STREAM INVENTORY REPORT

PREACHER GULCH

INTRODUCTION

A stream inventory was conducted during the summer of 1992 on Preacher Gulch to assess habitat conditions for anadromous salmonids. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Preacher Gulch. 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 Preacher Gulch. 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

Preacher Gulch is tributary to Bull Creek, tributary to the South Fork Eel River, tributary to the Eel River, located in Humboldt County, California (Figure 1). Preacher Gulch's legal description at the confluence with Bull Creek is T2S R1E S24. Its location is 40°17'19" N. latitude and 124°00'33" W. longitude. Preacher Gulch is a first order stream and has approximately 1.7 miles of blue line stream, according to the USGS Bull Creek and Weott 7.5 minute quadrangles. Preacher Gulch drains a watershed of approximately 0.9 square miles. Elevations range from about 900 feet at the mouth of the creek to 2,800 feet in the headwater areas. Redwood and hardwood forest dominates the watershed. The watershed is owned by the State of California and is managed by Humboldt Redwoods State Parks. Vehicle access exists from U.S. Highway 101 at Dyerville via Bull Creek Road. This road has a locked gate, which is controlled by Humboldt Redwoods State Parks.

METHODS

The habitat inventory conducted in Preacher Gulch 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). Preacher Gulch personnel were trained in May 1992, by Gary Flosi and Scott Downie. This inventory was conducted by a three person team.

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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 Preacher Gulch to record measurements and observations. There are nine components to the inventory form. For specific information on the methods used see the Upper Bull Creek report.

DATA ANALYSIS:

Data from the habitat inventory form are entered into Runtime, a DBASE 4.1 data entry program developed by the Department of Fish and Game. This program 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. Graphics developed for Preacher Gulch 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 May 26 and 27, 1992, was conducted by Brian Humphrey, Craig Mesman, and Tony Sartori (CCC). The total length of the stream surveyed was 2,700 feet, with an additional 235 feet of side channel.

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Flow was measured just below the Bull Creek Road bridge with a Marsh-McBirney Model 2000 flowmeter at 0.48 cfs on June 1, 1992.

Preacher Gulch is a B1 channel type for the entire 2,700 feet of stream reach surveyed. A3 channels are high gradient streams (4.0-10%), have steep, erodible watersheds, coarse grained channels and a high sediment supply.

Water temperatures ranged from 55 to 60 degrees fahrenheit. Air temperatures ranged from 59 to 74 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, riffles made up 52.4%; flatwater types were 23.8%; and pools were also 23.8% (Graph 1). Riffle habitat types made up 66.5% of the total survey **length**, flatwater types 21.2%, and pools 12.3% (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 high gradient riffles, 28.6%; step runs, 15.9%; and low gradient riffles, 15.9% (Graph 3). By percent total **length**, high gradient riffles made up 38.5%, step runs 17.4%, and low gradient riffles 14.4% (Table 2).

Fifteen pools were identified (Table 3). Scour pools were most often encountered at 60.0%, and comprised 28.7% of the total length of pools. Backwater pools comprised 6.7% of the pool occurrences and 51.1% 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. Twelve of the 15 pools (80%) had a depth of less than two feet (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 15 pool tail-outs measured, zero had a value of 1 (0.0%); 1 had a value of 2 (6.7%); 8 had a value of 3 (53.3%); and 6 had a value of 4 (40.0%). 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 50.7. Riffle habitats followed with a rating of 32.1 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at 135.0, scour pools had a rating of 50.0, and main channel pools rated 35.0 (Table 3).

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Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Preacher Gulch and are extensive. Graph 7 describes the pool cover in Preacher Gulch.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in four of the ten low gradient riffles (40.0%). Small cobble, large cobble, and boulder were each dominant in 20.0% of the remaining units (Graph 8).

Thirty percent of the survey reach lacked shade canopy. Of the 70% of the stream covered with canopy, 83% was composed of deciduous trees, and 17% was composed of coniferous trees. Graph 9 describes the canopy in Preacher Gulch.

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 70.4%. The mean percent left bank vegetated was 67.0%. The dominant elements composing the structure of the stream banks consisted of 0.8% bedrock, 3.2% boulder, 16.7% bare soil, 17.5% grass, 2.4% brush. Additionally, 42.1% of the banks were covered with deciduous trees, and 17.5% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

DISCUSSION

The B1 channel type is excellent for bank-placed boulders and bank cover; it is good for log cover; and poor for low-stage weirs, single and opposing wing-deflectors, and boulder clusters.

The water temperatures recorded on the survey days May 26-27, 1992, ranged from 55° F to 60° F. Air temperatures ranged from 59° F to 74° F. This is a 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.

Riffle habitat types comprised 66.5% of the total **length** of this survey, flatwater types 21.2%, and pools 12.3%. The pools are relatively shallow with only 3 of the 15 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.

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Fourteen of the 15 pool tail-outs measured had embeddedness ratings of 3 or 4. Zero had a 1 rating. Embeddedness in excess of 26%, a rating of 2 or more, is considered poor quality for fish habitat. In Preacher Gulch, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

The mean shelter rating for pools was moderate with a rating of 50.7. The shelter rating in the flatwater habitats was lower at 20.0. 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. 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.

Six of the 10 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 70%. 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) Preacher Gulch 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 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.

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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 Bull Creek. Channel type is a A3 for the entire survey reach.

371' Right bank erosion 15' high x 40' long.

452' Bull Creek Road bridge 20' long x 28' wide x 11' high.

577' Right bank erosion 15' high.

1100' Left bank erosion 15' high, depositing silt and fines into the channel.

1214' Young-of-the-year YOY observed.

1913' Three foot diameter log angled across the channel, causing a 5' high plunge.

2378' Logs across channel, causing a 4' high plunge.

2585' High gradient (20%) over the last 100'; possible barrier. Left and right bank erosion 150' long x 50' high, depositing trees into the channel.

2700' Gradient steepens. 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

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Dammed Pool	[DPL]	6.5