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COMMISSION

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Mr. David P. Boergers
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington DC 20426

Subject: Kern River No. 3 Hydroelectric Project (FERC No. 2290) - 036
Fish Population Monitoring Results

Dear Mr. Boergers:

The license for the subject project was issued by the Federal Energy Regulatory Commission (Commission) to Southern California Edison Company (SCE) on December 24, 1996. Article 411 of the new license required SCE to develop a fish population monitoring plan including consultation with the California Department of Fish and Game, the U.S. Forest Service, the U.S. Fish and Wildlife Service, and the U.S. National Park Service. The Commission subsequently approved the plan and ordered its implementation. Implementation includes monitoring at five locations along the Kern River using standard techniques for assessing fish populations. Monitoring is to be conducted at each station every five years, in the fall, for the term of the license.

The enclosed original and eight copies contains the results of the first monitoring period. The report was submitted to the above agencies for an extended review and comment period. Comments of the responding agencies have been incorporated in the report. Further comments received from agency representatives after this transmittal will be forwarded to the Commission. The report's recommendations regarding restoration and/or habitat enhancement opportunities will be submitted to the Trust Fund for evaluation of their desirability, feasibility, timing, and consistency with the objectives of the Upper Kern Basin Fishery Management Plan.

Please contact Daryl Fryer at (909) 394-8700 or Candace Irelan at (909) 394-8714 if you have any questions regarding this filing.

Sincerely,

- cc: Noel Folsom, FERC, San Francisco
- Art Gaffrey, USFS, Porterville
- Erik Ostly, USFS, Porterville
- Judy Schutza, USFS, Kernville
- Donna Heagy, USFS, Porterville
- George Nokes, CDFG, Fresno
- Dale Mitchell, CDFG, Fresno
- Wayne White, USFWS, Sacramento
- Michael Tollefson, NPS

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KERN RIVER NO. 3 HYDROELECTRIC PROJECT
FERC NO. 2290-006
FISH POPULATION MONITORING 1998

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Prepared for:

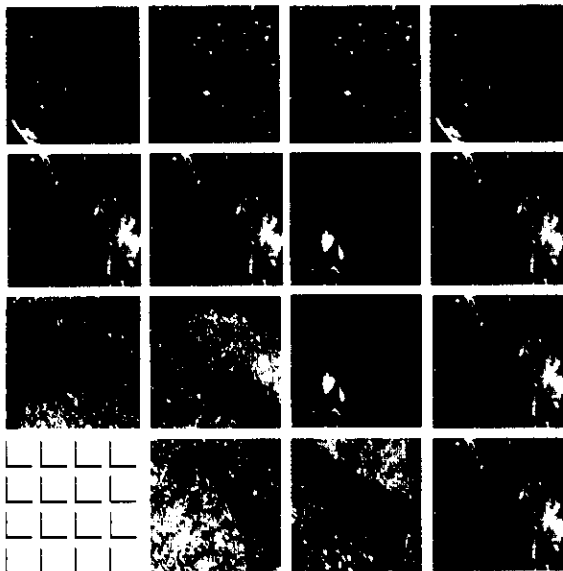
SOUTHERN CALIFORNIA EDISON
San Dimas, CA

Prepared by:

ENTRIX, INC.
Walnut Creek, CA

Project No. 306644

April 26, 1999



**KERN RIVER NO. 3 HYDROELECTRIC PROJECT
FERC NO. 2290-006
FISH POPULATION MONITORING 1998**

Prepared for:

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April 26, 1999

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1.1 BACKGROUND

Southern California Edison (SCE) operates the Kern River Hydroelectric No. 3 (KR3) Project (FERC 2290-006) on the North Fork Kern River near Kernville, California (Figure 1-1). On December 24, 1996, the Federal Energy Regulatory Commission (FERC) issued a new license for the KR3 Project. Under the conditions of the new license, the FERC included Article 411 requiring monitoring of fish populations in the North Fork Kern River. This report presents the results of the first relicensing monitoring survey carried out under Article 411. This survey was conducted during October, 1998.

In addition to reporting the results of this survey, analyses are presented that compare the current data with those collected during relicensing studies conducted during 1989 to 1991 (SCE 1991). The comparisons are presented to evaluate changes in fish abundance, community structure and population structure during the intervening period that might be attributable to changes in project operations or limiting factors.

Article 411 describes the requirements of the monitoring program as follows.

Within six months from the date of issuance of this license, the Licensee shall file with the Commission for approval a plan to monitor fish populations (Monitoring Plan). The Monitoring Plan shall include, but not be limited to, an implementation schedule, standard techniques for assessing fish populations, and sampling fish populations in 5 locations once every 5 years for the term of the license. The monitoring shall be 100 meter stations using techniques similar to those utilized in studies conducted for Exhibit E of the Licensee's application. A report shall be provided to the signatory agencies to the Settlement Agreement and to the Commission within 120 days of the end of each reporting period.

The Licensee shall prepare the Monitoring Plan after consultation with the California Department of Fish and Game, the U.S. Forest Service, U.S. Fish and Wildlife Service, and the U.S. National Park Service. The Licensee shall allow a minimum of 30 days for the signatories to the Settlement Agreement and the National Park Service to comment and to make recommendations regarding timing, location and methodology for additional monitoring before filing the Plan with the Commission. The Licensee shall include as part of its filing documentation of consultation, including copies of the comments and recommendations on the Monitoring Plan received during the consultation. If the Licensee does not adopt a recommendation of a consulted entity, the filing shall include the Licensee's reasons, based on the project-specific information.

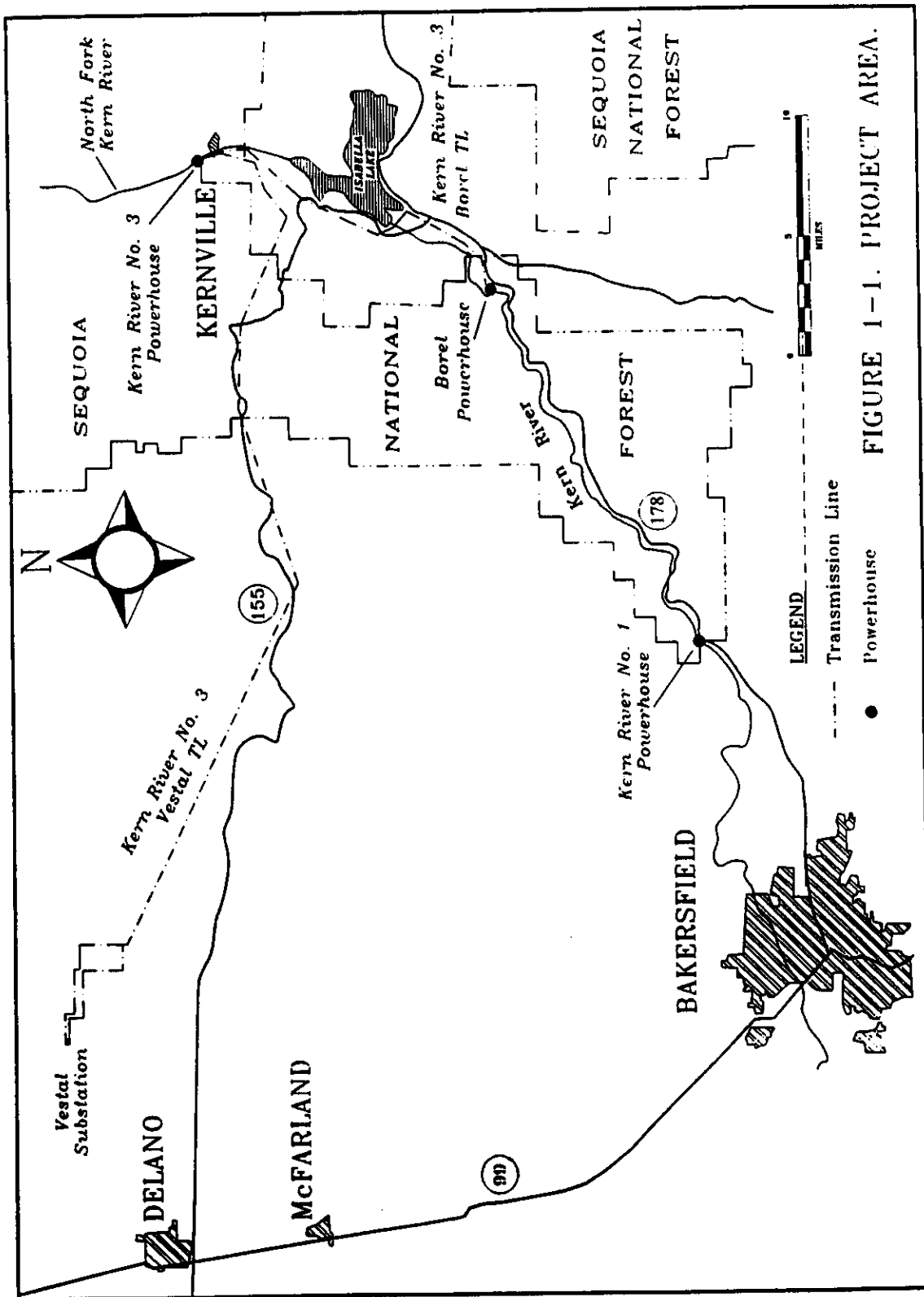


FIGURE 1-1. PROJECT AREA.

Figure 1-1. Project Area.

The Commission reserves the right to require changes to the Monitoring Plan. Upon Commission approval, the Licensee shall implement the Monitoring Plan, including any changes required by the Commission.

If the results of the Monitoring Plan indicate that changes in project facilities or operations, including alternative flow releases, are necessary to protect fish resources, the Commission reserves the authority to direct the Licensee to modify project facilities or operations

Discussions regarding potential monitoring activities were held during the preparation of the Kern River Trust Fund. The U.S. Forest Service reflected a portion of those discussions in Condition 5 of their 4(E) Conditions. The relevant portion of that Condition is as follows.

The Licensee shall monitor fish populations in five locations along the Kern River. Two sites above the diversion, two sites between the diversion and Goldledge Campground and one site in the lower portion of the diverted reach. Monitoring should consist of standard techniques for assessing fish populations. The methods used should be similar to those used for preparation of the Exhibit E for this process. Monitoring shall be performed at each station every five years during the term of the license. Sampling should be conducted during the fall. A plan for monitoring must be agreed to by the agencies and the licensee.

Consultation with the resource agencies took place prior to the preparation of the draft Monitoring Plan and through its finalization. Resource agency comments on the draft plan were incorporated into the final Fish Monitoring Plan which was submitted to FERC on June 23, 1997 and is appended to this report (Appendix A). This plan was amended and approved by FERC in their order dated October 7, 1997 (Appendix B). High flows during the 1998 water-year made the scheduling and feasibility of conducting this survey uncertain until late September. During this period of uncertainty, SCE discussed field conditions and the advisability of conducting sampling with CDFG and USFS. Once it became apparent that it would be feasible to proceed with sampling, SCE contacted the California Department of Fish and Game, the USFS - Sequoia National Forest, and the U.S. Fish and Wildlife Service and invited these agencies to send representatives to observe or participate in the monitoring.

1.2 PREVIOUS STUDIES

Recent studies of fish populations in the North Fork Kern River have been carried out as part of investigations for the preparation of the Application for New License for the KR3 Project (SCE 1991). Figure 1-2 presents sampling locations used in studies for the Exhibit E. Studies also have been carried out in support of the preparation of the Upper Kern Basin Fishery Management Plan (Stephens *et al.* 1995). These studies focused on fish populations in the Special Management Section of the river upstream of Johnsondale Bridge.

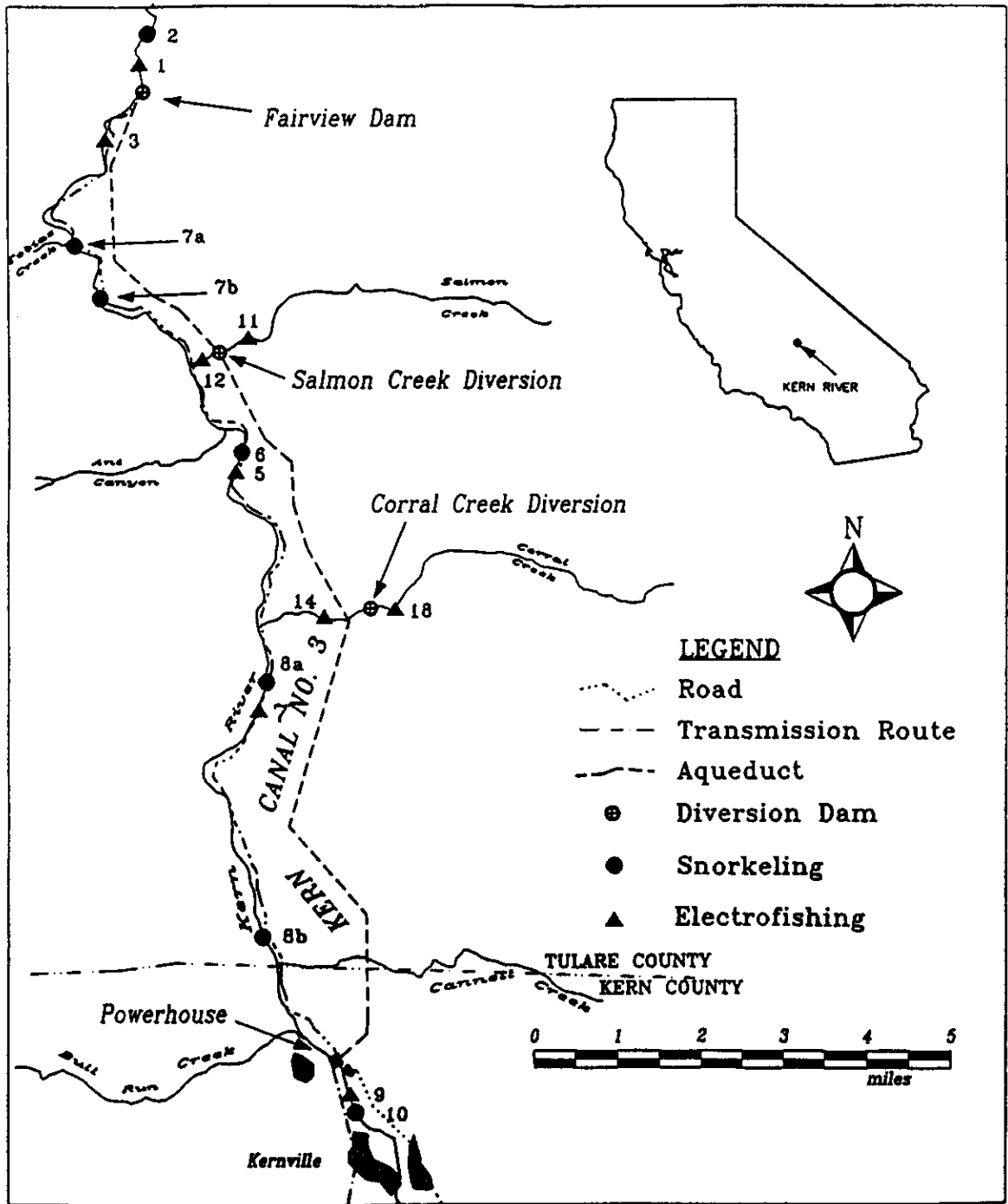


Figure 1-2. Sampling Stations Used for Monitoring Fish Populations in the North Fork Kern River During 1989-1991 Relicensing Studies.

1.3 CONSULTATION WITH AGENCIES

The Draft Kern River No. 3 Kern River No. 3 Hydroelectric Project FERC No. 2290-006 Fish Population Monitoring 1998 was provided to the California Department of Fish and Game, the U.S. Forest Service Sequoia National Forest, the National Park Service - Sequoia National Park, and the U.S. Fish and Wildlife Service for review during January, 1999. Comments were received from the Forest Service (letter dated March 10, 1999) and the Park Service (letter dated February 22, 1999). These comments are included as Appendix D.

Comments from the Forest Service indicated that they thought the report was thorough and well laid out and would serve as a good basis for comparison with future monitoring efforts. The Forest Service did not request any additional information or clarification.

The Park Service comments indicated that the report "*appears to adequately characterized fish populations in the study area.*" The Park Service offered five specific comments or suggestions. These are addressed individually below.

Comment 1: "*The maps on pages 1-4 and 2-2 are confusing.*"

The map on page 1-4 was intended to convey the locations of the study sites used during the relicensing study and was intended to show that the current study site locations are within close proximity to those stations. This map was incorporated from the FERC Exhibit E without modification. The site locations on Page 2-2 will be labeled with the appropriate designations as included in the text of the report.

Comment 2: "*Photographs of the sampling sites would be a very nice addition to the report for people who are not familiar with the area.*"

We agree and have incorporated available site photos in Figure 2-2.

Comment 3: "*Table 3-7 gives a nice view of the wild trout population by age class. It was difficult to follow some of the age class discussions in the text. It would be helpful to repeat Table 3-7 for the other species present. It would also be helpful to have a confidence interval for the age-class population estimates in the fourth column.*"

We reviewed the text which references Table 3-7. The accompanying text suggests that there are four basic inferences that may be drawn from this analysis. These are:

1. No trout were observed that were more than 3 years of age
2. Age 1+ fish were numerically dominant at all three sites where quantitative data are available
3. Age 3+ fish were more abundant Below Roads End than at the other stations

4. The proportion of the population made up by Age 1+ and 2+ fish increased with distance downstream of the diversion

No age class information is available for the other species captured. The study plan for this work included scale analysis for aging for salmonids and centrarchids, only. Length frequency distributions were completed for Sacramento sucker, but these distributions did not provide sufficient resolution to be able to distinguish year classes, given the highly variable growth rates reported for this species in the literature (see page 3-7). Because of this we have not included tables similar to Table 3-7 for the other species.

As discussed in the methods on pages 2-3 and 2-4, mark-recapture estimates were made on the basis of size classes (defined on pg. 2-4). The age structure for the rainbow trout population was determined at the conclusion of sampling based on scale analysis and length-frequency distribution, which were used to determine age at size. From this information, we determined the proportion of the total population (from mark-recapture estimates) that each age class composed. The current data set does not permit us to re-apportion the confidence intervals associated with the size class distributions into age classes.

Comment 4: *"At the bottom of page 4-1, Age 0+ trout are discussed as being less plentiful than trout of the preceding year. . . Seeing a confidence interval for that age class could shed some light on whether the actual population of young-of-year could have been larger than second year fish."*

As discussed above, mark recapture population estimates and their confidence intervals were calculated based on size class and the confidence intervals cannot be re-apportioned to year classes. In future studies, additional effort could be made to take larger numbers of fish for marking with scales taken from every fish marked. This potentially could provide for estimation of age-specific confidence intervals, if the sample size for each age class was sufficiently large.

- 5) On page 4-2, the author suggest that young-of-year may be missing from some stations due to being washed downstream. . . .

This comment was noted, but not addressed further in the text of the report. While it is true that some habitats are better than others for small fish, our electrofishing sampling was conducted in areas that should have been ideal for young trout. The upper sampling station (Below Roads End) is located in a very confined section of the river, this tends to result in a proportionately greater increase in velocity than in other areas where there is room for water to spread laterally as flows increase. This is discussed in more detail on the second paragraph on page 4-1.

2.0 METHODS

2.1 SITE SELECTION

As specified by Article 411, five stations were sampled. Of these stations, three were located downstream of Fairview Dam and two stations were located upstream of the diversion. We selected locations in close proximity to those used in previous studies. Sampling stations were selected on the basis of providing a representative sample of available habitats in each general area. Stations included both shallow and deep habitats (deep habitats included deep pools and deep runs), which were sampled by different methods. Each station totaled about 100 m including both types of habitat. Only contiguous habitats of each type were sampled. Figure 2-1 shows the general areas in which sampling occurred. Figure 2-2 shows the general nature of the sites from available photographs

The three stations located below the Fairview Dam, from upstream to downstream, were named *Below Roads End*, *Goldledge* and *Hospital Flat*. The most upstream station, *Below Roads End* was located just downstream of the Roads End Resort. An identification post remaining from the previous surveys indicated the current station was in approximately the same location as the "Below Fairview" station sampled during the 1989 - 1991 relicensing studies.

The current *Goldledge* Station was located just upstream of Goldledge Campground, downstream of the Below Roads End station. As at Below Roads End, a fence post remaining from the relicensing studies indicated this station to be in the same general location as the "Goldledge Campground" station sampled previously.

During discussions with USFS and CDFG biologists (Lechner pers. Comm., Staley Pers. Comm.), it was suggested that one of the sampling stations be located sufficiently far downstream of Fairview Dam to facilitate the sampling of native minnows. As a result of these discussions, the most downstream station was located immediately downstream of Hospital Flat campground, again an area that was sampled during the relicensing studies. During the relicensing studies, this station was dominated by the presence of native minnows and suckers. We were not able to find the previous station markers at this site, however field maps indicated that the 1998 *Hospital Flat* Station was located in the immediate vicinity of the "Hospital Flat" Station sampled previously.

Two stations were located above Fairview Dam. The first of the two stations was located just above the Fairview Dam impoundment and was named "Above Fairview Dam". Maps indicated that this site was located in the vicinity of the area previously sampled during relicensing. The second sampling station was located upstream of Johnsondale Bridge. The upstream site was suggested by the resource agencies to facilitate monitoring the self-sustaining wild rainbow trout (*Oncorhynchus mykiss*) population in

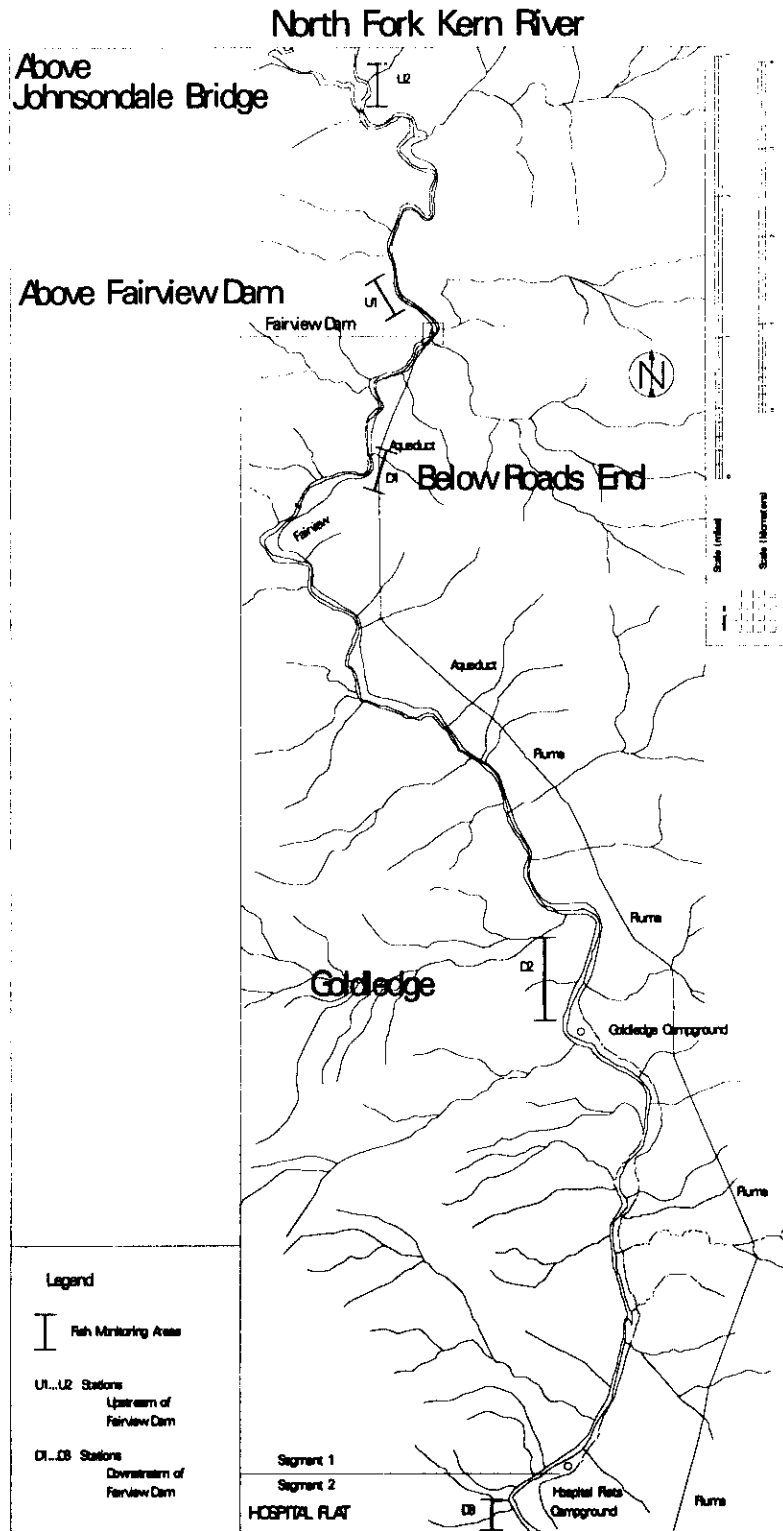


Figure 2-1. Fish Monitoring Station Locations.

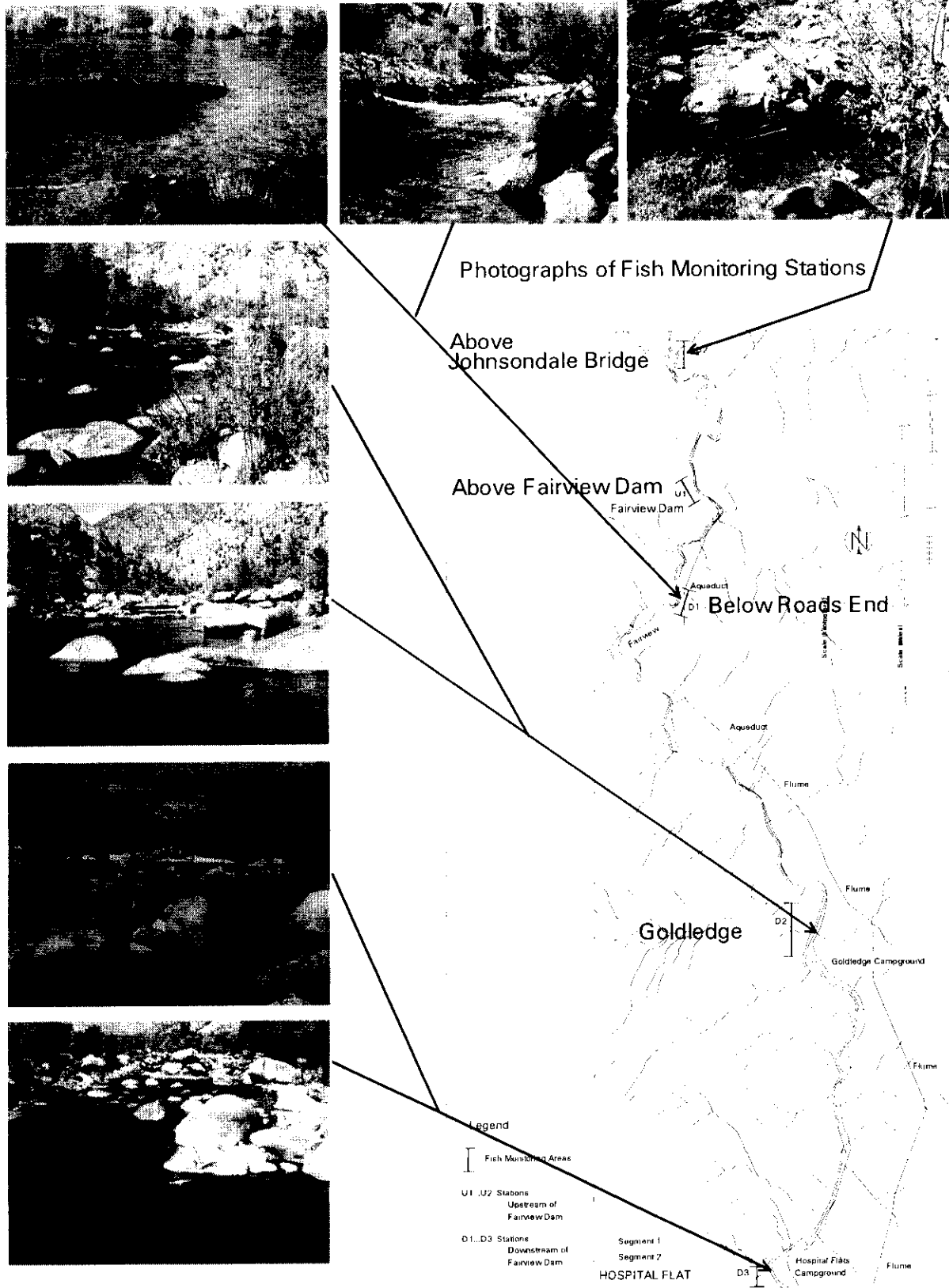


Figure 2-2. Photographs of Fish Monitoring Stations

the special regulation section of the river. A concern regarding this potential sampling location is that fish in this area are well outside the influence of the project. In addition, since there is no planting of hatchery fish in this area and fishing regulations and gear used differ, the factors limiting trout populations are likely to be different. This station was not sampled during the relicensing studies, but sampling was conducted by CDFG during 1992 (Stephens et al. 1995).

2.2 SAMPLING METHODS

Standard sampling methods were used to monitor fish populations. These procedures were similar to those used in the relicensing studies were used for monitoring (SCE 1991). The use of similar sampling stations and collection methods between past, present and future monitoring should result in data that are directly comparable.

2.2.1 ELECTROFISHING

Electrofishing was carried out in habitats sufficiently shallow to allow for adequate sampling (generally less than three feet, with a maximum depth in some pockets of 4 to 4.5 ft). Sites considered for electrofishing sampling were evaluated prior to initiating sampling activities to determine if habitats could be adequately sampled using this technique. Sampling was conducted during the second week of October in conjunction with seasonally lower flows and minimum instream flow releases (80cfs) to provide feasible conditions for electrofishing, improved access to all areas, and greater safety. Electrofishing sampling was conducted at each of the three sites downstream of Fairview Diversion Dam. Normal (median) flows upstream of Fairview Dam are usually 220 to 240 cfs during September and October (SCE 1991). During 1998, flows were about 469 cfs at the end of September, roughly double normal flows. Safety concerns relating to the unusually high flows present above the Dam in October 1998, prevented us from electrofishing above Fairview Dam.

The upstream and downstream ends of each electrofishing site were blocked using 0.125 or 0.25 inch mesh block nets. The block nets were used to prevent fish from escaping the sampling area during the abundance estimation. The 0.25 inch mesh nets were used in areas of deeper, fast moving water in order to prevent the net from collapsing due to leaf buildup. Sampling was conducted in an upstream direction from the downstream block net to the upstream block net.

Electrofishing was conducted using a barge electrofishing unit with three leads. A minimum available power of 2,500 watts was used to provide an adequate electric field and to maintain comparability to previous sampling. Settings on the unit (frequency, pulse width, and voltage) were adjusted to provide adequate field strength for polarization and anesthesia of fish based on site-specific conditions. A crew of ten people was used. Three people handled the wands (anodes), six people netted stunned fish, and one person handled the electrofishing barge. At any given time, at least four individuals were

operating dip nets to collect anesthetized fish. Electrofishing was generally conducted as described by Reynolds (1983).

Captured fish were transferred to a holding pen outside of the sampling area for processing. All captured fish were identified to species and measured to the nearest millimeter fork length. Based on their length, the fish were categorized as being in one of five size classes. These size classes were:

25-75 mm
76-175 mm
176-305 mm
306-405 mm
> 405 mm

Individual weights from a representative sample of the catch were measured to the nearest gram. The representative sample consisted of at least 10 fish (if available) of each species and size class encountered at each station.

At each station, scales were removed from at least 10 salmonids for each 10 mm size interval, as available. These scales taken from above the lateral line and approximately midway down the length of the dorsal fin, were collected and placed in individual coin envelopes labeled with the site, date taken, species, length and weight of the fish. These envelopes were later delivered to the ENTRIX laboratory for processing. Scale processing and reading is discussed in Section 2.5.2.

Population abundance was estimated using mark-recapture techniques. Population estimates were based on the five size-classes for each species of fish. Mark-recapture was the approach used for the majority of electrofishing sites sampled for the Exhibit E studies (SCE 1991). Each fish captured during the first pass was marked by a partial clip of its right pelvic fin. At the completion of the first pass all fish captured were redistributed through the site, and the site was allowed to rest for two hours prior to commencing the second pass to allow the fish to recuperate and redistribute themselves. The second pass was made in the same manner as the first. Marked fish captured in the second pass were enumerated by species and size class, unmarked fish were processed in the same manner as were the first pass fish, omitting the fin clip.

Hatchery-raised rainbow trout were differentiated from naturally-reproduced trout, referred to as "wild rainbow trout" by visually examining the individuals for signs of fin erosion or regenerated fins, typical of hatchery fish. Large numbers of hatchery trout are planted in the North Fork Kern River each year. Numbers planted have averaged 49,729 fish below Fairview Dam and 42,989 between Fairview Dam and Johnsondale Bridge between 1980 and 1993 (SCE 1995). Prior to our sampling, the most recent planting event occurred on September 18, 1998. During this planting event approximately 1500 trout were planted in Section 5 which includes our three sampling areas below the Fairview Dam. In addition, approximately 750 individuals were planted in Section 6 which is the area between

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