0.9	299	1194	250	1000	164	7
3	2	SCOUR	43	43	128	47	10.0	0.8	456	1368	347	1042	284	13

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
7	4	275	2562	2041

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

UNITS WX 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
1	TRP	14	0	0	1	100	0	0	0	0	0	0
3	MCP	43	0	0	2	67	1	33	0	0	0	0
1	LSR	14	0	0	1	100	0	0	0	0	0	0
2	LSBk	29	0	0	1	50	1	50	0	0	0	0

TOTAL UNITS
7

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

UNITS WX 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
1	TRP	14	0	0	1	100	0	0	0	0	0	0
3	MCP	43	0	0	2	67	1	33	0	0	0	0
1	LSR	14	0	0	1	100	0	0	0	0	0	0
2	LSBk	29	0	0	1	50	1	50	0	0	0	0

TOTAL UNITS
7

Pine Ridge Canyon Creek — Drainage: Dry Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type — Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

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
3	1	LGR	0	0	0	0	0	0	0	0	0
2	1	RUN	0	0	0	0	0	0	0	0	0
1	1	SRN	0	0	0	0	0	0	0	0	0
1	1	TRP	0	80	0	0	0	0	0	10	10
3	2	MCP	10	0	0	90	0	0	0	0	0
1	1	LSR	0	0	0	100	0	0	0	0	0
2	1	LSBk	0	0	20	80	0	0	0	0	0
2	0	DRY	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES 15	8		1	18	7	70	0	0	0	2	2
POOLS ONLY 7	5		1	18	7	70	0	0	0	2	2

Pine Ridge Canyon Creek | Drainage: Dry Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE | Survey Dates: 11/09/98

Confluence Location: QUAD: Guerneville LEGAL DESCRIPTION: T09NR09WS20 LATITUDE: 38°37'14" LONGITUDE: 122°53'21"

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
3	1	LGR	100	0	0	0	0	0	0
2	1	RUN	100	0	0	0	0	0	0
1	1	SRN	100	0	0	0	0	0	0
1	1	TRP	100	0	0	0	0	0	0
3	1	MCP	0	100	0	0	0	0	0
1	1	LSR	100	0	0	0	0	0	0
2	1	LSBk	100	0	0	0	0	0	0
2	0	DRY	0	0	0	0	0	0	0

Pine Ridge Canyon 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
85.50	0.00	100.00	82.86	60.00

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	0	2	14.29
Boulder	0	0	0
Cobble/Gravel	0	0	0
Silt/clay	7	5	85.71

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	6	4	71.43
Deciduous Trees	1	3	28.57
Evergreen Trees	0	0	0
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Pine Ridge Canyon Creek
SAMPLE DATES:
SURVEY LENGTH:
MAIN CHANNEL: 3917 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Guerneville Latitude: 38°37'14"
Legal Description: T09NR09WS20 Longitude: 122°53'21"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-1)

Channel Type: F6	Mean Canopy Density: 0%
Main Channel Length: 400 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 0%
Riffle/Flatwater Mean Width: 0.0 ft.	Pools by Stream Length: 0%
Pool Mean Depth: 0.0 ft.	Pools >=2 ft. Deep: **********%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: **********%
Water: 52-52°F Air: 64-64°F	Mean Pool Shelter Rtn: 0
Dom. Bank Veg.: Brush	Dom. Shelter: Undercut Banks
Bank Vegetative Cover: 0%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 400 ft.

Embeddness Value: 1. 2. 3. 4. 5.

STREAM REACH 2 (Units 2-15)

Channel Type: C4	Mean Canopy Density: 86%
Main Channel Length: 3517 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 4.0 ft.	Pools by Stream Length: 8%
Pool Mean Depth: 0.8 ft.	Pools >=2 ft. Deep: 29%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 0%
Water: 52-54°F Air: 61-64°F	Mean Pool Shelter Rtn: 9
Dom. Bank Veg.: Brush	Dom. Shelter: Root masses
Bank Vegetative Cover: 71%	Occurrence of LOD: 20%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 2876 ft.

Embeddness Value: 1. 0% 2. 0% 3. 0% 4. 57% 5. 43%