STREAM INVENTORY REPORT

INDIAN CREEK

INTRODUCTION

A stream inventory was conducted during the summer of 1993 on Indian 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 Indian 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 carcass surveys were conducted on Indian Creek by the California Department of Fish and Game (DFG) from 1988 through 1990. The table below describes the results of those surveys:

Indian Creek Carcass Surveys 1988 - 90

		Chinook Salmon				Other	
Year	# of Surveys	Live Fish	# of Carcass	AdiposeClipCWT	Redds seen	Coho seen	SH/RT seen
1987-88	2	9	246	0	16	17	1
1988-89	5	54	65	1	37	1	0
1989-90	1	0	0	0	0	0	1

The drought related low flows during prime migration periods from 1989 through 1992 made Indian Creek, typical of many South Fork Eel tributaries, inaccessible to most chinook salmon. In fact, not a single redd was observed in the 1989/1990 carcass survey and only one steelhead was observed. The objective of this report is to document the current habitat conditions in Indian Creek, and recommend options for the enhancement of habitat for chinook salmon, coho salmon and steelhead trout.

WATERSHED OVERVIEW

Indian Creek is tributary to the South Fork Eel River, tributary to the Eel River, located in Mendocino and Humboldt counties, California (Figure 1). The legal description at the confluence with the South Fork Eel River is T5S R3E S35. Its location is 39°58'37" N. latitude and 123°48'14" W. longitude. Indian Creek is a third order stream and has approximately 12.3 miles of blue

line stream, according to the USGS Piercy, Garberville, Bear Harbor, and Briceland 7.5 minute quadrangles. Its tributaries provide an additional 4.6 miles of blue line stream. Indian Creek drains a watershed of approximately 27.9 square miles. Summer base flow is approximately 7 cfs in the lower mile of the stream. Elevations range from about 510 feet at the mouth of the creek to 1,500 feet in the headwater areas. Redwood and Douglas fir forest dominates the watershed. The Indian Creek basin is owned primarily by the Georgia Pacific Corporation and is managed for timber production. Year round vehicle access exists from U.S. Highway 101 via State Highway 271. Travel north from Piercy on Highway 271 for approximately 1/2 mile, and turn left. This road leads to Andersonia and the mouth of Indian Creek. Access is controlled by Andersonia and Georgia Pacific.

METHODS

The habitat inventory conducted in Indian Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1991). The California Conservation Corps (CCC) and contract seasonal Technical Advisors that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). Indian Creek personnel were trained in May, 1993, by Gary Flosi and Scott Downie. This inventory was conducted by two person teams.

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 Indian 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 by David Rosgen (1985). 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 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 at 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 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". Indian 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. Unit measurements included mean length, mean width, mean depth, and maximum depth. 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 Indian 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 Indian 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 Indian Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of each unit. The area of canopy was further analyzed to estimate its percentages of coniferous or deciduous trees, and the results recorded.

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 Indian 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 Indian Creek to document the fish species composition and distribution. Two sites were electrofished in Indian Creek using one Smith Root Model 12 electrofisher. Each site was end-blocked with nets to contain the fish within the sample reach. Fish from each 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 forms are entered into Habitat Runtime, a DBASE 4.1 data entry program developed by the California Department of Fish and Game (DFG). This program also processes and summarizes the data.

The Habitat Runtime program 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 Indian 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 June 23, 24, 28, 29, and July 7, 8, 12-

Indian Creek

15, 20 and 21, 1993, was conducted by Brian Michaels, Erick Elliot, and Chris Coyle (CCC and contract seasonal). The survey began at the confluence with the South Fork Eel River and extended up Indian Creek approximately 1-1/2 miles beyond the confluence with Anderson Creek. The total length of the stream surveyed was 58,865 feet, with an additional 2,566 feet of side channel.

A flow of 6.25 cfs was measured 7-26-93 in habitat unit 324, 100' upstream from the Moody Creek confluence with a Marsh-McBirney Model 2000 flowmeter.

The surveyed section of Indian Creek has two channel types: from the mouth to 46,739 a C1-1; and the upper 12,126 feet a B1-1. C1-1 channels are low gradient (1.5% or less), bedrock controlled channels with unstable stream banks. B1-1 types are moderate gradient (1.5-4.0%), bedrock controlled channels, with coarse textured depositional bank material.

Water temperatures ranged from 55 to 68 degrees fahrenheit. Air temperatures ranged from 52 to 87 degrees fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent **occurrence**, flatwater habitat types made up 35.6%, pools 35.3%, and riffles 29.1% (Graph 1). Flatwater habitat types made up 43.4% of the total survey **length**, pools 28.7%, and riffles 27.9% (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, 26.9%; runs, 22.8%; lateral scour pools - bedrock formed, 15.4%; and step runs, 6.9% (Graph 3). By percent total **length**, low gradient riffles made up 26.8%, runs 22.4%, step runs 13.8%, and lateral scour pools - bedrock formed 13.7%.

Two-hundred-forty pools were identified (Table 3). Scour pools were most often encountered at 72.4%, and comprised 75.3% 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. One-hundred ninety-five of the 240 pools (81%) had a depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 236 pool tail-outs measured, 79 had a value of 1 (33.5%); 94 had a value of 2 (39.8%); 46 had a value of 3 (19.5%); and 17

had a value of 4 (7.2%). On this scale, a value of one is 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. Pools had the highest shelter rating at 48.1. Flatwater types had the lowest rating with 21.2 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 49.8, main channel pools rated 44.0, and backwater pools 21.7 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Indian Creek and are extensive. Bedrock ledges are the next most common cover type. Graph 7 describes the pool cover in Indian Creek.

Table 6 summarizes the dominant substrate by habitat type. Large cobble was the dominant substrate observed in 58 of the 183 low gradient riffles (31.7%). Small cobble was the next most frequently observed dominant substrate type, and occurred in 28.4% of the low gradient riffles (Graph 8).

Forty-two percent of Indian Creek lacked shade canopy. Of the 58% of the stream that was covered with canopy, 70% was composed of deciduous trees, and 30% was composed of coniferous trees. Graph 9 describes the canopy in Indian 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 28.2%. The mean percent left bank vegetated was 27.4%. The dominant elements composing the structure of the stream banks consisted of 31.7% bedrock, 4.2% boulder, 24.0% cobble/gravel, 1.1% bare soil, 1.9% grass, 0.3% brush. Additionally, 30.7% of the banks were covered with deciduous trees, and 6.1% with coniferous trees, including downed trees, logs, and root wads (Graph 10).

BIOLOGICAL INVENTORY RESULTS

Two sites were electrofished on July 28, and October 12, 1993 in Indian Creek. The units were sampled by Brian Michaels, Craig Mesman, and Chris Coyle (CCC and contract seasonals). All measurements are fork lengths unless noted otherwise.

The first site sampled included habitat units 29 and 30, a run and lateral scour pool, approximately 3,219 feet from the confluence with the South Fork Eel River. The site had an area of

1,362 sq ft, and a volume of 6,930 cu ft. The sample included 14 steelhead, ranging from 80 to 121mm; 16 roach, ranging from 30 to 90mm; 3 squaw fish, ranging from 56 to 76mm; 1 stickleback, 45mm; 3 western suckers, ranging from 54 to 129mm; 4 unidentified cyprinids 29 to 37mm; and 4 Pacific lamprey ammocete.

The second sample site included habitat units 412 and 413, a run/ riffle sequence, approximately 43,306 above the confluence with the South Fork Eel River, and 300 feet upstream from the confluence with Coulborn Creek. This site had an area of 4,337 sq ft, and a volume of 2,398 cu ft. The sample included 12 steelhead, ranging from 45 to 114mm and 2 coho, 53 and 55mm FL.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Indian Creek.

DISCUSSION

Indian Creek has two channel types: C1-1 and B1-1. The low gradient and unstable stream banks of the C1-1 channel type is generally not suitable for instream enhancement structures. There are 46,739 feet of this channel type in Indian Creek.

The upper 12,126 feet of the survey reach is a B1-1 channel. B1-1 channels are excellent for many instream habitat improvement structures including low and medium stage plunge weirs, single and double wing deflectors, bank cover, overhead log cover, submerged shelters on meanders or straight reaches, and "V" and straight spawning weirs. With careful planning and placement, half log covers are also appropriate.

The water temperatures recorded on the survey days June 23-July 21, 1993 ranged from 55° F to 68° F. Air temperatures ranged from 52° F to 87° F. The warmer water temperatures, if sustained, are above the threshold stress level for salmonids. To make any further conclusions, temperatures need to be monitored for a longer period of time through the critical summer months, and more extensive biological sampling conducted.

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Flatwater habitat types comprised 43.4% of the total **length** of this survey, pools 28.7%, and riffles 27.9%. The pools are relatively deep with 195 of the 240 pools having a maximum depth greater than 3 feet. In coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat. In third and fourth order streams a primary pool is defined to have a maximum depth of at least three feet,

occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Therefore, installing structures that will increase pool habitat is recommended for locations where their installation will not subject the structures to high stream energy.

Sixty-three of the 236 pool tail-outs measured had cobble embeddedness ratings of 3 or 4. Seventy-nine had a 1 rating. Embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Indian 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 moderate with a rating of 48.1. The shelter rating in the flatwater habitats was lower at 21.2. However, a pool shelter rating of approximately 100 is desirable. The cover that now exists is being provided primarily by boulders in all habitat types. Additionally, bedrock ledges contribute a small amount. Log and root wad cover structures in the 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.

Ninety of the 183 low gradient riffles had either large cobble or boulder as the dominant substrate. This is generally considered poor for spawning salmonids.

The mean percent canopy for the survey reach was 58%. This is a relatively low percentage of canopy, since 80 percent is generally considered desirable. Elevated water temperatures could be reduced by increasing stream canopy. Cooler water temperatures are desirable in Indian Creek. The large trees required to contribute shade to the wide channel typical of the lower section of the stream would also eventually provide a long term source of large woody debris needed for instream structure.

RECOMMENDATIONS

1) Indian Creek should be managed as an anadromous, natural production stream.

2) Temperatures in this section of Indian Creek, as well as upstream, should be monitored to determine if they are having a deleterious effect upon juvenile salmonids. To achieve this, biological sampling is also required.

3) Increase the canopy on Indian 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, 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.

4) Where feasible, increase woody cover in the flatwater habitat units. Most of the existing cover is from boulders. Adding high quality complexity with woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations. In many areas the material is at hand.

5) 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.

6) Spawning gravel on Indian Creek are limited to relatively few reaches. Crowding and/or superimposition of redds have been observed during winter surveys. Projects should be designed at suitable sites to trap and sort spawning gravel in order to expand redd site distribution in the stream.

7) Inventory and map sources of stream bank erosion, and rank them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

8) 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.

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 the South Fork Eel River. Confluence is 70' wide braided channel with 50% exposed substrate. Channel type is a C1-1.

Indian Creek

2979'Right bank bedrock erosion 100' high x 300' long, contributing gravel and fines into the channel.

3422'Small tributary enters from the right bank; approximate flow 0.25 cfs.

3949'Road fords the creek.

6457'Small tributary enters from the right bank; approximate flow <0.25 cfs.

9135'Tributary enters from the left bank; approximate flow 0.5 cfs.

9202'Left bank erosion 80' high x 150' long, contributing fines into the channel.

9595'Left bank erosion 90' high x 500' long, contributing fines and gravel into the channel.

10401'Tributary enters from the left bank; approximate flow <0.25 cfs.

10598'Jones Creek enters from the left bank.

10775'Right bank erosion 30' high x 120' long, contributing fines and gravel into the channel.

12262'Channel narrows into a gorge.

12973'Left bank slide 175' high x 300' long. Partially revegetated, but still contributing gravel and "blue goo" into the channel.

13874'Unnamed tributary enters from the right bank. This tributary is shown as intermittent on topographic map. Plunge 25' high over bedrock at the mouth; inaccessible to anadromous fish. Approximate flow 1.0 cfs.

14122'1+ steelhead observed.

14664'Right bank active landslide 900' high x 100' long, contributing fines and gravel into the channel. Small spring flows through this slide, stripping bank of vegetation and coniferous trees.

15902' Tributary enters from the left bank.

Indian Creek

17056' Right bank slide 150' high x 50' long, contributing fines and gravel into the channel.

17434' Bedrock gorge with 150' high banks.

18117'Left bank slide 200' high x 50' long, contributing fines and gravel into the channel.

18182'Tributary 2' wide enters from the right bank; no fish were observed in the stream.

19833'Left bank erosion 150' high x 150' long, contributing fines and gravel into the channel.

20652'Tributary enters from the left bank with large delta buildup; approximate flow 2 gallons/minute.

23667'Right bank tributary; flow <1.0 cfs.

24060'Right bank erosion 100' high x 150' long, contributing fines and gravel into the channel.

25178'Tributary enters from the left bank; approximate flow 2 cfs. Anadromous value unknown; no fish observed.

28432'Tributary enters from the right bank. Approximate flow 1.0 cfs; young-of-the-year (YOY) salmonids observed.

29051'Tributary enters from the left bank. Approximate flow 0.5 cfs; no anadromous value.

33053'Right bank tributary; flow <1 cfs. No anadromous fish observed. Recent slide 100' high x 40' long at 150' is a barrier.

34090'Right bank tributary, approximate flow 1.0 cfs. Mouth is accessible; YOY steelhead observed up to 400' from the mouth.

35788'Moody Creek enters from the right bank. Its flow was measured at 0.8 cfs, 7/26/93. Small salmonids were observed 400' up Moody Creek.

36061'Old road fords the channel.

37229'Old road fords the channel.

37388'Unnamed left bank tributary, approximate flow 1.0 cfs. No fish observed. Log and debris accumulation (LDA)

150' upstream from the confluence.

37531'Old road crossing.

38422'Left bank erosion 300' high x 100' long, contributing fines and gravel into the channel.

38608'Sebbas Creek enters from the left bank. Flow was measured at 1.2 cfs, 7/27/93. Small salmonids observed 400' above up Sebbas Creek.

39038'Left bank erosion 80' high x 200' long, contributing fines and gravel into the channel.

40987'Left bank erosion 35' high x 40' long, contributing fines and gravel into the channel.

43169'Coulborn Creek enters from the left bank. Flow was measured at 0.8 cfs, 7/27/93. Small salmonids observed 400' up Coulborn Creek.

45698'YOY coho salmon and steelhead observed.

46739'Channel type changes from a C1-1 to a B1-1.

48939'Plunge 3' high over bedrock; not a barrier.

50633'Bedrock sheet with plunge pools. Gradient is 21%; possible barrier at low flows.

50707'Remains of old bridge 18' high x 40' long.

50785'Anderson Creek enters from the right bank. Its flow was measured at 2.3 cfs, 7/26/93, and contributes approximately 1/2 of the total flow below confluence with Indian Creek. Juvenile salmonids observed 400' up Anderson Creek. Water temperature was 58° F at 1600 hours; air was 72° F.

50800'Indian Creek flow measured 1.7 cfs, 7/26/93, fifteen feet above confluence with Anderson Creek. Water temperature was 58° F at 1700 hours; air was 71° F.

51461'CCC log plunge weir, cut in middle. No pool, retaining gravel and boulders.

51486'CCC boulder weir retaining boulders and creating large pool.

Indian Creek

51580'CCC blasted bedrock site. Gradient is 25%; possible barrier.

52853'Right bank tributary; approximate flow 0.25 cfs. High gradient, probably not anadromous.

53037'High gradient tributary enters from the right bank. Approximate flow 0.25 cfs, probably not anadromous.

53313'Left bank tributary, approximate flow 0.5 cfs. LDA 50' upstream, dry channel at 70' upstream. No anadromous fish observed.

53405'Small right bank slide 35' high x 25' long, contributing gravel and boulder into the channel.

53490'Small right bank slide 65' high x 40' long, contributing gravel and boulders into the channel.

54950'LDA 6' high x 20' wide x 6' long, retaining gravel 3' high x 20' wide x 30' long.

56094'Right bank tributary, <0.25 cfs. High gradient, no fish observed.

57142'Right bank tributary, approximate flow 0.5 cfs. Plunge 6' high at the confluence; probable barrier. LDA 60' upstream with plunge 4' high. High gradient, no fish observed.

57439'LDA 5' high x 8' long x 35' wide retaining gravel 2' high x 30' long x 20' wide. No apparent barrier.

57497'LDA 6' high x 10' long x 30' wide, retaining gravel and sand 3' high x 10' long x 10' wide. No apparent barrier.

57662'LDA 6' high x 60' long x 30' wide, retaining gravel and sand 3' high x 40' long x 10' wide. Possible barrier. YOY steelhead/rainbow trout (SHRT) observed; coloration indicates they are probably resident.

58067'YOY and 1+ SHRT observed.

58109'Cut bank 7' high x 30' long, depositing gravel and fines into the channel.

58804'LDA 8' high x 40' wide x 50' long, retaining some gravel;

not a barrier.

58865'End of Survey. CCC blasting project, plunge 8.5' high into pool; possible barrier still. Gradient is 33%. Survey crew continued walking the channel for another 1390'.

59065'Left bank spring. YOY and 1+ SHRT observed.

59365' High gradient (4-8%) boulder cascade with step pools.

59715'LDA 10' high x 60' wide x 150' long. Fish passage problem; possibly an old CCC project site.

59985'1+ SHRT observed.

60020'Plunge 4' high from bedrock into 2' deep pool.

60255'LDA 14' high x 30' wide x 40' long. CCC project site #6, 5/27/87. End observation 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