# STREAM INVENTORY REPORT

# BLANTON CREEK

## INTRODUCTION

A stream inventory was conducted during the summer of 1991 on Blanton 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 Blanton 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.

Adult spawning surveys conducted in December 1987, January 1988, and January 1992, documented chinook salmon in Blanton Creek. Adult spawning surveys conducted in December 1988, January 1989, and January 1990 found no fish in Blanton Creek. The objective of this report is to document the current habitat conditions, and recommend options for the enhancement of habitat for chinook salmon, coho salmon and steelhead trout.

## WATERSHED OVERVIEW

Blanton Creek is tributary to Yager Creek, tributary to the Van Duzen River, tributary to the Eel River, located in Humboldt County, California (Figure 1). The legal description at the confluence with Yager Creek is T2N R1E S12. Its location is 40°34'35" N. latitude and 124°00'26" W. longitude. Blanton Creek is a first order stream. The total length of blue line stream, according to the USGS Hydesville quadrangle is 1.25 mile.

Blanton Creek drains a watershed of approximately 3.28 square miles. Redwood and Douglas fir forest dominates the watershed. The watershed is owned by the Pacific Lumber Company and is managed for timber production. Year round vehicle access exists from State Highway 36 near Carlotta, via Fisher Road, to Pacific Lumber Company's Yager Camp. The main Yager-Lawrence Haul Road crosses Blanton Creek at about mile 6.5.

## METHODS

The habitat inventory conducted in Blanton Creek follows the methodology as presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds). The inventory was conducted by three and four person teams. The California Conservation Corps (CCC), Technical Advisors conducting the

inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). Blanton Creek personnel were trained in May and June, 1991, by Gary Flosi and Scott Downie.

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 Blanton 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 was 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 operations 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 taken and recorded each tenth unit typed. The time of the measurement is also recorded. 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 used 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". Blanton 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 measurements were accomplished using hip chains, range finders,

tape measures, and stadia rods. Unit measurements included mean length, mean width, mean depth, and maximum depth. Depth of the pool tail crest at each pool habitat unit was measured at 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 Blanton 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 cover. 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 Blanton 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 Blanton 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 total canopy area was then further analyzed and recorded according to whether it was composed of either coniferous or deciduous trees.

9. Bank Composition:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Blanton 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 Blanton Creek to document the salmonid species composition and distribution. Four sites were electrofished in Blanton Creek using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, measured, and returned to the stream.

## SUBSTRATE SAMPLING

Gravel sampling is conducted using either a 6 or 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 0.85 mm). During field analysis, fine sediment suspended in the liquid portion of the sample is settled in Imhoff cones for one hour, measured, and recorded on a standard field form. The remainder of the sample is sealed in plastic bags with an identification and information ribbon, then taken to the laboratory for final processing.

In the laboratory the samples are wet sieved using standard Tyler screens. All particles greater than 0.85 mm diameter are measured by displacement in graduated cylinders. The volume of fine sediment less than 0.85 mm is measured following one hour of settling in graduated cylinders or Imhoff cones. The fines measured in the field are added to these results.

Gravel sampling is conducted to determine the percentage of fine sediment present in probable fish spawning areas. These areas are generally found in low gradient riffles, at the tail-out of a pool, in the thalweg. The higher the percent of fine

sediment, the lower the probability for eggs to survive to hatch. This is due to the reduced quantity of oxygenated water able to be percolated through the gravel, or because of the fine sediment capping the redd and preventing fry from emerging from the gravel.

## DATA ANALYSIS

Data from the habitat inventory form is entered into Habitat, a dBASE 4.1 data entry program developed by the Department and Fish and Game. Habitat also analyzes and summarizes the collected information for planning purposes.

The Habitat 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 Blanton 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 RESULTS *

The habitat inventory of May 31 and June 3, 1991, was conducted by Tony Sartori, Shea Monroe, Jay Miller, and Erick Elliot (CCC). The total length of the stream surveyed was 4,195 feet, with an additional 75 feet of side channel.

Flows were not measured on Blanton Creek.

Blanton Creek is a B3 channel type for the first 1,398 feet, then it changes to an A3 channel for the next 615 feet, then it

changes to a B2 channel for remaining 2,182 feet of the survey. B3 channels are moderate gradient (1.5-4.0%), well confined streams, with unstable stream banks. A3 channels are steep (4-10% gradient), very well confined, with erodible stream banks. B2 channels are moderate gradient, moderately confined, stable channels.
Water temperatures ranged from 48 to 52 degrees fahrenheit. Air temperatures ranged from 48 to 69 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, riffles made up 35.3%, flatwater types were 20.6%, and pools 44.1% (Graph 1). Flatwater habitat types made up 35.4% of the total survey **length**, riffles were 43.6%, and pools 21.0% (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, 28.4%; mid-channel pools, 14.7%; plunge pools, 13.7%; and step runs, 11.8% (Graph 3). By percent total **length**, low gradient riffles made up 37.3%; step runs were 29.3%; plunge pools 6.7%; and mid-channel pools 6.4%.

Table 3 summarizes the pool habitat types. By percent **occurrence**, scour pools made up 46.7% and main channel pools made up 40.0%. Scour pools and main channel pools comprised 48.0 and 37.4%, respectively, 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. The maximum depth for 34 of the 45 pools (75.6%) was two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 45 pool tail-outs measured, 16 had a value of 1 (34.8%); 12 had a value of 2 (26.1%); 13 had a value of 3 (30.4%); and 4 had a value of 4 (8.7%). 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 81.4 (Table 1). For the pool types, the main channel pools had the highest mean shelter rating at 85.3, backwater pools had a mean shelter rating of 80.8, and scour pools had a rating of 78.3 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks and boulders are the dominant cover types in Blanton Creek

and are extensive. Graph 7 describes the pool cover in Blanton Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 48.3% of the low gradient riffles (Graph 8).

Thirty-five percent of the survey reach lacked shade canopy. Of the 65% of the stream covered with canopy, 59% was composed of deciduous trees, and 41% was composed of coniferous trees. Graph 9 describes the canopy in Blanton 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 63.7%. The mean percent left bank vegetated was 65.5%. The dominant elements composing the structure of the stream banks consisted of 4.9% bedrock, 4.9% boulder, 4.9% cobble/gravel, 2.9% bare soil, 17.6% grass, 20.5% brush. Additionally, 15.6% of the banks were covered with deciduous trees, and 28.8% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

## BIOLOGICAL INVENTORY RESULTS

Four electrofishing sites were sampled on Blanton Creek. The units were sampled on August 12 and 13, 1991 by Craig Mesman and Jay Miller (CCC). The results are as follows:

The first site sampled was habitat unit 006, a plunge pool, approximately 195 feet from the confluence of Yager Creek. The site had an area of 300 sq ft and a volume of 480 cu ft. Two passes were performed, which yielded 14 steelhead, ranging from 47 to 108 mm fork length.

The second site was habitat unit 046, a plunge pool, approximately 1,772 feet from the confluence. This site had an area of 197.6 sq ft and a volume of 355.7 cu ft. Two passes were performed, which yielded five steelhead: 48, 110, 115, 122, and 168 mm fork length.

The third site was habitat unit 052, a plunge pool, approximately 1,936 feet from the confluence. The site had an area of 336.0 sq ft and a volume of 571.2 cu ft. Two steelhead were sampled, 110mm and 141mm fork length.

The fourth site was habitat unit 062, a plunge pool, approximately 2,459 feet from the confluence. The site had an

area of 286 sq ft and a volume of 286 cu ft. Three steelhead were sampled, 104, 113, and 117 mm fork length.

## GRAVEL SAMPLING RESULTS

No gravel samples were collected on Blanton Creek.

## DISCUSSION

Blanton Creek has three channel types: B2, B3, and A3. The unstable stream banks of the A3 and B3 channel types are generally unsuitable for instream enhancement structures. The B2 channel type is suitable for many types of low and medium stage instream enhancement structures. There are 2,182 feet of this type of channel in the upper reach of the surveyed area of Blanton 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 days May 28-31, 1991 ranged from 48° F to 52° F. Air temperatures ranged from 48° F to 69° F. This is a very 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.

Flatwater habitat types comprised 35.4% of the total **length** of this survey, riffles 43.6%, and pools 21.0%. The pools are relatively deep with 34 of the 45 pools having a maximum depth of two feet or greater. 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, or interfere with the unstable stream banks of the A3 and B3 channel types.

Seventeen of the 45 pool tail-outs measured had embeddedness ratings of 3 or 4. Sixteen had a 1 rating. Embeddedness in excess of 26%, a rating of 2 or more, is considered poor quality for fish habitat. In Blanton Creek, the higher embeddedness ratings occurred in the upper survey reaches. In these areas, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

The mean shelter rating for pools was relatively high with a rating of 81.4. The shelter rating in the flatwater habitats was 72.6. A pool shelter rating of approximately 100 is

desirable. The cover that now exists is being provided primarily by undercut banks and boulders in all habitat types. Additionally, large woody debris contributes only a small amount.

Sixteen of the 29 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 65%. This is a relatively high percentage of canopy, since 80 percent is generally considered desirable. In areas of stream bank erosion, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

Approximately 10 instream habitat structures were installed by the California Conservation Corps in Blanton Creek in the last five years. In addition, a major fishway was installed in the mouth of Blanton Creek in the summer of 1991.

## RECOMMENDATIONS

1) Blanton 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) 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.

## 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' | Survey begins at the confluence with Yager Creek. Reach #1 is a B3 channel type. |
| 258' | Log bridge 23' wide x 50' long x 13' high, currently in use. |
| 515' | Overflow channel on the left 6' wide x 70' long. |

765' Exposed left bank 10' high x 60' long.

860' Left bank erosion 20' high with log bank protection at the base. Right bank erosion 4' high x 30' long. Fallen tan oak is retaining small woody debris 20' wide x 20' long x 4' high, and gravel 15' wide x 100' long x 3' high.

977' Exposed left bank 20' high x 20' long.

1318' Left bank erosion 15' high x 25' long, contributing gravel and fines into the channel.

1398' Channel type changes from a B3 to an A3 (reach #2).

1778' Log and debris accumulation (LDA) 70' long; possible barrier.

1800' 5' high waterfall.

1836' Slide 100' high x 30' long behind log bank protection. Slide is contributing silt and gravel into the channel and causing the LDA downstream.

1994' Right bank erosion 10' high x 20' long.

2004' Left bank slide 30' high x 20' long, contributing fines and gravel into the channel.

2013' Channel type changes from an A3 to a B2 (reach #3).

2333' Left bank erosion 4' high x 20' long, contributing fines and gravel into the channel.

3263' LDA 20' long x 15' wide.

3520' Left bank is steep gravel bank (stable) 150' high x 162' long.

4151' 12' high cascade with overflow pool on the left bank.

4195' End of survey.