CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Mill Creek
Report Revised April 14, 2006
Report Completed 2002
Assessment Completed 1999

INTRODUCTION

A stream inventory was conducted during the summer of 1999 on Mill 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 Mill 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

Mill Creek is a tributary to Forsythe Creek, a tributary of the Russian River, located in Mendocino County, California (see Mill Creek map, page 2). The legal description at the confluence with Forsythe Creek is T17N, R13W, S36. Its location is 039°16'41.3" N. latitude and 123°15'35.1" W. longitude. Year round vehicle access exists from Highway 101 near Calpella, via Reeves Canyon Road.

Mill Creek and its tributaries drain a basin of approximately 10.5 square miles. Mill Creek is a third order stream and has approximately 9.2 miles of blue line stream, according to the USGS Laughlin Range 7.5 minute quadrangle. Elevations range from about 797 feet at the mouth of the creek to 2400 feet in the headwaters. There is one natural lake, Leonard Lake, and one manmade lake, Mud Lake, in the upper watershed where the stream terminates at 9.2 miles. Redwood and Douglas fir forest dominates the upper watershed, but there are zones of grassland and oak-woodland in the lower watershed, and the riparian corridor is dominated by alders. The watershed is owned primarily by private landowners and some land within the watershed is managed for timber production, livestock grazing and agricultural production.

No sensitive species were listed within the Mill Creek watershed in the CNPS inventory or DFG's Natural Diversity Database. However, during the habitat inventory, surveyors observed steelhead trout (*Onchorynchus mykiss*), which are federally listed as threatened, and yellow-legged frogs (*Rana boylii*), which are considered sensitive by the U.S. Forest Service.

METHODS

The habitat inventory conducted in Mill 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 Mill 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 are 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 (1998). 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". Mill 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. 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 are 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 Mill 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). "Not suitable" (value 5) is assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, absence of particulate substrate (e.g. bedrock), or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition. 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 Mill 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:

In all fully measured habitat units, dominant and sub-dominant substrate elements are visually estimated using a list of seven size classes: Silt/Clay, Sand, Gravel, Small Cobble, Large Cobble, Boulder, and Bedrock.

8. Canopy:

Stream canopy density is 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 Mill 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. Finally, the total canopy over each habitat unit is visually divided into evergreen and deciduous, and the estimated percentages are recorded.

9. Bank Composition and Vegetation:

Banks may be composed primarily of (1) Bedrock, (2) Boulders, (3) Cobble/Gravel, or (4) Silt/Clay/Sand, and may be covered predominantly with (5) Grass, (6) Brush, (7) Deciduous Trees, (8) Coniferous Trees, or (9) No Vegetation at all. These factors influence the ability of stream banks to withstand winter flows. For each fully measured habitat unit in Mill Creek, the dominant Bank Composition Type and Vegetation Type of both the right and left banks were chosen from the options above. Additionally, the percentage of vegetal coverage was estimated and recorded for each bank

BIOLOGICAL INVENTORY

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

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat, a dBASE IV data entry program developed by DFG. 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 Mill 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
- Percent Bank Composition and Bank Vegetation

HISTORICAL STREAM SURVEYS

Surveys were conducted on Mill Creek by DFG in September 1954, April 1957, July 1963 and June 1972. A survey was also conducted on behalf of Pan American Timber Services in July 1962.

In the 1957 survey it was noted that Mill Creek could be become a better steelhead spawning stream if some control could be enforced on proper road drainage and logging practices to prevent erosion. It was also noted that the stream was heavily fished.

In the 1962 report by Pan American Timber Services it was noted that heavy logging had had a serious effect on the watershed, resulting in several log jam barriers, heavy siltation of the streambed and slowing of flows to the point of heavy establishment of cattails along the length of the exposed areas. It was recommended that the log jams be removed, streamside vegetation be planted, logs be placed to create new pools, and the bedrock barriers be removed.

In the 1963 survey it was estimated that steelhead had access to 5 miles of Mill Creek, 30% of which could be utilized for spawning. Mill Creek was considered by most local residents to be of the greatest importance to the Forsythe steelhead fishery, as it was ideal for spawning and as a nursery area for steelhead propagation. It was noted that Mill Creek had a natural rock barrier which presumably blocked off the last 4 miles of stream. These falls were 3-10 feet high, however fish were seen above both points.

In the 1972 survey, it was noted once again that Mill Creek offered the best spawning and nursery habitat in the Forsythe system and that the creek had enough gradient and sufficient flow to keep its bed clear and in good condition for salmonids. The rock barrier was also noted during this survey.

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 8-September 16, 1999 was conducted by Ethan Jankowski and Sean Higgins (AmeriCorps Interns) with supervision and analysis by DFG. The survey began at the confluence with Forsythe Creek and extended up Mill Creek to the road approximately 2,500 feet below Mud Lake, at which point the channel became very narrow and entrenched and no fish were seen. A natural rock outcrop was noted approximately 23,500 feet upstream from the confluence with Forsythe Creek, but steelhead/rainbow trout were observed above the outcrop and the survey continued. DFG does not know whether the fish seen above the outcrop were resident rainbow trout, anadromous steelhead or stocked steelhead. The total length of the stream surveyed

was 46,534 feet, with an additional 400 feet of side channel.

Flows were not measured on Mill Creek.

This section of Mill Creek has 3 channel types: from the mouth to 1,561 feet a B4, the next 1,078 feet a B2 and the upper 43,895 feet a B3.

B channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated channels, with infrequently spaced pools, a very stable plan and profile, and stable banks. B4 channels have a predominantly gravel substrate, while B2 channels have a predominantly boulder substrate and B3 channels have a predominantly cobble substrate.

Water temperatures during the survey dates ranged from 50°F to 82°F. Air temperatures ranged from 69°F to 95°F. Summer water temperatures were also measured using remote temperature recorders placed in pools (see Temperature Summary graph at end of report). A recorder in Reach 3, in a pool at habitat unit #70, 5,663 feet upstream from the mouth of Mill Creek, logged temperatures every 2 hours from June 29 to September 25, 1999. The highest temperature recorded was 83°F in June and the lowest was approximately 61°F in September.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 47% pool units, 36% flatwater units, 17% riffle units, and no dry streambed units. Based on total length there were 58% flatwater units, 29% pool units, and 13% riffle units.

Four hundred forty one habitat units were measured and 15% were completely sampled. Eighteen Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent occurrence were runs at 29%, mid-channel pools 19%, low gradient riffles15% and root wad scour pools 8%. By percent total length, runs constituted 50%, low gradient riffles 12%, mid-channel pools 11%, and step runs 7%.

Two hundred seven pools were identified (Table 3). Scour pools were most often encountered at 53%, and comprised 38% of the total length of pools.

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Ninety of the 207 pools (43%) had a depth of three feet or greater. These deeper pools comprised 14% 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 67. Riffles had the lowest rating with 11, and flatwater types rated 26 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 79, main channel pools rated 51, and backwater pools rated 22 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were undercut banks at 29%, root masses at 23%, boulders at 16%, and large woody debris at 14%.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 8 of the 14 low gradient riffles measured. Small cobble was dominant in 5 of the low gradient riffles.

No mechanical gravel sampling was conducted in 1999 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 196 pool tail-outs measured, 27 had a value of 1 (14%); 59 had a value of 2 (30%); 57 had a value of 3 (29%); and 40 had a value of 4 (20%). Thirteen (7%) riffles rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the entire stream reach surveyed was 71%. The mean percentages of deciduous and evergreen trees were 37% and 62%, respectively.

For the entire stream reach surveyed, the mean percent right bank vegetated was 46% and the mean percent left bank vegetated was 47%. For the habitat units measured, the dominant vegetation types for the stream banks were: 45% evergreen trees, 34% deciduous trees, 18% grass, 2% brush and 1% bare soil. The dominant substrate for the stream banks were: 44% cobble/gravel, 37% silt/clay/sand, 14% boulder and 5% bedrock.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

Fish species noted during the 1954 survey conducted by DFG included steelhead, smallmouth bass, green sunfish, roach, suckers, and lamprey amocetes.

During the 1957 survey conducted by DFG, steelhead/rainbow trout were present.

In the 1963 survey conducted by DFG, Mill Creek appeared to have the greatest spawning success in the Forsythe system. Here counts of steelhead/rainbow trout averaged between 300-400 per 100 feet of stream, for the 5 miles of accessible area. One dead spent female was also observed on Mill Creek. No salmon were observed, but local residents said they (species unknown) were prominent at one time.

A survey was also conducted by DFG in 1972. Fish species noted during this survey included suckers, pike minnow and steelhead in the lower section of stream, with the abundance of steelhead estimated at 100/100 feet. Above the bedrock falls, resident rainbow trout were observed at an estimated abundance of 40/100 feet.

On October 4, 1999 DFG conducted a biological inventory in Mill Creek at four sites in Reach 3 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. Random samples of fish were selected from each reach and tissues were taken for genetic analysis. The air temperature was 63° and the water temperature was 60°. The observers were Sean Higgins (AmeriCorps) and Bryan Freele (DFG).

The inventory of the first site started 21,392 feet above the confluence with Forsythe Creek, at the first railroad bridge, and ended approximately 258 feet upstream. In run and riffle habitat types 31 steelhead (ranging from 45-200mm) were observed, along with 11 yellow-legged frogs, four rough-skinned newts and one Pacific Giant salamander.

The inventory of the second site started at habitat unit #192 and ended approximately 281 feet upstream. In riffle, run and glide habitat types 16 steelhead (ranging from 45-130mm) were observed, along with one Pacific Giant salamander.

The inventory of the third site started at habitat unit #89 and ended approximately 60 feet upstream. In run habitat types (the only type encountered) five California roach, five Sacramento pikeminnows and two Sacramento suckers were observed. No steelhead were observed at this site.

The inventory of the fourth site started at habitat unit #59 and ended approximately 170 feet upstream. In run habitat types (the only type encountered) one steelhead (140mm, with a possible adipose fin clip) was observed, along with approximately 230 California roach, six Sacramento suckers, two yellow-legged frogs, one Sacramento pikeminnow, one green sunfish and one signal crayfish.

On October 5, 1999 a second biological inventory was conducted in Mill Creek at three in Reach 3 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. A random sample of fish were selected from each reach and tissues were taken for genetic analysis. The air temperature was 58° and the water temperature was 54°. The observers were Aaron Fairbrook and Bryan Freele (DFG).

The inventory of the first site (site 5) started at habitat unit #404 and ended approximately 88 feet upstream. In run habitat types (the only type encountered) five steelhead (ranging from 65-75mm) were observed. All of these steelhead showed abbreviated operculum and appeared emaciated. Landowner Richard Grieve, who was present at the time of survey, indicated that adult steelhead were seen at this location in 1997 and that adult steelhead were seen in other places in 1998. These fish were likely the result of adult relocation of excess steelhead from Warm Springs Hatchery, stocked by the Cloverdale Casters. This practice has been discontinued out of concerns for genetic implications to native steelhead. A Sonoma State study is currently analyzing stocks the effects of the relocation effort.

The inventory of the second site (site 6) started at habitat unit #343 and ended approximately 107 feet upstream. Nine steelhead (ranging from 45-150mm) were observed, along with three yellow-legged frogs and one Pacific Giant salamander. One steelhead (125mm) had an adipose fin

clip, indicating that it was a hatchery-raised fish.

The inventory of the third site (site 7) started at habitat unit #313 and ended approximately 73 feet upstream. Six steelhead (ranging from 50-140mm) were observed, along with several yellow-legged frogs. One steelhead (100mm) had an adipose fin clip, indicating that it was a hatchery-raised fish.

During the habitat inventory, no salmonids were observed upstream of unit #431, 2500 feet downstream from Mud Lake.

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

Table 1. Species Observed in Historical and Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced
1954	Pacific Lamprey	DFG	N
1954	Smallmouth Bass	DFG	I
1954,1957,1963 1972, 1999	Steelhead	DFG	N
1954,1972,1999	Sacramento Sucker	DFG	N
1954,1999	California Roach	DFG	N
1954,1999	Green Sunfish	DFG	I
1972	Sacramento Pikeminnow	DFG	N
1972	Rainbow Trout	DFG	N
1999	Rough-Skinned Newt	DFG	N
1999	Pacific Giant Salamander	DFG	N
1999	Signal Crayfish	DFG	N
1999	Yellow-legged Frog	DFG	N

Historical records reflect that fish transfer operations into Mill Creek occurred in several years between 1915 and 1999.

Table 2. Summary of fish hatchery stocking into Mill Creek

YEAR	SOURCE	SPECIES	#	SIZE
1915	Upper Eel River	SH	?	?
1958	Dry Creek	SH	545	FING
1982	Dry Creek	SH	46684	FING
1983	Dry Creek	SH	29760	FING
1984	Dry Creek	SH	5000	FING
1984	Dry Creek	SH	16250	FING
1986	Dry Creek	SH	11760	FING
1986	Dry Creek	SH	13500	FING
1987	Dry Creek	SH	1200	YEAR
1993	Russian River	SH	16	YEAR
1994	Russian River	SH	18	YEAR
1995	Russian River	SH	106	YEAR
1996	Russian River	SH	77	YEAR
1997	Russian River	SH	44	YEAR
1999	Russian River	SH	80	YEAR

SH = steelhead

Historical records indicate that fish rescue operations out of Mill Creek occurred in 1956, 1960 and 1964.

Table 3. Summary of fish rescue operations from Mill Creek

YEAR	LOCATION	SOURCE	SPECIES	#	SIZE
1956	Russian River	Mill Creek	SH	1666	FING
1960	Mill Creek	Mill Creek	SH	1598	FING
1964	Russian River	Mill Creek	SH	6496	FING

SH = steelhead

ADULT SURVEYS:

No carcass surveys were conducted on Mill Creek in 1999, due to inadequate staffing levels.

DISCUSSION

Mill Creek has 3 channel types: B4 (1,561 ft.), B2 (1,078 ft.) and B3 (43,895 ft.).

According to the DFG Salmonid Stream Habitat Restoration Manual, B3 and 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. B2 channel types are excellent for low and medium-stage plunge weirs, single and opposing wing deflectors and bank cover. Many site specific projects can be designed within B channel types, especially to increase pool frequency, volume and shelter.

The water temperatures recorded on the survey days, August 8 to September 16, 1999, ranged from 50°F to 82°F. Air temperatures ranged from 69°F to 95°F. The warmer water temperatures were recorded in Reach 3.

The highest temperatures recorded, if sustained, are at the lethal level of 82ºF for salmonids.

Summer water temperatures measured using a remote temperature recorder placed in a pool in Reach 3 ranged from 61° to 83°F.

The Temperature Summary graph shows that for much of the summer (July through August) Mill Creek exhibited temperatures above the threshold stress level (72º) for salmonids.

Pools comprised 29% 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 Mill Creek, the pools are relatively shallow with 43% having a maximum depth of at least 3 feet. These pools comprised 14% 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 67. However, a pool shelter rating of approximately 80 is desirable. The relatively moderate amount of pool shelter that now exists is being provided primarily by undercut banks (29%), root masses (23%), boulders (16%), and large woody debris (14%). 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.

Thirteen of the 14 low gradient riffles measured (93%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

Forty nine of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 14% 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. In a reach comparison, Reach 3 had the poorest ratings.

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 Mill Creek, 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 71%. Eighty percent canopy is generally considered desirable. Cooler water temperatures are desirable in Mill Creek. Elevated water temperatures could be reduced by increasing stream canopy. The large trees required for adequate stream canopy would also eventually provide a long term source of large woody debris needed for

instream shelter and bank stability.

GENERAL MANAGEMENT RECOMMENDATIONS

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

Past winter storms brought down many large trees and other woody debris into the stream, which increased the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. 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) Increase the canopy on Mill Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels (particularly in Reaches 1 and 2). The non-anadromous reach above the survey section should be assessed for planting and treated as well, since water temperatures throughout are effected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects. If riparian areas are not improved in Reaches 1 and 2 temperatures in these lower sections of Mill Creek should be monitored to determine if they are having a deleterious effect upon juvenile salmonids. To achieve this, biological sampling is also required.

2) 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, ultimately reducing embeddedness. 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.

3) All reaches (particularly Reaches 1 and 2) would benefit from the utilization of bio-technical vegetative techniques to reestablish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.

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

5) Where feasible, increase woody cover in the pool habitat units along the entire stream (particularly in Reach 1). Most of the existing shelter is from undercut banks and root

masses. 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 pool locations. This must only 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.

6) Where feasible, design and engineer pool enhancement structures to increase the number of pools in reaches 2 and 3. This must only be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

PROBLEM SITES AND LANDMARKS
MILL 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	68	The survey was started 133 feet from the mouth.
9.00	1143	Surveyors observed a 5 in. pike minnow
14.00	1561	Dry side channel on the left bank that formed a large boulder island.
15.00	1689	There was a landslide on the right bank that was 150 ft in length.
16.00	1716	There was lots of large woody debris in the right bank tributary.
18.00	1800	Cascade with a 5 foot plunge that dropped into a pool.
20.00	1836	There was a large woody debris jam and also a 4 foot plunge.
36.00	2980	Tributary on right bank.
39.00	3211	Channel type taken at this point.
42.00	3444	Covered bridge 15 feet above creek and 25 feet wide.
45.00	3595	Four inch steel head/rainbow trout seen. First one seen.
53.00	4210	Surveyors observed 1+ steelhead.
59.00	4502	Tributary on the left bank.

61.00	4723	There was rip-rap on the left bank
62.00	4984	Yellow legged frog and eggs seen. Observers noted that the water was very stagnant.
63.00	5087	There was a multiple thread channel and a possible channel change seen here.
65.00	5400	Tributary seen on right bank.
66.00	5476	3 inch steelhead seen.
67.00	5539	Surveyors noted that the stream was close to the road. There was erosion on the right bank.
70.00	5682	Hobo temperature unit location
72.00	5774	Surveyors observed erosion 15 feet high on the left bank.
81.00	6546	Surveyors observed roach and pike minnow.
82.00	6667	Tributary on the left bank
83.00	6689	Surveyors observed a dam and irrigation pump.
84.00	7848	At 831 feet surveyors saw a tributary on the right bank.
86.00	8050	Surveyors saw a wet road crossing.
87.00	8190	Dry tributary on the right bank.
92.00	8720	Surveyors noted a slide on the right bank.
93.00	8794	Surveyors saw a wet road crossing.
98.00	9527	At 77 feet surveyors noted a tributary on the left bank. There was also a 36 inch culvert 50 feet up on the tributary.
99.00	9788	Tributary at the end of the left bank.
100.00	10070	Surveyors saw a fill blocking the creek.
102.00	10661	Slide seen on right bank. No riparian trees were seen.
103.00	10707	A single 1+ steelhead was seen.
104.00	10829	Culvert under road on right bank.
108.00	11167	Tributary on right bank at 140 feet and 36 inch culvert on tributary.
110.00	11255	Erosion and cattails on right bank.
113.00	11526	Road crossing.
116.00	11768	At 161 feet there was a tributary seen on the left bank.
117.00	11987	Small tributary on right bank. Gully erosion on left bank.
119.00	12186	Erosion on left bank and gully. First 0+

		steelheads observed.
120.00	12259	Erosion on left bank. Bank unstable.
121.00	12310	Possible tributary on right bank.
123.00	12412	Tributary on right bank.
125.00	12597	1+ steelhead seen.
129.00	13220	Flatcar railroad bridge. Rip Rap.
137.00	13870	Left and right bank erosion. Vineyard on right bank.
138.00	13949	First redwoods. Riparian section.
140.00	14255	Several 1+ steelhead were seen.
141.00	14279	Irrigation pump. Garden and vineyards.
143.00	14421	8 to 10 1+ steelhead were seen. 36 inch culvert on right bank.
144.00	14446	Road crossing. Recent road construction.
145.00	14530	2+,1+, and 0+ steelhead seen.
148.00	14906	Horse pasture on left bank. Vineyards on right bank.
149.00	14950	36 inch culvert going through tributary on left bank. 48 inch culvert on right bank.
150.00	15177	1+ steelhead observed.
152.00	15658	Flat car bridge. Base of dam.
153.00	16518	Flash board dam.
155.00	16651	Tributary on left bank. 0+ and 1+steelhead.
158.00	17097	Erosion on left bank. Extra road fill possibly dumped into stream.
159.00	17154	Rip rap on left bank. 1+ steelhead seen.
163.10	17386	Slide on right bank at 30 feet high.
164.00	17448	Dry tributary on right bank.
165.00	17476	1+ steelhead seen.
168.00	17670	Boulder section begins.
169.00	17735	0+ steelhead seen
170.00	17756	6 inch steelhead.
171.00	17805	0+ and 1+ steelhead.
172.00	17867	0+ and 1+ steelhead. End boulder section.
174.00	17985	0+ steelhead.
176.00	18308	1+ steelhead
184.00	18926	Abundant caddis fly and stone fly.
185.00	18960	Right bank well covered with oaks.
186.00	18997	Culvert on left bank. 10 feet of downcutting. 24 inch culvert.
187.00	19075	0+ steelhead
190.00	19461	Redwoods, Oaks and Alders.

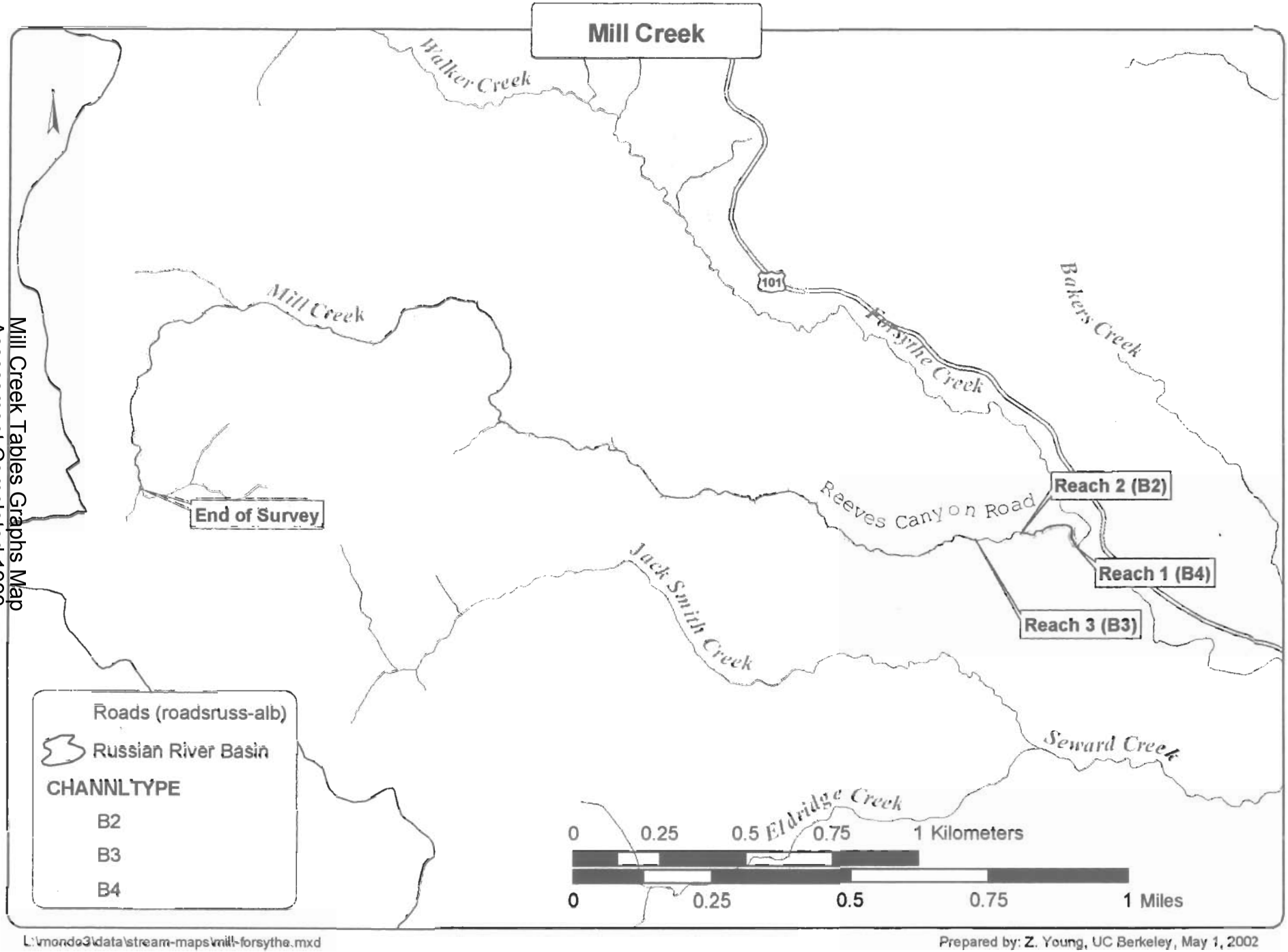
191.00	19629	Green, flatcar bridge at 135 feet. 8 feet high. Left bank has gully at bridge.
192.00	19732	7 inch trout/steelhead.
197.00	20092	12 inch culvert on right bank. Road directly along right bank.
200.00	20695	Flatcar bridge on right bank. Culvert at 250 feet.
201.00	20774	0+ steelhead. Right bank is bed rock.
203.00	20915	Bouldery section. Spawnable tailout.
206.00	21268	0+ steelhead
207.00	21346	Flat car bridge. 3 inch pipe water diversion.
209.00	21556	Large tributary on right bank. 6 foot flashboard dam with spillway.
210.00	21979	0+ steelhead. several 10 inch trout.
212.00	22072	1+ steelhead. Dry tributary on right bank.
217.00	22552	0+ steelhead
221.00	23244	Tributary on left bank. 0+,1+steelhead.
223.00	23398	0+,1+,2+ steelhead.
226.00	23517	35’ boulder/log. Survey continued
227.00	23621	Gravel backed up from dam.
229.00	23830	Many second growth redwoods, bay trees, ferns and tan oak.
233.00	24244	2+,1+ Rainbow trout.
241.00	25004	8 inch right tributary. Boulder/log jam 15 feet high and 15 feet wide.
249.00	25354	Wet road crossing.
255.00	25653	15 foot log/boulder jam.
257.00	25874	Old logging road on right bank.
260.00	26029	Overgrown with sawgrass.
264.00	26153	Sawgrass completely covers creek.
269.00	27011	11' high log jam holding gravel.
270.00	27474	Large woody debris everywhere. 8 to 10 foot log jams, not barriers. 0+ rainbow trout/steelhead.
274.00	28131	15 foot log/boulder jam.
277.00	28244	4 foot log jam holding gravel.
292.00	29492	6 inch rainbow trout/steelhead seen. 0+ rainbow trout/steelhead
298.00	29841	6 inch rainbow trout/steelhead observed.
300.00	29956	Old logging road crossing.
303.00	30102	Dry tributary on right bank.
305.00	30197	0+ and 1+ rainbow trout/steelhead observed
312.00	30956	Flatcar bridge

313.00	31004	Wet road crossing seen by observers
315.00	31181	Surveyors noted 10 inch diameter Redwood stumps and large 2nd growth Redwood trees.
319.00	31625	Surveyors observed a flatcar bridge, 6 feet height at 205 feet.
324.00	32199	House on right bank.
325.00	32238	6 inch rainbow trout/steelhead observed.
328.00	32619	Surveyors noted a great canopy of Douglas Firs and Redwoods.
329.00	32776	Dirt road and wet road crossing seen.
331.00	33509	Rip rap seen on the left bank about 180 degrees from road. 24 inch culvert on left bank.
343.00	34584	Surveyors noted 2 6 inch rainbow trout/steelhead
345.00	34909	0+ rainbow trout/steelhead seen
346.00	35070	Surveyors noted a foot bridge, a cabin on the right bank and cement bags in the creek on the right bank.
352.00	35395	Road 2 feet from the right bank.
354.00	35882	Four foot debris jam holding gravel.
355.00	36009	Surveyors noted a gully on the left bank and a wet road crossing.
358.00	36188	0+ rainbow trout/steelhead
365.00	36855	Large, wet tributary on left bank at 44 feet.
366.00	36891	7 foot high log jam observed.
370.00	37360	Surveyors noted a canopy of mostly redwoods.
371.00	37628	Small log jam observed. Also 0+ steelhead were seen.
376.00	37829	0+ rainbow trout/steelhead observed.
377.00	38173	Wet road crossing at 89 feet.
378.00	38190	Left bank 3 feet from road.
380.00	38439	1+ rainbow trout/steelhead observed.
385.00	39093	Erosion seen on left bank 7 feet High. 0+ rainbow trout/steelhead seen.
389.00	39625	Surveyors saw lots of large woody debris.
392.00	39928	0+ rainbow trout/steelhead seen.
397.00	40884	0+ steelhead/rainbow trout observed.
403.00	41313	Surveyors noted a debris jam 3 feet high and 25 feet wide.
404.00	41649	Dry tributary observed on right bank. Also a 24 inch culvert was

		seen under the road.
409.00	42054	Small log jam covering 2/3 of channel.
410.00	42097	Small log jam covering all of channel, 2.5 feet high.
411.00	42415	0+ rainbow trout/steelhead observed.
413.00	43247	Dry tributary on right bank at 406 feet. Erosion on left bank next to road at 333 feet. 5 foot high bridge seen at 449 feet.
415.00	43464	Surveyors noted a spring on the left bank at 50 feet.
417.00	44210	Erosion seen on left bank at 12 feet high. Also, the right bank had a small slide.
424.00	45509	Area was overgrown with willow.
425.00	45544	Surveyors lost their thermometer and could not record air and water temperature
426.00	45927	0+ rainbow trout/steelhead seen. 6 foot high bridge observed at 225 feet.
428.00	46318	Small dry tributary seen on left bank.
430.00	46490	Large dry tributary seen on right bank.
431.00	46534	End of survey at road bridge.

END OF SURVEY

Survey ended at unit 431, at a road approximately 2500 feet downstream of Mud Lake. No fish were seen beyond this point and the water became very dark in color. The stream also became very narrow and entrenched at this point, though flows continued due to the release from Mud Lake, which is drained by a culvert 28" in diameter.


Mill Creek
Walker Creek
Mill Creek
101
Forsythe Creek
Bakers Creek
End of Survey
Reeves Canyon Road
Reach 2 (B2)
Reach 1 (B4)
Reach 3 (B3)
Jack Smith Creek
Seward Creek
Eldridge Creek
Roads (roadsruss-alb)
Russian River Basin
CHANNLTYPE
B2
B3
B4
0 0.25 0.5 0.75 1 Kilometers
0 0.25 0.5 0.75 1 Miles
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Prepared by: Z. Young, UC Berkeley, May 1, 2002

Mill Creek Drainage: Forsythe Creek; Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS36 LATITUDE: 39°16'41" LONGITUDE: 123°15'35"

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
1	0		0	64	64	0	8.0	0.3	410	410	123	123	0	0
74	11	RIFFLE	17	81	6009	13	9.5	0.3	628	46462	233	17257	0	11
157	18	FLATWATER	36	174	27272	58	9.6	0.7	1515	237800	999	156815	0	26
207	35	POOL	47	65	13540	29	14.8	1.7	1443	298758	1395	288827	1258	67
2	0	DRY	0	57	113	0	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.)
441	64	46998	583429	463022

Mill Creek

Drainage: Forsythe Creek; Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS36 LATITUDE: 39°16'41" LONGITUDE: 123°15'35"

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 %
1	0		0	64	64	0	8	0.3	0.5	410	410	123	123	0	0	36
66	9	LGR	15	84	5526	12	9	0.3	1.5	688	45386	254	16735	0	7	64
3	1	HGR	1	50	151	0	8	0.4	0.7	278	835	111	334	0	20	75
5	1	CAS	1	66	332	1	20	0.5	1.3	140	700	70	350	0	40	69
3	0	GLD	1	103	308	1	0	0.0	0.0	0	0	0	0	0	0	89
130	13	RUN	29	181	23557	50	8	0.6	2.7	1695	220404	1061	137970	0	27	73
24	5	SRN	5	142	3407	7	13	0.8	2.0	1009	24204	824	19773	0	20	57
1	1	TRP	0	275	275	1	16	2.0	3.4	4400	4400	8800	8800	0	5	59
84	11	MCP	19	60	5031	11	14	1.4	4.3	662	55589	940	78987	828	47	77
2	1	CCP	0	35	70	0	18	1.8	3.8	666	1332	1199	2398	1066	195	55
5	1	STP	1	87	435	1	15	1.6	3.5	1285	6427	2134	10671	1837	70	54
13	2	CRP	3	52	682	1	12	1.7	4.2	634	8245	1108	14399	1016	59	84
14	3	LSL	3	48	674	1	14	1.5	4.2	569	7965	915	12807	838	117	90
37	7	LSR	8	50	1835	4	14	1.8	5.4	695	25716	1263	46719	1241	100	73
17	2	LSBk	4	49	828	2	14	1.8	5.0	709	12060	1405	23878	1361	41	61
20	5	LSBo	5	45	899	2	14	1.9	4.6	559	11184	982	19644	844	48	72
9	2	PLP	2	28	252	1	19	2.0	4.5	509	4585	1036	9326	947	83	62
5	0	DPL	1	512	2559	5	39	2.8	12.0	30205	151023	19199	95996	19192	22	43
2	0	DRY	0	57	113	0	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)
441	64	46998	580465	498911

Mill Creek Tables Graphs Map
Assessment Completed 1999
Page 3 of 9

Mill Creek | Drainage: Forsythe Creek; Russian River

Table 1 - SUMMARY OF POOL TYPES | Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range | LEGAL DESCRIPTION: T17NR13WS36 | LATITUDE: 39°16'41" | LONGITUDE: 123°15'35"

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
1	0		0	64	64	0	8.0	0.3	410	410	123	123	0	0
92	14	MAIN	44	63	5811	43	14.5	1.4	776	71403	1175	108111	918	51
110	21	SCOUR	53	47	5170	38	13.9	1.8	637	70032	1154	126992	1083	79
5	0	BACKWATER	2	512	2559	19	39.0	2.8	30205	151023	19199	95996	19192	22

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
208	35	13604	292867	331222

Mill Creek

Drainage: Forsythe Creek; Russian River

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

Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS36 LATITUDE: 39°16'41" LONGITUDE: 123°15'35"

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
1		0	1	100	0	0	0	0	0	0	0	0
1	TRP	0	0	0	0	0	0	0	1	100	0	0
84	MCP	40	0	0	21	25	45	54	15	18	3	4
2	CCP	1	0	0	0	0	1	50	1	50	0	0
5	STP	2	0	0	2	40	0	0	3	60	0	0
13	CRP	6	0	0	0	0	4	31	6	46	3	23
14	LSL	7	0	0	1	7	6	43	5	36	2	14
37	LSR	18	0	0	0	0	12	32	18	49	7	19
17	LSBk	8	0	0	1	6	7	41	5	29	4	24
20	LSBo	10	2	10	3	15	8	40	6	30	1	5
9	PLP	4	0	0	0	0	3	33	4	44	2	22
4	DPL	2	0	0	0	0	0	0	1	25	3	75

TOTAL UNITS
207

Mill Creek

Drainage: Forsythe Creek; Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS36 LATITUDE: 39°16'41" LONGITUDE: 123°15'35"

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
1	0		0	0	0	0	0	0	0	0	0
66	9	LGR	31	0	17	0	24	0	0	28	0
3	1	HGR	0	0	0	0	0	0	50	50	0
5	1	CAS	0	0	0	0	0	0	30	70	0
3	0	GLD	0	0	0	0	0	0	0	0	0
130	13	RUN	24	10	23	5	8	0	0	29	0
24	4	SRN	13	0	0	0	12	8	0	67	0
1	1	TRP	100	0	0	0	0	0	0	0	0
84	51	MCP	35	11	19	10	9	0	0	16	1
2	1	CCP	30	20	0	0	50	0	0	0	0
5	4	STP	21	0	3	0	2	1	8	64	0
13	11	CRP	70	6	8	10	0	0	0	5	0
14	12	LSL	23	15	37	24	0	0	0	1	0
37	33	LSR	27	9	11	49	1	0	0	3	0
17	14	LSBk	16	4	1	9	2	0	0	24	44
20	13	LSBo	11	0	8	4	3	0	0	66	7
9	6	PLP	11	11	31	6	2	0	4	21	14
5	3	DPL	32	16	8	0	0	0	0	44	0
2	0	DRY	0	0	0	0	0	0	0	0	0
ALL 441	177		28	9	15	19	5	0	1	19	3
HABITAT TYPES											
POOLS 207	149		29	9	14	23	4	0	1	16	4
ONLY											

Mill Creek

Drainage: Forsythe Creek; Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 08/23/99 to 09/16/99

Confluence Location: QUAD: Laughlin Range LEGAL DESCRIPTION: T17NR13WS36 LATITUDE: 39°16'41" LONGITUDE: 123°15'35"

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
1	1		0	0	100	0	0	0	0
66	14	LGR	0	0	57	36	7	0	0
3	1	HGR	0	0	100	0	0	0	0
5	1	CAS	0	0	0	0	0	100	0
3	0	GLD	0	0	0	0	0	0	0
30	12	RUN	0	17	67	17	0	0	0
14	5	SRN	0	20	20	0	20	40	0
1	1	TRP	0	100	0	0	0	0	0
34	11	MCP	27	36	27	9	0	0	0
2	1	CCP	0	100	0	0	0	0	0
5	1	STP	0	0	100	0	0	0	0
13	2	CRP	0	50	50	0	0	0	0
14	3	LSL	0	33	67	0	0	0	0
27	7	LSR	0	14	57	29	0	0	0
17	3	LSBk	0	67	33	0	0	0	0
20	5	LSBo	0	40	20	40	0	0	0
9	2	PLP	0	50	0	50	0	0	0
5	1	DPL	0	0	100	0	0	0	0
2	0	DRY	0	0	0	0	0	0	0

Mill 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
70.97	62.22	36.63	45.71	47.04

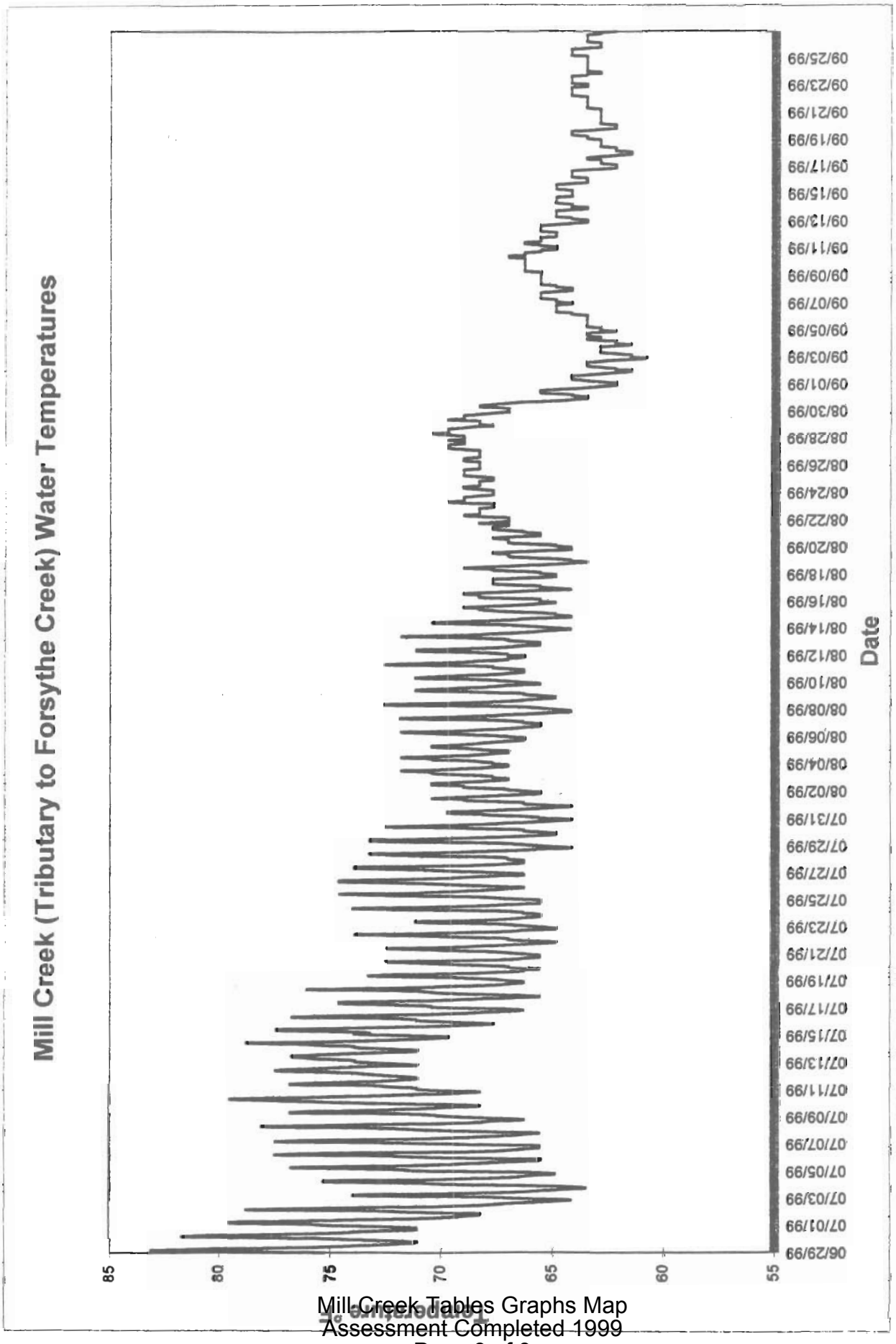
APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	6	2	5.48
Boulder	8	12	13.70
Cobble/Gravel	29	35	43.84
Silt/clay	30	24	36.99

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	10	17	18.49
Brush	2	1	2.05
Deciduous Trees	25	25	34.25
Evergreen Trees	35	30	44.52
No Vegetation	1	0	0.68


Mill Creek (Tributary to Forsythe Creek) Water Temperatures
Temperature °F
85
80
75
70
65
60
55
Date
06/29/99
07/01/99
07/03/99
07/05/99
07/07/99
07/09/99
07/11/99
07/13/99
07/15/99
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07/19/99
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