CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT

Gill Creek

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Report Completed 2000
Assessment Completed 1998

INTRODUCTION

A stream inventory was conducted during the summer of 1998 on Gill Creek starting at the River 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 Gill 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

Gill Creek is a tributary to the Russian River, located in Sonoma County, California (see Gill Creek map, page 2). The legal description at the confluence with the Russian River is T10N, R10W, S12. Its location is 38°43'44" N. latitude and 122°52'35" W. longitude. Year round vehicle access exists from Highway 101 near Geyserville, via River Road.

Gill Creek and its tributaries drain a basin of approximately 7.43 square miles. Gill Creek is a second order stream and has approximately 3.75 miles of blue line stream, according to the USGS Geyserville 7.5 minute quadrangle. Three unnamed tributaries ("South Fork Gill", " South Fork Gill Trib.", and "Gill Trib.") were also inventoried in 1998 and are included in this report. Summer flow was measured as approximately 2.3 cfs on October 28, 1998 in Reach 1. Elevations of Gill Creek range from about 220 feet at the mouth of the creek to 1640 feet in the headwaters. Mixed evergreen forest dominates the watershed, but there are zones of grassland and oak-woodland in the watershed. The watershed is privately owned and is managed for grazing and vineyards.

METHODS

The habitat inventory conducted in Gill 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 Gill 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". Gill 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 Gill 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 Gill 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 Gill 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 Gill 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 Gill 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.

HABITAT INVENTORY RESULTS

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

The habitat inventory of October 28, 1998 was conducted by Janet Lester and Chris Ramsey (AmeriCorps) with supervision and analysis by CDFG. The survey began at the beginning of landowner access permission at the River Road crossing and extended up Gill Creek to the end of

landowner access permission. The total length of the stream surveyed was 4693 feet, with no additional feet of side channel.

A flow of 2.3 cfs was measured October 28, 1998 in Reach 1 with a Marsh-McBirney Model 2000 flowmeter.

This section of Gill Creek has 3 channel types: from the mouth to 1542 feet an F4; next 1069 feet a B4 and the upper 2082 feet an F3.

F4 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate. F3 channel types are similar but have predominately cobble substrate.

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 53°F to 59°F. Air temperatures ranged from 61°F to 81°F. Summer temperatures were also measured using a remote temperature recorder placed in a pool (see Temperature Summary graphs at end of report). A recorder in Reach 3 logged temperatures every 2 hours from July 29 - October 5, 1998. The highest temperature recorded was 78°F in August and the lowest was 53°F in October.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 56% flatwater units, 26% pool units, 16% riffle units, and 2% dry streambed units. Based on total **length** there were 63% flatwater units, 16% pool units, 13% dry streambed units, and 8% riffle units (Graph 1).

Sixty-one habitat units were measured and 34% were completely sampled. 9 Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent **occurrence** were runs at 26%, mid-channel pools 23%, glides 21% and low gradient riffles 13% (Graph 2). By percent total **length**, runs made up 32%, glides 20%, mid-channel pools 15%, and dry streambed 13%.

Sixteen pools were identified (Table 3). Main Channel pools were most often encountered at 88%, and comprised 91% 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. 9 of the 16 pools (56%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 10% of the total length of stream habitat.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle types had the highest shelter rating at 33. Flatwater had the lowest rating with 10 and pool rated 14 (Table 1). Of the pool types, the main

channel pools had the highest mean shelter rating at 14. Scour pools rated 13 (Table 3). Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 42%, bedrock ledges 22%, root masses 18%, and undercut banks 11%. Graph 5 describes the pool shelter in Gill Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 2 of the 4 low gradient riffles measured. Small cobble was dominant in the other 2 of the low gradient riffles measured (Graph 6). 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 16 pool tail-outs measured, 0 had a value of 1 (0%); 3 had a value of 2 (19%); 9 had a value of 3 (56%); and 3 had a value of 4 (19%). One (6%) pool tail-out rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries. Gravel and cobble were the dominant substrates observed at pool tail-outs. Graph 7 describes percent embeddedness by reach.

The mean percent canopy density for the stream reach surveyed was 78% (100% deciduous). Graph 8 describes the canopy for the entire survey and graph 9 describes the canopy by reach.

For the entire stream reach surveyed, the mean percent right bank vegetated was 85% and the mean percent left bank vegetated was 82%. For the habitat units measured, the dominant vegetation types for the stream banks were: 90% deciduous trees, 7% grass, and 2% brush. The dominant substrate for the stream banks were: 76% silt/clay/sand, 14% cobble/gravel, 5% bedrock and 5% boulder (Graph 10).

HABITAT INVENTORY RESULTS FOR UNNAMED TRIBUTARY (GILL CREEK TRIB)

The habitat inventory of October 20 - 27, 1998 was conducted by Janet Lester and Chris Ramsey (AmeriCorps) with supervision and analysis by CDFG. The survey began at the confluence with Gill Creek and extended up Gill Creek Tributary to the end of anadromous fish passage at a rock falls. The total length of the stream surveyed was 10736 feet, with no additional feet of side channel.

A flow of 0.3 cfs was measured October 29, 1998 at approximately 50 feet upstream of the confluence with Gill Creek with a Marsh-McBirney Model 2000 flowmeter.

This section of Gill Creek Tributary has 2 channel types: from the mouth to 9530 feet a B4 and the upper 1206 feet an A3. 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.

A3 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly cobble substrate.

Water temperatures ranged from 55 ℉ to 61 ℉. Air temperatures ranged from 57 ℉ to 83 ℉.

*Based on frequency of **occurrence** there were 52% flatwater units, 22% pool units, 17% riffle units, and 9% dry streambed units. Based on total **length** there were 68% flatwater units, 13% riffle units, 11% dry streambed units, and 8% pool units.*

*One hundred sixty-one habitat units were measured and 22% were completely sampled. The most frequent habitat types by percent **occurrence** were runs at 27%, step runs 16%, mid-channel pools 16% and glides 9%. By percent total **length**, runs made up 35%, step runs 28%, dry streambed 11%, and low gradient riffles 6%.*

Thirty-six pools were identified. Main Channel pools were most often encountered at 69%, and comprised 71% of the total length of pools. Thirteen of the 36 pools (36%) had a depth of two feet or greater (comprised 3% of the total length). Pool types had the highest shelter rating at 23. Flatwater had the lowest rating with 10 and riffle rated 14. By percent area, the dominant pool shelter types were bedrock ledges at 35%, boulders 31%, aquatic vegetation 26%, and undercut banks 3%.

Gravel was the dominant substrate observed in 3 of the 4 low gradient riffles measured.

Of the 36 pool tail-outs measured, 0 had a value of 1 (0%); 2 had a value of 2 (6%); 11 had a value of 3 (31%); and 2 had a value of 4 (6%). 21 (58%) riffles 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 87% (deciduous and evergreen trees were 99% and 1%, respectively).

Mean percent right bank vegetated was 79% and the mean percent left bank vegetated was 83% (dominant vegetation types for the stream banks were: 96% deciduous trees and 4% grass). The dominant substrate for the stream banks were: 78% silt/clay/sand, 15% bedrock, and 7% boulder.

HABITAT INVENTORY RESULTS FOR UNNAMED TRIBUTARY (SOUTH FORK GILL CREEK)

The habitat inventory of October 26 - 28, 1998 was conducted by Chris Ramsey and Janet Lester (AmeriCorps) with supervision and analysis by CDFG. The survey began at the confluence with Gill Creek and extended up South Fork Gill Creek to the end of landowner access permission and the end of survey at a flashboard dam. The total length of the stream surveyed was 6099 feet, with an additional 170 feet of side channel.

A flow of 0.24 cfs was measured October 28, 1998 near the confluence of Gill Creek with a Marsh-McBirney Model 2000 flowmeter.

This section of Gill Creek - South Fork has 2 channel types: from the mouth to 748 feet an F4 and the upper 5351 feet an F3. F4 channel types are entrenched meandering riffle/pool channels on low

gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate. F3 channel types are similar but have predominately cobble substrate. Water temperatures ranged from 56 ℉ to 65 ℉. Air temperatures ranged from 59 ℉ to 71 ℉.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of ***occurrence*** *there were 40% flatwater units, 28% pool units, 25% riffle units, and 8% dry streambed units. Based on total* ***length*** *there were 45% flatwater units, 21% pool units, 17% dry streambed units, and 17% riffle units.*

One hundred-twenty habitat units were measured and 19% were completely sampled. Twelve Level IV habitat types were identified. The most frequent habitat types by percent ***occurrence*** *were runs at 24%, low gradient riffles 23%, mid-channel pools 23% and glides 9%. By percent total* ***length****, runs made up 26%, mid-channel pools 18%, dry streambed 17%, and low gradient riffles 17%. Thirty-three pools were identified. Main Channel pools were most often encountered at 82%, and comprised 86% of the total length of pools. Pool quality for salmonids increases with depth. Nine of the 33 pools (27%) had a depth of two feet or greater. These deeper pools comprised 6% 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 22. Riffle had the lowest rating with 6 and flatwater rated 11. Of the pool types, the backwater pools had the highest mean shelter rating at 40, scour pools rated 24, and main channel pools rated 16.

By percent area, the dominant pool shelter types were undercut banks at 32%, root masses 32%, small woody debris 22%, and boulders 12%. Small cobble was dominant in the low gradient riffles measured.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 33 pool tail-outs measured, 2 had a value of 1 (6%); 12 had a value of 2 (36%); 7 had a value of 3 (21%); and 9 had a value of 4 (27%). Three (9%) riffles rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries. Cobble was the dominant substrate observed at pool tail-outs.

The mean percent canopy density for the stream reach surveyed was 85%. The mean percentages of deciduous and evergreen trees were 98% and 2%, respectively. Mean percent right bank vegetated was 47% and the mean percent left bank vegetated was 58% (dominant vegetation types for the stream banks were: 65% deciduous trees, 31% brush, and 4% grass). The dominant substrate for the stream banks were: 77% silt/clay/sand, 10% boulder, 8% cobble/gravel and 4% bedrock.

<u>HABITAT INVENTORY RESULTS FOR UNNAMED TRIBUTARY (TRIBUTARY TO GILL CREEK SOUTH FORK)</u>

The habitat inventory of October 28, 1998 was conducted by Chris Ramsey and Janet Lester (AmeriCorps) with supervision and analysis by CDFG. The survey began at the confluence with

Gill Creek- South Fork and extended up Gill Creek South Fork Tributary 2034 feet, with no additional feet of side channel. Flows were not measured on Tributary to Gill Creek South Fork.

This section of Tributary to Gill Creek South Fork has one channel type, from the mouth to 2034 feet a B6. B6 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 silt substrate. Water temperatures ranged from 56℉ to 58℉. Air temperatures ranged from 56℉ to 60℉.

Based on frequency of ***occurrence*** *there were 49% flatwater units, 31% riffle units, 21% pool units, and 0% dry streambed units. Based on total* ***length*** *there were 76% flatwater units, 17% riffle units, 7% pool units, and 0% dry streambed units. The most frequent habitat types by percent* ***occurrence*** *were step runs at 38%, low gradient riffles 26%, plunge pools 10% and runs 8%. By percent total* ***length****, step runs made up 60%, runs 13%, low gradient riffles 11%, and cascades 6%. Scour pools were most often encountered at 63%, and comprised 60% of the total length of pools. One of the 8 pools (13%) had a depth of two feet or greater. These deeper pools comprised 1% of the total length of stream habitat.*

Pool types had the highest shelter rating at 24. Riffle had the lowest rating with 7 and flatwater rated 10. Of the pool types, the scour pools had the highest mean shelter rating at 33; main channel pools rated 15. By percent area, the dominant pool shelter types were bedrock ledges at 45%, boulders 24%, small woody debris 14%, and aquatic vegetation 9%. Small cobble was dominant in 1 of the low gradient riffles.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 8 pool tail-outs measured, 2 had a value of 1 (25%); 4 had a value of 2 (50%); 0 had a value of 3 (0%); and 0 had a value of 4 (0%). Two (25%) riffles rated a 5 (unsuitable substrate type for spawning). Cobble was the dominant substrate observed at pool tail-outs.

The mean percent canopy density for the stream reach surveyed was 90% (100% deciduous).

For the entire stream reach surveyed, the mean percent right bank vegetated was 69% and the mean percent left bank vegetated was 81% (dominant vegetation types: 100% deciduous trees). The dominant substrate for the stream banks were: 89% silt/clay/sand and 11% boulder.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

A biological survey was conducted in two sites of Gill Creek on October 20, 1958. The air temperatures ranged from 65°F to 67°F and the water temperatures ranged from 55°F to 57°F. The first station was located at T10N, R10W, Sec. 12, approximately 100 yards upstream from the road where the flow was estimated at 0.49 cfs. Steelhead/rainbow trout were observed along with roach, pike minnow, and suckers. The second station was located 1/4 mile upstream where the flow was

estimated at 0.56 cfs. Steelhead/rainbow trout were observed along with roach, pike minnow, and suckers. The observations revealed a 60% in favor of warm water fish over steelhead/rainbow trout. On November 5, 1998 a recent biological inventory was conducted in two sites of Gill Creek to document the fish species composition and distribution at several locations. Each site was single pass electrofished in Gill Creek using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature was 62°F and the water temperature was 52°F. The observers were Dez Mikkelsen (AmeriCorps), Stephanie Carey, and Bob Coey (DFG).

Reach 1 was dry. The inventory of Reach 3 started 50 feet downstream from the hobo temp location and ended approximately 400 feet upstream. In pool, run, glide, and riffle habitat types 75 0+, 8 1+, and 2 2 + steelhead were observed along with many roach.

The inventory was continued in Reach 3 by spot checking pools. In pool habitat types 26 0+, 9 1+, and 1 3+ steelhead were observed along with many roach and one yellow-legged frog.

The biological inventory was conducted in three sites of South Fork Gill Creek to document the fish species composition and distribution at several locations. Each site was single pass electrofished in South Fork Gill Creek using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature was 58°F and the water temperature ranged from 54°F to 56°F. The observers were Dez Mikkelsen (AmeriCorps), Stephanie Carey, and Bob Coey (DFG).

The inventory of Reach 1 started at the mouth of South Fork Gill Creek and ended approximately 648 feet upstream. In pool, run, and riffle habitat types 25 0+ and 6 1+ steelhead were observed along with many roach and one yellow-legged frog. No fish were seen from above the cascade to 200 feet below the first crossing on the South Fork.

The inventory of Reach 2 started approximately 300 feet downstream of the floating fence on the Draxton property (habitat unit #047) and continued for 300 feet upstream. In pool and riffle habitat types 3 3+ steelhead were observed along with 3 yellow-legged frogs. The steelhead observed were found in a deep pool and were probably resident fish.

The inventory of Reach 2 continued above the vineyard section and ended approximately 200 feet upstream. In pool, riffle, and run habitat types 12 0+, 6 1+, and 1 2+ steelhead were observed.

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
1958, 1998	Steelhead	DFG	N

Table 1. Species Observed in Historical and Recent Surveys			
YEARS	**SPECIES**	**SOURCE**	**Native/Introduced**
1958	Pike Minnow	DFG	N
1958, 1998	Roach	DFG	N
1958	Sacramento Sucker	DFG	N
1998	Yellow-legged Frog	DFG	N

No introduced fish species were observed during the survey. Historical records reflect that there has been no stocking, planting, or fish rescue/transfer operations in Gill Creek or its tributaries.

ADULT SURVEYS:

No spawning/carcass survey was conducted due to inadequate staffing levels.

DISCUSSION FOR GILL CREEK
Gill Creek has 3 channel types: F4 (1542 ft.), B4 (1069 ft.) and F3 (2082 ft.).

There are 1542 feet of F4 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.

F3 channel types are good for bank-placed boulders as well as single and opposing wing-deflectors. They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover.

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

Many site specific projects can be designed within these channel types, especially to increase pool frequency, volume and shelter.

The water temperatures recorded on the survey day October 20, 1998 ranged from 53°F to 59°F. This temperature regime is favorable to salmonids. Air temperatures ranged from 61°F to 81°F. The warmer water temperatures were recorded in Reach 3.

Summer temperatures measured using a remote temperature recorder placed in a pool ranged from

53° to 78°F for Reach 3. The Temperature Summary graph shows that for much of the summer (July through August) the upper watershed exhibited temperatures above the optimal for salmonids. Our electrofishing samples found steelhead more frequently in the cooler sample sites.

Pools comprised 16% 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 Gill Creek, the pools are relatively deep with 56% having a maximum depth of at least 2 feet. However, these pools comprised only 10% 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 14. However, a pool shelter rating of approximately 80 is desirable. The relatively small/moderate/large amount of pool shelter that now exists is being provided primarily by boulders (42%), bedrock ledges (22%), root masses (18%), and undercut banks (11%). 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.

Four of the 4 low gradient riffles measured (100%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

Seventy-five percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. None 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, Reaches 1 and 3 had the best ratings and Reach 2 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 Gill Creek Reaches 1-3, 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 78%. This is good, since 80 percent is generally considered desirable. However, the riparian buffer is thin or nearly absent in areas with livestock and agriculture. Riparian removal/intensive grazing/vineyard development within the riparian corridor all leads to less stream canopy and channel migration causing bank erosion and higher temperatures.

DISCUSSION FOR UNNAMED TRIBUTARY (GILL CREEK - SOUTH FORK)

Gill Creek - South Fork has 2 channel types: F4 and F3 (5351 ft.).

There are 748 feet of F4 channel type in Reach 1. According to the DFG Salmonid Stream Habitat Restoration Manual, F4 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover.

F3 channel types are good for bank-placed boulders as well as single and opposing wing-deflectors. They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover.

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

The water temperatures recorded on the survey days October 26 - 28, 1998 ranged from 56°F to 65°F. Air temperatures ranged from 59°F to 71°F. This temperature regime is favorable to salmonids.

*Pools comprised 21% 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 Gill Creek - South Fork, the pools are relatively shallow with 27% having a maximum depth of at least 2 feet. These pools comprised 6% 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 22. 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 undercut banks (32%), root masses (32%), small woody debris (22%), and boulders (12%). 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.

Three of the 5 low gradient riffles measured (60%) had either gravel or small cobble as the dominant substrate. This is generally considered fair for spawning salmonids.

Forty-eight percent of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 6% 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 1 had the better ratings then Reach 2.

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 Gill Creek - South Fork 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 85%. This is good, since 80 percent is generally considered desirable. However, the riparian buffer is thin or nearly absent in areas with agriculture 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.

SUMMARY

Biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were documented consistently during each past survey year. Overall, fair numbers were observed during the past surveys. The 1998 surveys documented 0+ fish indicating successful spawning in the middle and upper reaches of Gill Creek. Also 1+ fish were observed indicating good rearing conditions the year before, however, poor holding-over conditions exist in some areas. Recently much work has been undertaken to restore riparian areas and improve habitat in the South Fork of Gill Creek. Habitat conditions upstream of our survey reach are unknown where uncooperative ownership exists. Overall, habitat conditions for steelhead have declined over time.

The best spawning and rearing habitat in the watershed exists within the middle portion of Gill Creek, and on the South Fork.

In Reach 1 spawning and rearing habitat quality diminishes due to the effects of eroding stream banks, lack of riparian habitat, and increased temperatures and nutrient runoff from agriculture and livestock. These effects seriously impact resources during the warmer months when stream temperature rises, algae blooms and demand for oxygen and other resources increases. Sediment transported downstream from upslope roads in the winter also impacts fair quality spawning gravel downstream.

Portions of Reach 1 have been channelized and levied, thus stream velocity has increased resulting in streambank erosion and loss of mature riparian. Little riffle habitat exists for spawning, and what does exist is unsuitable for spawning due to high gravel embeddedness. The unstable banks and effects of channelization in these reaches limits instream habitat improvement alternatives, although some opportunity exists. Any work considered in these reaches will require careful design, placement, and construction that must include protection for the unstable banks and high stream velocities.

In Reach 2, bank protection, riparian planting and exclusionary fencing for livestock is recommended.

Upstream on the South Fork conditions are better, where recent restoration activities and pro- active management has improved rearing habitat. Canopy shading is now higher, instream shelter is developing and stream bank erosion is less prevalent due to revegetation. Many opportunities and alternatives exist for habitat improvement downstream on the mainstem as well due to the more stable channel types. Reaches 1 and 2 are excellent for many types of low and medium stage instream enhancement structures. Many site specific projects can be designed within these channel types, especially to increase pool frequency, volume and shelter.

GENERAL MANAGEMENT RECOMMENDATIONS

Gill Creek and its tributaries should be managed as an anadromous, natural production streams.

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 an ongoing potential problem in Reach 3 on the main fork, therefore, fish passage should be monitored, and improved where possible. The jump pools below the cascade falls should be improved.

2) There is at least one section (Reach 2 and Reach 3) where the stream is being impacted from livestock in the riparian zone. Livestock in streams generally inhibit the growth of new trees, exasperate erosion, and reduce summertime survival of juvenile fish by defecating in the water. Alternatives to limit cattle access, control erosion and increase canopy, should be explored with the landowner, and developed if possible.

3) Increase the canopy on Gill Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. 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. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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

5) 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.

6) 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 (Reaches 2 & 3) or in conjunction with stream bank armor to prevent erosion (South Fork).

7) 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 - GILL 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 LEN(FT)	COMMENTS
1.00	605	Begin survey at River Road crossing (beginning of creek access). Creek is dry, in a vineyard and pasture with no fencing (cows in the creek). Wooden fence across creek is 3'H with concrete base. Creek is scoured out below concrete, making a 3'H jump. River Road bridge 11'H X 30'W X 25'L.
2.00	675	Young of the Year salmonids observed.
21.00	1610	Channel Change to B4
29.00	2231	Substrate is very sandy.
31.00	2664	Channel change to F3
40.00	3245	20' Right bank Tributary.
53.00	3994	Left bank tributary "South Fork" enters at top of unit - 38 feet
57.00	4465	Large Debris Accumulation at 150', 3'H X 10'L X 15'W, not a barrier.
61.00	4693	Right bank trib. End of access.
		END OF SURVEY

PROBLEM SITES AND LANDMARKS - GILL CREEK TRIBUTARY SURVEY COMMENTS

HABITAT UNIT#	*STREAM LEN(FT)*	*COMMENTS*
1.00	*140*	*Begin survey at confluence with*

Gill Creek.

2.00	*187*	*2+ salmonids observed.*
8.00	*1071*	*Large debris accumulation at 209', 2'H X a5'w X 5'L, not a barrier.*
20.00	*1772*	*Left bank failure at 61', 60'L X 70'H, 4 trees down. holding sediment.*
24.00	*1957*	*1.5' High jump at top of unit.*
30.00	*2645*	*Right bank dry tributary enters at 68'.*
31.00	*2700*	*Barbed wire fence across creek @ top of unit- 5.5'H*
37.00	*3075*	*5.5' H barged wire fence across creek at top of unit (55').*
38.00	*3103*	*Young of the year salmonids observed in pool.*
65.00	*4615*	*Right bank slide at 24', 105'H X 70'W, trees and sediment in stream.*
67.00	*4691*	*Large Debris Accumulation 15'H X 18'W X 4'H, not a barrier.*
73.00	*5042*	*Left bank failure at 32', 56'L X 40'H including 4 trees, not a barrier.*
76.00	*5328*	*Left bank failure at 68', 68'L X 25'H. Right bank failure at 68'51'L X 20'H. Trees and debris in channel.*
80.00	*5571*	*Left bank failure 45'L X 20'H, not a barrier.*
84.00	*5737*	*Large Debris Accumulation at 57', 15'L X 21'W X 3'H.*
86.00	*6023*	*Right bank failure at 67', 15' H x 8' L with 2 trees fallen. Left Bank failure at 150' with 2 trees fallen. 15'L X 15' H.*
91.00	*6469*	*+30 dirt road xng; +87 dry trib RB*
98.00	*6876*	*1 plus salmonids observed.*
100.00	*7051*	*Dry tributary enters left bank at top of unit (70')*
108.00	*7356*	*Right bank dry tributary enters at 25'.*
120.00	*8129*	*Dry tributary enters right bank at end of unit (93).*
122.00	*8434*	*Dirt road crosses through creek at*

		end of unit (29').
127.00	*9049*	*Large woody debris through entire unit.*
128.00	*9069*	*Right bank failure (slide) begins 105'L x 90'H filling in the creek including 15 fallen trees.*
134.00	*9492*	*2 plus salmonids observed. Left bank failure 60'L x 20'H.*
135.00	*9510*	*Down tree holding sediment at top of unit (62').*
137.00	*9530*	*9' high jump.*
138.00	*9607*	*Channel change*
156.00	*10474*	*Left bank spring at top of unit (42').*
159.00	*10661*	*Large Debris Accumulation at 23', 20'L x 4'W x 3'H holding sediment.*
161.00	*10736*	*End of survey due to large boulders in small steep channel we can not climb around. 11'H straight jump with no jump pool.*

PROBLEM SITES AND LANDMARKS- GILL CREEK- SOUTH FORK SURVEY COMMENTS

HABITAT UNIT#	*STREAM LEN(FT)*	*COMMENTS*
1.00	*376*	*Begin survey at confluence with Gill Creek.*
2.00	*412*	*Left bank failure 50' L X 10'H.*
11.00	*806*	*Right bank boulder rip rap 15'L X 15'H.*
13.00	*964*	*Bridge at 28', 21'L X 5'W X 6'H (sill to bridge).*
20.00	*1267*	*Wood fence in creek at top of unit (33') 5' H X 7'W.*
21.00	*1299*	*Right bank culvert enters at 21', 1' diameter, 5.5' above creek.*
44.00	*2469*	*Right bank dry tributary (possible drainage ditch?) at 16'.*
46.00	*2533*	*Floating fence at top of unit (46'), 8'H X 25'W suspended at 4'.*
48.00	*2625*	*Begin left bank vineyard.*
53.00	*2766*	*3' Drop.*

54.00 2808 Right bank ½" hose.
61.00 3724 Left bank road construction with overflow dirt being placed in channel. Worker says the past twenty days the channel has been dry but just filled up with October rain. At 374' several 2' deep holes . 2'W X 5'L trenches along side of channel. Tractor tracks in channel.
64.00 3801 Left bank ½" hose.
66.00 3948 Left bank 1' culvert at 38'.
67.00 3972 New boulders added in channel (10/28)
68.00 4050 Bridge at 54' - 8'H X 20'W X 17'L.
84.00 4712 Cement blocks covering right bank.
86.00 4759 Pool created by large cement block 4' X 4' X 3.5'.
89.00 4866 Fence hanging on cable (but covered with wire fence - non-functional) holding debris At 30'.
92.00 4980 Confluence of two small tributaries.
103.00 557 6 Right bank tributary (gully).
*118.00 6099 ***END OF SURVEY****

PROBLEM SITES AND LANDMARKS- GILL CREEK- TRIBUTARY TO SOUTH FORK SURVEY COMMENTS

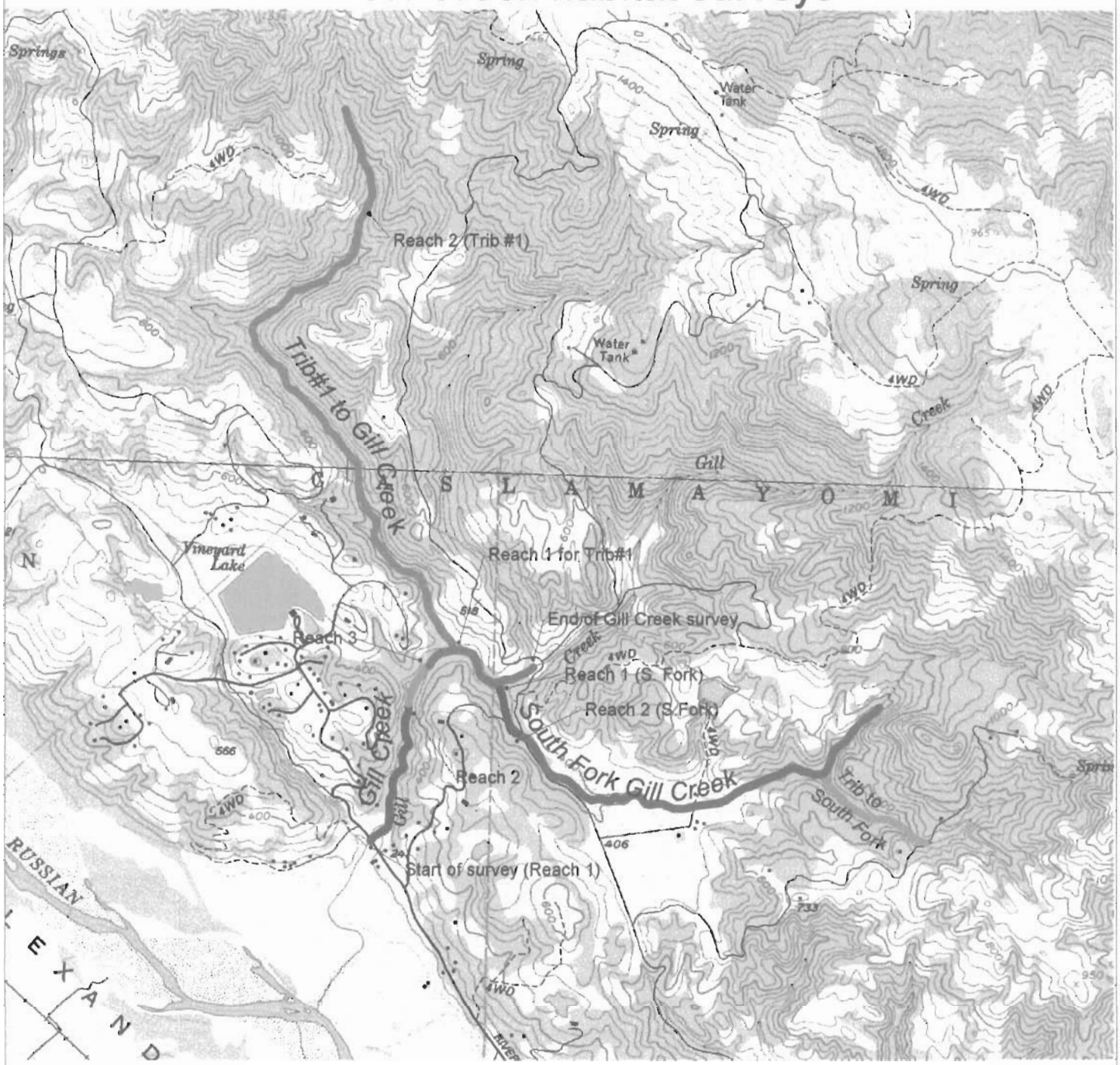
HABITAT UNIT#	*STREAM LEN(FT)*	*COMMENTS*
1.00	*29*	*Begin at confluence with "South Fork Gill".*
2.00	*81*	*Bridge at 8', 6'H x 6'W x 6'L*
3.00	*105*	*Four foot plunge.*
4.00	*144*	*Fence 4' above creek at 8'.*
17.00	*766*	*2 foot plunge.*
18.00	*905*	*Dry tributary enters left bank at 199'*
19.00	*1005*	*Large Debris Accumulation at 32', 5'H x 8'W x 3'L.*
37.00	*1938*	*Large debris accumulation holding*

sediment at 26'. 7'H x 15' W x 8' L.

38.00 2009 Bridge made of 2, 3'H x 25'L culverts.

*39.00 2034 End of access, END OF SURVEY ****

Gill Creek habitat surveys



Gill Creek
1
2
3
Trib#1 to Gill Creek
1
2
South Fork Gill Creek
1
2
Trib to South Fork Gill Creek
1
Quad75 (7.5' quad boundaries)
Waterbodies (nhd-all, region.wb)
Streams (nchruss-wc) /big/data/calibration

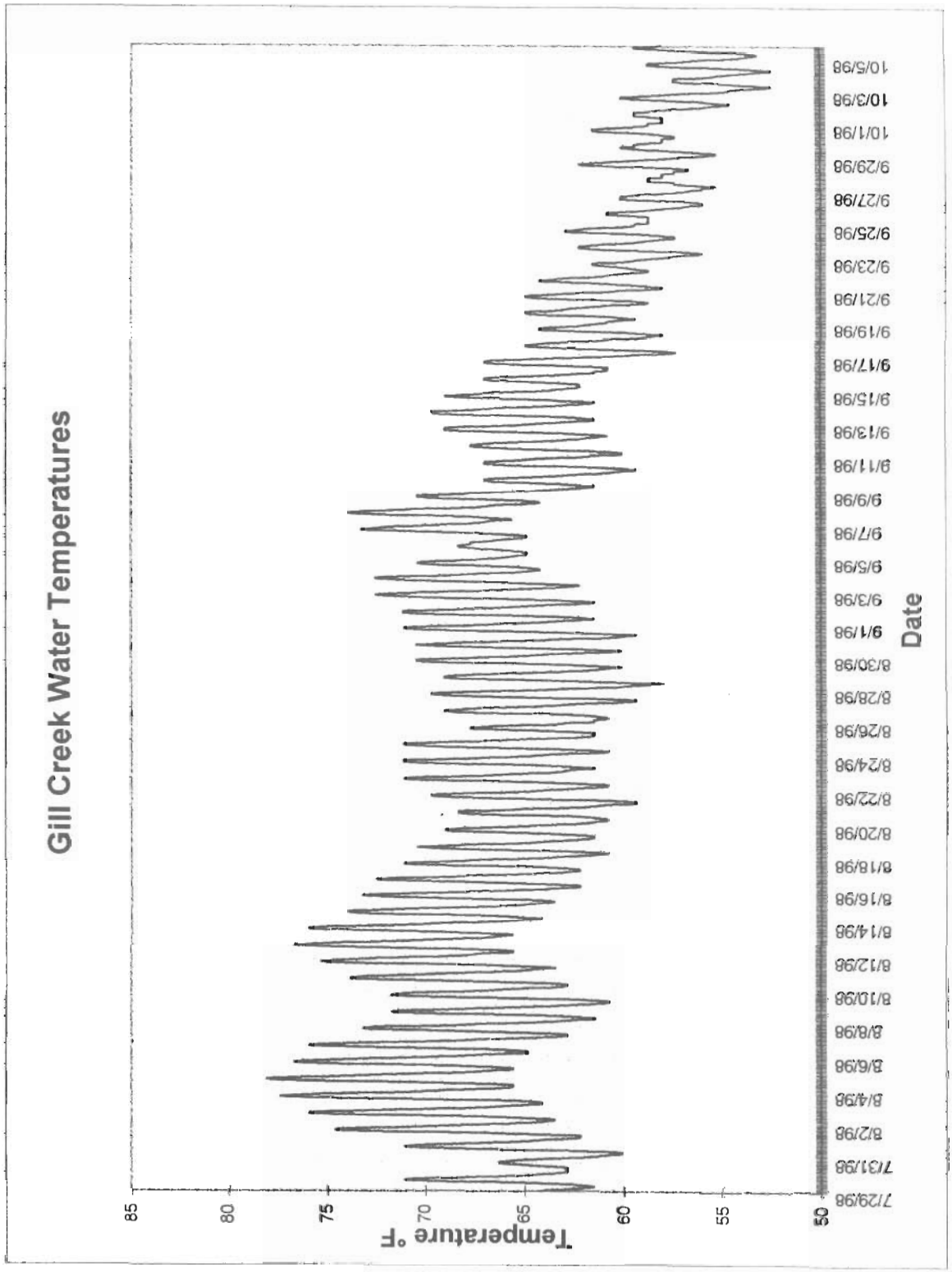
N
W E
S

0.25 0 0.25 0.5 Kilometers

0.5 0 0.5 Miles

Central Coast Region
Department of Fish and Game

/big/survey2/arc/russian/projects/
gill098.apr 10/2004


Gill Creek Water Temperatures
Temperature °F
85
80
75
70
65
60
55
50
Date
7/29/98
7/31/98
8/2/98
8/4/98
8/6/98
8/8/98
8/10/98
8/12/98
8/14/98
8/16/98
8/18/98
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9/7/98
9/9/98
9/11/98
9/13/98
9/15/98
9/17/98
9/19/98
9/21/98
9/23/98
9/25/98
9/27/98
9/29/98
10/1/98
10/3/98
10/5/98

Gill Creek Drainage: Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS12 LATITUDE: 38°43'44" LONGITUDE: 122°52'35"

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
10	6	RIFFLE	16	36	355	8	5.8	0.4	137	1365	67	671	0	33
34	9	FLATWATER	56	87	2973	63	7.2	0.6	572	19431	335	11406	0	10
16	6	POOL	26	48	760	16	12.9	2.0	621	9932	1268	20294	1066	14
1	0	DRY	2	605	605	13	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.)
61	21	4693	30728	32372

Gill Creek | Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS | Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS12 LATITUDE: 38°43'44" LONGITUDE: 122°52'35"

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 %
8	4	LGR	13	40	317	7	6	0.5	1.1	165	1316	86	690	0	35	81
2	2	HGR	3	19	38	1	6	0.4	0.8	81	161	29	58	0	28	81
13	3	GLD	21	71	920	20	9	0.6	1.3	496	6444	325	4221	0	7	76
16	3	RUN	26	94	1505	32	6	0.5	0.9	531	8491	273	4369	0	7	73
5	3	SRN	8	110	548	12	7	0.7	1.9	659	3295	390	1952	0	15	89
14	4	MCP	23	50	693	15	13	1.5	4.5	662	9265	1198	16776	1037	14	78
1	1	CRP	2	49	49	1	7	2.7	3.5	343	343	926	926	858	10	50
1	1	LSBo	2	18	18	0	18	8.0	1.8	324	324	2592	2592	1685	15	98
1	0	DRY	2	605	605	13	0	0.0	0.0	0	0	0	0	0	0	42

TOTAL UNITS	TOTAL UNITS				LENGTH (ft.)					AREA (sq.ft)		TOTAL VOL. (cu.ft)				
61	21				4693					29639		31583				

Gill Creek

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS12 LATITUDE: 38°43'44" LONGITUDE: 122°52'35"

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
14	4	MAIN	88	50	693	91	12.9	1.5	662	9265	1198	16776	1037	14
2	2	SCOUR	13	34	67	9	12.5	5.4	334	667	1759	3518	1271	13

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
16	6	760	9932	20294

Gill Creek | Drainage: Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES | Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville | LEGAL DESCRIPTION: T10NR10WS12 | LATITUDE: 38°43'44" | LONGITUDE: 122°52'35"

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
14	MCP	88	0	0	6	43	3	21	2	14	3	21
1	CRP	6	0	0	0	0	0	0	1	100	0	0
1	LSBa	6	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
16

Gill Creek Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS12 LATITUDE: 38°43'44" LONGITUDE: 122°52'35"

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
8	4	LGR	0	0	0	3	0	0	46	51	0
2	2	HGR	0	0	0	8	0	0	16	76	0
13	3	GLD	28	0	0	36	20	0	0	17	0
16	3	RUN	0	0	0	0	33	0	0	67	0
5	4	SRN	0	14	14	0	0	7	12	52	0
14	6	MCP	0	3	3	25	2	0	0	38	30
1	1	CRP	100	0	0	0	0	0	0	0	0
1	1	LSBo	0	0	0	0	0	0	10	90	0
1	0	DRY	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES 61	24		6	5	5	9	6	2	13	49	7
POOLS ONLY 16	8		11	2	2	18	1	0	2	42	22

Gill Creek

Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 10/20/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS12 LATITUDE: 38°43'44" LONGITUDE: 122°52'35"

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
8	4	LGR	0	0	50	50	0	0	0
2	2	HGR	0	0	100	0	0	0	0
3	3	GLD	0	33	67	0	0	0	0
6	3	RUN	0	0	100	0	0	0	0
5	4	SRN	0	25	75	0	0	0	0
4	4	MCP	0	50	25	0	0	25	0
1	1	CRP	0	0	100	0	0	0	0
1	1	LSBo	0	0	100	0	0	0	0
1	0	DRY	0	0	0	0	0	0	0

Gill 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
77.52	0.49	99.51	85.00	82.14

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	4.76
Boulder	2	0	4.76
Cobble/Gravel	2	4	14.29
Silt/clay	17	15	76.19

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	1	2	7.14
Brush	0	1	2.38
Deciduous Trees	20	18	90.48
Evergreen Trees	0	0	0
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Gill Creek
SAMPLE DATES:
SURVEY LENGTH:
MAIN CHANNEL: 4693 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Geyservill Latitude: 38°43'44"
Legal Description: T10NR10WS12 Longitude: 122°52'35"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-20)

Channel Type: F4	Mean Canopy Density: 76%
Main Channel Length: 1542 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 6.6 ft.	Pools by Stream Length: 28%
Pool Mean Depth: 2.2 ft.	Pools >=2 ft. Deep: 56%
Base Flow: 2.3 cfs	Pools >=3 ft. Deep: 44%
Water: 53-53°F Air: 61-64°F	Mean Pool Shelter Rtn: 10
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 86%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 605 ft.

Embeddness Value: 1. 0% 2. 22% 3. 56% 4. 22% 5. 0%

STREAM REACH 2 (Units 21-30)

Channel Type: B4	Mean Canopy Density: 83%
Main Channel Length: 1069 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 7.0 ft.	Pools by Stream Length: 7%
Pool Mean Depth: 1.3 ft.	Pools >=2 ft. Deep: 50%
Base Flow: 2.3 cfs	Pools >=3 ft. Deep: 0%
Water: 53-53°F Air: 64-64°F	Mean Pool Shelter Rtn: 40
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 80%	Occurrence of LOD: 10%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

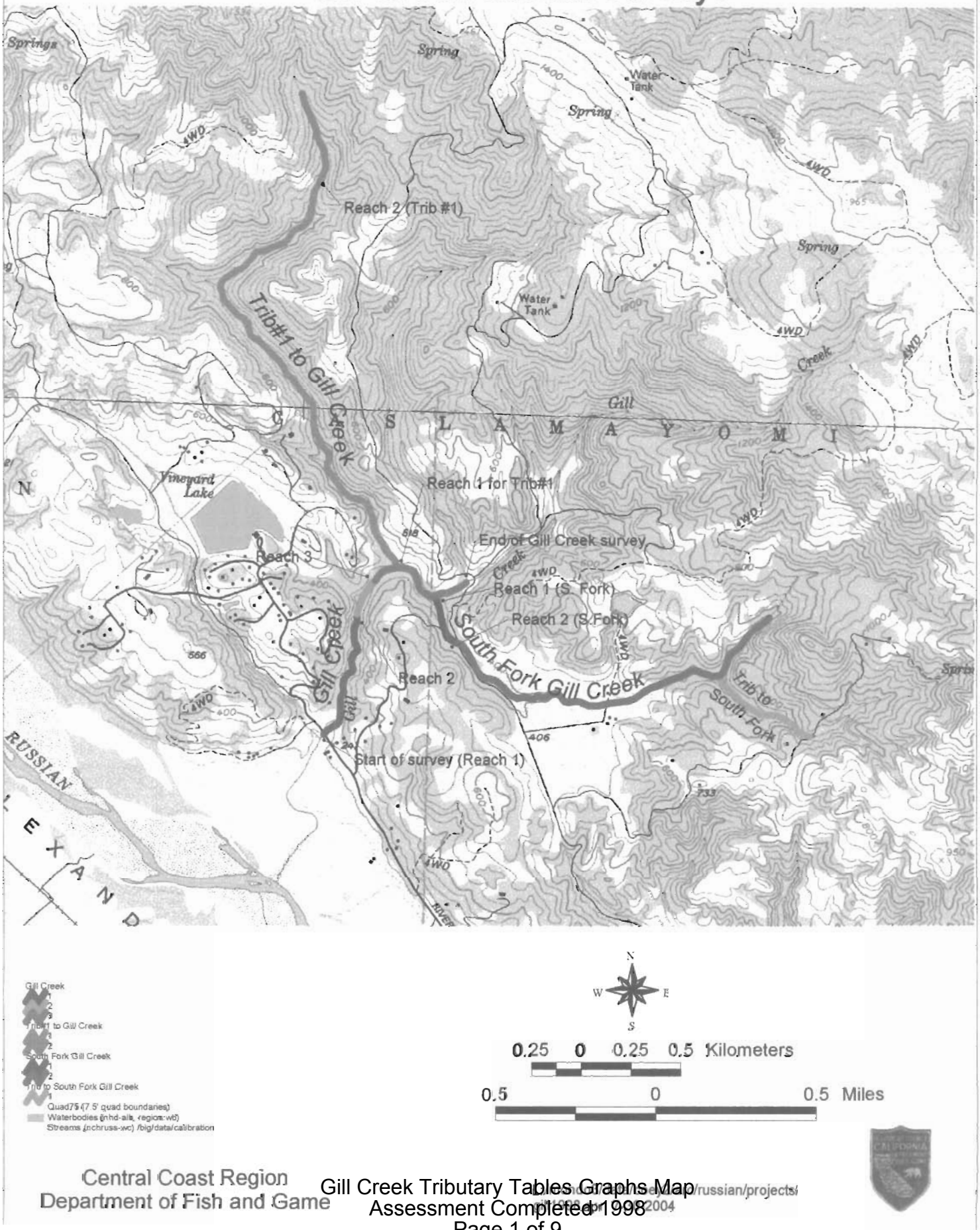
Embeddness Value: 1. 0% 2. 0% 3. 50% 4. 0% 5. 50%

STREAM REACH 3 (Units 31-61)

Channel Type: F3	Mean Canopy Density: 76%
Main Channel Length: 2082 ft.	Evergreen Component: 1%
Side Channel Length: 0 ft.	Deciduous Component: 99%
Riffle/Flatwater Mean Width: 6.6 ft.	Pools by Stream Length: 12%
Pool Mean Depth: 1.8 ft.	Pools >=2 ft. Deep: 60%
Base Flow: 2.3 cfs	Pools >=3 ft. Deep: 40%
Water: 53-59°F Air: 68-81°F	Mean Pool Shelter Rtn: 10
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 84%	Occurrence of LOD: 30%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 0% 2. 20% 3. 60% 4. 20% 5. 0%

Gill Creek habitat surveys



Gill Creek Tributary Tables Graphs Map
Assessment Completed 1998

Gill Creek - 1st Trib

Drainage: Gill Creek, Russian River

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

Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS1 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

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
28	9	RIFFLE	17	51	1421	13	3.6	0.4	170	4767	79	2213	0	14
83	14	FLATWATER	52	88	7264	68	4.5	0.4	255	21174	113	9354	0	10
36	12	POOL	22	25	891	8	7.8	1.2	210	7573	360	12949	314	23
14	0	DRY	9	83	1160	11	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.)
161	35	10736	33514	24515

Gill Creek - 1st Trib — Drainage: Gill Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS1 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

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 %
13	4	LGR	8	49	640	6	5	0.4	1.5	202	2629	88	1142	0	11	94
10	3	HGR	6	53	534	5	3	0.4	1.8	125	1254	67	674	0	13	92
4	1	CAS	2	40	158	1	3	0.6	1.1	178	713	107	428	0	40	97
1	1	BRS	1	89	89	1	2	0.3	0.8	169	169	51	51	0	5	97
15	4	GLD	9	34	514	5	6	0.5	1.7	246	3689	114	1712	0	10	85
43	7	RUN	27	86	3704	35	4	0.4	1.6	214	9214	91	3892	0	6	91
25	3	SRN	16	122	3046	28	4	0.4	2.7	363	9065	163	4063	0	17	79
25	6	MCP	16	25	630	6	7	1.1	2.9	189	4722	210	5249	174	24	89
1	1	CRP	1	28	28	0	5	1.2	1.9	140	140	168	168	140	0	96
10	5	PLP	6	23	233	2	9	1.6	7.2	271	2711	753	7532	683	22	83
14	0	DRY	9	83	1160	11	0	0.0	0.0	0	0	0	0	0	0	78

TOTAL UNITS	TOTAL UNITS				LENGTH (ft.)					AREA (sq.ft)		TOTAL VOL. (cu.ft)				
161	35				10736					34306		24911				

Gill Creek - 1st Trib

Drainage: Gill Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10W51 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

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
25	6	MAIN	69	25	630	71	7.4	1.1	189	4722	210	5249	174	24
11	6	SCOUR	31	24	261	29	8.7	1.5	259	2851	700	7700	634	22

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
36	12	891	7573	12949

Gill Creek - 1st Trib Drainage: Gill Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS1 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

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
25	MCP	69	0	0	17	68	8	32	0	0	0	0
1	CRP	3	0	0	1	100	0	0	0	0	0	0
10	PLP	28	0	0	5	50	4	40	0	0	1	10

TOTAL UNITS 36

Gill Creek - 1st Trib

Drainage: Gill Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS1 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

	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
	13	4	LGR	0	0	34	0	0	15	7	44	0
	10	3	HGR	0	0	0	0	33	0	20	47	0
	4	1	CAS	0	30	30	0	0	0	10	30	0
	1	1	BRS	0	0	0	0	0	0	0	0	100
	15	4	GLD	0	34	0	41	0	0	0	17	7
	43	7	RUN	0	36	0	0	0	0	2	46	16
	25	3	SRN	0	9	5	5	0	3	22	56	0
	25	7	MCP	9	1	4	5	0	34	0	45	2
	1	0	CRP	0	0	0	0	0	0	0	0	0
	10	5	PLP	0	0	0	0	0	22	1	24	53
	14	0	DRY	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES	161	35		2	8	6	4	2	15	6	37	20
POOLS ONLY	36	12		3	0	1	2	0	26	1	31	35

Gill Creek - 1st Trib

Drainage: Gill Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 10/20/98 to 10/27/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR10WS1 LATITUDE: 38°44'35" LONGITUDE: 122°54'40"

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	4	LGR	0	0	75	0	0	0	25
10	3	HGR	0	33	67	0	0	0	0
4	1	CAS	0	100	0	0	0	0	0
1	1	BRS	0	0	0	0	0	0	100
15	4	GLD	0	0	75	0	0	0	25
3	7	RUN	0	29	71	0	0	0	0
25	3	SRN	0	33	0	0	0	0	67
25	6	MCP	0	100	0	0	0	0	0
1	1	CRP	0	100	0	0	0	0	0
10	5	PLP	0	100	0	0	0	0	0
4	0	DRY	0	0	0	0	0	0	0

Gill Creek - 1st Trib

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
87.23	0.65	99.35	79.44	83.19

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	6	5	15.28
Boulder	2	3	6.94
Cobble/Gravel	0	0	0
Silt/clay	28	28	77.78

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	1	2	4.17
Brush	0	0	0
Deciduous Trees	35	34	95.83
Evergreen Trees	0	0	0
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Gill Creek - 1st Trib
SAMPLE DATES: 10/20/98 to 10/27/98
SURVEY LENGTH:
MAIN CHANNEL: 10736 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Geyservill Latitude: 38°44'35"
Legal Description: T10NR10WS1 Longitude: 122°54'40"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-137)

Channel Type: B4	Mean Canopy Density: 86%
Main Channel Length: 9530 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 4.4 ft.	Pools by Stream Length: 9%
Pool Mean Depth: 1.2 ft.	Pools >=2 ft. Deep: 39%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 3%
Water: 57-61°F Air: 57-83°F	Mean Pool Shelter Rtn: 26
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 83%	Occurrence of LOD: 57%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 1160 ft.

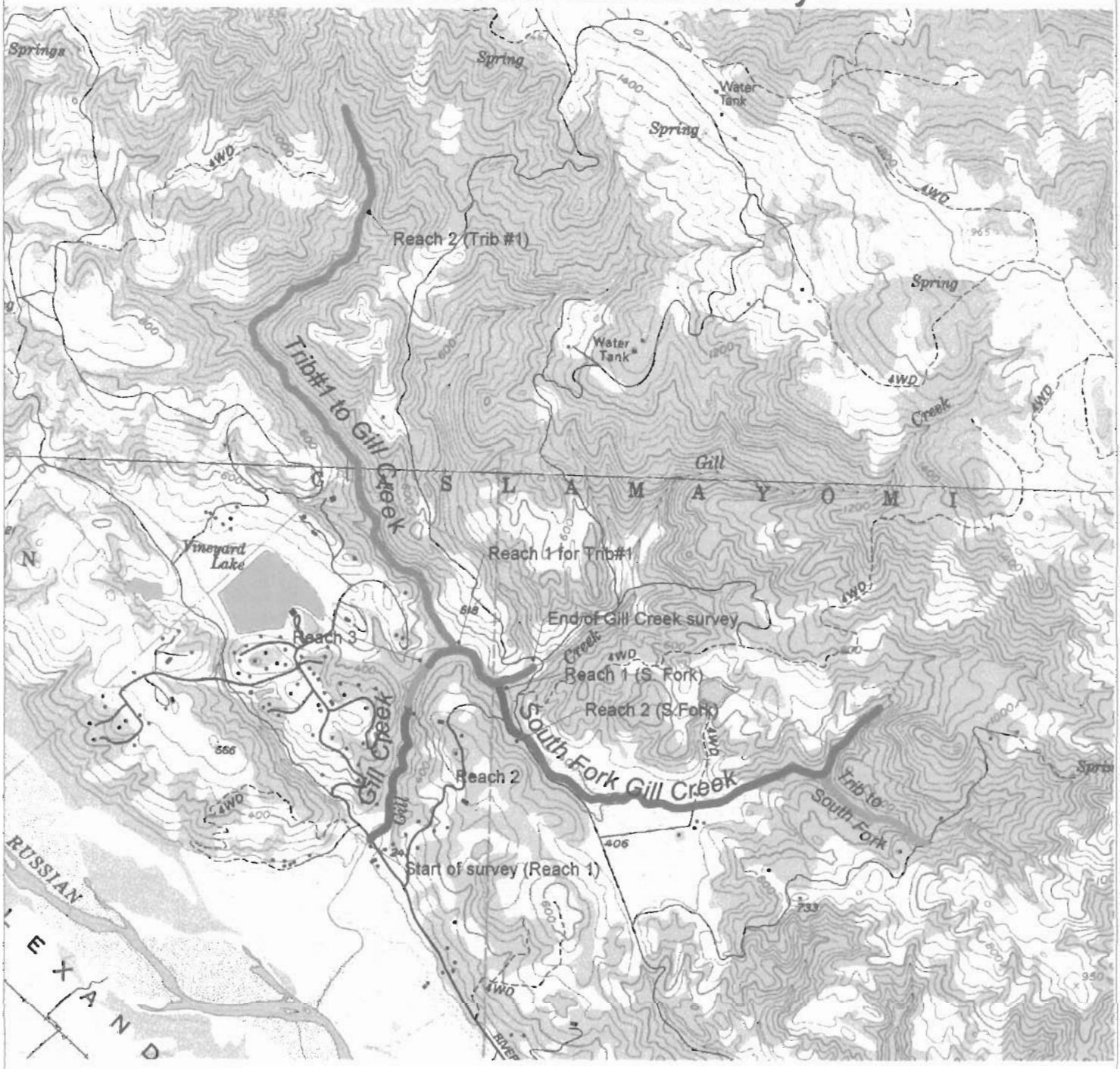
Embeddness Value: 1. 0% 2. 6% 3. 35% 4. 3% 5. 55%

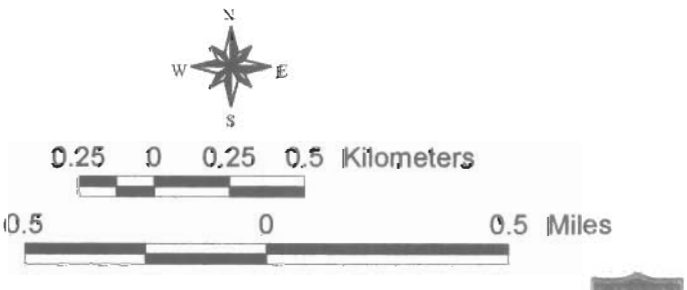
STREAM REACH 2 (Units 138-161)

Channel Type: A3	Mean Canopy Density: 93%
Main Channel Length: 1206 ft.	Evergreen Component: 4%
Side Channel Length: 0 ft.	Deciduous Component: 96%
Riffle/Flatwater Mean Width: 3.2 ft.	Pools by Stream Length: 6%
Pool Mean Depth: 1.2 ft.	Pools >=2 ft. Deep: 20%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 0%
Water: 55-57°F Air: 57-57°F	Mean Pool Shelter Rtn: 13
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 75%	Occurrence of LOD: 30%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 0% 2. 0% 3. 0% 4. 20% 5. 80%

Gill Creek habitat surveys





Central Coast Region
Department of Fish and Game

South Fork Gill Creek Tributary Tables Graphs Map
Assessment Completed 1998

Gill Creek - Trib to South Fork

Drainage: South Fork Gill Creek, Gill Creek, Russian River

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

Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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
12	2	RIFFLE	31	29	344	17	2.3	0.2	12	144	2	20	0	7
19	3	FLATWATER	49	82	1549	76	19.0	0.5	1177	22371	76	1441	0	10
8	4	POOL	21	18	141	7	7.8	1.2	138	1102	190	1517	172	24

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
39	9	2034	23617	2977

Gill Creek - Trib to South Fork

Drainage: South Fork Gill Creek, Gill Creek, Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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 %
10	1	LGR	26	22	224	11	3	0.2	0.4	18	180	2	25	0	10	100
2	1	CAS	5	60	120	6	2	0.2	0.3	0	0	0	0	0	0	90
1	1	GLD	3	51	51	3	3	0.5	0.7	145	145	73	73	0	5	98
3	1	RUN	8	89	268	13	4	0.3	0.6	162	487	49	146	0	5	100
15	1	SRN	38	82	1230	60	35	0.6	1.1	2201	33014	106	1592	0	20	82
3	2	MCP	8	19	57	3	7	1.0	1.8	131	394	131	394	116	15	84
1	1	LSBo	3	15	15	1	8	1.2	1.5	120	120	144	144	132	35	95
4	1	PLP	10	17	69	3	8	1.4	3.2	147	588	245	978	223	30	93

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
39	9	2034	34928	3352

Gill Creek - Trib to South Fork

Drainage: South Fork Gill Creek, Gill Creek, Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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
3	2	MAIN	38	19	57	40	7.0	1.0	131	394	131	394	116	15
5	2	SCOUR	63	17	84	60	8.2	1.4	142	708	224	1122	205	33

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
8	4	141	1102	1517

Gill Creek - Trib to South Fork — Drainage: South Fork Gill Creek, Gill Creek, Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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
3	MCP	38	0	0	3	100	0	0	0	0	0	0
1	LSBo	13	0	0	1	100	0	0	0	0	0	0
4	PLP	50	0	0	3	75	0	0	1	25	0	0

TOTAL UNITS
8

Gill Creek - Trib to South Fork — Drainage: South Fork Gill Creek, Gill Creek, Russian River

Table 5 - Summary of Shelter by Habitat Type — Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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
10	2	LGR	0	0	0	11	0	14	0	74	0
2	1	CAS	0	0	0	0	0	0	0	0	0
1	1	GLD	90	0	0	0	0	10	0	0	0
3	1	RUN	0	0	0	0	0	10	0	90	0
15	1	SRN	0	0	0	0	0	5	0	95	0
3	2	MCP	10	32	0	10	6	14	0	0	28
1	1	LSBo	0	0	0	0	0	0	0	100	0
4	1	PLP	0	10	0	0	0	10	0	0	80
TL 39	10		5	10	0	3	1	8	0	41	31
HABITAT TYPES											
POOLS ONLY 8	4		3	14	0	3	2	9	0	24	45

Gill Creek - Trib to South Fork Drainage: South Fork Gill Creek, Gill Creek, Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE Survey Dates: 10/28/98

Confluence Location: QUAD: Geyserville LEGAL DESCRIPTION: T10NR09WS6 LATITUDE: 38°44'19" LONGITUDE: 122°53'32"

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
10	2	LGR	0	0	0	50	50	0	0
2	1	CAS	0	0	0	0	0	100	0
1	1	GLD	0	100	0	0	0	0	0
3	1	RUN	0	0	0	0	0	100	0
5	1	SRN	0	0	0	0	0	0	100
3	2	MCP	0	50	0	0	0	0	50
1	1	LSBo	0	100	0	0	0	0	0
4	1	PLP	0	100	0	0	0	0	0

Gill Creek - Trib to South Fork

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
89.57	0.00	100.00	69.44	80.56

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	1	1	11.11
Cobble/Gravel	0	0	0
Silt/clay	8	8	88.89

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	0	0	0
Brush	0	0	0
Deciduous Trees	9	9	100
Evergreen Trees	0	0	0
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Gill Creek - Trib to SF
SAMPLE DATES:
SURVEY LENGTH:
MAIN CHANNEL: 2034 ft. SIDE CHANNEL: 0 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Geyserville Latitude: 38°44'19"
Legal Description: T10NR09WS6 Longitude: 122°53'32"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-39)

Channel Type: B6	Mean Canopy Density: 90%
Main Channel Length: 2034 ft.	Evergreen Component: 0%
Side Channel Length: 0 ft.	Deciduous Component: 100%
Riffle/Flatwater Mean Width: 11.9 ft.	Pools by Stream Length: 7%
Pool Mean Depth: 1.2 ft.	Pools >=2 ft. Deep: 13%
Base Flow: 0.0 cfs	Pools >=3 ft. Deep: 13%
Water: 056-058°F Air: 056-060°F	Mean Pool Shelter Rtn: 24
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 75%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 25% 2. 50% 3. 0% 4. 0% 5. 25%