STREAM INVENTORY REPORT

# North Dobbyn Creek

## INTRODUCTION

A stream inventory was conducted during the summer of 1995 on North Dobbyn 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 North Dobbyn 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 North Dobbyn Creek. Landowners have reported observing chinook salmon spawning in the past. 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

North Dobbyn Creek is tributary to Dobbyn Creek, tributary to the Eel River, located in Humboldt and Trinity Counties, California. North Dobbyn Creek's legal description at the confluence with Dobbyn Creek is T3S R5E S10. Its location is 40 °13'18" N. latitude and 123°36'05" W. longitude. North Dobbyn Creek is a second order stream and has approximately 15.6 miles of blue line stream according to the USGS Alderpoint and Blocksburg 7.5 minute quadrangles. North Dobbyn Creek drains a watershed of approximately 16.4 square miles. Elevations range from about 400 feet at the mouth of the creek to 3,400 feet in the headwater areas. Mixed hardwoods, Douglas fir forest, and grassland dominate the watershed. Most of the watershed is privately owned, although the upper 20% of the basin is part of Six Rivers National Forest. The watershed is managed for rangeland, timber production, and rural residence. Vehicle access to the mouth of North Dobbyn Creek exists via the Alderpoint - Blocksburg Road, approximately five miles northeast of the town of Alderpoint.

## METHODS

The habitat inventory conducted in North Dobbyn Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi and Reynolds, 1991 rev. 1994). The technicians from Pacific Coast Fisheries Wetlands and Wildlife Restoration Association (PCFWWRA) that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). North Dobbyn Creek personnel were trained in May, 1995, by Scott Downie and Ruth Goodfield. 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 North Dobbyn 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 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 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 each tenth unit typed. 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". North Dobbyn 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 measured for mean width, mean depth, and maximum depth (*Sampling Levels for Fish Habitat Inventory*, Hopelain, 1995). Pool tail crest depth at each pool unit was measured in 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 North Dobbyn 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 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 North Dobbyn 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 is estimated using handheld spherical densiometers and is a measure of the water surface shaded during periods of high sun. In North Dobbyn 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. The area of canopy was further analyzed to estimate its percentages of coniferous or deciduous trees, and the results were recorded.

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 North Dobbyn 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.

## 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, or 3) electrofishing. 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 (*Stream Substrate Quality for Salmonids: Guidelines for Sampling, Processing, and Analysis*, Valentine, 1995).

## DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat7.3, 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 Quattro Pro. Graphics developed for North Dobbyn 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
- Bank vegetation by vegetation type

## HABITAT INVENTORY RESULTS

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

The habitat inventory of August 28 to September 7, 1995, was conducted by Dylan Brown and Ray Bevitori (PCFWWRA). The total length of the stream surveyed was 20,619 feet with an additional 1,390 feet of side channel.

Flows were not measured on North Dobbyn Creek.

North Dobbyn Creek is a B3 channel type for the first 8,965 feet of stream reach surveyed, and an A2 channel for the remaining 11,654 feet of the survey. B3 channels are moderate gradient (2-4%), moderately entrenched, with predominantly cobble substrate. A2 channels are steep (4-10% gradient), very well confined streams, with stable stream banks.

Water temperatures ranged from 57 to 68° Fahrenheit. Air temperatures ranged from 62 to 80° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, riffles made up 39%, flatwater types 31%, and pools 29% (Graph 1). Flatwater habitat types made up 42% of the total survey **length**, riffles 41%, and pools 17% (Graph 2).

Nine Level IV habitat types were identified. These data are summarized in Table 2. The most frequent habitat types by percent **occurrence** were step runs, 23%; plunge pools, 19%; and cascades, 16% (Graph 3). By percent total **length**, step runs made up 37%, cascades 17%, and low gradient riffles 15%.

Ninety-one pools were identified (Table 3). Scour pools were most often encountered at 67% and comprised 57% of the total length of pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Depth is an indicator of pool quality. Eighty-nine of the 91 pools (98%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 19 pool tail-outs measured, zero had a value of 1; 1 had a value of 2 (5%); 14 had a value of 3 (74%); and 4 had a value of 4 (21%). On this scale, a value of 1 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 39. Riffle habitats followed with a rating of 19 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 40, and main channel pools rated 24 (Table 3).

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

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 4 of the 6 low gradient riffles measured (67%). Boulder was the next most frequently observed dominant substrate type and occurred in 33% of the low gradient riffles (Graph 8).

The mean percent canopy for the stream reach surveyed was 34.5%. The mean percentages of deciduous and coniferous trees were 33% and 1.5%, respectively. Graph 9 describes the canopy in North Dobbyn Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 65%. The mean percent left bank vegetated was 74%. The dominant elements composing the structure of the stream banks consisted of 4.5% bedrock, 70.5% boulder, and 25% cobble/gravel (Graph 10). Grass was the dominant vegetation type observed in 4.5% of the units surveyed. Additionally, 85.7% of the units surveyed had deciduous trees as the dominant vegetation type, and 0.9% had coniferous trees as the dominant vegetation, including down trees, logs, and root wads (Graph 11).

## BIOLOGICAL INVENTORY RESULTS

One site was electrofished on August 28, 1995, in North Dobbyn Creek. The units were sampled by Ray Bevitori, Dylan Brown, and Ruth Goodfield (PCFWWRA and CF&G).

The site sampled was habitat unit 033, a high gradient riffle, approximately 3,239 feet from the confluence with Dobbyn Creek. This site had an area of 529 sq ft and a volume of 265 cu ft. The unit yielded four steelhead, ranging from 58mm to 108mm fl, and 11 Sacramento squawfish, ranging from 53mm to 79mm fl.

## GRAVEL SAMPLING RESULTS

No gravel samples were taken on North Dobbyn Creek.

## DISCUSSION

North Dobbyn Creek is a B3 channel type for the first 8,965 feet of stream surveyed and an A2 for the remaining 11,654 feet. The suitability of B3 channel types for fish habitat improvement structures is considered excellent for low-stage plunge weirs and boulder clusters, and good for medium-stage plunge weirs. A2 channel types are generally not suitable for instream structures due to high stream energy and poor gravel retention capabilities.

The water temperatures recorded on the survey days August 28 to September 7, 1995, ranged from 57 to 68° Fahrenheit. Air temperatures ranged from 62 to 80° Fahrenheit. This is an acceptable water temperature range for salmonids. However, 68° 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 42% of the total **length** of this survey, riffles 41%, and pools 17%. The pools are relatively deep, with 89 of the 91 pools having a maximum depth greater than 2 feet. 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.

Eighteen of the 19 pool tail-outs measured had embeddedness ratings of 3 or 4. Zero 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. In North Dobbyn 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 low with a rating of 34. The shelter rating in the flatwater habitats was slightly lower at 16. 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. Additionally, whitewater contributes a small amount. 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.

Four of the six low gradient riffles measured 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 35.5%. This is a relatively low percentage of canopy, since 80 percent is generally considered optimum in these north coast streams.

The percentage of right and left bank covered with vegetation was moderate at 65% and 74%, 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) North Dobbyn Creek should be managed as an anadromous, natural production stream.

2) 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.

3) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites, like the site at 4917', should then be treated to reduce the amount of fine sediments entering the stream.

4) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

5) Increase the canopy on North Dobbyn Creek by planting willow, alder, 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, since the water flowing here is effected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

6) There are at least two sections where the stream is being impacted from cattle trampling the riparian zone and defecating in the water. Alternatives should be explored with the grazier and developed if possible.

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 Dobbyn Creek. Channel type is a B3 for the first 8,965' of stream surveyed. |
| 273' | Alderpoint Road bridge crosses creek. Sucker and steelhead observed. |
| 1549' | County maintenance yard located on the left bank (LB). |
| 2438' | Slide on right bank (RB) - approximately 50' high X 110' wide. |
| 3239' | Bioinventory site #1, habitat unit 033. |
| 4675' | Slides on both banks: LB - 20' high X 80' wide; RB - 20' high X 80' wide. |

| | |
|---|---|
| 4917' | Slide on LB - approximately 60' high X 200' wide. |
| 6231' | Evidence of cattle grazing, loafing, and defecating in the creek for the next 400'. |
| 6875' | Dirt road fords stream. |
| 7701' | Slide on RB - approximately 40' high X 80' wide. |
| 7731' | Slide on RB - approximately 80' high X 50' wide. |
| 8205' | Spring enters from RB; water temperature is 60°F. |
| 8550' | Large slide on LB - approximately 90' high X 250' wide. |
| 8965' | Channel type changes from a B3 to an A2 for the remaining 11,654' of stream surveyed. |
| 9397' | Evidence of cattle defecating in the stream. |
| 9575' | Slide on LB - approximately 150' high X 150' wide. |
| 9822' | Hoover Creek enters from RB. |
| 10715' | Spring enters from LB - water temperature is 61°F. |
| 10965' | Large slide on LB - approximately 50' high X 100' wide - contributing fines directly to stream. |
| 11669' | Road crosses creek. |
| 11790' | Slide on LB - approximately 50' high X 60' wide. |
| 13188' | Road crosses stream. |
| 15136' | Spring enters from LB, 60°F. |
| 15178' | Slump on LB - approximately 300' high X 100' wide. Left bank is very wet from springs. |
| 16763' | Slide on RB - approximately 75' high X 25' wide. |
| 17432' | Slide on RB - approximately 70' high X 120' wide. |
| 18110' | Right bank is failing for the next 500'. Very wet from springs. Large spring had water temperature of 58° F. |

20135' 12' waterfall at head of plunge pool. Probable barrier to upstream migration.

20282' Slide on LB - approximately 100' high X 80' wide.

20389' Slide on RB - approximately 100' high X 65' wide - threatening to block stream with trees and boulders. Fish were observed in this area.

20619' Stream is losing flow. High gradient. 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 |
| **Dammed Pool** | **[DPL]** | **6.5** |