STREAM INVENTORY REPORT

Standley Creek

INTRODUCTION

A stream inventory was conducted from September 29 to October 6, 2009 on Standley Creek. The survey began 16,057 feet from the confluence of the South Fork Eel River where the 2007 Standley Creek survey ended and extended upstream an additional 1.9 miles.

The Standley Creek 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 Standley Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for Chinook, 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

Standley 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). Standley Creek's legal description at the confluence with South Fork Eel River is T24N R18W S01. Its location is 39.9602 north latitude and 123.8002 west longitude, LLID number 1238003399603. Standley Creek is a first order stream and has approximately 4.7 miles of blue line stream according to the USGS Piercy 7.5 minute quadrangle. Standley Creek drains a watershed of approximately 7.3 square miles. Elevations range from about 500 feet at the mouth of the creek to 1,000 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Dimmick Road off U.S. Highway 101.

METHODS

The habitat inventory conducted in Standley Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) Members 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 Standley 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". Standley 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 Standley 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 Standley 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 Standley 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 Standley 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 during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Standley Creek. In addition, underwater observations were made at 10 sites using techniques 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

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for Standley 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

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

The habitat inventory of September 29 to October 6, 2009, was conducted by I. Mikus and S. McSmith (DFG), and T. Emmalhainz (WSP). The total length of the stream surveyed was 10,090 feet.

Stream flow was estimated near the bottom of the survey reach at 0.15 cfs on October 6, 2009.

Standley Creek is a G4 channel type for 10,090 feet of the stream surveyed (Reach 1). G4 channels are entrenched "gully" step-pool channels on moderate gradients with low width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 44 to 58 degrees Fahrenheit. Air temperatures ranged from 38 to 59 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36% pool units, 27% riffle units, and 26% flatwater units (Graph 1). Based on total length of Level II habitat types there were 35% flatwater units, 28% pool units, and 22% riffle units (Graph 2).

Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 31%; low gradient riffle units, 20%; step run units, 13%; and run units 13% (Graph 3). Based on percent total length, step run units made up 25%, mid-channel pool units 24%, and low gradient riffle units 18%.

A total of 103 pools were identified (Table 3). Main channel pools were the most frequently encountered at 88% (Graph 4), and comprised 89% 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. Thirty-three of the 103 pools (32%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 103 pool tail-outs measured, 58 had a value of 1 (56.3%); 30 had a value of 2 (29.1%); 7 had a value of 3 (6.8%); 3 had a value of 4 (2.9%); 5 had a value of 5 (4.9%) (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 3, flatwater habitat types had a mean shelter rating of 6, and pool habitats had a mean shelter rating of 21 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at mean shelter rating of 22. Scour pools had a mean shelter rating of 12 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Standley Creek. Graph 7 describes the pool cover in Standley Creek. Large woody debris is the dominant pool cover type followed by 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 60% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 23% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Standley Creek was 94%. Six percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 56% and 44%, respectively. Graph 9 describes the mean percent canopy in Standley Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 97%. The dominant elements composing the structure of the stream banks consisted of 63% sand/silt/clay, 17% bedrock, 17% cobble/gravel, and 2% boulder (Graph 10). Coniferous trees were the dominant vegetation type observed in 50.8% of the units surveyed. Additionally, 46.7% of the units surveyed had hardwood trees as the dominant vegetation type, and 2.4% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 10 sites for species composition and distribution in Standley Creek on October 6, 2009. Water temperatures taken during the sampling period of 1215 to 1405 ranged from 48 to 50 degrees Fahrenheit. Air temperatures ranged from 51 to 58 degrees Fahrenheit. The sites were sampled by S. McSmith (DFG) and M. Groff (WSP).

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In Reach 1, which comprised the entire 10,090 feet of stream surveyed, 10 sites were sampled. The reach sites yielded 48 young-of-the-year steelhead/rainbow trout (SH/RT), 3 age 1+ SH/RT, 4 age 2+ SH/RT, and 109 coho.

The following chart displays the information yielded from these sites:

2009 Standley Creek underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
Reach 1: G4 Channel Type									
10/06/09	1	018	4.2	16,694	21	1	1	43	0
10/06/09	2	043	4.2	17,701	13	0	0	28	0
10/06/09	3	063	5.4	18,524	3	0	0	10	0
10/06/09	4	079	4.2	19,142	3	0	0	24	0
10/06/09	5	096	4.2	19,578	1	0	0	4	0
10/06/09	6	127	5.6	20,843	4	2	1	0	0
10/06/09	7	129	4.2	20,960	3	0	0	0	0
10/06/09	8	184	4.2	22,736	0	0	1	0	0
10/06/09	9	242	4.2	25,069	0	0	1	0	0
10/06/09	10	252	4.2	25,300	0	0	0	0	0

DISCUSSION

Standley Creek is a G4 channel type for the entire 10,090 feet of the stream surveyed. The suitability of G4 channel types for fish habitat improvement structures is as follows: G4 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days September 29 to October 6, 2009 ranged from 44 to 58 degrees Fahrenheit. Air temperatures ranged from 38 to 59 degrees Fahrenheit. To make any 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 35% of the total length of this survey, riffles 22%, pools 28%, and dry unit 14%. Thirty-three of the 103 (32%) pools had 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. Installing large wood structures that will increase or deepen pool habitat is recommended.

Eighty-eight of the 103 pool tail-outs measured had embeddedness ratings of 1 or 2. Ten of the pool tail-outs had embeddedness ratings of 3 or 4. Five 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.

Eighty-six of the 103 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 is 21. The shelter rating in the flatwater habitats is 6. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Standley Creek. Large woody debris is the dominant cover type in pools followed by 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 94%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was 97% and 97%, 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) Standley Creek should be managed as an anadromous, natural production stream.

2) 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.

3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large woody debris. Adding high quality complexity with woody cover in the pools is desirable.

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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 at the end of the 2007 Standley Creek survey, above Clark Gulch and below North Fork Standley Creek.
210	0007.00	A slide on the right bank measures approximately 20' long x 15' high and is contributing sediment ranging in size from silt to gravel to the channel.
324	0010.00	Log debris accumulation (LDA) #01 contains 26 pieces of large woody debris (LWD) and measures 8' high x 67' wide x 3' long. Water does not flow through and there are no gaps in the LDA. Retained sediment ranges from silt to large cobble and measures 15' wide x 100' long x 3' deep. Fish were observed above the LDA.
456	0014.00	Tributary #01 (North Fork Standley Creek) enters from the left bank. See 2009 North Fork Standley Creek Habitat Inventory Report.
1608	0043.00	Tributary #02 enters from the right bank. The flow is 0.01 cfs, and it contributes to 5% of the downstream flow. The temperature downstream of the tributary is 58 degrees Fahrenheit, the temperature of the tributary is 56 degrees Fahrenheit, and the temperature upstream of the confluence is 58 degrees Fahrenheit. The slope of the tributary is 3%. The tributary is inaccessible to fish due to an LDA approximately 100' upstream from the mouth. No fish were observed in the tributary.
2349	0059.00	LDA #02 contains 12 pieces of LWD and measures 6' high x 28' wide x 5' long. Water does not flow through and there are no visible gaps. Retained sediment ranges from silt to small cobble and measures 12' wide x 40' long x 2' deep. Fish were observed above the LDA.
2549	0066.00	There is a dry tributary on the left bank.
2735	0072.00	LDA #03 contains 10 pieces of LWD and measures 5.5' high x 23' wide x 25' long. Water does flow through and there are visible gaps. Retained sediment ranges from silt to large cobble and measures 4' wide x 15' long x 2' deep. Fish were observed above the LDA.
2927	0077.00	LDA #04 contains 15 pieces of LWD and measures 6.5' high x 36' wide x 8' long. Water does not flow through and there are no visible gaps.

		Retained sediment ranges from silt to gravel and measures 15' wide x 20' long x 2.5' deep. Fish were observed above the LDA.
3130	0081.00	Tributary #03 enters from the right bank. The flow is 0.01 cfs, and it contributes to 5% of the downstream flow. The temperature downstream of the tributary is 52 degrees Fahrenheit, the temperature of the tributary is 52 degrees Fahrenheit, and the temperature upstream of the confluence is 52 degrees Fahrenheit. The slope of the tributary is 40%, making it inaccessible to fish.
3316	0088.00	LDA #05 contains 6 pieces of LWD and measures 6' high x 23' wide x 7' long. Water flows through and there are visible gaps. Retained sediment ranges from silt to large cobble and measures 20' wide x 12' long x 1' deep. Fish were observed above the LDA.
3335	0090.00	LDA #06 contains 9 pieces of LWD and measures 8' high x 28' wide x 5' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to small cobble and measures 20' wide x 50' long x 1' deep. Fish were observed above the LDA.
3367	0092.00	A blown out LDA is retaining approximately 100 cubic feet of sediment.
3705	0102.00	A slide on the left bank measures approximately 20' high x 15' long and is contributing sediment ranging in size from silt to gravel.
4377	0117.00	Tributary #04 enters from the left bank. The tributary consists of isolated pools for the first 100' followed by a 10' high bedrock sheet over which water is trickling. The temperature downstream of the tributary is 52 degrees Fahrenheit, the temperature of the tributary is 52 degrees Fahrenheit, and the temperature upstream of the confluence is 52 degrees Fahrenheit. The slope of the tributary is 18%. The tributary is inaccessible due a waterfall and debris blockages approximately 150' upstream from the mouth. No fish were observed in the tributary.
4503	0120.00	There is a 1.5' high plunge over a log.
4554	0122.00	Erosion on the left bank measures approximately 20' long x 10' high and is contributing sediment ranging in size from silt to gravel.
4710	0125.00	LDA #07 contains 14 pieces of LWD and measures 4' high x 22' wide x 6' long. Water flows through and there are no visible gaps. Retained sediment ranges from silt to small cobble and measures 10' wide x 20' long x 1' deep. Fish were observed above the LDA.
4726	0126.00	Tributary #05 enters from the right bank. The flow is 0.02 cfs, and it contributes to 10% of the downstream flow. The temperature

		downstream of the tributary is 53 degrees Fahrenheit, the temperature of the tributary is 52 degrees Fahrenheit, and the temperature upstream of the confluence is 52 degrees Fahrenheit. The slope of the tributary is 30%. The steep slope and a debris blockage approximately 80' upstream from the mouth make the tributary inaccessible to fish.
4786	0128.00	LDA #08 contains 9 pieces of LWD and measures 8' high x 27' wide x 3' long. Water does not flow through and there are no visible gaps. Retained sediment ranges from silt to small cobble and measures 15' wide x 20' long x 4' deep. Fish were observed above the LDA.
5139	0136.00	Boulders and a log form a 3.5' high jump with no pool.
5293	0140.00	LDA #09 contains 20 pieces of LWD and measures 2.5' high x 40' wide x 15' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to cobble and measures 10' wide x 40' long x 1' deep. Fish were observed above the LDA.
5778	0154.00	LDA #10 contains 2 pieces of LWD and measures 7' high x 42' wide x 4' long. Water flows through and there are no visible gaps. Retained sediment ranges from silt to gravel and measures 15' wide x 30' long x 4' deep. Fish were observed above the LDA.
5998	0162.00	LDA #11 contains 12 pieces of LWD and measures 7' high x 27' wide x 3' long. Water does not flow through and there are no visible gaps. Retained sediment ranges from silt to small cobble and measures 7' wide x 210' long x 1.5' deep. Fish were observed above the LDA.
6233	0170.00	LDA #12 contains 8 pieces of LWD and measures 3' high x 24' wide x 4' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to small cobble and measures 12' wide x 70' long x 1' deep. Fish were observed above the LDA.
6415	0173.00	A slide on the right bank measures approximately 30' long x 80' high and is contributing sediment ranging in size from silt to cobble to the stream channel.
6426	0174.00	LDA #13 contains 7 pieces of LWD and measures 5.5' high x 43' wide x 4' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to gravel and measures 12' wide x 140' long x 1.5' deep. Fish were observed above the LDA.
6450	0175.00	More than six salmonid young-of-the-year (YOY) are trapped in an isolated run.

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6576	0179.00	Small woody debris is accumulating in the channel. There is a dry tributary on the right bank.
6664	0184.00	LDA #14 contains 2 pieces of LWD and measures 5' high x 14' wide x 3' long. Water does not flow through and there are no visible gaps. Retained sediment ranges from silt to small cobble and measures 20' wide x 100' long x 2' deep. Fish were observed above the LDA.
7189	0195.00	There is a dry tributary on the left bank.
7549	0206.00	A road follows the left bank approximately 50' upslope.
7739	0212.00	Tributary #06 enters from the left bank. The tributary is not flowing; it contains standing water. The temperature downstream of the tributary is 52 degrees Fahrenheit, the temperature of the tributary is 51 degrees Fahrenheit, and the temperature upstream of the confluence is 51 degrees Fahrenheit. The slope of the tributary is 4% and fish are observed in the 200 feet explored. There is a possible jump barrier under a bridge 100 feet upstream from the mouth.
7876	0219.00	LDA #15 contains 5 pieces of LWD and measures 5' high x 24' wide x 4' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to small cobble and measures 8' wide x 200' long x 1' deep. The plunge over the LDA is a possible barrier to salmonids.
8002	0220.00	There is a dry tributary on the left bank. The tributary has a 15' perched culvert 100' upstream from its mouth.
9025	0244.00	LDA #16 contains 6 pieces of LWD and measures 4' high x 15' wide x 10' long. Water does not flow through and there are visible gaps. Retained sediment ranges from silt to gravel and measures 10' wide x 40' long x 1' deep. The LDA is a possible barrier to salmonids because it is a potential strainer. Fish were not observed above the LDA.
9761	0273.00	Tributary #07 enters from the right bank. The flow is 0.05 cfs, and it contributes to 25% of the downstream flow. The temperature downstream of the tributary is 48 degrees Fahrenheit, the temperature of the tributary is 44 degrees Fahrenheit, and the temperature upstream of the confluence is 50 degrees Fahrenheit. The slope of the tributary is 6%. The tributary is accessible to fish, but no fish were observed.
9888	0278.00	A cut on the left bank measures approximately 25' long x 15' high and is contributing sediment in size from silt to gravel.

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9941	0281.00	Tributary #08 enters from the left bank. The flow is less than 0.01 cfs, and it contributes to 5% of the downstream flow. The temperature downstream of the tributary is 52 degrees Fahrenheit, the temperature of the tributary is 50 degrees Fahrenheit, and the temperature upstream of the confluence is 50 degrees Fahrenheit. The slope of the tributary is 7%. It is accessible to fish, but no fish were observed. The tributary goes dry approximately 25' upstream from the mouth.
10090	0285.00	End of survey at a 5.5' high plunge off of bedrock. This is a possible end of anadromy. The pool below the plunge measures 1.5' deep. The plunge may pass fish during very high flows or flood events. No fish were seen above the barrier. Approximately 700' upstream of this unit the stream goes dry and the gradient increases to approximately eight percent. At this point the channel is filled with LWD and an LDA greater than 100' long.

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.

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LEVEL III and LEVEL IV HABITAT TYPES

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