



**El Dorado Hydroelectric Project  
FERC Project No. 184**

# **Rainbow Trout Monitoring Plan**

**EL DORADO IRRIGATION DISTRICT**  
2890 Mosquito Road  
Placerville, CA 95667

**October 2010  
Version 2.0**

This study plan has been developed to satisfy the fish population monitoring requirements for rainbow trout (*Oncorhynchus mykiss*) as required by the Federal Energy Regulatory Commission license for the El Dorado Hydroelectric Project No. 184 (Project 184).

## 1.0 License Requirements

The Project 184 Monitoring Program<sup>1</sup> defines the specific monitoring requirements for rainbow trout:

### 1. Fish Populations

Method: Electrofishing and/or snorkeling<sup>2</sup> (as conducted in 1998-2002 by the licensee) during late summer/fall at six stations for rainbow trout:

- SFAR below Carpenter Creek
- Lower Alder Creek
- Lower Pyramid Creek
- Lower Echo Creek
- Silver Fork American River at Forgotten Flat
- Caples Creek below Kirkwood Creek

Frequency: Rainbow trout: Years 5, 6, 10, 11, 15, 16, 20, 21, 25, 26, 30, 31.

Rationale: Sampling for 2 years in the beginning of each 5-year period provides a mean of 2 years for comparison to the ecological resource objective, reducing Electrofishing effects to individuals, with sufficient response time to the new streamflow regimes.

## 2.0 Background

Fish population monitoring was conducted at selected stream reaches during the Project 184 relicensing process in 1998-2001 (ECORP, 2002). The results of the 1998-2001 surveys were used to develop the ecological resource objectives identified in Appendix B, Section 1, of the El Dorado Relicensing Settlement Agreement, which provides the following fisheries objectives:

### Biomass Indices

Do not decrease the means developed from sampling efforts conducted in 1998, 1999, 2000, 2001, and 2002 by more than 20 percent. For example, suppose 2

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<sup>1</sup> Section 7 of the El Dorado Relicensing Settlement Agreement, U.S. Forest Service 4(e) Condition No. 37, and California State Water Resources Control Board Section 401 Clean Water Act Water Quality Certification Condition No. 13

<sup>2</sup> Snorkeling is a survey method utilized in monitoring efforts for hardhead; snorkeling is not proposed as a method for surveying rainbow trout in this plan

years of sampling at Lower Echo Creek results in a mean biomass of 10.5 lbs./surface acre of rainbow trout, an 11 percent decrease from the 11.8 lbs./surface acre. Because this decrease would be less than 20 percent, the management objective would be met and no further action would be necessary.

<b>EID Site</b>	<b>Location</b>	<b>Recommended Species</b>	<b>Biomass Indices (lbs/surface acre)</b>
<b>EC-1</b>	<b>Lower Echo Creek</b>	<b>RT</b>	<b>11.8</b>
<b>PY-1</b>	<b>Lower Pyramid</b>	<b>RT</b>	<b>6.5</b>
<b>CA-3</b>	<b>Caples Creek Below Kirkwood</b>	<b>RT</b>	<b>9.1</b>
<b>SV-4</b>	<b>Silver Fork American River @ Forgotten Flat</b>	<b>RT</b>	<b>19.7</b>
<b>AR-1</b>	<b>Lower Alder Creek</b>	<b>RT</b>	<b>74.6</b>
<b>SO-2</b>	<b>SFAR below Carpenter Creek</b>	<b>RT</b>	<b>33.9</b>

Rainbow trout has been chosen as the fish indicator of habitat quality because guidance in the Forest Plan directs focus to maintain, enhance, and restore habitat to support viable native species. Rainbow trout is also a Forest Management Indicator Species.

### **3.0 Study Plan Objective**

The objective of this monitoring effort is to evaluate the status of fish populations in selected reaches for comparison to the ecological resource objectives to help determine if ecological resource objectives and being met, as specified in the Project 184 Adaptive Management Program<sup>3</sup>.

### **4.0 Survey Locations**

The Project 184 Monitoring Program specifies six locations for conducting rainbow trout monitoring:

- SFAR below Carpenter Creek
- Lower Alder Creek
- Lower Pyramid Creek
- Lower Echo Creek
- Silver Fork American River at Forgotten Flat
- Caples Creek below Kirkwood Creek

<sup>3</sup> Section 8 of the El Dorado Relicensing Settlement Agreement and U.S. Forest Service 4(e) Condition No. 38

The approximate survey locations are depicted in Figure 1. Monitoring crews will attempt to relocate survey reaches from previous surveys. However, if these reaches cannot be re-located, new survey reaches will be delineated and the boundaries recorded with a handheld GPS unit. New survey reaches will be approximately 100 meters long and will be sited to begin and end at natural habitat unit boundaries.

## **5.0 Schedule**

Previous surveys (ECORP, 2002) were conducted from September through November. The District anticipates conducting surveys during the late summer or early fall to be consistent with the previous surveys. The District will attempt to schedule surveys during periods when significant changes in streamflows are not anticipated.

## **6.0 Data Collection**

### **6.1 Fish Population Data**

Fish sampling will be conducted by backpack electrofishing surveys (three-pass depletion technique) similar to surveys conducted during the relicensing process (Temple and Pearsons, 2007; ECORP 2002). Block nets or natural barriers will be used at the top and bottom of the survey reach to prevent fish movement into or out of the study site during sampling. Multiple backpack electrofishing units will be used to maximize catch efficiency. Crews will begin at the downstream boundary of the survey reach and work upstream.

All fish captured will be identified to species, weighed (to 0.1 gram) using either an electronic balance or volumetric displacement, and measured to fork length (to the nearest millimeter) using a metric fish board. Fish from each pass will be held in instream containers in an area located outside the sampling reach until surveys are completed. All captured fish will be redistributed throughout the survey reach.

### **6.2 Physical Habitat Data**

Physical habitat data to be collected will include water quality, stream discharge, site dimensions, and descriptions of physical habitat attributes. This data is intended to be consistent with previous monitoring efforts.

A YSI-556 multi-parameter instrument, or comparable meter(s), will be used to collect water quality data including: temperature, dissolved oxygen, and conductivity. Instantaneous water and air temperatures will also be measured using pocket thermometers for comparisons against meter readings.

Streamflow data will be collected using standard (i.e. USGS transect methodology) field methods at each survey reach. Existing Project 184 stream gages may also be used in addition to, but not as a replacement of, field measurements at each survey reach.

Site dimensions (survey reach length, stream width and depth) will be measured at each survey reach. Stream width and stream depth measurements will be taken at approximately 10 meter intervals along the entire length of each survey reach. Two measurements of stream depth will be collected at each 10 meter interval. Depth measurements will be collected at positions approximately 1/3 and 2/3 the distance of the total stream width. Site length and stream width will be used for calculating surface area to compare biomass indices (lbs / surface acre).

Physical habitat attributes will be described for each survey reach and will include the following variables: substrate composition, percent instream cover, canopy cover, and habitat composition (percent of area represented by pools, riffles, runs, and cascades). Digital photographs will also be taken of each survey reach.

## **5.0 Data Analysis**

Electrofishing data will be analyzed using the MicroFish 3.0 software package (Van Deventer and Platts 1989) to generate fish population and biomass estimates. MicroFish 3.0 calculates maximum-likelihood population estimates from removal-depletion sampling data and estimates biomass by extrapolating the total weight of a sample based on the population estimates and the length-weight relationships of the fish captured.

## **6.0 Reporting**

The data collected under this plan will be compiled into a report and distributed to the FS, ERC, and SWRCB for review and consideration at least two weeks prior to the annual ERC meeting. The report will include discussion appropriate to results and supportive of analyses and conclusions will be provided. All reports will be prepared in a format consistent with previous reports so that they can easily be reviewed by the ERC and filed with the FERC after approval.

A summary of the findings of the monitoring effort and an electronic copy of the report will be included in the Project 184 annual monitoring report, which the District is required to file with FERC by June 30 of each year. The District will distribute the draft annual monitoring report to the FS, ERC, and SWRCB to review at least 30 days prior to filing with FERC.

## **6.0 Literature Cited**

ECORP 2002. Fisheries Data Report for Project-Affected Stream Reaches; El Dorado Irrigation District Hydroelectric Project 184. April 7, 2002.  
[http://www.project184.org/doc\\_lib/documents/2002/0418/Fisheries\\_Rpt\\_20020407.pdf](http://www.project184.org/doc_lib/documents/2002/0418/Fisheries_Rpt_20020407.pdf)

Temple, G.M. and T.N. Pearsons. 2007. Electrofishing: Backpack and Drift Boat. Pages 95-132 in D.H. Johnson, B.M. Shrier, J.S. O'Neal, J.A. Knutzen, X. Augerot, T.A. O'Neil, and T.N. Pearsons. Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmon and Trout Populations

VanDeventer, J.S. and W.S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data: users guide for Microfish 3.0. Gen. Tech. Rept.

INT-254. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden,  
UT. 29 p.

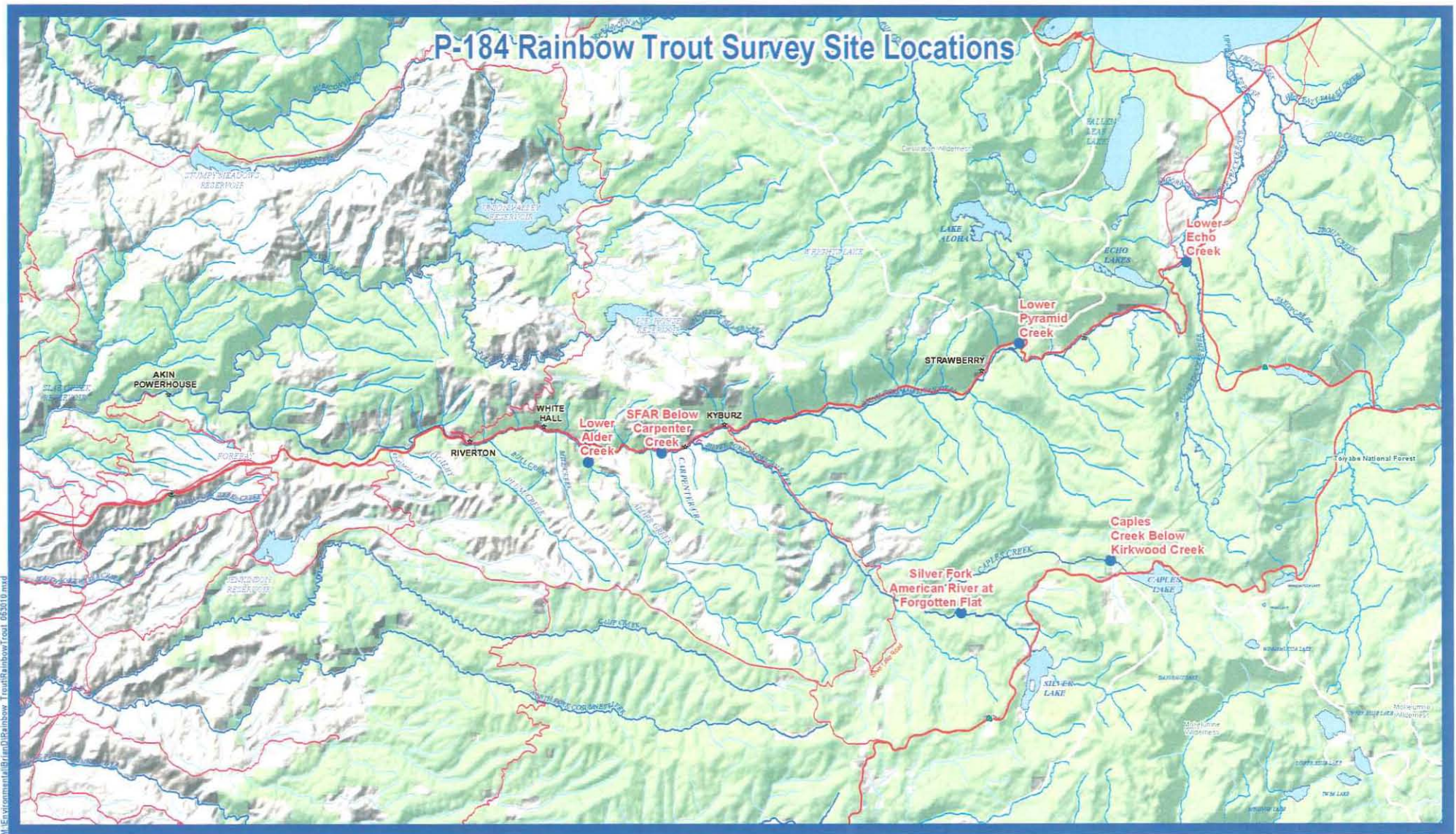


Figure 1 - Project 184 - Rainbow Trout Survey Site Locations

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134 FERC ¶ 62,099  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

El Dorado Irrigation District

Project No. 184-215

ORDER APPROVING RAINBOW TROUT MONITORING PLAN  
UNDER ARTICLE 401(A)

(Issued February 3, 2011)

1. On January 27, 2011, El Dorado Irrigation District (licensee) filed its Rainbow Trout Monitoring Plan, pursuant to Article 401(a) of the El Dorado Hydroelectric Project license.<sup>1</sup> The project is located on the South Fork of the American River and its tributaries in El Dorado, Alpine, and Amador counties, California, and occupies federal lands administered by the U.S. Forest Service (USFS).
2. Article 401(a) of the project license requires that the licensee file for Commission approval, various plans found in the USFS's Final 4(e) Terms and Conditions and the California State Water Resources Control Board's (State Water Board) Section 401 water quality certification. The State Water Board's certification Condition No. 13 and USFS 4(e) Condition 37 requires that the licensee file for Commission approval, various monitoring and study plans. Among these plans, the licensee is required to file a plan to conduct rainbow trout population estimates at the project. Monitoring is to be conducted during the late summer/fall at six locations in years 5, 6, 10, 11, 15, 16, 20, 21, 25, 26, 30, and 31, following license issuance, and to continue thereafter at 5-year intervals if the USFS, the Ecological Resource Committee (ERC), and the State Water Board determine it is necessary. The plan should be developed in consultation with, and approved by the USFS, the ERC, and the State Water Board.
3. The licensee proposes to conduct electrofishing surveys for rainbow trout at six locations, which include: the South Fork American River below Carpenter Creek; Lower Alder Creek; Lower Pyramid Creek; Lower Echo Creek; Silver Fork American River at Forgotten Flat; and Caples Creek below Kirkwood Creek. Surveys would be conducted during the late summer or early fall using a three-pass depletion technique. All captured fish will be identified to species, weighed and measures to fork length. The licensee concurrently proposes to collect data on water quality, stream discharge, site dimensions, and a description of physical habitat attributes. Collected data will be analyzed to generate fish population and biomass estimates. The licensee proposes to submit the

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<sup>1</sup> See 117 FERC ¶ 62,044. Order Issuing New License (Issued October 18, 2006).



results of monitoring to the USFS, the ERC, and the State Water Board. Following agency review and comment, the licensee proposes to file the results of monitoring with the Commission by June 30 each year following monitoring, as part of its annual project monitoring report.

4. The licensee submitted a final draft of the plan to the USFS, the ERC, and the State Water Board on October 28, 2010. Individual members of the ERC approved the plan by separate correspondence dated November 10, November 11, December 23, and December 27, 2010. The State Water Board formally approved the plan by letter dated November 9, 2010. The USFS also approved the plan by letter dated January 3, 2011.

5. The licensee's plan includes a proposal to conduct fisheries monitoring and site conditions at six locations, and to file periodic reports with the Commission each year following monitoring. The licensee's plan is consistent with the requirements of the project license and should adequately assess the effects of project operations on fish populations and aid in determining if management goals are being met, and should be approved.

The Director orders:

(A) El Dorado Irrigation District's (licensee) Rainbow Trout Monitoring Plan, filed with the Federal Energy Regulatory Commission on January 27, 2011, pursuant to Article 401(a) of the El Dorado Hydroelectric Project license, is approved.

(B) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2010). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Thomas J. LoVullo  
Acting Chief, Aquatic Resources Branch  
Division of Hydropower Administration  
and Compliance

Document Content(s)

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