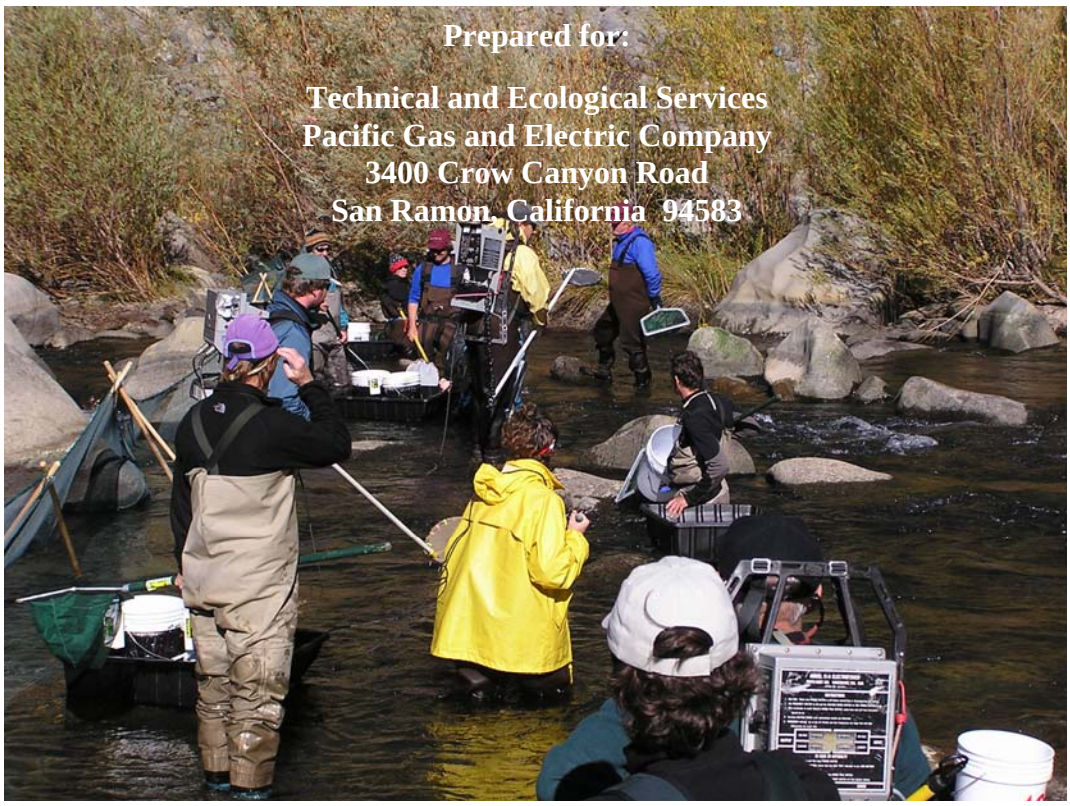
ROCK CREEK-CRESTA PROJECT (FERC No. 1962)

BACKPACK ELECTROFISHING SURVEYS

OF SHALLOW-WATER HABITATS – NOVEMBER 2004



FINAL REPORT

Prepared by:

Tim Salamunovich
Thomas R. Payne & Associates
P.O. Box 4678
890 L Street
Arcata, California 95521
(707) 822-8478

January 7, 2005

Data Report – Notice to Readers

This monitoring data report is part of Pacific Gas and Electric Company's ongoing effort to meet the study requirements of Condition 7 of the Rock Creek – Cresta Project License (FERC No. 1962). This report is part of a 15-year monitoring effort conducted in consultation with the Ecological Resources Committee (ERC) organized under the Rock Creek – Cresta Relicensing Settlement Agreement. This report has been submitted to the ERC for review and comment. This report may contain observations made by the authors that may not reflect the opinion of all ERC members. However, as this data report is part of an on-going long-term study effort, it is not the intent, after this first year, to present conclusions or recommendations on the overall impacts (positive, negative, or neutral) of base flow or recreational stream flow or pulse flow release scenarios. Any recommendations within this 2004 report relate to changes in backpack electrofishing efforts for the next two years (2005 and 2006), and any conclusions focus on comparisons with the 2002 and California Department of Fish and Game's 1982-1986 backpack efforts and to the fishery criteria identified in the Rock Creek-Cresta Operating License and Settlement Agreement.

Table of Contents

List of Figures and Tables

Figures

Tables

List of Appendices

Appendix

Introduction

In September 2000, Pacific Gas and Electric Company (PG&E) in concert with state and federal resource agencies, and numerous with other recreational and environmental groups signed the Rock Creek-Cresta Relicensing Settlement Agreement (SA). The SA attempts to strike a balance between continued hydropower generation from the Rock Creek-Cresta Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 1962) and ecological and recreational restoration of the North Fork Feather River (NFFR).

The SA specified a 15-year schedule of changes to the Project base flows (see Appendix A) with a goal of providing "*an excellent trout fishery and functioning ecosystem to all naturally occurring species*". The "excellent" trout fishery is defined in the SA as a fishery that includes:

- a wild rainbow trout population composed of at least four age classes
- recreational fish catches made up of 80% wild trout / 20% non-game fish
- average wild trout caught >9.7 inches fork length
- availability to recreational anglers of rainbow trout >17 inches in length
- harvestable component of wild trout population of 595 pounds per mile
- wild trout in the recreational catch having a biomass of 62 pounds per acre
- minimum angler catch rates of one trout per hour of effort (including catch and release)

In order to evaluate progress toward this goal over a range of three, 5-year base flow adjustments during the first 15 years of its operating license, PG&E agreed to conduct periodic fish population monitoring in the Cresta and Rock Creek reaches of the North Fork Feather River during the last three years of each 5-year period. The SA specifies that this monitoring will include backpack electrofishing in riffle and glide habitats fashioned after similar studies conducted during the 1980's by the California Department of Fish and Game (CDFG 1988). The SA stipulates that the fish population monitoring should be conducted during the late summer/fall periods at specified annual intervals (Table 1). A first year effort was also completed in 2002 (ECORP 2003) to provide a baseline measure of fish populations prior to the initial base flow adjustment.

Table 1. Electrofishing fish population monitoring schedule as specified in the Rock Creek- Cresta Relicensing Settlement Agreement.

Year	Anticipated Calendar Year	RCCSA base flow schedule year [1]	Status
1	2002	First year of first 5-yr flow period	Completed; reported in ECORP 2003
3-5	2004-2006	3rd-5th years of first 5-yr flow period	2004 surveys completed & reported in this document; 2005 & 2006 surveys to be completed over next two years
8-10	2009-2011	3rd-5th years of second 5-yr flow period	Future studies
13-15	2014-2016	3rd-5th years of third 5-yr flow period	Future studies

1/ The 5-year base flow periods specified in Section II (River Flow Management) of the Rock Creek-Cresta Relicensing Settlement Agreement (see Appendix A of this report).

Thomas R. Payne and Associates was contracted to conduct the shallow-water habitat electrofishing surveys for years three (2004) through five (2006) (Table 1). The goal of the studies is to characterize the fishery population (e.g., species composition, abundance, biomass, length frequencies, etc.) from selected sample sites in several shallow-water areas of the Cresta and Rock Creek reaches that can be sampled repetitively using backpack electrofishing techniques. The long-term hypothesis being tested, as outlined in the SA, is that programmatic increases in the base flows from the Rock Creek-Cresta Project will result in a corresponding increase in the quantity and quality of the trout population of the North Fork Feather River. The results of the monitoring will also reflect population responses of fish species other than trout to the base flow changes. Summer base flows during the 2002-2004 time periods were above the minimum 'normal water year' levels of 180 cfs and 220 cfs for the Rock Creek and Cresta river reaches, respectively. This report provides the results from the first of three consecutive years of backpack electrofishing surveys conducted in association with other concurrent 3-year monitoring efforts (e.g., barge electrofishing of pools, snorkeling surveys, angler surveys, macroinvertebrate surveys, etc.). All of these long-term surveys are designed to help assess the responses of the aquatic community to the base flow changes over the 15-year period.

Study Area/Study Sites

The Rock Creek-Cresta Hydroelectric Project is located on the NFFR in Butte and Plumas Counties. The Project is a vital part of PG&E's NFFR hydropower system, where stored water, mainly from Lake Almanor, produces electricity through a series of nine powerhouses before entering Lake Oroville (Figure 1).

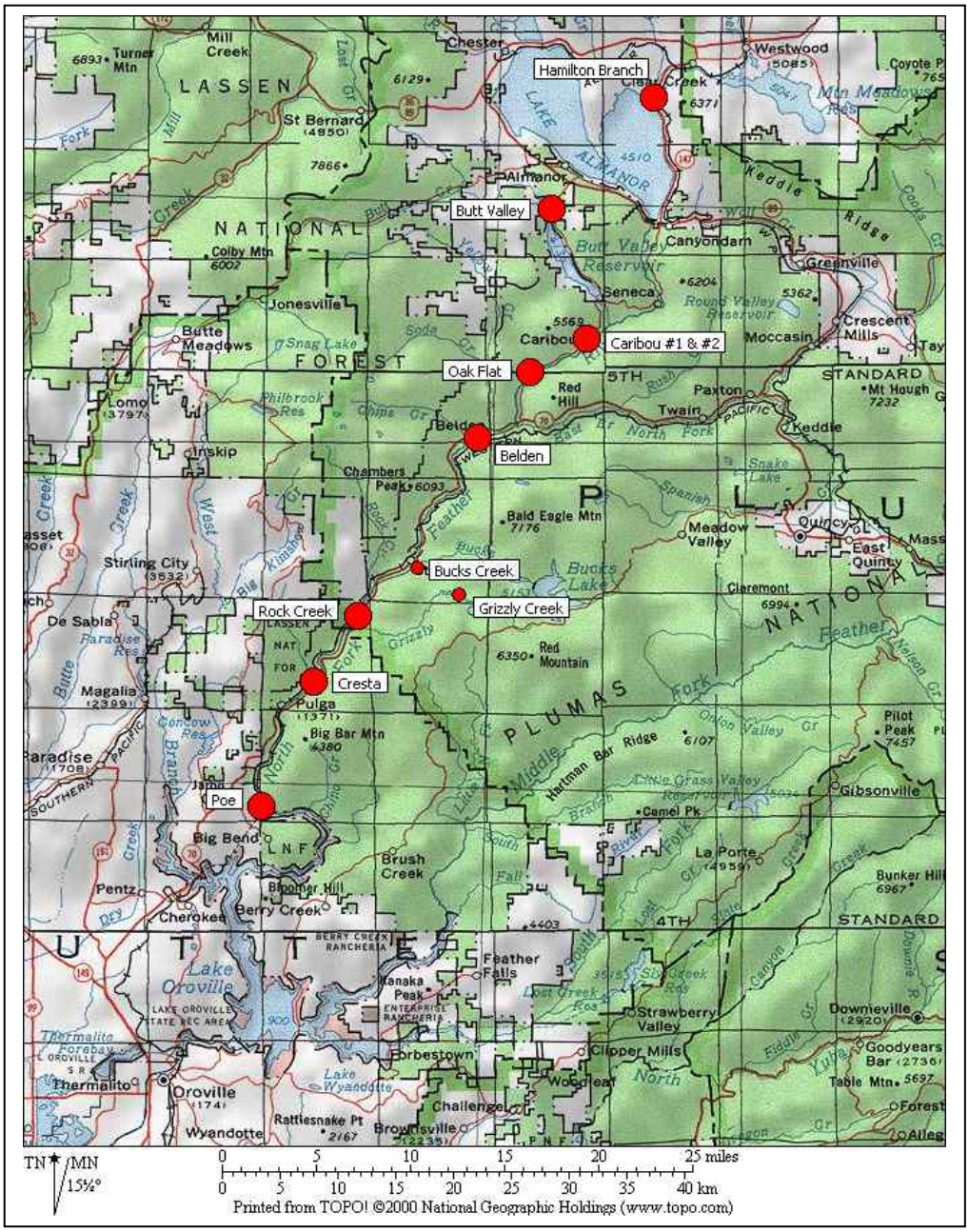


Figure 1. Map showing Pacific Gas and Electric Company's North Fork Feather River hydroelectric facilities including the Rock Creek-Cresta Project (FERC No. 1962)

The Rock Creek–Cresta Project consists of the Rock Creek Dam and Powerhouse and the Cresta Dam and Powerhouse. Water (3,300 cfs maximum) is diverted from the Rock Creek Reservoir through the Rock Creek Powerhouse and is discharged into the Cresta Reservoir. The 8.5 mile-long section of the NFFR bypassed by this portion of the project is referred to as the Rock Creek Reach (Figure 2). From Cresta Reservoir, flow (maximum of 3,800 cfs) is diverted through the Cresta Powerhouse and into the Poe Reservoir. The 4.9 mile-long section of the river between Cresta Dam and powerhouse is known as the Cresta Reach of the NFFR (Figure 2).

The Bucks Creek Project (FERC No. 619) discharges water from the Bucks and Grizzly Creek basins into the lower portion of the Rock Creek Reach about one mile upstream of the Rock Creek Powerhouse (Figure 2). Major tributaries to the NFFR in the Project area include Opapee, Milk Ranch, Chambers, Granite, Bucks, Rock, Grizzly, and Bear Ranch creeks.

The Rock Creek-Cresta Project reaches of the North Fork Feather River are considered to be within an ecological transition area between the rainbow trout zone and the pikeminnow-sucker-hardhead zone (Moyle 2002). Moyle et al. (1983) described fish populations in the project area as a mixture of native and introduced species including, rainbow trout (*Oncorhynchus mykiss*), Sacramento sucker (*Catostomus occidentalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), riffle sculpin (*Cottus gulosus*), smallmouth bass (*Micropterus dolomieu*), and brown trout (*Salmo trutta*). Prickly sculpin (*Cottus asper*) are known to occur in the project area (ECORP 2003; Salamunovich 2004a). Other species such as Sacramento perch (*Archoplites interruptus*) common carp (*Cyprinus carpio*) and wakasagi (or pond smelt, *Hypomesus nipponensis*) may also be present on occasion after periodically washing out of Lake Almanor (Moyle et al. 1983).

Supplementation of the Rock Creek and Cresta area trout populations using hatchery strains has been conducted with little regularity and limited success. In 1966-67 and 1977, several

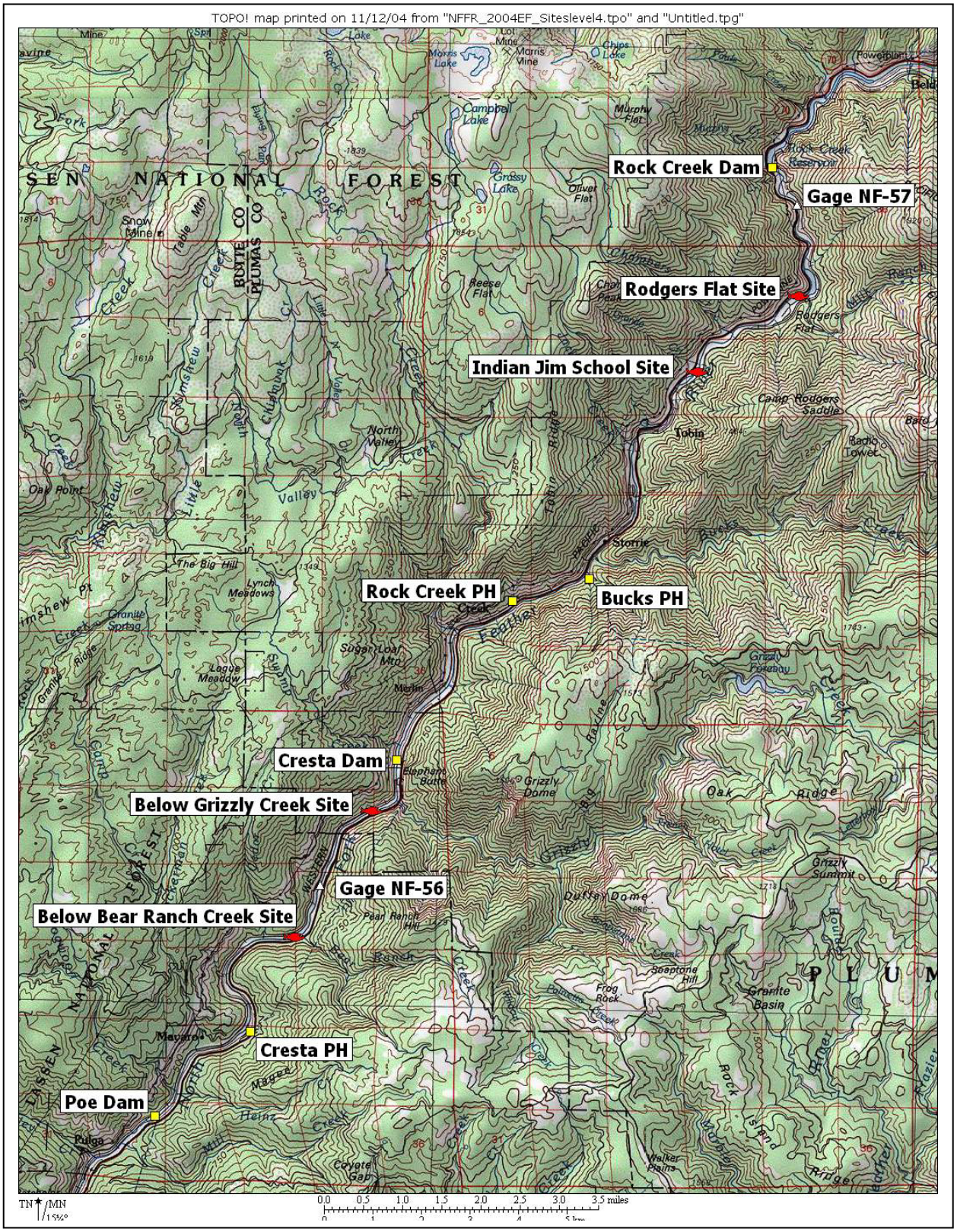


Figure 2. Location of the four shallow-water electrofishing sites (red fish symbols) in the Rock Creek-Cresta Project area of the North Fork Feather River. Yellow dots show locations of major project facilities.

plants of hatchery-reared rainbow and brown trout were made into the reaches following extensive chemical treatments aimed at reducing the non-game fish populations (Flint 1980; Moyle et al. 1983). While the California Department of Fish and Game regularly stock hatchery trout in the NFFR upstream of the East Branch confluence (Belden area), poor habitat and lack of availability of strains resistant to the protozoan parasite, *Ceratomyxa shasta*, has limited the success of plants made into the Cresta and Rock Creek reaches of the river (CDFG 1988). The Rock Creek and Cresta reaches are no longer stocked, and the flowing, non-reservoir areas are currently managed as a wild trout fishery under "catch and release" regulations.

The NFFR in the Project reaches is a relatively high-gradient river contained in a steep-walled canyon. At the current summer base flows (220 cfs in the Cresta Reach and 180 cfs in the Rock Creek Reach), the river in the project area is composed primarily of relatively long deeper-water habitats such as pools and runs that are separated by shorter shallow-water glide and riffle habitats (Table 2).

Table 2. Number, lengths in feet (total/mean), and percentage of total distance for various habitat types identified during habitat mapping of the main channel areas of the Cresta and Rock Creek reaches.

Habitat Type	N	Total length	Mean length	% Total Reach
Cresta Reach (Discharge = 275 cfs)				
Low gradient riffle	17	1,781	104.8	7.1
High gradient riffle	27	3,349	124.0	13.4
Run	43	7,420	172.6	29.7
Shallow pool	11	3,859	350.9	15.4
Deep pool (<10ft)	14	8,596	614.0	34.4
Rock Creek Reach (Discharge = 257 cfs)				
Low gradient riffle	26	3,263	125.5	7.3
High gradient riffle	59	7,597	128.8	16.9
Run	67	13,566	202.5	30.2
Shallow pool	26	8,299	319.2	18.5
Deep pool (<10ft)	22	12,166	553.0	27.1

Most of the gradient drop occurs over the short stretches of riffle habitat. This predominance of deep-water habitats in the project area limits the amount of wadeable, shallow-water habitats that can be sampled using backpack electrofishing equipment. The study's goal to sample habitat distances 200-400 feet in length further constrains the availability of suitable sample sites in the Project reaches.

The study plan provided by PG&E specified that, at a minimum, the same four sites be sampled during the 2002-2016 monitoring period. Following this guideline, the upper and lower boundaries of each study site surveyed during the October 2002 studies (ECORP 2003) were relocated the day prior to the 2004 sampling using photos and Global Positioning System (GPS) coordinates.

The four sites sampled in 2002 were also reportedly sampled by CDFG in 1986 as part of their six-year monitoring study (ECORP 2003). However, it appears the 2002/2004 Indian Jim School site, which is downstream of Granite Creek, is, in fact, immediately downriver from the CDFG 1986 site. Post-1986 flows (most likely the January 1997 flood event) altered the river channel, and in particular, the 1986 Granite Creek site where a mid-channel island now exists. This mid-channel island was purposely avoided during the 2002 site selection process. Any future comparison of the 1986 CDFG site and the 2002/2004 site should take this into account.

The four shallow-water sites sampled during 2004 represented a predominantly run/glide habitat and combination riffle/glide habitat from the Cresta and the Rock Creek reaches (Table 3; Figure 2). The study sites were named for easily recognizable physical or geographic features in the vicinity and generally follow the conventions used in the ECORP (2002) report.

Table 3. Name, Project reach location, and predominant shallow-water habitat type for the four study reaches sampled during the 2004 electrofishing surveys.

Site name	Project Reach	Predominant habitat[1]
Bear Ranch Creek	Cresta	Glide
Grizzly Creek	Cresta	Riffle/glide
Indian Jim School	Rock Creek	Glide
Rodgers Flat	Rock Creek	Riffle/glide

1/ predominant habitat types from ECORP (2003)

Methods

Physical Site Data Collection

Habitat dimensions, habitat characteristics, and water quality parameters were measured at all electrofishing sites at the time they were sampled. All data were recorded on standardized data forms (Appendix B).

The length of each site was measured to the nearest foot from the bottom boundary to the top boundary using a hip chain. Stream width to the nearest 0.1 foot was measured at a minimum of nine locations along the sampling station using a surveyors tape. The average of these measurements was used to determine the mean width at each station. Depth measurements (to the nearest 0.05 foot) were made using a survey stadia rod at ¼, ½, and ¾ distance across each of the width cross-sections to estimate the average depth for the entire sample station. The maximum depth within each of the stations was also recorded using the deepest reading made within the particular survey unit. Stream gradient over the length of each site was measured using a hand-level and the stadia rod placed on the stream bottom.

Habitat characteristics within each of the survey stations were also recorded at the time of sampling. The percentages of different habitat types (pool, run, riffle, or pocket water) comprising the station were visually estimated, along with the percentages of various substrate types (fines [<2mm], sand [2-7mm], gravel [8-75mm], cobble [76-300mm], boulder [>300 mm] and bedrock). The percent of the site available as fish cover was also

estimated using the same categories reported in ECORP (2003), which included surface turbulence, instream object cover, undercut bank, and overhanging vegetation within 48" of the water surface. The surface area of suitable trout spawning gravels in the study site was also estimated.

Air and water temperatures were measured at the time the stations were sampled. Other water quality parameters were also measured, including conductivity (µS/cm), specific conductivity (temperature standardized conductivity), salinity (ppt), and dissolved oxygen concentrations (mg/L), and percent saturation. Air temperatures were recorded using a handheld thermometer. The water quality parameters were measured using recently-calibrated Yellow Spring Instruments® handheld meters (Models 30 and 550).

To aid in relocating stations during future efforts, the top and bottom boundaries along each bank were denoted used high-visibility surveyors flagging. The flagging was hung near the waters edge as well as further up the bank. In addition, orange plastic squares with flagging were attached to trees well up the bank at the top and bottom boundaries of each site. In addition, sites were photographed from multiple vantage points, and the latitude and longitude of the top and bottom boundaries were determined using a handheld GPS receiver.

Electrofishing

Estimation of the abundance and population characteristics of resident fish in the shallow water areas of the Cresta and Rock Creek reaches of the North Fork Feather River was conducted using multiple-pass removal-depletion by backpack electrofishing.

Prior to sampling, stream flows from Cresta and Rock Creek dams were reduced to levels judged to provide safe wading conditions at the sample sites. The study sites were isolated with ½-inch (1.27 mm) mesh block nets to prevent immigration or emigration of fish during sampling. Five to six shocking teams (i.e., one shocker and one netter) moved upstream in concert across a unified front during each sampling pass. The shockers used

portable backpack electrofishers to stun fish, which were captured by the netters using ⅛-inch mesh dip nets. All captured fish were removed to one of several available 5-gallon live buckets that were towed on small plastic tote-barges by additional netters. All live buckets were filled with river water and equipped with a small bait bucket aerator. Fish in the live buckets were periodically transferred to a ⅛-inch mesh netted live box located in the river outside of the study site and away from the electric field.

The battery-powered backpack electrofishers used during these surveys included Smith-Root® Models Type VII, 11A, 11B, and 12B. A gas-powered Model 15-B backpack electrofisher was also used at the Grizzly Creek Site. A minimum of three passes of equal effort were made by the electrofishing teams within each reach. Teams maintained their same position across the stream channel for each pass. The target for the three-pass data was to provide a population estimate for rainbow trout with a standard error that was ten percent (or less) of that estimate. After the third pass, the trout capture data was used to generate the population statistics on a laptop computer loaded with the appropriate software. If the population estimate and standard error criterion was met, no additional passes were made. If it was not, another pass was made and the new estimate and standard error were evaluated.

Following each pass, captured fish were identified, measured and weighed. Prior to handling, fish were anesthetized in a weak CO_2 solution using commercially available effervescent pain-relief tablets (two tablets: ¾ gallons of clean river water). All fish were measured to the nearest millimeter fork length (FL) [or total length (TL) for sculpin species] and weighed on an electronic scale. Fish smaller than 150 mm in length were typically weighed to the nearest 0.1 gram; larger fish were weighed to the nearest gram. Fish measurement data and notes were recorded on standardized data sheets (Appendix C). During processing, fish were inspected for any distinguishing marks (fin clips) or features (e.g. hook scars, deformed fins, tumors; fungus, etc.), which were duly noted on the data sheets. All mortalities were also noted on the data sheets.

The Rodgers Flat site contained a side channel area that was electrofished separately, following each pass in the main channel. All effort, catches, and habitat data were recorded separately for the side channel and main channel areas.

Scale samples were taken from most captured trout for use in future age and growth determinations. Scales were removed from the right side between the dorsal fin and lateral line as specified in DeVries and Frie (1996). The scale samples were stored in labeled scale envelopes. Trout from which scale samples were taken were also noted on the data sheets to allow for cross referencing length/weight data in the event of potential omissions or confusion from the notes on the scale envelopes.

After processing fish, were placed in an aerated bucket of cool river water and allowed to recover. Fish in the recovery bucket were regularly transferred to a ⅛-inch mesh netted live box located in the river outside the study site. All fish were held in live boxes until fully recovered from the shocking and handling. After the completion of the survey, all fish were distributed back to size-appropriate habitat areas of the study site.

The length data was used to generate site-specific length-frequency histograms for each species. These plots show the size structure of the population, which tends to be related to the age structure of the specific population.

The multiple-pass capture data were used to generate a population estimate and 95 percent confidence interval for each species using the maximum-likelihood estimator from the microcomputer software program MicroFish 3.0 (Van Deventer and Platts 1989). MicroFish 3.0 cannot provide a population estimate if only a single fish is captured from all passes combined, or if all the fish are captured on the first pass. In these rare cases, the Zippin estimator from the software program CAPTURE (White et al. 1978) was used to calculate the population estimate and associated error. Both software programs generate probability-of-capture estimates based upon capture patterns. The capture probability estimate, which varies between zero and one, is a measure of sampling efficiency, with

values greater than 0.40 being generally indicative of effective sampling (White et al. 1982).

Fulton's Condition Factor (K) was calculated for rainbow trout using the formula of Bagenal and Tesch (1978). The condition factor compares the length and weight relationship of individual fish to assess their physical condition (Everhart et al. 1975). Higher condition factors indicate heavier fish for a given length. A value of 1.0 is generally considered normal for a healthy population of trout.

The population estimate data was used to generate abundance and biomass estimates. The abundance estimates were standardized to common indices (fish/mile and fish/acre) to facilitate comparisons between unequal length/area sites within and between years. Biomass estimates for each species at each station were calculated as the product of the estimated fish population and the mean weight for that species divided by the surface area of the river at sampled at that site. Biomass estimates were also calculated using several indices (e.g. kilograms/hectare, pounds/acre) to facilitate comparison with earlier surveys.

Results

The electrofishing surveys of the Cresta and Rock Creek reaches of the NFFR were conducted from November 2-6, 2004.

Detailed plots of the stream flows in the Cresta Reach (Gage NF-56) and Rock Creek Reach (Gage NF-57) during the 2004 electrofishing surveys are presented in Figure 3. The mean daily discharge in the Cresta Reach during the November 2 electrofishing survey below Bear Ranch Creek was 92 cubic feet per second. Electrofishing scheduled for November 3 was postponed due to intermittent, but heavy rain showers (0.74 inches at Bucks Creek Powerhouse [California Data Exchange Center 2004]). However, in order to more effectively sample the river channel in a safe manner, stream flows were reduced further to an average of 76 cfs when electrofishing was resumed on November 4 at the

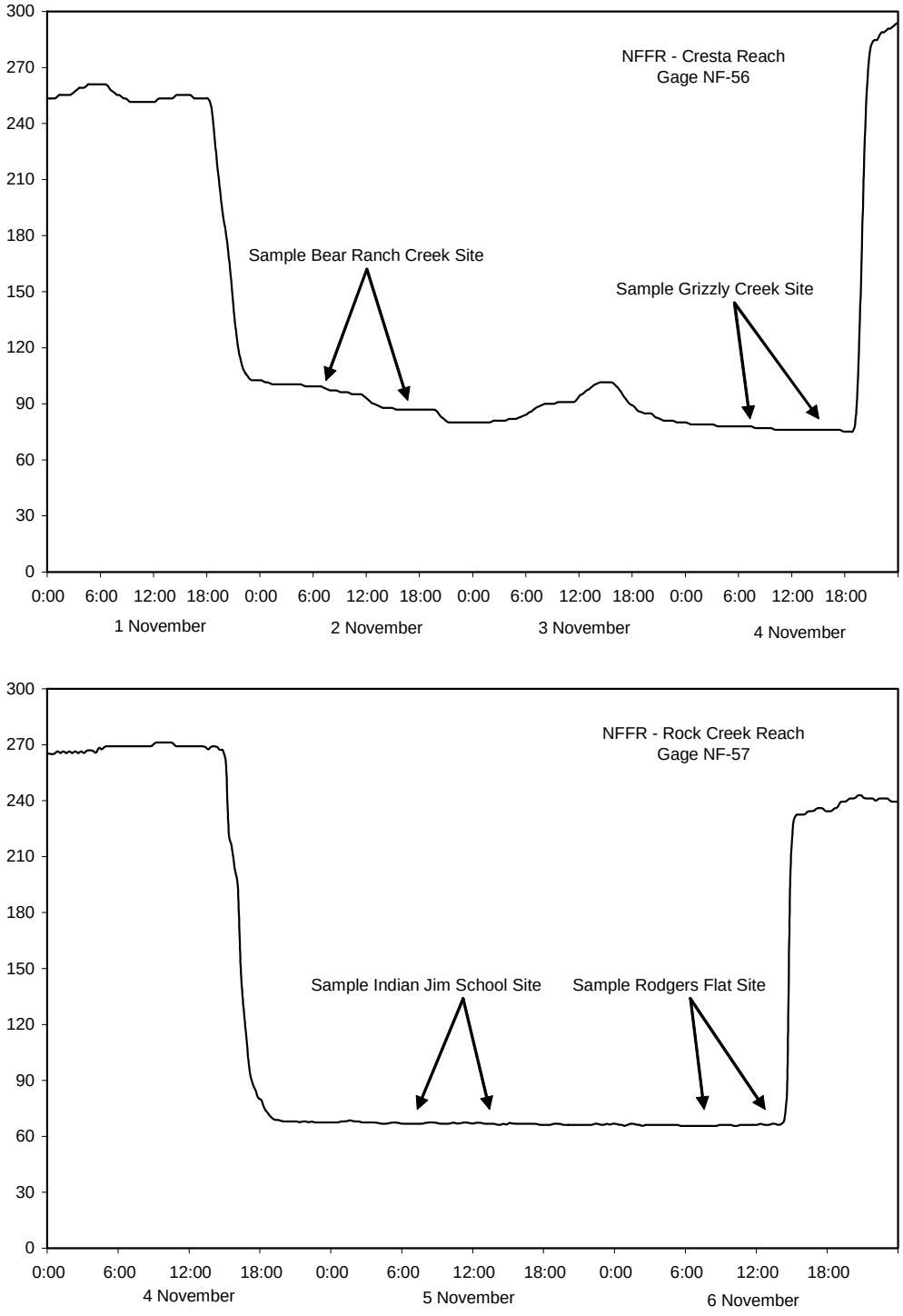


Figure 3. Stream flow records for the Cresta (top) and Rock Creek (bottom) study reaches during the November 2004 backpack electrofishing surveys. Data provided by PG&E.

Grizzly Creek site. After completion of the Cresta Reach surveys, stream flows below Cresta Dam were raised back to levels slightly above the minimum flow of 220cfs.

On November 4, the releases from Rock Creek Dam were reduced to accommodate the electrofishing surveys in the Rock Creek Reach on November 5 and 6 (Figure 3). The stream flow during the Rock Creek sampling was very stable and averaged 67 cfs during our surveys at the Indian Jim School and Rodgers Flat sites. Immediately following the electrofishing surveys, the flows from Rock Creek Dam were raised back to levels slightly above the minimum flow level of 180 cfs.

Physical Site Data Collection

The habitat and water quality measurements were conducted at each site following the first electrofishing pass while the remaining crews were processing the captured fish. Copies of the actual data sheets are contained in Appendix B. A summary of the habitat measurements and variables are presented in Table 4.

By the time of early November sampling, water temperatures were relatively low (<50°F), while dissolved oxygen concentrations were relatively high (>9.0 mg/L) at each of the study sites. This combination of low water temperature and high dissolved oxygen levels was ideal for electrofishing sampling and likely contributed to the low electrofishing/handling mortality noted during our surveys (1.2% for trout; 1.0% overall). Water conductivity was relatively low at all the sites, especially in the Cresta Reach where it averaged less than 70µS/cm.

Bear Ranch Creek Site

The top of this 370-foot long site was located in the Cresta Reach about 211 feet downstream of the mouth of Bear Ranch Creek (Figure 2). During our survey, this site encompassed 0.63 acres (0.26 hectares) and was predominantly run habitat (Table 4; Appendix B). The site had a relatively low gradient (<1%) and the substrate was

Table 4. Summary of habitat and water quality measurements during the Fall 2004 Rock Creek-Cresta electrofishing surveys.

Site	Date	Length (ft)	Mean Width (ft)	Area (ft^2)	Mean Depth (ft)	Max Depth (ft)	Gradient (%)	Water Temp (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat.)
Bear Ranch Creek	2 Nov	370	74.7	27,637.4	1.9	5.9	0.8	8.9	66.5	10.5	89.7
Grizzly Creek	4 Nov	300	92.1	27,627.3	1.4	3.9	3.3	8.9	63.7	10.4	89.2
Indian Jim School	5 Nov	294	54.5	16,023.0	2.4	5.0	0.5	9.4	81.9	10.1	86.5
Rodgers Flat											
Main channel	6 Nov	231	69.9	16,144.3	2.0	4.2	0.3	8.6	85.3	9.9	84.7
Side channel	6 Nov	128	15.6	1,996.8	0.8	1.55	no data	no data	no data	no data	no data

dominated by boulder and cobble. Instream object cover was identified as the dominant cover type. Very little trout spawning material, approximately 25 ft^2, was noted in the low flow channel at this site during our survey.

Grizzly Creek Site

This 300-foot long site was located in the Cresta Reach about 0.5 miles downstream of the mouth of Grizzly Creek (Figure 2). This study site was the widest and shallowest of the four study sites (Table 4). During our survey, this site encompassed 0.63 acres (0.26 hectares) and was classified as equal proportions of run and riffle habitats with some pocket water (Appendix B). The substrate in this relatively high gradient site (>3%) was dominated by boulder and cobble. Instream object cover was identified as the dominant cover type. Very little trout spawning material, approximately 100 ft^2 or <0.5% of the total surface area, was noted in the low flow channel at this site during our survey.

Indian Jim School Site

This 294-foot long Rock Creek Reach site was located adjacent to the now-abandoned Indian Jim Elementary School (Figure 2). The top of this site is located 892 feet downstream of the mouth of Granite Creek. During our survey, this site encompassed 0.37 acres (0.15 hectares) and was predominantly run habitat (Appendix B). This low gradient site (<1%) was the deepest and narrowest study site sampled during 2004 (Table 4). The substrate at the school site was dominated by boulder and cobble, while instream object cover was identified as the primary cover type. No significant patches of trout spawning gravel were noted in the low flow channel at this site during our survey.

Rodgers Flat Site

This 231-foot long site was located in the Rock Creek reach near Rodgers Flat (Figure 2). The top block net was about 370 feet downstream of the mouth of Milk Ranch Creek. The site contained 128 feet of side channel habitat that was sampled separately from the main channel. The side channel was located at the bottom end of a substantial north bank side

channel that entered the main channel 110 feet upstream of the bottom block net and extended beyond the upstream portion of the study site.

During our survey, the main channel area encompassed 0.37 acres (0.15 hectares) and was classified primarily as pocket water habitat (Table 4; Appendix B). The side channel area was 0.05 acres (0.02 hectares), but habitat classification for this side channel area was not done. This site had the lowest gradient of all the sites (0.3%) and the streambed of the main channel was almost exclusively made up of large boulder elements, which provided the dominant fish cover. Very little trout spawning material, approximately, 38 ft^2, was noted in the low flow area of the main channel at this site during our survey.

Electrofishing

The 2004 survey collected a total of 1,280 fish from seven species, each of which was present at each site (Table 5). Riffle sculpin were the most abundant species captured at three of the four sample sites and accounted for 43.2% of the overall total catch. Prickly sculpin was the least abundant species at most sites and contributed only 1.3% of the overall catch. Rainbow trout numerically dominated the Rodgers Flat catch data (47.8% of the total catch at the site), and were the second most abundant species overall (25.6%) from all four sites combined. Hardhead and Sacramento suckers each contributed 12.0 percent of the total catch. Sacramento pikeminnow (3.3%) and smallmouth bass (2.6%) were relatively minor components of the overall catch. Copies of the actual data sheets are contained in Appendix C.

Scales were collected from 309 rainbow trout ranging in size from 55 to 376 mm FL during the 2004 survey. None of the scale samples were examined for this report, since scale analysis and age/growth determination were not included in the original scope of work. The scale samples are archived and may be made available for future age/growth studies.

Table 5. Fish species collected at the four Rock Creek-Cresta Project electrofishing sample sites, November 2004.

Fish Species	Bear Ranch Cr.	Grizzly Cr.	Indian Jim School	Rodgers Flat		Total Fish
				Main Ch.	Side Ch.	
Rainbow trout	89	139	15	83	2	328
Hardhead	49	1	90	10	3	153
Sacramento pikeminnow	13	4	20	2	3	42
Sacramento sucker	45	22	79	8	0	154
Smallmouth bass	23	4	2	4	0	33
Riffle sculpin	165	233	97	56	2	553
Prickly sculpin	9	2	1	5	0	17
Site Total	393	405	304	168	10	1,280

Length-frequency analysis for rainbow trout captured at the various sites shows that smaller size classes dominated the Cresta sites compared to the Rock Creek sites, where larger sized fish tended to constitute a larger percentage of the total trout catch (Figure 4). No marked or clipped rainbow trout were captured during our surveys.

Inspection of the condition factor-frequencies indicate that the trout populations at all the sites are in good condition (Figure 5). The average condition factor for trout from the four study sites were all above 1.0, with only 2.5% of the calculated condition values less than this threshold.

Length-frequencies for hardhead captured at the various sites indicate that while hardhead were present at all sites, the larger sized juveniles (probably 1-2 year old fish) were present only at the Rock Creek sites (Figure 6). The Indian Jim School site had the largest range of sizes and the highest abundances for hardhead. No adult-sized hardhead (≥300 mm) were captured at any of the shallow-water sites sampled. Adult hardhead have been reported to prefer the deeper pool areas of streams (Moyle 2002). Large adult hardhead were observed at the Indian Jim site during snorkel surveys conducted in September and October 2004 (unpublished data); however, at the reduced flow conditions during which we sampled, they probably migrated to deeper areas downstream.

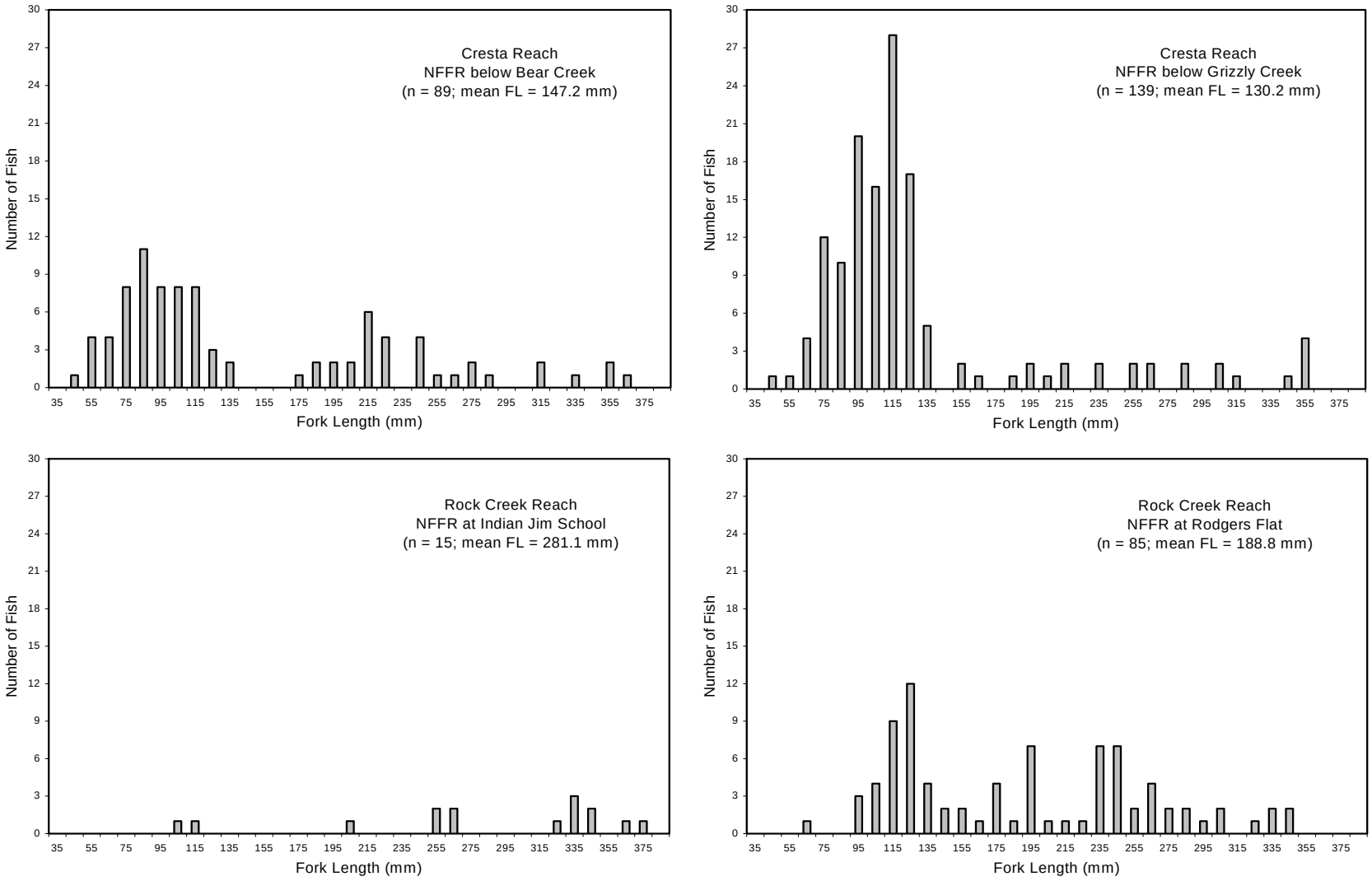


Figure 4. Length-frequency data for rainbow trout captured during the November 2004 Rock Creek-Cresta electrofishing survey.

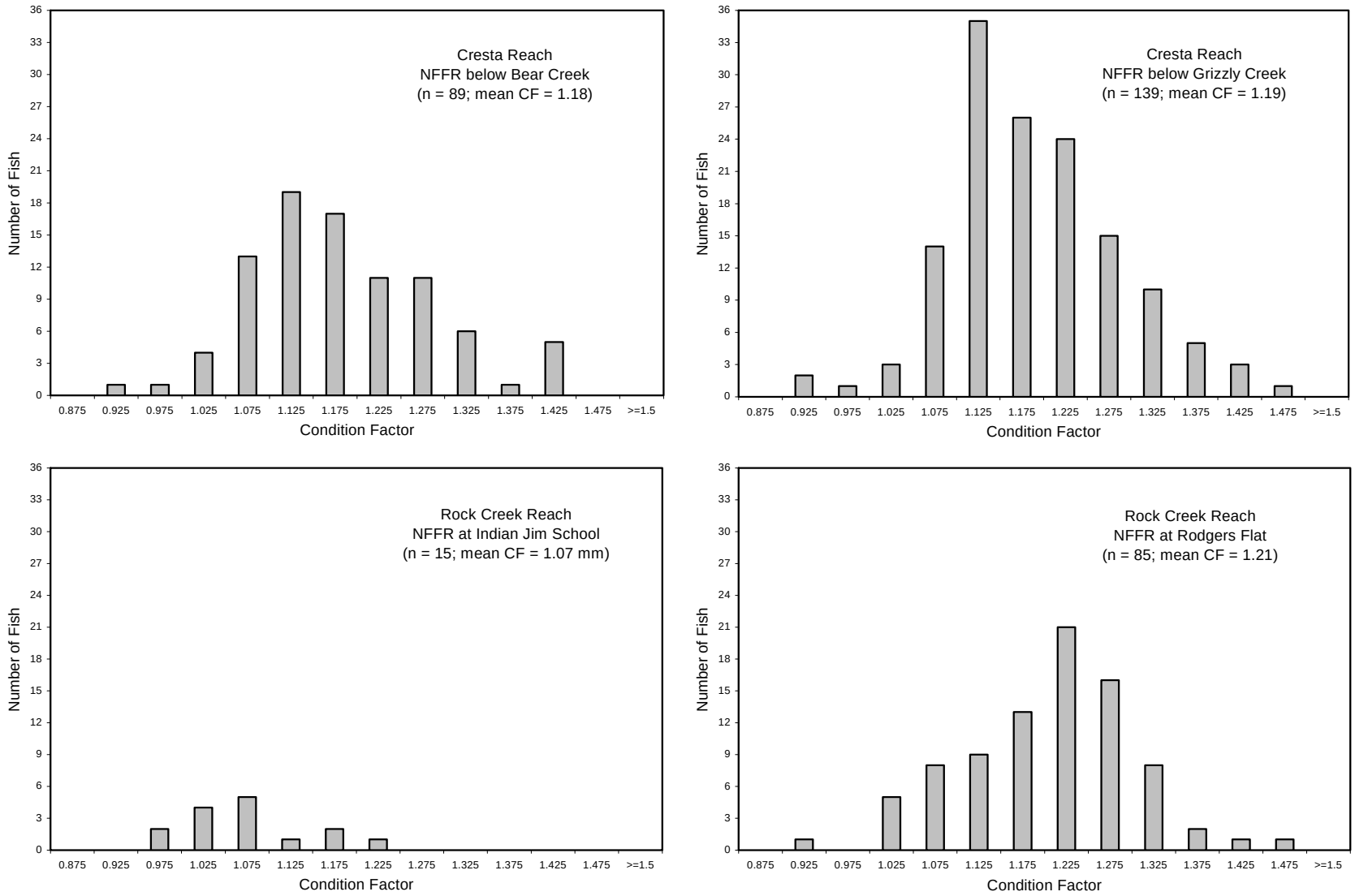


Figure 5. Condition factor-frequency data for rainbow trout captured during the November 2004 Rock Creek-Cresta electrofishing survey.

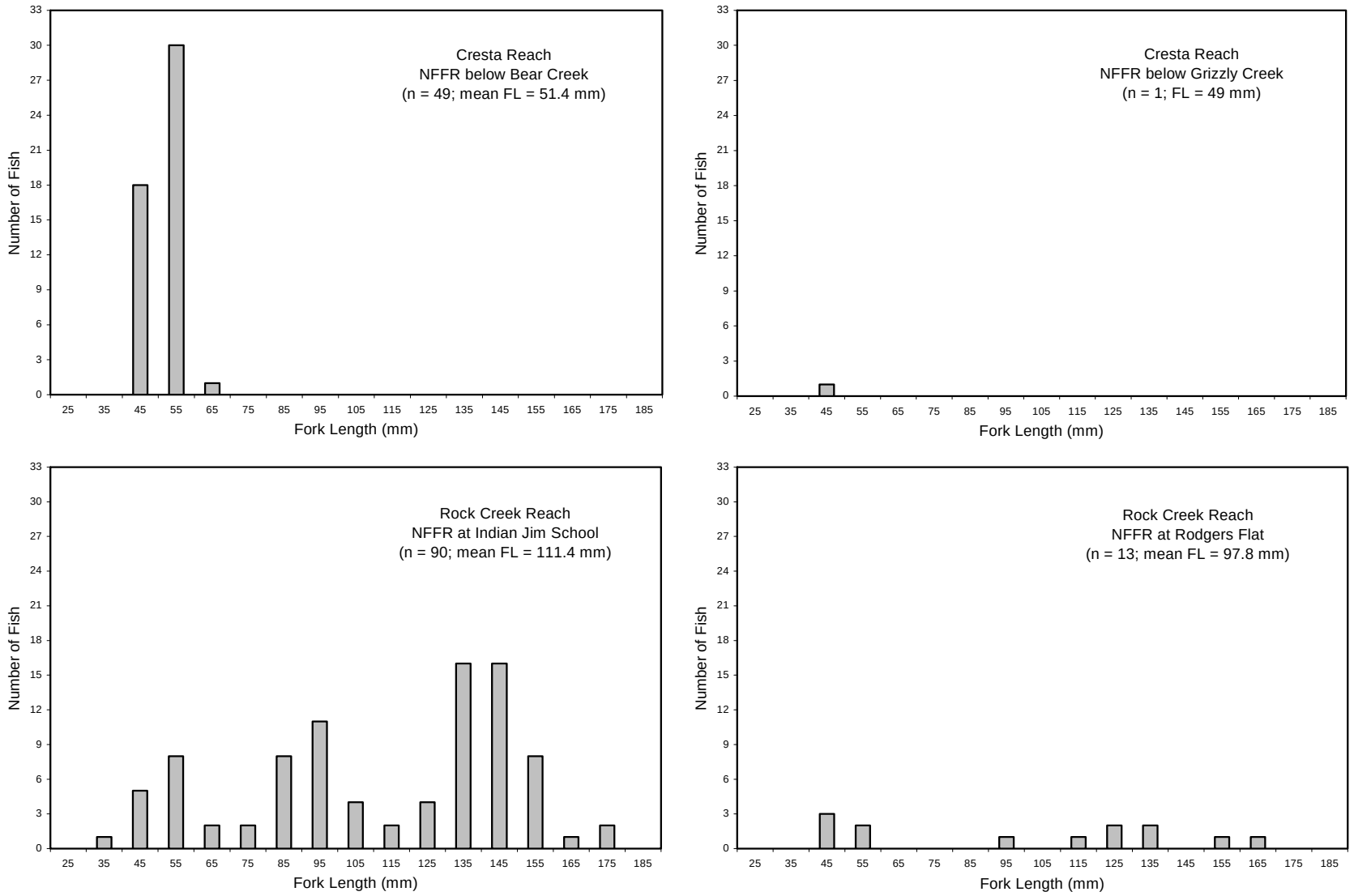


Figure 6. Length-frequency data for hardhead captured during the November 2004 Rock Creek-Cresta electrofishing survey.

Pikeminnow were present in generally low numbers at all four sites (Table 5). While several size classes of juveniles were noted during our surveys at most sites, no adult-sized fish (≥300 mm) were captured at any of the sites (Figure 7). Large pikeminnow, like their cousins, the hardhead, reportedly prefer the deeper areas of streams (Moyle 2002) and had probably migrated to deeper areas during the stream flow reduction.

Sacramento sucker were captured at four sample sites (Table 5). The suckers captured at the two Cresta Reach sites were mostly young-of-the-year fish that were residing along the shallow margins and backwater areas of the two sites (Figure 8). Suckers were the most abundant species captured at the Indian Jim School site in the Rock Creek Reach, where a wide range of size classes were present. The sucker population at this site was dominated by adult fish in the 360 to 450 mm FL size range, which Moyle (2002) suggested were 7 to 10 year-old fish.

Smallmouth bass were present in generally low numbers at all four sites (Table 5). Three size classes, representing young-of-the-year, juvenile, and adult age classes were captured at the Bear Ranch Creek site in the Cresta Reach (Figure 9). Only young-of-the-year and juvenile-sized fish were captured at the remaining three sites.

Riffle sculpin were the most abundant species captured during the shallow-water electrofishing surveys (Table 5). The length-frequency data for this species suggest that 2-3 size classes (and presumably age classes) of fish are present at all the sites (Figure 10). This is especially apparent for the two Cresta Reach sites where a clearly bimodal length distribution is evident.

Prickly sculpin, while present all sample sites, were only a minor component of the fish populations (Table 5). Two distinct size and age classes were present at three of the electrofishing sites (Figure 11).

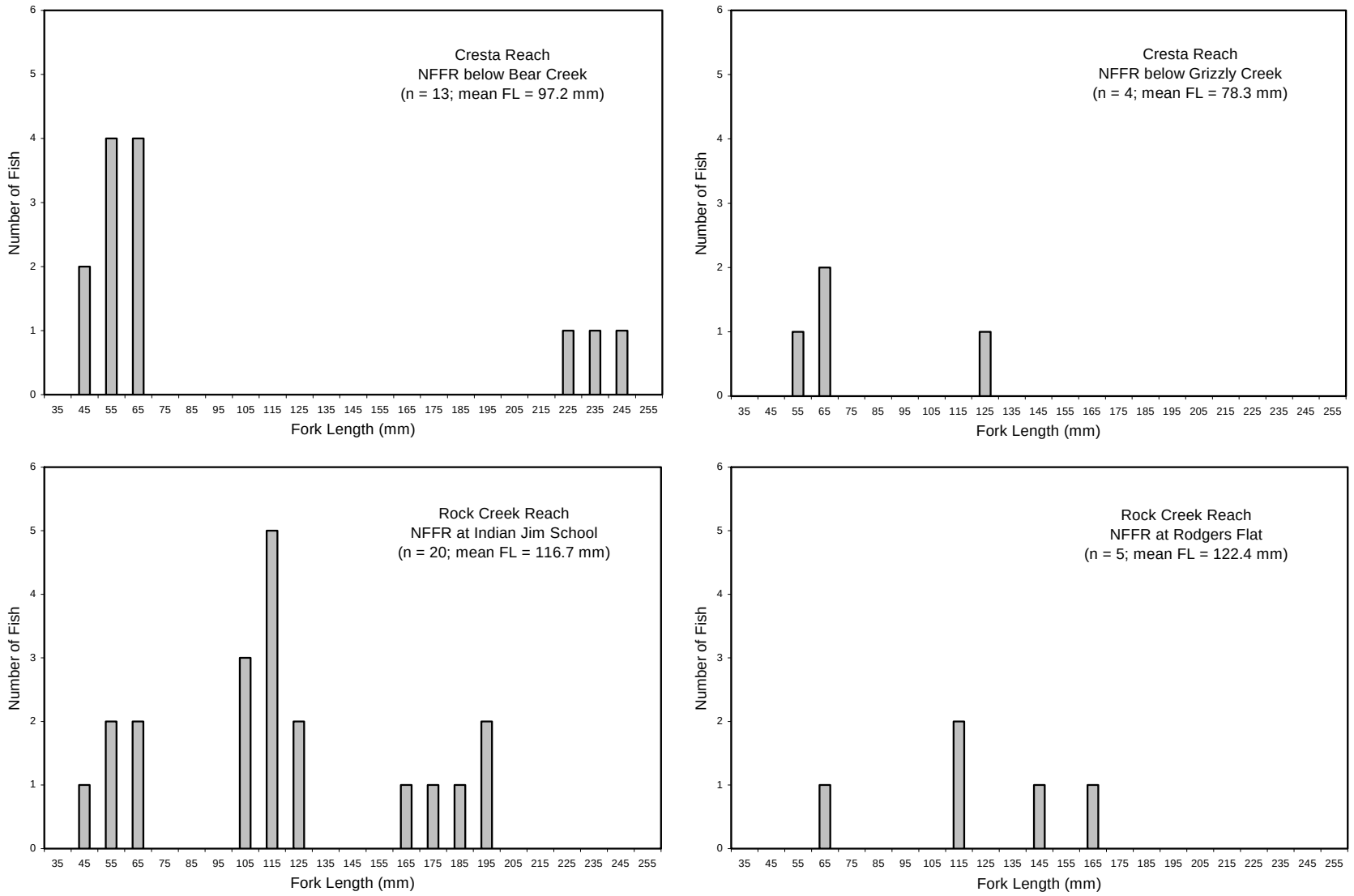


Figure 7. Length-frequency data for Sacramento pikeminnow captured during the November 2004 Rock Creek-Cresta electrofishing survey.

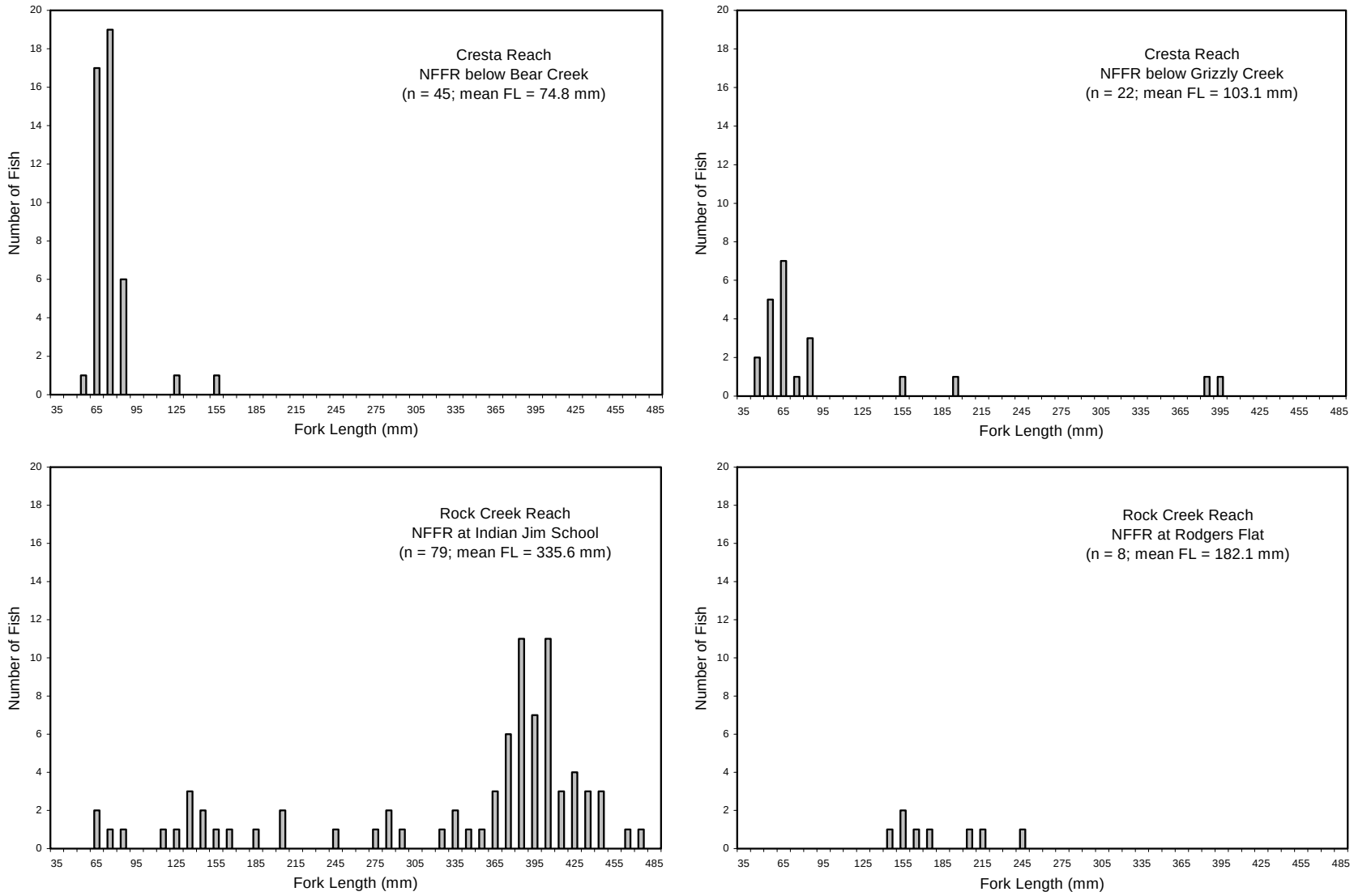


Figure 8. Length-frequency data for Sacramento sucker captured during the November 2004 Rock Creek-Cresta electrofishing survey.

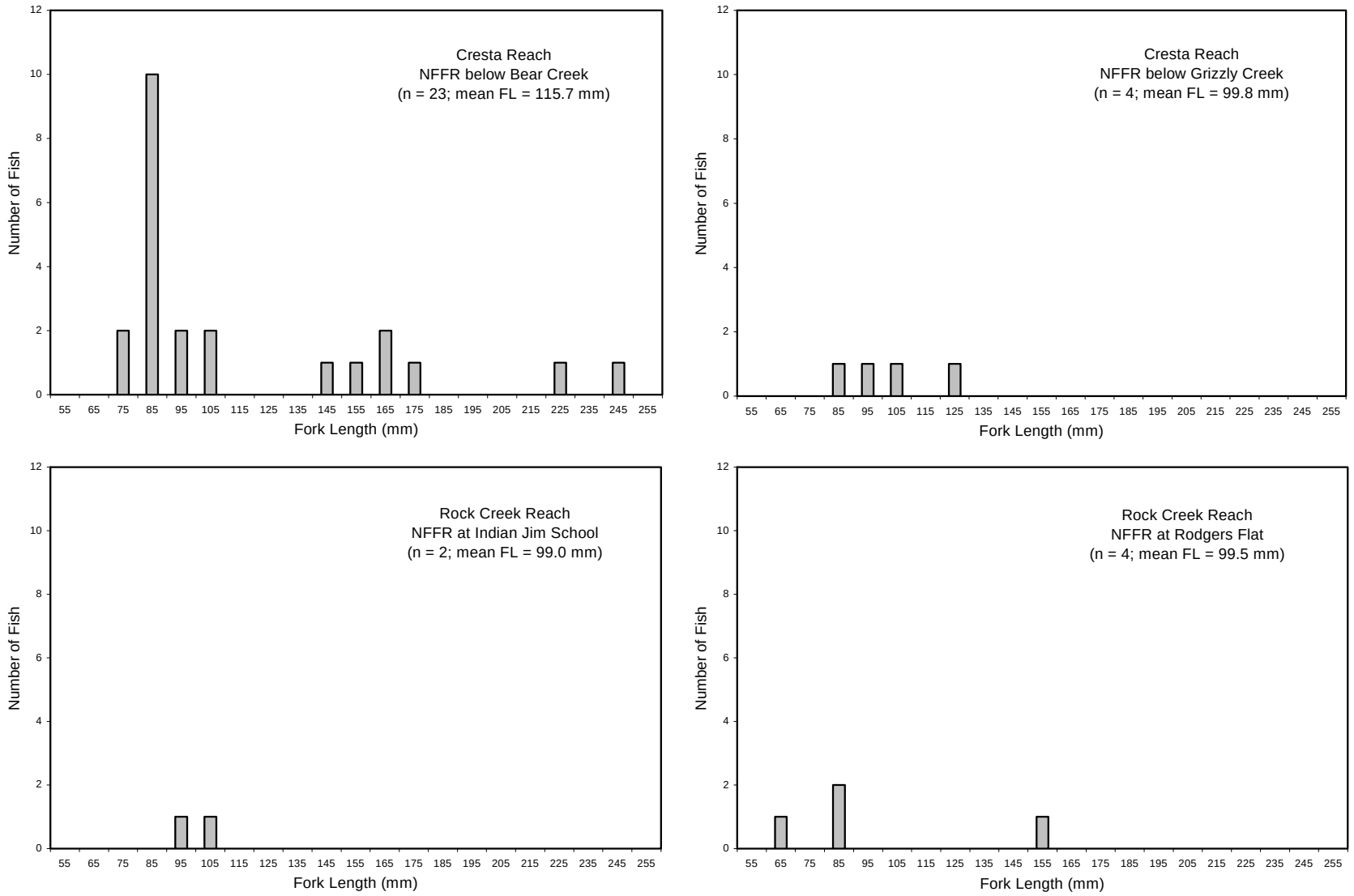


Figure 9. Length-frequency data for smallmouth bass captured during the November 2004 Rock Creek-Cresta electrofishing survey.

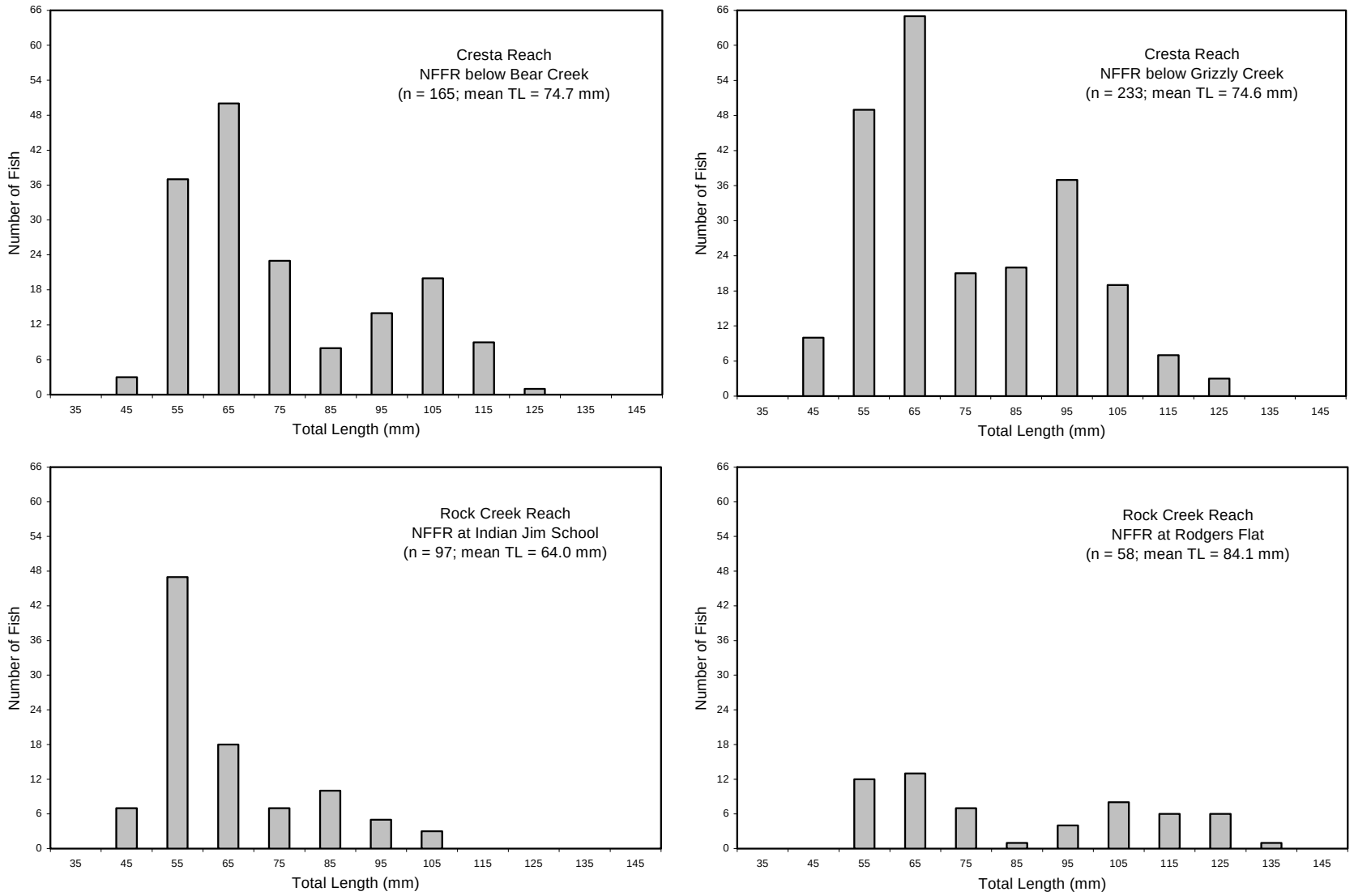


Figure 10. Length-frequency data for riffle sculpin captured during the November 2004 Rock Creek-Cresta electrofishing survey.

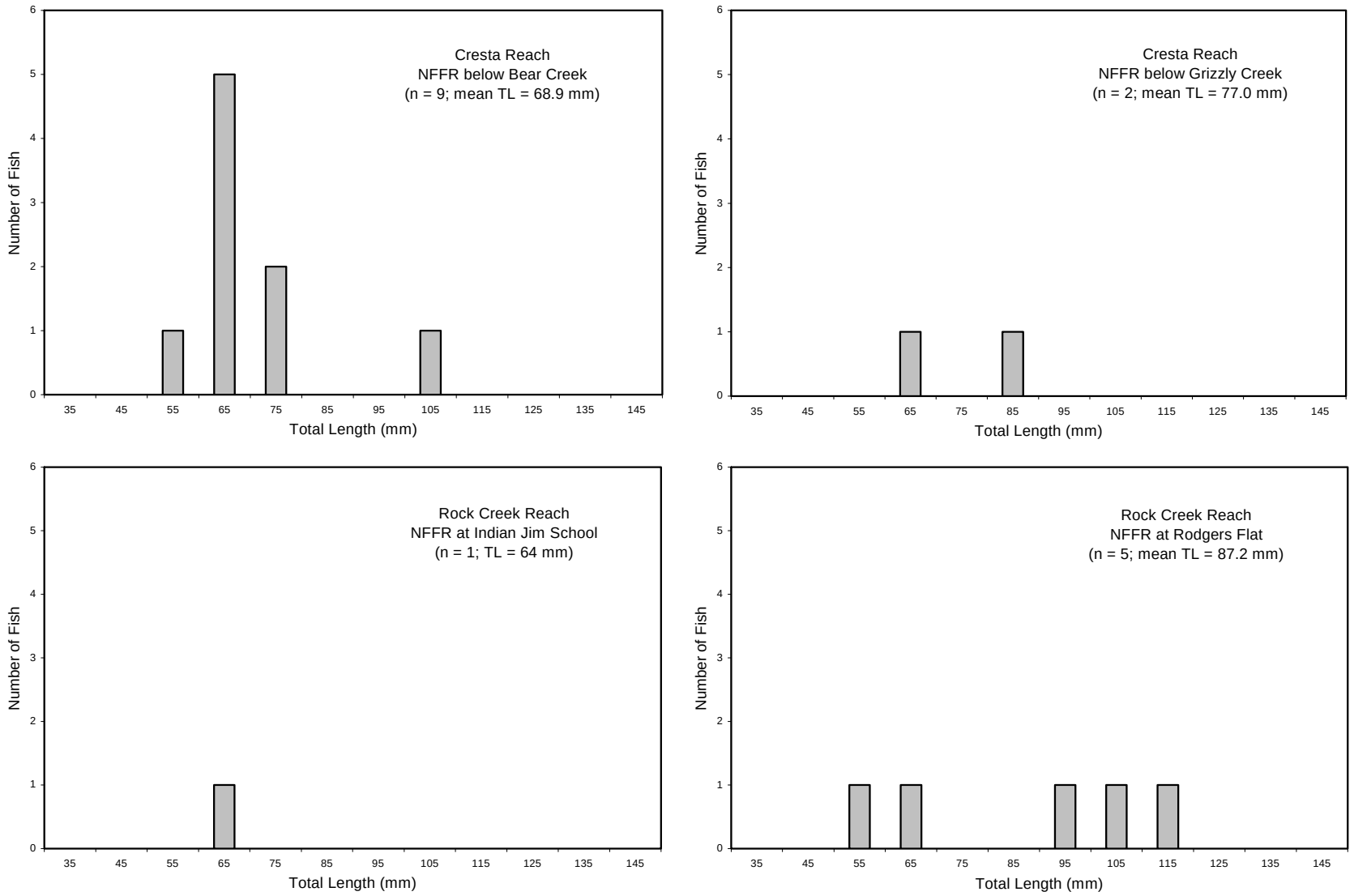


Figure 11. Length-frequency data for prickly sculpin captured during the November 2004 Rock Creek-Cresta electrofishing survey.

The MicroFish 3.0 (or CAPTURE) output, including the population estimates and associated statistics for each species at each site can be found in Appendix D. The model output is summarized below in Table 6.

The population estimates and their associated confidence interval appear to be reasonably good for most species at most sites, especially for rainbow trout. Our sampling goal of obtaining a standard error of the population estimate for rainbow trout that was ≤10% of the population estimate after three electrofishing passes was met at three of the four sites (Appendix D). A fourth pass was required at the Bear Ranch Creek site. After the additional pass, the standard error as a percentage of the population estimate (10.8%) was close, but still slightly in excess of our ten percent sample goal. However, given the slight discrepancy, as well as diminishing daylight conditions for continued effective sampling, no additional effort was made.

Less confidence and larger potential errors were generally associated with the estimates derived for the less abundant species at sample sites (Table 6). Large confidence intervals and lower relative probabilities of capture were also generally observed for riffle sculpin. Despite riffle sculpin being abundant at most sites, their benthic nature, cryptic coloration, and tendency to sink quickly to the bottom made them difficult to capture at most of the study sites, especially in the deeper areas, or among the interstitial spaces that dominated the streambed at all the sample sites.

The calculated population estimates for each species were examined as the relative population abundance at each site (Figure 12). The two Cresta Reach sites are remarkably similar, with riffle sculpin dominating the local fish populations and accounting for 60 to 70 percent of the calculated populations. Rainbow trout and suckers are second and third most abundant species among the Cresta site populations. The only notable difference between the two Cresta Reach sites is the relative abundance of hardhead, which numerically make up over ten percent of the fish population at the Bear Ranch Creek site, compared to less than 1 percent at the Grizzly Creek site. At both Cresta Reach sites

Table 6. Multiple pass removal-depletion patterns and electrofishing statistics for various fish species captured at the four shallow-water Rock Creek-Cresta sites sampled using backpack electrofishers in November 2004. Unless noted, all estimates were generated using the program MicroFish 3.0.

Species	Removal Pattern	Total Catch	Population Estimate	Probability of Capture Estimate
NFFR below Bear Ranch Creek				
Rainbow trout	32 – 32 – 15 – 10	89	110 ± 24	0.336 ± 0.134
Hardhead	16 – 14 – 8 – 11	49	87 ± 73	0.186 ± 0.211
Sacramento pikeminnow	8 – 3 – 1 – 1	13	13 ± 1	0.619 ± 0.290
Sacramento sucker	11 – 15 – 12 – 7	45	91 ± 103	0.156 ± 0.227
Smallmouth bass	8 – 7 – 6 – 2	23	28 ± 12	0.338 ± 0.274
Riffle sculpin	49 – 33 – 52 – 31	165	513 ± 601	0.092 ± 0.125
Prickly sculpin	4 – 2 – 2 – 1	9	9 ± 3	0.500 ± 0.427
NFFR below Grizzly Creek				
Rainbow trout	84 – 35 – 20	139	154 ± 15	0.537 ± 0.109
Hardhead*	1 – 0 – 0	1	1 ± 1	0.9996
Sacramento pikeminnow	2 – 1 – 1	4	4 ± 3	0.571 ± 1.028
Sacramento sucker	6 – 11 – 5	22	54 ± 128	0.158 ± 0.447
Smallmouth bass	2 – 0 – 2	4	4 ± 5	0.500 ± 1.167
Riffle sculpin	88 – 86 – 59	233	520 ± 311	0.180 ± 0.131
Prickly sculpin	1 – 1 – 0	2	2 ± 5	0.667 ± 4.883
NFFR at Indian Jim School				
Rainbow trout	11 – 3 – 1	15	15 ± 1	0.750 ± 0.255
Hardhead	57 – 23 – 10	90	96 ± 8	0.596 ± 0.125
Sacramento pikeminnow	11 – 5 – 4	20	22 ± 7	0.513 ± 0.318
Sacramento sucker	63 – 11 – 5	79	79 ± 2	0.790 ± 0.094
Smallmouth bass	1 – 1 – 0	2	2 ± 5	0.667 ± 4.883
Riffle sculpin	41 – 35 – 21	97	151 ± 67	0.289 ± 0.180
Prickly sculpin*	1 – 0 – 0	1	1 ± 1	0.9996
NFFR at Rodgers Flat – Main Channel				
Rainbow trout	58 – 17 – 8	83	86 ± 5	0.664 ± 0.117
Hardhead	5 – 2 – 3	10	12 ± 9	0.417 ± 0.546
Sacramento pikeminnow	0 – 2 – 0	2	2 ± 13	0.500 ± 6.593
Sacramento sucker	2 – 4 – 2	8	13 ± 27	0.258 ± 0.730
Smallmouth bass	1 – 2 – 1	4	4 ± 5	0.500 ± 1.167
Riffle sculpin	36 – 11 – 9	56	60 ± 7	0.577 ± 0.165
Prickly sculpin	4 – 1 – 0	5	5 ± 0	0.833 ± 0.466
NFFR at Rodgers Flat – Side Channel				
Rainbow trout*	2 – 0 – 0	2	2 ± 1	0.9998
Hardhead	1 – 2 – 0	3	3 ± 3	0.600 ± 1.525
Sacramento pikeminnow	1 – 1 – 1	3	3 ± 5	0.500 ± 1.823
Riffle sculpin*	2 – 0 – 0	2	2 ± 1	0.9998

* Estimates derived using Program CAPTURE

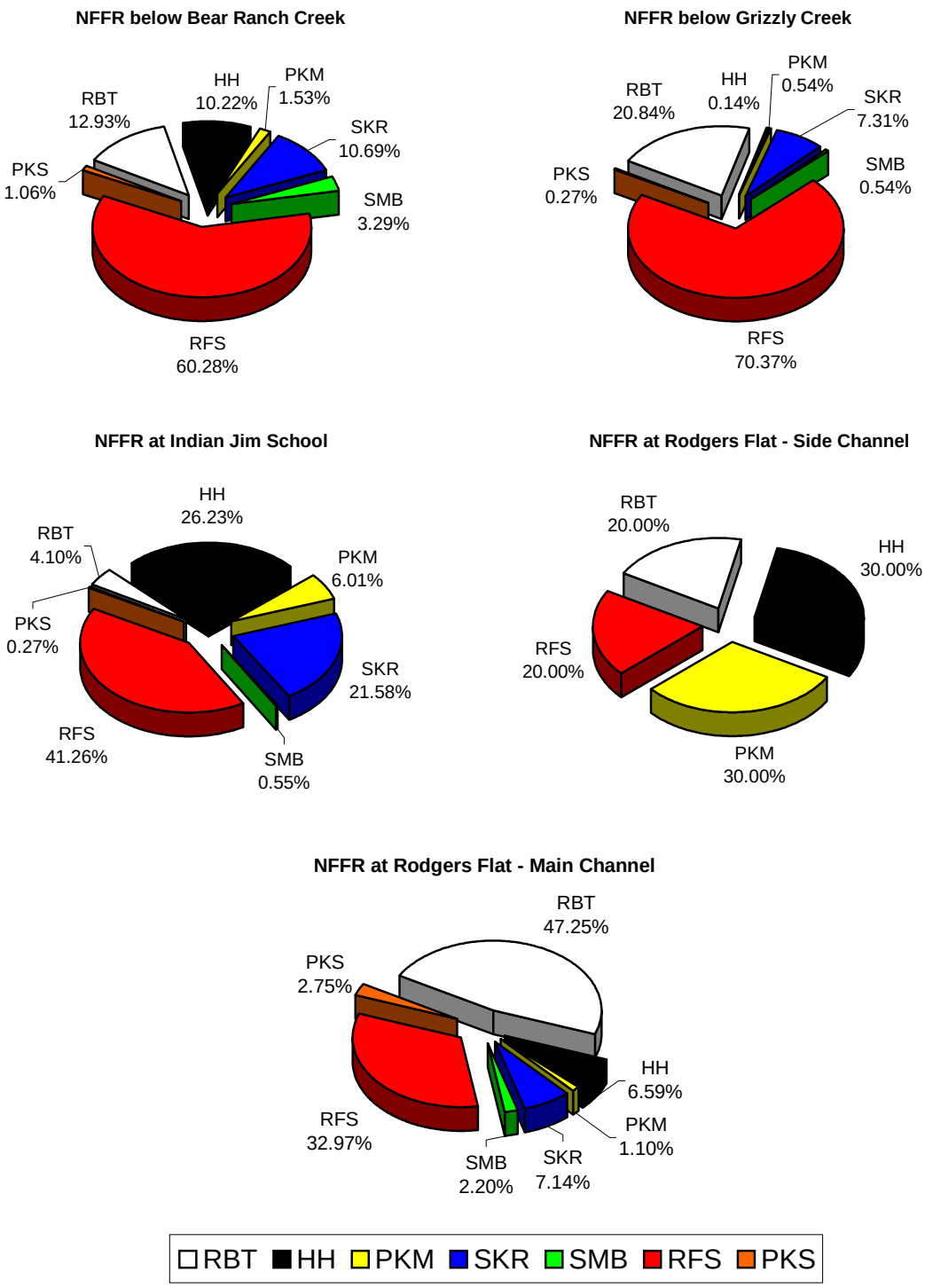


Figure 12. Relative species abundance presented as percentage of total study reach population estimates at the various Rock Creek-Cresta study reaches during the November 2004 backpack electrofishing surveys.

pikeminnow, smallmouth bass, and prickly sculpin all make only minor contributions to the fish populations.

The relative species abundances are comparatively different at the two Rock Creek Reach sites (Figure 12). At the Indian Jim School site, riffle sculpin make up over 40 percent of the fish population, with hardhead and sucker each contributing over 20 percent. Rainbow trout make up only about 4 percent of the Indian Jim fish population. At the Rodgers Flat site, rainbow trout were the dominant fish in main channel populations, making up over 47 percent of the estimated population. While riffle sculpin comprised a similar proportion of the Rodgers Flat site main channel fish populations (about 33%), hardhead and suckers each made up less than 8 percent of the species abundance. The relative species abundance in the Rodgers Flat side channel area has near equal contributions from the four species that were captured.

The various site-specific biomass estimates (and associated confidence intervals) derived from the population data and the mean weight for each fish species are presented in Table 7. Rainbow trout contributed the largest proportion of the total biomass (51 to 82 percent) at three of the four main channel sites (Figure 13). At the Indian Jim School site, the low numbers of trout, combined with the abundance of large suckers, resulted in biomass estimates that were dominated by suckers, which made up almost 90 percent of fish biomass. Rainbow trout contributed less than 7 percent of the total fish biomass at the Indian Jim School site. At the Rodgers Flat side channel area pikeminnow and riffle sculpin dominated the biomass estimates, while rainbow trout made up most of the remaining biomass.

In terms of standardized biomass indices, the Indian Jim School site had the largest fish biomass with 2,403.4 pounds/mile and 363.8 pounds/acre (Table 7). The biomass indices for rainbow trout at the Indian Jim School site were 166.7 pounds/mile and 25.2 pounds/acre.

Table 7. Mean weights and biomass estimates (with 95% confidence intervals) by species based upon mean weights of captured fish, multiple pass removal-depletion population estimates, and the physical dimensions of the four shallow-water Rock Creek-Cresta sites sampled using backpack electrofishers in November 2004.

Species	Mean weight (grams)	Reach Biomass Estimate (Kg)	Biomass Estimate (Kg/300 feet)	Biomass Estimate (Kg/mile)	Biomass Estimate (Pounds/mile)	Biomass Estimate (Kg/hectare)	Biomass Estimate (Pounds/acre)
NFFR below Bear Ranch Creek							
Rainbow trout	76.43	8.4073 ± 1.8343	6.8204 ± 1.4881	120.0393 ± 26.1940	264.63 ± 57.74	32.7427 ± 7.1439	29.21 ± 6.37
Hardhead	1.45	0.1262 ± 0.1059	0.1023 ± 0.0859	1.8012 ± 1.5113	3.97 ± 3.33	0.4913 ± 0.4122	0.44 ± 0.37
Sacramento pikeminnow	30.99	0.4029 ± 0.0310	0.3268 ± 0.0251	5.7522 ± 0.4425	12.68 ± 0.98	1.5690 ± 0.1207	1.40 ± 0.11
Sacramento sucker	6.94	0.6315 ± 0.7148	0.5123 ± 0.5799	9.0171 ± 10.2062	19.88 ± 22.50	2.4596 ± 2.7839	2.19 ± 2.48
Smallmouth bass	37.38	1.0466 ± 0.4486	0.8491 ± 0.3639	14.9439 ± 6.4045	32.94 ± 14.12	4.0762 ± 1.7469	3.64 ± 1.56
Riffle sculpin	6.64	3.4063 ± 3.9906	2.7634 ± 3.2374	48.6354 ± 56.9783	107.22 ± 125.61	13.2661 ± 15.5418	11.84 ± 13.87
Prickly sculpin	4.93	0.0444 ± 0.0148	0.0360 ± 0.0120	0.6335 ± 0.2112	1.40 ± 0.47	0.1728 ± 0.0576	0.15 ± 0.05
Total		14.0652 ± 7.1400	11.4104 ± 5.7923	200.8226±101.9444	442.71 ± 224.74	54.7777 ± 27.8070	48.87 ± 24.81
NFFR below Grizzly Creek							
Rainbow trout	51.41	7.9171 ± 0.7712	7.9171 ± 0.7712	139.3417 ± 13.5722	307.18 ± 29.92	30.8450 ± 3.0044	27.52 ± 2.68
Hardhead*	1.40	0.0014 ± 0.0014	0.0014 ± 0.0014	0.0246 ± 0.0246	0.05 ± 0.05	0.0055 ± 0.0055	0.01 ± 0.01
Sacramento pikeminnow	6.40	0.0256 ± 0.0192	0.0256 ± 0.0192	0.4506 ± 0.3379	0.99 ± 0.74	0.0997 ± 0.0748	0.09 ± 0.07
Sacramento sucker	75.51	4.0775 ± 9.6653	4.0775 ± 9.6653	71.7647 ± 170.1089	158.21 ± 375.01	15.8860 ± 37.6557	14.17 ± 33.59
Smallmouth bass	15.10	0.0604 ± 0.0755	0.0604 ± 0.0755	1.0630 ± 1.3288	2.34 ± 2.93	0.2353 ± 0.2941	0.21 ± 0.26
Riffle sculpin	6.68	3.4736 ± 2.0775	3.4736 ± 2.0775	61.1354 ± 36.5637	134.77 ± 80.60	13.5331 ± 8.0938	12.07 ± 7.22
Prickly sculpin	5.70	0.0114 ± 0.0285	0.0114 ± 0.0285	0.2006 ± 0.5016	0.44 ± 1.11	0.0444 ± 0.1110	0.04 ± 0.10
Total		15.5671 ± 12.6385	15.5671 ± 12.6385	273.9806±222.4378	603.99 ± 490.36	60.6490 ± 49.2394	54.11 ± 43.93
NFFR at Indian Jim School							
Rainbow trout	280.69	4.2104 ± 0.2807	4.2963 ± 0.2864	75.6145 ± 5.0410	166.69 ± 11.11	28.2832 ± 1.8855	25.23 ± 1.68
Hardhead	18.53	1.7789 ± 0.1482	1.8152 ± 0.1513	31.9472 ± 2.6623	70.43 ± 5.87	11.9497 ± 0.9958	10.66 ± 0.89
Sacramento pikeminnow	21.15	0.4653 ± 0.1481	0.4748 ± 0.1511	8.3564 ± 2.6589	18.42 ± 5.86	3.1257 ± 0.9945	2.79 ± 0.89
Sacramento sucker	679.31	53.6655 ± 1.3586	54.7607 ± 1.3864	963.7884 ± 24.3997	2,124.67 ± 53.79	360.5005 ± 9.1266	321.62 ± 8.141
Smallmouth bass	14.25	0.0285 ± 0.0713	0.0291 ± 0.0727	0.5118 ± 1.2796	1.13 ± 2.82	0.1915 ± 0.4786	0.17 ± 0.43
Riffle sculpin	3.66	0.5527 ± 0.2452	0.5639 ± 0.2502	9.9253 ± 4.4040	21.88 ± 9.71	3.7125 ± 1.6473	3.31 ± 1.47
Prickly sculpin*	3.20	0.0032 ± 0.0032	0.0033 ± 0.0033	0.0575 ± 0.0575	0.13 ± 0.13	0.0215 ± 0.0215	0.02 ± 0.02
Total		60.7044 ± 2.2553	61.9432 ± 2.3013	1,090.2011±40.5028	2,403.35 ± 89.29	407.7846 ± 15.1499	363.81 ± 13.52

Table 7. Mean weights and biomass estimates (with 95% confidence intervals) by species based upon mean weights of captured fish, multiple pass removal-depletion population estimates, and the physical dimensions of the four shallow-water Rock Creek-Cresta sites sampled using backpack electrofishers in November 2004. (continued)

Species	Mean weight (grams)	Reach Biomass Estimate (Kg)	Biomass Estimate (Kg/300 feet)	Biomass Estimate (Kg/mile)	Biomass Estimate (Pounds/mile)	Biomass Estimate (Kg/hectare)	Biomass Estimate (Pounds/acre)
NFFR at Rodgers Flat (Main Channel)							
Rainbow trout	114.75	9.8685 ± 0.5738	12.8162 ± 0.7451	225.5657 ± 13.1143	497.26 ± 28.91	65.7939 ± 3.8252	58.70 ± 3.41
Hardhead	18.61	0.2333 ± 0.1675	0.2900 ± 0.2175	5.1045 ± 3.8283	11.25 ± 8.44	1.4889 ± 1.1167	1.33 ± 1.00
Sacramento pikeminnow	31.60	0.0632 ± 0.4108	0.0821 ± 0.5335	1.4446 ± 9.3897	3.18 ± 20.70	0.4214 ± 2.7388	0.38 ± 2.44
Sacramento sucker	93.16	1.2111 ± 2.5153	1.5728 ± 3.2667	27.6818 ± 57.4930	61.02 ± 126.74	8.0743 ± 16.7698	7.20 ± 14.96
Smallmouth bass	20.20	0.0808 ± 0.1010	0.1049 ± 0.1312	1.8469 ± 2.3086	4.07 ± 5.09	0.5387 ± 0.6734	0.48 ± 0.60
Riffle sculpin	9.54	0.5724 ± 0.0668	0.7434 ± 0.0867	13.0834 ± 1.5264	28.84 ± 3.36	3.8162 ± 0.4452	3.40 ± 0.40
Prickly sculpin	10.24	0.0512 ± 0.0000	0.0665 ± 0.0000	1.1703 ± 0.0000	2.58 ± 0.00	0.3414 ± 0.0000	0.30 ± 0.00
Total		12.0705 ± 3.8351	15.6760 ± 4.9807	275.8971 ± 87.6603	608.22 ± 193.25	80.4748 ± 25.5691	71.80 ± 22.81
NFFR at Rodgers Flat (Side Channel)							
Rainbow trout	10.20	0.0204 ± 0.0102	0.0478 ± 0.0239	0.8415 ± 0.4208	1.86 ± 0.93	1.0996 ± 0.5498	0.98 ± 0.49
Hardhead	1.27	0.0038 ± 0.0038	0.0089 ± 0.0089	0.1572 ± 0.1572	0.35 ± 0.35	0.2054 ± 0.2054	0.18 ± 0.18
Sacramento pikeminnow	14.60	0.0438 ± 0.0730	0.01027± 0.1711	1.8068 ± 3.0113	3.98 ± 6.64	2.3610 ± 3.9350	2.11 ± 3.51
Riffle sculpin	16.70	0.0334 ± 0.0167	0.0783 ± 0.0391	1.3778 ± 0.6889	3.04 ± 1.52	1.8004 ± 0.9002	1.61 ± 0.80
Total		0.1014 ± 0.1037	0.2377 ± 0.2431	4.1832 ± 4.2780	9.22 ± 9.43	5.4664 ± 5.5904	4.88 ± 4.99

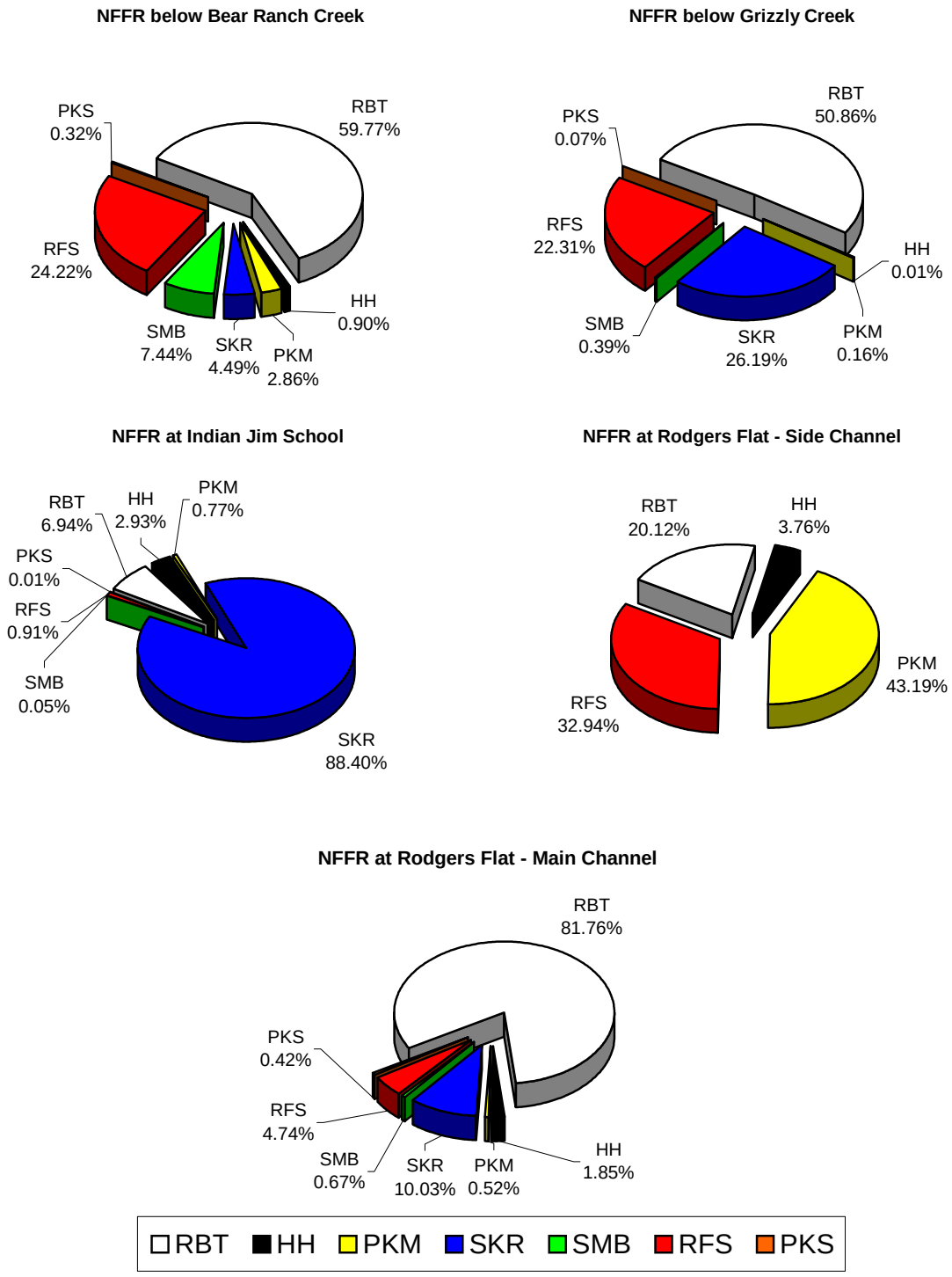


Figure 13. Relative species biomass presented as percentage of total study reach population biomass estimates at the various Rock Creek-Cresta study reaches during the November 2004 backpack electrofishing surveys.

The main channel area of the Rodgers Flat site had the next highest total fish biomass indices, with 608.2 pounds/mile and 71.8 pounds/acre (Table 7). In comparison, the side channel area had very low fish biomass indices (9.2 pounds/mile and 4.9 pounds/acre). The main channel Rodgers Flat site had the highest rainbow trout biomass indices of any of the backpack electrofishing sites (497.3 pounds/mile and 58.7 pounds/acre).

Of the two Cresta Reach sites, Grizzly Creek had the highest total fish biomass estimates, with 604 pounds/mile and 54.1 pounds/acre (Table 7). The Bear Ranch site had estimated total biomass values of 442.7 pounds/mile and 48.9 pounds/acre. Despite these differences in total fish biomass, the two Cresta Reach sites had remarkably similar surface-area trout biomass estimates, 27.5 pounds/acre at the Grizzly Creek site versus 29.2 pounds/acre at the Bear Ranch Creek site. The difference in the per-mile rainbow trout biomass estimates for the two Cresta Reach sites was slightly larger, 307.2 pounds/mile for the Grizzly Creek site versus 264.6 pounds/mile at the Bear Ranch Creek site.

Discussion

The 2004 fish population sampling in the Cresta and Rock Creek reaches of the NFFR demonstrated that under reduced flow conditions multiple-pass removal-depletion sampling using electrofishing techniques can produce resident fish population estimates in shallow-water habitat with tight confidence intervals and a high probability of accuracy. The electrofishing survey showed the resident fish population in the Project area to be numerically dominated by riffle sculpin. In terms of biomass, rainbow trout dominated the fish populations at both Cresta Reach sites and the Rodgers Flat site in the Rock Creek Reach. The catch of numerous large mature Sacramento suckers at the Indian Jim School site of the Rock Creek Reach resulted in this species dominating the biomass statistics at this site.

Comparison of the present survey results with other recent surveys demonstrates some interesting between year differences (Tables 8, 9, and 10). We have limited our comparisons to those made at roughly equivalent sample sites, which includes the 2002

Table 8. Population and mean weight summary for various species sampled by electrofishing at the four equivalent shallow water sites sampled during 1986 (CDFG 1988), 2002 (ECORP 2003), and 2004 (this report).

Site	Population Estimate (N)			Mean weight (grams)		
	1986	2002	2004	1986	2002	2004
			Brown trout			
Bear Creek	---	---	---	---	---	---
Grizzly Creek	1	---	---	52.0	---	---
Indian Jim School	---	---	---	---	---	---
Rodgers Flat	1	---	---	795.0	---	---
			Rainbow trout			
Bear Creek	92*	27	110	40.6	169.0	76.4
Grizzly Creek	144*	86	154	35.0	67.7	51.4
Indian Jim School	184*	23	15	19.0	239.3	280.7
Rodgers Flat	93*	33	86	24.7	164.4	112.3
			Hardhead			
Bear Creek	195	33	87	1.0	2.6	1.5
Grizzly Creek	24	1	1	0.7	1.4	1.4
Indian Jim School	128	130	96	2.1	49.9	18.5
Rodgers Flat	68	---	16	1.1	---	14.6
			Sacramento pikeminnow			
Bear Creek	76	43	13	2.7	6.9	31.0
Grizzly Creek	54	6	4	1.1	5.7	6.4
Indian Jim School	404	39	22	1.5	32.9	21.2
Rodgers Flat	75	16	6	11.4	26.1	21.4
			Sacramento sucker			
Bear Creek	679	15	91	65.8	6.5	6.9
Grizzly Creek	356	17	54	2.5	134.8	75.5
Indian Jim School	1,770	44	79	21.5	731.1	679.3
Rodgers Flat	384	6	13	85.2	443.8	93.2
			Smallmouth bass			
Bear Creek	1	13	28	14.0	22.3	37.4
Grizzly Creek	---	---	4	---	---	15.1
Indian Jim School	---	---	2	---	---	14.3
Rodgers Flat	---	1	4	---	14.4	20.2
			Sculpin**			
Bear Creek	25	50	522	20.7	10.4	6.6
Grizzly Creek	2	258	522	22.0	8.9	6.7
Indian Jim School	279	141	152	4.6	9.1	3.7
Rodgers Flat	70	46	67	11.1	13.4	9.8

* 1986 DFG rainbow trout data includes hatchery fish

** 1986 DFG data did not identify sculpin to species

Table 9. Standardized abundance estimates for various fish species at the four Rock Creek-Cresta shallow-water study sites sampled by electrofishing during 1986 (CDFG 1988), 2002 (ECORP 2003), and 2004 (this report). CDFG 1986 data included hatchery trout and did not identify species of sculpin. Rodgers Flat 2004 estimates include combined main and side channel data.

Estimated number per mile

Species	Bear Ranch Creek			Grizzly Creek			Indian Jim School			Rodgers Flat		
	1986	2002	2004	1986	2002	2004	1986	2002	2004	1986	2002	2004
Brown trout	14.4	---	---	---	---	---	---	---	---	23.32	---	---
Rainbow trout	1,322.0	395.0	1,570.6	2,461.9	1,537.8	2,710.4	2,667.7	406.8	269.4	2,169.1	829.8	1,988.6
Hardhead	2,802.0	482.8	1,242.2	415.3	17.9	17.6	1,855.8	2,299.1	1,724.1	1,586.0	---	365.7
Sac. pikeminnow	1,092.1	629.1	185.6	934.5	107.3	70.4	5,857.4	689.7	395.1	1,749.3	402.3	137.1
Sac. sucker	9,756.7	219.5	1,299.3	6,160.5	304.0	950.4	25,622.5	778.1	1,418.8	8,956.4	150.9	297.1
Smallmouth bass	14.4	190.2	399.8	---	---	70.4	---	---	35.92	---	25.2	91.4
Sculpin	359.2	731.5	7,453.1	34.61	4,613.5	9,187.2	4,045.1	2,493.6	2,729.8	1,632.7	1,156.7	1,531.4
All fish	15,360.6	2,648.1	12,150.6	10,036.8	6,580.4	13,006.4	40,088.6	6,667.3	6,573.1	16,116.8	2,564.9	4,411.4

Estimated number per acre

	Bear Ranch Creek			Grizzly Creek			Indian Jim School			Rodgers Flat		
	1986	2002	2004	1986	2002	2004	1986	2002	2004	1986	2002	2004
Brown trout	2.3	---	---	---	---	---	---	---	---	2.3	---	---
Rainbow trout	207.8	43.6	173.4	267.8	139.5	242.8	220.3	60.6	40.8	209.4	95.6	208.9
Hardhead	440.4	53.3	137.1	44.6	1.6	1.6	153.3	342.3	261.0	153.1	---	38.4
Sac. Pikeminnow	171.6	69.4	20.5	100.4	9.7	6.3	483.7	102.7	59.8	168.9	46.4	14.4
Sac. Sucker	1,533.4	24.2	143.4	662.1	27.6	85.1	2,119.2	115.9	214.8	864.8	17.4	31.2
Smallmouth bass	2.3	21.0	44.1	---	---	6.3	---	---	5.4	---	2.9	9.6
Sculpin	56.5	80.7	822.7	3.7	418.5	823.0	334.1	371.2	413.2	157.6	133.3	160.9
All fish	2,414.1	292.3	1,341.3	1,078.7	596.9	1,165.2	3,310.5	992.6	995.0	1,556.1	295.5	463.4

Table 10. Standardized biomass estimates for various fish species at the four Rock Creek-Cresta shallow-water study sites sampled by electrofishing during 1986 (CDFG 1988), 2002 (ECORP 2003), and 2004 (this report). CDFG 1986 data included hatchery trout and did not identify species of sculpin. Rodgers Flat 2004 estimates include combined main and side channel data.

Estimated pounds per mile

Species	Bear Ranch Creek			Grizzly Creek			Indian Jim School			Rodgers Flat		
	1986	2002	2004	1986	2002	2004	1986	2002	2004	1986	2002	2004
Brown trout	1.65	---	---	---	---	---	---	---	---	40.88	---	---
Rainbow trout	118.35	147.20	264.63	192.39	229.44	307.18	111.90	214.59	166.69	118.16	300.73	492.26
Hardhead	6.21	2.77	3.97	0.61	0.06	0.05	8.44	252.72	70.43	3.86	---	11.78
Sac. pikeminnow	6.49	9.62	12.68	2.29	1.35	0.99	19.24	49.98	18.42	43.86	23.11	6.47
Sac. sucker	1,415.50	3.14	19.88	33.95	90.34	158.21	1,216.91	1,254.24	2,124.67	1,682.54	147.62	61.02
Smallmouth bass	0.44	9.36	32.94	---	---	2.34	---	---	1.13	---	0.80	4.07
Sculpin	16.41	16.81	108.62	1.68	89.97	135.21	40.75	50.13	22.01	39.90	34.04	33.16
All fish	1,565.05	188.90	442.72	230.92	411.16	603.98	1,397.25	1,821.66	2,403.35	1,929.20	506.30	608.76

Estimated pounds per acre

	Bear Ranch Creek			Grizzly Creek			Indian Jim School			Rodgers Flat		
	1986	2002	2004	1986	2002	2004	1986	2002	2004	1986	2002	2004
Brown trout	0.26	---	---	---	---	---	---	---	---	3.95	---	---
Rainbow trout	18.60	16.25	29.21	20.68	20.81	27.52	9.24	31.95	25.23	11.41	34.65	51.71
Hardhead	0.98	0.31	0.44	0.07	0.01	0.01	0.70	37.62	10.66	0.37	---	1.24
Sac. Pikeminnow	1.02	1.06	1.40	0.25	0.12	0.09	1.59	7.44	2.79	4.24	2.66	0.68
Sac. Sucker	222.47	0.35	2.19	3.65	8.20	14.17	100.50	186.72	321.62	162.46	17.01	6.41
Smallmouth bass	0.07	1.03	3.64	---	---	0.21	---	---	0.17	---	0.09	0.43
Sculpin	2.58	1.86	11.99	0.18	8.16	12.11	3.37	7.46	3.33	3.85	3.92	3.48
All fish	245.98	20.86	48.87	24.82	37.30	54.11	115.39	271.19	363.80	186.28	58.33	63.95

ECORP survey (ECORP 2003) and the CDFG 1986 survey (CDFG 1988). Earlier surveys (Flint 1980; Moyle et al. 1983; CDFG 1988) included additional and different sample areas and will not be discussed in this report. Even the comparisons between the most recent data need to be evaluated cautiously since at least one our sample sites (Indian Jim School) appears to be considerably different in character and location than that sampled in 1986. Our Indian Jim School site, while typified as a "run habitat" at the reduced flow, resembles a shallow pool during normal base flow conditions (200+ cfs). We suspect that the original CDFG Indian Jim School site was located in shallow-water habitat further upstream and closer to the mouth of Granite Creek. Apparently the current Indian Jim School site was chosen for sampling in 2002 because of a small midchannel island located upstream that at the time was considered too complex (Stuart Moock, pers. comm.).

Brown trout, which were captured during the 1986 surveys, were not observed during the 2002 or 2004 surveys. This non-native trout still occurs in the basin, mainly in the upper portions of some of the tributaries (Salamunovich and Berg 2002a, 2002b). While brown trout have been occasionally documented in the Project area during recent snorkel surveys (Salamunovich 2004a, 2004b), they appear to be very rare in the Rock Creek-Cresta reaches of the NFFR.

Our rainbow trout estimates showed increased numbers at three of the four sample sites compared to 2002, but roughly comparable numbers to levels noted in 1986 (Tables 8 and 9). However, it should be noted that the 1986 data included hatchery trout, while the 2002 and 2004 data was based solely on wild trout. An inspection of the mean weight data for rainbow trout captured during these comparative surveys indicates that despite the inclusion of hatchery trout (which are presumably heavier, catchable-sized fish), the trout at the four sites tend to be larger now compared to 1986 (Table 8). Examination of the biomass data confirms this as there was generally more trout biomass present at three of the four sample sites in 2004 compared to the previous surveys (Table 10).

The largest discrepancies between the 1986 and the 2002/2004 trout data occur at the Indian Jim School site (Table 8). In 1986 large numbers (population N = 184) of small

trout (mean weight = 19 grams) were collected. In 2002, and again in 2004, very few trout were captured at this site, but those captured were over ten times heavier. The size discrepancy for rainbow trout between the 1986 and the 2002/2004 surveys can be seen when examining the length-frequency data for the Rock Creek sites (Figure 14).

Unfortunately, the 1986 CDFG length-frequency data combined their three Rock Creek Reach sample sites, which included the Rodgers Flat pool site. However, it should be noted that only six large rainbow trout (mean weight = 242.2 grams) were captured at the Rock Creek Reach pool site (CDFG 1988). Despite the inclusion of pool catch data in the 1986 length-frequencies, the comparison clearly shows that in 1986 the trout populations at the Rock Creek sites were dominated by small young-of-the-year fish (Figure 14).

Conversely, the more recent surveys (2002 and 2004) suggest the trout populations were composed primarily of larger juvenile and adult-sized fish. Again, we reiterate that some of this apparent difference between the 1986 and the 2002/2004 surveys may be due to different sample areas at the Indian Jim School site, rather than significant changes to the trout populations. Certainly, the results from the Indian Jim School site and the descriptions of the site as primarily run/glide habitat in 2002 and 2004 compared to a combination of glide and riffle habitats in 1986 suggest that the 2002/2004 sampling was conducted downstream from the 1986 site. It would be expected that more young-of-the-year would be found in shallower riffle habitat than in a glide/run habitat.

Examination of the comparative data also demonstrates a large change since 1986 in the Project area for suckers. In 1986, suckers dominated the numerical abundance indices at all the sites (Table 9). However, examination of the biomass estimates shows that despite the recent decreases in numerical abundance, sucker biomass is actually greater now at two of the four sample sites (Grizzly Creek and Indian Jim School) (Table 10). The 2004 data suggests that there has been a shift in the sucker populations at these two sites, with fewer,

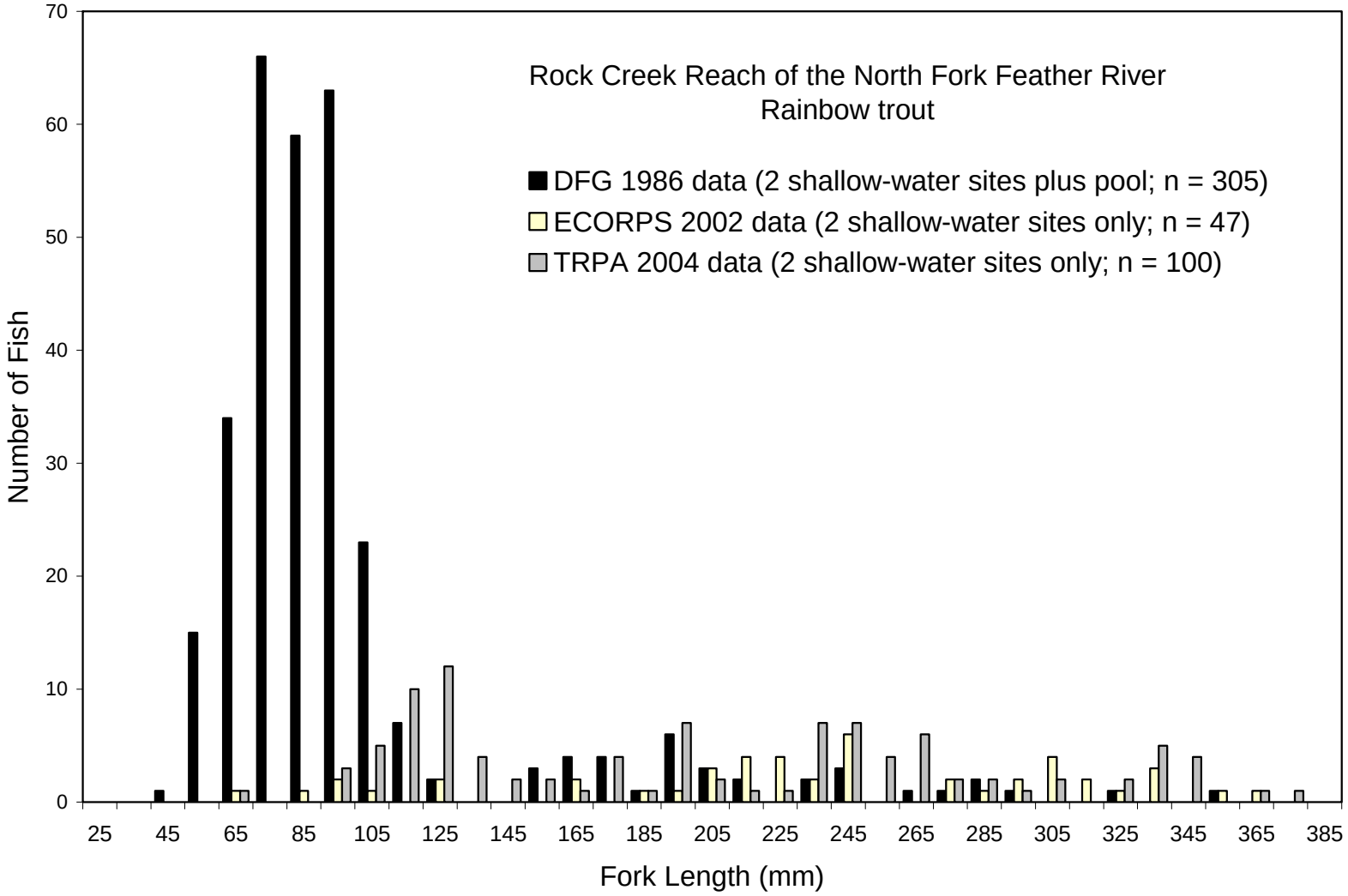


Figure 14. Length-frequency data for rainbow trout captured during three separate late-fall electrofishing surveys of Rock Creek sample sites. Note that the 1986 data includes data from three sample sites, while the 2002 and 2004 data from only 2 sample sites.

larger fish in the population. In 1986, large populations (N = 1,770) of smaller suckers (mean weight = 21.5 grams) were captured at the Indian Jim School site compared to fewer (2002 N = 44, 2004 N = 79), but much larger suckers (mean weight 2002 = 731.1 grams, 2004 = 679.3 grams) during the more recent surveys (Table 8). Again, this apparent difference may be a response to altered stream flow conditions or may just be an artifact of different sample areas, in particular for both large and small suckers at the Indian Jim School site.

The numerical abundance for both hardhead and pikeminnow has decreased during recent surveys compared to the 1986 data (Tables 8 and 9). However, the minnows captured during the 2002 and 2004 surveys are typically larger than those observed during the 1986 survey. As a result, the biomass estimates (pounds/acre) for the minnows have actually changed little over the intervening years (Table 10).

Another notable change exhibited since 1986 is the apparent increase in the sculpin populations at the Cresta Reach sites. In 1986, sculpin contributed only a small percentage to the numerical abundance and biomass estimates at the Bear Ranch and Grizzly sites; however, by 2004 their numbers and biomass have increased (Tables 9 and 10).

Comparison of the 1986-2004 survey data for smallmouth bass indicates that this introduced centrarchid continues to be only a minor component of the Rock Creek-Cresta shallow-water fish populations.

Conclusions

The goals of the 15-year monitoring effort are to characterize and track the response of the resident fish populations in the Rock Creek-Cresta Project area to changes in base flows during the first 15 years of the License, and to assess the abundance, biomass, and condition of the wild trout component of the population against the fishery criteria set forth by the SA during the 15-year test period. The calculated condition factors for the 2004 length-weight data suggests the presence of healthy rainbow trout populations at all sites.

In terms of the "*excellent trout fishery goals*" defined in the SA, the 2004 data indirectly confirms the achievement of one of the milestones, specifically a wild rainbow trout population composed of at least four age classes. The 2004 length-frequency data shows the presence of multiple size classes for rainbow trout based upon the 2002 scale analysis that correspond to 4 age classes of trout (ECORP 2003).

The 2004 shallow-water survey data suggests that the current trout populations fall short of several of the other SA criteria. The 2004 data does not provide any evidence that large rainbow trout >17 inches (432 mm) are available to the recreational anglers. The largest trout observed during our survey was a 376 mm FL (14.8 inch) rainbow trout captured at the Indian Jim School site. Despite, this lack of evidence in the shallow-water surveys, observations made during concurrent angler creel surveys, fish population snorkel surveys, and displacement snorkel surveys indicate the presence of large trout >17inches in both the Cresta and Rock Creek reaches.

Our 2004 biomass estimates for rainbow trout, which ranged from 265 to 492 pounds per mile (Table 10), suggests that the SA goal of a wild trout population possessing a harvestable component of 595 pounds per mile has yet to be achieved.

Continued sampling in future years should provide additional data for evaluating the abundance and biomass of the resident fish populations in the Project area and for assessing the wild rainbow trout population status at the various base flow scenarios and against the criteria stipulated in the SA and currently adopted by the NFFR Ecological Resources Committee.

Recommendations

Given the variations in the populations evident at the two Rock Creek shallow-water survey sites, we recommend adding additional sample sites in this reach. Much of the apparent variation can probably be ascribed to different sample sites in 1986 versus 2002/2004. Adding additional shallow-water sites in future efforts should increase

confidence in characterizing the status of the Project area fish populations under the various base flows, and in assessing achievement of specific SA criteria. At the very least, an additional site in the shallow-water area downstream of Granite Creek should be added to the existing evaluation. This would include an area that is more equivalent to the CDFG 1986 Indian Jim School site. Adding another site in an extensive shallow-water area just downstream of the Rodgers Flat Bridge should also be considered. Adding sites in the Cresta Reach may be more problematic due to the lack of extensive shallow-water sites in this reach.

We also recommend additional effort be allocated to secure the raw data from CDFG's 1982-1986 surveys in order to allow more appropriate and equivalent between year abundance, biomass, and length-frequency comparisons.

Literature Cited

Bagenal, T.B., and F.W. Tesch. 1978. Age and growth. Chapter 5 *in* T.B. Bagenal, editor. Methods for assessment of fish production in fresh waters, 3rd edition. International Biological Programme Handbook 3. Blackwell Scientific Publications. Oxford. 365p.

California Data Exchange Center. 2004. Daily and hourly rainfall records for Bucks Creek Powerhouse (BUP). Available online at http://cdec.water.ca.gov/

California Department of Fish and Game. 1988. Rock Creek–Cresta Project (FERC 1962) fisheries management study, North Fork Feather River, California. 1 July 1988 final report prepared by Region 2 Environmental Services and submitted to Pacific Gas and Electric Company.

DeVries, D.R., and R.V. Frie. 1996. Determination of age and growth. Chapter 16 *in* B.R. Murphy and D.W. Willis, editors. Fisheries Techniques, 2nd edition. American Fisheries Society, Bethesda, MD. 732p.

ECORP Consulting, Inc. 2003. Draft results of backpack electrofishing surveys for the Rock Creek-Cresta Project (FERC No. 1962), Plumas County, California. 4 March 2003 draft report prepared for Pacific Gas and Electric Company.

Everhart, H.W., A.W. Eipper, and W.D. Youngs. 1975. Principles of fishery science. Cornell University Press, Ithaca, NY. 288p.

Flint, R.A. 1980. Chemical treatment of the North Fork Feather River, Butte and Plumas counties, California, 1977. California Department of Fish and Game, Inland Fisheries Administrative Report No. 80-4.

Moyle, P.B. 2002. Inland Fishes of California, 2nd edition. University of California Press, Berkeley, California. 502p.

Moyle, P.B., B. Vondracek, and G.D. Grossman. 1983. Responses of fish populations in the North Fork of the Feather River, California, to treatments with fish toxicants. North American Journal of Fisheries Management 3:48-60.

Salamunovich, T. 2004a. Rock Creek-Cresta (FERC No. 1962) Recreation and pulse flow biological evaluation: stranding and displacement studies, year 1 – 2002. October 5, 2004 final report prepared by Thomas R. Payne & Associates for Technical and Ecological Services, Pacific Gas and Electric Company, San Ramon, CA.

Salamunovich, T. 2004b. Rock Creek-Cresta (FERC No. 1962) Recreation and pulse flow biological evaluation: stranding and displacement studies, year 2 – 2003. December 2004 final report prepared by Thomas R. Payne & Associates for Technical and Ecological Services, Pacific Gas and Electric Company, San Ramon, CA.

Salamunovich, T. and A. Berg, contributors. 2002a. Bucks Creek Project 2002 fish population report, FERC Project No. 619, Article 103. December 2002 report prepared by Thomas R. Payne & Associates for Technical and Ecological Services, Pacific Gas and Electric Company, San Ramon, CA.

Salamunovich, T. and A. Berg, contributors. 2002b. Grizzly Creek 2002 fish population report, Grizzly Creek Rehabilitation Monitoring Program, FERC Project No. 619, Article 404(c). December 2002 report prepared by Thomas R. Payne & Associates for Technical and Ecological Services, Pacific Gas and Electric Company, San Ramon, CA.

Van Deventer, J.S., and W.S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data - user's guide for MicroFish 3.0. USDA, Forest Service General Technical Report INT-254. Intermountain Research Station, Ogden, Utah. 29p.

White, G.C., K.P. Burnham, D.L. Otis, and D.R. Anderson. 1978. User's manual for program CAPTURE. Utah State University Press, Logan, Utah. 40p.

White, G.C., D.R. Anderson, K.P. Burnham, and D.L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. LA-8787-NERP. Los Alamos National Laboratory, Los Alamos, New Mexico. 235p.

Appendix A

Rock Creek-Cresta Relicensing Settlement Agreement
Minimum Flow Schedules

Appendix A. Summary of Rock Creek-Cresta Project minimum flow schedules for three consecutive five-year periods under various water year types as specified in the Rock Creek Cresta Relicensing Settlement Agreement. Water year types to be determined by California Department of Water Resources forecasts of unimpaired flow of North Fork Feather River into Lake Oroville.

	1st 5-year Period					
	Cresta			Rock Creek		
	Normal/Wet	Dry	Crit. Dry	Normal/Wet	Dry	Crit. Dry
Oct	220	175	140	180	150	150
Nov	220	175	100	180	150	110
Dec	240	190	100	200	160	110
Jan	240	190	100	225	180	110
Feb	240	190	100	225	180	110
Mar	250	200	100	250	200	110
Apr	250	200	100	250	200	110
May	250	200	140	250	200	150
June	240	190	140	220	175	150
Jul	220	175	140	180	150	150
Aug	220	175	140	180	150	150
Sep	220	175	140	180	150	150

	2nd 5-year Period					
	Cresta			Rock		
	Normal/Wet	Dry	Crit. Dry	Normal/Wet	Dry	Crit. Dry
Oct	325	260	140	260	210	150
Nov	325	260	100	260	210	110
Dec	350	280	100	350	280	110
Jan	350	280	100	350	280	110
Feb	350	280	100	350	280	110
Mar	350	280	100	350	280	110
Apr	350	280	100	350	280	110
May	350	280	140	350	280	150
June	325	260	140	260	210	150
Jul	325	260	140	260	210	150
Aug	325	260	140	260	210	150
Sep	325	260	140	260	210	150

Appendix A. Summary of Rock Creek-Cresta Project minimum flow schedules for three consecutive five-year periods under various water year types as specified in the Rock Creek Cresta Relicensing Settlement Agreement. Water year types to be determined by California Department of Water Resources forecasts of unimpaired flow of North Fork Feather River into Lake Oroville. (continued)

	3rd 5-year Period					
	Cresta			Rock		
	Normal/Wet	Dry	Crit. Dry	Normal/Wet	Dry	Crit. Dry
Oct	325	260	140	260	210	150
Nov	325	260	100	260	210	110
Dec	350	280	100	350	280	110
Jan	350	280	100	350	280	110
Feb	350	280	100	350	280	110
Mar	350	280	100	350	280	150
Apr	350	280	100	350	280	150
May	350	280	140	350	280	150
June	325	260	140	600	480	150
Jul	325	260	140	260	210	150
Aug	325	260	140	260	210	150
Sep	325	260	140	260	210	150

Appendix B

November 2004 Habitat Characteristic Data Sheets

Thomas R. Payne & Associates Electrofishing Survey - Habitat Characteristic Data Form

Stream: NFFR County: BUTTE Date: 11 / 2 / 2004

Reach: BEAR CRK Est. Q: ~95 {60 DAM, 15 LEAK, 10 GRIB Page: 1 of 1

Air Temp.: 55°F @ 1055 H20 Temp.: 47.0 @ 1005 Conductivity: 66.5 µS/cm

Air Temp.: 54°F @ 1459 H20 Temp.: 48°F @ 1459 Specific Cond.: 97.6 µS/cm

Length: 112.7 meters = 369.8 ft gradient: Top→V2 7.6, V2→BT m 6.0, eyeleve = 5.4 Salinity: 0 ppt

0.76%

OR RB

D.O.: 10.50 mg/L

2.8' drop over 112.7 meters or 2.8/369.75 = 0.76%

D.O.: 89.7 % Saturation

ft / (m) Distance	ft / (m) Width	(ft) / m 1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth (÷4)
0	30.4	1.2	1.9	1.0	
11	27.2	2.9	1.7	1.1	
22	31.5	3.4	1.2	0.75	
33	32.0	3.8	2.3	0.5	
44	21.0	2.3	1.9	0.8	
55	16.1	3.4	2.5	1.5	
66	13.5	2.2	2.6	1.2	
77	13.4	2.9	3.5	2.5	
88	17.5	2.6	2.2	0.3	
99	21.5	1.5	0.9	0.6	
112.7	26.2	2.8	1.0	0.6	

Mean Width: 22.78m Mean Depth: *pure avg 1.87ft / overall avg 1.40ft

Total Area: 2567.51m² / 27,637.366ft² Total Volume: 51,681.87ft³ / 38,692.31ft³

GPS Coord. Bottom 39° 50.565 N 121° 23.971 W Acc 21'

TOP 39° 50.582 N 121° 23.898 W 21'

Photos: #1 Cover (Data Sheet)
#2 Cover
#3 Top Down
#4 Across Top
#5 taken from top upon rd. - overview
#6 from road across top (w/ bank features)
#7 mid unit looking upstrm.
#8 mid unit looking down
#9 from bottom looking across
#10 from bottom looking up

All taken from rt. bank

method

Maximum Depth 5.9

Reach Habitat Characterization:

Habitat types		
Pool	—	%
Run	85	%
Riffle	5	%
POW	10	%
	-	%

Substrate types		
fines (< 2mm or 1/16")	5	%
sand (2-7mm or 1/16-1/4")	5	%
gravel (7-75mm or 1/4-3")	10	%
cobble (75-300mm or 3-12")	30	%
boulder (>300mm or >12")	50	%
bedrock	—	%

trout spawning: 25 ft²

Fish Cover		
Surface turbulence	10	%
Instream object	25	%
Undercut bank	5	%
Overhanging vegetation (<48")	-	%

Top Marker - ORANGE SQUARE & Flagging on LB OAK

Bottom Marker - ORANGE SQUARE & Flagging on LB OAK
no writing on bottom square.

Thomas R. Payne & Associates Electrofishing Survey - Habitat Characteristic Data Form

Stream: North Fork Feather | County: PLUMAS | Date: 11/04/04
Reach: Grizzly Creek | Est. Q: 70 | Page: 1 of 1
Air Temp.: @ | H20 Temp.: 8.5°C @ 0912 | Conductivity: 63.7 µS/cm
Air Temp.: 49.0°F @ 14:10 | H20 Temp.: 48°F @ 14:13 | Specific Cond.: 93.0 µS/cm
Length: 300' | gradient: 7.4 | Salinity: 0 ppt
From LB RB | LB Δ = 9.9'/300 = 3.3% (eye level 5.6' Top; 8.6, 7.2, 9.1 Bottom) | D.O.: 10.40 mg/L
D.O.: 89.2 % Saturation

GPS Coord. N 39° 51.993' } Top WP001
W 121° 22.775' }
N 39° 51.982' } Btm WP002
W 121° 22.836' }

(ft) / m Distance	(ft) m Width	(ft) / m 1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth (÷4)
0	75	0.9	1.1	1.6	
30	73	1.3	0.6	1.0	
60	70	1.3	1.4	1.6	
90	78	1.5	1.2	1.1	
120	93	1.8	1.2	1.6	
150	92	1.4	1.9	2.6	
180	99	1.8	1.9	2.3	
210	105	1.0	1.0	1.7	
240	110	1.0	0.8	0.7	
270	118	1.7	1.3	1.3	
300	110	1.5	2.1	1.3	

Mean Width: 92.1 ft | Mean Depth: PURE ÷ 3 = 1.41 ft / OVERTON ÷ 4 = 1.06 ft
Total Area: 27,627.27 ft² / 2566.57 m² | Total Volume: 38929.34 ft³ / 29,197.00 ft³

Photos: #1 Cover
#2 Top Down
#3 R→L Bank Top
#4 overview from road @ Top half
#5 overview of lower half from road
#6 Bottom u/s
#7 R→L Bank @ Bottom

Maximum Depth: 3.9

Reach Habitat Characterization:

Habitat types		
Pool	–	%
Run	40	%
Riffle	40	%
POW	20	%
	–	%

Substrate types		
fines (< 2mm or 1/16")	5	%
sand (2-7mm or 1/16-1/4")	5	%
gravel (7-75mm or 1/4-3")	10	%
cobble (75-300mm or 3-12")	40	%
boulder (>300mm or >12")	40	%
bedrock	0	%

trout spawning: 100 ft² (9 / 70)

Fish Cover		
Surface turbulence	10	%
Instream object	30	%
Undercut bank	5	%
Overhanging vegetation (<48")	5	%

Orange Marker @ Top LB on BayTree
PINK Flags @ Top and BTm

* Top net half way between mile marker 0.32 and 0.35 *

Gradient = (rise ÷ run) x 100 = 9.9/300 x 100 = 3.3%

Thomas R. Payne & Associates Electrofishing Survey - Habitat Characteristic Data Form

Stream: North FORK Feather | County: PLUMAS | Date: 9/10/04
Reach: INDIAN JIM | Est. Q: ~ 40 | Page: 1 of ~~2~~ 1
Air Temp.: 41°F @ 0938 | H20 Temp.: 8.7°C @ 0848 | Conductivity: 81.9 µS/cm
Air Temp.: 67°F @ 1250 | H20 Temp.: 49°F @ 1257 | Specific Cond.: 118.7 µS/cm
Length: 294' | gradient: BTm: 7.5 Top: 6.1 | Salinity: 0.1 ppt
LB RB | Δ = 1.4/294 = 0.48% | D.O.: 10.05 mg/L
D.O.: 96.5 % Saturation

(ft)/ m Distance	(ft)/ m Width	ft/ m 1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth (÷4)
0	69	2.0	2.9	2.0	
30	61.5	0.9	2.1	2.3	
60	68	1.0	3.1	4.7	
90	60	1.6	2.6	2.2	
120	56	1.3	2.7	4.1	
150	48	1.2	3.1	4.3	
180	44.5	1.3	2.9	4.6	
210	51	1.6	3.3	4.4	
240	46	0.9	2.6	3.8	
270	45.5	1.2	1.5	1.9	
294	50	0.9	2.3	1.5	

PURE AVG OVERTON ÷4

Mean Width: 54.50 ft | Mean Depth: 2.38 ft / 1.79 ft
Total Area: 16,023.00 ft² / 1488.54 m² | Total Volume: 38,163.87 ft³ / 28,622.90 ft³

GPS Coord. N 39° 56. 929' Top
W 121° 18.062' WP 003
N 39° 56. 891' BTm
W 121° 19. 110' WP 004

Photos: #1 Cover
#2 across top L→R
#3 top down
#4 middle looking upstream
#5 " " downstream
#6 across bottom L→R
#7 bottom looking upstream

Maximum Depth 5.0

Reach Habitat Characterization:

Habitat types	
Pool	– %
Run	85 %
Riffle	5 %
POW	10 %
	– %

Substrate types	
fines (< 2mm or 1/16")	5 %
sand (2-7mm or 1/16-1/4")	10 %
gravel (7-75mm or 1/4-3")	5 %
cobble (75-300mm or 3-12")	40 %
boulder (>300mm or >12")	40 %
bedrock	– %

trout spawning: 0 ft²

Fish Cover	
Surface turbulence	~~10~~ 5 %
Instream object	25 %
Undercut bank	– %
Overhanging vegetation (<48")	– %

ORANGE Squares @ BTm LB OAK + Lower on LB Shrub.

Top of Reach is 892' Downstream of mouth of Granite Creek

Two Markers @ waters edge on LB willow & RB Bldr.

Another Top Marker on OAK ≈ 70' from waters edge

RODGERS FLAT – MAIN CHANNEL

Thomas R. Payne & Associates Electrofishing Survey - Habitat Characteristic Data Form

Stream: North Fork Feather County: Plumas Date: 11 OCT 05

Reach: RODGERS FLAT (reduced plot) Est. Q: ≈ 70 Page: 1 of 21

Air Temp.: 49°F @ 0941 H20 Temp.: 8.6 @ 0835 Conductivity: 85.3 µS/cm

Air Temp.: @ H20 Temp.: @ Specific Cond.: 124.2 µS/cm

Length: 231 ft gradient: BTm 8.1 Salinity: 0.1 ppt

TOP 7.4

gradient = 0.7/231 = 0.30% D.O.: 9.89 mg/L

D.O.: 84.7 % Saturation

MAIN CHANNEL:

(ft) / m Distance	(ft) / m Width	(ft) / m 1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth (÷4)
0	83	1.7	2.3	1.5	
30	80	3.0	2.4	1.7	
60	62	0.4	1.8	0.8	
90	64	1.6	2.1	1.7	
120	63	1.6	3.3	1.1	
150	70	1.6	2.5	1.4	
180	62	2.1	2.0	2.3	
210	71	1.1	1.3	2.9	
231	74	3.1	4.2	1.6	

PURE AVG OVERTON ÷4

Mean Width: 69.89 Mean Depth: 2.00ft / 1.50 ft

MAINCH. Total Area: 16,144.33 ft² / 1499.81 m² Total Volume: 32,228.87 ft³ / 24,171.65 ft³

GPS Coord. N 39° 57.765'2 WP005 on LB

W 121° 16.628') BTm

N 39° 57.769'2 WP006

W 121° 16.579'5 TOP

Photos: #1 cover

#2 across Top

#3 Top Down

#4 Middle up

#5 Middle Down

#6 Across BTm

#7 Bottom up

#8 over view from RB below BTm.

(Sketch, Photos on Back)

Maximum Depth: 4.2

Reach Habitat Characterization:

Habitat types		
Pool	–	%
Run	30	%
Riffle	–	%
POW	70	%
	–	%

Substrate types		
fines (< 2mm or 1/16")	0	%
sand (2-7mm or 1/16-1/4")	0	%
gravel (7-75mm or 1/4-3")	10	%
cobble (75-300mm or 3-12")	10	%
boulder (>300mm or >12")	80	%
bedrock	0	%

trout spawning: 3.8 ft²

4
12
16
6

Fish Cover		
Surface turbulence	5	%
Instream object	60	%
Undercut bank	–	%
Overhanging vegetation (<48")	5	%

side channel @ 110' from bottom net Side Channel length = 128' (see back)

Top net ≈ 30 downstrm of downstrm end of displacement dyer reach

Top net about 370' downstrm of MR creek

SIDE CHANNEL

Thomas R. Payne & Associates Electrofishing Survey - Habitat Characteristic Data Form

Stream: NFFR | County: PLUMAS | Date: 11/6/2004
Reach: RODGERS FLAT - SIDE CH | Est. Q: ~0.5 cfs | Page: 1 of 1
Air Temp.: @ | H20 Temp.: @ | Conductivity: — µS/cm
Air Temp.: @ | H20 Temp.: @ | Specific Cond.: — µS/cm
Length: 128 feet | gradient: — | Salinity: — ppt
D.O.: — mg/L
D.O.: — % Saturation

(ft)/m Distance	(ft)/m Width	(ft)/m 1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth (ft)
0	18	0.5	0.6	0.2	
30	10	1.1	1.2	0.7	
60	12	1.1	1.4	0.65	
90	25	0.9	1.0	0.7	
128	13	0.6	0.9	0.6	

Mean Width: 15.60ft | Mean Depth: 0.81 ft
Total Area: 1996.80ft² (185.5m²) | Total Volume:

GPS Coord. —

Photos:
#9 Across bottom
#10 bottom up
#11 middle up
#12 middle down
#13 Across top
#14 top down

Maximum Depth 1.55

Reach Habitat Characterization:

Habitat types	
Pool	%
Run	%
Riffle	%
POW	%
	%

Substrate types	
fines (<2mm or 1/16")	%
sand (2-7mm or 1/16-1/4")	%
gravel (7-75mm or 1/4-3")	%
cobble (75-300mm or 3-12")	%
boulder (>300mm or >12")	%
bedrock	%

trout spawning: 2 ft²

Fish Cover	
Surface turbulence	%
Instream object	%
Undercut bank	%
Overhanging vegetation (<48")	%

Appendix C

November 2004 Electrofishing Fish Data Sheets

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR County: BUTTE Date: 11 / 2 / 2004

Reach: BEAR CRK (CRESTA) Est. Q: ~85 cfs Page: 1 of 10

Air Temp.: @ H20 Temp.: @ Conductivity: microSiemens

Blocknets: TOP & BOTTOM Specific Cond.: microSiemens

Reach Length: 112.7 meters along SB Salinity: ppt

Electroshocker Type: D.O.: mg/L

Personnel: Shockers: TOM GAST; MARK ALLEN; STEVE EGGERS % saturation

DOUG PARKINSON; TIM SALAMUNOVICH Photos:

2002 RBT
R 17-6-3
SK 11 2 2
HH 3-18-0
PK 24-11-5
SC 23-15-6

Netters: SCOTT RILEY; ROBERT LAMB; SEAN THOBABEN

SMB 7-6-0

CINDY GLASE; JASON COBURN; DON BRAMM

SARAH YOUNG; SEALA BURBER; PAM TUSON

Tom MARK

Shocker	PGE 207	PGE 206	STEVE	DOUG	TIM				
Model	12B PGE	12B	11A T	11A T	PGE T/P7				
Battery ID	PGE	PGE	Xiang	CLARK	PGE				
Voltage:	400	400	400	400	400				
Frequency:	J-B	J-B	30	30	J-B				
1st Pass	1944	2204	1980	1715	1830				
2nd Pass	2025	2001	2043	1734	~~1475~~				
3rd Pass	1947	1897	2064	1722	2143				
4th Pass	1642	1602	1860	1424	1824				
5th Pass									

Lengths are fork lengths or total lengths in millimeters Weights are in grams

Pass#	Species	Length	Weight	Scale Sample	Notes
1 ✓	HH	48	1.4	B04	
✓	HH	47	1.1		
✓	HH	52	1.1		
✓	HH	52	1.4		
✓	HH	53	1.4		
✓	HH	47	0.9		
✓	HH	49	0.7		
✓	HH	58	2.1		
✓	HH	44	0.6		m
✓	HH	57	2.1		
✓	HH	57	1.9		
✓	PM	63	3.1		
✓	PM	47	1.3		
✓	PM ✓	53	1.5		
✓	PM ✓	52	1.6		
✓	HH	47	1.2		
✓	PM ✓	49	1.2		
✓	HH	47	1.2		
✓	HH	57	2.1		
✓	HH	52	1.4		
✓	SMB	167	71.4		
✓	SMB	80	7.3		
✓	RBT	92	9.9	B04-1	
✓	RBT	113	16.9	B04-2	
✓	RBT	356	428	B04-3	

~~RBT SCP SKR PM HH~~

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/02/04 Page: 2 of ~~5~~ 10

Reach: Bear (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF ✓	116	21.7		
	RIF ✓	92	10.8		
	Prickly ✓	55	1.9		
	SMB ✓	99	14.9		
	RBT ✓	85	7.3	B04-4	
	PM ✓	55	1.6		
	Sucker ✓	66	4.2		
	RBT ✓	89	7.9	B04-5	
	RIF ✓	56	2.1		
	RIF ✓	51	1.6		
	RIF ✓	82	7.1		
	RIF ✓	70	4.4		
	HH ✓	49	1.2		
	SMB ✓	220	154.6		
	RBT ✓	213	117.3	B04-6	
	RIF ✓	121	23.3		
	RIF ✓	104	17.7		
	RIF ✓	99	13.6		
	RIF ✓	61	2.5		
	RIF ✓	107	16.8		
	RBT ✓	79	6.9	B04-7	
	RBT ✓	82	6.1	B04-8	
	Sucker ✓	63	3.1		
	" ✓	67	3.9		
	RBT ✓	72	4.1	B04-9	
Sucker →	~~RBT~~ ✓	59	3.0	~~B04~~	
	RIF ✓	117	20.8		
	RBT ✓	60	2.3	B04-10	MJ
	Sucker ✓	81	8.0		
	RBT ✓	68	4.0	B04-11	
	RBT ✓	82	7.9	B04-12	
	RBT ✓	93	9.3	B04-13	
	RBT ✓	55	2.1	B04-14	
	RIF ✓	58	2.1		
	SMB ✓	80	7.1		
	Sucker ✓	77	6.7		
	RIF ✓	59	2.5		
	BMB ✓	81	7.9		
	RIF ✓	90	11.2		
	RIF ✓	60	2.5		
	PM ✓	65	2.9		
	RBT ✓	116	16.2	B04-15	
	RBT ✓	217	125.5	B04-16	
	RIF ✓	106	18.2		
	RBT ✓	121	19.4	B04-17	

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/02/04 Page: 3 of ~~9~~ 10

Reach: Bear (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF ✓	108	17.9		
	RIF ✓	76	5.4		
	RIF ✓	94	10.1		
	RBT ✓	213	131.6	B04-18	
	RBT ✓	247	166.4	B04-19	
	RIF ✓	92	11.2		
	RIF ✓	61	2.7		
	RIF ✓	64	2.9		
	RIF ✓	98	14.5		
	RBT ✓	78	6.3	B04-20	
	RBT ✓	64	2.9	B04-21	
	RIF ✓	68	4.1		
	RIF ✓	105	16.2		
	RIF ✓	47	1.4		M
	RIF ✓	79	6.9		
	RIF ✓	104	16.6		
	Prickly ✓	106	18.3		
	SMB ✓	81	7.8 ← (7.8)		
	RIF ✓	61	2.5		
	RIF ✓	59	1.9		
	SMB ✓	179	85.6		
	Sucker ✓	155	50.5		
	PM ✓	222	110.5		
	RBT ✓	193	92.6	B04-22	
	RBT ✓	84	7.3	B04-23	M
	RIF ✓	61	2.8		
	Sucker ✓	63	3.7		
	RIF ✓	72	5.0		
	RIF ✓	69	4.1		
	RBT ✓	115	19.6	B04-24	
	RBT ✓	131	25.7	B04-25	
	RBT ✓	111	16.1	B04-26	
	RIF ✓	47	0.9		
	RIF ✓	51	1.6		
	RBT ✓	247	162	B04-27	
	RIF ✓	89	8.7		
	Sucker ✓	69	5.1		
	RIF ✓	101	14.5		
	Prickly ✓	64	2.7		
	Sucker ✓	68	4.8		
	RIF ✓	63	2.9		
	RBT ✓	177	69.8	B04-28	
	RBT ✓	108	14.8	B04-29	
	RIF ✓	118	20.9		
	Prickly ✓	60	3.1		

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 111 021 04 Page: 4 of ~~8~~ 10

Reach: Bear (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF ✓	62 ✓	3.4		
	RIF ✓	65 ✓	2.6		
	RIF ✓	62 ✓	2.5		
	RIF ✓	65 ✓	3.5		
	RIF ✓	66 ✓	3.0		
	RIF ✓	108 ✓	16.7		
	Sucker ✓	89	10.6		
	RIF ✓	70 ✓	4.2		
	RIF ✓	110 ✓	17.8		
	RIF ✓	86 ✓	8.2		
	RBT ✓	111	15.6	B04-30	
	RBT ✓	279	252	B04-31	
	RBT ✓	319	379	B04-32	
#2	HH ✓	53	1.6		
	PM ✓	51	1.2		
	RBT ✓	79	6.6	B04-33	
	HH ✓	59	2.3		
	RIF ✓	64	2.9		M
	Sucker ✓	82	7.5		
	Sucker ✓	122	24.3		
	RBT ✓	204	99	B04-34	
	RBT ✓	240	147	B04-35	
	RBT ✓	358	450	B04-36	
	RBT ✓	113	15.7	B04-37	
	RBT ✓	81	6.2	B04-38	
	RBT ✓	212	109.3	B04-39	
	RIF ✓	60	2.6		M no head - (crawdad) mishandled in bucket
	HH ✓	48	1.2		
SMB →	~~RBT~~ ✓	85	8.1		
	Sucker ✓	65	3.6		
	Sucker ✓	79	6.4		
	Sucker ✓	78	6.8		
	RIF ✓	63	2.8		
	RIF ✓	109	19.3		
	RIF ✓	118	19.9		
	RIF ✓	61	2.6		
	RIF ✓	53	1.5		
	SMB ✓	87	9.3		
	HH ✓	64	2.4		
	RBT ✓	71	4.0	B04-40	
	RBT ✓	86	7.0	B04-41	
	SMB ✓	164	63.9		
	Sucker ✓	78	6.8		
	HH ✓	55	1.6		

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11 / 021 04 Page: 5 of ~~8~~ 10

Reach: Bear (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
2	HH ✓	55	1.6		
↓	HH ✓	55	1.9		
	HH ✓	48	~~0.23~~ 1.0		
	Sucker ✓	78	5.9		
	Sucker ✓	71	5.1		
	RIF ✓	56	2.0		
	Sucker ✓	78	6.5		
	RBT ✓	223	120	B04-42	
	RBT ✓	279	242	B04-43	
	RIF ✓	57	2.2		
	RBT ✓	250	190	B04-44	
	RBT ✓	223	133	B04-45	
	RBT ✓	209	116	B04-46	
	RBT ✓	335	440	B04-47	
	RBT ✓	109	16.0	B04-48	
	Sucker ✓	66	3.7		
	HH ✓	46	1.0		
	Sucker ✓	65	4.1		
	RIF ✓	81	7.0		
	HH ✓	52	1.3		
	RIF ✓	53	1.7		
	RIF ✓	106	17.5		
	SMB ✓	85	9.0		
	RBT ✓	104	13.6	B04-49	
	RIFI ✓	108	17.1		
	RBT ✓	87	7.7	B04-50	
	RBT ✓	89	7.1	B04-51	
	SMB ✓	78	6.3		
	Sucker ✓	79	6.3		
	RIF ✓	57	2.0		
	RIF ✓	77	6.4		
	RIF ✓	59	2.6		
	RIF ✓	68	3.8		
	RIF ✓	52	1.8		
	Prickly ✓	61	2.5		
	H.H ✓	54	1.6		
	RIF ✓	71	4.1		
	Prickly ✓	71	4.5		
	RIF ✓	71	4.4		
	RBT ✓	90	9.3	B04-52	
	RBT ✓	104	12.6	B04-53	
	Sucker ✓	87	10.2		
	RM ✓	233	122		
	RBT ✓	67	3.7	B04-54	
	RBT ✓	76	5.4	B04-55	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11 021 04 Page: 6 of ~~8~~ 10

Reach: Bear (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
2	RBT ✓	114	15.9	B04-56	
	RBT ✓	75	5.0	B04-57	
	RBT ✓	102	12.1	B04-58	
	Sucker ✓	69	4.5		
	HH ✓	59	2.2		
	RIF ✓	59	2.2		
	RIF ✓	63	3.3		
	SMB ✓	85	8.9		
	RIF ✓	88	8.4		
	RBT ✓	96	9.6	B04-59	
	HH ✓	53	1.6		
	RIF ✓	101	16.1		
	RIF ✓	109	17.2		
	RIF ✓	54	1.7		
	RBT ✓	91	8.7	B04-60	
	RBT ✓	97	10.2	B04-61	
	PM ✓	63	2.4		
	Sucker ✓	72	5.7		
	RIF ✓	60	2.5		
	RIF ✓	59	2.2		
	SMB ✓	83	8.3		
	RIF ✓	97	12.1		
	RIF ✓	57	2.3		
	RIF ✓	52	1.6		
	RIF ✓	63	3.3		
	RBT ✓	185	77.3	B04-62	
	HH ✓	52	1.5		
	RIF ✓	65	3.2		
	RBT ✓	218	120	B04-63	
	RBT ✓	319	377	B04-64	
#3	RIF ✓	69	4.2		
	RIF ✓	64	3.3		
	RBT ✓	123	21.5	B04-65	
	Sucker ✓	73	5.7		
	RIF ✓	88	9.9		
	RIF ✓	107	15.3		
	RIF ✓	78	5.5		
	Sucker ✓	73	5.6		
	RIF ✓	68	3.7		
	Sucker ✓	63	3.5		
	Sucker ✓	74	5.9		
	SMB ✓	108	19.1		
	RIF ✓	70	3.7		

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/2/2004 Page: 7 of 10

Reach: BEAR (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#3	RBT ✓	73	5.0	—	Mort.
	RIF ✓	73	4.9		
	HH ✓	45	1.1		
	HH ✓	50	1.4		
	Sucker ✓	62	3.3		
	HH ✓	50	1.3		
	RIF ✓	61	2.5		
	HH ✓	52	1.5		
(R.E)	Sculpin ✓	~90	9.0		Tail missing - no ID (called Riffle)
	RBT ✓	~~995~~	9.0	B04-66	
	RBT ✓	56	2.2		
	HH ✓	~~53~~	1.5		
	RIF ✓	86	8.1		
	RIF ✓	55	1.8		
	HH ✓	46	0.9		
	HH ✓	53	1.6		
	RIF ✓	57	2.0		
	SMB ✓	95	12.6		
	Sucker ✓	70	5.1		
	Prickly ✓	65	3.4		
	Sucker ✓	72	5.0		
	RBT ✓	138	33.1	B04-67	
	Sucker ✓	68	4.4		
	RIF ✓	55	2.0		
	RIF ✓	48	1.2		
	RIF ✓	56	1.9		
	RIF ✓	101	14.3		
	RIF ✓	107	18.0		
	RIF ✓	73	4.4		
	RIF ✓	111	17.1		
	RIF ✓	72	5.0		
	RIF ✓	72	4.4		
	RIF ✓	87	7.3		
	RIF ✓	92	9.0		
	RIF ✓	77	5.4		
	RIF ✓	78	5.3		
	Sucker ✓	82	8.8		
	RIF ✓	65	3.1		
	RIF ✓	68	4.1		
	RIF ✓	69	3.8		
	RIF ✓	64	3.5		
	RIF ✓	51	1.5		
	Sucker ✓	86	8.7		
	Sucker ✓	64	3.2		
	RBT ✓	111	15.1	B04-68	

Σ=297

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/2/2004 Page: 8 of 10

Reach: BEAR (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
	RBT ✓	220	140	B04-69	
	RBT ✓	260	197	B04-70	
	SMB ✓	242	232		
	PM ✓	248	151		
	RBT ✓	127	29.0	B04-71	
	RBT ✓	223	128	B04-72	
	RBT ✓	211	117	B04-73	
	SMB ✓	71	~~5.1~~ 5.1		
	RBT ✓	54	1.7	—	NO SCALES TAKEN
	RBT ✓	287	270	B04-74	
	RIF ✓	103	13.6		
	RIF ✓	78	6.3		
	RIF ✓	53	1.8		
	RIF ✓	73	4.6		
	RIF ✓	66	3.1		
	RIF ✓	60	2.5		
	SMB ✓	103	15.4		
	RIF ✓	73	5.5		
	RIF ✓	68	4.2		
	RIF ✓	67	3.6		
	Sucker ✓	72	6.0		
	HH ✓	57	2.1		
	RBT ✓	186	73.9	B04-75	
	RBT ✓	247	171	B04-76	
	SMB ✓	81	7.8		
	RIF ✓	111	17.9		
	RIF ✓	90	9.4		
	RIF ✓	115	21.1		
	RIF ✓	56	2.1		
	RIF ✓	51	1.5		
	Prickly ✓	61	3.0		
	RIF ✓	72	4.7		
	RIF ✓	55	2.0		
	RIF ✓	55	1.9		
	RIF ✓	63	2.8		
	RIF ✓	61	2.7		
	RIF ✓	50	1.5		
	RIF ✓	61	2.8		
					330
PASS#4	RBT ✓	361	484	B04-77	
#4	RBT ✓	55	1.8	—	NO SCALE SAMPLE
↓	RBT ✓	109	17.3	B04-78	
	RBT ✓	199	81.5	B04-79	
	RBT ✓	102	14.0	B04-80	

E-33

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/2/2004 Page: 9 of 10

Reach: BEAR (continued)

Pass# 4	Species	Length	Weight	Scale Sample	Notes
|	RBT ✓	87	7.1	—	NO SCALES TAKEN
|	RBT ✓	83	6.3	—	NO SCALES
|	RBT ✓	102	14.2	—	NO SCALES
|	RBT ✓	94	11.8	—	NO SCALES
↓	RIF ✓	55	1.7		
	SMB ✓	157	49.0		
	SMB ✓	149	48.4		
	RIF ✓	105	16.1		
	RIF ✓	97	12.2		
	RIF ✓	71	4.7		
	HH ✓	58	2.4		
	Sucker ✓	73	6.2		
	RIF ✓	109	17.7		
	RIF ✓	67	3.9		
	RIF ✓	90	8.9		
	Sucker ✓	76	6.8		
	Sucker ✓	65	4.3		
	RIF ✓	70	4.6		
	RIF ✓	73	4.9		
	RIF ✓	94	10.2		
	Sucker ✓	70	5.2		
	RIF ✓	66	3.2		
	RIF ✓	53	1.9		
	RIF ✓	62	2.8		
	RBT ✓	44	1.2		NO SCALES TAKEN
	HH ✓	51	1.5		
	HH ✓	59	2.0		
	RIF ✓	114	20.3		
	RIF ✓	102	14.4		
	RIF ✓	67	3.8		
	HH ✓	47	1.0		
	Sucker ✓	72	5.9		
	HH ✓	52	1.6		
	HH ✓	50	1.4		
	Sucker ✓	64	4.0		
	HH ✓	50	1.3		
	Prickly ✓	77	5.0		
	RIF ✓	94	10.3		[redacted]
	RIF ✓	61	2.8		
	RIF ✓	64	2.9		
	RIF ✓	67	3.3		
	RIF ✓	58	2.3		
	RIF ✓	60	2.8		
	RIF ✓	65	3.3		
	PM ✓	62	2.6		

(43)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/2/2004 Page: 10 of 10

Reach: BEAR (continued)

Pass# 4	Species	Length	Weight	Scale Sample	Notes
4	HH	47	1.1		
	Sucker	62	3.5		
	RIF	67	3.5		
	RIF	67	3.5		
	RIF	56	2.0		
	RIF	55	2.1		
	RIF	59	2.4		
	RIF	52	1.5		
	RIF	52	1.7		
	HH	43	0.9		
	HH	40	0.7		
	HH	45	1.0		
	RIF	66	3.2		
				End	

(13) Σ=392

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR | County: PLUMAS | Date: 11103104

Reach: GRIZZLY | Est. Q: 70 | Page: 1 of 10

Air Temp.: 48F @ 9:15 | H20 Temp.: 8.5C @ 9:15 | Conductivity: microSiemens

Blocknets: TOP & BOTTOM | Specific Cond.: microSiemens

Reach Length: 300' | Salinity: ppt

Electroshocker Type: | D.O.: mg/L

Personnel: Shockers: SCOTT RILEY; MARK ALLEN; SEAN THORABEN; TOM GAST; STEVE EGGERS; TIM SALAMUNOVICH | % saturation

Photos:

Netters: CINDY GLASE; DOUG PARKINSON; SARAH YOUNG; JASON COBURN; DON BREMM; SEAILA FURBER; PAM TUSON; ROBERT LAMB

Shocker	Scott	Mark	Sean	Tom G	Steve	Tim			
Model	~~SR 15B~~	PGE 12B	TRPA 11B	PGE 12B	TRPA 11A	Type 7			
Battery ID	GAS	PGE	LEWIS	PGE	CLARK	PGE			
Voltage:	400	400	400	400	400	400	Start	Stop	
Frequency:	J-8	J-8	~~60~~ 30	~~30~~ J-8	30	J-8	time	Time	
1st Pass	1360	1735	1428	1829	1908	2129			
2nd Pass	1328	1776	1627	1819	2061	2386		11:28	
3rd Pass	1255	1688	1498	1673	1889	2208			
4th Pass									
5th Pass									

Lengths are fork lengths or total lengths in millimeters **Weights are in grams**

Pass#	Species	Length	Weight	Scale Sample	Notes
1	Sucker	389	631		
	RBT	218	130	GR0401	Mort. in bottom net after 1st pass
	RBT	232	131	GR04 -02	Frayed dorsal
	RBT	239	164	GR04 -03	
	RBT	125	23.0	GR04 -04	
	RIF	97	11.8		
	RBT	65	2.5		No scales
	RBT	104	13.0	-05	
	RBT	124	21.8	-06	
	RBT	102	12.8	-07	
	RIF	105	17.2		
	RBT	103	13.2	-08	
	RBT	92	8.8	-09	
	SMB	105	16.4		
	RBT	105	14.4	~~-09~~	10
	RBT	301	287	-11	
	RBT	355	467	-12	
	RBT	350	392	-13	
	Sucker	394	806		
	RBT	266	213	-14	
	RIF	127	30		
	RBT	161	50.0	-15	
	RIF	63	2.9		
	RBT	112	16.4	16	
	RBT	78	5.3	—	No Scales

352+166 50

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/03/04 Page: 2 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RBT	284	247	GROC 17	
	RBT	286	259	18	
	RBT	202	97	19	
	RIF	97	11.0	—	
	RBT	210	113	20	
	RBT	256	180	21	
	RBT	318	367	22	
	RBT	256	198	23	
	RBT	104	15.0	24	
	RBT	120	19.9	25	
	RBT	122	20.9	26	
	RBT	119	21.5	27	
	RBT	123	21.9	28	
	RIF	65	4.1	—	
	RBT	114	18.4	29	
	RBT	127	23.4	30	
	RBT	91	8.6	31	
	RBT	112	17.8	32	
	RBT	107	13.8	33	
	RBT	102	13.8	34	
	RBT	119	18.9	35	Missing tip of caddle fin
	RBT	96	10.1	36	
	RBT	~~44~~ (114)	17.2	37	
	HH	49	1.4	—	
	RBT	152	39.5	38	
	RBT	112	15.7	39	
	RBT	115	18.2	40	
	RBT	136	25.8	41	
	RIF	118	18.6	—	
	ATF	80	7.5 ~~7.5~~	—	
	RIF	68	3.8	—	
	RBT	93	8.7	42	
	RBT	112	19.3	43	
	RBT	88	7.7	44	
	RIF	101	14.4	—	
	RIF	68	4.4	—	
	RIF	103	10.2	—	
	RIF	89	8.1	—	
	RBT	98	11.4	45	
	RBT	99	10.8	46	
	RBT	109	16.1	47	
	RBT	74	4.5	No Scale	
	RBT	125	21.6	48	
	RIF	98	13.5	—	
	RBT	49	1.2	No Scale	

34

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11103104 Page: 3 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RBT	98	10.8	GR04 49	
	RBT	192	89.5	50	
	RIF	56	2.2	—	
	RBT	111	17.5	51	
	RBT	132	28.8	52	
	RBT	131	27.8	53	
	RBT	151	40.5	54	
	RBT	76	5.6	No scales	
	RIF	110	16.8	—	
	RIF	94	10.6	—	
	RBT	120	20.0	55	
	Sucker	69	4.3	—	
	RBT	71	4.6	56	
	RIF	60	2.6	—	
	RIF	83	7.9	—	
	RBT	94	9.9	57	
	RBT	87	7.3	58	
	RIF	59	2.3	—	
	RIF	87	9.7	—	
	RIF	69	4.1	—	
	RBT	60	2.4	No scales	
	RBT	71	4.8	59	
	RBT	96	10.4	60	
	RIF	99	13.0	—	
	RBT	77	6.4	61	
	RBT	114	19.8	62	
	RIF	62	2.8	—	
	RBT	100	12.2	63	
	RIF	90	10.6	—	
	RBT	82	8.0	64	
	RBT	124	22.6	65	
	RBT	108	13.7	66	
	RBT	51	1.6	~~No scales~~	No scales taken
	RIF	60	2.6	—	
	PM	64	2.8	—	
	RIF	90	9.4	—	
	RBT	112	17.2	67	
	RBT	195	105.8	68	
	RIF	99	13.0	—	
	RIF	85	7.8	—	
	RBT	81	6.0	69	
	RIF	83	7.7	—	
	RIF	79	6.2	—	
	RIF	61	2.7	—	
	RIF	95	11.5	—	

24

E115

G45

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/03/04 Page: 4 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF	71	4.8	—	
	RIF	97	12.2	—	
	RIF	64	3.8	—	
	RIF	50	1.5	—	
	RIF	64	2.9	—	
		62	3.1	—	
		62	3.3	—	
		64	3.0	—	
		49	1.3	—	
		62	2.9	—	
		51	1.6	—	
		55	1.8	—	
		64	2.9	—	
		56	2.6	—	
		115	24.8	—	
		92	11.9	—	
		92	10.3	—	
		96	10.9	—	
		62	3.4	—	
		71	3.5	—	
	—	53	2.0	—	
	PM	57	1.8	—	
	Sucker	152	53.0	—	
	Sucker	61	3.2	—	
	RIF	105	15.7	—	
	RIF	83	8.5	—	
	RIF	60	2.6	—	
	RBT	119	18.3	GR04 70	
	RIF	69	4.2	—	
	RIF	65	4.1	—	
	RIF	54	2.1	—	
	RIF	66	4.1	—	
	RBT	96	11.4	71	
	RBT	86	7.1	72	
	RIF	64	3.4	—	
	RIF	72	4.9	—	
	RBT	105	13.3	73	
	RBT	114	14.3	74	
	RIF	103	15.2	—	
	RIF	99	12.1	—	
	RIF	99	11.2	—	
	RBT	78	6.4	75	
	RBT	79	5.9	76	
	RBT	81	6.0	77	
	RIF	75	5.1	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11 03 04 Page: 5 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF ✓	65	3.4	—	
	RIF ✓	60	3.0	—	
	RIF ✓	56	2.6	—	
	RIF ✓	67	3.4	—	
	RIF ✓	52	1.3	—	
	SMB ✓	83	7.9	—	
	RIF ✓	71	4.9	—	
	RIF ✓	58	2.2	—	
	RIF ✓	74	5.7	—	
	Sucker ✓	66	4.0	—	
	RIF ✓	59	2.8	—	
	Prickly ✓	69	3.3	—	
	RIF ✓	52	2.2	—	
	RIF ✓	62	2.8	—	
	RIF ✓	79	6.3	—	
	RIF ✓	62	2.8	—	
	RIF ✓	54	1.7	—	
	RIF ✓	51	1.6	—	
	RIF ✓	53	1.7	—	
	RIF ✓	73	4.9	—	
	RIF ✓	68	3.8	—	
	RIF ✓	56	2.1	—	
	RIF ✓	47	1.3	—	
	RIF ✓	47	1.2	—	
#2	RBT ✓	117	19.0	GR04 78	
	RBT ✓	118	~~23~~ 20.5	79	
	RBT ✓	353	464	80	
	RBT ✓	354	434	81	
	RBT ✓	345	443	82	
	Sucker ✓	51	1.8	—	
RIF	~~Prickly~~ ✓	70	4.3	—	
	RBT ✓	306	311	83	
	RIF ✓	101	13.4	—	
	RIF ✓	114	21.8	—	
	RIF ✓	102	13.2	—	
	RIF ✓	105	16.7	—	
	RIF ✓	89	9.7	—	
	RIF ✓	86	8.8	—	
	RIF ✓	91	10.3	—	
	RBT ✓	~~23~~ 69	4.3	84	
	RIF ✓	54	1.7	—	
	Sucker ✓	44	1.0	—	
	RIF ✓	94	13.5	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

OK

Stream: NFFR Date: 11/03/04 Page: 6 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	RIF ✓	83	6.8	—	
	Sucker ✓	43	1.8	—	
	RIF ✓	74	4.7	—	
	RIF ✓	81	7.6	—	
	RIF ✓	44	2.9	—	
	RIF ✓	81	7.9	—	
	RIF ✓	61	2.9	—	
	RIF ✓	65	3.6	—	
	Sucker ✓	82	7.8	—	
	RIF ✓	61	3.0	—	
	RIF ✓	59	2.4	—	
	Sucker ✓	50	2.2	—	
	RIF ✓	63	3.0	—	
	RIF ✓	48	~~3.3~~ 1.3	—	
	RBT ✓	105	12.3	GR04 85	
	RBT ✓	128	25.3	86	
	✓	115	18.5	87	
	✓	114	18.8	88	
	✓	118	20.1	89	
	✓	123	26.0	90	
	✓	109	14.2	91	
	✓	73	4.9	NO Scale ~~93~~	
	✓	115	19.6	92	
	RIF ✓	69	4.9	—	
	Pricky ✓	85	8.1	—	
	RBT ✓	119	20.6	93	
	RIF ✓	70	4.2	—	
	RBT ✓	112	16.8	94	Deformed or meristic 1/2 of Caudle fin.
	RBT ✓	110	16.4	95	
	RIF ✓	62	2.5	—	
	RIF ✓	80	6.0	—	
	RBT ✓	87	8.5	96	
	RBT ✓	102	12.3	97	
	✓	94	10.3	98	
	✓	116	17.8	99	
	✓	91	9.0	100	
	✓	90	8.5	101	
	✓	107	13.0	102	
	✓	139	32.7	103	
	RIF ✓	93	9.8	—	
	RIF ✓	93	11.6	—	
	RBT ✓	113	18.9	104	
	RIF ✓	124	22.8	—	
	RIF ✓	61	3.0	—	
	RBT ✓	123	22.4	105	

(22)

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/03/04 Page: 7 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	RIF ✓	62	2.2	—	
	RBT ✓	110	17.9	GR04-106	
	RIF ✓	104	14.1	—	
	RIF ✓	109	18.2	—	
	RIF ✓	95	12.1	—	
	RIF ✓	99	14.2	—	
	RIF ✓	89	9.7	—	
	RIF ✓	98	13.8	—	
	RIF ✓	79	6.2	—	
	RIF ✓	75	5.1	—	
	PM ✓	64	2.7	—	
	RBT ✓	75	5.8	107	
	Sucker ✓	56	2.3	—	
	RBT ✓	116	17.7	108	
	RBT ✓	87	9.0	109	
	RBT ✓	61	2.6	No Scale	
	RIF ✓	51	1.6	—	
	RBT ✓	89	7.8	110	
	Sucker ✓	65	3.9	—	
	Sucker ✓	81	6.4	—	
	Sucker ✓	62	3.4	—	
	Sucker ✓	57	2.4	—	
	Sucker ✓	77	6.0	—	
	RIF ✓	94	12.2	—	
	RIF	105	16.0	—	
	↓	97	15.7	—	
		57	2.4	—	
		108	15.8	—	
		92	9.4	—	
		110	21.8	—	
		89	9.6	—	
		94	11.1	—	
		66	3.5	—	
		112	19.2	—	
		57	2.4	—	
		52	1.9	—	
		64	3.2	—	
		59	2.5	—	
		63	2.8	—	
		60	2.8	—	
		75	6.0	—	
		65	3.5	—	
		96	13.2	—	
		69	4.4	—	
	↓	54	2.1	—	

(60)

29

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/03/04 Page: 8 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	RIF	59	2.6	—	
		69	4.7	—	
		60	2.6	—	
		61	2.6	—	
		54	1.6	—	
		57	2.6	—	
		45	1.0	—	
		66	3.5	—	
		99	13.0	—	
		84	7.4	—	
		60	2.8	—	
		64	2.9	—	
		70	4.6	—	
		52	1.6	—	
		59	2.3	—	
		59	2.6	—	
		61	2.7	—	
		54	2.0	—	
		55	1.9	—	
		61	2.7	—	
		49	1.4	—	
		52	1.4	—	
		61	2.8	—	
	—	53	1.7	—	
	RIF	80	6.2	—	
#3	RBT	120	21.0	GR04 111	
		97	11.1	112	
		120	19.5	113	
	—	97	10.4	114	
	Sucker	194	1061.7	—	
	RBT	76	6.2	115	
		92	10.2	116	
		70	4.0	117	
	—	262	224	118	
	RIF	54	1.9	—	
	RIF	101	14.0	—	
	RIF	105	14.7	—	
	RIF	58	2.1	—	
	RIF	59	2.1	—	
	RIF	59	2.5	—	
		105	14.8	—	
		82	7.1	—	
		59	2.5	—	
	—	52	1.6	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/03/04 Page: 9 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
3	RIF	43	1.0	—	
	"	53	1.7	—	
	Sucker	82	8.8	—	
	RBT	188	90.4	GR04-119	
	RBT	127	23.3	120	
	"	125	24.7	121	
	"	115	17.2	122	
	PM	128	18.3	—	
	RBT	85	6.9	123	
	RBT	129	23.5	124	
	RBT	109	15.5	125	
	RBT	131	25.2	126	
	RIF	116	21.5	—	
	"	94	11.0	—	
	"	99	12.0	—	
	"	107	17.3	—	
	"	96	11.5	—	
	"	93	10.6	—	
	"	97	13.7	—	
	"	109	21.2	—	
	"	80	6.5	—	
	"	70	4.2	—	
	"	77	5.6	—	
	"	66	3.6	—	
	"	62	2.9	—	
	SMB	120	25.6	—	
	"	91	10.5	—	
	RIF	102	14.9	—	
	RIF	98	12.4	—	
	"	81	6.5	—	
	"	69	4.1	—	
	RBT	94	9.9	GR04 127	
	RBT	99	11.2	128	
	RIF	75	5.5	—	
	RIF	97	14.1	—	
	RIF	92	10.4	—	
	RIF	103	14.5	—	
	"	60	2.6	—	
	"	65	3.2	—	
	"	63	3.0	—	
	RBT	95	10.8	129	
	RIF	71	4.9	—	
	Sucker	55	2.2	—	
	RBT	95	11.5	130	
	RIF	73	5.1	—	

E-38
45

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11 / 03 04 Page: 10 of 10

Reach: GRIZZLY (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#3	RIF	66	3.1	—	
		58	2.5	—	
		69	4.1	—	
		90	8.9	—	
	Sucker	68	4.4	—	
	RIF	123	27.2	—	
		64	3.0	—	
		81	7.5	—	
	Sucker	69	4.6	—	
	RIF	67	3.9	—	
	RIF	54	2.0	—	
	RIF	62	3.0	—	
		62	2.4	—	
		87	8.3	—	
		54	1.9	—	
		67	3.4	—	
		45	1.0	—	
		51	1.8	—	
		62	2.6	—	
		47	1.3	—	
		57	1.9	—	
		55	2.0	—	
		57	2.10	—	
					END

23

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR | County: PLUMAS | Date: 11/04/04
Reach: Indian Jim | Est. Q: ~60 | Page: 1 of 3
Air Temp.: @ | H20 Temp.: @ | Conductivity: microSiemens
Blocknets: TOP & BOTTOM | Specific Cond.: microSiemens
Reach Length: 294 feet 11-3 | Salinity: ppt
Electroshocker Type: | D.O.: mg/L
Personnel: Shockers: SCOTT RILEY; SEAN THORABEN; TOM GAST; TIM SALAMUNOVICH; STEVE EGGERS | % saturation
IJ04 Netters: SARAH YOUNG; MARK ALLEN; DON BREMM; PAM TUSON; JASON COBURN; DOUG PARKINSON; SEAILA FURBER; ROBERT LAMB; CINDY GLASE | Photos:

Shocker	Scott	SEAN	Tom	TIM	STEVE				
Model	PGE 12B	TRPA IIA	PGE 12B	PGE TYPE VII	TRPA IIA				
Battery ID	PGE	Lewis	PGE	PGE	CLARK				
Voltage:	400	→	→	→	→		Stop time		
Frequency:	J-8	30	J-8	J-8	30				
1st Pass	1250	1326	1837	1875	1863				
2nd Pass	1349	1367	1748	1818	1478		11:13 a.m.		
3rd Pass	1145	1066	1461	??? 3 sec.	1304		12:45 p.m.		
4th Pass				↙					
5th Pass				Clock malfunctioned ? - RESET			VERK TOP ? NIB13		

Lengths are fork lengths or total lengths in millimeters **Weights are in grams**

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RBT ✓	333	385	IJ04 01	
	SKR ✓	467	1301	—	
	| ✓	400	966	—	
	| ✓	389	817	—	
	⊥ ✓	385	869	—	
	HH ✓	148	31.1	—	
	HH ✓	133	23.9	—	
	SKR ✓	446	1253	—	
	| ✓	404	885	—	
	⊥ ✓	435	1187	—	
	HH ✓	146	28.5	—	
	HH ✓	91	7.3	—	
	HH ✓	109	12.3	—	
	SKR ✓	383	810	—	
	⊥ ✓	474	1448		left Pelvic fin missing
	RBT ✓	367	502	IJ04-02	
	HH ✓	50	1.3	—	
	⊥ ✓	48	1.3	—	
	SKR ✓	278	307	—	
	| ✓	389	812	—	Tumor left Dorsal
	| ✓	404	985	—	
	| ✓	360	628	—	
	| ✓	404	922	—	
	| ✓	401	878	—	
	↓ ✓	423	1118	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/04/04 Page: 2 of 8

Reach: Indian Jim (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	SKR	379	830	—	
	"	349	538	—	
	"	406	906	—	
	"	390	857	—	
	"	384	772	—	
	HH	140	29.3	—	
	PM	182	63.0	—	
	PM	198	71.4	—	
	HH	142	31.9	—	
	HH	136	26.2	—	
	HH	136	26.7	—	
	HH	136	25.9	—	
	HH	62	2.4	—	
	HH	152	39.4	—	
	RBT	263	193	IJ04-03	
	HH	45	1.1	—	
	HH	77	4.5	—	
	RBT	376	505	IJ04-04	
	SKR	376	720	—	
	"	443	977	—	
	"	404	850	—	
	HH	127	19.9	—	
	"	51	1.1	—	
	"	130	21.7	—	
	"	140	27.3	—	
	RBT	328	374	IJ04-05	
	SKR	327	501	—	
	"	386	814	—	Parasite right Caudal
	"	374	691	—	
	PM	167	42.6	—	
	HH	144	30.7	—	
	"	44	0.8	—	
	"	32	0.3	—	
	RBT	330	360	IJ04-06	
	SKR	400	852	—	
	"	363	701	—	
	"	442	1167	—	
	"	387	915	—	
	HH	143	30.7	—	
	"	96	8.8	—	
	"	115	15.7	—	
	"	141	27.5	—	
	SKR	433	1193	—	
	"	389	797	—	
	"	337	552	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/04/04 Page: 3 of 8

Reach: INDIAN JIM (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	SKR	282	342	—	
	HH	105	11.9	—	
	"	41	0.7	—	
	"	137	26.9	—	
	"	81	5.6	—	
	"	141	28.2	—	
	SKR	420	1038	—	Tumor Rt. dorsal
	"	412	985	—	
	"	379	755	—	
	"	378	814	—	Tumor Rt dorsal
	HH	95	8.4	—	
	"	54	1.6	—	
	SKR	403	899	—	
	"	428	1037	—	
	HH	54	1.7	—	
	RBT	343	424	IJ04-07	
	SKR	366	676	—	
	RBT	255	174	IJ04-08	
	SKR	356	594	—	
	"	384	845	—	
	"	398	865	—	
	"	286	363	—	
	HH	147	35.5	—	
	"	170	48.1	—	
	RBT	253	177	IJ04-09	
	SKR	448	1137	—	
	"	424	1053	—	
	"	409	905	—	Tumor Rt Dorsal
	SMB	93	11.4	—	
	HH	89	7.1	—	
	SKR	395	850	—	
	"	331	524	—	
	"	394	831	—	
	HH	91	8.0	—	
	"	131	21.9	—	
	SKR	120	23.4	—	
	HH	86	6.3	—	
	HH	134	25.2	—	
	PM	127	18.7	—	
	PM	115	14.0	—	
	SKR	390	860	—	
	"	380	733	—	
	"	294	403	—	Tumor left dorsal
	HH	104	11.1	—	
	"	145	31.1	—	

5:11
US

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11041 04 Page: 4 of 8

Reach: INDIAN JIM (continued)

Pass#	Species		Length	Weight	Scale Sample	Notes
1	HH	✓	97	9.4	—	
	⊥	✓	151	35.8	—	
	PM	✓	190	58.5	—	
	HH	✓	121	18.2	—	
	⊥	✓	151	35.4	—	
	PM	✓	117	13.7	—	
	HH	✓	137	25.5	—	
	RIF	✓	79	5.0	—	
	PM	✓	127	19.4	—	
	HH	✓	145	29.4	—	
	|	✓	101	10.1	—	
	⊥	✓	51	1.3	—	
	PM	✓	118	16.8	—	
	SKR	✓	61	2.9	—	
	HH	✓	148	32.6	—	
	⊥	✓	130	21.9	—	
	RIF	✓	105	14.6	—	
	SKR	✓	140	32.4	—	
	RIF	✓	83	5.8	—	
	|	✓	93	9.6	—	
	⊥	✓	58	2.4	—	
	SKR	✓	135	35.7	—	
	RIF	✓	57	2.5	—	
	|	✓	75	6.6	—	
	|	✓	106	13.6	—	
	|	✓	81	6.0	—	
	|	✓	81	6.2	—	
	|	✓	78	5.6	—	
	|	✓	70	4.8	—	
	|	✓	58	2.5	—	
	|	✓	51	1.5	—	Mort
	|	✓	89	8.3	—	
	|	✓	62	2.7	—	
	|	✓	97	10.9	—	
	|	✓	61	2.4	—	
	|	✓	94	11.1	—	
	|	✓	56	2.1	—	
	|	✓	55	2.4	—	
	|	✓	57	2.2	—	
	—	✓	65	3.3	—	
	PRICKLY	✓	64	3.2	—	
	RIF	✓	69	3.8	—	
	|	✓	56	2.3	—	
	|	✓	58	2.5	—	
	↓	✓	51	1.6	—	

Σ=16

(45)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: ~~E~~NFFR Date: 11/04/04 Page: 5 of 8

Reach: INDIAN JIM (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF	✓ 55	2.1	—	
	|	✓ 57	2.0	—	
	|	✓ 55	2.1	—	
	|	✓ 65	3.2	—	
	|	✓ 51	1.5	—	
	|	✓ 52	1.5	—	
	|	✓ 49	1.6	—	
	|	✓ 48	1.5	—	
	|	✓ 46	1.0	—	
	|	✓ 44	1.0	—	
	SKR	✓ 67	4.0	—	
	RIF	✓ 65	3.5	—	
	|	✓ 54	2.0	—	
	⊥	✓ 47	1.2	—	
	RBT	✓ 208	101	IJ04-10	
	⊥	✓ 108	14.5	IJ04-11	
	SKR	✓ 241	170	—	
	RIF	✓ 55	1.8	—	
	SKR	✓ 201	101	—	
	⊥	✓ 180	72	—	
	HH	✓ 136	25.3	—	
	PM	✓ 113	13.7	—	
	⊥	✓ 103	10.5	—	
	HH	✓ 147	32.1	—	
	HH	✓ 54	1.7	—	
#2	HH	✓ 135	24.7	—	missing snout & tail (most)
	PM	✓ 57	1.7	—	
	HH	✓ 121	18.2	—	
	|	✓ 134	22.9	—	
	|	✓ 138	25.3	—	
	|	✓ 149	33.6	—	
	|	✓ 158	39.6	—	
	|	✓ 152	37.4	—	
	|	✓ 81	4.8	—	
	⊥	✓ 75	4.6	—	
	RIF	✓ 74	5.4	—	
	RBT	✓ 341	394	IJ04-12	
	SKR	✓ 373	638	—	
	|	✓ 419	1124	—	
	|	✓ 393	789	—	
	|	✓ 398	924	—	
	⊥	✓ 388	862	—	
	HH	✓ 150	33.8	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/04/04 Page: 6 of 8

Reach: INDIAN JIM (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	HH ✓	139	28.3	—	
	" ✓	93	8.6	—	
	" ✓	95	9.3	—	
	" ✓	155	36.2	—	
	" ✓	153	36.4	—	
	" ✓	96	8.9	—	
	" ✓	59	2.3	—	
	" ✓	60	2.0	—	
	SKR ✓	403	845	—	
	HH ✓	169	53.4	—	
	" ✓	121	17.4	—	
	" ✓	89	6.6	—	lower tail fin missing
	" ✓	86	5.7	—	
	RBT ✓	264	216	IS04-13	
	" ✓	333	372	IS04-14	
	SKR ✓	147	38.2	—	
	PM ✓	170	37.2	—	
	SKR ✓	205	122.1	—	
	" ✓	136	34.7	—	
	" ✓	157	48.5	—	
	" ✓	131	30.1	—	
	PM ✓	102	9.7	—	
	SMB ✓	105	17.1	—	
	PM ✓	111	12.4	—	
	HH ✓	86	6.0	—	
	RIF ✓	86	7.4	—	
	" ✓	72	5.0	—	
	" ✓	65	2.0	—	
	" ✓	53	2.0	—	
	" ✓	89	7.6	—	
	" ✓	56	2.2	—	
	" ✓	77	4.5	—	
	" ✓	61	2.9	—	
	" ✓	65	2.7	—	
	" ✓	62	3.3	—	
	" ✓	57	1.8	—	
	" ✓	56	1.8	—	
	" ✓	51	1.4	—	
	" ✓	51	1.3	—	
	" ✓	55	1.9	—	
	" ✓	52	1.5	—	
	" ✓	52	1.4	—	
	" ✓	61	2.1	—	
	PM ✓	61	1.6		
	RIF ✓	65	3.4	—	

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/04/04 Page: 7 of 8

Reach: INDIAN JIM (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	RIF	59	2.5		
	↓	60	2.3		
		60	2.2		
		61	2.4		
		50	1.4		
		59	2.1		
		58	2.1		
		55	2.2		
		55	1.5		
		49	1.0		
		59	2.3		
		58	2.1		
		59	2.3		
	—	50	1.2		
	—	50	1.2		
#3	SKR ✓	433	1143	—	
	— ✓	118	23.1	—	Mort Headless/Tailless
	RBT ✓	115	18.9	I504 -15	
	HH ✓	80	5.7	—	Mort [redacted]
	HH ✓	142	27.9	—	
	HH ✓	138	28.0	—	
	| ✓	119	17.2	—	
	| ✓	176	57.4	—	
	SKR ✓	164	59.8	—	
	PM ✓	64	3.1	—	
	HH ✓	99	10.2	—	
	| ✓	98	9.6	—	
	| ✓	46	1.0	—	
	— ✓	54	1.5	—	
	RIF ✓	81	5.5	—	
	HH ✓	91	7.6	—	
	RIF ✓	65	3.4	—	
	PM ✓	103	11.9	—	
	SKR ✓	89	8.9	—	
	RIF ✓	106	18.7	—	
	PM ✓	59	2.0	—	
	RIF ✓	98	13.1	—	
	| ✓	84	7.3	—	
	| ✓	88	7.9	—	
	SKR ✓	77	5.6	—	
	PM ✓	49	1.1	—	
	RIF ✓	58	2.6	—	
	↓ ✓	81	5.6	—	

263 Σ= (15)

Σ=291 (43)

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/04/04 Page: 8 of 8

Reach: INDIAN JIM (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#3	RIF	58	2.2		
		55	1.7		
		62	2.6		
		57	2.2		
		54	1.6		
		95	9.0		
		51	1.6		
		48	1.1		
		58	2.4		
		60	2.5		
		59	2.2		
		54	1.6		
		50	1.4		
					END

TOP NET ONLY IN SIDECHANNEL — NO BOTTOM NET — 6 NOV 2004

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form (6)

Stream: NFFR | County: PLUMAS | Date: 11/10/04

Reach: Rogers Flat | Est. Q: ~70 cfs | Page: 1 of 5

Air Temp.: @ | H20 Temp.: @ | Conductivity: microSiemens

Blocknets: TOP & BOTTOM in Main Channel (Bottom) | Specific Cond.: microSiemens

Reach Length: 231 feet | WINDY - set up umbrella 1/2 to screen sides | Salinity: ppt

Electroshocker Type: | D.O.: mg/L

Personnel: Shockers: DOUG PARKINSON; SEAN THORABEN; TIM SALAMUNOVICH; TOM GAST; STEVE EGGERS | Photos: % saturation

P1-P2-P3 60-17-8

Netters: SCOTT RILEY; CINDY GLASS; PAM TUSON; SARAH YOUNG; SEAILA FURBEE; DON BRAMM; MARK ALLEN; ROBERT LAMB; JASON COBURN | Side Channel

Shocker	Doug	Sean	Tim	Tom	Steve		Tom	Sean	
Model	TRPA 5A	PGE 12B	TYPE 7	PGE 12B	TRPA 11B		PGE 12B	PGE 12B	
Battery ID	LEWIS	PGE	PGE	PGE	CLARK		PGE	PGE	
Voltage:	400	~~B~~400	400	400	400		400	400	
Frequency:	30	J-8	J-8	J-8	30		J-8	J-8	
1st Pass	1118	996	1497	1123	1109		339	383	
2nd Pass	1041	1011	1416	1033	1086		322	286	
3rd Pass		896	1070	1052	1144		234	311	
4th Pass									
5th Pass									

Lengths are fork lengths or total lengths in millimeters **Weights are in grams**

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF	109	15.5	~~RF04-00~~	
	RBT	136	30.5	RF04-01	
	⊥	122	22.3	RF04-02	
	⊥	123	22.5	-03	
	RIF	107	16.5	—	
	HH	126	21.9	—	
	RBT	234	166	RF04-04	
	RBT	262	204	RF04-05	
* SC 1	RIF	127	31.3	—	
** ↑	⊥	53	2.1	—	
***	RBT	64	2.4	NO SC. ~~06~~	SIDE CHANNEL PASS 1 CAPTURES
*	PM	144	25.8	—	
**	HH	51	2.1	—	
* SC 1	RBT	115	18.0	RF04-06	
	RIF	98	12.3	—	
	⊥	130	29.4	—	
	PRICKLY	101	13.2	—	
	RBT	105	13.6	RF04-07	
	SMB	153	54.6	—	
	HH	134	23.7	—	
	RBT	141	36.5	RF04-08	
	RIF	102	15.4	—	
	↓	118	20.6	—	
	↓	71	5.1	—	
	↓	65	3.4	—	

6 NOV 2004 OK

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/06/04 Page: 2 of 5

Reach: Roger's Flat (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RIF	✓ 56	2.0	—	
	⊥	✓ 74	5.2	—	
	RBT	✓ 176	79.0	RF04-09	
	|	✓ 231	131	RF04-10	
	|	✓ 182	72.0	RF04-11	
	|	✓ 343	423	RF04-12	
	RIF	✓ 110	19.7	—	
	⊥	✓ 98	12.5	—	
	HH	✓ 130	21.2	—	
	RIF	✓ 94	9.2	—	
	Prickly	✓ 95	16.4	—	
	RIF	✓ 65	3.0	—	
	⊥	✓ 74	4.5	—	
	HH	✓ 92	7.1	—	
	Sucker	✓ 150	50.4	—	
	RBT	✓ 174	65.3	RF04-13	
	|	✓ 174	70.6	RF04-14	
	|	✓ 251	177	RF04-15	
	|	✓ 120	21.3	RF04-16	
	|	✓ 271	219	RF04-17	
	|	✓ 123	23.5	RF04-18	
	|	✓ 236	169	RF04-19	
	|	✓ 338	430	RF04-20	
	|	✓ 308	316	RF04-21	
	|	✓ 287	264	RF04-22	
	|	✓ 281	262	RF04-23	
	|	✓ 322	337	RF04-24	
	|	✓ 269	207	RF04-25	
	⊥	✓ 197	93.2	RF04-26	
	RIF	✓ 122	24.5	—	
	RBT	✓ 138	33.0	RF04-27	
	|	✓ 112	17.2	RF04-28	
	|	✓ 110	16.0	RF04-29	
	|	✓ 109	15.7	RF04-30	
	|	✓ 302	290	RF04-31	
	|	✓ 343	422	RF04-32	
	|	✓ 250	182	RF04-33	
	|	✓ 332	379	RF04-34	
	|	✓ 246	174	RF04-35	
	|	✓ 290	278	RF04-36	
	|	✓ 231	137	RF04-37	
	|	✓ 195	100	RF04-38	
	|	✓ 241	186	RF04-39	
	|	✓ 244	177	RF04-40	
	↓	✓ 195	90	RF04-41	

45

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/05/04 Page: 3 of 5

Reach: Rogers Flat (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1	RBT	232	162	RF04-42	
		247	163	-43	
		240	150	-44	
		210	105	-45	
		199	102	-46	
	RIF	58	2.4	—	
	RBT	122	22.9	-47	eroded lower caudal
		116	20.0	-48	
		122	22.6	-49	
		145	41.0	-50	wt = 41.0 grams
		123	22.5	-51	
		139	33.5	-52	
		203	90.8	-53	
		230	143.0	-54	
		152	48.0	-55	
		128	24.8	-56	
		99	11.3	-57	
		118	20.1	-58	
		113	18.0	-59	
	RIF	121	20.0	—	
		121	25.1	—	
		103	15.2	—	
		56	1.6	—	
		112	16.6	—	
	HH	125	17.9	—	
	Sucker	156	50.8	—	
	RIF	112	18.5	—	
		128	30.6	—	
		64	3.1	—	
		63	3.1	—	
		60	2.5	—	
		105	13.6	—	
		65	3.1	—	
	Prickly	58	2.2	—	
	RIF	60	2.5	—	
		110	16.0	—	
		62	3.0	—	
		76	5.0	—	
	Prickly	64	2.9	—	
	RIF	55	1.8	—	
		54	1.9	—	
		54	1.8	—	
				//	end 1st pass

E112
42

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/05/04 Page: 4 of 5

Reach: Roger's Flat (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#2	RBT ✓	170	63.4	-60	mort. in bottom net after 2nd pass
	RBT ✓	192	95.0	-61	
	RBT ✓	129	27.8	-62	
	Prickly ✓	118	22.5	—	
	RBT ✓	95	10.7	-63	
	SKR ✓	176	84.0	—	
	RBT ✓	265	203.0	-64	
	SKR ✓	208	115.2	—	
* SC-2	[redacted] HH ✓	44	0.7	—	[redacted]
* SC-2	HH ✓	47	1.0	—	Stubby caudal fin
* SC-2	PM ✓	116	15.3	—	→ ONLY 2nd PASS STOECH CAPTURES = 3 FISH
#2	SKR ✓	215	134.6	—	
	RBT ✓	190	86.1	-65	
	RBT ✓	115	17.8	-66	
	RBT ✓	240	161	-67	
	RBT ✓	274	264	-68	
	PM ✓	119	17.8	—	
	RBT ✓	137	29.5	-69	
	RIF ✓	71	4.3	—	
	RBT ✓	121	22.6	-70	
	SMB ✓	88	10.0	—	
	RBT ✓	121	21.1	-71	
	RIF ✓	100	13.4	—	
	HH ✓	152	32.5	—	
	PM ✓	169	45.4	—	
	RBT ✓	151	43.2	-72	
	RIF ✓	71	4.4	—	
	RBT ✓	117	20.9	-73	
	RIF ✓	56	1.4	—	
	RBT ✓	93	9.4	-74	
	SKR ✓	166	66.1	—	
	RIF ✓	86	8.0	—	
	RBT ✓	118	20.2	-75	
	RBT ✓	103	15.0	-76	
	RIF ✓	60	2.2	—	
	SMB ✓	69	5.5	—	
	HH ✓	51	1.2	—	
	RIF ✓	59	2.2	—	
	RIF ✓	62	2.5	—	
	RIF ✓	68	4.1	—	
	RIF ✓	69	4.6	—	
↓	RIF ✓	59	2.1	—	End Pass 2

Thomas R. Payne & Associates Electrofishing Survey - Fish Data Form

Stream: NFFR Date: 11/6/04 Page: 5 of 5

Reach: Rogers Flat (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
#3	RIF ✓	107	17.6	—	
	RIF ✓	106	16.4	—	
	RIF ✓	115	21.6	—	
	HH ✓	45	0.9	—	
	RIF ✓	64	2.9	—	
	HH ✓	111	15.2	—	
	RBT ✓	234	167	-77	
	RIF ✓	121	21.2	—	
↓	HH ✓	163	44.5	—	Missing top of caudal
#3	RBT ✓	161	52.6	-78	
	RBT ✓	124	27.5	-79	
	RBT ✓	262	186	-80	
	RBT ✓	243	174	-81	
	SKR ✓	246	208	—	
	RBT ✓	196	94.1	-82	
↓	RIF ✓	99	9.4	—	
	RBT ✓	229	145	-83	
	RIF ✓	74	5.1	—	
	RBT ✓	106	14.7	-84	
	RIF ✓	58	2.7	—	
	RIF ✓	59	2.0	—	
	SKR ✓	140	30.2	—	
↓	SMB ✓	88	10.7	—	
*	SC-03	PM ✓ 64	2.7	—	* ONLY SIDECH PASS 3 CAPTURE
					End of PASS 3

24 179

Appendix D

MicroFish 3.0 and Program CAPTURE Output for the November 2004 Electrofishing Data

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Rainbow trout

Removal Pattern: 32 32 15 10
Total Catch = 89
Population Estimate = 110

Chi Square = 3.099
Pop Est Standard Err = 11.984
Lower Conf Interval = 89.000
Upper Conf Interval = 133.729

Capture Probability = 0.336
Capt Prob Standard Err = 0.068
Lower Conf Interval = 0.202
Upper Conf Interval = 0.470

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 86.27124 .

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Hardhead

Removal Pattern: 16 14 8 11
Total Catch = 49
Population Estimate = 87

Chi Square = 1.338
Pop Est Standard Err = 36.591
Lower Conf Interval = 49.000
Upper Conf Interval = 159.743

Capture Probability = 0.186
Capt Prob Standard Err = 0.106
Lower Conf Interval = -.026
Upper Conf Interval = 0.397

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 14.25737 .

Stream: NFFR below Bear Creek, 2 November 2004
Species: Sacramento pikeminnow

Removal Pattern: 8 3 1 1
Total Catch = 13
Population Estimate = 13

Chi Square = 0.724
Pop Est Standard Err = 0.658
Lower Conf Interval = 13.000
Upper Conf Interval = 14.433

Capture Probability = 0.619
Capt Prob Standard Err = 0.133
Lower Conf Interval = 0.329
Upper Conf Interval = 0.909

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 11.56654 .

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Sacramento sucker

Removal Pattern: 11 15 12 7
Total Catch = 45
Population Estimate = 91

Chi Square = 2.112
Pop Est Standard Err = 51.798
Lower Conf Interval = 45.000
Upper Conf Interval = 193.922

Capture Probability = 0.156
Capt Prob Standard Err = 0.114
Lower Conf Interval = -.071
Upper Conf Interval = 0.383

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -11.92172 .

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Smallmouth bass

Removal Pattern: 8 7 6 2
Total Catch = 23
Population Estimate = 28

Chi Square = 1.350
Pop Est Standard Err = 5.947
Lower Conf Interval = 23.000
Upper Conf Interval = 40.202

Capture Probability = 0.338
Capt Prob Standard Err = 0.133
Lower Conf Interval = 0.064
Upper Conf Interval = 0.612

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 15.79751 .

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Riffle sculpin

Removal Pattern: 49 33 52 31
Total Catch = 165
Population Estimate = 513

Chi Square = 7.246
Pop Est Standard Err = 305.053
Lower Conf Interval = 165.000
Upper Conf Interval = 1,113.955

Capture Probability = 0.092
Capt Prob Standard Err = 0.063
Lower Conf Interval = -.033
Upper Conf Interval = 0.217

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -87.9549 .

Stream: NFFR below Bear Ranch Creek, 2 November 2004
Species: Prickly sculpin

Removal Pattern: 4 2 2 1
Total Catch = 9
Population Estimate = 9

Chi Square = 1.142
Pop Est Standard Err = 1.180
Lower Conf Interval = 9.000
Upper Conf Interval = 11.720

Capture Probability = 0.500
Capt Prob Standard Err = 0.185
Lower Conf Interval = 0.073
Upper Conf Interval = 0.927

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 6.279553 .

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Rainbow trout

Removal Pattern: 84 35 20
Total Catch = 139
Population Estimate = 154

Chi Square = 0.593
Pop Est Standard Err = 7.362
Lower Conf Interval = 139.424
Upper Conf Interval = 168.576

Capture Probability = 0.537
Capt Prob Standard Err = 0.055
Lower Conf Interval = 0.427
Upper Conf Interval = 0.646

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Hardhead

Removal Pattern: 1 0 0
Total Catch = 1
Population Estimate = 1 (**Using Program CAPTURE**)

Chi Square = 0.000
Pop Est Standard Err = 0.00014
Lower Conf Interval = 1.000
Upper Conf Interval = 2.000

Capture Probability = 0.9996

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 0.00.

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Sacramento pikeminnow

Removal Pattern: 2 1 1
Total Catch = 4
Population Estimate = 4

Chi Square = 0.865
Pop Est Standard Err = 0.969
Lower Conf Interval = 4.000
Upper Conf Interval = 7.083

Capture Probability = 0.571
Capt Prob Standard Err = 0.323
Lower Conf Interval = -.456
Upper Conf Interval = 1.599

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was .9168732 .

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Sacramento sucker

Removal Pattern: 6 11 5
Total Catch = 22
Population Estimate = 54

Chi Square = 2.958
Pop Est Standard Err = 63.884
Lower Conf Interval = 22.000
Upper Conf Interval = 182.152

Capture Probability = 0.158
Capt Prob Standard Err = 0.222
Lower Conf Interval = -.288
Upper Conf Interval = 0.605

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -74.15192 .

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Smallmouth bass

Removal Pattern: 2 0 2
Total Catch = 4
Population Estimate = 4

Chi Square = 5.571
Pop Est Standard Err = 1.468
Lower Conf Interval = 4.000
Upper Conf Interval = 8.670

Capture Probability = 0.500
Capt Prob Standard Err = 0.367
Lower Conf Interval = -.667
Upper Conf Interval = 1.667

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -.6698995 .

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Riffle sculpin

Removal Pattern: 88 86 59
Total Catch = 233
Population Estimate = 520

Chi Square = 1.697
Pop Est Standard Err = 158.084
Lower Conf Interval = 233.000
Upper Conf Interval = 831.426

Capture Probability = 0.180
Capt Prob Standard Err = 0.067
Lower Conf Interval = 0.048
Upper Conf Interval = 0.311

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was 208.5739 .

Stream: NFFR below Grizzly Creek, 4 November 2004
Species: Prickly sculpin

Removal Pattern: 1 1 0
Total Catch = 2
Population Estimate = 2

Chi Square = 0.929
Pop Est Standard Err = 0.384
Lower Conf Interval = 2.000
Upper Conf Interval = 6.884

Capture Probability = 0.667
Capt Prob Standard Err = 0.384
Lower Conf Interval = -4.217
Upper Conf Interval = 5.550

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was -2.883589 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Rainbow trout

Removal Pattern: 11 3 1
Total Catch = 15
Population Estimate = 15

Chi Square = 0.147
Pop Est Standard Err = 0.595
Lower Conf Interval = 15.000
Upper Conf Interval = 16.275

Capture Probability = 0.750
Capt Prob Standard Err = 0.119
Lower Conf Interval = 0.495
Upper Conf Interval = 1.005

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 13.72461 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Hardhead

Removal Pattern: 57 23 10
Total Catch = 90
Population Estimate = 96

Chi Square = 0.050
Pop Est Standard Err = 4.106
Lower Conf Interval = 90.000
Upper Conf Interval = 104.150

Capture Probability = 0.596
Capt Prob Standard Err = 0.063
Lower Conf Interval = 0.471
Upper Conf Interval = 0.721

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 87.85045 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Sacramento pikeminnow

Removal Pattern: 11 5 4
Total Catch = 20
Population Estimate = 22

Chi Square = 0.720
Pop Est Standard Err = 3.195
Lower Conf Interval = 20.000
Upper Conf Interval = 28.646

Capture Probability = 0.513
Capt Prob Standard Err = 0.153
Lower Conf Interval = 0.195
Upper Conf Interval = 0.831

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was 15.35389 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Sacramento sucker

Removal Pattern: 63 11 5
Total Catch = 79
Population Estimate = 79

Chi Square = 2.187
Pop Est Standard Err = 0.994
Lower Conf Interval = 79.000
Upper Conf Interval = 80.979

Capture Probability = 0.790
Capt Prob Standard Err = 0.047
Lower Conf Interval = 0.696
Upper Conf Interval = 0.884

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was 77.02127 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Smallmouth bass

Removal Pattern: 1 1 0
Total Catch = 2
Population Estimate = 2

Chi Square = 0.929
Pop Est Standard Err = 0.384
Lower Conf Interval = 2.000
Upper Conf Interval = 6.884

Capture Probability = 0.667
Capt Prob Standard Err = 0.384
Lower Conf Interval = -4.217
Upper Conf Interval = 5.550

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -2.883589 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Riffle sculpin

Removal Pattern: 41 35 21
Total Catch = 97
Population Estimate = 151

Chi Square = 0.720
Pop Est Standard Err = 33.926
Lower Conf Interval = 97.000
Upper Conf Interval = 218.174

Capture Probability = 0.289
Capt Prob Standard Err = 0.091
Lower Conf Interval = 0.108
Upper Conf Interval = 0.469

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 83.82638 .

Stream: NFFR at Indian Jim School, 5 November 2004
Species: Prickly sculpin

Removal Pattern: 1 0 0
Total Catch = 1
Population Estimate = 1 (**Using Program CAPTURE**)

Chi Square = 0.000
Pop Est Standard Err = 0.00014
Lower Conf Interval = 1.000
Upper Conf Interval = 2.000

Capture Probability = 0.9996

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 0.00.

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Rainbow trout

Removal Pattern: 58 17 8
Total Catch = 83
Population Estimate = 86

Chi Square = 0.638
Pop Est Standard Err = 2.563
Lower Conf Interval = 83.000
Upper Conf Interval = 91.096

Capture Probability = 0.664
Capt Prob Standard Err = 0.059
Lower Conf Interval = 0.547
Upper Conf Interval = 0.781

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 80.90379 .

Stream: Rodgers Flat - Side Channel, 6 November 2004
Species: Rainbow trout

Removal Pattern: 2 0 0
Total Catch = 2
Population Estimate = 2 (**Using Program CAPTURE**)

Chi Square = 0.000
Pop Est Standard Err = 0.000
Lower Conf Interval = 2.000
Upper Conf Interval = 3.000

Capture Probability = 0.9998

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 1.00.

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Hardhead

Removal Pattern: 5 2 3
Total Catch = 10
Population Estimate = 12

Chi Square = 1.294
Pop Est Standard Err = 4.152
Lower Conf Interval = 10.000
Upper Conf Interval = 21.177

Capture Probability = 0.417
Capt Prob Standard Err = 0.247
Lower Conf Interval = -.130
Upper Conf Interval = 0.963

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 2.823284 .

Stream: Rodgers Flat - Side Channel, 6 November 2004
Species: Hardhead

Removal Pattern: 1 2 0
Total Catch = 3
Population Estimate = 3

Chi Square = 2.932
Pop Est Standard Err = 0.709
Lower Conf Interval = 3.000
Upper Conf Interval = 6.050

Capture Probability = 0.600
Capt Prob Standard Err = 0.354
Lower Conf Interval = -.925
Upper Conf Interval = 2.125

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was -5.002093E-02 .

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Sacramento pikeminnow

Removal Pattern: 0 2 0
Total Catch = 2
Population Estimate = 2

Chi Square = 5.786
Pop Est Standard Err = 1.038
Lower Conf Interval = 2.000
Upper Conf Interval = 15.186

Capture Probability = 0.500
Capt Prob Standard Err = 0.519
Lower Conf Interval = -6.093
Upper Conf Interval = 7.093

The population estimate lower confidence interval was set equal
to the total catch. Actual calculated lower CI was -11.18564 .

Stream: Rodgers Flat - Side Channel, 6 November 2004
Species: Sacramento pikeminnow

Removal Pattern: 1 1 1
Total Catch = 3
Population Estimate = 3

Chi Square = 1.345
Pop Est Standard Err = 1.271
Lower Conf Interval = 3.000
Upper Conf Interval = 8.469

Capture Probability = 0.500
Capt Prob Standard Err = 0.424
Lower Conf Interval = -1.323
Upper Conf Interval = 2.323

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -2.469018 .

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Sacramento sucker

Removal Pattern: 2 4 2
Total Catch = 8
Population Estimate = 13

Chi Square = 1.489
Pop Est Standard Err = 12.520
Lower Conf Interval = 8.000
Upper Conf Interval = 40.280

Capture Probability = 0.258
Capt Prob Standard Err = 0.335
Lower Conf Interval = -.472
Upper Conf Interval = 0.988

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -14.28024 .

Stream: Rodgers Flat - Side Channel, 6 November 2004
Species: Sacramento sucker

Removal Pattern: None Captured
Total Catch = 0
Population Estimate = 0

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Smallmouth bass

Removal Pattern: 1 2 1
Total Catch = 4
Population Estimate = 4

Chi Square = 2.071
Pop Est Standard Err = 1.468
Lower Conf Interval = 4.000
Upper Conf Interval = 8.670

Capture Probability = 0.500
Capt Prob Standard Err = 0.367
Lower Conf Interval = -.667
Upper Conf Interval = 1.667

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -.6698995 .

Stream: Rodgers Flat Side Channel, 6 November 2004
Species: Smallmouth bass

Removal Pattern: None Captured
Total Catch = 0
Population Estimate = 0

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Riffle sculpin

Removal Pattern: 36 11 9
Total Catch = 56
Population Estimate = 60

Chi Square = 2.241
Pop Est Standard Err = 3.625
Lower Conf Interval = 56.000
Upper Conf Interval = 67.254

Capture Probability = 0.577
Capt Prob Standard Err = 0.083
Lower Conf Interval = 0.412
Upper Conf Interval = 0.742

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 52.74622 .

Stream: Rodgers Flat - Side Channel, 6 November 2004
Species: Riffle sculpin

Removal Pattern: 2 0 0
Total Catch = 2
Population Estimate = 2 (**Using Program CAPTURE**)

Chi Square = 0.000
Pop Est Standard Err = 0.000
Lower Conf Interval = 2.000
Upper Conf Interval = 3.000

Capture Probability = 0.9998

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 1.00.

Stream: Rodgers Flat - Main Channel, 6 November 2004
Species: Prickly sculpin

Removal Pattern: 4 1 0
Total Catch = 5
Population Estimate = 5

Chi Square = 0.257
Pop Est Standard Err = 0.168
Lower Conf Interval = 5.000
Upper Conf Interval = 5.466

Capture Probability = 0.833
Capt Prob Standard Err = 0.168
Lower Conf Interval = 0.367
Upper Conf Interval = 1.299

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 4.533857 .

Stream: Rodgers Flat Side Channel, 6 November 2004
Species: Prickly sculpin

Removal Pattern: None Captured
Total Catch = 0
Population Estimate = 0
