



LETTER OF TRANSMITTAL

DATE: April 16, 2002

TO: Mr. Richard Floch
Richard Floch and Associates
512 Finders Way
El Dorado Hills, California 95762

FROM: Jim Stewart

RE: *Project 184 Surveys*

WE ARE SENDING:

CAD PLOT (S)	REPORT (S)
BLUEPRINTS	LETTERS (S)
DISKETTE	CONTRACT (S)
AGENCY CORR.	⇒ OTHER

DELIVERED BY:

OVERNIGHT
FEDERAL EXPRESS
U.S. MAIL
⇒ EMAIL

REMARKS:

Please find enclosed the updated Fisheries Data Spreadsheets, as of April 16, 2002, including Draft Summary Tables and Graphs from 1998, 1999, 2000, and 2001 electrofishing sampling results. Please let me know if you have any questions or comments. The Draft Summary Tables and Graphs were prepared by Tom Keegan, Senior Fisheries Scientist, Lourdes M. Ruge, M.S. Wildlife Ecologist and Kes Benn, Fisheries Biologist.

SIGNED:



Jim Stewart
Principal

DRAFT
FISHERIES DATA REPORT
FOR PROJECT-AFFECTED STREAM REACHES,
EL DORADO IRRIGATION DISTRICT
Hydroelectric Project 184
(El Dorado County, California)

April 7, 2002

Prepared by:
EL DORADO IRRIGATION DISTRICT
2890 Mosquito Rd.
Placerville, CA 95667

FISHERIES DRAFT REPORT

CONTENTS

EL DORADO IRRIGATION DISTRICT – PROJECT 184

1.0 INTRODUCTION 1
 1.1 Background..... 2
2.0 STUDY AREA 4
3.0 METHODS 5
 3.1 Data Collection..... 6
 3.2 Data Analysis 7
4.0 RESULTS 9
 4.1 Physical Data Collection..... 9
 4.2 Fish Population Data Collection..... 9

LIST OF FIGURES

- Figure 1 – Project 184 – Survey Reach Locations
- Figure 2 – Project 184 – Survey Site Locations
- Figure 3 – Rainbow Trout Population Estimates per Linear-km by Site, SFAR
- Figure 4 – Brown Trout Population Estimates per Linear-km by Site, SFAR
- Figure 5 – Brook Trout Population Estimates per Linear-km by Site, SFAR
- Figure 6 – Rainbow Trout Population Estimates per Acre by Site, SFAR
- Figure 7 – Brown Trout Population Estimates per Acre by Site, SFAR
- Figure 8 – Brook Trout Population Estimates per Acre by Site, SFAR
- Figure 9 – Rainbow Trout Mean Population Density Estimates (Fish/Linear-km), for
Tributary Sites, Fall 2001
- Figure 10 – Rainbow Trout Mean Population Density Estimates (Fish/Acre), for Upper
and Lower Tributary Sites, Fall 2001
- Figure 11 – Rainbow Trout Total Biomass per Linear-km by Site
- Figure 12 – Brook Trout Total Biomass per Linear-km by Site

Figure 13 – Brown Trout Total Biomass per Linear-km by Site

Figure 14 – Rainbow Trout Total Biomass per Acre by Site

Figure 15 – Brown Trout Total Biomass per Acre by Site

Figure 16 – Brook Trout Total Biomass per Acre by Site

LIST OF TABLES

Table 1 – Water Quality at EID Project 184 Stream Electrofishing Sites, Fall 1998

Table 2 – Water Quality at EID Project 184 Stream Electrofishing Sties, Fall 1999

Table 3 – Water Quality at EID Project 184 Stream Electrofishing Sties, Fall 2000

Table 4 – Water Quality at EID Project 184 Stream Electrofishing Sties, Fall 2001

Table 5 – Fish Catch (Number and Biomass) by Species at EID Project 184 Stream Electrofishing Sites, Fall 1998

Table 6 – Fish Catch (Number and Biomass) by Species at EID Project 184 Stream Electrofishing Sites, Fall 1999

Table 7 – Fish Catch (Number and Biomass) by Species at EID Project 184 Stream Electrofishing Sites, Fall 2000

Table 8 – Fish Catch (Number and Biomass) by Species at EID Project 184 Stream Electrofishing Sites, Fall 2001

Table 9 – Total Fish Population Estimates by Species at EID Project 184 Stream Electrofishing Sites, Fall 1998

Table 10 – Total Fish Population Estimates by Species at EID Project 184 Stream Electrofishing Sites, Fall 1999

Table 11 – Total Fish Population Estimates by Species at EID Project 184 Stream Electrofishing Sites, Fall 2000

Table 12 – Total Fish Population Estimates by Species at EID Project 184 Stream Electrofishing Sites, Fall 2001

LIST OF APPENDICES

Appendix A – Species and Number Per Pass, Stream Electrofishing Sites, Fall 1998 through 2001.

1.0 INTRODUCTION

The El Dorado Hydroelectric Project, FERC 184-065 (Project 184) is a 21-megawatt (MW) project located on the South Fork American River (SFAR) in the counties of El Dorado, Alpine, and Amador, California. Project 184 components are set in both private lands and land administered by the El Dorado National Forest. Project 184 consists of four storage reservoirs, the El Dorado Diversion Dam, water conveyance facilities consisting of flumes and tunnels, several smaller diversions on tributaries to the SFAR, a forebay, penstock, and a powerhouse.

Water is released from the four storage reservoirs (Lake Aloha, Echo Lake, Silver Lake and Caples Lake) at seasonally varying volumes. At full project load, up to 165 cubic feet per second (cfs) of SFAR streamflow is diverted at the El Dorado Diversion Dam, located near the community of Kyburz, at an elevation of 3,911 feet above sea level. Water is diverted into a 22.3 mile-long water conveyance system, the El Dorado Canal, which terminates at the forebay. The canal descends more gradually than does the SFAR, with an elevation drop of approximately 110 feet, compared to approximately 2,000 feet in the SFAR. Seven smaller tributaries are diverted directly into the canal between the El Dorado Diversion Dam and the forebay, including: Carpenter Creek, No-Name Creek, Alder Creek, Mill Creek, Bull Creek, Ogilby Creek, and Esmeralda Creek.

Due to a major January 1997 storm, Project 184 suffered significant damage to the diversion dam, certain sections of the canal, and the powerhouse. Since then, Project 184 has remained inoperable for power generation; however, a temporary repair of the canal has allowed the diversion of approximately 40 cfs to the forebay for subsequent diversion into the EID water supply system for consumptive use.

The El Dorado Irrigation District (EID) has contracted with ECORP Consulting, Inc. (ECORP) to conduct aquatic-oriented environmental studies in support of its application to the Federal Energy Regulatory Commission (FERC) for relicensing of Project 184.

ECORP and its designated subcontractors (Entrix, Inc. and Woods Hole Group) have been assigned the following study elements:

- General Fisheries Assessments
- Benthic Macroinvertebrate Surveys
- Amphibian and aquatic reptile surveys
- Water temperature modeling
- Stream geomorphology studies
- IFIM/Habitat Time Series
- Water Quality Assessments
- Bathymetry of Lake Aloha and other project reservoirs.

This draft document presents an analysis of data collected under the *General Fisheries Assessments* study element. Preliminary results of the fish population studies in project stream reaches is presented herein, including data collected from 19 primary electrofishing sites (sampled mostly in 1998, 1999, 2000), and 14 project-affected tributary electrofishing sites, sampled in 2001.

The *General Fisheries Assessments* study element also includes analysis of the fisheries of the four project reservoirs. Those studies have been completed and preliminary results presented in previous Project 184 environmental documentation (e.g., the FERC Exhibit E document and the Application for New License). All stream and reservoir fishery data and analyses will be presented under single cover in the *Final General Fisheries Assessments Report for Project 184*.

1.1 Background

The primary review agencies (California Department of Fish and Game, State Water Resources Control Board, and U.S. Forest Service) indicated in initial scoping documents, that three years of fish species composition and abundance data were required to be collected at each of 19 primary electrofishing sites. This task has been

completed, with the exception of a necessary third year of data collection at Caples Meadow (Site CA-3). Additionally, fish population sampling was required by the review agencies at each of the seven tributaries that are diverted into the El Dorado Canal; fish population sampling was required at two sites in each tributary, upstream and downstream of the diversion, for a total of 14 tributary sampling sites. These tributaries include: Carpenter Creek, No-Name Creek, Alder Creek, Mill Creek, Bull Creek, Ogilby Creek, and Esmeralda Creek. One year of sampling has been completed for the 14 tributary sites.

2.0 STUDY AREA

For the purposes of this study, the Project 184 study area was subdivided into 8 distinct reaches, which are described below and are depicted in Figure 1.

Reach 1 - Mainstem South Fork American River (SFAR), extending upstream from the El Dorado Powerhouse to the confluence with Esmeralda Creek.

Reach 2 - Mainstem SFAR, extending upstream from the confluence with Esmeralda Creek to the SFAR Diversion Dam. Reach 2 also includes the 7 project-affected tributaries.

Reach 3 - Mainstem SFAR, extending upstream from the SFAR Diversion Dam to the confluence with Pyramid Creek.

Reach 4 - Mainstem SFAR, extending upstream from the confluence with Pyramid Creek. Reach 4 also includes the Echo Creek Conduit, Echo Creek to the confluence with the Truckee River, and upper and lower Echo lakes.

Reach 5 - Pyramid Creek, extending upstream from the confluence with the SFAR. Reach 5 also includes the instream lakes of Pyramid Creek and Lake Aloha.

Reach 6 - Silver Fork American River, extending upstream from the confluence with the SFAR to the confluence with Caples Creek.

Reach 7 - Upper Silver Fork American River, extending upstream from the confluence with Caples Creek to Silver Lake. Reach 7 also includes Silver Lake.

Reach 8 - Caples Creek, extending upstream from the confluence with Silver Fork American River to Caples Lake. Reach 8 also includes Caples lake.

3.0 METHODS

In 1998, 16 electrofishing sites were identified and sampled, using the agency-accepted multi-pass depletion method. In addition, four tributary sites were qualitatively sampled (single pass, single backpack electroshocker), however, those results are not included in the current quantitative analysis. In 1999, 3 additional sampling sites were added to the 16 sites previously identified and sampled in 1998, resulting in the current 19 primary electrofishing site sampling regime. In 1999 and 2000, multi-pass fish population sampling was conducted at those 19 electrofishing sites (referred to as the 19 primary electrofishing sites, Figure 2). One additional year of sampling was required for the 3 sites added in 1999, and in 2001, sampling was conducted at two of those three sites: Forgotten Flat (Reach 6) and Oyster Creek (Reach 7). The third site, Caples Meadow (Reach 8), could not be sampled due to early snowfall, but is scheduled for sampling in 2002. In summary, three required years of fish population data have been collected from 18 of the 19 primary electrofishing sites. The third year of data will be collected from the remaining Caples Meadow site in 2002.

Also in 2001, quantitative (multi-pass) fish population sampling was begun in seven tributaries that flow into the SFAR downstream of the El Dorado Diversion Dam. A portion of streamflow from each of these seven tributaries is diverted directly to the El Dorado Canal. Two sites were sampled at each tributary (downstream and upstream of each tributary diversion dam), for a total of 14 additional electrofishing sites (referred to as the 14 project-affected tributary electrofishing sites)(see Figure 2). One of these sites, lower Alder Creek (AR-1), was also one of the 19 primary electrofishing sites. Although three years of data had been collected at that site by the end of the 2000 season, it was included for additional sampling as a member of the 14 project-affected tributary electrofishing sites to strengthen the study design as a season-specific comparison to the upstream Alder Creek site (i.e., upstream of the Alder Creek diversion dam).

3.1 Data Collection

Physical Habitat Data

Streamflow data were collected using standard (i.e., USGS transect methodology) field methods at each stream electrofishing site. Water quality data collected included temperature, dissolved oxygen, and conductivity. Dissolved oxygen was determined with an YSI Model 57 DO meter, and conductivity with an YSI Model 33 S-C-T meter. Instantaneous water and air temperatures were also measured using pocket thermometers for comparisons against meter readings.

Measurements of several physical variables were gathered during sampling events in 1998, 1999, and 2000, and 2001. These variables included substrate composition, percent instream cover, canopy cover, and habitat composition (percent of area represented by pools, riffles, runs, and cascades). In 2001, stream widths, with associated water depths, were measured at 10m intervals throughout each station. Prior to 2001, an estimated average stream width was provided at the time of sampling.

Fish Population Data

All electrofishing stations were sited to begin and end at natural habitat unit boundaries. Many of the electrofishing stations were 100 meters in length. However, the river morphology sometimes prevented a suitable end point at precisely 100 meters, resulting in some stations being greater or less than 100 meters.

Fish population sampling was conducted by backpack electrofishing (multi-pass depletion method). Prior to each sampling event, block nets were placed at the beginning and end of each site to prevent fish movement into or out of the study site during sampling. Block net locations were flagged with surveyor's tape on both sides of the stream for site identification purposes.

Fish were captured during multiple passes (at least three) using Smith-Root backpack electroshockers in pulsed DC mode. Additional passes were conducted, when necessary, to minimize population estimation error. The objective was to estimate population size by species and lifestage at an error of less than 10 percent. One to three electroshockers were used, depending on the flow and width of the stream. Captured fish were held in live cars outside the electrofishing station. After each pass, fish were processed and placed in a different live car. All fish were carefully redistributed throughout the sampling site after all fish collected during the final pass were processed.

For all sampling efforts, the fork length of each fish was measured to the nearest millimeter. During the 1998, 1999, and 2000 sampling efforts, the biomass of large numbers of small non-salmonids, as well as small rainbow trout, was calculated using the volumetric method (i.e., they were volumetrically ‘weighed’ in batches). This method entails placing a fish, or groups of fish, in a graduated cylinder with a known volume of water. One ml of water displaced equals one gram of fish biomass. In 2001, the weight of each fish was measured directly (to 0.1 gram) using a portable digital scale.

Fish scale samples were collected to characterize the age structure of trout populations at each site. Scales were removed from the right side of each fish between the dorsal fin and the lateral line. Scales were placed in individual envelopes labeled with species, length and weight, capture date, location, and an identification number. All collected fish scales were read (i.e., “aged”) at ECORP laboratories, and length ranges at age were calculated. These length ranges were compared against length-frequency histograms to more accurately determine age classes.

3.2 Data Analysis

ECORP acquired original field data sheets for sampling conducted in 1998, 1999, and 2000. After sampling was completed by ECORP in 2001, all data (including those data collected in previous years) were entered into a spreadsheet. Error checking procedures were performed, as well as data exploration analysis (e.g., SPSS Crosstabs,

minimum/maximum values, frequency tables and length/weight plots). Population estimates were computed by species and for each sampling site using maximum likelihood equations (USFS MICROFISH program; Van-Deventner and Platts 1986). The condition factor of each fish was also calculated, using the following formula:

$$\text{Condition Factor} = \frac{\text{Length}}{\text{Weight} \times 100,000}$$

Where length is measured in mm, weight is measured in grams, 100,000 is a unit conversion factor, and condition factor is dimensionless. In general, the closer the ratio is to 1.0, the healthier the fish. This relationship is useful for relative health comparison between medium-sized fish populations; but it tends to be less applicable for very small and very large fish. Population estimates were calculated without age groupings.

4.0 RESULTS

4.1 Physical Data Collection

Water quality data and electrofishing site summaries are presented for each year of sampling (1998, 1999, 2000, and 2001) in Tables 1 through 4.

4.2 Fish Population Data Collection

Numbers of fish collected and total biomass of all fish species collected during each year of sampling (1998, 1999, 2000, and 2001) are presented by site in Tables 5 through 8. Species-specific population estimates are derived from these tables for each site and are presented for each year of sampling (1998, 1999, 2000, and 2001) in Tables 9 through 12. Species-specific mean population estimates, extrapolated as estimated number of fish per kilometer (fish/km), are presented by reach for 1998, 1999, and 2000 in Figures 3 through 5, and include analyses of data collected from the 19 primary electrofishing sites. Species-specific mean population density estimates, extrapolated as estimated number of fish per acre (fish/acre), are presented by reach for 1998, 1999, and 2000 in Figures 6 through 8, and again provide an analysis of data collected from the 19 primary electrofishing sites.

Rainbow trout mean population density estimates for the 14 project-affected tributary electrofishing sites, sampled in 2001, are presented in Figures 9 and 10. No other salmonids were collected from the 7 project-affected tributaries in 2001. In fact, no other fish species were collected from the 7 project-affected tributaries in 2001, with the exception of Alder Creek, which contained Sacramento sucker. This species composition pattern was identical to that observed during the previous three years of quantitative sampling at Alder Creek, and the qualitative (single-pass) sampling in 1998 at Carpenter Creek, Mill Creek, and Esmeralda Creek (No fish were collected from Bull Creek or Ogilby Creek during the qualitative sampling effort conducted in 1998).

Primary Electrofishing Sites

Species biomass per area (km and acre) and site for 1998, 1999, and 2000 are presented in Figures 11 through 16.

Reach 1 – Mainstem SFAR, downstream of Esmeralda Creek

Reach 1 includes one site: SFAR at Pacific House (SO-1). This site was sampled in 1998 (127 fish were collected), 1999 (158 fish), and 2000 (218 fish). Four fish species were collected at this site in all years, including rainbow trout (50 fish in 1998, 94 fish in 1999, and 132 in 2000), brown trout (1 fish each year; 1998, 1999, and 2000), Sacramento sucker (53 fish in 1998, 59 fish in 1999, and 76 fish in 2000), and California roach (23 fish in 1998, 4 fish in 1999, and 9 fish in 2000).

The total fish biomass collected at Site SO-1 in 1998 was 2,452.2 grams, followed by 3,021.2 grams in 1999, and 2,553.6 grams in 2000. In 1998, rainbow trout accounted for 66 percent of the total biomass at this site, followed by 12 percent for brown trout, 19 percent for Sacramento sucker, and 3 percent for California roach. In 1999, rainbow trout accounted for 88 percent of the total biomass at this site, followed by 11 percent for Sacramento sucker; California roach and brown trout made up the remaining 1 percent of biomass. In 2000, 77 percent of the biomass was rainbow trout, followed by 21 percent for Sacramento sucker, and 2 percent for California roach and brown trout.

Reach 2 – Mainstem SFAR, downstream of SFAR Diversion Dam

Reach 2 includes two sites: a mainstem site, SFAR below Carpenter Creek and Kyburz Gage (SO-2), and a tributary site, lower Alder Creek (AR-1). Site SO-2 was sampled in 1998 (151 fish), 1999 (205 fish), and 2000 (193 fish). Three fish species were collected in 1998, two in 1999, and two in 2000, including rainbow trout (149 fish in 1998, 201 fish in 1999, and 178 fish in 2000), brown trout (1 fish in 1998 and 4 fish in 1999), and Sacramento sucker (1 fish in 1998 and 15 fish in 2000).

The total fish biomass collected at Site SO-2 in 1998 was 1,807.7 grams, followed by 3,797.0 grams in 1999, and 3,128.1 grams in 2000. In 1998, rainbow trout accounted for 99 percent of the total biomass at this site, while brown trout and Sacramento sucker accounted for the remaining 1 percent. In 1999, rainbow trout also accounted for 99 percent of the total site biomass, while the remaining 2 percent was brown trout. In 2000, rainbow trout accounted for 87 percent of the site biomass; the remaining 13 percent was Sacramento sucker.

Lower Alder Creek (AR-1) was sampled in 1998 (472 fish), 1999 (617 fish), and 2000 (693 fish). Two species were collected at this site during all years, including rainbow trout (451 fish in 1998, 536 fish in 1999, and 546 fish in 2000), and Sacramento sucker (21 fish in 1998, 81 fish in 1999, 147 fish in 2000).

The total biomass collected from Alder Creek in 1998 was 6,053.9 grams, in 1999 was 5,803.5 grams, and in 2000 was 5,849.9 grams. Rainbow trout accounted for over 98 percent of the total biomass at this tributary site for all years.

Reach 3 – Mainstem SFAR, upstream of SFAR Diversion Dam

Reach 3 includes two mainstem sites: SFAR at 33-mile tract (SO-3) and SFAR at Forni Creek (SO-4), both of which were sampled in 1998, 1999, and 2000. The number of fish collected at these two sites in 1998 was 311 (with a mean of 155.5 fish), in 1999 was 362 (with a mean of 181 fish), and in 2000 was 438 (with a mean of 219 fish). Rainbow trout dominated the catch at both sites during all years of sampling, ranging from 112 to 187 fish in 1998, from 140 to 216 fish in 1999, and from 184 to 216 fish in 2000. At Site SO-3, Sacramento sucker was the only other species collected, ranging from 3 to 24 fish, except for 1 brown trout in 2000. At Site SO-4, brook trout was the only other species collected in 1998 (7 fish), brown trout was the only other species collected in 1999 (2 fish), and in 2000, 8 brown trout and 1 Sacramento sucker were collected.

Total biomass was slightly higher at Site SO-4 than at Site SO-3 for all three years. The total biomass collected from both sites was 5,695.0 grams in 1998, 10,624.8 grams in 1999, and 10,966.0 grams in 2001. In 1998, 96 percent of the total biomass was rainbow trout; the remaining 4 percent was brook trout and Sacramento sucker. In 1999, 79 percent of the biomass was rainbow trout, followed by 15 percent for brown trout; the remaining 6 percent of the total biomass was brook trout and hatchery trout. In 2000, rainbow trout accounted for 75 percent of the total biomass, followed by 15 percent for Sacramento sucker. The remaining 10 percent of the catch was brown and hatchery trout.

Reach 4 – Mainstem SFAR, upstream of Pyramid Creek

Reach 4 includes two mainstem SFAR sites, SFAR at Sayles Canyon (SO-5) and SFAR at Phillips (SO-6), and two Echo Creek sites, lower Echo Creek (EC-1) and upper Echo Creek (EC-2). All four sites were sampled during 1998, 1999 and 2000.

A total of 82 fish (with a mean of 41.5 fish) were collected at the two mainstem sites in 1998, 150 fish (with a mean of 75 fish) in 1999, and 288 fish (with a mean of 144 fish) in 2000. Brown trout was the dominant species during all years at both sites (81 fish in 1998, 135 fish in 1999, and 275 fish in 2000). Brook trout were the second most abundant species collected from both sites (1 fish in 1998, 11 fish in 1999, and 11 fish in 2000), while rainbow trout (0 fish in 1998, and 1 fish each in 1999 and 2000) were incidental to the catch.

The total number of fish collected at the Echo Creek sites was 179 for 1998, 254 fish in 1999, and 340 fish in 2000. At EC-1 (lower Echo Creek), rainbow trout ranged from 34 to 98 fish, and brown trout similarly ranged from 42 to 98 fish. Prickly sculpin were also abundant, ranging from 25 to 114 fish. Brook trout were incidental to the catch. At EC-2 (upper Echo Creek), rainbow trout ranged from 22 to 25 fish, while brown trout were more abundant, ranging from 32 to 56 fish. Brook trout and cutthroat trout were incidental to the catch.

The total biomass for the two mainstem sites (SO-5 and SO-6) was 3,827.0 grams in 1998, 6,436.0 grams in 1999, and 7,737.6 grams in 2000. Brown trout biomass was greatest during all years at both sites. The total biomass for the two Echo Creek sites (EC-1 and EC-2) was 3,646.0 grams in 1998, 3,819.8 grams in 1999, and 2,973.4 grams in 2000. Brown trout biomass was greatest for all years at Site EC-2 (upper Echo Creek); however, at Site EC-1 (lower Echo Creek) rainbow trout biomass was slightly higher than brown trout biomass.

Reach 5 - Pyramid Creek

Reach 5 includes two sites: lower Pyramid Creek (PY-1) and upper Pyramid Creek (PY-2). Both sites were sampled during 1998 (24 fish), 1999 (24 fish), and 2000 (50 fish). Two fish species were collected in 1998, 1999, and 2000, including rainbow trout (14 fish in 1998, 22 fish in 1999, and 40 fish in 2000) and brown trout (10 fish in 1998, 2 fish in 1999, and, 10 fish in 2000).

The total biomass for fish collected from these two sites was 644.6 grams in 1998, 669.5 grams in 1999, and 618.8 grams in 2000. In 1998, 63 percent of the total biomass was brown trout and 37 percent was rainbow trout. In 1999, 80 percent of the biomass was rainbow trout and 20 percent was brown trout. In 2000, 93 percent was rainbow trout and 7 percent was brown trout.

Reach 6 - Silver Fork American River, to confluence with Caples Creek

Reach 6 includes two sites: Silver Fork at Beanville (SV-1) and Silver Fork Below Silver Fork Campground (SV-2). Both sites were sampled during 1998 (503 fish), 1999 (597 fish), and 2000 (714 fish). Three fish species were collected during all years of sampling, including rainbow trout (474 fish in 1998, 572 fish in 1999, and 639 fish in 2000), brown trout (18 fish in 1998, 24 fish in 1999, and 40 fish in 2000), and Sacramento sucker (11 fish in 1998, 1 fish in 1999, and 35 fish in 2000).

The total biomass for this Reach was 10,639.9 grams in 1998, 12,981.0 in 1999, and 14,724.0 in 2000. In 1998, 82 percent of the total biomass was rainbow trout, followed by 10 percent for brown trout, and 8 percent for Sacramento sucker. In 1999, 95 percent of the total biomass was rainbow trout; the remaining 6 percent was brown trout and Sacramento sucker. In 2000, rainbow trout accounted for 79 percent of the total biomass, followed by 14 percent for Sacramento sucker, and 7 percent for brown trout.

Reach 7 - Upper Silver Fork American River, upstream of Caples Creek

Reach 7 includes three sites: two Silver Fork sites, Silver Fork Below Silver Lake (SV-3), and Silver Fork at Forgotten Flat (SV-4); and one Oyster Creek site (OY-1). Silver Fork Below Silver Lake (SV-3) was sampled in 1998, 1999, and 2000, while Oyster Creek (OY-1) and Silver Fork at Forgotten Flat (SV-4) were sampled in 1999, 2000 and 2001. The total number of fish collected from Site SV-3 was 76 fish in 1998 and 156 fish in 1999. No fish were collected from this site in 2000 (only one pass was conducted). Brown trout were dominant with 73 fish in 1998 and 149 fish in 1999. Rainbow trout (6 fish in 1999) and speckled dace were incidental to the catch at this site. Numbers of fish collected at Site SV-4 were 139 fish in 1999, 156 fish 2000, and 154 fish in 2001. Rainbow trout were the most abundant fish collected during all three years, ranging from 83 to 107 fish. Brown trout were only slightly less abundant, ranging from 49 to 71 fish. Brown trout was the only species collected from Oyster Creek (OY-1) during the three years of sampling, with numbers collected ranging from 108 to 187 fish.

The total fish biomass collected from Site SV-3 was 1,261.0 grams in 1998, 1,972.0 grams in 1999, and no biomass in 2000. Brown trout accounted for 99 percent of the biomass during both years, while rainbow trout and speckled dace accounted for 1 percent. Total fish biomass at Site SV-4 was 5,345.0 grams in 1999, 4,609.4 grams in 2000, and 3,457.6 grams in 2001. Rainbow trout accounted for 56 percent of the biomass in 1999, 52 percent in 2000, and 32 percent in 2001. Brown trout accounted for 44 percent of the biomass in 1999, 48 percent in 2000, and 68 percent in 2001. The total

biomass at Oyster Creek (OY-1) was brown trout, consisting of 1,777.0 grams in 1999, 1,342 grams in 2000, and 4,404.8 grams in 2001.

Reach 8 - Caples Creek

Reach 8 includes three sites: Caples Creek above Silver Fork (CA-1), Caples Creek above Kirkwood Creek (CA-2), and Caples Creek below Kirkwood Creek (CA-3). All three sites were sampled during 1999 and 2000; however, in 1998 only CA-1 and CA-2 were sampled. Only two species were collected from lower Caples Creek (CA-1), rainbow trout (ranging from 19 to 62 fish) and brown trout (ranging from 18 to 58 fish). At Caples Creek above Kirkwood Creek (CA-2), four fish species were collected: rainbow trout (ranging from 6 to 27 fish), brown trout (ranging from 10 to 73 fish), brook trout (ranging from 28 to 50 fish), and speckled dace (zero to 1 fish). At Caples Creek below Kirkwood Creek (CA-3), brook trout were numerically dominant, ranging from 74 to 126 fish. Brown trout ranged from 48 to 76 fish, and rainbow trout ranged from 13 to 26 fish.

The total biomass at Site CA-1 ranged from 1,942.6 to 3,280.3 grams, and was dominated by brown trout, ranging from 58 to 68 percent of the total biomass. Rainbow trout biomass ranged from 32 to 42 percent of the total. Total biomass at CA-2 ranged from 663.3 to 2,099.5 grams; brown trout biomass ranged from 35 to 55 percent of the total, rainbow trout biomass ranged from 24 to 33 percent of the total, and brook trout ranged from 12 to 41 percent of the total. Total biomass at CA-3 ranged from 3,941.6 to 4,645.2 grams, and was dominated by brown trout (50 to 75 percent of the total biomass). Brook trout ranged from 17 to 35 percent, and rainbow trout ranged from 8 to 15 percent of the total biomass.

Project-Affected Tributary Electrofishing Sites

All 14 project-affected tributary electrofishing sites are located in Reach 2: Carpenter Creek downstream (CR-1) and upstream (CR-2) of the diversion, No-Name Creek

downstream (NN-1) and upstream (NN-2) of the diversion, Alder Creek downstream (AR-1) and upstream (AR-2) of the diversion, Mill Creek downstream (ML-1) and upstream (ML-2) of the diversion, Bull Creek downstream (BU-1) and upstream (BU-2) of the diversion, Ogilby Creek downstream (OG-1) and upstream (OG-2) of the diversion, Esmeralda Creek downstream (ES-1) and upstream (ES-2) of the diversion, All sites were quantitatively sampled in 2001. With the exception of No-Name and Alder creeks, the upstream tributary sites were also qualitatively sampled in 1998, on a one-pass exploration basis only.

A total of 630 fish were collected from the 14 sites, 614 of which were rainbow trout. The remaining 16 fish were Sacramento sucker that were collected from the lower Alder Creek site (AR-1). Over half of the tributary catch was collected from Lower Alder Creek and lower Carpenter Creek (54 percent of the total catch). Lower Bull Creek, lower Mill Creek, and lower Ogilby Creek together accounted for over 12 percent of the catch. Only 1 fish was collected from lower No-Name Creek, and 2 fish were collected from lower Esmeralda Creek.

A total of 214 fish were collected at Lower Alder Creek (AR-1), 198 of which were rainbow trout; 16 Sacramento sucker were also collected. Rainbow trout biomass totaled 1,897.2 grams, while Sacramento sucker totaled only 127.5 grams. This is in contrast to a total of 11 rainbow trout collected at upper Alder Creek, with 325.5 grams total biomass. Trout collected from upper Alder Creek, on average, weighed over 3 times as much as trout collected from lower Alder Creek. This is due to the predominance of young-of-the-year fish, and greater trout production at the lower Alder Creek site.

A total of 133 rainbow trout were collected from lower Carpenter Creek (1,314.1 grams), while 64 rainbow trout were collected from upper Carpenter Creek (1,376.8 grams). Trout collected from the upper site, on average, weighed twice as much as trout collected from the lower site, again due to the larger number of young-of-the-year trout at the lower site.

A total of 19 rainbow trout were collected from lower Mill Creek (98.1 grams), while 63 trout were collected from upper Mill Creek (962.8 grams). Trout collected from the upper site, on average, weighed over 3 times as much as trout collected from the lower site, indicating higher production at the lower site.

A total of 25 rainbow trout were collected from the lower Ogilby Creek site (469.8 grams), while 15 trout were collected from the upper Ogilby Creek site (522.0 grams). Trout collected from the upper site weighed, on average, 1.8 times as much as trout collected from the lower site.

The only creek that did not fit the pattern of larger upstream fish was Esmeralda Creek. Two rainbow trout were collected in lower Esmeralda Creek (86.3 grams) and 51 trout were collected from upper Esmeralda Creek (374.2 grams). Trout collected from the lower site weighed, on average, 6 times as much as the trout collected from the upper site.

Rainbow trout were relatively abundant in lower Bull Creek (32 fish), but were absent from the upper site. Fish were largely absent from No-Name Creek; no fish were collected from the upper site and only 1 rainbow trout was collected from the lower site.