STREAM INVENTORY REPORT

CUMMINGS CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1993 on Cummings Creek to assess habitat conditions for anadromous salmonids. The inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Cummings Creek. The objective of the biological inventory was to document the salmonid species present and their distribution. After analysis of the information and data gathered, stream restoration and enhancement recommendations are presented.

There is no known record of adult spawning surveys having been conducted on Cummings Creek. The objective of this report is to document the current habitat conditions, and recommend options for the potential enhancement of habitat for chinook salmon, coho salmon and steelhead trout.

WATERSHED OVERVIEW

Cummings Creek is tributary to Rattlesnake Creek, tributary to the South Fork Eel River, tributary to the Eel River, located in Mendocino County, California. Cummings Creek's legal description at the confluence with Rattlesnake Creek is T23N R15W S19. Its location is 39°49'38" N. latitude and 123°34'14" W. longitude. Cummings Creek is a first order stream and has approximately 0.8 miles of blue line stream, according to the USGS Tan Oak Park 7.5 minute quadrangle. Cummings Creek drains a watershed of approximately 1.9 square miles. Summer base runoff is approximately 0.6 cfs at the mouth. Elevations range from about 1,400 feet at the mouth of the creek to 3,200 feet in the headwater areas. Douglas fir forest dominates the watershed. The watershed is privately owned and is managed for timber production. Vehicle access exists from U.S. Highway 101, approximately two miles east of Tan Oak Park.

METHODS

The habitat inventory conducted in Cummings Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1991). The California Conservation Corps (CCC) Technical Advisors that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). Cummings Creek personnel were trained in May, 1993, by Gary Flosi and

Scott Downie. This inventory was conducted by a two person team.

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 Cummings Creek to record measurements and observations. There are nine components to the inventory form. For specific information on the methods used, see the Rattlesnake Creek report.

BIOLOGICAL INVENTORY

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

SUBSTRATE SAMPLING

Gravel sampling is conducted using a 9 inch diameter standard McNeil gravel sampler. Sample sites are identified numerically beginning at the most upstream site in the stream. Gravel samples are separated and measured to determine respective percent volume using five sieve sizes (25.4, 12.5, 4.7, 2.37, and 0.85mm).

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat Runtime, a DBASE 4.1 data entry program developed by the California Department of Fish and Game. This program processes and summarizes the data, and produces the following six tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Graphics are produced from the tables using Lotus 1,2,3. Graphics developed for Cummings Creek include:

- Riffle, flatwater, pool habitats by percent occurrence

Cummings Creek

- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence

- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Percent canopy
- Bank composition by composition type

HABITAT INVENTORY RESULTS

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

The habitat inventory of July 19 and 20, 1993, was conducted by Ruth Goodfield and Warren Mitchell (CCC). The total length of the stream surveyed was 3,967 feet, with an additional 66 feet of side channel.

Flow was measured 300 feet from the confluence of Rattlesnake Creek with a Marsh-McBirney Model 2000 flowmeter at 0.6 cfs on July 15, 1993.

Cummings Creek is a B2 channel type for the first 2,208 feet of stream reach surveyed, then it changes to an A3 channel type for the remaining 1,759 feet of the survey. B2 channels are moderate gradient (1.0-2.5%), moderately confined streams, with stable stream banks. A3 channels are steep gradient (4-10%), well confined, and have unstable stream banks.

Water temperatures ranged from 49 to 66 degrees fahrenheit. Air temperatures ranged from 51 to 78 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, pools made up 38.7%, riffles 34.9%, and flatwater 26.4% (Graph 1). Flatwater habitat types made up 42.1% of the total survey **length**, riffles 32.4%, and pools 25.5% (Graph 2).

Fourteen Level IV habitat types were identified. The data are summarized in Table 2. The most frequent habitat types by percent **occurrence** were low gradient riffles, 21.7%; mid-channel pools, 17.9%; and runs, 15.1% (Graph 3). By percent total **length**, step runs made up 27.3%, low gradient riffles 17.4%, and runs 14.8%.

Cummings Creek

Forty-one pools were identified (Table 3). Main channel pools were most often encountered at 58.5%, and comprised 66.8% of the total length of pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Depth is an indicator of pool quality. Twenty-six of the 41 pools (63%) had a depth of less than two feet (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 32 pool tail-outs measured, zero had a value of 1 (0.0%); 2 had a value of 2 (6.3%); 24 had a value of 3 (75.0%); and 6 had a value of 4 (18.7%). On this scale, a value of one is the best for fisheries (Graph 6).

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Pool habitat types had the highest shelter rating at 14.4. Riffle habitats followed with a rating of 10.4 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 25.4, main channel pools had a rating of 10.0, and backwater pools rated 5.0 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Cummings Creek and are extensive. Large and small woody debris are lacking in nearly all habitat types. Graph 7 describes the pool cover in Cummings Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 20 of the 23 low gradient riffles (87.0%). Gravel was the next most frequently observed dominant substrate type, and occurred in 13.0% of the low gradient riffles (Graph 8).

Twenty-four percent of the survey reach lacked shade canopy. Of the 76% of the stream covered with canopy, 99% was composed of deciduous trees, and 1% was composed of coniferous trees. Graph 9 describes the canopy in Cummings Creek.

Table 2 summarizes the mean percentage of the right and left stream banks covered with vegetation by habitat type. For the stream reach surveyed, the mean percent right bank vegetated was 66.0%. The mean percent left bank vegetated was 69.1%. The dominant elements composing the structure of the stream banks consisted of 54.3% bedrock, 11.9% boulder, 19.0% cobble/gravel, 4.8% bare soil, 0.9% grass, 2.9% brush. Additionally, 6.2% of the banks were covered with deciduous trees, including downed trees, logs, and root wads (Graph 10).

Cummings Creek

BIOLOGICAL INVENTORY RESULTS

One site was electrofished on August 11, 1993 in Cummings Creek. The unit was sampled by Ruth Goodfield and Warren Mitchell. All measurements are fork lengths (FL) unless noted otherwise.

The site sampled was habitat unit 016, a step run, approximately 942 feet from the confluence with Rattlesnake Creek. This site had an area of 85 sq ft, and a volume of 51 cu ft. The unit yielded one steelhead, 171mm FL.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Cummings Creek.

DISCUSSION

The surveyed reach of Cummings Creek has two channel types: A3 and B2. The A3 channel type is generally not suitable for fish habitat improvement structures. A3 channels are found in high energy, steep gradient stream reaches. They have channels dominated by coarse-grained materials, do not retain gravels very well, and have unstable stream banks. The B2 channel type is excellent for many types of low and medium stage instream enhancement structures. There are 2,208 feet of this type of channel in Cummings Creek. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and pool cover.

The water temperatures recorded on the survey days July 19 and 20, 1993 ranged from 49° F to 66° F. Air temperatures ranged from 51° F to 78° F. This is a good water temperature regime for salmonids. However, 66° F, if sustained, is above the threshold stress level for salmonids. This does not seem to be the case here, and Cummings Creek seems to have temperatures favorable to salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling conducted.

Flatwater habitat types comprised 42.1% of the total **length** of this survey, riffles 32.4%, and pools 25.5%. The pools are relatively shallow with only 15 of the 41 pools having a maximum depth greater than 2 feet. However, in coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat. In first and second order streams a primary pool is defined to have a maximum depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Therefore, 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 cause streambank erosion.

Thirty of the 32 pool tail-outs measured had embeddedness ratings of 3 or 4. Zero had a 1 rating. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Cummings Creek, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

The mean shelter rating for pools was low with a rating of 14.4. The shelter rating in the flatwater habitats was lower at 7.9. However, a pool shelter rating of approximately 100 is desirable. The relatively small amount of cover that now exists is being provided primarily by boulders in all habitat types. Additionally, bedrock ledges contribute a small amount. Log and root wad cover structures in the pool and flatwater habitats are needed to improve 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.

Twenty of the 23 low gradient riffles had gravel as the dominant substrate. This is generally considered good for spawning salmonids.

The mean percent canopy for the stream was 76%. This is a relatively high percentage of canopy, since 80 percent is generally considered optimum in these north coast streams. In areas of stream bank erosion, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

1) Cummings Creek should be managed as an anadromous, natural production stream.

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

3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from boulders. Adding high quality complexity with woody cover is desirable and in some areas the material is at hand.

4) Temperatures in this section of Cummings Creek, as well as upstream, should be monitored to determine if they are having a deleterious effect upon juvenile salmonids. To achieve this, biological sampling is also required.

5) Inventory and map sources of stream bank 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.

6) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

7) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem. Fish passage should be monitored, and improved where possible.

PROBLEM SITES AND LANDMARKS

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

0' Begin survey at confluence with Rattlesnake Creek. Reach #1 is a B2 channel type.

25' Corrugated arch culvert 10' wide x 6.5' high with a concrete bottom. Plunge 2' high at culvert outfall.

1734' Small tributary enters from the left bank. Not utilized by anadromous fish: waterfall at mouth, high gradient, low flow.

2208' Channel type changes to an A3 (reach #2).

2274' Plunge 4' high with no plunge pool.

2515' Plunge 3' high.

2525' Steep chute is a probable fish barrier.

Cummings Creek

2795'Plunge 3' high.

3715'Tributary enters from the left bank; approximate flow 0.2 cfs.

3878'Plunge 3.5' high.

3967'End of survey. Series of cascades with plunges 8' high; major fish barrier.

LEVEL III and LEVEL IV HABITAT TYPE KEY:

HABITAT TYPE	LETTER	NUMBER
RIFFLE		
Low Gradient Riffle	[LGR]	1.1
High Gradient Riffle	[HGR]	1.2
CASCADE		
Cascade	[CAS]	2.1
Bedrock Sheet	[BRS]	2.2
FLATWATER		
Pocket Water	[POW]	3.1
Glide	[GLD]	3.2
Run	[RUN]	3.3
Step Run	[SRN]	3.4
Edgewater	[EDW]	3.5
MAIN CHANNEL POOLS		
Trench Pool	[TRP]	4.1
Mid-Channel Pool	[MCP]	4.2
Channel Confluence Pool	[CCP]	4.3
Step Pool	[STP]	4.4
SCOUR POOLS		
Corner Pool	[CRP]	5.1
Lateral Scour Pool - Log Enhanced	[LSL]	5.2
Lateral Scour Pool - Root Wad Enhanced	[LSR]	5.3
Lateral Scour Pool - Bedrock Formed	[LSBk]	5.4
Lateral Scour Pool - Boulder Formed	[LSBo]	5.5
Plunge Pool	[PLP]	5.6
BACKWATER POOLS		
Secondary Channel Pool	[SCP]	6.1
Backwater Pool - Boulder Formed	[BPB]	6.2
Backwater Pool - Root Wad Formed	[BPR]	6.3
Backwater Pool - Log Formed	[BPL]	6.4
Dammed Pool	[DPL]	6.5