

# Scott River Adult Coho Spawning Ground Surveys 2010-2011 Season

Report Prepared by Danielle Yokel  
Siskiyou Resource Conservation District

For the United States Fish and Wildlife Service

Agreement # 813339G030

2009-FISHERIES-FP-07

April 2011

# Scott River Adult Coho Spawning Ground Surveys 2010-2011

## Contents

|                                               |    |
|-----------------------------------------------|----|
| Contents .....                                | 2  |
| Abstract .....                                | 3  |
| Introduction.....                             | 3  |
| Project Objectives .....                      | 3  |
| Project Location .....                        | 4  |
| Survey Locations .....                        | 4  |
| Map 1. 2010-2011 Survey Reaches .....         | 9  |
| Crew training .....                           | 10 |
| Spawning Ground and Carcass Surveys .....     | 10 |
| Biological Sample Collection .....            | 11 |
| GPS data collection.....                      | 11 |
| Fish ID and Mark Identification .....         | 11 |
| Fish ID .....                                 | 11 |
| Cooperators .....                             | 12 |
| Results.....                                  | 14 |
| Run timing and duration of coho spawning..... | 14 |
| Summary .....                                 | 15 |
| Redd Survey Results .....                     | 15 |
| Map 2. 2010-2011 Coho Redd Observations.....  | 17 |
| Map 3. Redds per mileFlow Conditions .....    | 19 |
| Flow Conditions.....                          | 20 |
| Biological Sample Collection .....            | 20 |
| CDFG Scott River Weir.....                    | 21 |
| Discussion.....                               | 22 |
| Run Timing and Duration .....                 | 22 |

## **Abstract**

In 2010-2011, adult coho spawning ground surveys were completed in the Scott River Watershed in order to continue to further existing knowledge of the distribution and timing of coho salmon. A total of 42.0 miles were surveyed (9.10 miles on the mainstem and 32.90 miles on tributaries). Surveys consisted of trained crews walking established reaches either instream or on the bank in order to collect information on lives, carcasses, and redds. Most reaches were surveyed weekly; however, some reaches were surveyed only once. Streams that were surveyed include: East Fork Scott River, South Fork Scott River, Sugar Creek, French-Miners Creek, Etna Creek, Patterson Creek, Kidder Creek, Shackleford-Mill Creek, Kelsey Creek, Canyon Creek, and Tompkins Creek. The survey season lasted from November 17<sup>th</sup> 2010– January 12<sup>th</sup> 2011. During this period a total of 162 redds, and 35 carcasses were identified.

## **Introduction**

Coho salmon (*Oncorhynchus kisutch*) in the Klamath River Basin, the Southern Oregon-Northern California Coast ESU, were listed as threatened by the National Marine Fisheries Service in 1997. In 2001, the State of California began considering a listing of the species as threatened, and in August of 2004, the California Fish and Game Commission acted to add the coho to the list of endangered and threatened species. The listing became effective March 30<sup>th</sup>, 2005.

Adult coho spawning ground surveys have been performed annually in the Scott River Watershed since the winter of 2001. These surveys began as a cooperative effort between local landowners, agencies, and concerned volunteers. At that time it was recognized that baseline population and distribution data were needed in order to implement and assess effective restoration efforts.

## **Project Objectives**

- 1.) Document the presence of coho salmon within the historic range of distribution.
- 2.) Survey “Index Reaches”, as delineated in the 2001-2002 survey, once per week, or as survey conditions (e.g. flow) allow.

## Scott River Adult Coho Spawning Ground Surveys 2010-2011

- 3.) Document distribution of adult coho spawning by brood year. Document the upper extent of spawning in each tributary where coho salmon are observed.
- 4.) Determine the run timing and duration of adult coho spawning in the Scott River system.
- 5.) Collect one set of tissue samples for DNA analysis to understand the genetic relationship of the Scott River coho salmon to other stocks and collect a sets of scale samples to understand the life history of the Scott River coho salmon. The tissue and scale samples will be submitted to CDFG. In addition, otoliths are to be collected for life history analysis, and submitted to CDFG.
- 6.) Determine additional site specific information as they relate to spawning: redd composition, substrate composition, temperature, and stream gradient.

### **Project Location**

The 2010-2011 survey effort took place in the Scott River Watershed, a sub-basin of the Klamath River Basin. The Scott River is located in Siskiyou County, CA. The legal description of the mouth of the Scott River is T45N R10W Sec 6.

### **Survey Locations**

Adult coho spawning ground surveys were completed in the Scott River mainstem, and in the following tributaries: East Fork Scott, South Fork Scott, Sugar Creek, French-Miners Creek, Etna Creek, Patterson Creek, Kidder Creek, Shackleford-Mill Creek, Kelsey Creek, Canyon Creek, and Thompkins Creek. Some reaches of these streams were not surveyed during the season due to flow conditions, or a lack of access: Lower South Fork, Lower French, Lower and Upper Etna, Middle and Upper Kidder, Upper Shackleford, and the Mainstem Scott Reach 14. Streams not surveyed in 2010-2011 include: Moffet Creek, Indian Creek, Patterson Creek (Fort Jones), Rattlesnake Creek, Scott Bar-Mill, Boulder Creek, Middle Creek, Wildcat Creek, and Kangaroo Creek. **Table 1. Survey Reach Descriptions** depicts all stream reaches surveyed since 2001, and indicates the reaches surveyed in 2010-2011. Reaches were surveyed a minimum of once, and reaches designated as index reaches in 2001 were attempted to be surveyed weekly, when flow conditions allowed. Reaches designated in the past as index reaches are: Upper South Fork, Lower Shackleford/Mill, Lower Mill, Middle Patterson, Lower and Middle French, Miners, Lower and Upper Sugar, and the Mainstem Tailings. The index reaches able to be

Scott River Adult Coho Spawning Ground Surveys 2010-2011

surveyed five times or more in 2010-2011 are: Mid Patterson, Middle French, Miners, and Upper Sugar. See **Map 1** for a depiction of reaches surveyed in 2010-2011.

| <b>Table I. Survey Reach Descriptions</b> |                                                                           |                    |                   |                 |                     |                    |
|-------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------|-----------------|---------------------|--------------------|
| <b>Watershed</b>                          | <b>Reach Description</b>                                                  | <b>Survey Crew</b> | <b>Begin Mile</b> | <b>End Mile</b> | <b># of Surveys</b> | <b>Total Miles</b> |
|                                           | <b>Mill Cr. (Scott Bar)</b>                                               | NS                 | 0.40              | 0               | NS                  | 0                  |
| <b>Tompkins Creek</b>                     |                                                                           |                    |                   |                 |                     |                    |
| Lower.                                    | Lowest 1.25 miles of Tompkins Creek                                       | CDFG               | 1.8               | 0               | 4                   | 1.6                |
| Upper                                     | From USFS road # 46N64 crossing to Potato Patch                           | CDFG               | 2                 | 1               | 4                   | 1.0                |
| <b>Middle Creek</b>                       | Lowest .4 miles of Middle Creek                                           | NS                 | .40               | 0               | NS                  | 0                  |
| <b>Kelsey Creek</b>                       | Lower Kelsey from barrier to mouth                                        | CDFG               | 0.6               | 0               | 4                   | 0.6                |
| <b>Kelsey Spawning Channel</b>            | Spawning channel                                                          | CDFG               | 0.2               | 0               | 4                   | 0.2                |
| <b>Canyon Creek</b>                       | mouth up                                                                  | CDFG               | 1.1               | 0               | 4                   | 1.1                |
| <b>Boulder Creek</b>                      | County bridge to mouth                                                    | NS                 | .20               | 0               | NS                  | 0                  |
| <b>Shackleford-Mill Creek</b>             |                                                                           |                    |                   |                 |                     |                    |
| Lower Shackleford-Mill(Index)             | From Milepost 2 on Dangel lane to Bridge at Quartz Valley Dr              | RCD                | 2.17              | 0               | 3                   | 1.60               |
| Upper Shackleford                         | Below the falls                                                           |                    | 5                 | 4.5             | NS                  | 0                  |
| Lower Mill(Index)                         | From the QV road bridge to road crossing ~ 300 meters below conf of Shack | RCD                | 1.6               | 0               | 2                   | 1.4                |
| Middle Mill                               | From the Quartz Valley Rd bridge to above Emigrant Cr.                    | RCD/Menke          | 3.2               | 1.5             | 1                   | 1.7                |
|                                           |                                                                           |                    |                   |                 |                     |                    |

Scott River Adult Coho Spawning Ground Surveys 2010-2011

|                               |                                                                                |             |      |      |    |      |
|-------------------------------|--------------------------------------------------------------------------------|-------------|------|------|----|------|
| Emmigrant Creek(trib to Mill) | Confluence with Mill Creek to County Road                                      | RCD/Menke   | 0.1  | 0    | 1  | 0.1  |
| Upper Mill Creek              | From county road crossing to 1/2 mile above                                    | RCD         | 3.7  | 3.3  | 1  | 0.4  |
| <b>Kidder Creek</b>           |                                                                                |             |      |      |    |      |
| Lower                         | Below Hwy 3 bridge                                                             | RCD         |      |      | 2  | 1.3  |
| Middle                        | Above Hwy 3 bridge outside of Greenview                                        | NS          | 5.8  | 5.0  | NS | 0    |
| Upper                         | Upper FGS property                                                             | spot survey |      |      |    |      |
| <b>Patterson(Etna)</b>        |                                                                                |             |      |      |    |      |
| Lower                         | Confluence of Johnson and Patterson Creek to below Hwy 3                       | RCD         | .80  | 0    | 1  | .80  |
| Mid (FGS) (Index)             | From Upper Youngs Diversion to Hwy 3                                           | RCD         | 6.2  | 4.6  | 7  | 1.70 |
| Lower Mid                     | Hwy 3 down                                                                     | RCD         | 4.60 | 3.90 | 5  | .70  |
| Upper (FGS)                   | From the Falls down                                                            | RCD         | 7.9  | 7.6  | 6  | 0.3  |
| <b>Etna Creek</b>             |                                                                                |             |      |      |    |      |
| Lower                         | 200 yards below Highway 3 to mouth                                             | RCD         | 2.25 | 0    | NS | 0    |
| Middle                        | From Etna City Diversion to End of FGS                                         | RCD         | 5.2  | 4.6  | 5  | .60  |
| Upper                         | From Mill Creek to Alder Creek                                                 | RCD         | 8    | 6.35 | NS | 0    |
| Ruffy Gap (Trib to Etna)      | area above mouth                                                               | RCD         | 0.2  | 0    | NS | 0    |
| <b>French Creek</b>           |                                                                                |             |      |      |    |      |
| Lower (Index)                 | Hwy 3 to mouth (New Reach 2003)                                                | NO Access   | 0.7  | 0    | NS | 0    |
| Middle 1 (Index)              | Confluence w/Miners to bottom of Krum. Reduced from 2001 due to lack of access | RCD         | 2.43 | 1.83 | 8  | .60  |
| Middle 2                      | Miner Cr. Rd to bottom of Tobias                                               | RCD         | 1.60 | .80  | 8  | .8   |

Scott River Adult Coho Spawning Ground Surveys 2010-2011

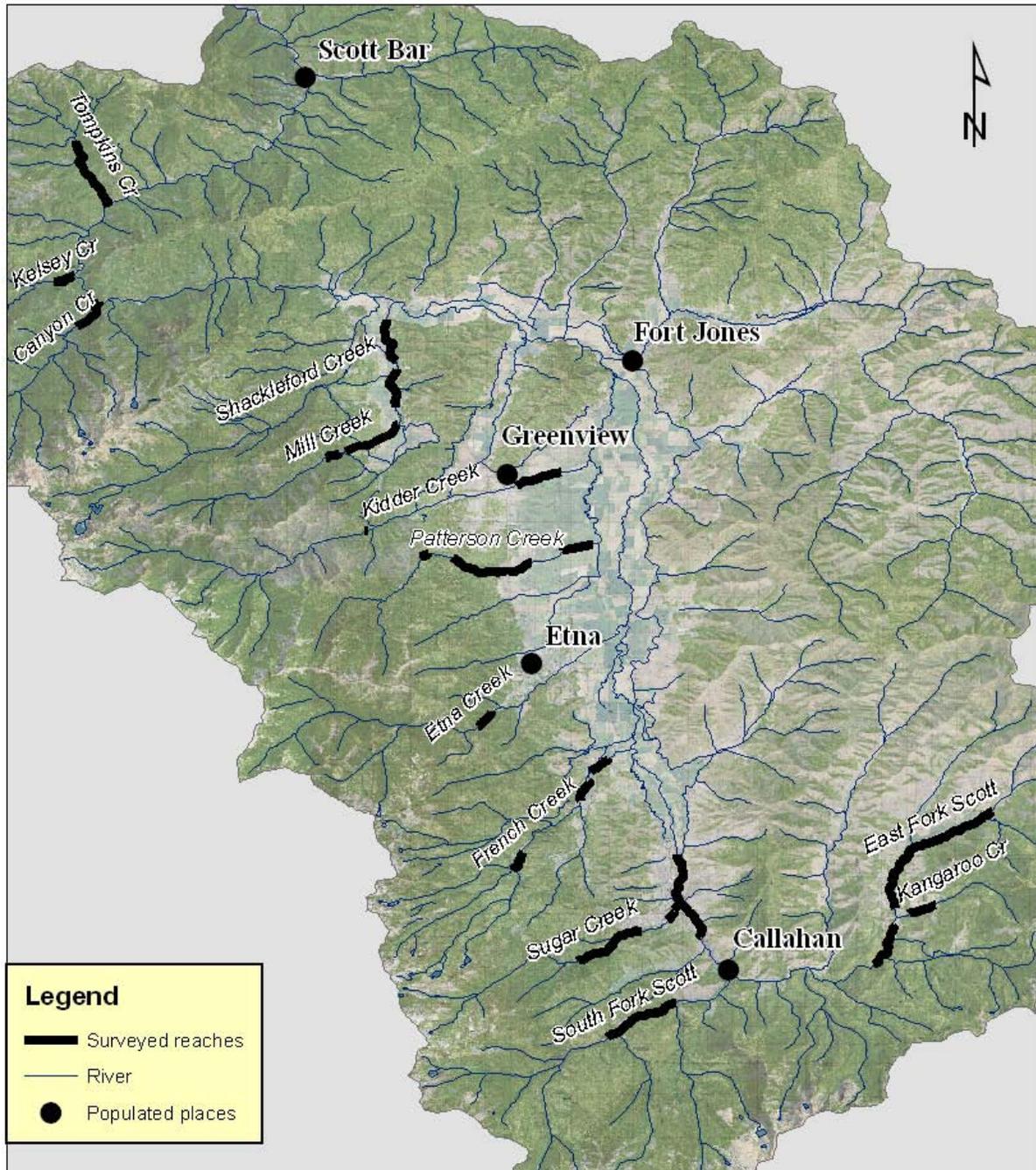
|                           |                                                                           |           |       |       |    |      |
|---------------------------|---------------------------------------------------------------------------|-----------|-------|-------|----|------|
| North Fork Area           | From below North Fork to confluence of French and Miners                  | RCD       | 3.43  | 2.43  | 1  | 1    |
| Paynes Creek Area         | French Creek from 1/4 mile us Paynes Creek to 1/4 mile ds                 | RCD       | 5.35  | 4.65  | 1  | 0.70 |
| Duck Lake Area            | Above and below mouth of Duck Lake                                        | RCD       | 6.3   | 5.8   | NS | 0    |
| Miners Creek              | Confluence with French Creek to upper Phelps Property                     | RCD       | 0.9   | 0     | 7  | 0.9  |
| Paynes Cr.                | Lowest .2 miles                                                           | RCD       | 0.2   | 0     | NS | 0    |
| North Fork French Cr.     | Timber Products                                                           | TP        | 0.7   | 0     | NS | 0    |
| <b>Tailings (INDEX)</b>   | From .30 miles below Wildcat Cr. To 1/2 mile upstream from Messner gulch. | RCD       | 55.35 | 52.25 | 1  | 3.10 |
| <b>Sugar Creek</b>        |                                                                           |           |       |       |    |      |
| Lower (Index)             | From Hwy 3 mouth                                                          | RCD       | 0.3   | 0     | 1  | 0.3  |
| mid                       | From Hwy 3 to Jeffy Bridge                                                |           | 0.3   | 0.60  | 1  | 0.3  |
| Upper (Index)             | From bridge crossing on Rd # 40N23 to cattle guard on Sugar Cr. Rd.       | RCD /NOAA | 4     | 1.9   | 5  | 2.1  |
| <b>Wildcat</b>            | Mouth up 2 mile                                                           | RCD       | 2.0   | 0     | NS | 0    |
| <b>South Fork</b>         |                                                                           |           |       |       |    |      |
| Lower S. Fork             | USFS piece                                                                | RCD/NOAA  | 0.7   | 0.3   | NS | 0    |
| Upper S. Fork             | 800 meters above Fox Cr. to Boulder Cr.                                   | RCD/NOAA  | 4     | 1.8   | 2  | 2.2  |
| Boulder Creek             | Mouth area                                                                | RCD/NOAA  |       |       | 2  | 0    |
| Fox Creek                 | Mouth Area                                                                | RCD/NOAA  |       |       | 2  | 0    |
| <b>East Fork</b>          |                                                                           |           |       |       |    |      |
| E. Fork-Lower Masterson   | Beginning 1.4 miles above mouth of Grouse Cr.                             | RCD       | 6.3   | 5.8   | 3  | 1.1  |
| E. Fork-Lower Masterson   | Grouse Creek downstream.                                                  | RCD       | 5.8   | 4.9   | 3  | .5   |
| East Fork-Upper Masterson | AP Cattle Ranch                                                           | RCD       | 11.8  | 7     | 1  | 4.8  |

Scott River Adult Coho Spawning Ground Surveys 2010-2011

|                      |                                                   |     |      |      |              |       |
|----------------------|---------------------------------------------------|-----|------|------|--------------|-------|
| Upper East Fork      | Confluence of Crater and Houston Creek downstream | RCD | 13.8 | 12.8 | 1            | 1.0   |
| Grouse Cr.           | lower .6mile                                      | RCD | 0.6  | 0    | NS           | 0     |
| Kangaroo Cr. - Lower | Lower 1 mile of creek                             | RCD | 1.1  | 0.1  | 1            | .8    |
| Kangaroo Cr. - Upper | USFS piece                                        | RCD | 2.1  | 1.4  | 1            | 0.5   |
| Rail Creek           | Rd 41N39 to end of USFS land                      | RCD | 1.25 | 1.45 | 1            | 0.2   |
| Mainstem Scott       | Reach 13                                          | RCD |      | 4    | 1            | 1     |
| Mainstem Scott       | Reach 14                                          | RCD |      | 0    | 0            | 5     |
|                      |                                                   |     |      |      | <b>Total</b> | 42.00 |

**Map 1. 2010-2011 Survey Reaches**

**Scott River coho surveys - 2010  
Surveyed reaches**



### **Crew training**

Crew training was organized by California Dept. of Fish and Game (CDFG) and the Siskiyou RCD. Training was held on November 17<sup>th</sup>, 2010 at the Siskiyou RCD office. Training included: Fish ID, tissue and scale sampling techniques, identification of marks and tags that have been applied throughout the Klamath Basin, GPS use and naming conventions, data sheets, and redd identification. See **Appendix A. Training Materials**.

All Siskiyou RCD field crew members have participated in the Adult Chinook Spawning Ground Surveys (CDFG) for several years, and had participated in the Scott River Adult Coho Spawning Ground surveys in previous years. A landowner volunteer was also present for the training and walked several surveys with the RCD.

### **Spawning Ground and Carcass Surveys**

Stream surveys were completed by a two person field crew. A stream survey is completed by walking instream, or on the bank (to avoid disturbing redds) beginning upstream and moving downstream. Crew members walk on opposite sides of the stream, looking for redds and fish. The location of any fish, redd, or carcasses was recorded by GPS, and noted on the data sheet. In addition, flagging was hung at redds to mark for the next survey crew, preventing double counting of redds. Carcasses are processed and then chopped to prevent double counting. Tissue and scale samples were taken from a subset of carcasses, and the species, sex, forklength, and any marking recorded on the data sheet. Additionally, otoliths were collected from a subset of carcasses sampled. One member of each crew had a State of California Scientific Collection Permit.

During redd surveys, the following data was collected from redds, if it did not disturb the spawning fish: redd length, width, pott depth, and substrate composition. Substrate composition categories are: Sand (<.2 cm), small gravel (.2-5 cm), large gravel (6-9 cm), small cobble (10-13 cm), and large cobble (> 13 cm).

See **Appendix A** for sample datasheets.

## **Biological Sample Collection**

Tissue samples were collected by clipping a one cm<sup>2</sup> piece of operculum tissue, using a hole punch. Samples were placed in absorptive paper, and placed into labeled envelopes. Scale samples were collected below the dorsal fin, but above the lateral line. Samples were collected by scraping with a knife blade in the direction from head to tail. Scale samples were placed in a labeled scale envelope. When possible, both left and right otoliths were collected using a pocket knife. The otoliths were then cleaned, dried, and placed in a labeled envelope. All samples were then provided to the California Department of Fish and Game, Yreka.

## **GPS data collection**

Hand-held Global Positioning System (GPS) units were used to record the location of the beginning and end of each survey reach, and location of each carcass, redd, and live fish identified. However, large concentrations of redds within ten meters of each other received only one GPS point. Only carcasses which were sampled were marked, and live fish sightings were grouped. The exception to this was if the fish or carcass was found in a unique location, or beyond the upper extent previously observed. In that case a GPS point was taken.

GPS waypoints were assigned an ID based on a stream code, sequential number, and a letter code denoting carcass (C), redd (R), or live fish (F).

Ex.) F C 0 4 C = French Creek # 4 Carcass

In addition, the GPS coordinates in Lat/Long were recorded on the field data sheet, along with the ID code assigned to that datapoint. See **Appendix A** for further detail on naming conventions.

## **Fish ID and Mark Identification**

### **Fish ID**

Positive identification of coho salmon was a crucial step in conducting the spawning ground surveys, and the collection of the tissue and scale samples. Morgan Knechtle, CDFG, provided

## Scott River Adult Coho Spawning Ground Surveys 2010-2011

hatchery carcasses of all three species (coho, chinook, steelhead) present in the Scott River Watershed, to ensure that the crew was fully aware of key identifying features.

The following characteristics are used to identify coho salmon:

**Gums:** Coho salmon have white gums at the base of the teeth only, typically the rest of the gum is gray.

**Spots:** These spots are black in color and can vary from circular to irregularly shaped spots. Both sexes have spots on the back, dorsal fin, and upper lobe of the caudal fin, with no spots on the lower lobe.

**Color:** Many coho salmon, both male and female, can exhibit extremely brilliant pink to red coloration of the lower 2/3 of the body.

**Kype:** Both males and females can have a fairly pronounced kype

**Nares:** Nares are enlarged and white in coloration. This characteristic is useful in identification of live fish due to the visibility.

**Caudal Peduncle:** the caudal peduncle is thicker than that of a Chinook. This is most noticeable when picking up a carcass, making it difficult to hold in one hand.

**Anal Fin:** The anal fin of coho salmon have 12-17 rays, and the outermost rays are longer than the inner rays, which is not the case with Chinook or steelhead.

**Sex:** Males generally are larger, have larger hooked kypes, and brilliant pink to red coloration. To verify the sex the anal opening was squeezed to determine the presence of milt (male) or eggs (female).

**Origin:** Hatchery fish are identified by either the lack of an adipose fin, or by a maxillary clip. (Right maxillary clip = Trinity River Hatchery, Left maxillary clip = Iron Gate Hatchery) Adipose clipped fish have the snout removed and submitted to CDFG for coded-wire tag recovery.

## Cooperators

The following entities cooperated in the survey effort this year:

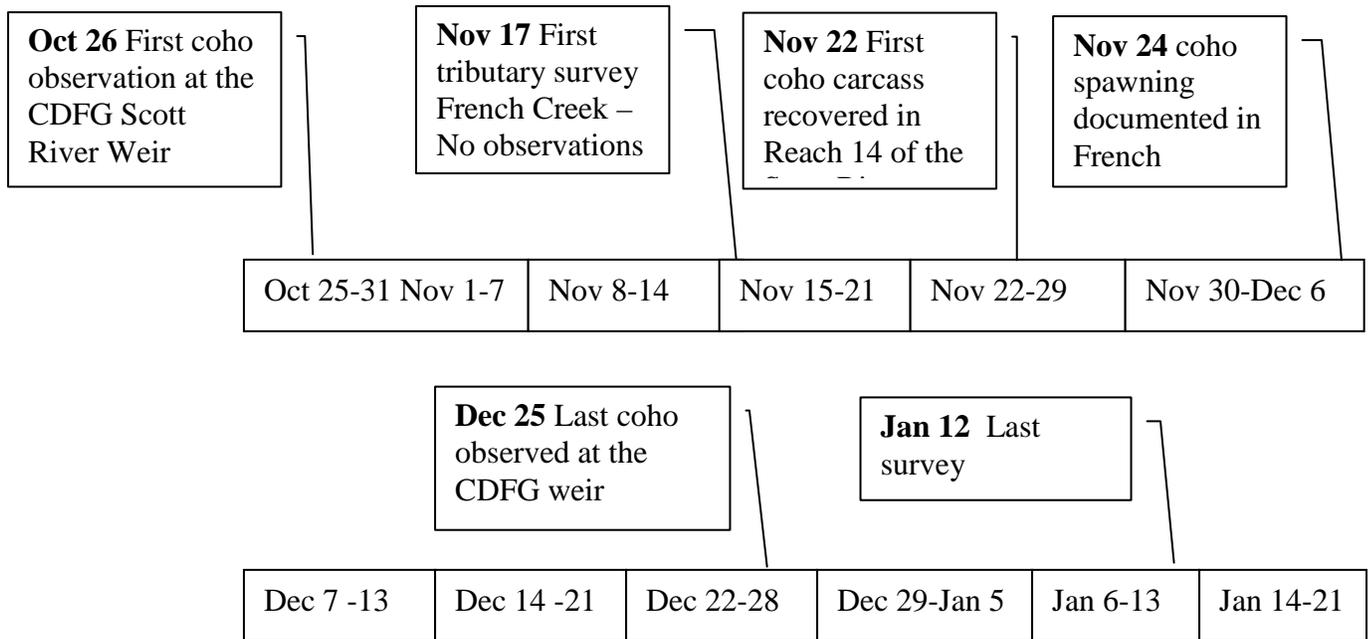
California Dept. of Fish and Game  
National Oceanic Atmospheric Administration  
Natural Resource Conservation Service

Scott River Adult Coho Spawning Ground Surveys 2010-2011

United States Fish and Wildlife Service  
United States Forest Service  
Scott Valley Landowners

## Results

### Run timing and duration of coho spawning.



**Figure I. Adult coho run timing in the Scott River – 2010-2011**

### Initial coho sightings

The first sighting of live coho adults in the Scott River was on October 26<sup>th</sup>, 2010, at the Scott River Weir, just upstream of Indian Scotty Campground (CDFG). By November 22<sup>nd</sup>, RCD crews had identified a coho carcass in Reach 14 on the mainstem Scott River. The last live coho observation at the CDFG weir was on December 25<sup>th</sup> 2010. The last carcass collected was in French Creek on January 4<sup>th</sup>, 2011.

## Summary

### Redd Survey Results

**Table II. Results by Reach**, documents the redds, and carcasses identified during the survey season.

**Table II. Results by Reach**

| Stream                 | Reach                | Total Redds     | Total Carcasses b |
|------------------------|----------------------|-----------------|-------------------|
| Canyon Cr              | Mouth up             | 1               | 0                 |
| East Fork              | AP Cattle Ranch      | 8               | 0                 |
| East Fork              | Lower Masterson      | 7               | 0                 |
| Etna                   | Middle               | 4               | 0                 |
| French Creek           | Middle               | 16              | 3                 |
| Kangaroo               | Lower                | 2               | 0                 |
| Kelsey Creek           | Lower                | 5               | 0                 |
| Kidder Creek           | Lower                | 4               | 0                 |
| Mill Creek             | Lower                | 52              | 0                 |
| Mill Creek             | Middle               | 4               | 8                 |
| Mill Creek             | Upper                | 1               | 0                 |
| Patterson              | Lower                | 2               | 0                 |
| Patterson              | upper/middle (index) | 9               | 1                 |
| Rail Creek             |                      | 2               | 0                 |
| Scott                  | Tailings             | 3               | 0                 |
| Shackleford-Mill       | Lower                | 32 <sup>a</sup> | 15                |
| South Fork Scott River | Upper                | 1               | 0                 |
| Sugar                  | Middle               | 3               | 0                 |
| Sugar                  | Upper                | 2               | 0                 |
| Sugar Creek            | Lower                | 2               | 0                 |
| Tompkins Creek         | Lower                | 2               | 0                 |
| Scott River Main       | Reach 13             | 0               | 1                 |
| Scott River Main       | Reach 14             | 0               | 1                 |
|                        | Redd Total           | 162             | 29                |

.a – some of the 32 redds in Shackleford-Mill were likely Chinook redds.

b- An additional six (6) coho were found by CDFG as washbacks from the weir.

A total of 162 Redds were observed during the survey season, and 29 redds were sampled. Very few live fish were observed during the surveys. It should be noted that some of the redds observed in Shackleford-Mill were likely Chinook. It is difficult based on timing and redd size to definitively determine which redds were which species. This reach typically has Chinook and

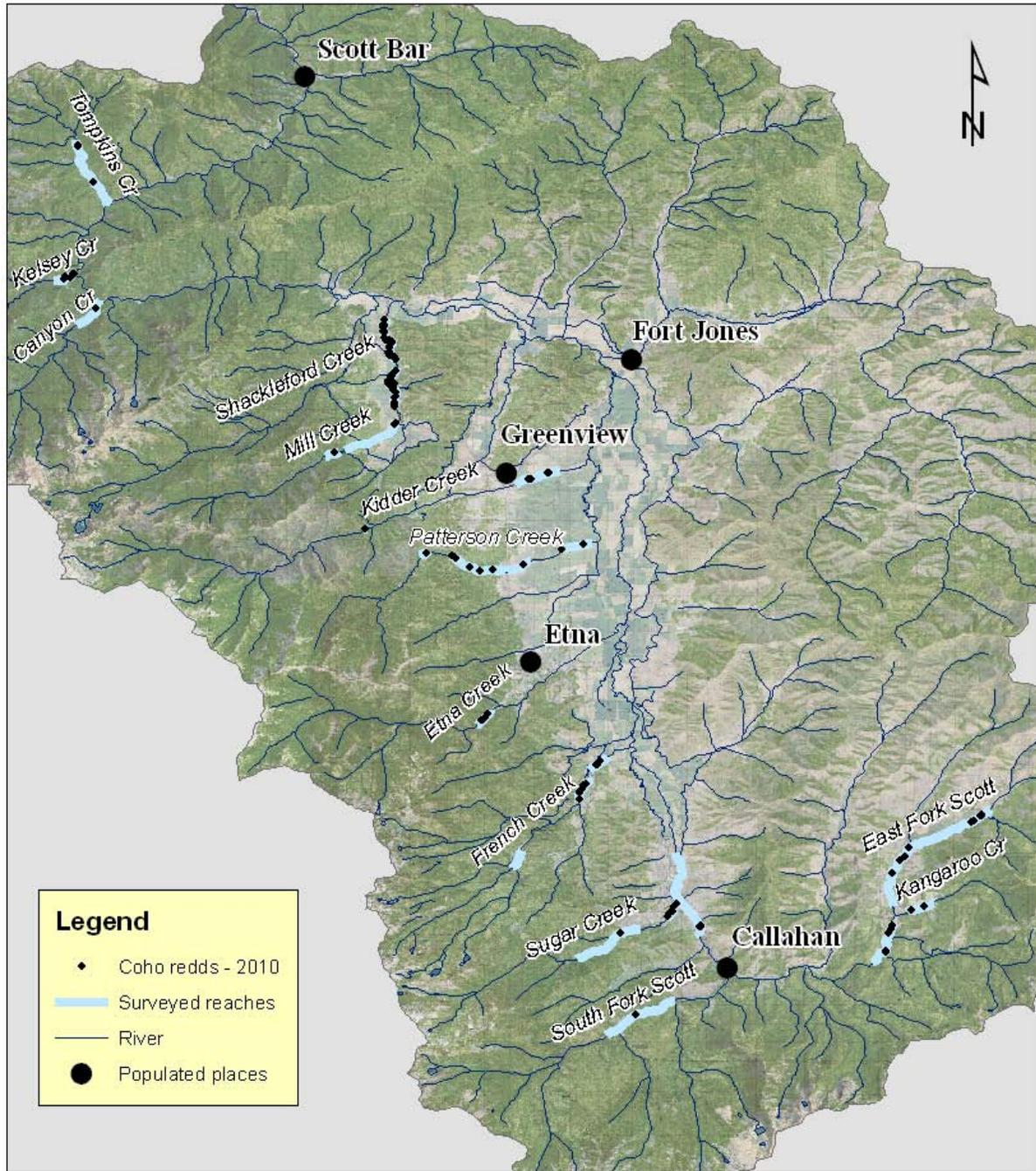
## Scott River Adult Coho Spawning Ground Surveys 2010-2011

coho overlap in spawning in years when flows are sufficient to reconnect Shackleford Creek to the Scott River during coho spawning. See **Map 2** for redds observed during the 2010-2011 survey season.

**Table II** and **Map 3** show the redds per mile for each survey reach where coho were observed. Similar to previous years, the highest spawning density was observed in lower Shackleford and Lower Mill Creek (See **Appendix B** for 2008 data). After that the highest spawning density was observed in lower Sugar Creek and French Creek.

**Map 2. 2010-2011 Coho Redd Observations**

**Scott River coho surveys - 2010  
Coho redds**

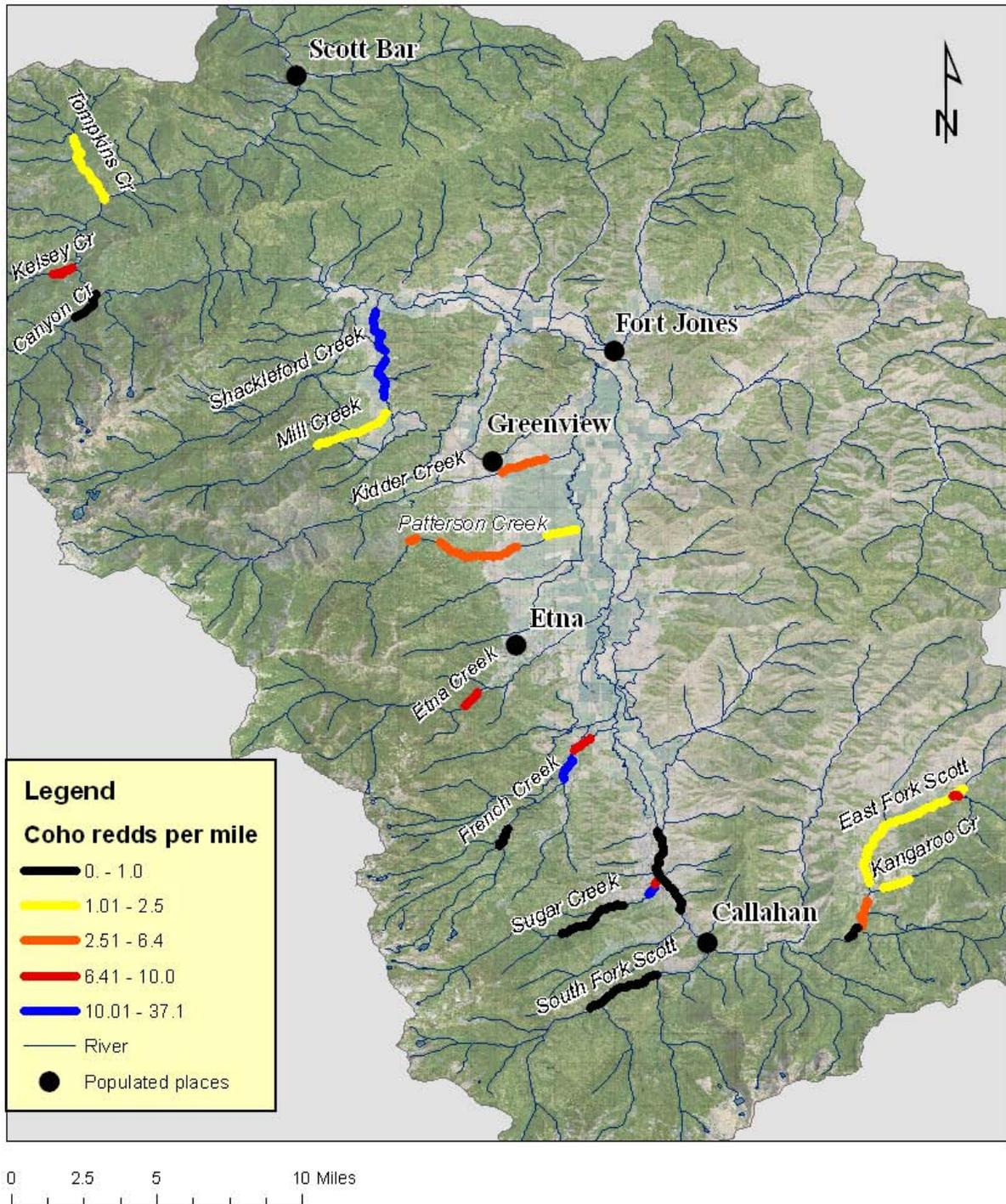


0 2.5 5 10 Miles

**Table III. Redds by Mile for Each Reach.**

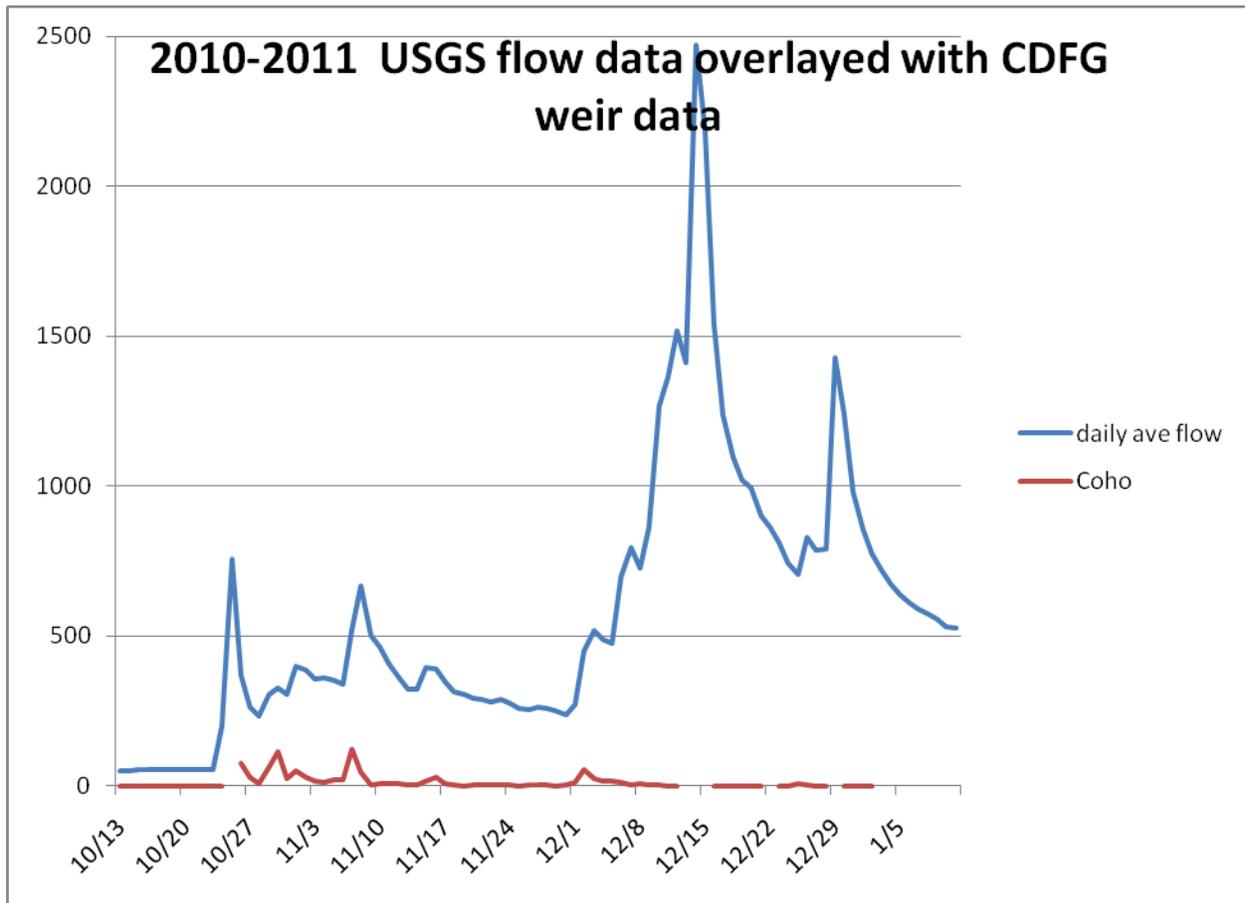
| <b>Stream</b>          | <b>Reach</b>         | <b>Distance (miles)</b> | <b>Number Redds</b> | <b>Redds per Mile</b> |
|------------------------|----------------------|-------------------------|---------------------|-----------------------|
| East Fork Scott River  | Lower - Below Grouse | 0.5                     | 0                   | 0                     |
| French Creek           | Paynes Creek area    | 0.7                     | 0                   | 0.0                   |
| Kidder Creek           | Gage Site            | Spot                    | 1                   | NA                    |
| Sugar Creek            | Upper                | 2.1                     | 1                   | 0.5                   |
| South Fork Scott River | Upper- Boulder Creek | 2.2                     | 1                   | 0.5                   |
| Canyon Creek           | Mouth to Mauer       | 1.1                     | 1                   | 0.9                   |
| Scott River            | Tailings             | 3.1                     | 3                   | 1.0                   |
| Tompkins Creek         | Mouth to Potato Flat | 2.6                     | 3                   | 1.2                   |
| East Fork Scott River  | AP Cattle Ranch      | 4.8                     | 8                   | 1.7                   |
| Mill Creek             | Middle               | 1.7                     | 4                   | 2.4                   |
| Patterson Creek        | Lower                | 0.8                     | 2                   | 2.5                   |
| Kangaroo Creek         | Lower                | 0.8                     | 2                   | 2.5                   |
| Mill Creek             | Upper                | 0.4                     | 1                   | 2.5                   |
| Patterson              | Middle               | 0.7                     | 2                   | 2.9                   |
| Kidder Creek           | Below HWY3           | 1.3                     | 4                   | 3.1                   |
| Patterson Creek        | Upper                | 0.3                     | 1                   | 3.3                   |
| Patterson              | Middle               | 1.7                     | 6                   | 3.5                   |
| East Fork              | Above Grouse         | 1.1                     | 7                   | 6.4                   |
| Etna Creek             | Diversion Dam Down   | 0.6                     | 4                   | 6.7                   |
| Kelsey                 | Mouth to falls       | 0.6                     | 5                   | 8.3                   |
| French Creek           | Middle               | 0.6                     | 6                   | 10.0                  |
| Sugar Creek            | Lower                | 0.3                     | 3                   | 10.0                  |
| Rail Creek             | Lower                | 0.2                     | 2                   | 10.0                  |
| French Creek           | Middle               | 0.8                     | 10                  | 12.5                  |
| Sugar Creek            | Gozzarino            | 0.3                     | 5                   | 16.7                  |
| Shackleford Creek      | Mill Creek Down      | 1.6                     | 32                  | 20.0                  |
| Mill Creek             | Lower                | 1.4                     | 52                  | 37.1                  |

### Scott River coho surveys - 2010 Coho redds per mile



Map 3. Redds per mile

## Flow Conditions



**Figure II.** Streamflow at USGS gauge during survey period, and coho migration at the CDFG weir. (Note: USGS data is preliminary only.)

Figure II. shows the relationship between flow events and coho migrations. Coho clearly migrated upstream when there are “pulses” of water movement. This migration pattern was observed in 2009-2010 as well (M Knechtle, CDFG). The largest migration of coho was observed in late October, and again in early November, following significant rain events.

## Biological Sample Collection

A total of 35 coho carcasses were recovered in the Scott River Watershed. Of those identified, eleven (11) were male and twenty-four (24) were female. Tissue, scale and otolith samples were taken from each carcass recovered. All samples were submitted to Morgan Knechtle (CDFG-Yreka). **Table IV. Carcass Details** contains data for each carcass sampled by the RCD.

## Scott River Adult Coho Spawning Ground Surveys 2010-2011

| Date       | Stream           | Reach | Lat      | Long      | Sex | forkleng<br>th | clips  | Scale | Tissue | otolith | collector |
|------------|------------------|-------|----------|-----------|-----|----------------|--------|-------|--------|---------|-----------|
| 11/22/2010 | Scott            | 14    | 41.44321 | 122.85354 | F   | 74             | no     | y     | y      | y       | E YokeI   |
| 11/30/2010 | Shackleford-Mill | Lower | 41.61404 | 122.96471 | F   | 74             | no     | y     | y      | y       | E YokeI   |
| 11/30/2010 | Scott            | 13    | 41.47569 | 122.84912 | F   | 65             | no     | y     | y      | y       | E YokeI   |
| 12/3/2010  | French           | mid   | 41.40921 | 122.86241 | m   | 75             | no     | y     | y      | y       | E YokeI   |
| 12/9/2010  | Shackleford-Mill | Lower | 41.62394 | 122.9657  | f   | 71             | no     | y     | y      | y       | E YokeI   |
| 12/17/2010 | mill             | Lower | 41.5943  | 122.96367 | f   | 70             | no     | y     | y      | y       | E YokeI   |
| 12/17/2010 | Shackleford-Mill | Lower | 41.59877 | 122.96076 | f   | 68             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.60677 | 122.96398 | f   | 71             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.60733 | 122.96416 | F   | 75             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.61117 | 122.96337 | m   | 76             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.61129 | 122.9633  | F   | 68             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.61313 | 122.96213 | m   | 63             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.61923 | 122.96647 | m   | 71             | no     | y     | y      | y       | E YokeI   |
| 12/21/2010 | Shackleford-Mill | Lower | 41.62401 | 122.96569 | m   | 77             | no     | y     | y      | y       | E YokeI   |
| 12/27/2010 | French           | mid   | 41.86248 | 122.40958 | f   | 66             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.5853  | 122.96185 | m   | 62             | pot RM | y     | y      | n       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.5853  | 122.96185 | f   | 68             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.5879  | 122.96055 | f   | 65             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.59219 | 122.96287 | F   | 60             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.59433 | 122.96376 | f   | 73             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.59649 | 122.96266 | f   | 69             | no     | y     | y      | y       | E YokeI   |
| 12/28/2010 | mill             | Lower | 41.58196 | 122.9606  | f   | 73             | no     | y     | y      | y       | E YokeI   |
| 12/30/2010 | Shackleford-Mill | Lower | 41.61329 | 122.96297 | m   | 71             | no     | y     | y      | y       | E YokeI   |
| 12/30/2010 | Shackleford-Mill | Lower | 41.6114  | 122.96311 | f   | 70             | no     | y     | y      | y       | E YokeI   |
| 12/30/2010 | Shackleford-Mill | Lower | 41.61202 | 122.96254 | f   | 68             | no     | y     | y      | y       | E YokeI   |
| 12/30/2010 | Shackleford-Mill | Lower | 41.61403 | 122.96378 | f   | 69             | no     | y     | y      | y       | E YokeI   |
| 12/30/2010 | Shackleford-Mill | Lower | 41.61744 | 122.96587 | f   | 70             | no     | y     | y      | y       | E YokeI   |
| 1/3/2011   | Patterson        | mid   | 41.50278 | 122.9135  | f   | 70             | no     | y     | y      | y       | E YokeI   |
| 1/4/2011   | French           | Mid   | 41.40954 | 122.80231 | f   | 70             | no     | y     | y      | y       | E YokeI   |

**Table IV. Carcass Details.**

### CDFG Scott River Weir

Since the fall of 2007, the California Department of Fish and Game (CDFG) has operated a weir and camera flume just upstream of Indian Scotty campground. Recording began on 10/13/2010 and the first coho was recorded on 10/26/2010. The last coho was recorded migrating past the weir on 12/25/2010. High flows from 12/13/2010 to 12/15/2010 made it impossible to run the video weir during that period. The weir was removed on 01/01/2011. The preliminary total count of coho observed at the weir stands at 881. (Pers. Comm. Morgan Knechtle, CDFG)

## **Discussion**

### **Run Timing and Duration**

Data collected from spawning ground surveys and the CDFG weir during this period indicates that the run timing is very similar from year to year. Coho appear to enter the Scott River system as early as flows will allow. Migration and spawning appears to be mostly completed by the last week of December

### **Coho Spawning Distribution**

During the 2010 spawning season, coho were observed in all of the tributaries where they have previously been documented. No effort was made during this survey season to identify new spawning reaches. Based on this year and previous year's information, coho appear to distribute throughout the watershed based upon flow conditions.

The highest spawning densities were observed in Lower Mill, Lower Shackleford, Lower Sugar Creek, and Lower French. These locations all provide both quality spawning habitat and quality rearing habitat. (Quigley 2003, Yokel 2006)

## References

California Data Exchange Center – Flow data for Shackleford and French Cr.

<http://cdec.water.ca.gov/cgi-progs/queryF?s=FCC>

<http://cdec.water.ca.gov/cgi-progs/queryF?s=SCK>

United States Geological Survey – Flow data for Fort Jones Gauge

[http://waterdata.usgs.gov/ca/nwis/uv/?site\\_no=11519500](http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11519500)

Knechtle, M. Borok, S, Mid-Klamath Cooperative Spawning Ground Survey 2009.

Quigley, D. (2003) Stream Inventory Report Scott River Watershed 2003. Siskiyou RCD pp 139

Quigley, D. (2006) *Draft Scott River Watershed Monitoring Program Cumulative Report 1995-2005*. pp32 prepared for the Siskiyou RCD and SRWC.

Yokel, Erich M. (2005) *Scott River Juvenile Salmonid Habitat Assessment – Final Project Report*. Prepared for the Siskiyou RCD. pp 69

## Appendix B

### Coho redds per mile - 2004 - 05

| Reach                                  | Length (mi.) | # Redds | Redds/mile |
|----------------------------------------|--------------|---------|------------|
| Upper Mill Creek (Scott Bar Mill)      | 0.7          | 0       | 0.0        |
| Upper Thompkins Creek                  | 1.0          | 0       | 0.0        |
| Middle Creek                           | 0.4          | 0       | 0.0        |
| Boulder Creek                          | 0.2          | 0       | 0.0        |
| Middle Etna (above Etna Diversion)     | 1.6          | 0       | 0.0        |
| East Fork - below Grouse Creek         | 0.6          | 0       | 0.0        |
| Upper Kidder Creek                     | 0.5          | 0       | 0.0        |
| Grouse Creek                           | 0.6          | 0       | 0.0        |
| East Fork - below Rail                 | 5.1          | 1       | 0.2        |
| Wildcat Creek                          | 2.0          | 1       | 0.5        |
| Upper French Creek - N. Fork to Miners | 1.0          | 1       | 1.0        |
| Kelsey Creek                           | 0.6          | 1       | 1.7        |
| Canyon Creek                           | 1.1          | 2       | 1.8        |
| Upper French Creek - Horse Range Cr    | 0.5          | 2       | 4.0        |
| Lower Thompkins Creek                  | 1.8          | 8       | 4.4        |
| Middle Etna                            | 1.0          | 7       | 7.0        |
| Scott River - Tailings                 | 2.8          | 21      | 7.6        |
| South Fork                             | 1.9          | 15      | 7.9        |
| Upper Mill Creek (Shackleford)         | 0.5          | 5       | 10.0       |
| Middle Patterson                       | 1.6          | 19      | 11.9       |
| Mid Sugar Creek                        | 2.1          | 26      | 12.4       |
| Upper Patterson                        | 0.3          | 6       | 20.0       |
| East Fork - above Grouse Creek         | 1.1          | 23      | 20.0       |
| Lower Etna Creek                       | 2.3          | 50      | 22.2       |
| Lower French Creek                     | 0.6          | 20      | 28.6       |
| Mid French Creek                       | 1.6          | 49      | 30.1       |
| Shackleford Creek                      | 2.2          | 76      | 34.5       |
| Lower Mill Creek (Scott Bar Mill)      | 0.4          | 15      | 37.5       |
| Miners Creek                           | 0.9          | 43      | 47.8       |
| Lower Kidder Creek                     | 1.1          | 56      | 50.9       |
| Lower Sugar Creek                      | 0.3          | 26      | 86.7       |
| Lower Mill Creek (Shackleford)         | 1.4          | 127     | 90.7       |
| Lower Patterson                        | 1.3          | 232     | 178.5      |

Scott River Adult Coho Spawning Ground Surveys 2010-2011

**Coho redds per mile - 2007 - 08**

| Reach                                  | Length (mi.) | # Redds | Redds/mile |
|----------------------------------------|--------------|---------|------------|
| Upper Mill Creek (Scott Bar Mill)      | 0.6          | 0       | 0.0        |
| Upper Thompkins Creek                  | 1.3          | 0       | 0.0        |
| Lower Thompkins Creek                  | 0.5          | 0       | 0.0        |
| Middle Creek                           | 0.3          | 0       | 0.0        |
| Boulder Creek                          | 0.2          | 0       | 0.0        |
| Middle Etna (above Etna Diversion)     | 2.2          | 0       | 0.0        |
| Middle Miners Creek                    | 1.1          | 0       | 0.0        |
| Middle Sugar Creek                     | 2.1          | 0       | 0.0        |
| Grouse Creek                           | 0.9          | 0       | 0.0        |
| East Fork below Rail Cr.               | 2.6          | 2       | 0.8        |
| Upper French Cr. - Horse Range Cr.     | 0.7          | 1       | 1.5        |
| East Fork below Grouse Cr.             | 0.6          | 1       | 1.6        |
| Canyon Creek                           | 0.9          | 2       | 2.3        |
| Lower South Fork Scott River           | 0.4          | 1       | 2.6        |
| Scott River - Tailings                 | 3.1          | 8       | 2.6        |
| Upper French Creek - N. Fork to Miners | 1.0          | 3       | 2.9        |
| Lower Mill Creek (Scott Bar Mill)      | 0.3          | 1       | 3.1        |
| Kelsey Creek                           | 0.6          | 2       | 3.2        |
| Lower Kidder Creek                     | 1.3          | 5       | 3.7        |
| Wildcat Creek                          | 0.8          | 3       | 4.0        |
| Upper Mill Creek (Shackleford)         | 0.9          | 4       | 4.6        |
| Lower Patterson                        | 1.1          | 5       | 4.7        |
| South Fork Scott River                 | 2.5          | 16      | 6.3        |
| Middle Etna (below Etna Diversion)     | 0.7          | 5       | 7.5        |
| Lower Miners Creek                     | 0.9          | 7       | 7.8        |
| Shackleford Creek                      | 0.3          | 3       | 10.0       |
| Upper Kidder Creek                     | 0.2          | 2       | 10.3       |
| Mid French Creek                       | 1.0          | 10      | 10.4       |
| Lower Sugar Creek                      | 0.3          | 3       | 11.3       |
| Lower Patterson Creek                  | 0.4          | 5       | 12.3       |
| Lower French Creek                     | 0.6          | 9       | 13.8       |
| East Fork above Grouse Creek           | 1.1          | 16      | 14.2       |
| Mid French Creek                       | 0.6          | 10      | 15.6       |
| Middle Patterson Creek                 | 1.7          | 27      | 15.7       |
| Shackleford Creek                      | 2.3          | 39      | 16.6       |
| Upper Patterson Creek                  | 0.3          | 9       | 30.2       |
| Lower Mill Creek (Shackleford)         | 1.4          | 57      | 40.7       |

Scott River Adult Coho Spawning Ground Surveys 2010-2011

**Redds per mile 2008-2009**

| Name                                 | Length (miles) | No_Redds  | Redds_per_mile |
|--------------------------------------|----------------|-----------|----------------|
| Upper Scott Bar Mill Creek           | 0.60           | 0         | 0.00           |
| Lower Scott Bar Mill Creek           | 0.35           | 1         | 2.90           |
| Upper Thompkins Creek                | 1.35           | 0         | 0.00           |
| Lower Thompkins Creek                | 0.46           | 0         | 0.00           |
| Middle Creek                         | 0.31           | 0         | 0.00           |
| Kelsey Creek                         | 0.62           | 2         | 3.23           |
| Canyon Creek                         | 0.88           | 2         | 2.27           |
| Boulder Creek                        | 0.16           | 0         | 0.00           |
| Upper Mill Creek                     | 0.87           | 4         | 4.60           |
| <b>Lower Mill Creek</b>              | <b>1.40</b>    | <b>57</b> | <b>40.71</b>   |
| <b>Shackleford Creek</b>             | <b>2.35</b>    | <b>39</b> | <b>16.60</b>   |
| <b>Upper Kidder Creek</b>            | <b>0.19</b>    | <b>2</b>  | <b>10.50</b>   |
| Lower Kidder Creek                   | 1.34           | 5         | 3.73           |
| <b>Upper Patterson</b>               | <b>0.30</b>    | <b>9</b>  | <b>30.00</b>   |
| <b>Middle Patterson - above HWY3</b> | <b>1.72</b>    | <b>27</b> | <b>15.70</b>   |
| <b>Lower Patterson - below HWY3</b>  | <b>0.41</b>    | <b>5</b>  | <b>12.30</b>   |
| Lower Patterson                      | 1.06           | 5         | 4.72           |
| Middle Etna - above Etna Diversion   | 2.22           | 0         | 0.00           |
| Middle Etna - below Etna Diversion   | 0.67           | 5         | 7.46           |
| Upper French Cr. - Paynes Creek Area | 0.69           | 1         | 1.45           |
| Upper French Cr. - Below North Fork  | 1.04           | 3         | 2.88           |
| <b>Mid French Creek</b>              | <b>0.96</b>    | <b>10</b> | <b>10.40</b>   |
| <b>Mid French Creek</b>              | <b>0.64</b>    | <b>10</b> | <b>15.63</b>   |
| <b>Lower French Creek</b>            | <b>0.65</b>    | <b>9</b>  | <b>13.85</b>   |
| Miners Creek                         | 1.06           | 0         | 0.00           |
| Miners Creek                         | 0.90           | 7         | 7.78           |
| Mid Sugar Creek                      | 2.08           | 0         | 0.00           |
| <b>Lower Sugar Creek</b>             | <b>0.27</b>    | <b>3</b>  | <b>11.10</b>   |
| Wildcat Creek                        | 0.75           | 3         | 4.00           |
| Scott River - Tailings               | 3.07           | 8         | 2.61           |
| South Fork Scott River               | 2.54           | 16        | 6.30           |
| Lower South Fork Scott River         | 0.38           | 1         | 2.63           |
| East Fork - Above Kangaroo Cr.       | 2.62           | 2         | 0.76           |
| <b>East Fork - Above Grouse Cr.</b>  | <b>1.15</b>    | <b>16</b> | <b>13.90</b>   |
| East Fork - Below Grouse Cr.         | 0.63           | 1         | 1.59           |
| Grouse Creek                         | 0.88           | 0         | 0.00           |