STREAM INVENTORY REPORT

Dutch Charlie Creek

INTRODUCTION

A stream inventory was conducted during July 31, 2007 to August 6, 2007 on Dutch Charlie Creek. The survey began at the confluence with Thompson Creek and extended upstream 2.9 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Dutch Charlie Creek.

A biological survey of Dutch Charlie Creek was last conducted in 2002 to document the presence of juvenile salmonid species. Findings from that survey are included in this report.

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

Dutch Charlie Creek is a tributary to South Fork Eel River, tributary to Eel River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Dutch Charlie Creek's legal description at the confluence with South Fork Eel River is T21N R16W S09. Its location is 39.6922 north latitude and 123.6555 west longitude, LLID number 1236555396922. Dutch Charlie Creek is a second order stream and has approximately 6.5 miles of blue line stream according to the USGS Lincoln Ridge 7.5 minute quadrangle. Dutch Charlie Creek drains a watershed of approximately 4.3 square miles. Elevations range from about 1,440 feet at the mouth of the creek to 2,000 feet in the headwater areas. Grass, oak, Douglas fir, and redwood forest are distributed in the watershed. The watershed is privately owned and is managed for timber production. Vehicle access exists from State Highway 101 at Laytonville via Highway 271/Branscomb Road, west through Branscomb to Wilderness Lodge Road. Wilderness Lodge Road crosses Dutch Charlie Creek at mile one.

METHODS

The habitat inventory conducted in Dutch Charlie Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Pacific States Marine Fisheries Commission (PSMFC) Fisheries Technicians that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). 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. 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, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are 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 Dutch Charlie Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (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. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

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 (1990). 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". Dutch Charlie 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. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Dutch Charlie 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) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile 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 for prey. 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 Dutch Charlie 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. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Dutch Charlie 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 hardwood 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 Dutch Charlie Creek, the dominant composition type and the dominant vegetation type 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 (including downed trees, logs, and rootwads) was estimated and recorded.

10. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests (velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

BIOLOGICAL INVENTORY

Biological sampling is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks during habitat typing in Dutch Charlie Creek. Detailed biological sampling (electrofishing and/or underwater observation) was not conducted on Dutch Charlie Creek during the 2007 survey. Data from a 2006 electrofishing survey is listed in the Biological Inventory Results section of this report. Electrofishing sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Dutch Charlie Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

HABITAT INVENTORY RESULTS

\ast ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT \ast

The habitat inventory of July 31, 2007 to August 6, 2007 was conducted by M. Reneski and C. Hines (PSMFC). The total length of the stream surveyed was 15,200 feet with an additional 88 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.2 cfs on August 6, 2007.

Dutch Charlie Creek is an F3 channel type for 1,484 feet of the stream surveyed (Reach 1), a B2 channel type for 689 feet of the stream surveyed (Reach 2), and an F4 channel type for 13,027 feet of the stream surveyed (Reach 3). F3 channel types are entrenched, meandering riffle/pool channels on low gradients with high width/depth ratios and cobble-dominant substrates. B2 channel types are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools. B2 channel types have a very stable plan and profile with stable banks and boulder-dominant substrates. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 53 to 60 degrees Fahrenheit. Air temperatures ranged from 56 to 70 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40.4% pool units, 33.8% flatwater units, 24.2% riffle units, 1.2% dry units and 0.4% no survey units (Graph 1). Based on total length of Level II habitat types there were 47.9% flatwater units, 33.6% pool units, 17.6% riffle units and 0.2% no survey units (Graph 2).

Sixteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 22% low gradient riffle units, 22% mid-channel pool units and 21% step run units (Graph 3). Based on percent total length, step-run units made up 38%, mid-channel pool units 18%, and low gradient riffle units 15%.

A total of 105 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 57% (Graph 4), and comprised 58% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Seventy-nine of the 105 pools (75%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 105 pool tail-outs measured, 24 had a value of 1 (22.9%); 43 had a value of 2 (41%); 29 had a value of 3 (27.6%); 3 had a value of 4 (2.9%) and 6 had a value of 5 (5.7%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 19, flatwater habitat types had a mean shelter rating of 27, and pool habitats had a mean shelter rating of 59 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 43, scour pools had a mean shelter rating of 81 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks are the dominant cover types in Dutch Charlie Creek. Graph 7 describes the pool cover in Dutch Charlie Creek. Undercut banks are the dominant pool cover type followed equally by large woody debris and small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 77% of pool tail-outs while small cobble was observed in 12% of pool tail-outs.

The mean percent canopy density for the surveyed length of Dutch Charlie Creek was 98%. Two percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 73% and 25%, respectively. Graph 9 describes the mean percent total canopy in Dutch Charlie Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 94%. The mean percent left bank vegetated was 94%. The dominant elements composing the structure of the stream banks consisted of 92% sand/silt/clay, 7% bedrock and 1% boulder (Graph 10). Deciduous trees were the dominant vegetation type observed in 47% of the units surveyed. Additionally, 23% of the units surveyed had coniferous trees as the dominant vegetation type and 24% had brush as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Dutch Charlie Creek was biologically sampled in 2006 by Campbell Timberland Management Co. for fish presence and identification. Using a backpack electrofisher, 142 coho salmon and 60 steelhead trout were captured and identified. The survey location was located 14,450 feet upstream of the confluence with South Fork Eel River.

DISCUSSION

Dutch Charlie Creek is an F3 channel type for the first 1,484 feet of stream surveyed and a B2 channel type for the next 689 feet and an F4 channel type for the remaining 13,027 feet. The suitability of F3, B2, and F4 channel types for fish habitat improvement structures are as follows: F3 channel types are good for bank-placed boulders and single and opposing wing-deflectors and fair for plunge weirs, boulder clusters, channel constrictors and log cover. B2 channel types are excellent for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover. F4 channel types are good for bank placed boulders and fair for plunge weirs, single and opposing wing-deflectors and log cover.

The water temperatures recorded on the survey days July 31, 2007 to August 6, 2007, ranged from 53 to 60 degrees Fahrenheit. Air temperatures ranged from 56 to 70 degrees Fahrenheit. 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 48% of the total length of this survey, riffles 18%, and pools 34%. The pools are relatively deep, with 79 of the 105 (75%) pools having a maximum residual 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 residual 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.

Sixty-seven of the 105 pool tail-outs measured had embeddedness ratings of 1 or 2. Thirty-two of the pool tail-outs had embeddedness ratings of 3 or 4. Six of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead.

Ninety-three of the 104 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 59. The shelter rating in the flatwater habitats was 27. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in Dutch Charlie Creek. Undercut banks are the dominant cover type in pools followed equally by large woody debris and small woody debris. Log and root wad cover structures in the pool and flatwater habitats would enhance 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.

The mean percent canopy density for the stream was 98%. Reach 1 had a canopy density of 98.9%, Reach 2 had a canopy density of 99.6% and Reach 3 had a canopy density of 97.9%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 94% and 94%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Dutch Charlie 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 in the pools is from undercut banks. Adding high quality complexity with woody cover in the pools is desirable.
- 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.
- 4) 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.

COMMENTS AND LANDMARKS

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

Position (ft):	Habitat Unit #:	Comments:
0	0001.00	Start of survey was at the confluence with Thompson Creek, at about 7,035 feet from the confluence with the South Fork Eel River. Tributary #1 was Thompson Creek, which entered from the left bank at about 7,035 feet from the confluence of the South Fork Eel River. The flow was approx. 0.05 cfs and it contributed about 20% to the downstream flow. The temperature of Thompson Creek was 56 degrees Fahrenheit. Upstream and downstream of Thompson Creek, the temperatures were 57 degrees Fahrenheit. The surveyors checked about 100 feet upstream and noticed that it was accessible to fish and a 2+ steelhead was observed. Thompson Creek had a slope of 4%.
342	0004.00	One plus steelhead observed from the stream bank.
417	0005.00	Right bank erosion was estimated to be about 20 feet high.
587	0009.00	Left bank erosion was estimated to be about 15 feet high.
662	0010.00	Right bank erosion was estimated to be about 6 feet high.
852	0014.00	Right bank dry tributary was observed at the top of the habitat unit.
1207	0020.00	Right bank erosion was estimated to be about 15 feet high. 8

		Young-of-the-year salmonids (YOY) were observed by the surveyors from the stream bank throughout the previous twenty habitat units.
1484	0026.00	Channel type changed from an F3 to a B2 channel type.
1886	0031.00	Right and left banks were bedrock walls estimated to be 60 ft high.
2173	0035.00	Channel type changed from a B2 to an F4 channel type.
2333	0038.00	Right bank erosion was estimated to be about 6 feet high.
2383	0039.00	Right bank erosion was estimated to be about 6 feet high.
2400	0040.00	Juvenile salmonids were observed by the surveyors from the stream bank throughout the previous habitat units.
2617	0043.00	Right bank erosion was estimated to be about 15 feet high.
2707	0045.00	Left and right bank erosion was estimated to be about 6 feet high.
3098	0051.00	Left and right bank erosion was estimated to be about 5 feet high.
3286	0054.00	Left bank erosion was estimated to be about 6 feet high.
3523	0057.00	Right bank erosion was estimated to be about 8 feet high.
3718	0060.00	Juvenile salmonids were observed by the surveyors from the stream bank throughout the previous habitat units.
4855	0077.00	Left bank erosion was estimated to be about 5 feet high.
5279	0085.00	A dry tributary entered from the right bank.
5344	0086.00	Left bank erosion was estimated to be about 5 feet high.
5662	0093.00	A 1+ steelhead was observed by the surveyors from the stream bank.
5686	0094.00	Right bank erosion was estimated to be about 6 feet high.
5727	0095.00	Tributary #2 was Eagle Creek and it entered from the left bank at about 85 feet into the habitat unit. The flow was estimated to be about 0.06 cfs and it was contributing an estimated 30% to the downstream flow. The temperature of Eagle Creek was 59 degrees Fahrenheit. Both downstream and upstream of the tributary water temperatures were 58 degrees Fahrenheit. The surveyors checked upstream of Eagle Creek about 100 feet and observed steelhead fish, as well as warm water temperature and clarity was turbid with suspended sediment.

5856	0097.00	Bridge #1 was observed on a decommissioned logging road. It was made up of rotting redwood logs and was 19 ft. wide by 4 ft. high by 25 ft. long.
6331	0105.00	Left and right bank erosion was estimated to be about 5 feet high.
6678	0111.00	A 3+ steelhead was observed by the surveyors from the stream bank.
6860	0115.00	An old redd was observed from the stream bank at the pool tail crest.
7648	0126.00	The flow was subsurface for an estimated 5% of the habitat unit.
8806	0141.00	Left bank erosion was estimated to be about 10 feet high.
8856	0142.00	Right bank erosion was estimated to be about 12 feet high.
9053	0145.00	Right bank erosion was estimated to be about 15 feet high.
9382	0152.00	Right bank erosion consisted of bedrock substrate and was estimated to be about 75 feet high.
9422	0153.00	Right bank erosion was estimated to be about 20 feet high.
9456	0154.00	Left bank erosion was estimated to be about 12 feet high.
9592	0156.00	Left bank erosion was estimated to be about 10 feet high.
9654	0158.00	Bridge #2, Road 7300, was 20 ft. wide x 12 ft. high x 60 ft. long. It was made up of steel and had large boulders stabilizing both the right and left bank.
9722	0159.00	Left and right bank erosion was estimated to be about 10 feet high.
10746	0170.00	Left and right bank erosion was estimated to be about 10 feet high.
10787	0171.00	Left bank erosion was estimated to be about 9 feet high.
10989	0173.00	A 2+ steelhead was observed by the surveyors from the stream bank.
11155	0176.00	Left bank erosion was estimated to be about 15 feet high.
11247	0178.00	Left bank erosion was estimated to be about 8 feet high.
11410	0180.00	Tributary #3 entered from the left bank at about 35 feet into the habitat unit. The flow was an estimated 0.03 cfs and contributed an estimated 15% to the downstream flow. No temperatures were taken. The tributary was not accessible to fish due to a perched, 3 feet diameter culvert that was 4 feet into the tributary and was lacking a jump pool. The slope of the tributary, taken with a clinometer was 12%.

11654	0187.00	Left bank erosion was estimated to be about 15 feet high. Log debris accumulation (LDA) #1, located at the top of habitat unit #187, was 6 ft. high x 15 ft. wide x 8 ft. long. It had about 4 pieces of large wood. There were visible gaps and water was flowing through it. The LDA was is retaining sand and silt about 10 ft. wide x 9 ft. long x 2 ft. deep.
11674	0188.00	There was a bedrock cascade about 9 feet high.
12164	0196.00	Tributary #4 entered from the left bank, about 68 feet into the habitat unit. It had an estimated flow of 0.02 cfs and contributed an estimated 5% to the downstream flow. The temperatures of the tributary, upstream and downstream of the tributary were all 56 degrees Fahrenheit. For at least 150 feet upstream of the tributary it was accessible to fish, however, no fish were observed. The slope was 7% and taken with a clinometer. The mouth of the tributary had a perched culvert that was 40 feet long by 3 feet diameter. The culvert was 0.3 feet above Dutch Charlie Creek and lacked a jump pool.
12569	0204.00	Left and right bank erosion was estimated to be about 20 feet high.
12674	0207.01	An estimated 20% of the habitat unit had subsurface flow. The top of the side channel reconnected at the top of habitat unit #207.
13729	0224.00	Left bank erosion was estimated to be about 10 feet high.
14016	0230.00	Tributary #5 entered from the right bank and flowed at an estimated 0.06 cfs and contributed an estimated 50% to downstream flow. The temperatures of the tributary, upstream and downstream of the tributary were all 54 degrees Fahrenheit. The tributary was accessible to fish for at least 200 ft, although no fish were observed. After that, the slope changed from 3% to 7%. Left bank active erosion was estimated to be about 20 feet high.
14654	0245.00	LDA #2 was 9 ft. high x 15 ft. wide x 20 ft. long with 9 pieces of large woody debris (LWD). There were no visible gaps in LDA, but water was flowing through it. Sediment retention was 15 ft. wide x 20 ft. long x 2.5 ft. deep and consisted of sand and gravel substrates. No fish were observed above the LDA and it could be a potential barrier to salmonids because Dutch Charlie Creek ran dry for about 50 feet above the LDA. LDA was possible end of anadromy.
14915	0253.00	Right bank erosion was estimated to be 10 feet high.
14945	0254.00	Bridge #3 was10 feet into the habitat unit and located on Road 7300. The bridge was constructed of steel and right and left banks were reinforced with large boulders. The bridge was 25 ft. wide x 25 ft. high x 75 ft. long.

15200 0259.00 The stream survey ended due to deteriorating salmonid habitat. Juvenile salmonids were observed steadily throughout the stream survey. However, no fish were observed above LDA #2, which was located at habitat unit #245.

REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE Low Gradient Riffle High Gradient Riffle	(LGR) (HGR)	[1.1] [1.2]	$\{1\}$ $\{2\}$
CASCADE Cascade Bedrock Sheet	(CAS) (BRS)	[2.1] [2.2]	{ 3} {24}
FLATWATER Pocket Water Glide Run Step Run Edgewater	(POW) (GLD) (RUN) (SRN) (EDW)	[3.1] [3.2] [3.3] [3.4] [3.5]	{21} {14} {15} {16} {18}
MAIN CHANNEL POOLS Trench Pool Mid-Channel Pool Channel Confluence Pool Step Pool	(TRP) (MCP) (CCP) (STP)	[4.1] [4.2] [4.3] [4.4]	{ 8 } {17} {19} {23}
SCOUR POOLS Corner Pool Lateral Scour Pool - Log Enhanced Lateral Scour Pool - Root Wad Enhanced Lateral Scour Pool - Bedrock Formed Lateral Scour Pool - Boulder Formed Plunge Pool	(CRP) (LSL) (LSR) (LSBk) (LSBo) (PLP)	[5.1] [5.2] [5.3] [5.4] [5.5] [5.6]	<pre>{22} {10} {11} {11} {12} {20} { 9 }</pre>
BACKWATER POOLS Secondary Channel Pool Backwater Pool - Boulder Formed Backwater Pool - Root Wad Formed Backwater Pool - Log Formed Dammed Pool	(SCP) (BPB) (BPR) (BPL) (DPL)	[6.1] [6.2] [6.3] [6.4] [6.5]	{ 4 } { 5 } { 6 } { 7 } { 13 }
ADDITIONAL UNIT DESIGNATIONS Dry Culvert Not Surveyed Not Surveyed due to a marsh	(DRY) (CUL) (NS) (MAR)	[7.0] [8.0] [9.0] [9.1]	



Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name:Dutch Charlie CreekLLID: 1236555396922Drainage:Eel River - South ForkSurvey Dates:7/31/2007 to 8/6/2007Confluence Location:Quad:LINCOLN RIDGELegal Description:T21NR16WS09Latitude: 39:41:32.0NLongitude:123:39:20.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
3	0	DRY	1.2	29	88	0.6									
88	18	FLATWATER	33.8	83	7328	47.9	6.6	0.6	1.1	404	35575	273	24011		27
1	0	NOSURVEY	0.4	31	31	0.2									225
105	105	POOL	40.4	49	5143	33.6	10.3	1.6	2.6	503	52811	935	98169	843	59
63	23	RIFFLE	24.2	43	2698	17.6	7.0	0.3	0.7	213	13402	82	5188		19

Total	Total Units	Total Length	Total Area	Total Volume	
Units	Fully Measured	(ft.)	(sq.ft.)	(cu.ft.)	
260	146	15288	101788	127368	

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Dutch Charlie Creek

LLID: 1236555396922 Drainage: Eel River - South Fork

Survey Dates: 7/31/2007 to 8/6/2007

Confluence Location: Quad: LINCOLN RIDGE Legal Description: T21NR16WS09 Latitude: 39:41:32.0N Longitude: 123:39:20.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
56	16	LGR	21.5	40	2213	14.5	6	0.2	1.5	149	8364	42	2359		10	98
5	5	HGR	1.9	88	442	2.9	10	0.5	1.5	434	2169	211	1056		45	100
1	1	CAS	0.4	31	31	0.2	10	0.5	1.3	310	310	155	155		0	100
1	1	BRS	0.4	12	12	0.1	2	0.4	2	24	24	10	10		50	100
33	9	RUN	12.7	47	1549	10.1	7	0.5	1.5	287	9464	174	5751		41	98
55	9	SRN	21.2	105	5779	37.8	7	0.7	1.9	522	28696	371	20430		17	100
57	57	MCP	21.9	47	2685	17.6	11	1.6	5.4	512	29168	971	55361	874	41	97
1	1	CCP	0.4	118	118	0.8	13	1.4	2.8	1534	1534	2454	2454	2148	30	94
2	2	STP	0.8	94	188	1.2	11	1.7	3.5	623	1245	1116	2231	1020	95	99
8	8	CRP	3.1	56	449	2.9	11	1.9	3.9	604	4831	1334	10675	1197	75	98
23	23	LSL	8.8	51	1181	7.7	9	1.5	4.4	486	11175	846	19462	771	92	98
3	3	LSR	1.2	40	120	0.8	11	1.8	3.9	437	1312	865	2596	798	125	98
8	8	LSBk	3.1	41	330	2.2	9	1.5	3.9	367	2936	586	4684	520	36	100
1	1	LSBo	0.4	36	36	0.2	7	1.2	2.2	252	252	328	328	302	195	100
2	2	PLP	0.8	18	36	0.2	10	1.0	2.4	179	358	189	378	171	35	100
3	0	DRY	1.2	29	88	0.6										100
1	0	NS	0.4	31	31	0.2									225	80

Total	Total Units	Total Length	Total Area	Total Volume	
Units	Fully Measured	(ft.)	(sq.ft.)	(cu.ft.)	
260	146	15288	101837	127928	

Table 3 - Summary of Pool Types

45

SCOUR

43

48

2152

45

Stream Name: Dutch Charlie Creek LLID: 1236555396922 Drainage: Eel River - South Fork Survey Dates: 7/31/2007 to 8/6/2007 Confluence Location: Quad: LINCOLN RIDGE Legal Description: T21NR16WS09 Latitude: 39:41:32.0N Longitude: 123:39:20.0W Estimated Habitat Units Fully Habitat Habitat Mean Total Total Mean Mean Mean Estimated Mean Mean Units Measured Туре Occurrence Length Length Length Width Residual Total Area Residual Total Shelter Area (%) (ft.) (ft.) (%) (ft.) Depth (ft.) (sq.ft.) (sq.ft.) Pool Vol Resid.Vol. Rating (cu.ft.) (cu.ft.) 60 MAIN 57 50 2991 58 10.7 54022 43 60 1.6 532 31947 900

42

9.7

1.5

464

20864

767

34519

81

Total	Total Units	Total Length	Total Area	Total Volume	
Units	Fully Measured	(ft.)	(sq.ft.)	(cu.ft.)	
105	105	5143	52811	88542	

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Dutch Charlie Creek

LLID: 1236555396922 Drainage: Eel River - South Fork

Survey Dates: 7/31/2007 to 8/6/2007

Confluence Location: Quad: LINCOLN RIDGE Legal Description: T21NR16WS09 Latitude: 39:41:32.0N Longitude: 123:39:20.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
57	MCP	54	0	0	14	25	28	49	10	18	5	9
1	CCP	1	0	0	0	0	1	100	0	0	0	0
2	STP	2	0	0	0	0	1	50	1	50	0	0
8	CRP	8	0	0	1	13	4	50	3	38	0	0
23	LSL	22	0	0	8	35	8	35	6	26	1	4
3	LSR	3	0	0	1	33	1	33	1	33	0	0
8	LSBk	8	0	0	1	13	5	63	2	25	0	0
1	LSBo	1	0	0	0	0	1	100	0	0	0	0
2	PLP	2	0	0	1	50	1	50	0	0	0	0
Total			Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Units			< 1 Foot	< 1 Foot	1< 2 Foot	1< 2 Foot	2< 3 Foot	2< 3 Foot	3< 4 Foot	3< 4 Foot	>= 4 Foot	>= 4 Foot
			Max Resid.	% Occurrence	Max Resid.	% Occurrence	Max Resid.	% Occurrence	Max Resid.	% Occurrence	Max Resid.	% Occurrence
			Depui		Deptil		Deptil		Deptil		Deptil	

Mean Maximum Residual Pool Depth (ft.): 2.6

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Dutch Charlie Creek LLID: 1236555396922 Drainage: Eel River - South Fork Survey Dates: 7/31/2007 to 8/6/2007 Dry Units: 3 Confluence Location: Quad: LINCOLN RIDGE Legal Description: T21NR16WS09 Latitude: 39:41:32.0N Longitude: 123:39:20.0W Habitat Units Habitat Mean % Units Fully Туре Undercut SWD LWD Root Mass Terr. Aquatic White Boulders Bedrock Measured Banks Vegetation Vegetation Water Ledges LGR HGR CAS BRS TOTAL RIFFLE RUN SRN TOTAL FLAT MCP CCP STP CRP LSL LSR LSBk LSBo PLP TOTAL POOL NS TOTAL

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream I	Name: Dutch	Charlie Cree	ek			LLID	: 1236555396922	Drainage:	Eel River - South Fork
Survey [Dates: 7/31/2	007 to 8/6/2	007	Dry Units	: 3				
Confluer	nce Location:	Quad: LII	NCOLN RIDGE	Legal Description: T21NR16WS09			ude: 39:41:32.0N	Longitude:	123:39:20.0W
Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
56	16	LGR	0	0	81	6	13	0	0
5	5	HGR	0	0	20	0	0	80	0
1	1	CAS	0	0	0	0	0	0	100
1	1	BRS	0	0	0	0	0	0	100
33	9	RUN	11	0	67	0	22	0	0
55	12	SRN	0	8	50	25	8	0	8
57	57	MCP	7	40	28	4	7	7	7
1	1	CCP	0	100	0	0	0	0	0
2	2	STP	0	0	0	0	0	50	50
8	8	CRP	38	50	0	13	0	0	0
23	23	LSL	9	57	30	4	0	0	0
3	3	LSR	0	67	33	0	0	0	0
8	8	LSBk	0	25	13	25	25	0	13
1	1	LSBo	0	0	100	0	0	0	0
2	2	PLP	0	0	100	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name:	Dutch Charlie C	Creek	LLID: 1236555396922	Drainage:	Eel River - South Fork			
Survey Dates:	7/31/2007 to 8/	6/2007						
Confluence Loo	cation: Quad:	LINCOLN RIDGE	E Legal	Description:	T21NR16WS09	Latitude: 39:41:32.0N	Longitude:	123:39:20.0W
Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	t Mean Left Bank % Cover			
98	26	74	0	94	94			

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 8 - Fish Habitat Inventory Data Summary

Stream Name:	Dutch (Charlie C	Creek				LLID: 1236	6555396922	Drainage: E	el River	- South Fork
Survey Dates:	7/31/20	07 to 8/	6/2007	Survey Length (ft.):	15288	Main	Channel (ft	.): 15200	Side Chann	el (ft.):	88
Confluence Loc	ation:	Quad:	LINCOLN RIDGE	Legal Description:	T21NR16W	/S09	Latitude: 3	39:41:32.0N	Longitude:	123:39:2	20.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1		
Channel Type: F3	Canopy Density (%): 98.9	Pools by Stream Length (%): 43.5
Reach Length (ft.): 1484	Coniferous Component (%): 17.6	Pool Frequency (%): 40.0
Riffle/Flatwater Mean Width (ft.): 9.5	Hardwood Component (%): 82.4	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 20
Range (ft.): 11 to 14	Vegetative Cover (%): 88.8	2 to 2.9 Feet Deep: 70
Mean (ft.): 13	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 0
Std. Dev.: 1	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 10
Base Flow (cfs.): 0.2	Occurrence of LWD (%): 9	Mean Max Residual Pool Depth (ft.): 2.5
Water (F): 57 - 60 Air (F): 66 - 70	LWD per 100 ft.:	Mean Pool Shelter Rating: 29
Dry Channel (ft): 0	Riffles: 1	
	Pools: 0	
	Flat: 0	
Pool Tail Substrate (%): Silt/Clay: 0 San	d: 0 Gravel: 20 Sm Cobble: 60 Lg Cobble: 20) Boulder: 0 Bedrock: 0
	C C	
Embeddedness Values (%): 1. 0.0 2.	70.0 3. 30.0 4. 0.0 5. 0.0	
Embeddedness Values (%): 1. 0.0 2.	70.0 3. 30.0 4. 0.0 5. 0.0	
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2	70.0 3. 30.0 4. 0.0 5. 0.0	
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6	Pools by Stream Length (%): 26.9
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7 Hardwood Component (%): 88.3	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%):
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW:	70.03.30.04.0.05.0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood Trees	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67
Embeddedness Values (%): 1. 0.0 2.STREAM REACH: 2Channel Type: B2Reach Length (ft.): 689Riffle/Flatwater Mean Width (ft.): 11.0BFW:Range (ft.): 10 to 13	70.03.30.04.0.05.0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11	70.03. 30.04. 0.05. 0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6Dominant Shelter:Boulders	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1	70.03. 30.04. 0.05. 0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6Dominant Shelter:BouldersDominant Bank Substrate Type:Sand/Silt/Clay	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 5td. Dev.: 1 Base Flow (cfs.): 0.2 0.2	70.03. 30.04. 0.05. 0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6Dominant Shelter:BouldersDominant Bank Substrate Type:Sand/Silt/ClayOccurrence of LWD (%):6	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7 Hardwood Component (%): 88.3 Dominant Bank Vegetation: Hardwood Trees Vegetative Cover (%): 90.6 Dominant Shelter: Boulders Dominant Bank Substrate Type: Sand/Silt/Clay Occurrence of LWD (%): 6 LWD per 100 ft.: 100	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70 Dry Channel (ft): 0	70.03. 30.04. 0.05. 0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6Dominant Shelter:BouldersDominant Bank Substrate Type:Sand/Silt/ClayOccurrence of LWD (%):6LWD per 100 ft.:Riffles:0100	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70 Dry Channel (ft): 0 10 10 10 10 10	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7 Hardwood Component (%): 88.3 Dominant Bank Vegetation: Hardwood Trees Vegetative Cover (%): 90.6 Dominant Shelter: Boulders Dominant Bank Substrate Type: Sand/Silt/Clay Occurrence of LWD (%): 6 LWD per 100 ft.: Riffles: Riffles: 0 Pools: 1	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70 Dry Channel (ft): 0 1 10 10 10 10	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7 Hardwood Component (%): 88.3 Dominant Bank Vegetation: Hardwood Trees Vegetative Cover (%): 90.6 Dominant Bank Substrate Type: Sand/Silt/Clay Occurrence of LWD (%): 6 LWD per 100 ft.: Riffles: Riffles: 0 Pools: 1	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70 Dry Channel (ft): 0 0 San	70.0 3. 30.0 4. 0.0 5. 0.0 Canopy Density (%): 99.6 Coniferous Component (%): 11.7 Hardwood Component (%): 88.3 Dominant Bank Vegetation: Hardwood Trees Vegetative Cover (%): 90.6 Dominant Shelter: Boulders Dominant Bank Substrate Type: Sand/Silt/Clay Occurrence of LWD (%): 6 LWD per 100 ft.: Riffles: Riffles: 1 Flat: 1 d: 0 Gravel: 0	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50 Boulder: 100 Bedrock: 0
Embeddedness Values (%): 1. 0.0 2. STREAM REACH: 2 Channel Type: B2 Reach Length (ft.): 689 Riffle/Flatwater Mean Width (ft.): 11.0 BFW: Range (ft.): 10 to 13 Mean (ft.): 11 Std. Dev.: 1 Base Flow (cfs.): 0.2 Water (F): 58 - 60 Air (F): 68 - 70 Dry Channel (ft): 0 2 Pool Tail Substrate (%): Silt/Clay: 0 San	70.03. 30.04. 0.05. 0.0Canopy Density (%):99.6Coniferous Component (%):11.7Hardwood Component (%):88.3Dominant Bank Vegetation:Hardwood TreesVegetative Cover (%):90.6Dominant Shelter:BouldersDominant Bank Substrate Type:Sand/Silt/ClayOccurrence of LWD (%):6LWD per 100 ft.:Riffles:Riffles:0Pools:1Flat:1d:0Gravel:005. 0.0	Pools by Stream Length (%): 26.9 Pool Frequency (%): 33.3 Residual Pool Depth (%): < 2 Feet Deep: 67 2 to 2.9 Feet Deep: 33 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.7 Mean Pool Shelter Rating: 50 Boulder: 100 Bedrock: 0

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3	
Channel Type: F4 Canopy Density (%): 97.9	Pools by Stream Length (%): 32.9
Reach Length (ft.): 13027 Coniferous Component (%): 27.7	Pool Frequency (%): 40.7
Riffle/Flatwater Mean Width (ft.): 5.3 Hardwood Component (%): 72.3	Residual Pool Depth (%):
BFW: Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 24
Range (ft.): 8 to 13 Vegetative Cover (%): 95.1	2 to 2.9 Feet Deep: 46
Mean (ft.): 11 Dominant Shelter: Undercut Banks	3 to 3.9 Feet Deep: 25
Std. Dev.: 2 Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 5
Base Flow (cfs.): 0.2 Occurrence of LWD (%): 16	Mean Max Residual Pool Depth (ft.): 2.6
Water (F): 53 - 59 Air (F): 56 - 70 LWD per 100 ft.:	Mean Pool Shelter Rating: 63
Dry Channel (ft): 88 Riffles: 1	
Pools: 2	
Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 1 Sand: 0 Gravel: 86 Sm Cobble: 8 Lg Cobble: 0 Embeddedness Values (%): 1. 26.1 2. 35.9 3. 28.3 4. 3.3 5. 6.5	Boulder: 1 Bedrock: 4

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name:	ream Name: Dutch Charlie Creek					LLID: 123	6555396922	Drainage:	Eel River -	South Fork	
Survey Dates:	7/31/20	07 to 8/6	6/2007								
Confluence Loca	ation:	Quad:	LINCOLN RIDGE		Legal Description:	T21NR16WS09	Latitude:	39:41:32.0N	Longitude:	123:39:20	.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	10	10	6.7
Boulder	1	2	1.0
Cobble / Gravel	0	0	0.0
Sand / Silt / Clay	138	137	92.3

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	8	8	5.4
Brush	40	31	23.8
Hardwood Trees	76	63	46.6
Coniferous Trees	23	45	22.8
No Vegetation	2	2	1.3

Total Stream Cobble Embeddedness Values:

2

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Dutch Charlie Creek

LLID: 1236555396922 Drainage: Eel River - South Fork

Survey Dates: 7/31/2007 to 8/6/2007

Confluence Location: Quad: LINCOLN RIDGE Legal Description: T21NR16WS09 Latitude: 39:41:32.0N Longitude: 123:39:20.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	4	32	52
SMALL WOODY DEBRIS (%)	5	23	16
LARGE WOODY DEBRIS (%)	17	17	16
ROOT MASS (%)	0	0	2
TERRESTRIAL VEGETATION (%)	5	2	2
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	1	0
BOULDERS (%)	60	24	10
BEDROCK LEDGES (%)	10	1	2

DUTCH CHARLIE CREEK 2007 HABITAT TYPES BY PERCENT OCCURRENCE



DUTCH CHARLIE CREEK 2007 HABITAT TYPES BY PERCENT TOTAL LENGTH



DUTCH CHARLIE CREEK 2007 HABITAT TYPES BY PERCENT OCCURRENCE



DUTCH CHARLIE CREEK 2007 POOL TYPES BY PERCENT OCCURRENCE



DUTCH CHARLIE CREEK 2007 MAXIMUM DEPTH IN POOLS



DUTCH CHARLIE CREEK 2007 PERCENT EMBEDDEDNESS



DUTCH CHARLIE CREEK 2007 MEAN PERCENT COVER TYPES IN POOLS



DUTCH CHARLIE CREEK 2007 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



DUTCH CHARLIE CREEK 2007 MEAN PERCENT CANOPY





DUTCH CHARLIE CREEK 2007 DOMINANT BANK COMPOSITION IN SURVEY REACH



DUTCH CHARLIE CREEK 2007 DOMINANT BANK VEGETATION IN SURVEY REACH

