

**CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT**

Cummiskey Creek

Report Revised April 14, 2006

Report Completed 2005

Assessment Completed 2002

INTRODUCTION

A stream inventory was conducted during the summer of 2002 on Cummiskey Creek, a stream in the Russian River Basin. Stream inventory subsections to this report were also completed for four unnamed tributaries. 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 Cummiskey 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, after analyzing historical and recent data, 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

Cummiskey Creek is located in Mendocino County, California and is a tributary of Russian River (see Cummiskey Creek map, Appendix A). The legal description at the confluence with the Russian River is T12N, R11W, S23. Its location is 38°52'50.62"N latitude 123°03'15.71"W longitude. Access to the mouth exists from Cummiskey Station Road. After crossing the train bridge over the Russian River, the confluence is just north of the bridge.

Cummiskey Creek and its tributaries drain a basin of approximately 9,992.0 acres (15.6 square miles). Cummiskey Creek is a maximum third order stream and has approximately 56177.8 feet (10.64 miles) of blue line stream, according to the USGS "Hopland" 7.5 minute quadrangles. McDonald Creek, a major tributary, is discussed in a separate report. Cummiskey Creek Trib A and B are included in this report and appear as italics. Elevations range from about 374 feet at the mouth of the creek to 3327 feet in the headwaters. The vegetation is primarily hardwood (42%) and herbaceous (36%) with some mixed hardwood/conifer (15%) and minor amounts of conifer (4%) and shrub (2%). None of the watershed is agricultural or urban. The watershed is 99.7% privately owned and 0.3% state owned (CalTrans).

Salmonid fish species historically present include steelhead trout. Endangered, threatened, or sensitive species include Raiche's manzanita (*Arctostaphylos stanfordiana ssp raichei*) and colusa layia (*Layia septentrionalis*) (Ndbb source).

METHODS

The habitat inventory conducted in Cummiskey Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi, et al., 1998). The California Department of Fish and Game (DFG) field crew that conducted the inventory was trained in standardized habitat inventory methods by DFG. This inventory was conducted by two person teams and was supervised by Derek Acomb, Russian River Planner (DFG).

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

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 Cummiskey Creek to record measurements and observations. There are nine components to the inventory form: flow, channel type, air and water 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. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

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 temperatures every 1.5 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. Cummiskey 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 measurements were in feet to the nearest tenth. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a hip chain and a stadia rod.

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 Cummiskey 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). Additionally, a rating of "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 Cummiskey Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the shelter. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent covered. Thus, shelter ratings can range from 0-300, and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully measured habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes which are defined in the California Salmonid Stream Habitat Restoration Manual.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the California Salmonid Stream Habitat Restoration Manual. Canopy density relates to the amount of stream shaded from the sun. In Cummiskey Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the top of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated visually into percentages of evergreen or deciduous trees.

9. Bank Composition and Vegetation:

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 Cummiskey 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, including downed trees, logs and rootwads, 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) electro fishing. These sampling techniques are discussed in the California Salmonid Stream Habitat Restoration Manual.

IMPACT INVENTORY & ANALYSIS

Problems such as migration barriers, streambed erosion, poor water quality or temperatures are noted in the comments and landmarks section. In some cases measurements are taken, an analysis of what caused the problem is made and restoration potential and alternatives are recommended.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat for data storage and analysis. Habitat is a Visual Basic extension to Microsoft Access, developed by Zebulon Young, University of California, Berkeley. This program processes and summarizes the data, and produces the following tables and appendices:

- Summary of riffle, flatwater, and pool habitat types
- Summary of habitat types and measured parameters
- Summary of pool types
- Summary of maximum pool depths by pool habitat types
- Summary of shelter by habitat types

- Summary of dominant substrates by habitat types
- Summary of fish habitat elements by stream reach

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Cummiskey Creek include:

- Level II habitat types by % occurrence
- Level II habitat types by % total length
- Level IV habitat types by % occurrence
- Level I pool habitat types by % occurrence
- Maximum depth in pools
- Percent embeddedness estimated in pool tail-outs
- Mean percent cover types in pools
- Substrate composition in pool tail-outs
- Mean percent canopy
- Dominant bank composition in survey reach
- Dominant bank vegetation in survey reach

HISTORICAL STREAM SURVEYS:

The Department of Fish and Game has not conducted previous surveys of Cummiskey Creek.

HABITAT INVENTORY RESULTS FOR CUMMISKEY CREEK

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

The habitat inventory of Cummiskey Creek, 7/3/2002 - 9/4/2002, was conducted by Jake Newell (DFG) and Cassie Simons (AmeriCorps) with supervision and analysis by California Department of Fish and Game (DFG). The survey began at the confluence with the Russian River and the survey ended at a 26' vertical rock falls. The total length of stream surveyed was 35855 feet, with an additional 447 feet of side channel.

Flow was estimated, using surface velocity, to be 0.437 cfs on 9/18/02 in Reach 6, 13758' from the mouth.

This section of Cummiskey Creek has twelve reaches with seven distinct channel types: from the mouth to 1401 feet a F4, 3500 feet a B2, 2546 feet a F3, 3584 feet a B2, 1008 feet a F3, 2524 feet a B3, 8711 feet a F3, 1034 feet a B1, 4153 feet a B2, 2060 feet a A2, 1853 feet a B4 and 3481 feet an A2.

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

B2 channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated

channels, with infrequently spaced pools, a very stable plan and profile, stable banks and have a predominantly boulder substrate.

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

B3 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 cobble substrate.

B1 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 bedrock substrate.

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

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 59°F to 91°F. Air temperatures ranged from 62°F to 109°F. Summer temperatures were also measured using remote temperature recorders placed in pools (see Temperature Summary graphs at end of report). The recorder in Reach 1 logged temperatures every 1.5 hours from July 16 to October 28, 2002. The highest temperature recorded was 75.3°F on July 21 and the lowest was 49.0°F on October 27 and 28. The mean of the daily highs was 72.8°F for the month of July, 69.7°F for August, 63.9°F for September, and 54.8°F for October.

Another recorder in Reach 7 logged temperatures every 1.5 hours from July 15 to October 28, 2002. The highest temperature recorded was 73.9°F on July 19 and 20 and the lowest was 56.7°F on October 3, 27 and 28. The mean of the daily highs was 72.7°F for July, 68.8°F for August, 68.5°F for September, and 62.9°F for October.

Another recorder in Reach 12 logged temperatures every 1.5 hours from July 16 to October 31, 2002. The highest temperature recorded was 69.0°F on July 20 and the lowest was 45.4°F on October 31. The mean of the daily highs was 67.9°F for the month of July, 64.6°F for August, 59.9°F for September, and 52.8°F for October.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 6% dry units, 25% pool units, 51% flatwater units, 18% riffle units, 0% no survey units, (Graph 1). Based on total length of Level II habitat types there were 6% dry units, 13% pool units, 73% flatwater units, 8% riffle units, 0% no survey units, (Graph 2).

Fifteen Level IV habitat types were identified (Table 2). The most frequent habitat types by

percent **occurrence** were 6% Dry units, 3% Lateral Scour Pool - Boulder Formed units, 21% Glide units, 17% Mid-Channel Pool units, 10% Run units, 9% Low Gradient Riffle units, 3% Lateral Scour Pool - Bedrock Formed units, 20% Step Run units, 8% High Gradient Riffle units, 2% Cascade units, 1% Plunge Pool units, (Graph 3). Based on percent total **length**, 6% Dry units, 2% Lateral Scour Pool - Boulder Formed units, 20% Glide units, 9% Mid-Channel Pool units, 11% Run units, 4% Low Gradient Riffle units, 2% Lateral Scour Pool - Bedrock Formed units, 42% Step Run units, 3% High Gradient Riffle units, 1% Cascade units.

A total of 102 pools were identified (Table 3). Main Channel pools were the most frequently encountered, at 68%, and comprised 66% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirty four of the 98 pools (35%) had a residual depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 87 pool tail-outs measured, five had a value of 1 (5.7%); thirty six had a value of 2 (41.4%); thirty one had a value of 3 (35.6%); two had a value of 4 (2.3%); thirteen had a value of 5 (14.9%); (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders.

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 habitat types had a mean shelter rating of 2, flatwater habitat types had a mean shelter rating of 8, and pool habitats had a mean shelter rating of 21 (Table 1). Of the pool types, the Scour pools had a mean shelter rating of 21, Main Channel pools had a mean shelter rating of 21, Backwater pools had a mean shelter rating of 10, (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Cummiskey Creek. Graph 7 describes the pool cover in Cummiskey Creek. Boulders are the dominant pool cover type followed by bedrock ledges.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 36% of pool tail-outs, and small cobble was observed in 28% of pool tail-outs.

The mean percent canopy density for the surveyed length of Cummiskey Creek was 58%. The mean percentages of hardwood and coniferous trees were 35% and 65%, respectively. 42 ---(eg. Ten) percent of the canopy was open. Graph 9 describes the mean percent canopy in Cummiskey Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 18%. The mean percent left bank vegetated was 14%. The dominant elements composing the structure of the

stream banks consisted of 35% bedrock, 30% boulder, 31% cobble/gravel, 4% sand/silt/clay, (Graph 10). Grass was the dominant vegetation type observed in 13% of the units surveyed. Additionally, 31% of the units surveyed had hardwood trees as the dominant vegetation type, and 42% had coniferous trees as the dominant vegetation (Graph 11).

HABITAT INVENTORY RESULTS FOR CUMMISKEY CREEK, TRIB A

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

The habitat inventory of 8/13/2002 to 8/13/2002, was conducted by J. Newell (DFG) and C. Simons (WSP). The total length of the stream surveyed was 6,641 feet with an additional 45 feet of side channel.

Stream flow was not measured on Cummiskey Creek, Trib A.

Cummiskey Creek, Trib A is a B4 channel type for 6,641 feet of the stream surveyed (Reach 1).

B4 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks on moderate gradients with low width /depth ratios and gravel dominant substrates.

Water temperatures taken during the survey period ranged from 71 to 71 degrees Fahrenheit. Air temperatures ranged from 67 to 92 degrees Fahrenheit.

*Table 1a summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 50% dry units, 17% culvert units, 8% flatwater units, 17% pool units, 8% riffle units, (Graph 1a). Based on total **length** of Level II habitat types there were 98% dry units, 1% culvert units, 1% flatwater units, (Graph 2a).*

*Four Level IV habitat types were identified (Table 2a). The most frequent habitat types by percent **occurrence** were 50% Dry units, 17% Culvert units, 8% Run units, 17% Mid-Channel Pool units, 8% Cascade units, (Graph 3a). Based on percent total **length**, 98% Dry units, 1% Culvert units, 1% Run units.*

A total of 2 pools were identified (Table 3a). Main Channel pools were the most frequently encountered, at 100%, and comprised 100% of the total length of all pools (Graph 4a).

Table 4a is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. None of the 2 pools (0%) had a residual depth of two feet or greater (Graph 5a).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the one pool tail-outs measured, one had a value of 3 (100%);(Graph 6a). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to

tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders.

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 habitat types had a mean shelter rating of 0, flatwater habitat types had a mean shelter rating of 0, and pool habitats had a mean shelter rating of 10 (Table 1a). Of the pool types, the Main Channel pools had a mean shelter rating of 10, (Table 3a).

Table 5a summarizes mean percent cover by habitat type. Undercut Banks are the dominant cover types in Cummiskey Creek, Trib A. Graph 7a describes the pool cover in Cummiskey Creek, Trib A. Undercut Banks is the dominant pool cover type followed by bedrock ledges.

Table 6a summarizes the dominant substrate by habitat type. Graph 8a depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 100% of pool tail-out.

The mean percent canopy density for the surveyed length of Cummiskey Creek, Trib A was 72%. The mean percentages of hardwood and coniferous trees were 49% and 51%, respectively. Twenty-eight percent of the canopy was open. Graph 9a describes the mean percent canopy in Cummiskey Creek, Trib A.

For the stream reach surveyed, the mean percent right bank vegetated was 17%. The mean percent left bank vegetated was 20%. The dominant elements composing the structure of the stream banks consisted of 40% bedrock, 60% sand/silt/clay, (Graph 10a). Grass was the dominant vegetation type observed in 70% of the units surveyed. Additionally, 30% of the units surveyed had hardwood trees as the dominant vegetation type, and none had coniferous trees as the dominant vegetation (Graph 11a).

HABITAT INVENTORY RESULTS FOR CUMMISKEY CREEK, TRIB B

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

The habitat inventory of 9/15/2002 to 9/15/2002, was conducted by J.Newel (DFG) and, C.Simons (WSP). The total length of the stream surveyed was 801 feet.

Stream flow was not measured on Cummiskey Creek, Trib B.

Cummiskey Creek, Trib B is an AA2 channel type for 801 feet of the stream surveyed (Reach 1).

A2 channels are steep, narrow, cascading, step-pool, high energy debris transporting channels associated with depositional soils, and gravel dominant substrates.

Water temperatures were not taken during the survey period. Air temperature was 76 degrees Fahrenheit.

Table 1b summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 57% dry units, 29% flatwater units, 14% pool units, (Graph 1b). Based on total length of Level II habitat types there were 97% dry units, 1% flatwater units, 2% pool units, (Graph 2b).

*Three Level IV habitat types were identified (Table 2b). The most frequent habitat types by percent **occurrence** were 57% Dry units, 29% Glide units, 14% Step Pool units, (Graph 3). Based on percent total **length**, 97% Dry units, 1% Glide units, 2% Step Pool units.*

A total of one pool was identified (Table 3b). Main Channel pools were the most frequently encountered, at 100%, and comprised 100% of the total length of all pools (Graph 4b).

Pool quality for salmonids increases with depth. None of the pools had a residual depth of two feet or greater.

The depth of cobble embeddedness was not estimated at pool tail-outs. A value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Flatwater habitat types had a mean shelter rating of 0, and pool habitats had a mean shelter rating of 5 (Table 1b). Of the pool types, the Main Channel pools had a mean shelter rating of 5, (Table 3b).

Table 5b summarizes mean percent cover by habitat type. Bedrock Ledges are the dominant cover types in Cummiskey Creek, Trib B. Graph 7b describes the pool cover in Cummiskey Creek, Trib B. Bedrock Ledges is the dominant pool cover type followed by boulders.

Table 6b summarizes the dominant substrate by habitat type.

The mean percent canopy density for the surveyed length of Cummiskey Creek, Trib B was 90%. The mean percentages of hardwood and coniferous trees were 30% and 70%, respectively. Ten percent of the canopy was open. Graph 9b describes the mean percent canopy in Cummiskey Creek, Trib B.

For the stream reach surveyed, the mean percent right bank vegetated was 25%. The mean percent left bank vegetated was 18%. The dominant elements composing the structure of the stream banks consisted of 50% bedrock, 50% boulder, (Graph 10b). Twenty-five percent of the units surveyed had hardwood trees as the dominant vegetation type, and 75% had coniferous trees as the dominant vegetation (Graph 11b).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

In 1956-57 and 1963-64 DFG rescued juvenile steelhead from pools in portions of Cummiskey Creek that were drying up during the summer months. Rescues averaged 818 fish per year. The fingerlings were usually released into the Russian River and in 1963 were released elsewhere in Cummiskey Creek. In 1960, 2,392 fingerling steelhead were transferred from Robinson Creek. There are 3 recorded instances of steelhead fingerling stocking in Cummiskey Creek averaging 8199 fish per year. In 1993, Coyote Valley Fish Facility released 58 adult steelhead into Cummiskey Creek.

Summary of transfers, rescues, and hatchery stocking						
YEAR	SPECIES	TYPE	LOCATION	SOURCE	NUMBER	SIZE
1956	SH	TRANSFER	RUSSIAN RIVER	CUMMISKEY CREEK	2130	FING
1957	SH	TRANSFER	RUSSIAN RIVER	CUMMISKEY CREEK	380	FING
1960	SH	TRANSFER	CUMMISKEY CREEK	ROBINSON CREEK	2392	FING
1963	SH	TRANSFER	CUMMISKEY CREEK	CUMMISKEY CREEK	440	FING
1964	SH	TRANSFER	RUSSIAN RIVER	CUMMISKEY CREEK	320	FING
1972	SH	PLANT	CUMMISKEY CREEK	TALMAGE REARING PONDS	297	YEAR
1984	SH	PLANT	CUMMISKEY CREEK	WARM SPRINGS HATCHERY	10500	FING
1986	SH	PLANT	CUMMISKEY CREEK	WARM SPRINGS HATCHERY	13800	FING
1993	SH	PLANT	CUMMISKEY CREEK	COYOTE VALLEY FISH FACILITY	58	ADULT

SH = Steelhead Trout (*Oncorhynchus mykiss*)

A biological inventory was conducted at two sites on Cummiskey Creek to document fish species presence at the site sampled. The sites were electro-fished. Fish from the sites were counted by species, and returned to the stream. At site 1 on 8/14/03, the air temperature ranged from 80-81°F and the water temperature ranged from 61-69°F. The observers were Justin Smith (DFG) and Amy Livingston (Americorps). At site 2 on 8/13/02, the air temperature was 84°F and the air temperature was 66°F. The observers were Justin Smith and Mike Shugars (DFG).

Species Observed in Historical and Recent Surveys			
YEARS	SPECIES	SOURCE	NATIVE/ INTRODUCED
2002	STEELHEAD TROUT <i>(Oncorhynchus mykiss)</i>	DFG	N
2002	SCULPIN OR COTTOIDS <i>(Cottus sp.)</i>	DFG	N
2002	CALIFORNIA OR VENUS ROACH <i>(Hesperoleucus symmetricus)</i>	DFG	N
2002	SACRAMENTO OR WESTERN SUCKER <i>(Catostomus occidentalis)</i>	DFG	N
2002	SACRAMENTO PIKE MINNOW OR SQUAWFISH <i>(Ptychocheilus grandis)</i>	DFG	N

The site 1 inventory began at 1235 hours in Reach 2 and ended at 1540 hours upstream. The distance sampled was approximately 1266'. Habitat types sampled were runs and step pools. Steelhead were observed. The site 2 inventory began in Reach 7 at 1250 hours and progressed upstream. Habitat types sampled were runs and step pools. Steelhead were observed. Other vertebrates collected were crayfish, frogs, and frog larvae. The following table displays the total fish yielded from each site.

Species Observed	Numbers Recorded at Site 1 lower watershed	Numbers Recorded at Site 2 upper watershed
STEELHEAD TROUT 0+	1	41
STEELHEAD TROUT 1+	0	5
STEELHEAD TROUT 2+	0	0
CALIFORNIA ROACH	213	29
SCULPIN	9	24
SACRAMENTO SUCKER	43	0
SACRAMENTO PIKE MINNOW	4	0

Vertebrates observed during the stream habitat inventory included tree frogs, woodpeckers, green heron, blue heron, violet-green swallows, killdeer, black phoebe, king fisher, king snake, blue-tailed skink, and California quail.

DISCUSSION FOR CUMMISKEY CREEK

Cummiskey Creek has twelve reaches and seven channel types: F4, F3, B1, B2, B3, B4, and A2. For B and F channel types, many site specific projects can be designed within these channel types, especially to increase pool frequency, volume and shelter.

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 on F type channels will require careful design, placement, and construction that must include protection for any unstable banks.

B type channels 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. B1 channel types are excellent for bank-placed boulders and bank cover and good for log cover. B2 channel types are excellent for low and medium-stage plunge weirs, single and opposing wing deflectors and bank cover. 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.

The high energy, steep gradient A2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

The water temperatures recorded on the survey days 7/3/2002 - 9/4/2002 ranged from 59°F to 91°F. Air temperatures ranged from 62°F to 109°F. The warmest water temperatures were recorded in Reach 7. Water temperatures above 65°F, if sustained, are above the threshold stress level for salmonids.

Summer temperatures measured using remote temperature recorders ranged from 49.0° to 75.3°F for Reach 1 (lower), 56.7° to 73.9°F for Reach 7 (middle), and 45.4° to 69.0°F for Reach 12 (upper). The Temperature Summary graphs show that for much of the summer (July through August) the lower, middle and upper watershed exhibited temperatures above the optimal for salmonids. It is unknown if this thermal regime is typical. To make any further conclusions, temperatures need to be monitored for a longer period of time through the critical summer months, in more location, and extensive biological sampling conducted.

Flatwater habitat types comprised 73% of the total length of this survey, riffles 8%, and pools 13%. The pools are relatively shallow/deep, with only 34 of the 98 (35%) pools having a maximum residual depth greater than 3 feet. In general, pool enhancement projects are

considered when primary pools comprise less than 40% of the length of total stream habitat. In third and fourth order streams, a primary pool is defined to have a maximum residual 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Forty-one of the 87 pool tail-outs measured had embeddedness ratings of 1 or 2. Thirty-three of the pool tail-outs had embeddedness ratings of 3 or 4. Thirteen of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Cummiskey Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Sixty-two of the 98 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 21. The shelter rating in the flatwater habitats was 8. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by Boulders in Cummiskey Creek. Boulders are the dominant cover type in pools followed by bedrock ledges. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 58%. Reach 1 had a canopy density of 17.1%, Reach 2 had a canopy density of 28.8%, Reach 3 had a canopy density of 53.1%, Reach 4 had a canopy density of 60.8%, Reach 5 had a canopy density of 79%, Reach 6 had a canopy density of 63.9%, Reach 7 had a canopy density of 50.3%, Reach 8 had a canopy density of 72%, Reach 9 had a canopy density of 71.2%, Reach 10 had a canopy density of 82.7%, Reach 11 had a canopy density of 76.9%, Reach 12 had a canopy density of 77.1%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 18% and 14%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

DISCUSSION FOR CUMMISKEY CREEK, TRIB A

Cummiskey Creek, Trib A is a B4 channel type for 6,641 feet of the stream surveyed (Reach 1).

According to the DFG Salmonid Stream Habitat Restoration Manual, B4 type channels 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. 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. 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 days 8/13/2002 to 8/13/2002 was 71 degrees Fahrenheit. Air temperatures ranged from 67 to 92 degrees Fahrenheit. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 1% of the total length of this survey. The pools are shallow, with none of the two (0%) pools having a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

None of the pool tail-outs measured had embeddedness ratings of 1 or 2. One of the pool tail-outs had embeddedness ratings of 3 or 4. None of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Cummiskey Creek, Trib A should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Two of the two pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 10. The shelter rating in the flatwater habitats was 0. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by Undercut Banks in Cummiskey Creek, Trib A. Undercut Banks are the dominant cover type in pools followed by bedrock ledges. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 72%. Reach 1 had a canopy density of 75%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 17% and 20%,

respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

DISCUSSION FOR CUMMISKEY CREEK, TRIB B

Cummiskey Creek, Trib B is a AA2 channel type for 801 feet of the stream surveyed (Reach 1).

According to the DFG Salmonid Stream Habitat Restoration Manual, the high energy, steep gradient AA2 channel types have stable stream banks and poor gravel retention capabilities and are generally not suitable for instream enhancement structures.

The water temperatures were not recorded on the survey days 9/15/2002 to 9/15/2002. Air temperatures recorded was 76 degrees Fahrenheit. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 1% of the total length of this survey, and pools 2%. The pools are shallow, with none of the pools having a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

No pool tail-outs were measure. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Cummiskey Creek, Trib B should be mapped and rated according to their potential sediment yields, and control measures should be taken.

The mean shelter rating for pools was 5. The shelter rating in the flatwater habitats was 0. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by Bedrock Ledges in Cummiskey Creek, Trib B. Bedrock Ledges are the dominant cover type in pools followed by boulders . Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 90%. Reach 1 had a canopy density of 90%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 25% and 18%,

respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

GENERAL MANAGEMENT RECOMMENDATIONS

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

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1. Access for migrating salmonids is a potential problem in the reaches above Reach 9, therefore, fish passage should be monitored, and improved where possible.
2. Increase the canopy on Cummiskey Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The 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.
3. In Cummiskey 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.
4. Map sources of upslope and in-channel erosion, and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream. Near-stream riparian planting along any portion of the stream should be encouraged to provide bank stability and a buffering against agricultural, grazing and urban runoff.
5. There are sections of the stream that are 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.
6. Cummiskey Creek would benefit from 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.

7. Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations in the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion. In some areas the material is at hand.
8. 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.
9. If riparian areas are not improved in Cummiskey Creek, temperatures should be monitored to determine if they are having a deleterious effect upon juvenile salmonids. To achieve this, biological sampling is also required.

COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey.

- | | |
|-------|---|
| 0' | Active gully/bank EROSION on right bank, not debris influenced, dimensions: 5'D x 6'L x 60'W. Just upstream of HWY 101 a culvert and bare banks are a major source of siltation. |
| 63' | First rough fish and algae in pool. |
| 208' | BRIDGE dimensions:40'H x 90'W x 18'L, not downcutting, no sill, not retaining gravel. Railroad BRIDGE, wire fence along base, 4' high. CULVERT on right bank, dimensions: 20'L x 2'W x 4'H; downcutting, dry, not retaining gravel, maintenance is required. |
| 739' | 20' broken culvert in channel. BRIDGE, dimensions: 12'H x 65'W x 9'L, no downcutting, no sill, not retaining gravel. After bridge, channel retains gravel but it does not seem to be because of the bridge. Landowner states that the channel has been aggrading in recent years, no fish have been rearing on his property. He claims planted fish do no survive temperature of water in summer. |
| 918' | Active bank EROSION, dimensions: 60'D x 25'W, high flow influenced, not debris influenced. There is a barren hillside upslope. Grazing and erosion are visible from the freeway; possibly a good site for a willow wall. |
| 1268' | First steelhead observed: 50+ SH YOY. Steelhead of all age classes were observed in abundance (often more than 100 YOY at a time) throughout 1268' to 35565'. |
| 1401' | Channel type change to B2. |
| 1549' | First roach observed. California roach were observed in abundance (often more than 100 at a time) throughout 1549'-27,253'. |
| 1654' | Heavy deposition of fine substrate. |
| 1745' | Abundant suckers. Sacramento suckers were observed throughout 1745'-12716'. |

- 1777' Channel has changed. Vegetation is now mainly alder along the banks and buckeye and oak on the hillsides. Substantially more water. Wet tributary, water temp of tributary 69°F, upstream water temperature 80°F, downstream water temperature 73°F.
- 2205' Abundant crayfish found throughout 2205'-23822'.
- 2448' Steep gully right bank.
- 3356' Small dry tributary on left bank.
- 3644' Dry tributary on right bank.
- 4848' Channel change to F3.
- 5078' Good spawning gravel.
- 5516' Large amount of algae.
- 5726' Signs of boar or wild pig rooting throughout reach.
- 6192' Road crossing.
- 6320' Large amount of sand/silt deposition. Gully on left bank active EROSION, dimensions: 6'D x 40'L x 10'W, not high flow influenced, debris influenced. Wet tributary, steep and actively eroding, may be affected by road, water temperatures: tributary 60°F, confluence 63°F, mainstem upstream 64°F.
- 6613' Erosive banks
- 6795' Tributary on left bank, channel confluence pool.
- 6993' Large boulder cluster.
- 7447' Channel change to a B2.
- 7595' Road crossing
- 7635' Wild grape
- 8473' 3% gradient
- 8837' Wet tributary left bank, water temperatures: tributary 63°F, confluence 79°F, and mainstem upstream 79°F.
- 9693' Mature sedge throughout reach
- 9823' Bedrock banks throughout reach
- 10085' DEBRIS ACCUMULATION, dimensions: 7'D x 7'L x 20'W, not retaining gravel, fish observed upstream, scour pool under accumulation, no erosion or downcutting. The accumulation is several pieces LWD are caught by live alder instream, accumulation spans half of the channel width.
- 10151' Several steep bedrock gullies throughout reach.
- 10649' Active EROSION of bank, dimensions: 12'D x 45'L x 45'W, not upslope, high flow influenced, not debris influenced, and is a sediment source, possible willow wall site.
- 10678' Active GULLY may have seasonal flow, dimensions: 12'D x 100'L x 20'W, upslope, not high flow or debris influenced.
- 10773' Active GULLY on right bank is a sediment source, dimensions: 20'D x 80+'L x 120'W, high flow influenced, not debris influenced.
- 10826' Heavy siltation throughout reach
- 11031' Gully/small tributary on right bank. Channel change to F3.
- 11698' Heavy sand/silt deposits
- 12039' Channel change to B3

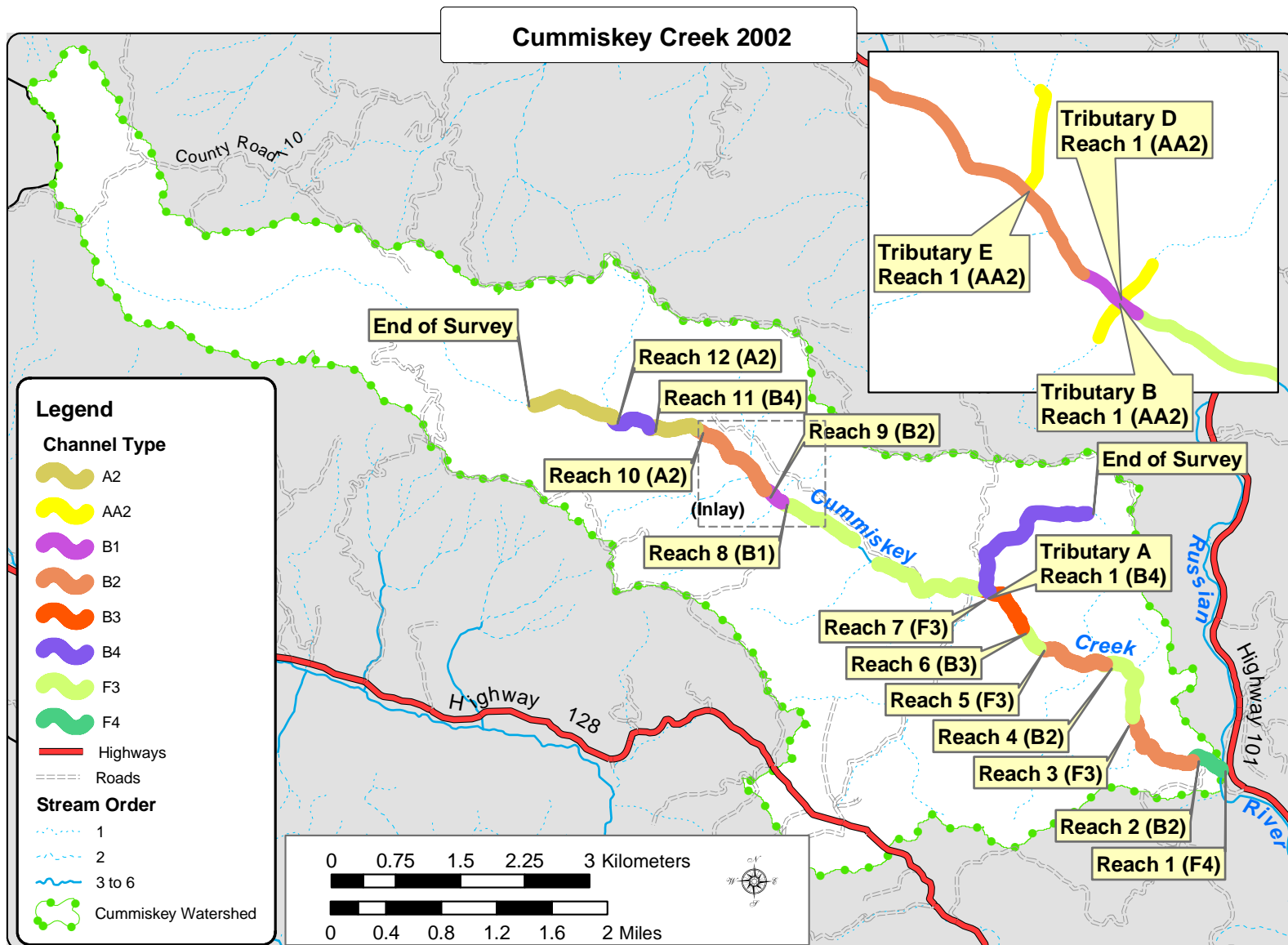
- 12167' DEBRIS ACCUMULATION, dimensions: 9'D x 20'L x 40'W, retaining 4' of gravel, fish observed upstream, no scour pool under accumulation, erosion and downcutting present. Accumulation is a fallen tree cluster.
- 12546' Reach has bedrock and silt banks.
- 12716' Small gully/tributary on right bank.
- 13214' Active EROSION on right bank is a sediment source, dimensions: 6'D x 9'L x 150'W, high flow influenced, not debris influenced. Bank is silt partially covered by mature bay and oak.
- 13302' Heavy silt deposition.
- 13758' The banks are highly erosive and extremely steep. Erosion is suspected to be natural as no land use is apparent.
- 13903' Pond - abundant roach and bullfrog.
EROSION- right bank active, dimensions: 10'D x 30'L x 45'W, not upslope, high flow influenced, not debris influenced
- 13988' Large gravel bar on right bank.
- 14083' Road drainage CULVERT on left bank, dimensions: 50'L x 2'W x 0.4'H, downcutting 0.5', 0.4' plunge from culvert, not retaining gravel, no maintenance required.
- 14343' Large dry tributary on left bank.
- 14563' Channel change to an F3
- 14718' Confluence to McDonald Creek on right bank.
- 14783' Mountain. House Road historic 1913 BRIDGE, dimensions: 7'H x 50'W x 25'L, not downcutting, no sill, not retaining gravel.
- 15028' Willow re-establishing riparian.
- 15153' Shallow warm pools
- 15358' Small dry tributary on left bank.
- 15918' Road and rip-rap on right bank. 1,000+ tadpoles
- 16258' Road crossing
- 16803' Dry tributary on right bank.
- 17127' Small gully on right bank.
- 17272' Channel narrows
- 17304' Channel measurements taken.
- 17641' Electric cattle fence on left bank.
- 18080' Active EROSION on right bank, dimensions: 5'D x 8'L x 120'W, not upslope, high flow influenced, not debris influenced. The silt bank is partially secured by roots, but is a major sediment source.
- 18822' Gully at homestead, and a herd of wild pigs on the left bank.
- 19152' DAM with flashboards, dimensions: H: 4' & 6', flashboards, L: 7', W: 30', retaining gravel, downcutting 1'at sill, 3.5' plunge from sill. House on left bank has seasonal flash boards.
- 19914' Large amount of sand in pool
- 19965' Substrate changes to boulder
- 20340' Redwoods on left bank. Fence along left bank 20' up from channel.
- 21844' Stream gradient increases
- 21989' Abundant algae

22240' Heavy siltation from eroding GULLY on left bank.
 22465' Many 3' diameter rusted metal pipes
 22749' Channel changes to B1
 23906' Sedge has been grazed, cattle presence.
 24278' Channel change to a B2
 24385' Substantial sediment deposition
 25064' Dry tributary on right bank.
 25367' Abundant fine sedimentation
 25689' Wet tributary on left bank, water temperatures: tributary 63°F, mainstem 63°F, confluence 63°F.
 26092' Dry tributary on left bank.
 26550' Wet tributary left bank, water temperature 63°, substantial flow (about 0.5 cfs). 80 foot steep (50% or higher) channel.
 26617' 10' jumps, see photo.
 27865' Large amount of silt and algae.
 28423' Channel changes to an A2
 28507' Fish abundant upstream.
 28519' Road crossing.
 29055' Difficult passage, steep with large boulders.
 30097' 26' vertical jump. Survey continued due to healthy fish populations upstream.
 30123' Very steep terrain units 348-360.
 30178' Steep entrenched canyon
 30263' 2 pieces LWD with several SWD (hard and soft wood).
 30391' 6'-10' jumps. 26' vertical drop with no pool below. Very healthy populations of resident trout in the 4000' stretch upstream; all pools containing +1, +2 and occasional YOY and +3. Also abundant Yellow-legged frogs observed.
 30521' Channel changes to a B2
 32374' Channel changes to an A2
 32675' Large dry tributary left bank. Actively ERODING banks are a source of shale and silt, dimensions:12'D x 65'L x 120'W, high flow influenced, not debris influenced. Erosive banks through out reach.
 34590' Dry tributary on left bank.
 34765' Tributary on right bank.
 35565' Sulphur springs.
 35625' Pig hoof prints. END OF SURVEY

REFERENCES

California Dept. of Fish and Game, Yountville. Database files regarding history of rescues, transfers, and hatchery plants in creeks of the Russian River basin. Updated 2003.

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. California Salmonid Stream Habitat Restoration Manual, 3rd edition. California Department of Fish and Game, Sacramento, California.



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Prepared by: Ann-Marie Osterback, May 16, 2003

APPENDIX B: TABLES

Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Cummiskey Creek

LLID:

1230543388827

Drainage:

Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T13NR12WS32

Latitude: 38:52:58.0N

Longitude: 123:03:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
23	0	DRY	5.6	89	2037	5.6									
209	55	FLATWATER	51.1	127	26557	73.2	11.1	0.7	1.4	1125	235029	780	160100		8
1	0	NOSURVEY	0.2	0	0	0.0									
102	101	POOL	24.9	48	4861	13.4	17.3	2.0	2.8	845	86140	2010	198950	1584	21
74	23	RIFFLE	18.1	38	2847	7.8	8.8	0.2	0.5	166	12281	38	2838		2
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
409	179				36302					333450			361887		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Cummiskey Creek

LLID:

1230543388827 Drainage: Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T13NR12WS32 Latitude: 38:52:58.0N Longitude: 123:03:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max 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	Mean Canopy (%)
35	8	LGR	8.6	43	1519	4.2	14	0.2	1	277	9691	69	2432		2	48
32	11	HGR	7.8	32	1023	2.8	7	0.2	0.7	132	4211	26	840		1	56
7	4	CAS	1.7	44	305	0.8	2	0.3	0.8	39	271	9	65		1	64
87	20	GLD	21.3	84	7324	20.2	14	1.0	3	1098	95534	1047	86559		9	59
39	15	RUN	9.5	103	4022	11.1	10	0.6	2.2	1326	51720	645	25158		9	46
83	20	SRN	20.3	183	15211	41.9	9	0.6	2.2	1000	82980	628	52111		7	67
68	67	MCP	16.6	47	3172	8.7	17	2.3	6.6	826	56156	2101	140704	1758	21	62
1	1	STP	0.2	45	45	0.1	8	0.9	1.9	72	72	72	72	65	5	89
1	1	LSL	0.2	25	25	0.1	11	1.6	1.9	248	248	470	470	396		90
2	2	LSR	0.5	36	72	0.2	12	1.0	2.5	428	856	604	1207	480	40	45
13	13	LSBk	3.2	69	899	2.5	18	1.6	5.3	1277	16595	3210	38524	2297	18	55
13	13	LSBo	3.2	44	573	1.6	19	1.0	3.7	869	11295	1252	16271	646	20	42
3	3	PLP	0.7	17	50	0.1	14	2.5	4	233	700	607	1820	607	30	82
1	1	SCP	0.2	25	25	0.1	8			200	200				10	75
1	0	NS	0.2	0	0	0.0										
23	0	DRY	5.6	89	2037	5.6										56

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
409	179	36302	330529	366233

Table 3 - Summary of Pool Types

Stream Name: Cummiskey Creek

LLID:

1230543388827

Drainage:

Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location:

Quad: YORKVILLE

Legal Description:

T13NR12WS32

Latitude: 38:52:58.0N

Longitude:

123:03:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid.Vol. (cu.ft.)	Mean Shelter Rating
69	68	MAIN	68	47	3217	66	17.4	2.3	815	56217	1732	117781	21
32	32	SCOUR	31	51	1619	33	17.4	1.4	928	29694	1263	39140	21
1	1	BACKWATER	1	25	25	1	8.0		200	200		0	10

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
102	101	4861	86111	156921

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Cummiskey Creek

LLID:

1230543388827

Drainage: Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T13NR12WS32

Latitude: 38:52:58.0N

Longitude: 123:03:15.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
66	MCP	67	0	0	12	18	31	47	11	17	12	18
1	STP	1	0	0	1	100	0	0	0	0	0	0
1	LSL	1	0	0	1	100	0	0	0	0	0	0
2	LSR	2	0	0	0	0	2	100	0	0	0	0
12	LSBk	12	0	0	2	17	3	25	2	17	5	42
13	LSBo	13	1	8	5	38	5	38	2	15	0	0
3	PLP	3	0	0	1	33	0	0	1	33	1	33

Total Units

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Foot Max Resid. Depth	Total 1 < 2 Foot % Occurrence	Total 2 < 3 Foot Max Resid. Depth	Total 2 < 3 Foot % Occurrence	Total 3 < 4 Foot Max Resid. Depth	Total 3 < 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
98	1	1	22	22	41	42	16	16	18	18

Mean Maximum Residual Pool Depth (ft.):

2.8

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Cummiskey Creek LLID: 1230543388827 Drainage: Russian River - Upper
 Survey Dates: 7/3/2002 to 9/4/2002 Dry Units: 23
 Confluence Location: Quad: YORKVILLE Legal Description: T13NR12WS32 Latitude: 38:52:58.0N Longitude: 123:03:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
35	9	LGR	0	0	0	0	11	0	0	22	0
32	11	HGR	0	0	0	0	0	0	0	18	0
7	4	CAS	0	0	0	0	0	0	0	25	0
74	24	TOTAL RIFFLE	0	0	0	0	4	0	0	21	0
87	18	GLD	5	4	1	2	6	3	0	44	14
39	15	RUN	0	6	0	9	14	0	0	58	0
83	20	SRN	0	3	0	0	1	0	5	74	3
209	53	TOTAL FLAT	2	4	0	3	6	1	2	59	6
68	64	MCP	1	2	1	10	0	5	0	52	28
1	1	STP	0	0	0	0	0	0	0	100	0
2	2	LSR	0	0	0	95	0	0	0	5	0
13	11	LSBk	0	9	3	4	0	0	0	18	66
13	13	LSBo	0	5	3	1	5	10	0	58	18
3	3	PLP	0	0	0	0	0	0	0	33	67
1	1	SCP	0	0	0	0	0	0	0	70	30
102	95	TOTAL POOL	1	3	1	9	1	4	0	48	32
1	0	NS									
409	172	TOTAL	1	3	1	6	3	3	1	47	19

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Cummiskey Creek

LLID:

1230543388827

Drainage: Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Dry Units: 23

Confluence Location: Quad: YORKVILLE

Legal Description: T13NR12WS32

Latitude: 38:52:58.0N

Longitude: 123:03:15.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
35	9	LGR	0	0	0	67	33	0	0
32	11	HGR	0	0	0	9	73	18	0
7	4	CAS	0	0	0	0	0	25	75
87	20	GLD	0	20	25	20	35	0	0
39	15	RUN	0	0	7	60	13	20	0
83	19	SRN	0	0	5	11	42	37	5
68	32	MCP	0	47	22	9	9	13	0
1	1	STP	0	0	0	0	0	100	0
1	1	LSL	0	0	100	0	0	0	0
2	2	LSR	0	50	50	0	0	0	0
13	9	LSBk	0	56	33	0	0	0	11
13	9	LSBo	0	33	33	22	11	0	0
3	3	PLP	0	0	67	0	0	0	33
1	1	SCP	0	100	0	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Cummiskey Creek

LLID:

1230543388827 Drainage: Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location: Quad: YORKVILLE Legal Description: T13NR12WS32 Latitude: 38:52:58.0N Longitude: 123:03:15.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
58	65	35	2	18	14

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Cummiskey Creek

LLID:

1230543388827 Drainage: Russian River - Upper

Survey Dates: 7/3/2002 to 9/4/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T13NR12WS32

Latitude: 38:52:58.0N Longitude: 123:03:15.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	52	39	35.0
Boulder	38	39	29.6
Cobble / Gravel	35	46	31.2
Sand / Silt / Clay	5	6	4.2

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	15	19	13.1
Brush	5	11	6.2
Hardwood Trees	44	37	31.2
Coniferous Trees	60	48	41.5
No Vegetation	5	14	7.3

Total Stream Cobble Embeddedness Values: 3

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Cummiskey Creek LLID: 1230543388827 Drainage: Russian River - Upper
 Survey Dates: 7/3/2002 to 9/4/2002
 Confluence Location: Quad: YORKVILLE Legal Description: T13NR12WS32 Latitude: 38:52:58.0N Longitude: 123:03:15.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	2	1
SMALL WOODY DEBRIS (%)	0	4	3
LARGE WOODY DEBRIS (%)	0	0	1
ROOT MASS (%)	0	3	9
TERRESTRIAL VEGETATION (%)	4	6	1
AQUATIC VEGETATION (%)	0	1	4
WHITEWATER (%)	0	2	0
BOULDERS (%)	21	59	48
BEDROCK LEDGES (%)	0	6	32

Table 1a - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Cummiskey Creek, Trib A

LLID:

1230862389006

Drainage:

Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location: Quad: HOPLAND

Legal Description: T12NR11WS09

Latitude: 38:54:02.0N

Longitude: 123:05:10.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
2	0	CULVERT	16.7	18	37	0.6									
6	0	DRY	50.0	1094	6564	98.2									
1	1	FLATWATER	8.3	34	34	0.5	2.0	0.2	0.3	54	54	11	11		0
2	2	POOL	16.7	10	21	0.3	6.3	0.7	1.1	70	140	44	88	42	10
1	1	RIFFLE	8.3	30	30	0.4	1.0	0.1	0.3	20	20	2	2		0
Total Units	Total Units Fully Measured			Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)			
12	4			6686						214		101			

Table 2a - Summary of Habitat Types and Measured Parameters

Stream Name: Cummiskey Creek, Trib A

LLID:

1230862389006

Drainage: Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location:

Quad: HOPLAND

Legal Description: T12NR11WS09

Latitude: 38:54:02.0N

Longitude: 123:05:10.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max 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	Mean Canopy (%)
1	1	CAS	8.3	30	30	0.4	1	0.1	0.3	20	20	2	2		0	70
1	1	RUN	8.3	34	34	0.5	2	0.2	0.3	54	54	11	11		0	65
2	2	MCP	16.7	10	21	0.3	6	0.7	1.3	70	140	44	88	42	10	68
6	0	DRY	50.0	1094	6564	98.2										65
2	0	CUL	16.7	18	37	0.6										100
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)			
12	4				6686					214			101			

Table 3a - Summary of Pool Types

Stream Name: Cummiskey Creek, Trib A

LLID:

1230862389006

Drainage: Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location: Quad: HOPLAND

Legal Description: T12NR11WS09

Latitude: 38:54:02.0N

Longitude: 123:05:10.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid. Vol. (cu.ft.)	Mean Shelter Rating
2	2	MAIN	100	11	21	100	6.3	0.7	70	140	42	83	10

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
2	2	21	140	83

Table 4a - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Cummiskey Creek, Trib A

LLID:

1230862389006 Drainage: Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location: Quad: HOPLAND Legal Description: T12NR11WS09 Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
2	MCP	100	1	50	1	50	0	0	0	0	0	0

Total Units

	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Foot Max Resid. Depth	Total 1 < 2 Foot % Occurrence	Total 2 < 3 Foot Max Resid. Depth	Total 2 < 3 Foot % Occurrence	Total 3 < 4 Foot Max Resid. Depth	Total 3 < 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
2	1	50	1	50	0	0	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.1

Table 5a - Summary of Mean Percent Cover By Habitat Type

Stream Name: Cummiskey Creek, Trib A LLID: 1230862389006 Drainage: Russian River - Upper
 Survey Dates: 8/13/2002 to 8/13/2002 Dry Units: 6
 Confluence Location: Quad: HOPLAND Legal Description: T12NR11WS09 Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
1	1	CAS	0	0	0	0	0	0	0	0	0
1	1	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
1	1	RUN	0	0	0	0	0	0	0	0	0
1	1	TOTAL FLAT	0	0	0	0	0	0	0	0	0
2	2	MCP	50	0	0	0	0	0	0	0	0
2	2	TOTAL POOL	50	0	0	0	0	0	0	0	0
2	0	CUL									
12	4	TOTAL	25	0	0	0	0	0	0	0	0

Table 6a - Summary of Dominant Substrates By Habitat Type

Stream Name: Cummiskey Creek, Trib A LLID: 1230862389006 Drainage: Russian River - Upper
 Survey Dates: 8/13/2002 to 8/13/2002 Dry Units: 6
 Confluence Location: Quad: HOPLAND Legal Description: T12NR11WS09 Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
1	1	CAS	0	0	0	0	0	0	100
1	1	RUN	0	0	0	100	0	0	0
2	2	MCP	0	50	0	0	0	0	50

Table 7a - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Cummiskey Creek, Trib A LLID: 1230862389006 Drainage: Russian River - Upper
 Survey Dates: 8/13/2002 to 8/13/2002
 Confluence Location: Quad: HOPLAND Legal Description: T12NR11WS09 Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
73	51	49	0	17	20

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 9a - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Cummiskey Creek, Trib A

LLID:

1230862389006 Drainage: Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location: Quad: HOPLAND

Legal Description: T12NR11WS09

Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	2	2	40.0
Boulder	0	0	0.0
Cobble / Gravel	0	0	0.0
Sand / Silt / Clay	3	3	60.0

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	4	3	70.0
Brush	0	0	0.0
Hardwood Trees	1	2	30.0
Coniferous Trees	0	0	0.0
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 3

Table 10a - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Cummiskey Creek, Trib A

LLID:

1230862389006 Drainage: Russian River - Upper

Survey Dates: 8/13/2002 to 8/13/2002

Confluence Location: Quad: HOPLAND

Legal Description: T12NR11WS09 Latitude: 38:54:02.0N Longitude: 123:05:10.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	50
SMALL WOODY DEBRIS (%)	0	0	0
LARGE WOODY DEBRIS (%)	0	0	0
ROOT MASS (%)	0	0	0
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	0	0	0
BEDROCK LEDGES (%)	0	0	0

Table 1b - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Cummiskey Creek, Trib B

LLID:

1231151389096

Drainage:

Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location:

Quad: YORKVILLE

Legal Description:

T12NR11WS08

Latitude: 38:54:35.0N

Longitude: 123:06:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
4	0	DRY	57.1	194	774	96.6									
2	1	FLATWATER	28.6	5	10	1.2	2.5	0.4	0.5	13	25	5	10		0
1	1	POOL	14.3	17	17	2.1	5.0			68	68				5
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
7	2				801					93			10		

Table 2b - Summary of Habitat Types and Measured Parameters

Stream Name: Cummiskey Creek, Trib B

LLID:

1231151389096 Drainage: Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T12NR11WS08

Latitude: 38:54:35.0N

Longitude: 123:06:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max 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	Mean Canopy (%)
2	1	GLD	28.6	5	10	1.2	2	0.4	0.5	13	25	5	10		0	90
1	1	STP	14.3	17	17	2.1	5			68	68				5	90
4	0	DRY	57.1	194	774	96.6										90

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
7	2	801	93	10

Table 3b - Summary of Pool Types

Stream Name: Cummiskey Creek, Trib B

LLID:

1231151389096 Drainage: Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T12NR11WS08

Latitude: 38:54:35.0N

Longitude: 123:06:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid.Vol. (cu.ft.)	Mean Shelter Rating
1	1	MAIN	100	17	17	100	5.0		68	68		0	5

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
1	1	17	68	0

Table 5b - Summary of Mean Percent Cover By Habitat Type

Stream Name: Cummiskey Creek, Trib B LLID: 1231151389096 Drainage: Russian River - Upper
 Survey Dates: 9/15/2002 to 9/15/2002 Dry Units: 4
 Confluence Location: Quad: YORKVILLE Legal Description: T12NR11WS08 Latitude: 38:54:35.0N Longitude: 123:06:54.0W

Habitat Units	Units Fully Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
0	0	TOTAL RIFFLE									
2	1	GLD	0	0	0	0	0	0	0	0	0
2	1	TOTAL FLAT	0	0	0	0	0	0	0	0	0
1	1	STP	0	0	0	0	0	0	0	20	80
1	1	TOTAL POOL	0	0	0	0	0	0	0	20	80
7	2	TOTAL	0	0	0	0	0	0	0	10	40

Table 6b - Summary of Dominant Substrates By Habitat Type

Stream Name: Cummiskey Creek, Trib B LLID: 1231151389096 Drainage: Russian River - Upper
 Survey Dates: 9/15/2002 to 9/15/2002 Dry Units: 4
 Confluence Location: Quad: YORKVILLE Legal Description: T12NR11WS08 Latitude: 38:54:35.0N Longitude: 123:06:54.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
2	1	GLD	0	0	0	0	0	0	100
1	1	STP	0	0	100	0	0	0	0

Table 7b - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Cummiskey Creek, Trib B

LLID:

1231151389096 Drainage: Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location: Quad: YORKVILLE Legal Description: T12NR11WS08 Latitude: 38:54:35.0N Longitude: 123:06:54.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
90	70	30	0	25	18

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 9b - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Cummiskey Creek, Trib B

LLID:

1231151389096 Drainage: Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location: Quad: YORKVILLE Legal Description: T12NR11WS08 Latitude: 38:54:35.0N Longitude: 123:06:54.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	1	1	50.0
Boulder	1	1	50.0
Cobble / Gravel	0	0	0.0
Sand / Silt / Clay	0	0	0.0

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	0	0.0
Brush	0	0	0.0
Hardwood Trees	1	0	25.0
Coniferous Trees	1	2	75.0
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 0

Table 10b - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Cummiskey Creek, Trib B

LLID:

1231151389096 Drainage: Russian River - Upper

Survey Dates: 9/15/2002 to 9/15/2002

Confluence Location: Quad: YORKVILLE

Legal Description: T12NR11WS08 Latitude: 38:54:35.0N Longitude: 123:06:54.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)		0	0
SMALL WOODY DEBRIS (%)		0	0
LARGE WOODY DEBRIS (%)		0	0
ROOT MASS (%)		0	0
TERRESTRIAL VEGETATION (%)		0	0
AQUATIC VEGETATION (%)		0	0
WHITEWATER (%)		0	0
BOULDERS (%)		0	20
BEDROCK LEDGES (%)		0	80

APPENDIX C - Fish Habitat Inventory Data Summary

Stream Name: Cummiskey Creek LLID: 1230543388827 Drainage: Russian River -
Survey Dates: 7/3/2002 to 9/4/2002 Survey Length (ft.): 36302 Main Channel (ft.): 35855 Side Channel (ft.): 447
Confluence Location: Quad: YORKVILLE Legal Description: T13NR12WS32 Latitude: 38:52:58.0N Longitude: 123:03:15.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4	Canopy Density (%): 17.1	Pools by Stream Length (%): 4.0
Reach Length (ft.): 1401	Coniferous Component (%): 55.0	Pool Frequency (%): 21.4
Riffle/Flatwater Mean Width (ft.): 9.0	Hardwood Component (%): 45.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Grass	< 2 Feet Deep: 66.7
Range (ft.): to	Vegetative Cover (%): 8.4	2 to 2.9 Feet Deep: 33.3
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 0.0
Std. Dev.:	Dominant Bank Substrate Type: Cobble/Gravel	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0	Occurrence of LWD (%): 1.3	Mean Max Residual Pool Depth (ft.): 1.73
Water (F): 66 - 76 Air (F): 72 - 80	LWD per 100 ft.:	Mean Pool Shelter Rating: 25
Dry Channel (ft.): 1022	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 50.0 Sm Cobble: 50.0 Lg Cobble: 0.0 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 33.3 3. 66.7 4. 0.0 5. 0.0		

STREAM REACH: 2

Channel Type: B2	Canopy Density (%): 28.8	Pools by Stream Length (%): 27.3
Reach Length (ft.): 3500	Coniferous Component (%): 77.6	Pool Frequency (%): 30.9
Riffle/Flatwater Mean Width (ft.): 9.7	Hardwood Component (%): 22.4	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 25.0
Range (ft.): to	Vegetative Cover (%): 13.2	2 to 2.9 Feet Deep: 37.5
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 12.5
Std. Dev.:	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 25.0
Base Flow (cfs): 0	Occurrence of LWD (%): 1.4	Mean Max Residual Pool Depth (ft.): 2.9
Water (F): 66 - 76 Air (F): 80 - 92	LWD per 100 ft.:	Mean Pool Shelter Rating: 19
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 6.3 Gravel: 25.0 Sm Cobble: 50.0 Lg Cobble: 18.8 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 6.3 2. 43.8 3. 43.8 4. 0.0 5. 0.0		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: F3	Canopy Density (%): 53.1	Pools by Stream Length (%): 33.3
Reach Length (ft.): 2546	Coniferous Component (%): 74.3	Pool Frequency (%): 28.9
Riffle/Flatwater Mean Width (ft.): 11.3	Hardwood Component (%): 25.7	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 9.1
Range (ft.): to	Vegetative Cover (%): 13.6	2 to 2.9 Feet Deep: 54.5
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 18.2
Std. Dev.:	Dominant Bank Substrate Type: Cobble/Gravel	>= 4 Feet Deep: 18.2
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 2.99
Water (F): 62 - 72 Air (F): 68 - 85	LWD per 100 ft.:	Mean Pool Shelter Rating: 21
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 72.7 Sm Cobble: 18.2 Lg Cobble: 9.1 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 45.5 3. 45.5 4. 9.1 5. 0.0		

STREAM REACH: 4

Channel Type: B2	Canopy Density (%): 60.8	Pools by Stream Length (%): 17.4
Reach Length (ft.): 3584	Coniferous Component (%): 73.9	Pool Frequency (%): 23.2
Riffle/Flatwater Mean Width (ft.): 16.1	Hardwood Component (%): 26.1	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 15.4
Range (ft.): to	Vegetative Cover (%): 16.0	2 to 2.9 Feet Deep: 53.8
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 23.1
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 7.7
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 2.69
Water (F): 70 - 75 Air (F): 82 - 91	LWD per 100 ft.:	Mean Pool Shelter Rating: 20
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 38.5 Gravel: 23.1 Sm Cobble: 30.8 Lg Cobble: 7.7 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 38.5 3. 23.1 4. 0.0 5. 0.0		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 5

Channel Type: F3	Canopy Density (%): 79.0	Pools by Stream Length (%): 19.8
Reach Length (ft.): 1008	Coniferous Component (%): 71.0	Pool Frequency (%): 25.0
Riffle/Flatwater Mean Width (ft.): 17.7	Hardwood Component (%): 29.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 33.3
Range (ft.): to	Vegetative Cover (%): 16.7	2 to 2.9 Feet Deep: 0.0
Mean (ft.):	Dominant Shelter: Root masses	3 to 3.9 Feet Deep: 66.7
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 2.9
Water (F): 75 - 77 Air (F): 83 - 95	LWD per 100 ft.:	Mean Pool Shelter Rating: 12
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 33.3 Gravel: 33.3 Sm Cobble: 0.0 Lg Cobble: 33.3 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 33.3 3. 0.0 4. 33.3 5. 0.0		

STREAM REACH: 6

Channel Type: B3	Canopy Density (%): 63.9	Pools by Stream Length (%): 17.5
Reach Length (ft.): 2524	Coniferous Component (%): 54.7	Pool Frequency (%): 22.6
Riffle/Flatwater Mean Width (ft.): 17.5	Hardwood Component (%): 45.3	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 50.0
Range (ft.): to	Vegetative Cover (%): 18.0	2 to 2.9 Feet Deep: 33.3
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 0.0
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 16.7
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 2.43
Water (F): 67 - 79 Air (F): 80 - 95	LWD per 100 ft.:	Mean Pool Shelter Rating: 13
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 42.9 Gravel: 14.3 Sm Cobble: 42.9 Lg Cobble: 0.0 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 28.6 3. 28.6 4. 0.0 5. 0.0		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 7

Channel Type: F3	Canopy Density (%): 50.3	Pools by Stream Length (%): 8.9
Reach Length (ft.): 8711	Coniferous Component (%): 43.1	Pool Frequency (%): 19.7
Riffle/Flatwater Mean Width (ft.): 10.4	Hardwood Component (%): 56.9	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 7.7
Range (ft.): to	Vegetative Cover (%): 28.1	2 to 2.9 Feet Deep: 69.2
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 15.4
Std. Dev.:	Dominant Bank Substrate Type: Cobble/Gravel	>= 4 Feet Deep: 7.7
Base Flow (cfs): 0	Occurrence of LWD (%): 1.1	Mean Max Residual Pool Depth (ft.): 2.79
Water (F): 64 - 91	Air (F): 62 - 109	LWD per 100 ft.:
Dry Channel (ft.): 366		Riffles:
		Pools:
		Flat:
Pool Tail Substrate (%): Silt/Clay: 0.0	Sand: 7.7	Gravel: 46.2
Embeddedness Values (%): 1. 7.7	2. 15.4	3. 38.5
	4. 0.0	5. 30.8
		Sm Cobble: 15.4
		Lg Cobble: 15.4
		Boulder: 15.4
		Bedrock: 0.0

STREAM REACH: 8

Channel Type: B1	Canopy Density (%): 72.0	Pools by Stream Length (%): 7.4
Reach Length (ft.): 1034	Coniferous Component (%): 65.0	Pool Frequency (%): 33.3
Riffle/Flatwater Mean Width (ft.): 5.5	Hardwood Component (%): 35.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 50.0
Range (ft.): to	Vegetative Cover (%): 7.5	2 to 2.9 Feet Deep: 50.0
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 0.0
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 2.05
Water (F): 64 - 64	Air (F): 70 - 70	LWD per 100 ft.:
Dry Channel (ft.): 0		Riffles:
		Pools:
		Flat:
Pool Tail Substrate (%): Silt/Clay: 0.0	Sand: 50.0	Gravel: 50.0
Embeddedness Values (%): 1. 0.0	2. 0.0	3. 100.0
	4. 0.0	5. 0.0
		Sm Cobble: 0.0
		Lg Cobble: 0.0
		Boulder: 0.0
		Bedrock: 0.0

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 9

Channel Type: B2	Canopy Density (%): 71.2	Pools by Stream Length (%): 8.0
Reach Length (ft.): 4153	Coniferous Component (%): 65.0	Pool Frequency (%): 24.0
Riffle/Flatwater Mean Width (ft.): 6.6	Hardwood Component (%): 35.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 18.2
Range (ft.): to	Vegetative Cover (%): 13.9	2 to 2.9 Feet Deep: 45.5
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 9.1
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 27.3
Base Flow (cfs): 0	Occurrence of LWD (%): 0.6	Mean Max Residual Pool Depth (ft.): 2.86
Water (F): 60 - 71 Air (F): 70 - 82	LWD per 100 ft.:	Mean Pool Shelter Rating: 37
Dry Channel (ft.): 73	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 27.3 Sm Cobble: 36.4 Lg Cobble: 9.1 Boulder: 27.3 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 36.4 3. 36.4 4. 0.0 5. 27.3		

STREAM REACH: 10

Channel Type: A2	Canopy Density (%): 82.7	Pools by Stream Length (%): 12.9
Reach Length (ft.): 2060	Coniferous Component (%): 59.8	Pool Frequency (%): 30.3
Riffle/Flatwater Mean Width (ft.): 4.9	Hardwood Component (%): 40.2	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 50.0
Range (ft.): to	Vegetative Cover (%): 9.2	2 to 2.9 Feet Deep: 10.0
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 20.0
Std. Dev.:	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 20.0
Base Flow (cfs): 0	Occurrence of LWD (%): 4.4	Mean Max Residual Pool Depth (ft.): 2.67
Water (F): 62 - 67 Air (F): 73 - 85	LWD per 100 ft.:	Mean Pool Shelter Rating: 21
Dry Channel (ft.): 356	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 40.0 Sm Cobble: 30.0 Lg Cobble: 0.0 Boulder: 30.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 20.0 2. 50.0 3. 0.0 4. 0.0 5. 30.0		

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 11

Channel Type: B4	Canopy Density (%): 76.9	Pools by Stream Length (%): 2.7
Reach Length (ft.): 1853	Coniferous Component (%): 89.4	Pool Frequency (%): 15.4
Riffle/Flatwater Mean Width (ft.): 13.5	Hardwood Component (%): 10.6	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 0.0
Range (ft.): to	Vegetative Cover (%): 18.1	2 to 2.9 Feet Deep: 50.0
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 50.0
Std. Dev.:	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0	Occurrence of LWD (%): 5.0	Mean Max Residual Pool Depth (ft.): 2.55
Water (F): 59 - 63 Air (F): 72 - 74	LWD per 100 ft.:	Mean Pool Shelter Rating: 5
Dry Channel (ft.): 0	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 50.0 Sm Cobble: 0.0 Lg Cobble: 50.0 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 100.0 3. 0.0 4. 0.0 5. 0.0		

STREAM REACH: 12

Channel Type: A2	Canopy Density (%): 77.1	Pools by Stream Length (%): 5.1
Reach Length (ft.): 3481	Coniferous Component (%): 73.5	Pool Frequency (%): 25.0
Riffle/Flatwater Mean Width (ft.): 10.0	Hardwood Component (%): 26.5	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 14.3
Range (ft.): to	Vegetative Cover (%): 12.9	2 to 2.9 Feet Deep: 14.3
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 14.3
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep: 57.1
Base Flow (cfs): 0	Occurrence of LWD (%): 0.4	Mean Max Residual Pool Depth (ft.): 3.91
Water (F): 62 - 63 Air (F): 72 - 73	LWD per 100 ft.:	Mean Pool Shelter Rating: 18
Dry Channel (ft.): 220	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 14.3 Sm Cobble: 0.0 Lg Cobble: 42.9 Boulder: 28.6 Bedrock: 14.3		
Embeddedness Values (%): 1. 14.3 2. 28.6 3. 14.3 4. 0.0 5. 42.9		

Appendix 2C - Fish Habitat Inventory Data Summary

Stream Name: Cummiskey Creek, Trib A	LLID: 1230862389006	Drainage: Russian River -
Survey Dates: 8/13/2002 to 8/13/2002	Survey Length (ft.): 6686	Main Channel (ft.): 6641 Side Channel (ft.): 45
Confluence Location: Quad: HOPLAND	Legal Description: T12NR11WS09	Latitude: 38:54:02.0N Longitude: 123:05:10.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B4	Canopy Density (%): 75.0	Pools by Stream Length (%): 0.2
Reach Length (ft.): 6641	Coniferous Component (%): 52.5	Pool Frequency (%): 11.1
Riffle/Flatwater Mean Width (ft.): 1.5	Hardwood Component (%): 47.5	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Grass	< 2 Feet Deep: 100.0
Range (ft.): to	Vegetative Cover (%): 20.0	2 to 2.9 Feet Deep: 0.0
Mean (ft.):	Dominant Shelter:	3 to 3.9 Feet Deep: 0.0
Std. Dev.:	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0.0
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.): 0.84
Water (F): 71 - 71 Air (F): 67 - 92	LWD per 100 ft.:	Mean Pool Shelter Rating: 0
Dry Channel (ft.): 6527	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 0.0 Gravel: 100. Sm Cobble: 0.0 Lg Cobble: 0.0 Boulder: 0.0 Bedrock: 0.0		
Embeddedness Values (%): 1. 0.0 2. 0.0 3. 100.0 4. 0.0 5. 0.0		

Appendix 3C - Fish Habitat Inventory Data Summary

Stream Name: Cummiskey Creek, Trib B	LLID: 1231151389096	Drainage: Russian River -
Survey Dates: 9/15/2002 to 9/15/2002	Survey Length (ft.): 801	Main Channel (ft.): 801 Side Channel (ft.): 0
Confluence Location: Quad: YORKVILLE	Legal Description: T12NR11WS08	Latitude: 38:54:35.0N Longitude: 123:06:54.0W

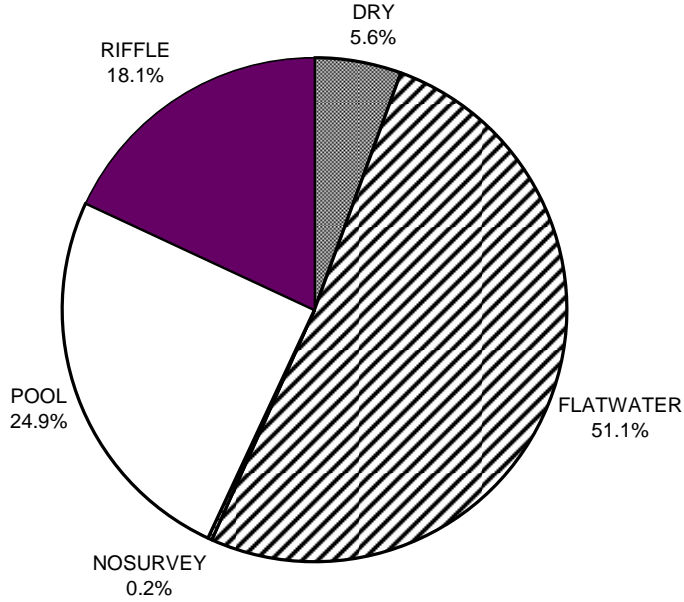
Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: AA2	Canopy Density (%): 90.0	Pools by Stream Length (%): 2.1
Reach Length (ft.): 801	Coniferous Component (%): 70.0	Pool Frequency (%): 14.3
Riffle/Flatwater Mean Width (ft.): 2.5	Hardwood Component (%): 30.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep:
Range (ft.): to	Vegetative Cover (%): 21.3	2 to 2.9 Feet Deep:
Mean (ft.):	Dominant Shelter: Boulders	3 to 3.9 Feet Deep:
Std. Dev.:	Dominant Bank Substrate Type: Bedrock	>= 4 Feet Deep:
Base Flow (cfs):	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.):
Water (F): 0 - 0 Air (F): 76 - 76	LWD per 100 ft.:	Mean Pool Shelter Rating: 5
Dry Channel (ft.): 774	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay:	Sand:	Gravel:
Embeddedness Values (%): 1.	2.	3.
		Sm Cobble:
		4.
		Lg Cobble:
		5. 0.0
		Boulder:
		Bedrock:

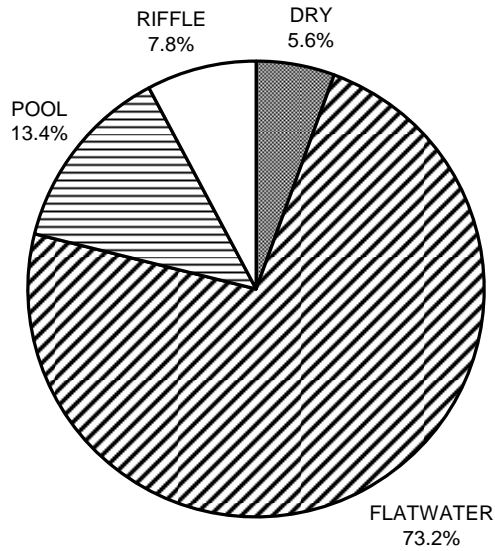
APPENDIX D: GRAPHS

**CUMMISKEY CREEK
HABITAT TYPES BY PERCENT OCCURRENCE**



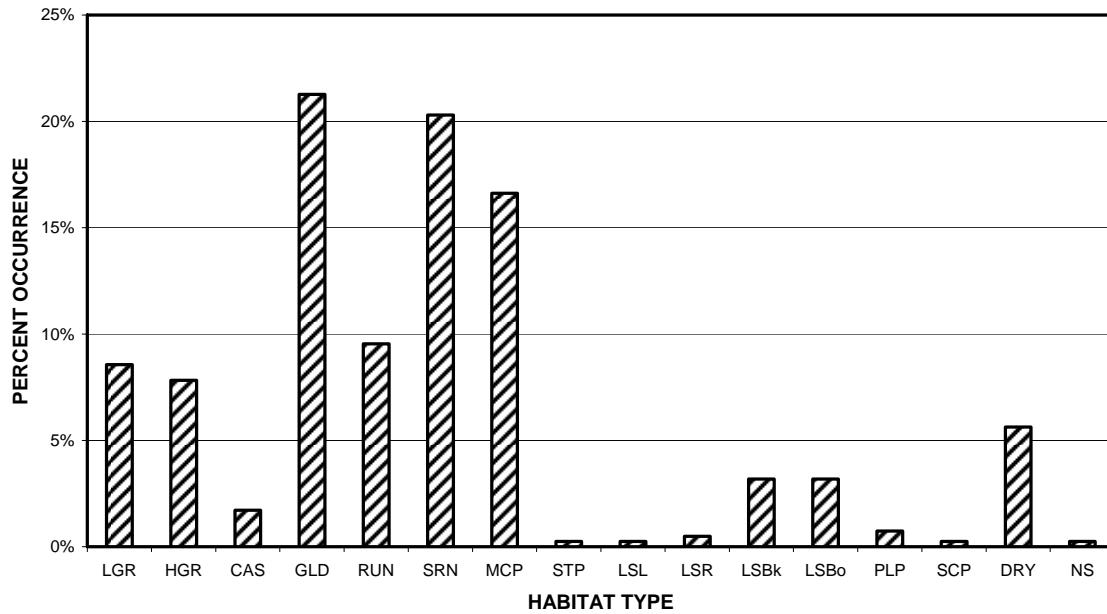
GRAPH 1: Level II habitat types by percent occurrence

**CUMMISKEY CREEK
HABITAT TYPES BY PERCENT TOTAL LENGTH**



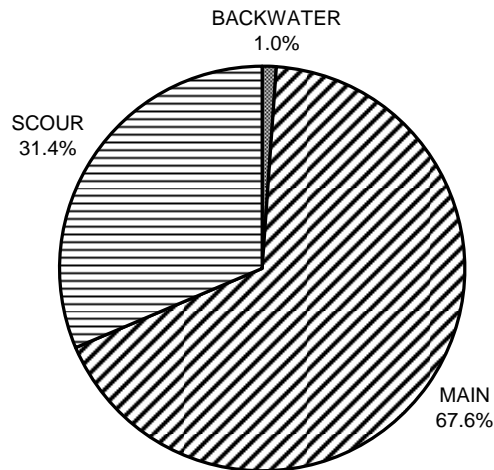
GRAPH 2: Level II habitat types by percent total length

**CUMMISKEY CREEK
HABITAT TYPES BY PERCENT OCCURRENCE**



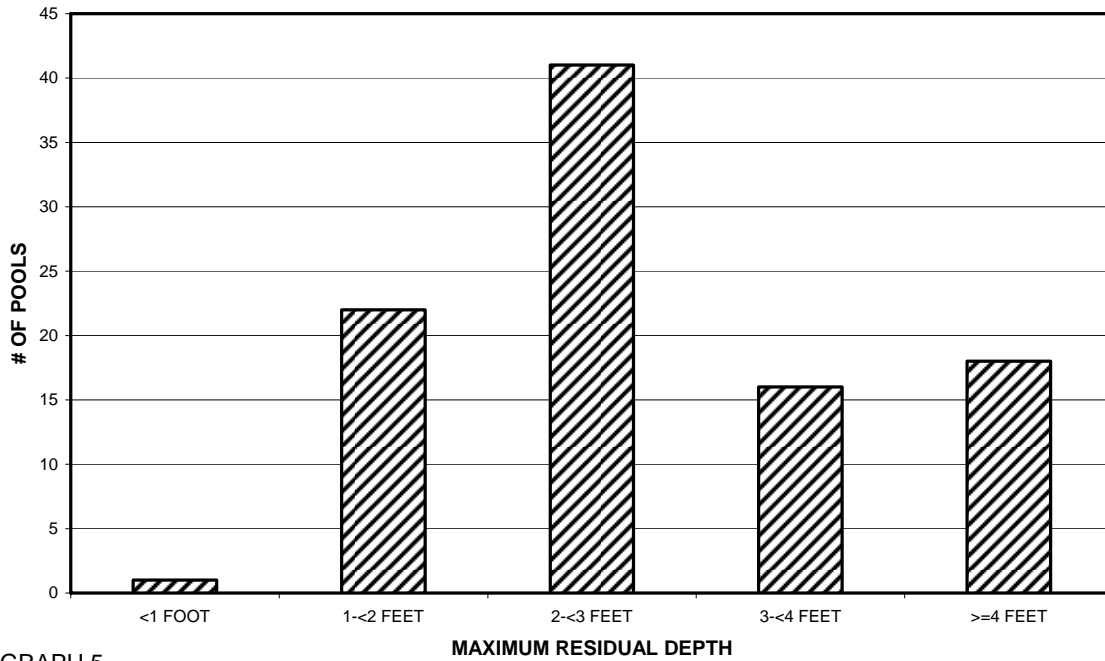
GRAPH 3: Level IV habitat types by percent occurrence

**CUMMISKEY CREEK
POOL TYPES BY PERCENT OCCURRENCE**



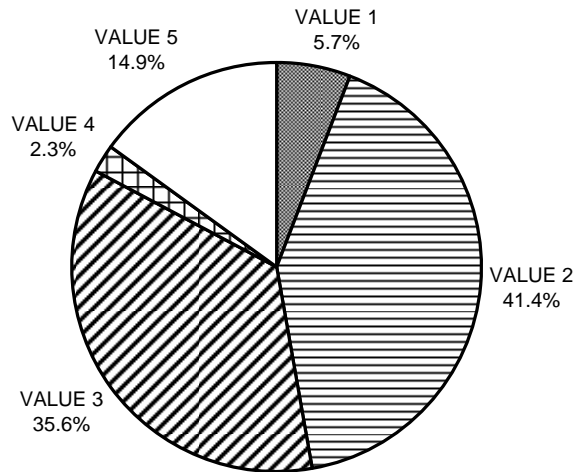
Graph 4: Level I pool types by percent occurrence

**CUMMISKEY CREEK
MAXIMUM DEPTH IN POOLS**



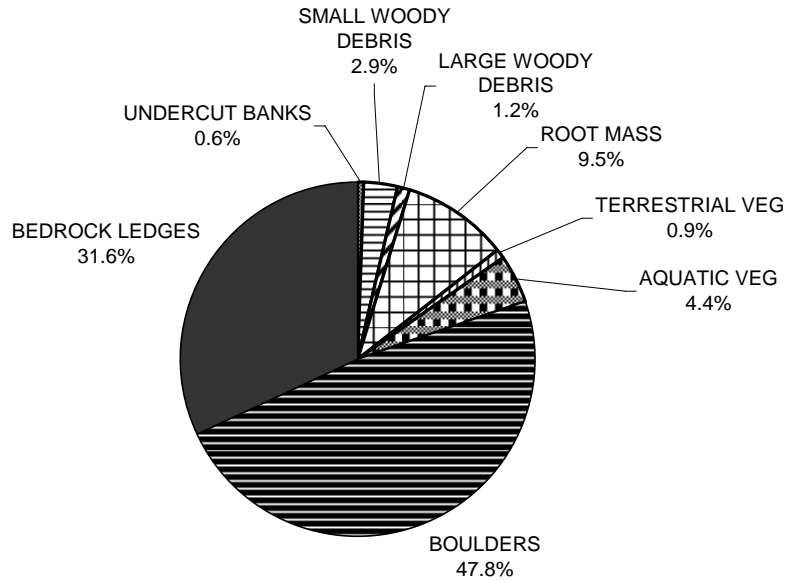
GRAPH 5

**CUMMISKEY CREEK
PERCENT EMBEDDEDNESS**



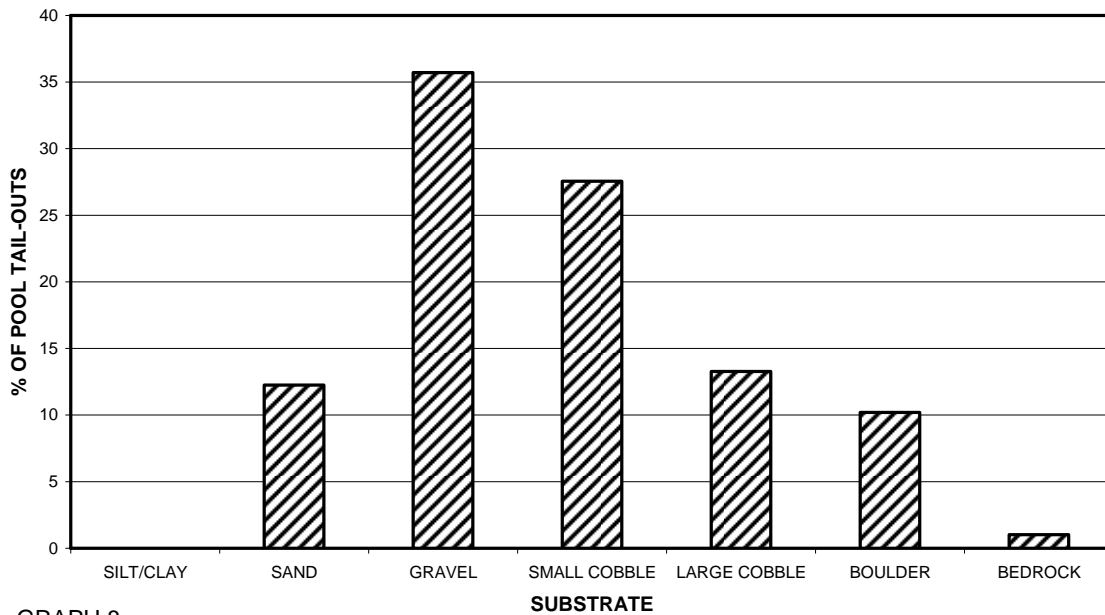
GRAPH 6

**CUMMISKEY CREEK
MEAN PERCENT COVER TYPES IN POOLS**



GRAPH 7

**CUMMISKEY CREEK
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS**



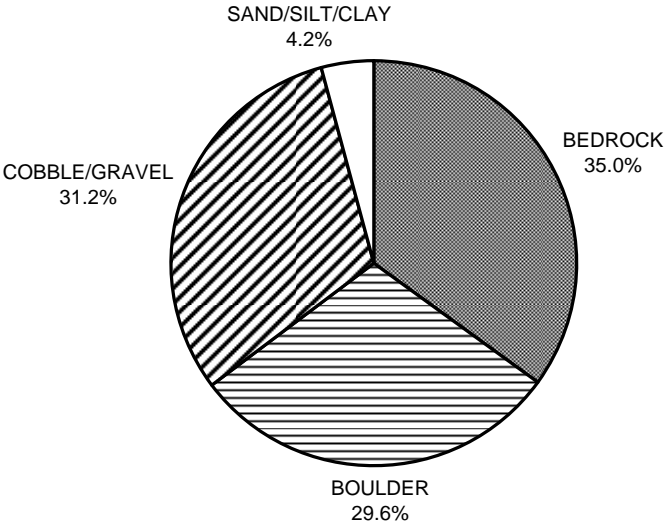
GRAPH 8

**CUMMISKEY CREEK
MEAN PERCENT CANOPY**



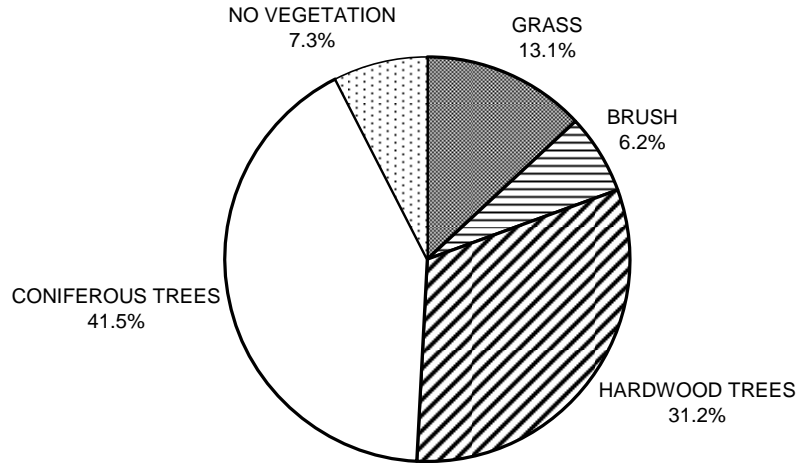
GRAPH 9

**CUMMISKEY CREEK
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

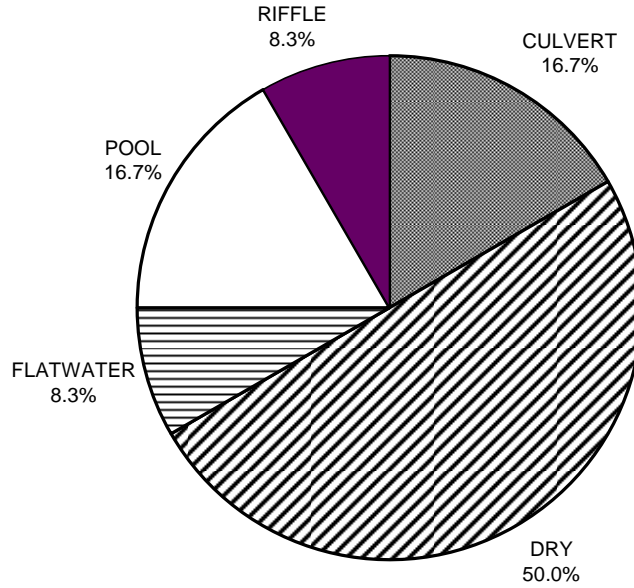
**CUMMISKEY CREEK
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

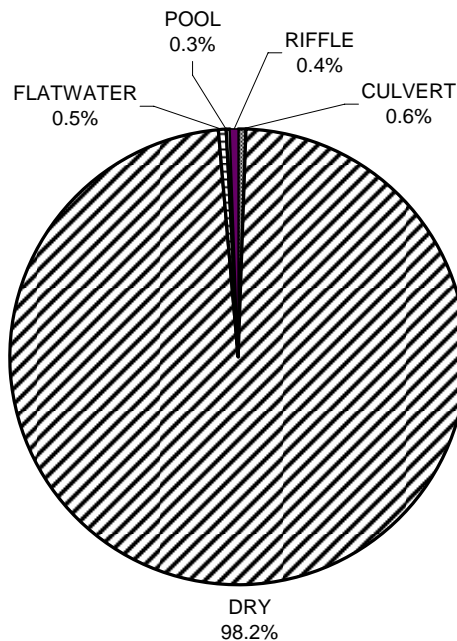
APPENDIX D: TRIB A GRAPHS

**CUMMISKEY CREEK, TRIB A
HABITAT TYPES BY PERCENT OCCURRENCE**



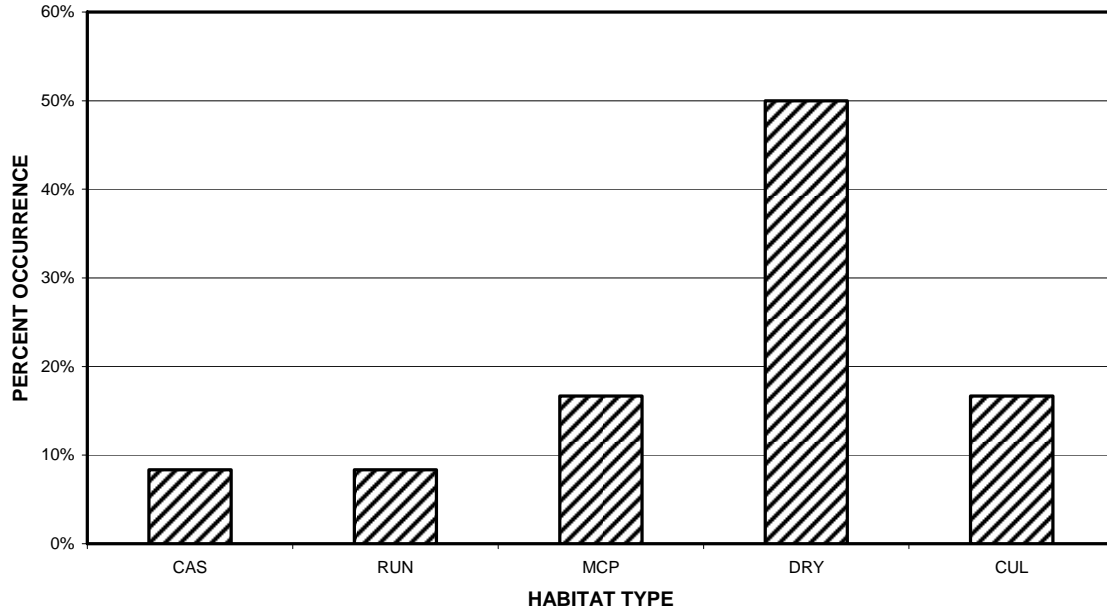
GRAPH 1: Level II habitat types by percent occurrence

**CUMMISKEY CREEK, TRIB A
HABITAT TYPES BY PERCENT TOTAL LENGTH**



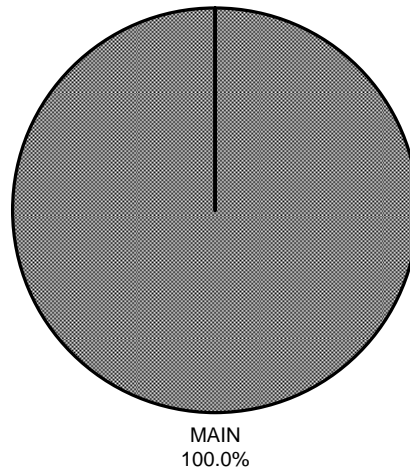
GRAPH 2: Level II habitat types by percent total length

**CUMMISKEY CREEK, TRIB A
HABITAT TYPES BY PERCENT OCCURRENCE**



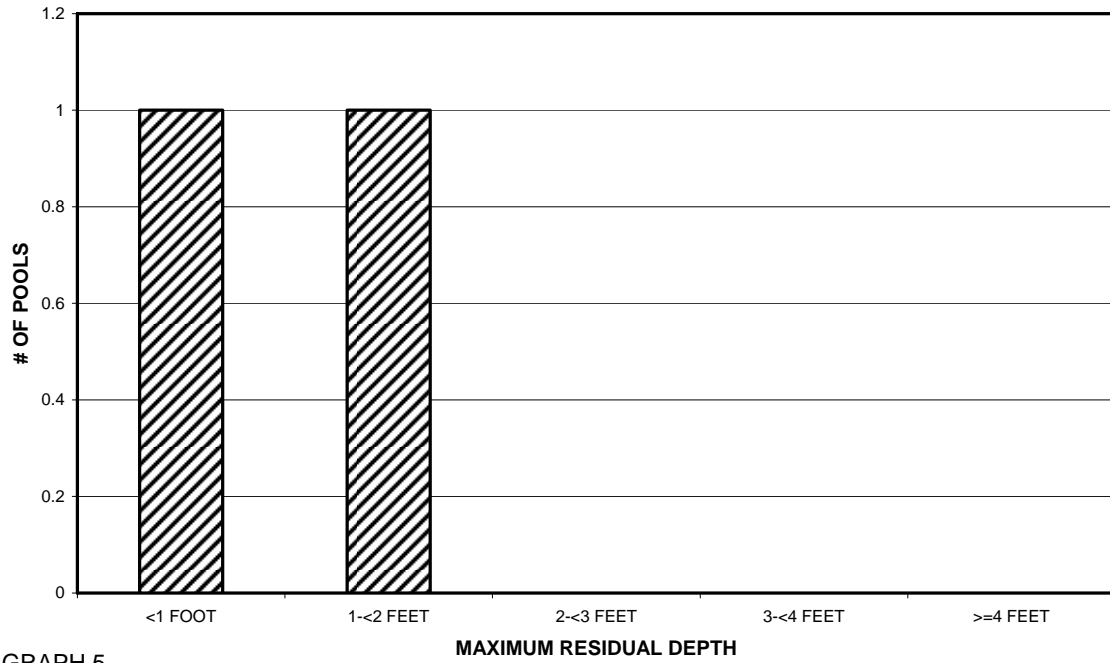
GRAPH 3: Level IV habitat types by percent occurrence

**CUMMISKEY CREEK, TRIB A
POOL TYPES BY PERCENT OCCURRENCE**



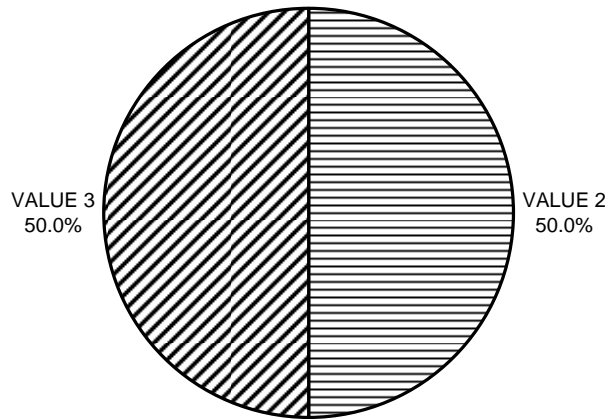
GRAPH 4: Level I pool types by percent occurrence

**CUMMISKEY CREEK, TRIB A
MAXIMUM DEPTH IN POOLS**



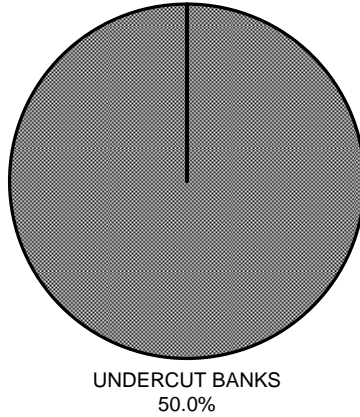
GRAPH 5

**CUMMISKEY CREEK, TRIB A
PERCENT EMBEDDEDNESS**



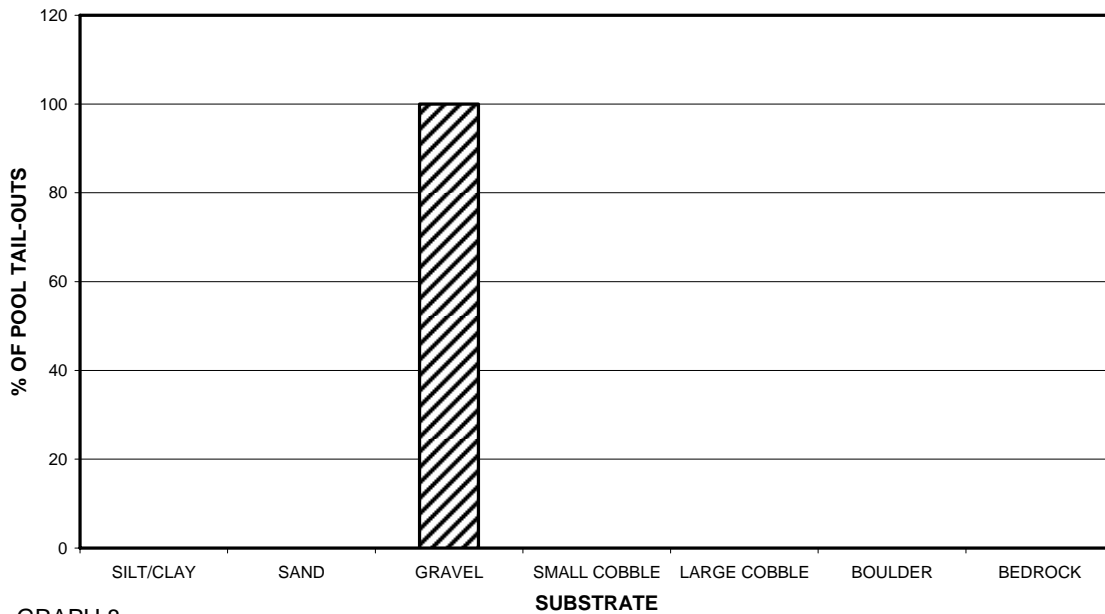
GRAPH 6

**CUMMISKEY CREEK, TRIB A
MEAN PERCENT COVER TYPES IN POOLS**



GRAPH 7

**CUMMISKEY CREEK, TRIB A
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS**



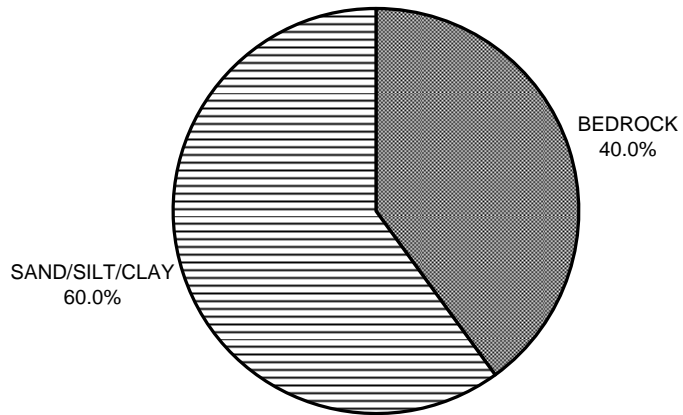
GRAPH 8

**CUMMISKEY CREEK, TRIB A 2002
MEAN PERCENT CANOPY**



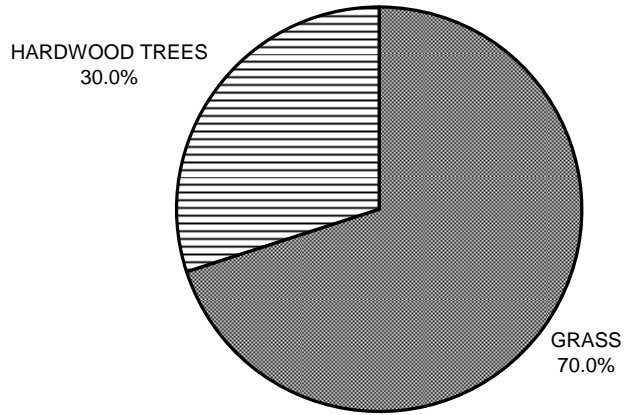
GRAPH 9

**CUMMISKEY CREEK, TRIB A
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

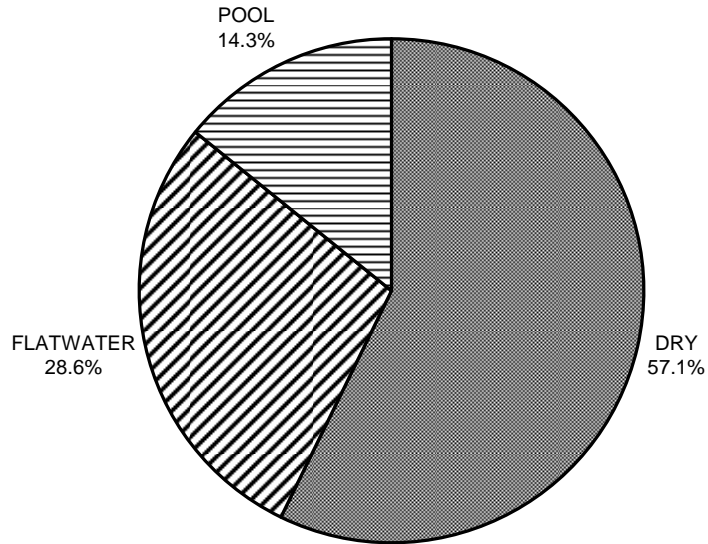
**CUMMISKEY CREEK, TRIB A
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

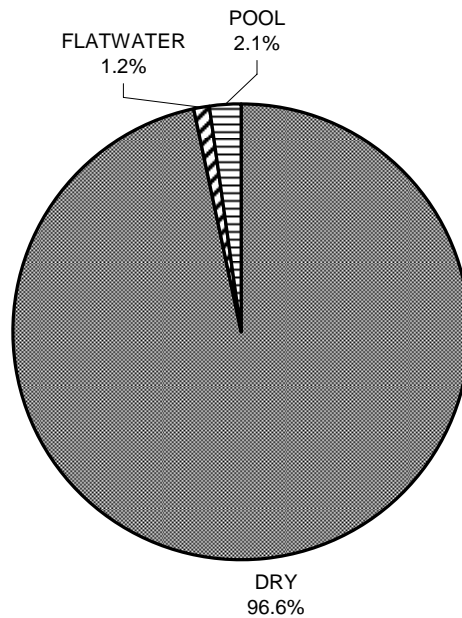
APPENDIX D: TRIB B GRAPHS

**CUMMISKEY CREEK, TRIB B
HABITAT TYPES BY PERCENT OCCURRENCE**



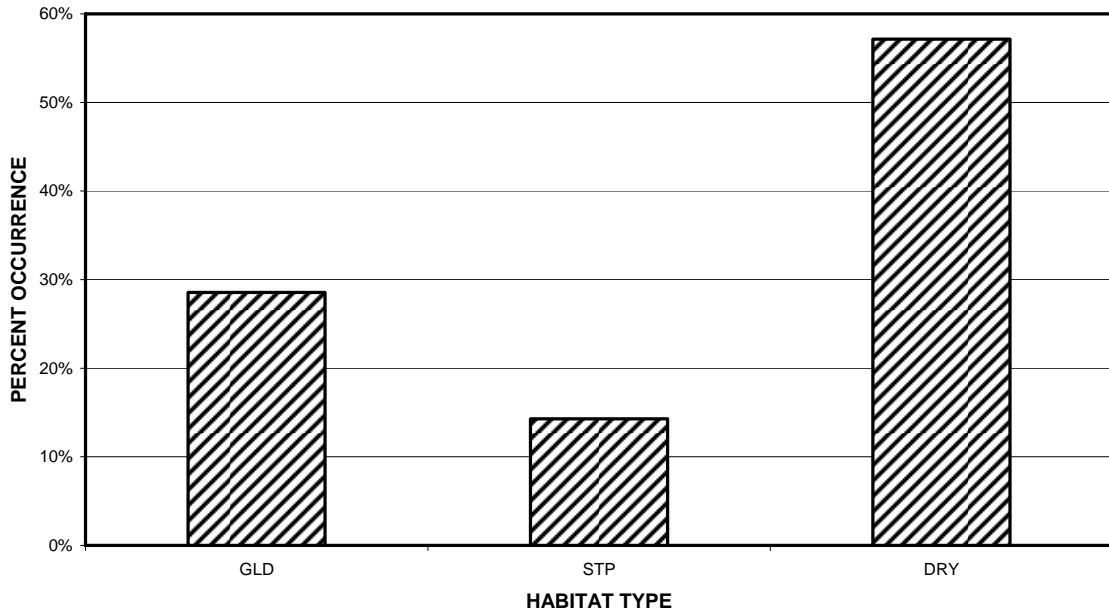
GRAPH 1: Level II habitat types by percent occurrence

**CUMMISKEY CREEK, TRIB B
HABITAT TYPES BY PERCENT TOTAL LENGTH**



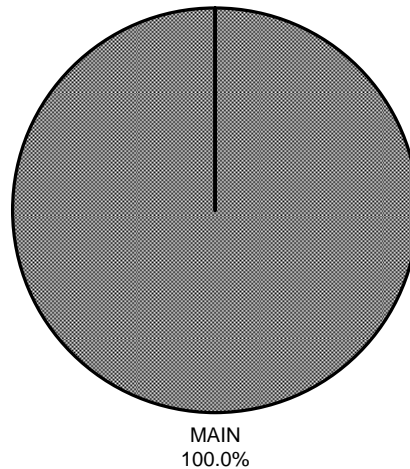
GRAPH 2: Level II habitat types by percent total length

**CUMMISKEY CREEK, TRIB B
HABITAT TYPES BY PERCENT OCCURRENCE**



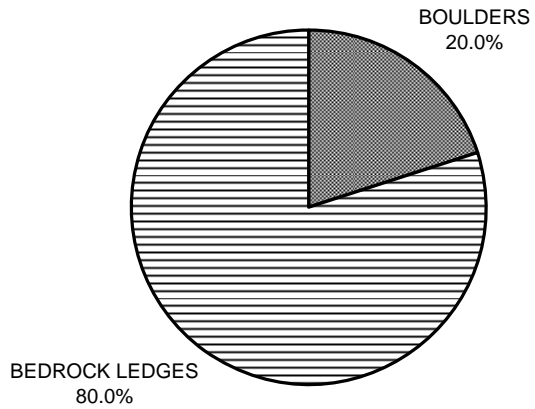
GRAPH 3: Level IV habitat types by percent occurrence

**CUMMISKEY CREEK, TRIB B
POOL TYPES BY PERCENT OCCURRENCE**



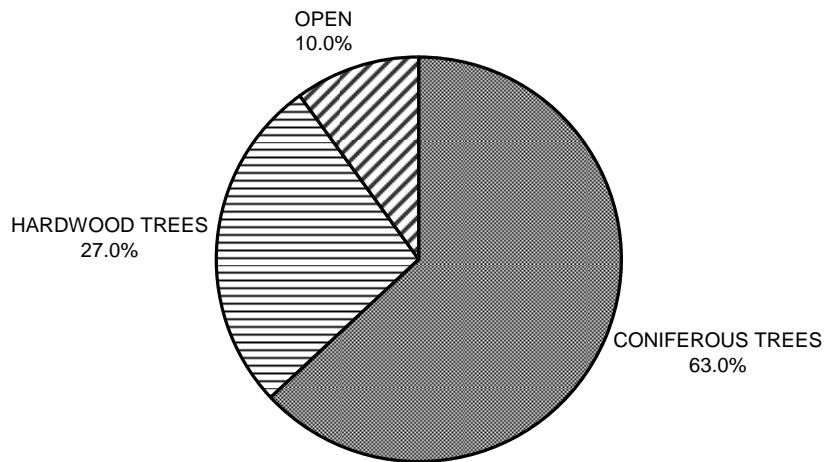
GRAPH 4: Level I pool types by percent occurrence

**CUMMISKEY CREEK, TRIB B
MEAN PERCENT COVER TYPES IN POOLS**



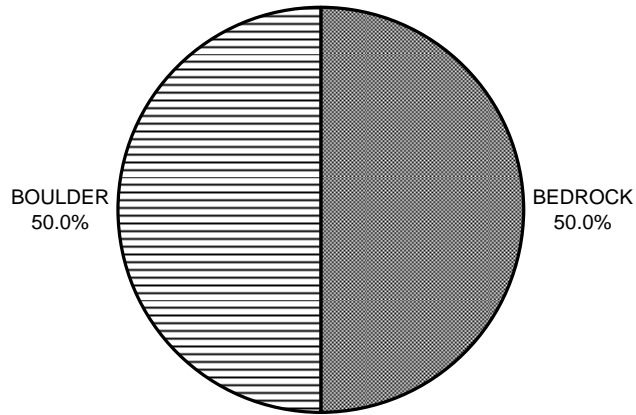
GRAPH 7

**CUMMISKEY CREEK, TRIB B
MEAN PERCENT CANOPY**



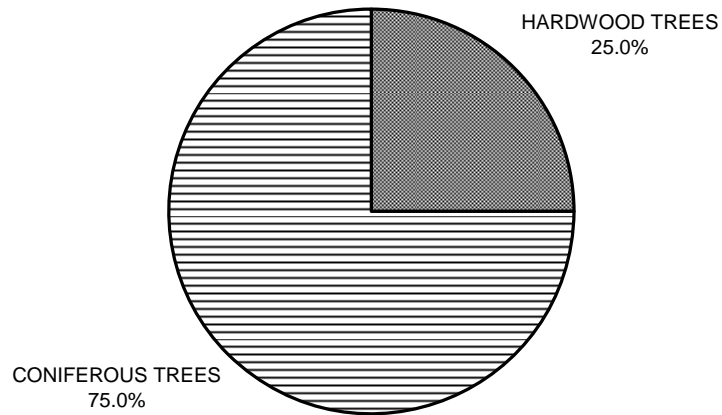
GRAPH 9

**CUMMISKEY CREEK, TRIB B
DOMINANT BANK COMPOSITION IN SURVEY REACH**



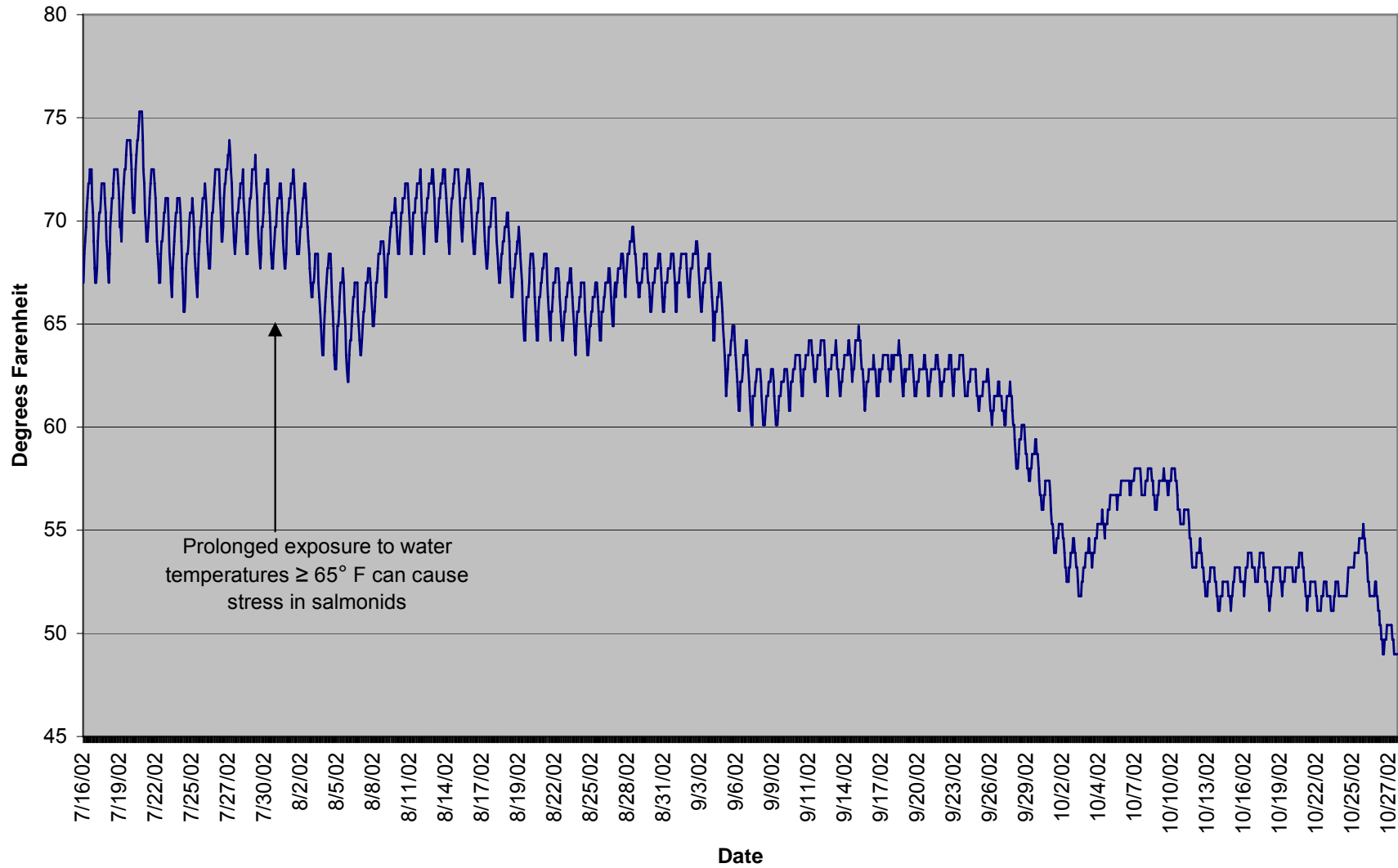
GRAPH 10

**CUMMISKEY CREEK, TRIB B
DOMINANT BANK VEGETATION IN SURVEY REACH**

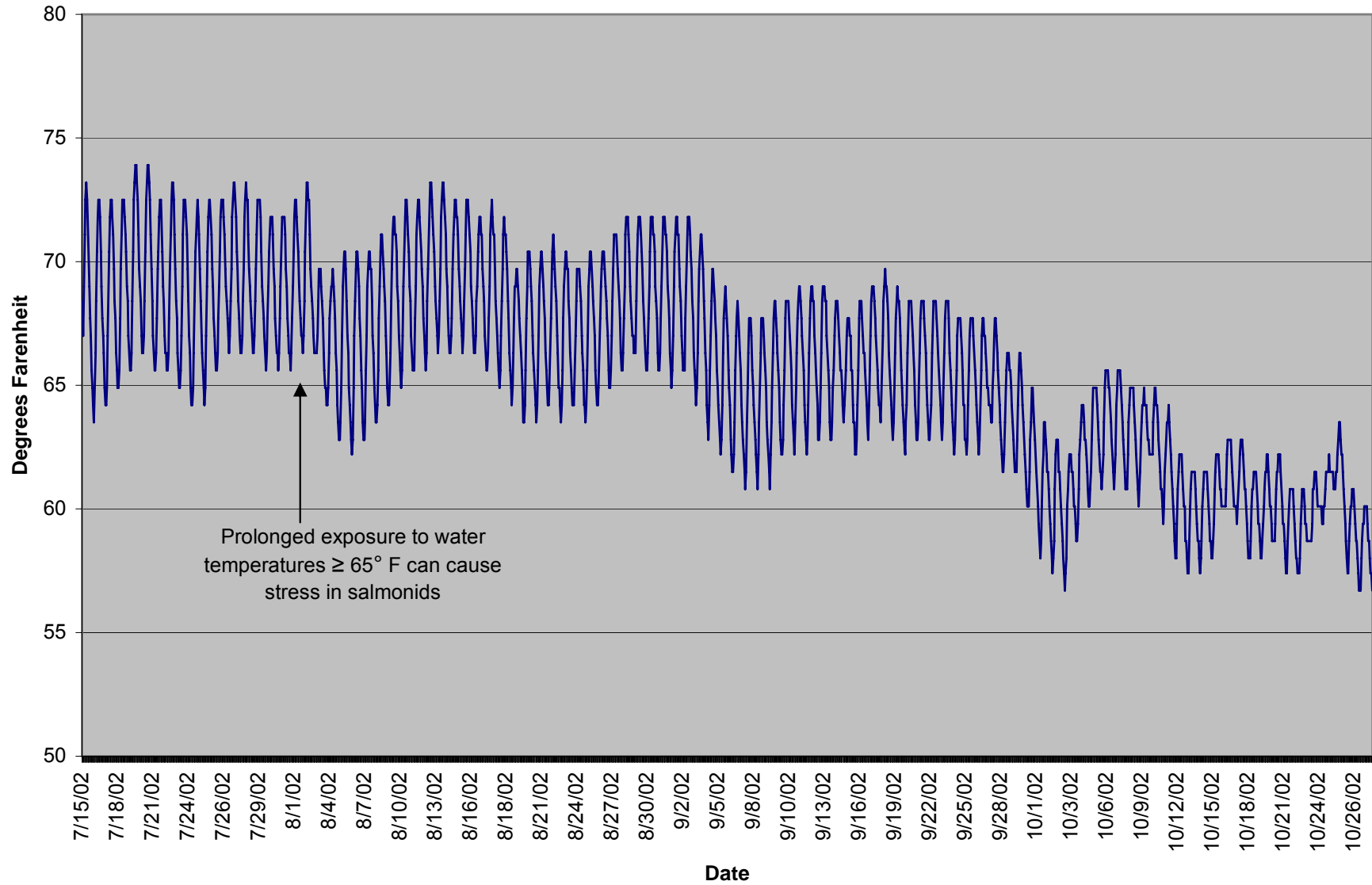


GRAPH 11

Cummiskey Creek Water Temperature 2002 (Lower - Reach 1)



Cummiskey Creek Water Temperature 2002 (Middle - Reach 7)



Cummiskey Creek Water Temperature 2002 (Upper - Reach 12)

