STREAM INVENTORY REPORT

PANTHER CREEK

INTRODUCTION

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

Panther Creek is tributary to the Little Van Duzen River, tributary to the Van Duzen River, tributary to the Eel River, located in Humboldt County, California. Panther Creek's legal description at the confluence with the Little Van Duzen River is T1S R5E S09. Its location is 40°23'45" N. latitude and 123°36'31" W. longitude. Panther Creek is a second order stream and has approximately 3.9 miles of blue line stream, according to the USGS Dinsmore 7.5 minute quadrangle. Panther Creek drains a watershed of approximately 2.9 square miles. Elevations range from about 2,600 feet at the mouth of the creek to 4,400 feet in the headwater areas. Grass, oak, and Douglas fir forest dominate the watershed. The watershed is privately owned and is managed for timber production and rangeland. Vehicle access exists from State Highway 36, approximately 33 miles east from Alton and Highway 101 to the Little Van Duzen River bridge, and then via a private road controlled by the Cottrell Ranch.

METHODS

The habitat inventory conducted in Panther 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). Panther Creek personnel were trained in May, 1992, 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 Panther Creek to record measurements and observations. There are nine components to the inventory form. For more specifics on the methods used, see the Little 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 Panther Creek to document the fish species composition and distribution. One site was electrofished in Panther 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. This program processes and summarizes the data, and 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 Panther 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 27, 1992, was conducted by Shea Monroe and Brian Humphrey (CCC). The total distance surveyed was 5,058 feet, with an additional 105 feet of side channel.

Flows were not measured on Panther Creek.

Panther Creek is a B2 channel type from its mouth to 2303'. This section was dry on the survey day and was not inventoried. The

stream is an A2 channel for the next 2755' and was wetted, and therefore surveyed. B2 channels are low gradient (1 - 1.5%) slightly confined streams, with cobble/gravel beds. A2 channels are steep (4 - 10% gradient), very well confined streams, with stable stream banks.

Water and air temperatures were not measured during the habitat inventory, but on 9/10/92, during electrofishing samples, the water temperature was 53° F and the air temperature 62° F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, flatwater made up 37.9%, pools were also 37.9%, and riffles 3.5% (Graph 1). Flatwater habitat types made up 37.5% of the total survey **length**, pools 8.7%, and riffles 2.0%. At the time of the survey 51.8% of the total survey length was dry (Graph 2).

Five Level IV habitat types were identified. The data are summarized in Table 2. The most frequent habitat types by percent **occurrence** were step runs, 34.5%; and mid-channel pools, also 34.5% (Graph 3). By percent total **length**, step runs made up 36.2%, and mid-channel pools 6.1%.

Eleven pools were identified (Table 3). All of these were mid-channel pools (Graph 4). Table 4 is a summary of maximum pool depths. Depth is an indicator of pool quality. Nine of the 11 pools (82%) had a depth of less than two feet (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 10 pool tail-outs measured, zero had a value of 1 (0.0%); one had a value of 2 (10%); two had a value of 3 (20%); and seven had a value of 4 (70%). 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. Riffle habitat types had the highest shelter rating at 20.0. Flatwater habitats followed with a rating of 18.6, and pools rated 16.8 (Table 1).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Panther Creek and are extensive.

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Graph 7 describes the pool cover in Panther Creek.

Table 6 summarizes the dominant substrate by habitat type. There was one low gradient riffle in the survey reach. It had boulder as its dominant substrate (Graph 8).

Thirteen percent of the survey reach lacked shade canopy. Of the 87% 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 Panther 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 81.5%. The mean percent left bank vegetated was 83.3%. The dominant elements composing the structure of the stream banks consisted of 8.5% bedrock, 6.8% boulder, 1.7% brush. Additionally, 1.7% of the banks were covered with deciduous trees, and 81.4% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

BIOLOGICAL INVENTORY RESULTS

One site was electrofished on September 10, 1992 in Panther 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 a small pool, with an area of 375 sq ft. Two passes were made, for a total effort of 290. The unit yielded 42 steelhead, ranging from 52 to 180mm FL.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Panther Creek.

DISCUSSION

The A2 channel type is generally not suitable for fish habitat improvement structures. A2 channels are found in high energy,

steep gradient stream reaches. They have channels dominated by boulders, do not retain gravels very well, but do have stable stream banks. Usually within the A2 channel there are zones of lower gradient where structures designed to trap gravels can be constructed. This seems to be the case in Panther 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 B2 channel type is excellent for many types of low and medium stage instream enhancement structures. There are 2303' of this type of channel in Panther Creek. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and pool cover.

The water temperature recorded on the biological survey day September 10, 1992 was 53° F. Air temperature was 62° F. This is a good water temperature for salmonids. To make any further conclusions, temperatures need to be monitored through the warm summer months, and more extensive biological sampling conducted.

Flatwater habitat types comprised 37.5% of the total **length** of this survey, pools 8.7%, and riffles 2.0%. The pools are relatively shallow with only 2 of the 11 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.

Nine of the 10 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 Panther 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 16.8. The shelter rating in the flatwater habitats was slightly better at 18.6. 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.

There was only one low gradient riffle in the survey reach. It had boulder as the dominant substrate. This is generally considered poor for spawning salmonids.

The mean percent canopy for the stream was 87%. 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) Panther 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 and in some areas the material is at hand.

4) 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.

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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 2303' from the confluence with the Little Van Duzen River. The channel was dry until this point.
420'	Gradient increases. Numerous young-of-the-year (YOY), 1+, and 2+ steelhead observed. Tributary enters from the left bank.
2096'	Tributary enters from the right bank. No YOY observed.
2738'	Gradient is steep with boulders as the dominant substrate. No YOY observed.
2755'	Large log and debris accumulation (LDA) 50' wide x 40' long x 15' high, retaining gravel 12' high x 100' long. End of survey.

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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