STREAM INVENTORY REPORT

GRAPEWINE CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1993 on Grapewine 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 Grapewine 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 Grapewine 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

Grapewine Creek is tributary to Rattlesnake Creek, tributary to the South Fork Eel River, located in Mendocino County, California. Grapewine Creek's legal description at the confluence with Rattlesnake Creek is T23N R15W S28. Its location is 39°48'31" N. latitude and 123°32'50" W. longitude. Grapewine Creek is a first order stream and has approximately 1.3 miles of blue line stream, according to the USGS Tan Oak and Iron Peak 7.5 minute quadrangles. Grapewine Creek drains a watershed of approximately 2.5 square miles. Summer base runoff is approximately 0.14 cfs at the mouth. Elevations range from about 1,480 feet at the mouth of the creek to 3,200 feet in the headwater areas. Grass, oak and Douglas fir forest dominate the watershed. The watershed is privately owned and is managed for rural residential purposes. Vehicle access exists via Highway 101, 5.6 miles south of Cummings at Grapewine Station. Foot access is available from Grapewine Station picnic area to the mouth of Grapewine Creek.

METHODS

The habitat inventory conducted in Grapewine 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). Grapewine 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 Grapewine 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.

Grapewine Creek

Graphics developed for Grapewine 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 10, 1993, was conducted by Ruth Goodfield and Warren Mitchell (CCC). The total length of the stream surveyed was 4,073 feet, with an additional 132 feet of side channel.

Flow was measured 100 feet from the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.14 cfs on August 10, 1993.

Grapewine Creek is a B2 channel type for the entire 4,073 feet of stream reach surveyed. B2 channels are moderate gradient, moderately confined streams, with stable stream banks.

Water temperatures ranged from 61 to 64 degrees Fahrenheit. Air temperatures ranged from 61 to 71 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, flatwater made up 38.5%, pool types 38.5%, and riffles 21.2% (Graph 1). Flatwater habitat types made up 69.4% of the total survey **length**, riffles 14.4%, and pools 14.1% (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 step runs, 26.9%; mid-channel pools, 23.1%; and low gradient riffles, 21.2% (Graph 3). By percent total **length**, step runs made up 61.9%, mid-channel pools, 8.9%, and low gradient riffles, 14.4%.

Twenty pools were identified (Table 3). Main channel pools were

most often encountered at 65.0%, and comprised 67.7% 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. Ten out of the 20 pools (50%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 20 pool tail-outs measured, zero pools had a value of 1; one pool had a value of 2 (5%); 10 had a value of 3 (50%); and 8 had a value of 4 (40%). 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. Flatwater habitat types had the highest shelter rating at 19.8. Pool habitats followed with a rating of 18.3 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 22.5, with backwater pools rated 20.0, and main channel pools rated 16.2 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Grapewine Creek and are extensive. All other cover types are lacking in nearly all habitat types. Graph 7 describes the pool cover in Grapewine Creek.

Table 6 summarizes the dominant substrate by habitat type. Small cobble was the dominant substrate observed in six of the 11 low gradient riffles (54.6%). Gravel was the next most frequently observed dominant substrate type, and occurred in 27.3% of the low gradient riffles (Graph 8).

Twenty-one percent of the survey reach lacked shade canopy. Of the 79% 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 Grapewine 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 72.3%. The mean percent left bank vegetated was 71.5%. The dominant elements composing the structure of the stream banks consisted of 9.6% bedrock, 2.9% boulder, 6.7% cobble/gravel, 1.9% bare soil, 1.9% grass, 3.9% brush. Additionally, 73.1% of the banks were covered with deciduous trees, including downed trees, logs, and root wads (Graph 10).

Grapewine Creek

BIOLOGICAL INVENTORY RESULTS

One site was electrofished on August 17, 1993 in Grapewine Creek. The units were sampled by Ruth Goodfield and Warren Mitchell. All measurements are fork lengths (FL) unless noted otherwise.

The site sampled was habitat unit 003, a step run, approximately 87 feet from the confluence with Rattlesnake Creek. This site had an area of 110 sq ft, and a volume of 55 cu ft. The unit yielded 26 steelhead, ranging from 44 to 120 mm FL.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Grapewine Creek.

DISCUSSION

The entire length of stream surveyed on Grapewine Creek is a B2 channel type. The B2 channel type is excellent for many types of low and medium stage instream enhancement structures. There are 4,205 feet of this type of channel in Grapewine 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 day August 10, 1993 ranged from 61° F to 64° F. Air temperatures ranged from 62° F to 78° F. This is a fair water temperature regime for salmonids. However, 64° F, if sustained, is near the threshold stress level for 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 69.4% of the total **length** of this survey, riffles 14.4%, and pools 14.1%. The pools are of moderate depth with 10 of the 20 pools having a maximum depth greater than 2 feet. In coastal coho and steelhead streams where primary pools comprise less than approximately 40% of total habitat, pool improvement projects are usually recommended. 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 cause streambank erosion.

Eighteen of the 20 pool tail-outs measured had embeddedness

ratings of 3 or 4. Only one 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 Grapewine 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 18.3. The shelter rating in the flatwater habitats was slightly better at 19.8. 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, terrestrial vegetation contributes 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.

Nine of the 11 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 79%. 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)Grapewine Creek should be managed as an anadromous, natural production stream.

2)Inventory and map sources of stream bank erosion, and prioritize them according to present and potential sediment yield. Identified sites, like the site at 4,073', should then be treated to reduce the amount of fine sediments entering the stream.

3) 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.

4)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.

5)Temperatures in this section of Grapewine 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.

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. Channel type is B2 for entire length of survey.

87'Square concrete culvert. Dimensions are 7' high x 10' wide x 32' long. No baffles, concrete bottom. Flow measured at 0.14 cfs.

2053'Dry tributary entering from right bank (RB).

2828'Stream becomes intermittent.

4067'Stream pinched by debris flow on left bank (LB). Dimensions are 150' long x 350' high. Contributing fines directly into the stream.

4073'End of survey. Channel dry, steep, full of large boulders. Clearly a fish barrier. Large man-made pond and old concrete dam structure observed approximately 500' beyond the end of survey.

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