STREAM INVENTORY REPORT

DAIRY CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1992 on Dairy 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 Dairy 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 Dairy 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

Dairy Creek is tributary to the Little Van Duzen River (South Fork Van Duzen River), tributary to the Van Duzen River, tributary to the Eel River, located in Humboldt County, California. Dairy Creek's legal description at the confluence with the South Fork Van Duzen River is T1S R5E S03. Its location is 40°23'51" N. latitude and 123°36'55" W. longitude. Dairy Creek is a second order stream and has approximately 4.9 miles of blue line stream, according to the USGS Dinsmore 7.5 minute quadrangle. Dairy Creek drains a watershed of approximately 4.0 square miles. Elevations range from about 2,200 feet at the mouth of the creek to 4,000 feet in the headwater areas. Grass, oak, and Douglas fir forest dominate the watershed. The watershed is privately owned and is managed for rangeland. Vehicle access exists from State Highway 36 at Dinsmore, via a private road controlled by the Cottrell Ranch. Dairy Creek is located approximately 7 miles from State Highway 36.

METHODS

The habitat inventory conducted in Dairy 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 by the California Department of Fish and Game (DFG). Dairy Creek personnel were trained in May, 1992, by Gary Flosi and Scott Downie.

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 Dairy Creek to record measurements and observations. There are nine components to the inventory form. For specific information on the methods used, see the South Fork Van Duzen River 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.

Biological inventory was conducted in Dairy Creek to document the fish species composition and distribution. One site was electrofished in Dairy Creek using one Smith Root Model 12 electrofisher. The site was end-blocked with nets to contain the fish within the sample reach. Fish from the site were counted by species, measured, and returned to the stream.

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 (DFG). This program also processes and summarizes the data.

The Habitat Runtime program produces the following 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 Dairy Creek include:

- Riffle, flatwater, pool habitats by percent occurrence
- 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 August 28 and 31, 1992, was conducted by Shea Monroe and Russ Irvin (CCC and contract seasonal). The total length of the stream surveyed was 6,817 feet, with an additional 52 feet of side channel.

Flows were not measured on Dairy Creek.

Dairy Creek is a C2 channel type for the first 3,972 feet of the stream reach surveyed, then it changes to a D1 channel type for the remaining 2,845 feet of the survey. C2 channels are low gradient, moderately confined streams, with over-fit cobble beds. D1 channels are low gradient, braided, coarse grained streams.

Water temperatures ranged from 52 to 62 degrees fahrenheit. Air temperatures ranged from 54 to 86 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, riffles made up 39.4%, flatwater types 28.8%, and pools 21.2% (Graph 1). Riffles made up 31.7% of the total survey **length**, flatwater types 20.8%, and

pools 8.2% (Graph 2).

Ten 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, 39.4%; runs, 16.7%; and step runs, 9.1% (Graph 3). By percent total **length**, low gradient riffles made up 31.7%, runs 9.3%, and step runs 7.9%.

Fourteen pools were identified (Table 3). Scour pools were most often encountered at 54.1%, and comprised 67.2% 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. Eight of the 14 pools (57%) had a depth of less than two feet (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 8 pool tail-outs measured, one had a value of 1 (12.5%); 6 had a value of 2 (75.0%); one had a value of 3 (12.5%); and zero had a value of 4. 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 38.6. Riffle habitats followed with a rating of 19.8 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 41.7, scour pools had a rating of 38.6, and backwater pools rated 20.0 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Dairy Creek and are extensive. Large and small woody debris are the next most common cover types. Graph 7 describes the pool cover in Dairy Creek.

Table 6 summarizes the dominant substrate by habitat type. Large cobble was the dominant substrate observed in 10 of the 26 low gradient riffles (38.5%). Gravel was the next most frequently observed dominant substrate type, and occurred in 30.8% of the low gradient riffles (Graph 8).

Twenty-eight percent of the survey reach lacked shade canopy. Of the 72% of the stream covered with canopy, 91% was composed of deciduous trees, and 9% was composed of coniferous trees. Graph 9 describes the canopy in Dairy 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

55.0%. The mean percent left bank vegetated was 60.1%. The dominant elements composing the structure of the stream banks consisted of 6.8% boulder, 12.9% cobble/gravel, 2.3% bare soil, 10.6% grass, 5.3% brush. Additionally, 56.8% of the banks were covered with deciduous trees, and 2.3% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

BIOLOGICAL INVENTORY RESULTS

One site was electrofished on September 10, 1992, in Dairy Creek. The unit was sampled by John Crittenden and Russ Irvin (CCC and contract seasonal). All measurements are fork lengths unless noted otherwise.

The site sampled was habitat unit 031, a run, approximately 4,313 feet from the confluence with the Little Van Duzen River. This site had an area of 1,091 sq ft, and a volume of 327 cu ft. One pass was conducted at the site, with an effort of 328. Thirty-five steelhead were sampled, ranging from 46 to 120 mm FL.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Dairy Creek.

DISCUSSION

The surveyed reach of Dairy Creek has two channel types: C2 and D1. D1 channels are braided, unstable streams that are poorly suited for enhancement structures. C2 channels have the suitable gradient 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 cover for fish. Well placed and engineered structures that constrict the
channel to form pool habitat are usually appropriate and have a good chance of success in this channel type.

The water temperatures recorded on the survey days August 28 and 31, 1992, ranged from 52° F to 62° F. Air temperatures ranged from 54° F to 86° F. This is a very good water temperature regime for salmonids. However, 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 20.8% of the total **length** of

this survey, riffles 31.7%, and pools 8.2%. The pools are relatively shallow with only 6 of the 14 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. 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.

Six of the 8 pool tail-outs measured had embeddedness ratings of 2. Only one had a rating of 3 or more. Embeddedness in excess of 26%, a rating of 2 or more, is considered poor quality for fish habitat.

The mean shelter rating for pools was moderate with a rating of 38.6. The shelter rating in the flatwater habitats was lower at 15.3. 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, large and small woody debris 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.

Fifteen of the 26 low gradient riffles had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean percent canopy for the stream was 72%. 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) Dairy 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.

4) Inventory and map sources of stream bank erosion, and prioritize them according to present and potential sediment yield. Identified sites, like the site at 5486', should then be treated to reduce the amount of fine sediments entering the stream.

5) There are at least two sections where the stream is being impacted from cattle trampling the riparian zone, and defecating in the water. Alternatives should be explored with the grazier, and developed if 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 the Little Van Duzen River. Reach #1 is a C2 channel type.
148'	Abundant cattle dung in the stream channel, with cattle trails eroding the stream banks.
887'	Left bank erosion 6' high x 20' long, with alders at the toe.
902'	Cattle crossing with associated left bank erosion.
1119'	YOY and 1+ steelhead observed.
1424'	Channel is braided and dry for the next 1590 feet.
3120'	Road crossing.
3150'	Channel is braided and dry for the next 639 feet.
3789'	Right bank erosion 175' high x 100' long contributing cobble into the channel.
3972'	Channel type changes from a C2 to a D1 (reach #2).
5486'	Left bank slide 40' high x 150' long x 70' wide, with gravel retention 100' long x 60' wide.
5750'	YOY observed.

6006' Log and debris accumulation (LDA) 50' wide x 30' long x 10' high with gravel retention. Right bank slide 50' high x 50' long, contributing sediment into the channel.

6817' End of survey.