STREAM INVENTORY REPORT

SOUTH FORK THOMPSON CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1992 on South Fork Thompson 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 South Fork Thompson 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 South Fork Thompson 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

South Fork Thompson Creek is tributary to Thompson Creek, tributary to the Eel River, located in Humboldt County, California (Figure 1). South Fork Thompson Creek's legal description at the confluence with Thompson Creek is T1S R3E S28. Its location is 40°21'03" N. latitude and 123°50'44" W. longitude. South Fork Thompson Creek is a first order stream and has approximately 2.0 miles of blue line stream, according to the USGS Myers Flat 7.5 minute quadrangle. South Fork Thompson Creek drains a watershed of approximately 1.3 square miles. Elevations range from about 240 feet at the mouth of the creek to 2,400 feet in the headwater areas. Redwood forest dominates the watershed. The watershed is owned by the Pacific Lumber Company and is managed for timber production. Vehicle access exists from U.S. Highway 101 at Dyerville to McCann, and then via private road to the mouth of Thompson Creek. Foot access exists by walking up Thompson Creek to the forks.

METHODS

The habitat inventory conducted in South Fork Thompson Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1991). The California Conservation Corps (CCC) and contract seasonal Technical Advisors that conducted the inventory were trained in standardized habitat inventory methods by the California

Department of Fish and Game (DFG). South Fork Thompson Creek personnel were trained in May and June, 1992, by Gary Flosi and Scott Downie. This inventory was conducted by two person teams.

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

Biological inventory was conducted in South Fork Thompson Creek to document the fish species composition and distribution. Three sites were electrofished in South Fork Thompson 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.

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 also processes and summarizes the data.

The Runtime program produces the following summary 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.

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Graphics developed for South Fork Thompson 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 July 2, 14, 17, and 20, 1992, was conducted by Russ Irvin, Judah Sanders, Tony Sartori, John Crittenden and Erick Elliot (contract seasonals and CCC). The total length of the stream surveyed was 2,889 feet, with an additional 103 feet of side channel.

Flow was not measured in South Fork Thompson Creek.

South Fork Thompson Creek is an A3 channel type for the entire 2,889 feet of stream reach surveyed. A3 channels are steep (4-10% gradient), very well confined streams, with unstable stream banks.

Water temperatures ranged from 59 to 67 degrees fahrenheit. Air temperatures ranged from 61 to 78 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, riffles made up 47%, flatwater types 35%, and pools 18% (Graph 1). Flatwater habitat types made up 49.5% of the total survey **length**, riffles 43.1%, and pools 7.4% (Graph 2).

Nine 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, 25.0%; step runs, 21.0%; and high gradient riffles, 16.0% (Graph 3). By percent total **length**, step runs made up 42.1%, low gradient riffles 24.9%, and high gradient riffles 13.3% (Table 2).

Eighteen pools were identified (Table 3). Main channel pools comprised 50.3% of the total length of pools. Scour pools were

also encountered, and comprised 49.7% of the total pool length (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Depth is an indicator of pool quality. Seventeen of the 18 pools (94%) had a depth of less than two feet (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 18 pool tail-outs measured, 4 had a value of 1 (22.2%); 10 had a value of 2 (55.6%); 3 had a value of 3 (16.7%); and one had a value of 4 (5.6%). 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. Riffles habitat types had the highest shelter rating at 61.0. Flatwater habitats followed with a rating of 55.9, and pools rated 51.4 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 52.8, and main channel pools rated 50.0 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in South Fork Thompson Creek and are extensive. Graph 7 describes the pool cover in South Fork Thompson Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 8 of the 25 low gradient riffles (32.0%). Large cobble and boulder were the next most frequently observed dominant substrate types, and each occurred in 24.0% of the low gradient riffles (Graph 8).

Twenty-two percent of the survey reach lacked shade canopy. Of the 78% of the stream covered with canopy, 73% was composed of deciduous trees, and 27% was composed of coniferous trees. Graph 9 describes the canopy in South Fork Thompson 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 53.6%. The mean percent left bank vegetated was 65.7%. The dominant elements composing the structure of the stream banks consisted of 3.0% bedrock, 2.5% boulder, 4.0% cobble/gravel, 9.0% bare soil, 22.0% grass, 33.5% brush. Additionally, 23.0% of the banks were covered with deciduous trees, and 3.0% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

BIOLOGICAL INVENTORY RESULTS

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Three electrofishing sites were sampled on South Fork Thompson Creek. The objective was to identify fish species and distribution. The units were sampled on July 22, 1992, by Judah

Sanders and Russ Irvin (contract seasonals). Each unit was end-blocked with nets to contain the fish within the sample reach. Three passes were conducted at each site, fork lengths (FL) measured and recorded, and the fish returned to the stream.

The first site sampled included habitat units 018-020, a plunge pool/low gradient riffle/high gradient riffle sequence, approximately 459 feet from the confluence with Thompson Creek. This site had an area of 489 sq ft, and a volume of 135 cu ft. The unit yielded 11 steelhead, ranging from 44 to 103mm FL.

The second site included habitat units 083-085, a riffle/step run sequence, located approximately 2,359 feet above the creek mouth. This site had an area of 1,196 sq ft, and a volume of 502 cu ft. Six steelhead were sampled. They ranged from 52 to 74mm FL.

The third site sampled was habitat unit 097, a step run, located approximately 2,889 feet above the creek mouth. The site had an area of 230 sq ft, and a volume of 92 cu ft. No fish were found.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on South Fork Thompson Creek.

DISCUSSION

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 substrates, do not retain gravels very well, and have unstable stream banks. Usually within the A3 channel there are zones of lower gradient where structures designed to trap gravels can be constructed. This seems to be the case in South Fork Thompson Creek, but any structure sites must be selected with care because of the high stream energy which can create problems with stream bank erosion and structure stability.

The water temperatures recorded on the survey days July 2-20, 1992, ranged from 59° F to 67° F. Air temperatures ranged from 61° F to 78° F. This is a fair water temperature regime for salmonids. However, 67° 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 49.5% of the total **length** of this survey, riffles 43.1%, and pools only 7.4%. The pools are

relatively shallow with only one of the 18 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 unstable stream banks of the A3 channel type.

Four of the 18 pool tail-outs measured had embeddedness ratings of 3 or 4. Four 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.

The mean shelter rating for pools was moderate with a rating of 51.4. The shelter rating in the flatwater habitats was slightly better at 55.9. 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.

Thirteen of the 25 low gradient riffles had gravel or small cobble as the dominant substrate. The remaining low gradient riffles had large cobble or boulder as the dominant substrate. This is on the high end of the substrate size generally considered desirable for spawning salmonids.

The mean percent canopy for the stream was 78%. 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) South Fork Thompson 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) There are several log debris accumulations present on South Fork Thompson Creek that are retaining large quantities of fine sediment. Modification of these debris accumulations

is desirable, but must be done carefully over time to avoid excessive sediment loading in downstream reaches.

4) Spawning gravels on Thompson Creek are limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravels in order to expand redd distribution in the stream.

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) 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 Thompson Creek. Channel type is an A3 for the entire survey reach.
280'	Numerous young-of-the-year steelhead (YOY) observed.
459'	Road crosses the channel. Road appears to be unused.
551'	Right bank erosion, contributing fines into the channel.
959'	Left bank erosion, contributing fines into the channel.
1065'	Log and debris accumulation (LDA) 17' wide x 9' long x 7' high, retaining boulder/cobble 7' high; possible barrier.

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1189'	YOY observed.
2165'	LDA 14' wide x 19' long x 8' high, retaining gravel 40' long.
2212'	Right bank erosion 90' high x 160' long, contributing gravel into the channel.
2522'	Left bank erosion 20' high x 30' long, contributing gravel and silt into the channel.
2780'	LDA 15' wide x 20' long x 7' high, creating a plunge 5' high with no jump pool.
2889'	End of survey due to steep gradient.