

STREAM INVENTORY REPORT

West Fork Honeydew Creek

INTRODUCTION

A stream inventory was conducted during the summer of 1996 on West Fork Honeydew Creek. 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 West Fork Honeydew Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species. There is no known record of adult spawning surveys having been conducted on West Fork Honeydew 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. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

West Fork Honeydew Creek is tributary to Honeydew Creek, tributary to the Mattole River, located in Humboldt County, California. West Fork Honeydew Creek's legal description at the confluence with the Mattole River is T03S R01W S24. Its location is 40°11'46" N. latitude and 124°07'31" W. longitude. West Fork Honeydew Creek is a first order stream and has approximately 2.2 miles of blue line stream according to the USGS Shubrick Peak 7.5 minute quadrangle. West Fork Honeydew Creek drains a watershed of approximately 2.5 square miles. Summer base runoff is approximately 0.1 cubic feet per second (cfs) at the mouth, but over 15 cfs is not unusual during winter storms. Elevations range from about 800 feet at the mouth of the creek to 2,200 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely owned by the Bureau of Land Management (BLM) and is managed for recreation. Vehicle access exists via the Shelter Cove Road from Redway to Ettersburg/Honeydew Road. Turn north and continue through Ettersburg along Wilder Ridge Road toward the town of Honeydew. Turn west on the unimproved road just past Honeydew Creek bridge. Drive approximately 2.4 miles and walk upstream on Honeydew Creek approximately 0.5 miles to the mouth of West Fork Honeydew Creek.

METHODS

The habitat inventory conducted in West Fork Honeydew Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi and Reynolds, 1991 rev. 1994). The Pacific Coast Fisheries, Wildlife, and Wetlands Restoration Association (PCFWWRA) members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). West Fork Honeydew Creek personnel were trained in May, 1996, by Scott Downie and Ruth Goodfield. This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach (Hopelain, 1994). All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth. Habitat unit types encountered for the first time are further measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

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 West Fork Honeydew 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.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 1994). 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 five measured parameters used to determine channel type: 1) water slope

West Fork Honeydew Creek

gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees 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". West Fork Honeydew 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. All units were measured for mean length; additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were sampled for all features on the sampling form (Hopelain, 1995). Pool tail crest depth at each pool unit was measured in the thalweg. All measurements were 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 West Fork Honeydew 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). Additionally, a rating of "not suitable" (NS) was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream

West Fork Honeydew Creek

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 fully-described 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 West Fork Honeydew 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 fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two respectively.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*, 1994. Canopy density relates to the amount of stream shaded from the sun. In West Fork Honeydew Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or deciduous trees.

9. Bank Composition and Vegetation:

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 West Fork Honeydew Creek, the dominant composition type (options 1-4) and the dominant vegetation type (options 5-9) of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation was estimated and recorded.

West Fork Honeydew Creek

BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream. In West Fork Honeydew Creek fish presence was observed from the stream banks.

These sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

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 0.85 mm) (Valentine, 1995).

DATA ANALYSIS

Data from the habitat inventory form are entered into *Habitat*, a DBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, 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 West Fork Honeydew 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

West Fork Honeydew Creek

- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

HABITAT INVENTORY RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of July 31, 1996, was conducted by Dave Smith and Ray Bevitori (PCFWWRA). The total length of the stream surveyed was 3,897 feet with no additional feet of side channel.

Flows were not measured on West Fork Honeydew Creek. West Fork Honeydew Creek is a B2 channel type for the entire 3,897 feet of stream reach surveyed. B2 channels are moderately entrenched, moderate gradient, riffle dominated channels with stable banks and boulder-dominant substrates.

Water temperatures taken during the survey period ranged from 60 to 63° Fahrenheit. Air temperatures ranged from 62 to 75° F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 43% riffle units, 39% flatwater units, and 18% pool units (Graph 1). Based on total **length** of Level II habitat types there were 49% flatwater units, 39% riffle units, and 12% pool units (Graph 2).

Eight Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were low gradient riffles, 39%; step runs, 21%; and runs, 18% (Graph 3). Based on percent total **length**, low gradient riffles made up 39%, step runs 31%, and runs 18%.

A total of sixteen pools were identified (Table 3). Main channel pools were most frequently encountered at 88% and comprised 90% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. All of the 16 pools had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs.

West Fork Honeydew Creek

Of the 16 pool tail-outs measured, none had a value of 1; 15 had a value of 2 (94%); one had a value of 3 (6%); and none had a value of 4 (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate.

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 a mean shelter rating of 83, and riffle habitats had a mean shelter rating of 44 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 180. Main channel pools had a mean shelter rating of 70 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Boulder was the dominant substrate observed in three of the five low gradient riffles measured (60%). Small cobble was the next most frequently observed dominant substrate type and occurred in 40% of the low gradient riffles (Graph 8).

The mean percent canopy density for the stream reach surveyed was 75%. The mean percentages of deciduous and coniferous trees were 87% and 13%, respectively. Graph 9 describes the canopy in West Fork Honeydew Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 80%. The mean percent left bank vegetated was 66%.

The dominant elements composing the structure of the stream banks consisted of 40.9% bedrock, 18.2% boulder, 29.6% cobble/gravel, and 11.4% sand/silt/clay (Graph 10). Brush was the dominant vegetation type observed in 32% of the units surveyed. Additionally, 36.4% of the units surveyed had deciduous trees as the dominant vegetation type, and 2.3% had coniferous trees as the dominant vegetation, including down trees, logs, and root wads (Graph 11).

BIOLOGICAL INVENTORY RESULTS

No sites were electrofished during the 1996 survey of West Fork Honeydew Creek. Juvenile salmonids were observed from the

West Fork Honeydew Creek

streambank by the survey crew throughout the survey.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on West Fork Honeydew Creek.

DISCUSSION

West Fork Honeydew Creek is a B2 channel type for the entire 3,897 feet of stream surveyed. The suitability of B2 channel types for fish habitat improvement structures is excellent for low-and medium-stage plunge weirs, single and opposing wing deflectors, and bank cover.

The water temperatures recorded on the survey day July 31, 1996, ranged from 60 to 63 degrees Fahrenheit. Air temperatures ranged from 62 to 75 degrees Fahrenheit. This is an acceptable water temperature range 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 would need to be conducted.

Flatwater habitat types comprised 49% of the total **length** of this survey, riffles 39%, and pools 12%. The pools are relatively deep, with all of the 16 pools having a maximum depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream 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.

One of the 16 pool tail-outs measured had embeddedness ratings of 3 or 4. None had a 1 rating. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. In West Fork Honeydew Creek, sediment sources should be mapped and rated according to their potential sediment yields, and control measures should be taken.

The mean shelter rating for pools was relatively high with a rating of 83. The shelter rating in the flatwater habitats was considerably lower at 35. A pool shelter rating of approximately

West Fork Honeydew Creek

100 is desirable. Existing cover is being provided primarily by boulders in all habitat types. Additionally, bubble curtain contributes a small amount. Log and root wad cover structures in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and creates territorial units to reduce density related competition.

Three of the five low gradient riffles had large cobble or boulders as the dominant substrate. This is generally considered poor for spawning salmonids.

The mean percent canopy density for the stream was 75%. This is a relatively high percentage of canopy. In general, re-vegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was moderate at 80% and 66%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) West Fork Honeydew Creek should be managed as an anadromous, natural production stream.
- 2) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem. Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and maintained as needed.
- 3) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

West Fork Honeydew Creek

- 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 locally available.
- 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) Increase the canopy on West Fork Honeydew Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

PROBLEM SITES AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

- | | |
|-------|---|
| 0' | Begin survey at confluence with Honeydew Creek. Channel type is a B2 for entire 3,897' of stream surveyed. |
| 1364' | Large debris accumulation (LDA) in stream channel - approximately 40' long x 7' high. LDA is retaining boulders; has created a 7' high barrier. |
| 2534' | Old slope failure on the left bank (LB) - approximately 180' high x 80' long. |
| 3120' | Old LB slope failure - approximately 200' high x 80' long. |
| 3897' | Flow is intermittent; gradient is too steep for anadromous fish. End of survey. |

West Fork Honeydew Creek

References

- Flosi, G., and F. Reynolds. 1994. California salmonid stream habitat restoration manual, 2nd edition. California Department of Fish and Game, Sacramento, California.
- Hopelain, J. 1995. Sampling levels for fish habitat inventory, unpublished manuscript. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California.
- Valentine, B. 1995. Stream substrate quality for salmonids: guidelines for sampling, processing, and analysis, unpublished manuscript. California Department of Forestry and Fire Protection, Santa Rosa, California.

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