STREAM INVENTORY REPORT

SEBBAS CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1993 on Sebbas 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 Sebbas Creek. The objective of the biological inventory was to document the salmonid species present and their distribution. After analysis of the information and data collected, stream restoration and enhancement recommendations are presented.

There is no known record of adult spawning surveys having been conducted on Sebbas 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

Sebbas Creek is tributary to the Indian Creek, tributary to the South Fork Eel River, located in Mendocino County, California. Sebbas Creek's legal description at the confluence with Indian Creek is T24N R18W S05. Its location is 39°58'03" N. latitude and 123°52'43" W. longitude. Sebbas Creek is a first order stream and has approximately 3.3 miles of blue line stream, according to the USGS Bear Harbor 7.5 minute quadrangle. Sebbas Creek drains a watershed of approximately 2.8 square miles. Summer base runoff is approximately 1.2 cfs at the mouth. Elevations range from about 760 feet at the mouth of the creek to 1,600 feet in the headwater areas. Redwood and Douglas fir forest dominate the watershed. The watershed is privately owned and is managed for timber production. Vehicle access exists from State Highway 1 via Georgia Pacific's WRP Road, which is gated.

METHODS

The habitat inventory conducted in Sebbas Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1991). The California Conservation Corps (CCC) Technical Advisors and the contract seasonals that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). Sebbas Creek personnel were trained in June, 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 Sebbas Creek to record measurements and observations. There are nine components to the inventory form.

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 should also be measured or estimated at major tributary confluences.

2. Channel Type:

Channel typing is conducted according to the classification system developed by David Rosgen (1985). 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 four measured parameters used to determine channel type: 1) water slope gradient, 2) channel confinement, 3) width/depth ratio, 4) substrate composition.

3. Temperatures:

Both water and air temperatures are measured and recorded at each tenth unit typed. The time of the measurement is also recorded. Both temperatures are taken in fahrenheit at the middle of the habitat unit and within one foot of the water surface.

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". Sebbas 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. Channel dimensions were measured using hip chains, range finders, tape measures, and stadia rods. Unit measurements included mean length, mean width, mean depth, and maximum depth. Pool tail crest depth at each

pool unit was measured in the thalweg. All measurements were taken in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Sebbas Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), 76 - 100% (value 4).

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. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent unit covered. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. In Sebbas Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. 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 habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes.

8. Canopy:

Stream canopy is estimated using handheld spherical densiometers and is a measure of the water surface shaded during periods of high sun. In Sebbas Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of each unit. The percentages of the canopy composed of coniferous and deciduous trees was also estimated, and the results recorded.

9. Bank Composition:

Bank composition elements range from bedrock to bare soil. Also, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand

winter flows. In Sebbas Creek, the dominant composition type in both the right and left banks was selected from a list of eight options on the habitat inventory form. Additionally, the percent of each bank covered by vegetation was estimated and recorded.

BIOLOGICAL INVENTORY

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

Biological inventory was conducted in Sebbas Creek to document the fish species composition and distribution. One site was electrofished in Sebbas Creek using one Smith Root Model 12 electrofisher. Each site was end-blocked with nets to contain the fish within the sample reach. Fish from each 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 forms 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 Sebbas 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 18, 24, and 25, 1993, was conducted by Brian Michaels and Chris Coyle (CCC and contract seasonal). The total length of the stream surveyed was 20,284 feet, with an additional 315 feet of side channel.

Flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 1.2 cfs on July 27, 1993.

Sebbas Creek is a B1-1 for the first 4,384 feet and an F3 for the remaining 15,899 feet. B1-1 streams are moderate gradient (1.5-4.0%), bedrock controlled channels, with coarse textured depositional bank materials. F3 channel types are flat, totally confined, highly meandering boulder streams with a high sediment supply.

Water temperatures ranged from 54 to 65 degrees fahrenheit. Air temperatures ranged from 48 to 80 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, pools made up 40.0%, riffles 36.8%, and flatwater types 22.6% (Graph 1). Riffle habitat types made up 41.0% of the total survey **length**, flatwater 34.6%, and pools 23.3% (Graph 2).

Nineteen 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, 36.0%; lateral scour bedrock pools, 14.2%; and step runs, 13.2% (Graph 3). By percent total **length**, low gradient riffles made up 40.2%, step runs 25.6%, and lateral scour bedrock pool 9.4%.

Sebbas Creek

One-hundred-sixty-three pools were identified (Table 3). Scour pools were most often encountered at 77.9%, and comprised 80.1% 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. Sixty-one of the 163 pools (37%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 162 pool tail-outs measured, sixty-six had a value of 1 (40.7%); 59 had a value of 2 (36.4%); 23 had a value of 3 (14.2%); and 14 had a value of 4 (8.6%). 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 46.9. Flatwater habitats followed with a rating of 21.2 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 77.9, and main-channel pools rated 18.4 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Small cobble was the dominant substrate observed in 88 of the 147 low gradient riffles (59.9%). Large cobble was the next most frequently observed dominant substrate type, and occurred in 23.8% of the low gradient riffles (Graph 8).

Eleven percent of the survey reach lacked shade canopy. Of the 89% of the stream covered with canopy, 75% was composed of deciduous trees, and 15% was composed of coniferous trees. Graph 9 describes the canopy in Sebbas 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 27.7%. The mean percent left bank vegetated was 28.7%. The dominant elements composing the structure of the stream banks consisted of 20.2% bedrock, 1.7% boulder, 6.1% cobble/gravel, 1.7% bare soil, 3.2% grass, 10.1% brush. Additionally, 43.3% of the banks were covered with deciduous trees, and 13.7% with

coniferous trees, including downed trees, logs, and root wads (Graph 10).

BIOLOGICAL INVENTORY RESULTS

Three sites were electrofished on July 28 and 30, 1993 in Sebbas Creek. The units were sampled by Brian Michaels and Craig Mesman (contract seasonal/ CCC). All measurements are fork lengths unless noted otherwise.

The first site sampled included habitat units 001-004, a mid-channel pool, riffle, run, and riffle sequence approximately 50 feet from the confluence with Indian Creek. This site had an area of 880 sq ft, and a volume of 352 cu ft. The unit yielded 15 steelhead, ranging from 41 to 76mm FL and one coho 68mm FL.

The second site sampled included units 101-102, a run/pool sequence approximately 5,784' above the confluence. This site had an area of 957 sq ft, and a volume of 400 cu ft. The unit yielded 15 steelhead ranging from 45 to 127mm FL, and 11 coho salmon ranging from 59 to 81mm FL.

The third site sampled included units 231-233, a pool, riffle, pool sequence approximately 12,004' from the confluence. This site had an area of 997 sq ft, and a volume of 736 cu ft. The site yielded 15 steelhead, ranging from 44 to 124mm FL and 15 coho ranging from 57 to 76mm FL

No gravel samples were taken on Sebbas Creek.

DISCUSSION

Sebbas Creek has two channel types; a B1-1 and an F3. The F3 channel type is generally not suitable for fish habitat improvement structures. F3 channels are highly meandering, totally confined streams with unstable stream banks. There are 15,899 feet of this channel type in Sebbas Creek.

The B1-1 channel type is excellent for many instream habitat improvement structures including bank placed boulders, submerged shelter in straight reaches, over head log cover, and "V" and straight spawning weirs. There are 4,384 feet of this channel type in Sebbas Creek.

The water temperatures recorded on the survey days August 18, 24,

and 25, 1993 ranged from 54° F to 65° F. Air temperatures ranged from 48° F to 80° F. This is a good water temperature regime 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 22.6% of the total **length** of this survey, riffles 36.8%, and pools 40.0%. The pools are relatively shallow with only 61 of the 163 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 where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream. The LDA's in the system are retaining needed gravel. Any necessary modifications to them should be done with the intent of metering the gravel out to downstream reaches that will trap the gravel for future spawning use. Therefore, gravel retention features may need to be developed prior to any LDA modification.

One-hundred-twenty-five pool tail-outs measured had embeddedness ratings of 1 or 2. Only, 14 had a 4 rating. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Sebbas Creek, 40% had a rating of 1 which is relatively good for Eel River streams, but sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken to improve this rating.

The mean shelter rating for pools was moderate with a rating of 46.9. The shelter rating in the flatwater habitats was less at 21.3. However, a pool shelter rating of approximately 100 is desirable. The 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.

One-hundred-three of the 147 low gradient riffles had small

cobble or gravel as the dominant substrate. This is generally considered good for spawning salmonids.

The mean percent canopy for the stream was 89%. This is a 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)Sebbas 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, and improve the quality of existing pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent increases in 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)There are several log debris accumulations present on Sebbas Creek that are retaining large quantities of fine sediment. The modification of these debris accumulations is desirable, but must be done carefully, over time to avoid excessive sediment loading in downstream reaches.

5)Inventory and map sources of stream bank erosion, and rank them according to present and potential sediment yield. Identified sites, like the site at 12,347', 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)The bedrock sheets and cascades above 16,241' should be investigated to determine whether migration passage should be improved or constructed.

Sebbas Creek

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 Indian Creek. Channel type is a B1-1. Biological Sample Site # 1 began at the top of habitat unit 001, 50' above the confluence.

64' Georgia-Pacific temperature monitoring site #1. DFG flow profile site.

3964' Small log debris accumulation (LDA) forming side channel.

4037' LDA 12' high x 80' wide x 30' long, retaining gravel 4' high x 60' wide x 50' long.

4077' Large LDA in previous unit clogging channel. Flow is subsurface.

4384' Channel type changes from a B1-1 to an F3.

4495' Remains from old bridge in channel, 7' high x 50' long.

4749' Small tributary entering from right bank (RB).

5588' Georgia-Pacific temperature monitoring site # 5.

5784' Biological Sample Site # 2 at habitat units 101-102.

7692' Dry tributary from right bank.

9636' Tributary entering from left bank. Flow is equivalent to 1/3 the flow of Sebbas Creek. Salmonids observed for first 1,000'. Eight foot plunge blocking fish passage beyond 1,000' mark.

10467' Left bank erosion 30' high x 40' long, contributing gravel and fines.

12004' Biological Sample Site # 3 at habitat units 231-233.

12347' Right bank erosion 10' high x 100' long, contributing gravel and fines. Source of erosion is an old road bed.

Sebbas Creek

13578'Dry tributary from right bank.

14118'LDA 4' high x 30' wide x 10' long, retaining gravel 3' high x 30' wide x 20' long. Not a barrier.

14157'LDA 5' high x 40' wide x 30' long, retaining gravel 4' high x 30' wide. Not a barrier.

15278'Dry tributary from left bank.

15789'Bedrock trench channel in next eight units.

15853'LDA 8' high x 15' wide x 25' long, retaining gravel 6' high x 20' wide. LDA is creating passage problem.

16192'Dry tributary from right bank. Young-of-the-year (YOY) salmonids observed in the main channel.

16241'Nine foot plunge over bedrock substrate. Possible passage problem.

16280'Eight foot drop in twenty feet over bedrock sheet. Possible barrier.

17490'LDA 8' high x 30' wide x 10' long, retaining gravel 4' high x 15' wide x 50' long. No fish observed over last 30 units.

18525' Right bank erosion 20' high x 100' long, retaining gravel and fines.

19029'LDA 6' high x 20' wide x 15' long, retaining gravel 5' high x 20' wide x 40' long. Main portion of LDA is comprised of an old bridge.

20090'LDA 6' high x 30' wide x 10' long, retaining gravel 4' high x 20' wide x 40' long. LDA creating passage problem. No fish observed over last 70 units.

20284'Tributary entering from left bank. Flow equals 1/2 of Sebbas. 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

Sebbas Creek

Dammed Pool	[DPL]	6.5