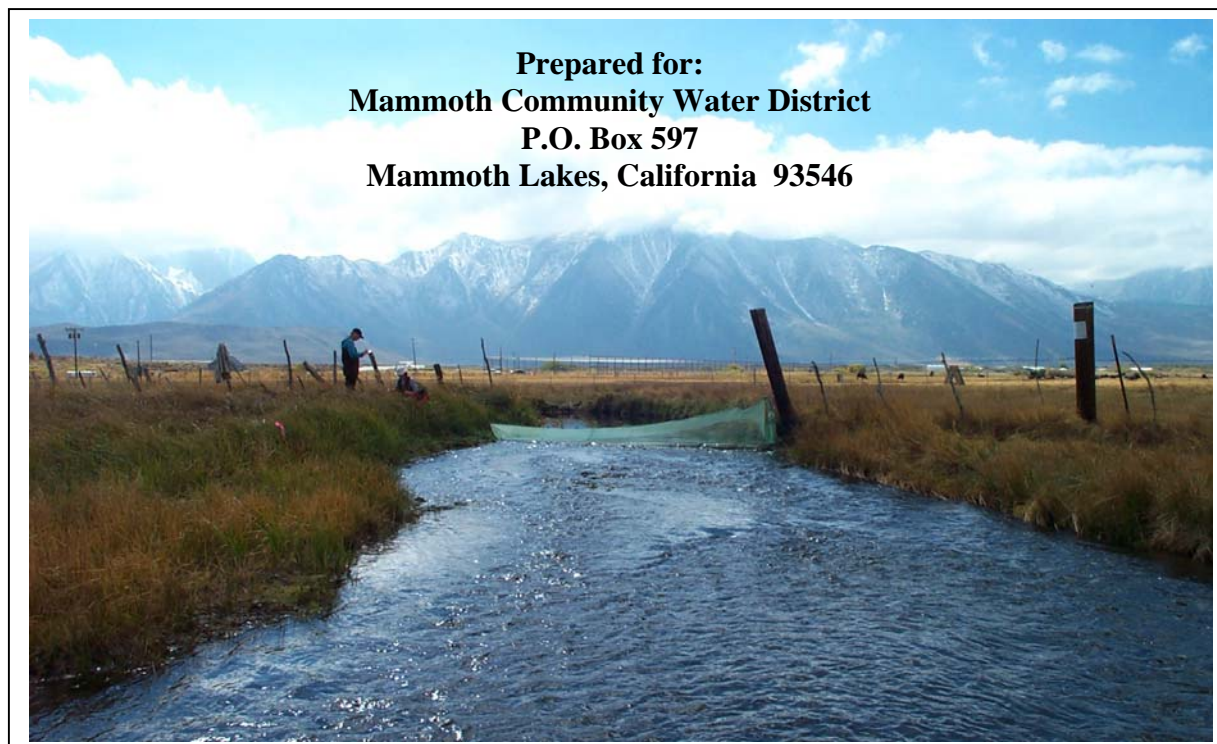


# OCTOBER 2006 MAMMOTH CREEK FISH COMMUNITY SURVEY



## FINAL REPORT

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## **Introduction**

Since 1992, the fish populations in Mammoth Creek have been systematically surveyed annually each fall (except for 1998) to evaluate the efficacy of the existing bypass flows in maintaining the fish populations throughout the lower basin (Hood 1998, 2001, 2002, 2003, 2004, 2006a, 2006b; Hood et al. 1992, 1993, 1994; Jenkins 1999; Jenkins and Dawson 1996, 1997). This report presents the results of the latest monitoring effort. The specific objectives of the 2006 fish community survey were to characterize fishery population (e.g., species composition, abundance, biomass, length frequencies, etc.) at each of the historic Mammoth Creek fish sampling stations and to compare the results of the 2006 survey with those from previous years surveys.

## **Study Area/Study Sites**

Mammoth Creek drains the Mammoth Crest and several high elevation lakes on the eastern side of the southern Sierra Nevada in Mono County, California. The Mammoth Creek basin has a drainage area of about 71 square miles (California Department of Water Resources 1973). Basin elevations range from about 11,000 feet in the headwaters along the Mammoth Crest to 7,000 feet at the Cashbaugh Ranch near its confluence with Hot Creek.

Mammoth Creek is part of the Owens Subprovince of the Great Basin Province (Moyle 2002). The native fish fauna likely consisted of Owens sucker (*Catostomus fumeiventris*) and Owens tui chub (*Gila bicolor snyderi*). The tui chub in Mammoth Creek are likely hybrid forms resulting from crosses with Lahontan tui chub (*G. b. obesa*) that were presumably introduced as baitfish in the 1960's (Chen et al. 2006). Historically, trout were absent from the Owens River watershed, which includes Mammoth Creek (Moyle et al. 1996). It is unknown when rainbow trout (*Oncorhynchus mykiss*) were introduced into the basin, but brown trout (*Salmo trutta*) were likely introduced in the 1890's (Jenkins et al. 1999). Both species have established naturalized populations in Mammoth Creek. In addition to the naturalized rainbow trout, California Department of Fish and Game's

(CDFG) Hot Creek Hatchery currently plants an average of over 13,000 catchable-sized rainbow trout, totaling almost 7,300 pounds at 12 to 15 locations along Mammoth Creek from Minaret Road (0.3 miles downstream of Site BL) to the Mammoth Creek Flume area (Site EL) each year (Table 1). Hatchery fish are planted about once a week throughout the trout fishing season (April-October).

Table 1. Levels of catchable-sized rainbow trout planted in Mammoth Creek for past three years. Data provided by CDFG.

Year	Number	Pounds	Average weight/fish (pounds)
2004	12,426	7,367	0.89
2005	13,109	7,200	0.55
2006	14,583	7,250	0.54
Average	13,373	7,272	0.66

New Zealand mudsnails ([NZMS], *Potamopyrgus antipodarum*) are known to occur in Hot Creek below the CDFG Hot Creek State Fish Hatchery. This known infestation site is located near its confluence with Mammoth Creek.

The fish survey project area consists of the lower 8.9 miles of Mammoth Creek from the Sherwin Street crossing in the town of Mammoth Lakes downstream to its confluence with Hot Creek (Figure1). The fish survey project area has been divided into four distinct reaches based upon analysis conducted by Beak Consultants (Bratovich et al. 1990). The characteristics of aquatic habitat vary considerably among the four study reaches based upon the combination of channel morphology, riparian vegetation, stream gradient, and bed substrate size and composition. Channel braiding occurs in each study reach and is a result of large woody debris accumulation in lower gradient sections of the channel.

The experimental design and rationale for the original selection of the fish survey sample sites are described in detail in Bratovich et al. (1990). Distinct differences in the amount of riparian cover within each study reach were observed during the habitat mapping survey conducted in 1988 (Bratovich et al. 1990). To ensure representation of riparian cover and dispersion of

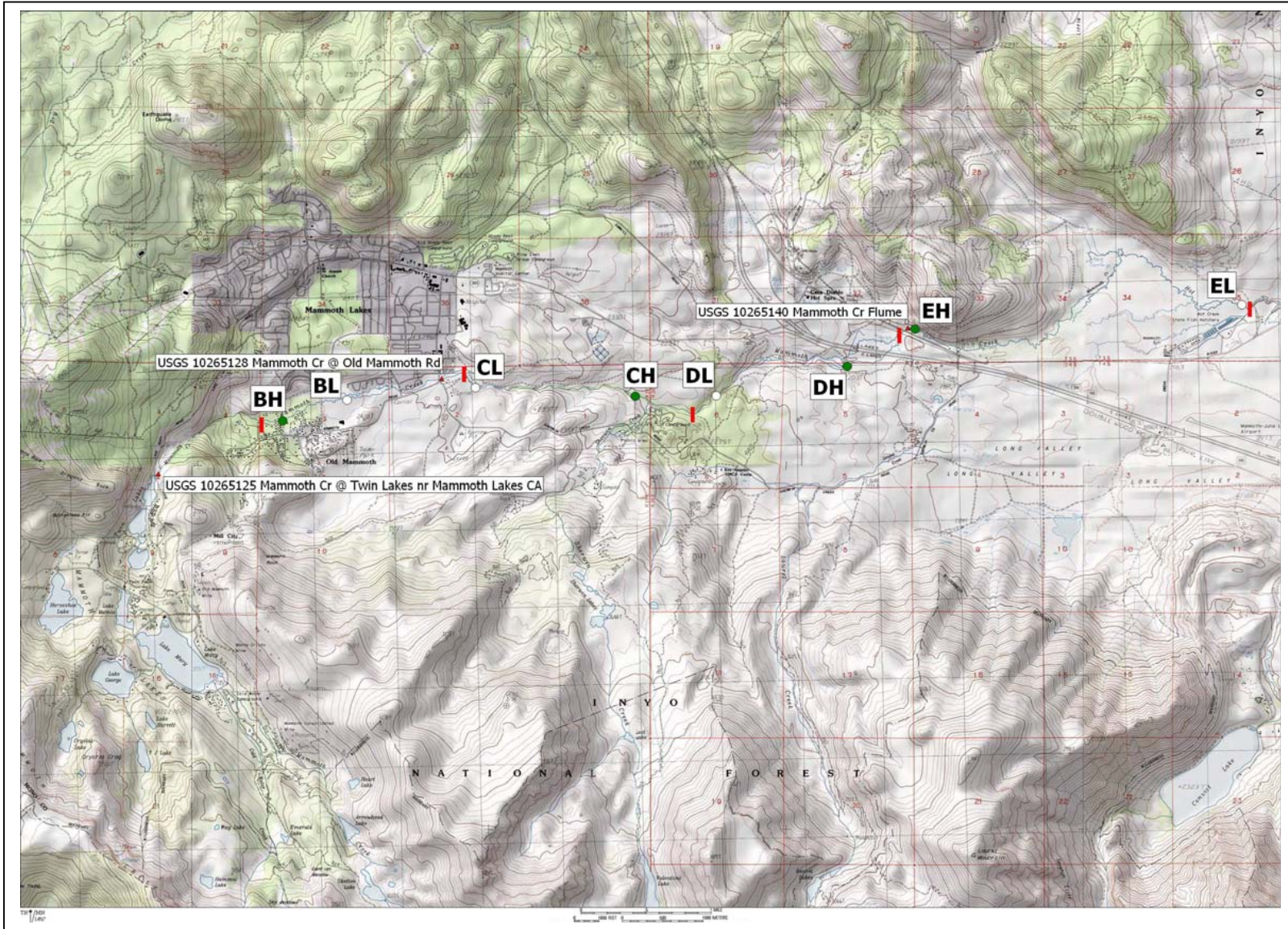


Figure 1. Map showing Mammoth Creek basin and location of the eight fish sampling sites. Red hashes show reach boundaries. Green dots are high riparian density fish samples sites, white dots are low riparian density sites. Red triangles show stream flow gage locations.

sampling sections, fish sampling stations were originally located within “high” and “low” density riparian habitat sites within each study reach. For example, Site BH represents high-density riparian cover habitat site within Reach B, while Site EL represents a low-density riparian cover site Reach E. Discretion must be used when comparing and interpreting the results between high and low-density riparian cover sites because of between reach variation in riparian density and tree species and changes in the riparian area over time.

Consistent with previous surveys, eight stations of approximately 300 feet in length were sampled in October 2006, with each site representing a high or low-density riparian vegetation cover habitat within the four study reaches (Figure 1). While over the years several of the sample sites have been moved up or downstream due to changes in landowner access or channel morphology, the habitat areas have remained unchanged (Hood 2006b). The sites sampled in 2006 were identical to those sampled in October 2005 and were easily identified by flagging and rebar left behind from previous surveys. In order to help in locating sites and to gain familiarity with access, TRPA biologists visited each of the eight sites with MCWD personnel immediately prior to the initiation of the surveys.

## **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. 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 eleven locations along the sampling station using a surveyors tape. The average of these measurements was used to determine the mean width at each station, which was used in combination with reach length to estimate a total sample area. Depth measurements (to the nearest 0.05 foot) were made using a survey

stadia rod at  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  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. When unobstructed views could be obtained, stream gradient over the part or all of the length of the study sites 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 by particle size (fines [ $<2\text{mm}$ ], sand [ $2\text{-}7\text{mm}$ ], gravel [ $8\text{-}75\text{mm}$ ], cobble [ $76\text{-}300\text{mm}$ ], boulder [ $>300\text{ mm}$ ] and bedrock). The percent of the site available as fish cover was also estimated using the categories of surface turbulence, instream object cover, undercut bank, and overhanging vegetation within 48 inches of the water surface. The surface area of suitable trout spawning gravels in the study site was also estimated.

Water temperature was recorded at the time the stations were sampled. Other water quality parameters were also measured, including pH, conductivity ( $\mu\text{S}/\text{cm}$ ), specific conductivity (temperature standardized conductivity), salinity (ppt), and dissolved oxygen concentrations (mg/L), and percent saturation. The pH measurements were made using a Tetratest® pH freshwater kit available at most aquarium stores. The remaining water quality parameters were measured using 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, 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 Mammoth Creek was conducted using multiple-pass removal-depletion by backpack electrofishing. The study sites were isolated with ¼-inch (6.4 mm) mesh block nets to prevent immigration or emigration of fish during sampling. Two shockers assisted by two netters moved upstream in concert across a unified front during each sampling pass. The shockers used portable backpack electrofishers (Smith-Root® Models 11A and 12A) to stun fish, which were captured by the netters using either ⅛-inch mesh dip nets. All captured fish were removed to 5-gallon live buckets filled with river water and equipped with a small bait bucket aerators. 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.

A minimum of three passes of equal effort were made by the electrofishing teams within each reach. The target for the three-pass data was to provide a population estimate for the dominant trout species 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 using MicroFish 3.0 (Van Deventer and Platts 1989). If the population estimate and standard error criterion was met, no additional passes were made. If the criterion was not met, another pass would be made and the new estimate and standard error would be re-evaluated.

Following each pass, captured fish were identified, measured and weighed. Prior to handling, fish were anesthetized in a weak CO<sub>2</sub> 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) and weighed to the nearest 0.1 gram on an electronic scale. Fish measurement data and notes were recorded on standardized data sheets.

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 rainbow trout were examined for physical evidence of hatchery origin, such as frayed fins, deformed fins, missing adipose fins, or abraded skin on snouts or backs. Rainbow trout showing such signs were designated as hatchery rainbow trout. Those rainbow trout not showing these characteristics were considered “wild” rainbow trout. All mortalities were also noted on the data sheets.

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 1/8-inch mesh net floating nylon fish bags located in the river outside the study site. All fish were held in the live bags 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.

In order to minimize contamination of field equipment with NZMS and their inadvertent spread within the Mammoth Creek basin, several precautionary measures were used during the survey. All gear was thoroughly rinsed and cleaned of vegetation and sediment at each site. We tried to minimize any exposure risks at the lower EL Site (near the hatchery and known NZMS locale) by using the hatchery foot bridge to cross Hot Creek. Following sampling at Site EL, all gear was rinsed off before leaving the site, and then hosed-off again at the Mammoth Community Water District (MCWD) office before moving to a new site the next day. During the entire survey period, we left the gear (waders/boots/dip nets/block nets/anode pole rings/live carts) outside each evening to freeze during the sub-zero nighttime temperatures that occurred in Mammoth Lakes at the time.

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 all 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 of that species captured during electrofishing divided by the surface area of the river at sampled at that site. Biomass estimates were also calculated using several indices (e.g. pounds/mile and pounds/acre) to facilitate comparison with earlier surveys. Biomass is a more meaningful production index, since it takes into account both fish numbers and fish size (as indicated by weight).

## Results

The electrofishing surveys of the eight Mammoth Creek study sites were conducted over five consecutive days from October 11-15, 2006. Stream flows in the upper portion of the study reach averaged 12.3 cubic feet per second (cfs) during this period and were about 40% higher compared to than stream flow during the Fall 2005 sampling (Figure 2). The average stream flow in the lower basin (i.e. downstream of Sherwin Creek) was slightly higher at 16.1 cfs, during the 2006 sample period (MCWD, unpublished data).

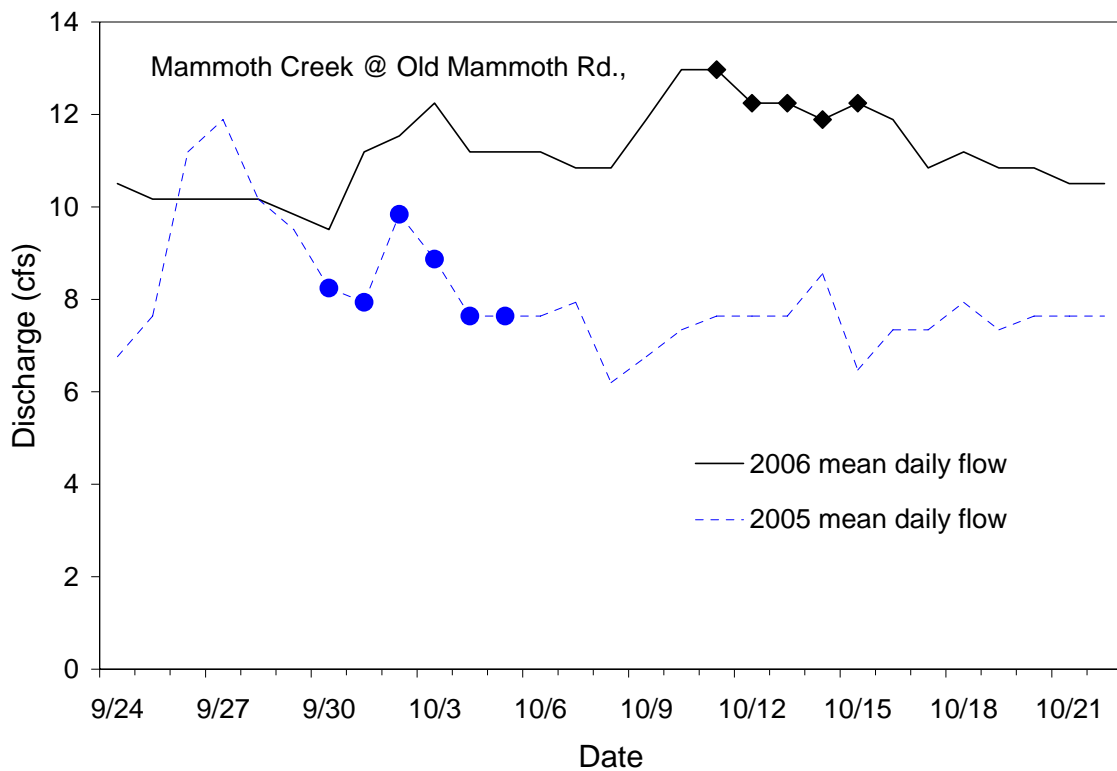


Figure 2. Stream flow records for Mammoth Creek at Old Mammoth Road crossing (near site CL) during the 2005 and 2006 fish surveys. Dark markers show actual fish sampling dates for both years. Data provided by MCWD.

### 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 A. A summary of the habitat dimensions (i.e. lengths, widths, and depths), water quality parameters, and habitat characteristics (i.e. habitat types, substrate types, and cover types) are presented in Table 2. Site locations are shown on Figure 1.

By the time of the mid-October sampling, water temperatures were relatively cool (<48°F), while dissolved oxygen concentrations were moderate to high (>6.5 mg/L) at most of the study sites (Table 2). The combination of cold water temperature and moderate dissolved oxygen levels likely contributed to the low electrofishing/handling mortality noted during our 2006 surveys (0.8 percent for trout).

Our experience has shown that water conductivities in the 70-150  $\mu\text{S}/\text{cm}$  are ideal for effective backpack electrofishing. The water conductivity measured at all sites was within this range.

#### *Site BH*

This 303-foot long high-density riparian habitat site was located in the town of Mammoth Lakes just downstream of the Sherwin Road crossing (Figure 1). During our survey, this site had a mean width of 14.3 feet and a mean depth of 0.61 feet and was predominantly riffle habitat (Table 2). The site had a relatively low gradient (1.7 percent) and the substrate was dominated by cobble and gravel. About 755  $\text{ft}^2$  of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Surface turbulence and overhanging vegetation were identified as the dominant cover types.

#### *Site BL*

This 287-foot long low-density riparian cover habitat site was located in the town of Mammoth Lakes just downstream of the Snow Creek Condominiums access road crossing (Figure 1). This site was located within a braided section of Mammoth Creek and so

Table 2. Summary of habitat and water quality measurements at each of the eight Mammoth Creek electrofishing sites, October 2006.

	BH	BL	CH	CL	DH	DL	EH	EL
<b>HABITAT MEASUREMENTS</b>								
Sample date	15 Oct	14 Oct	15 Oct	14 Oct	12 Oct	13 Oct	12 Oct	11 Oct
Length (ft)	303	287	300	309	320	294	281	303
Mean width (ft)	14.3	9.5	12.8	20.1	11.8	19.0	18.3	16.8
Mean depth (ft)	0.61	0.43	0.95	0.96	1.34	0.97	0.82	1.09
Maximum depth (ft)	3.10	1.30	2.80	2.40	3.40	2.20	2.00	3.25
Surface Area (ft <sup>2</sup> )	4,321.9	2,723.9	3,848.2	6,210.9	3,778.7	5,583.3	5,155.1	5,084.9
Gradient (%)	1.72	1.09	3.42	1.09	---	~7-10 <sup>a</sup>	---	0.53
<b>WATER QUALITY MEASUREMENTS</b>								
Water temperature (°C)	8.2	7.8	4.0	5.5	4.4	4.2	7.2	9.1
Conductivity (µS/cm)	125.1	124.5	115.9	121.3	79.8	79.8	86.7	125.4
pH	7.5	8.0	8.0	8.0	7.5	7.5	7.5	8.0
Dissolved Oxygen (mg/L)	5.48	6.83	6.55	6.65	10.15	9.93	9.41	6.78
Dissolved Oxygen (% saturation)	47.0	57.7	50.5	53.0	79.0	76.6	78.4	59.3
<b>HABITAT TYPES</b>								
% pool	5	5	15	5	15	20	5	25
% run	15	15	40	35	80	25	70	55
% riffle	80	80	35	35	5	30	25	20
% pocket water	0	0	10	25	0	25	0	0
<b>SUBSTRATE TYPES</b>								
% fines (<2 mm)	0	0	0	0	0	0	5	10
% sands (2 - 7 mm)	5	5	5	5	10	5	15	15
% gravel (7 - 75 mm)	20	80	20	30	20	20	35	60
% cobble (75 - 300 mm)	60	10	45	35	65	50	40	10
% boulder (>300 mm)	15	5	30	30	5	25	5	5
% bedrock	0	0	0	0	0	0	0	0
<b>TROUT SPAWNING</b>								
Surface area (ft <sup>2</sup> )	755	1,635	54	191	484	120	860	1,470
<b>COVER TYPES</b>								
% surface turbulence	30	5	15	20	10	35	10	5
% instream object	15	5	40	50	20	35	10	5
% undercut bank	5	0	10	0	0	30	15	20
% overhanging vegetation (<48")	30	10	30	20	45	25	35	0

<sup>a</sup> this value was visually estimated.

carried only a portion of the stream flow. During our survey, this site had a mean width of 9.5 feet and a mean depth of 0.43 feet and was predominantly riffle habitat (Table 2). The site had a relatively low gradient (1.1 percent) and the stream bed was dominated by gravel substrate. Over 1,600 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Overhanging vegetation was identified as the dominant cover type, though little overall cover was available at this site.

#### *Site CL*

This 309-foot long low-density riparian habitat site was located about 0.4 miles downstream of the MCWD's stream gage site at Old Mammoth Road (Figure 1). This site is near the upstream boundary of the Sherwin Creek Meadows section of Mammoth Creek. This site was located in a single channel area of the creek. During our survey, this site had a mean width of 20.1 feet and a mean depth of 0.96 feet and was composed of a combination of run, riffle, and pocket water habitats (Table 2). The site had a relatively low gradient (1.1 percent) and the substrate was composed of near equal amounts of gravel, cobble, and boulder elements. About 191 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Instream object cover (mainly boulder and large cobble) was identified as the dominant cover type. Signs of heavy angling pressure, in the form discarded lures and fishing line were evident at the time of the survey. Several groups of anglers were also observed fishing nearby at the time of our survey. This site is located in a stretch of creek that is regularly planted with catchable-sized rainbow trout from the Hot Creek Hatchery (Vern Carr, personal communication).

#### *Site CH*

This 300-foot long high-density riparian cover habitat site was located in a relatively remote area of Mammoth Creek about 0.1 miles upstream of the Sherwin Creek confluence (Figure 1). This site was located within a single channel, full flow section of Mammoth Creek. During our survey, this site had a mean width of 12.8 feet and a mean depth of 0.95

feet and was predominantly a combination run and riffle habitats (Table 2). The site had a relatively moderate gradient (3.4 percent) and the stream bed was dominated by cobble and boulder elements. Only about 54 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Instream object and overhanging vegetation were identified as the dominant cover types.

#### *Site DL*

This 294-foot long low-density riparian habitat site was located in a relatively remote area of Mammoth Creek about 0.6 miles downstream of the Sherwin Creek confluence (Figure 1). While this area was a relatively low-density riparian section, it was located in a forested canyon area of the basin and carried the full stream flow of mammoth Creek. During our survey, this site had a mean width of 19.0 feet and a mean depth of 0.97 feet and was a combination of pool, run, riffle, and pocket water habitats (Table 2). Relatively large amounts of large woody debris were present in this reach, contributed from the adjacent forested hillsides. While gradient was not measured at the time of the survey, the gradient was visually estimated to be 7-10 percent. Substrate in this relatively high gradient reach was dominated by boulder and cobble. While gravel was judged to be a significant portion of the substrate, it was distributed among the larger cobble substrate elements and most gravel was not judged available for trout spawning. Only 120 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Surface turbulence, instream object (boulder and cobble elements) and undercut banks were identified as the dominant cover types.

#### *Site DH*

This 320-foot long high-density riparian cover habitat site was located about 0.30 miles upstream of the U.S. Highway 395 crossing (Figure 1). This site was located within a single channel area of Mammoth Creek. During our survey, this site had a mean width of 11.8 feet and a mean depth of 1.34 feet and was predominantly run habitat (Table 2). The density of riparian growth in this area precluded making any gradient measurements. The



stream bed in this reach was dominated by cobble substrates. About 484 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Overhanging vegetation was identified as the dominant cover type.

#### *Site EH*

This 281-foot long high-density riparian habitat site was located downstream of the frontage road (Substation Road) crossing on the northeast side of U.S. Highway 395 (Figure 1). The upstream boundary of the study site was located about 25 feet downstream of the Los Angeles Department of Water and Power stream flow weir facility. During our survey, this site had a mean width of 18.3 feet and a mean depth of 0.82 feet and was composed predominantly of run habitat (Table 2). The density of riparian growth in this area precluded making any gradient measurements. The stream bed was dominated by cobble and gravel substrates. About 860 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. Overhanging vegetation was identified as the dominant cover type. Direct (three anglers actively fishing just upstream at time of our survey) and indirect evidence (abundance of discarded fishing tackle and multiple recreation vehicles parked nearby) suggest that this area receives substantial angling pressure. This site is located in an area that is regularly planted with catchable-sized rainbow trout from the Hot Creek Hatchery (Vern Carr, personal communication).

#### *Site EL*

This 303-foot long, single channel, low-density riparian cover habitat site was located in a meadow area of the creek just upstream of the Hot Creek confluence and adjacent to the Hot Creek State Fish Hatchery (Figure 1). The site is just downstream of extensive livestock grazing land. During our survey, this site had a mean width of 16.8 feet and a mean depth of 1.09 feet and was predominantly run habitat (Table 2). The site had a relatively low gradient (0.5 percent) and the stream bed was dominated by gravel substrate. About 1,470 ft<sup>2</sup> of suitable trout spawning gravel deposits were noted in the low flow channel at this site during our survey. This site also had the highest levels of fine sediment

of any study reach. Undercut bank was identified as the dominant cover type, though overall, cover was not plentiful at this site.

### Electrofishing

The October 2006 survey collected a total of 731 fish from five species (Table 3). Brown trout, which were captured at all eight sites, was the most abundant species and accounted for 61.3 percent of the overall total catch. Rainbow trout, also captured at all eight sample sites, was the second most abundant species in the total catch (36.3 percent). Of the 265 rainbow trout captured during the survey, 77 were identified as hatchery-reared fish. No hatchery rainbow trout were identified at either of the high-density riparian habitat sites in reaches B or C. The greatest concentrations of hatchery rainbow trout occurred at sites CL and EH. Both these sites showed evidence of heavy angling pressure (i.e. presence of anglers and discarded fishing tackle) and suggest that these sites are frequently planted by CDFG. About 825 catchable-sized hatchery rainbow trout were released throughout Mammoth Creek on 12 October, the second day of our survey (Judy Urrutia, personal communication).

Table 3. Numbers of fish captured at each of the electrofishing study sites, Mammoth Creek, Mono County, California, 11-15 October 2006.

Species	BH	BL	CH	CL	DH	DL	EH	EL	Total
Brown trout	162	17	26	16	66	16	67	78	448
Rainbow trout (wild)	45	5	16	14	25	14	48	21	188
Rainbow trout (hatchery)	0	2	0	36	9	4	17	9	77
Brook trout	1	0	0	0	0	0	0	0	1
Owens sucker	0	0	0	0	0	0	0	11	11
Tui chub	0	0	0	0	0	0	0	6	6
Total	208	24	42	66	100	34	132	125	731

A handful of young-of-the-year (YOY) Owens suckers and tui chub were captured at the most downstream site (EL) and made up 1.5 percent and 0.8 percent of the total catch, respectively. A single juvenile brook trout (*Salvelinus fontinalis*) was captured at the most

upstream site (BH). The size of this fish (76mm FL) suggests that it was naturally produced and probably originated from one of the lakes upstream of the project area. Copies of the actual data sheets are contained in Appendix B.

### *Trout Length-frequency*

Length-frequency analysis for rainbow trout captured at the various sites shows that multiple size (and presumably age) classes of wild rainbow trout are present at most of the study areas (Figure 3). The exception was for site BL, where all five of the wild trout appeared to be small YOY fish. The YOY size class dominated the wild rainbow trout populations at most of the study sites, especially at those sites where few hatchery trout were captured. All of the hatchery rainbow trout were  $\geq 170$  mm in length. Another observation of note from the length data is the larger size of the YOY size class at the lowermost sample Site EL compared to the other seven sites. At Site EL, YOY rainbow trout ranged in fork length from 97 to 122 mm, while at the other seven sites, the YOY were in the 38 to 78 mm range. This may have been a function of the higher water temperatures that seem to occur in this lower site near the confluence with Hot Creek, which may allow for earlier hatching and faster growth for trout.

Examination of the brown trout length-frequencies also shows multiple size/age classes present at all the sites (Figure 4). As was the case for the wild rainbow trout, YOY size class dominated the brown trout populations at most of the sites. The exceptions were Sites BL and DL, where few small fish were captured. The length-frequency data for the lowermost Site EL show a YOY size class that appeared to larger than those noted at the other upstream sites. At Site EL YOY brown trout ranged in fork length from 75 to 132 mm, while YOY at the remaining sites were in the 62 to 100 mm size range. This apparent size discrepancy for YOY brown trout at Site EL may be a function of the warmer water temperatures at this site and its proximity to Hot Creek.

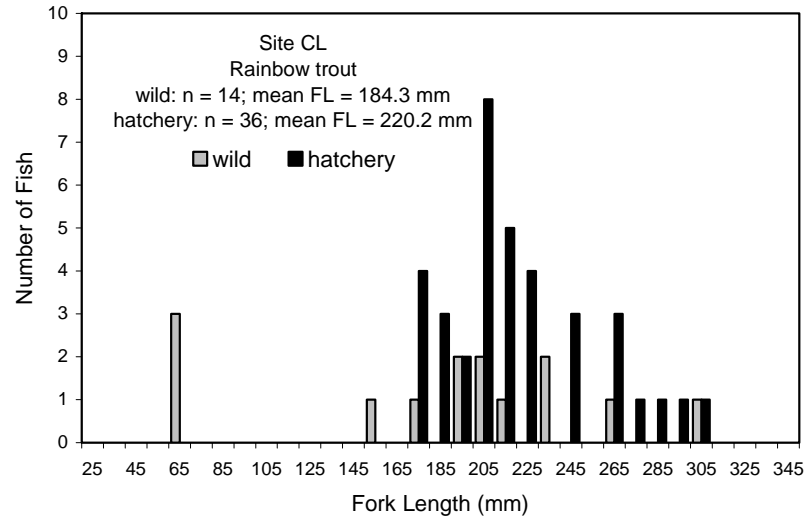
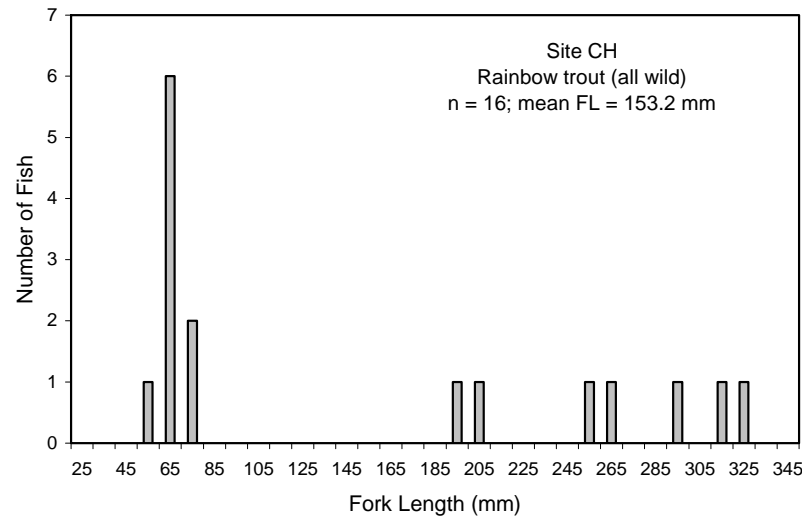
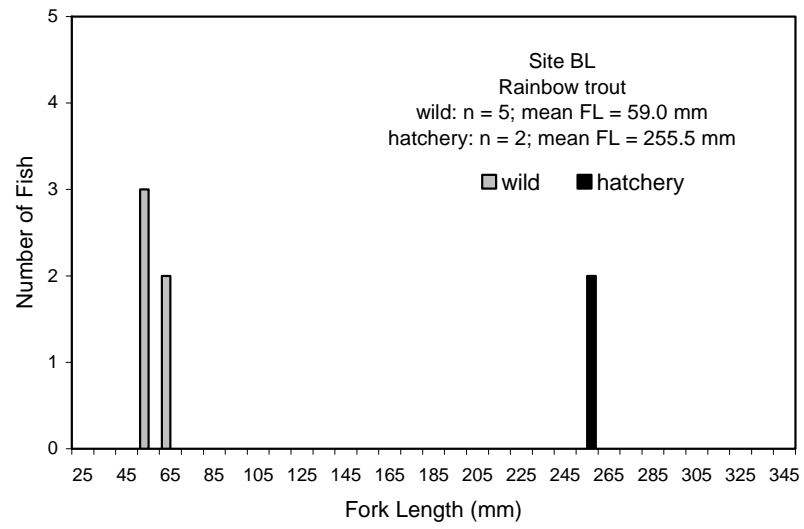
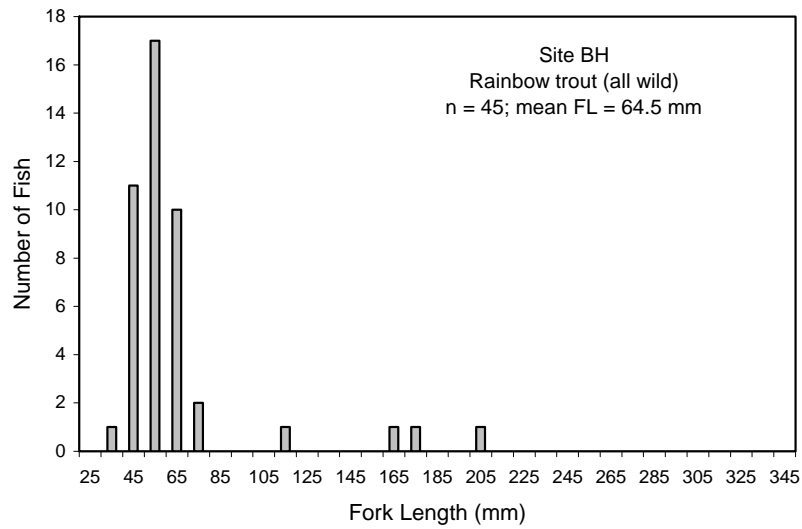


Figure 3. Length-frequency data for wild and hatchery rainbow trout captured during the October 2006 Mammoth Creek electrofishing survey.

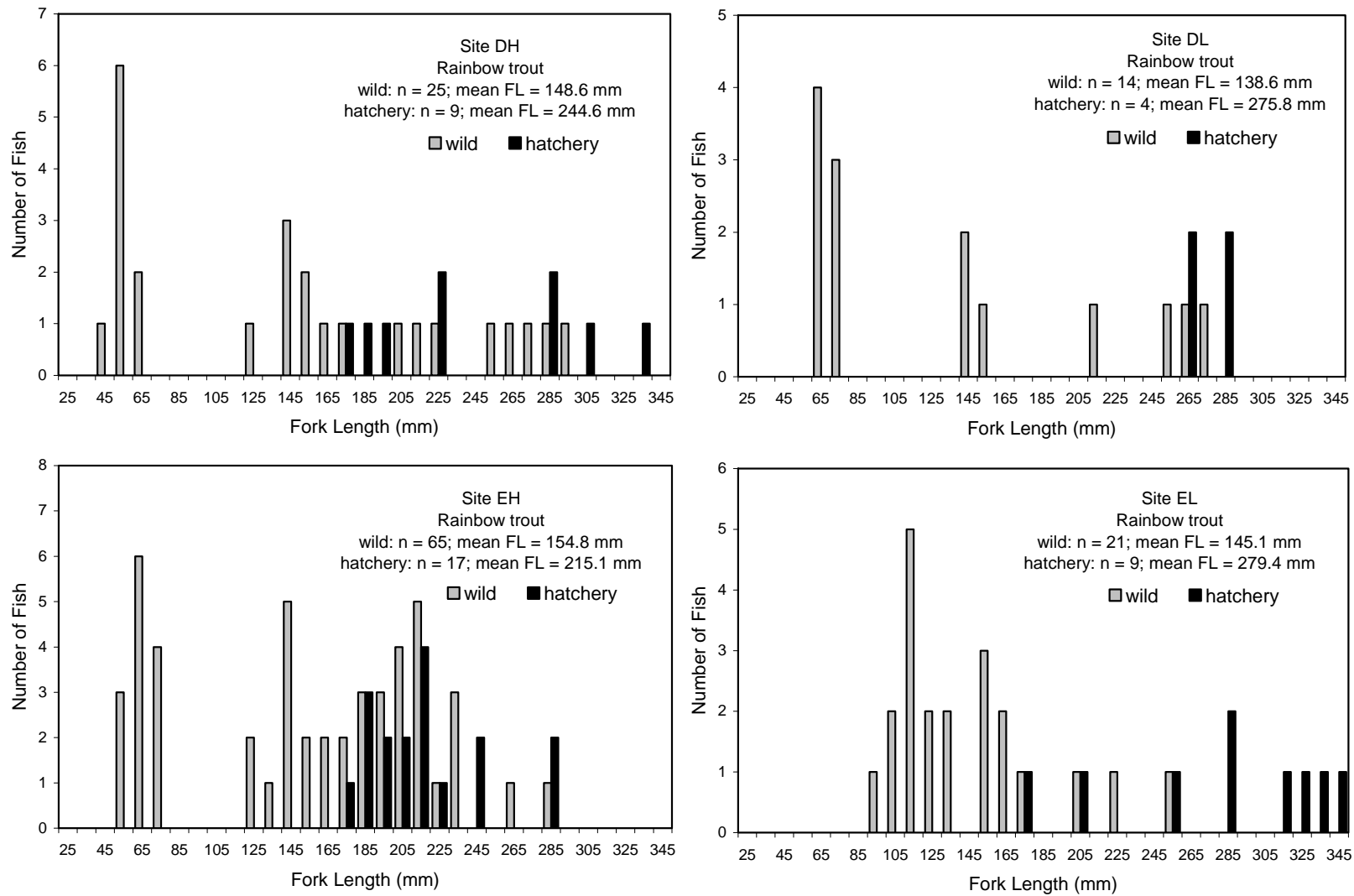


Figure 3. Length-frequency data for wild and hatchery rainbow trout captured during the October 2006 Mammoth Creek electrofishing survey. (continued)

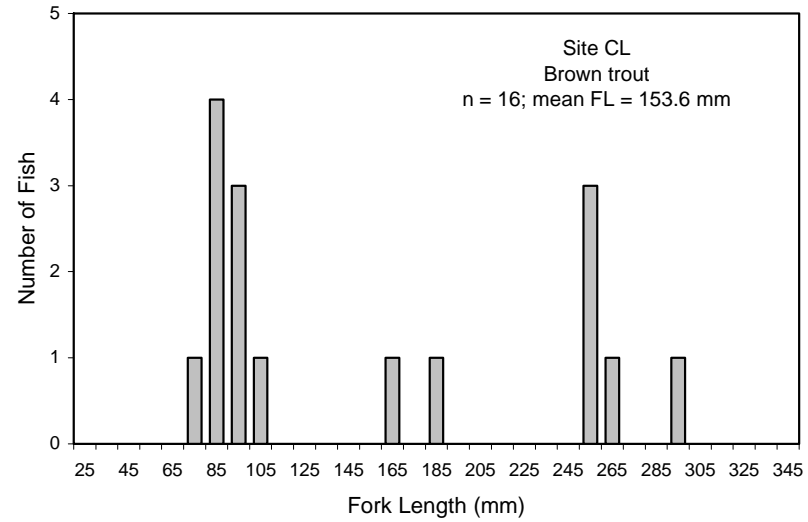
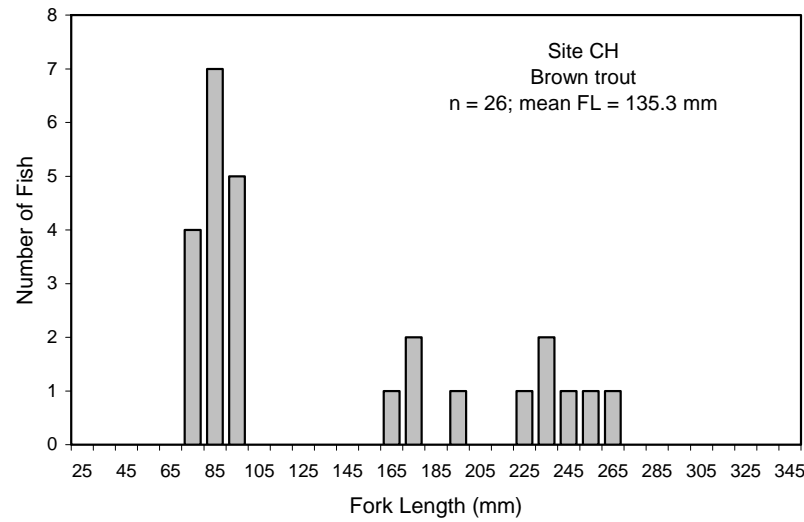
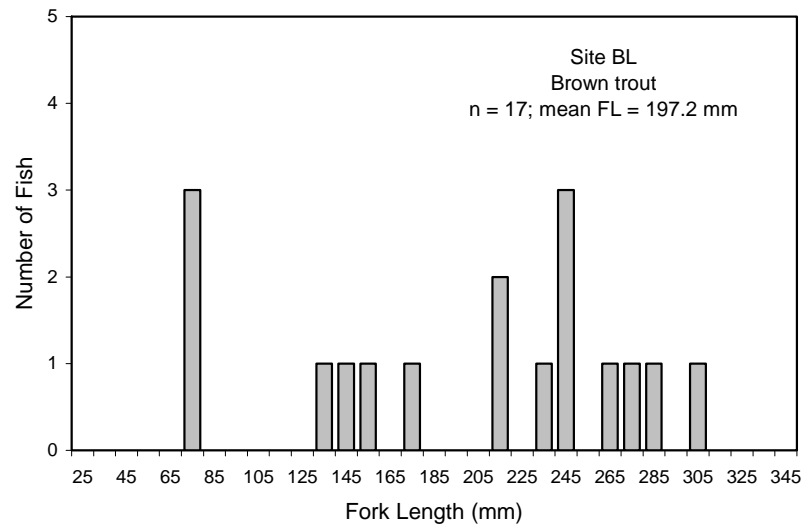
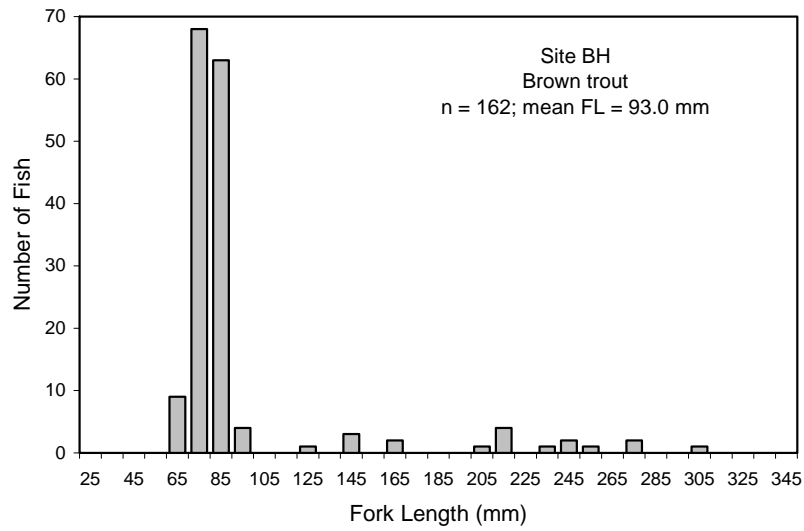


Figure 4. Length-frequency data for brown trout captured during the October 2006 Mammoth Creek electrofishing survey.

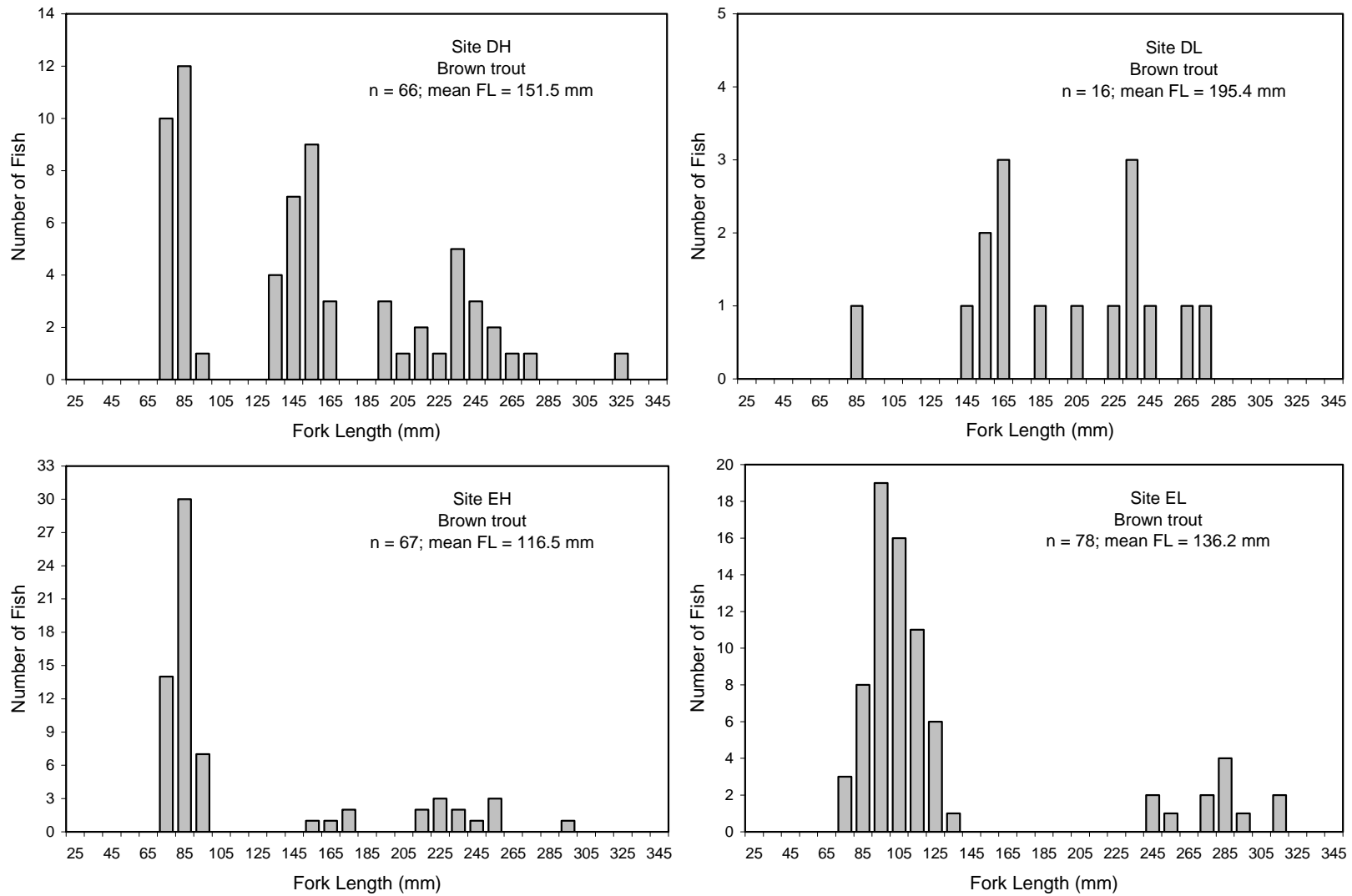


Figure 4. Length-frequency data for brown trout captured during the October 2006 Mammoth Creek electrofishing survey. (continued)

Another interesting observation for Site EL is the complete absence of any brown trout in the 140 to 240 mm size range, which includes yearling and small adult brown trout (Figure 4). This missing size/age class is probably not explained by flow conditions, since rainbow trout in this size range were present (Figure 3). Examination of previously unreported 2005 length-frequency data for this site offers an explanation for the absence of yearling brown trout in 2006. The September 2005 survey at Site EL (conducted by the CDFG Wild Trout Program biologists) captured only one YOY brown trout and no yearling trout (Figure 5). This suggests a general failure in the 2005 and 2004 brown trout year classes, which explains the lack of yearling and small adult brown trout at Site EL evidenced in 2006.

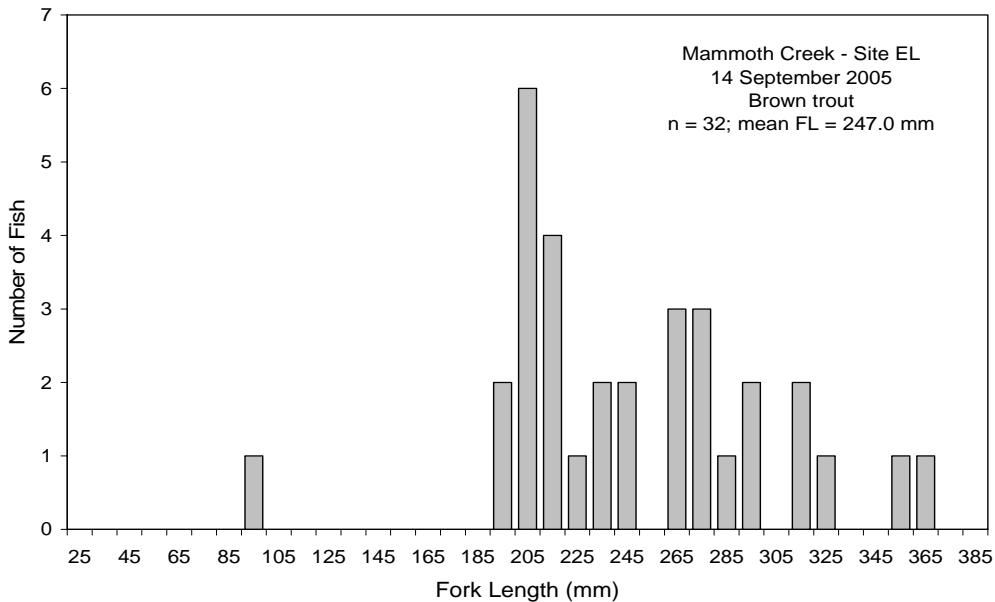


Figure 5. Length-frequency data for brown trout captured at Site EL during the September 2005 Mammoth Creek electrofishing survey. (Data from CDFG)

The 2006 length data for the single brook trout captured at Site BH suggest that this was a YOY fish that likely originated from one of the upstream lakes where this species is known to reside (Figure 6). The suckers and tui chubs captured at Site EL in October 2006 were



also small, recently hatched YOY of the year fish (Figure 6). No adult suckers or minnows were observed or captured.

### *Trout Condition Factors*

The condition factor-frequency analysis suggests healthy populations of both rainbow and brown trout were present at all the study sites, with mean condition factors all well above the 1.0 “healthy trout” threshold. Only 5.9 percent of the calculated condition values were less than this critical value. The mean condition factors for wild rainbow trout ranged from 1.14 to 1.32, while those for hatchery rainbow trout ranged from 1.12 to 1.30 (Figure 7). The brown trout condition factors ranged from 1.14 to 1.25 (Figure 8).

### *Population Estimation*

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 C. The model output is summarized below in Table 4.

The population estimates and their associated confidence intervals appear to be reasonably good for all the species at most sites (Table 4). Our sampling goal of obtaining a standard error of the population estimate for the dominant trout species that was  $\leq 10$  percent of the population estimate after three electrofishing passes was met at all eight sites. Most of the probabilities of capture surpassed the 0.4 “effective sampling” threshold (White et al. 1982). The exceptions were for wild rainbow trout at Sites BL and DL, where more trout were captured in later passes than desirable.

The estimated number of brown trout captured in all sampling sections ranged from 16 fish at Site CL to 186 fish at Site BH (Table 4). The estimates for wild rainbow trout ranged from a low of 6 fish at Site BL to a high of 48 fish at Site EH. Hatchery rainbow trout population estimates ranged from zero fish at Sites BH and CH to a high of 36 hatchery

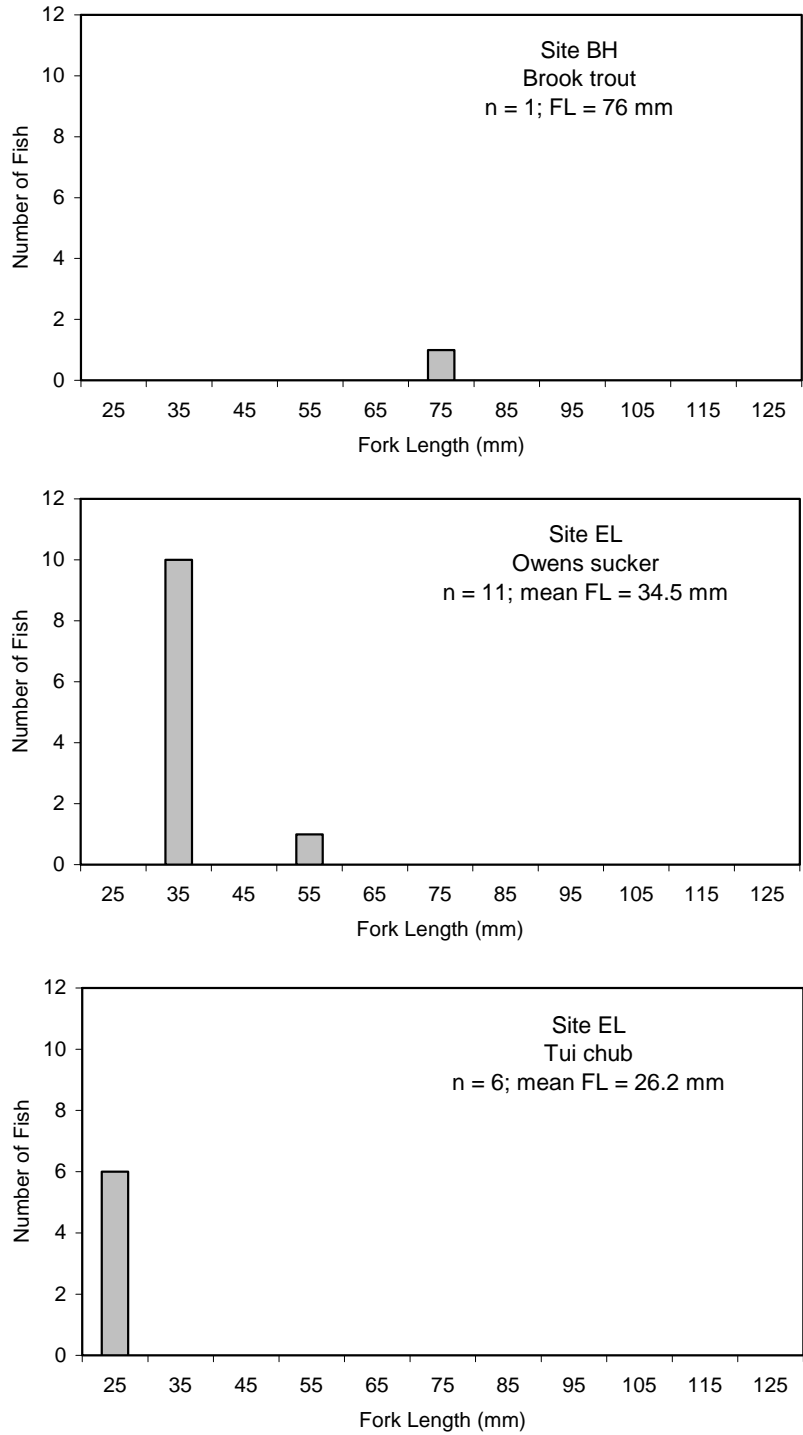


Figure 6. Length-frequency data for brook trout, Owens sucker, and tui chub captured during the October 2006 Mammoth Creek electrofishing survey.

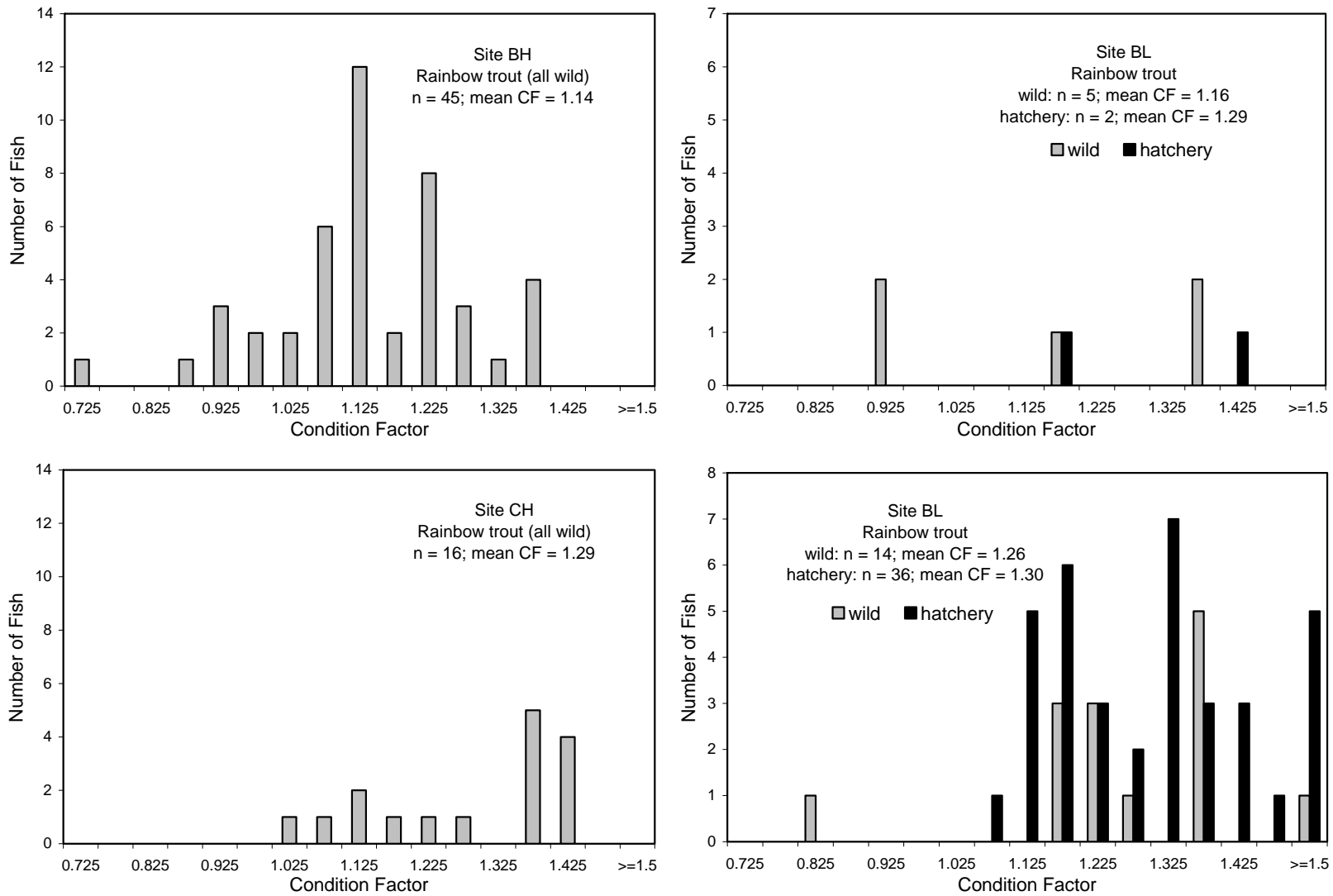


Figure 7. Condition factor-frequency data for wild and hatchery rainbow trout captured during the October 2006 Mammoth Creek electrofishing survey.

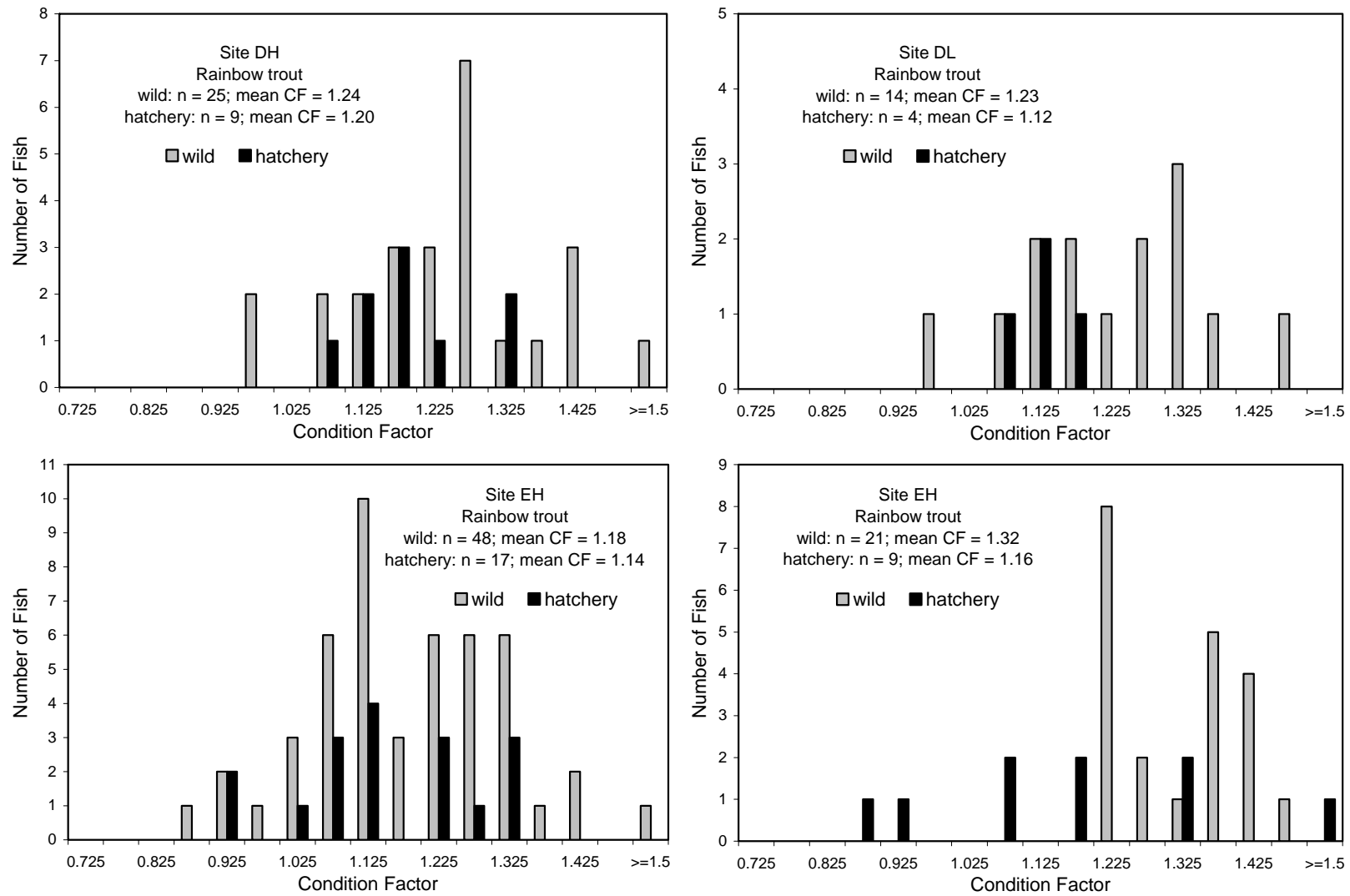


Figure 7. Condition factor-frequency data for wild and hatchery rainbow trout captured during the October 2006 Mammoth Creek electrofishing survey. (continued)

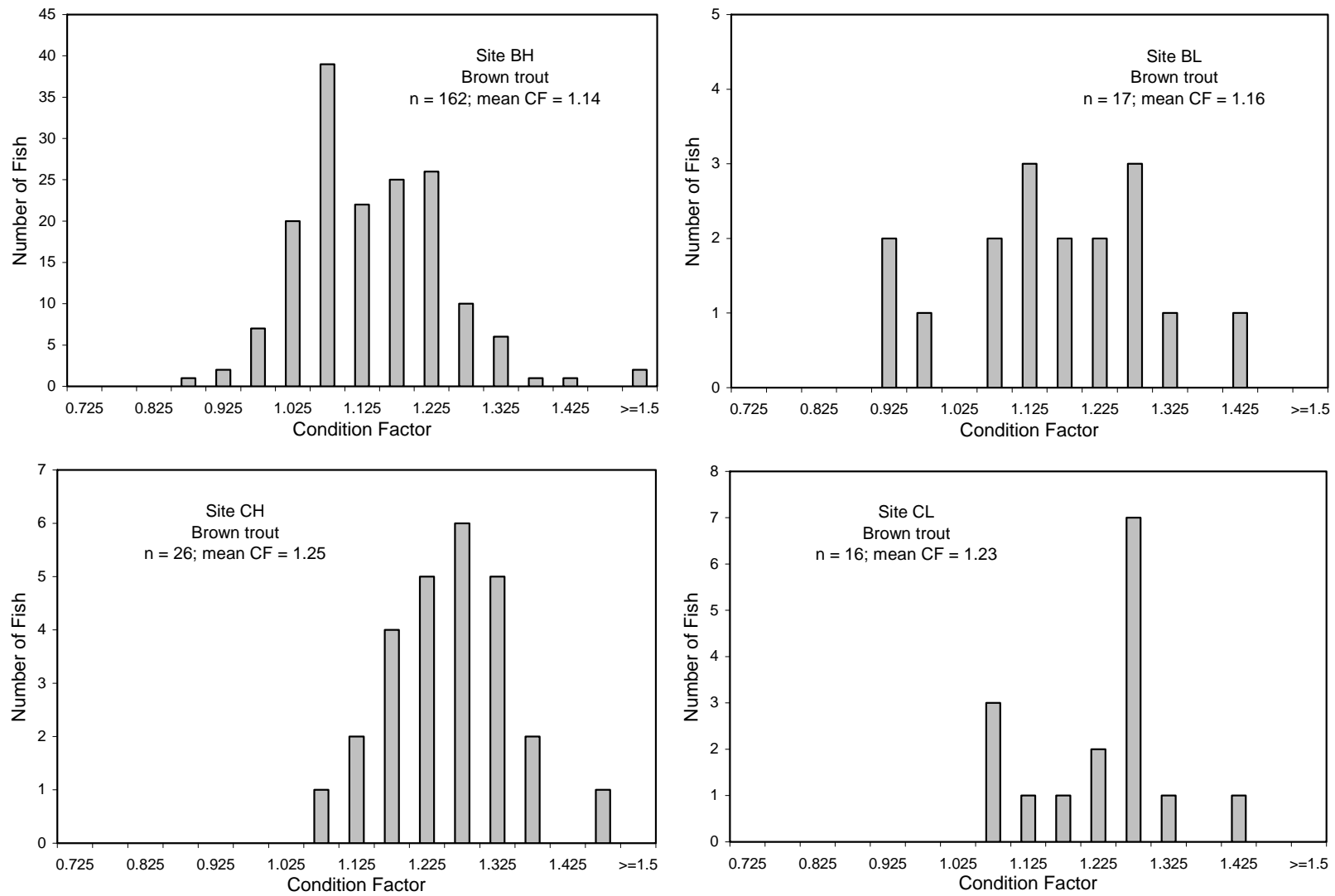


Figure 8. Condition factor-frequency data for brown trout captured during the October 2006 Mammoth Creek electrofishing survey.

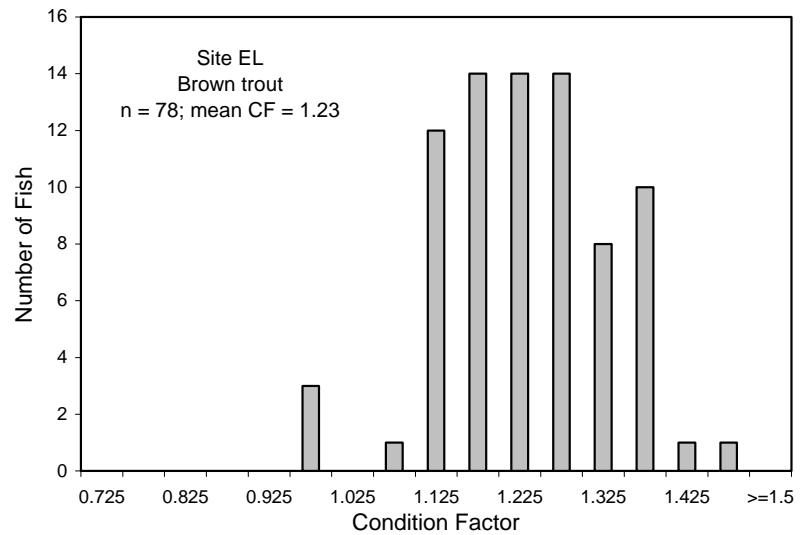
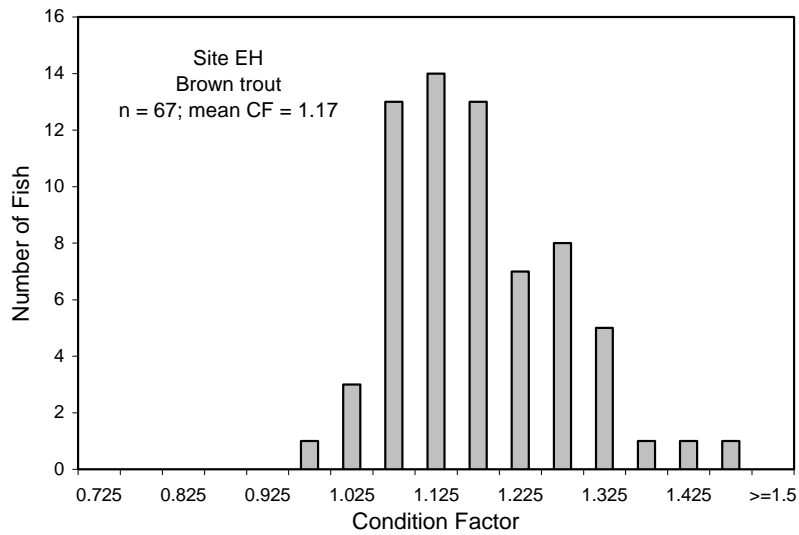
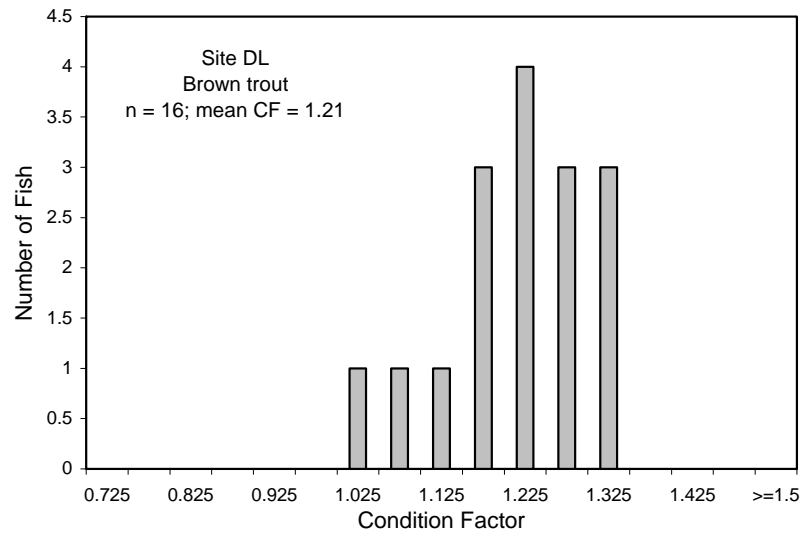
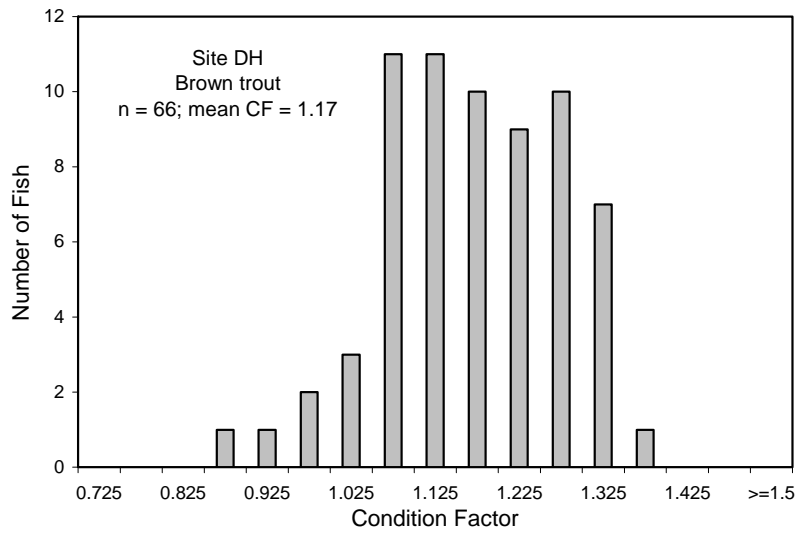


Figure 8. Condition factor-frequency data for brown trout captured during the October 2006 Mammoth Creek electrofishing survey. (continued)

Table 4. Multiple pass removal-depletion patterns and electrofishing statistics for various fish species captured at the eight Mammoth Creek sites, October 2006. Unless noted, all estimates were generated using the program MicroFish 3.0.

Species	Removal Pattern	Total Catch	Population Estimate	Probability of Capture Estimate
<b><u>Site BH</u></b>				
Brown trout	95 – 39 – 28	162	186 ± 21	0.492 ± 0.108
Rainbow trout (wild)	30 – 10 – 5	45	47 ± 5	0.634 ± 0.169
Brook trout*	1 – 0 – 0	1	1 ± 1	0.9996
<b><u>Site BL</u></b>				
Brown trout	13 – 4 – 0	17	17 ± 1	0.810 ± 0.206
Rainbow trout (wild)	2 – 1 – 2	5	6 ± 9	0.385 ± 0.956
Rainbow trout (hatchery)*	2 – 0 – 0	2	2 ± 1	0.9998
<b><u>Site CH</u></b>				
Brown trout	16 – 8 – 2	26	27 ± 4	0.634 ± 0.229
Rainbow trout (wild)	10 – 5 – 1	16	16 ± 2	0.696 ± 0.274
<b><u>Site CL</u></b>				
Brown trout	9 – 5 – 2	16	17 ± 4	0.571 ± 0.333
Rainbow trout (wild)	7 – 6 – 1	14	14 ± 3	0.636 ± 0.332
Rainbow trout (hatchery)	34 – 1 – 1	36	36 ± 0	0.923 ± 0.089
<b><u>Site DH</u></b>				
Brown trout	44 – 13 – 9	66	70 ± 7	0.606 ± 0.144
Rainbow trout (wild)	17 – 5 – 3	25	25 ± 2	0.694 ± 0.213
Rainbow trout (hatchery)	8 – 1 – 0	9	9 ± 0	0.900 ± 0.227
<b><u>Site DL</u></b>				
Brown trout	13 – 1 – 2	16	16 ± 1	0.762 ± 0.239
Rainbow trout (wild)	5 – 6 – 3	14	20 ± 21	0.318 ± 0.490
Rainbow trout (hatchery)	2 – 2 – 0	4	4 ± 2	0.667 ± 0.864
<b><u>Site EH</u></b>				
Brown trout	44 – 18 – 5	67	69 ± 5	0.663 ± 0.132
Rainbow trout (wild)	35 – 11 – 2	48	48 ± 2	0.762 ± 0.130
Rainbow trout (hatchery)	14 – 2 – 1	17	17 ± 1	0.810 ± 0.206
<b><u>Site EL</u></b>				
Brown trout	52 – 20 – 6	78	81 ± 5	0.655 ± 0.123
Rainbow trout (wild)	18 – 2 – 1	21	21 ± 1	0.840 ± 0.168
Rainbow trout (hatchery)	6 – 3 – 0	9	9 ± 1	0.750 ± 0.354
Owens sucker	6 – 3 – 2	11	11 ± 3	0.611 ± 0.404
Tui chub	4 – 1 – 1	6	6 ± 2	0.667 ± 0.570

\* Estimate derived using Program CAPTURE

trout at Site CL. Site CL is located in an area of Mammoth Creek that is regularly stocked by CDFG with hatchery rainbow trout.

The calculated population estimates for each species were examined as the relative population abundance at each site (Figure 9). At five of the eight sample sites (Sites BH, BL, CH, DH, and EL), brown trout dominated the populations, contributing between 63 and 80 percent of the estimated number of fish. At Site EH, brown trout made up just over half the fish population numbers, with wild rainbow trout contributing another 36 percent. At Site DL, wild rainbow trout made up half the fish populations, with brown trout contributing 40 percent. Hatchery rainbow trout were a minor component of the fish populations at seven of the eight sites, contributing between zero and 13 percent of the estimated fish numbers. Site CL was the only location where hatchery rainbow trout dominated the populations numerically, making up almost 54 percent of the estimated fish numbers. Site CL is located in an area of Mammoth Creek that is regularly stocked by CDFG with hatchery rainbow trout.

The population estimates and reach lengths were used to extrapolate the population numbers to abundance estimates of fish per mile (Table 5). This extrapolation resulted in total trout (wild and hatchery fish) abundance estimates ranging from 460 to 4,077 trout per mile, with average of 1,666 trout per mile. If only wild trout (both rainbow and brown) are considered, the abundance estimates for all sites average 1,495 wild trout per mile, and ranged from 423 wild trout per mile at Site BL to 4,060 fish per mile at Site BH.

Examination of the abundance index by species showed that brown trout estimates averaged 1,059 brown trout per mile, with range of 287 to 3,241 fish per mile (Table 5). Wild rainbow trout abundance estimates averaged 436 wild rainbow trout per mile and ranged from 110 to 902 fish per mile. Hatchery rainbow abundance estimates averaged 169 hatchery fish per mile and ranged from zero to 615 fish per mile. The two highest



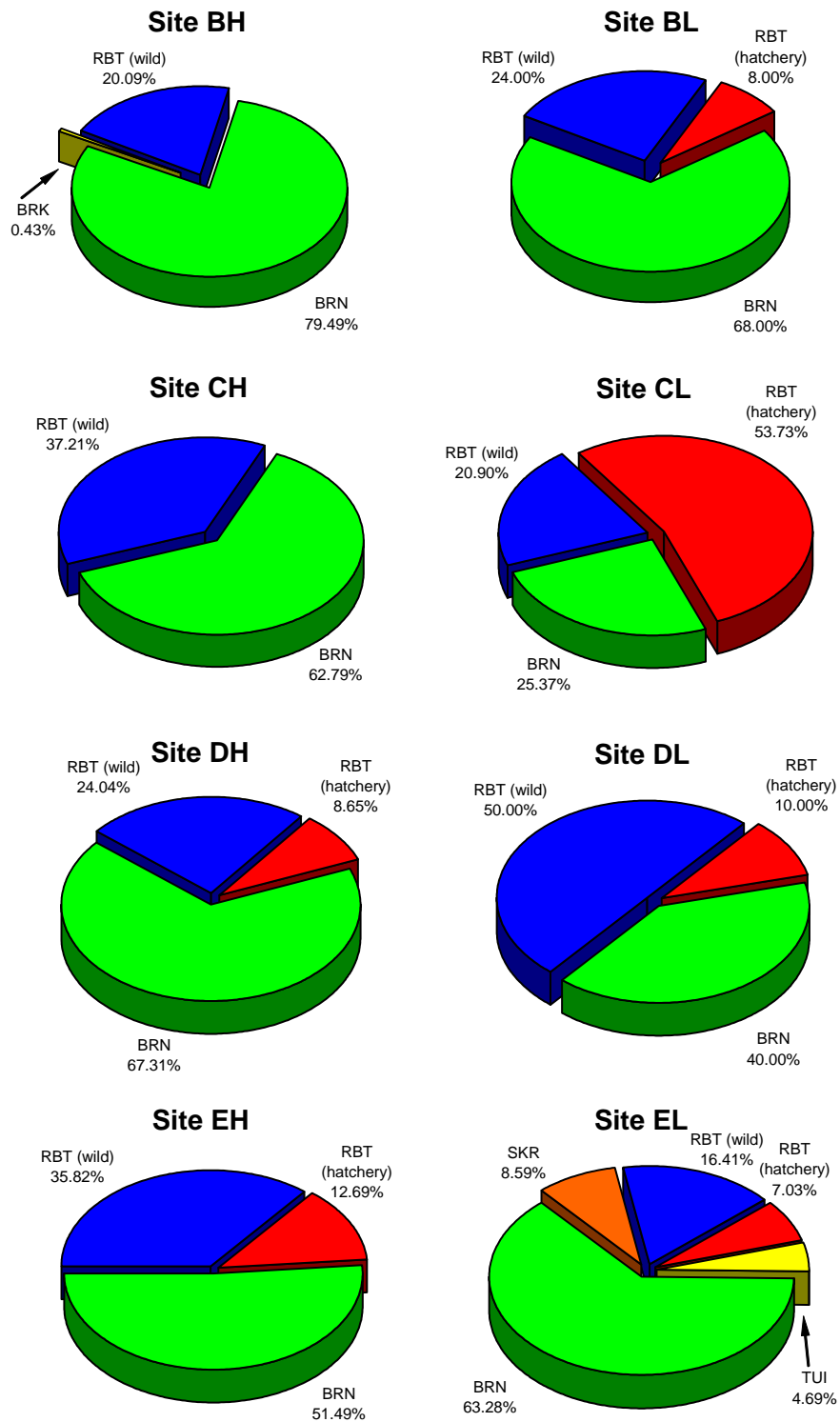


Figure 9. Relative species abundance presented as percentage of total study reach population estimates for Mammoth Creek October 2006 electrofishing surveys.

Table 5. Mean weights and standardized abundance and biomass estimates for various fish species captured at the eight Mammoth Creek electrofishing sites, October 2006.

Species	Mean wt (grams)	Abundance Estimates		Biomass Estimates	
		Fish/mile	Fish/acre	Pounds/mile	Pounds/acre
<b><u>Site BH</u></b>					
Brown trout	18.44	3,241	1,875	131.76	76.21
Rainbow trout (wild)	7.15	819	474	12.91	7.47
Brook trout	4.50	17	10	0.17	0.10
Total		4,077	2,359	144.84	83.77
<b><u>Site BL</u></b>					
Brown trout	115.89	313	272	79.90	69.45
Rainbow trout (wild)	2.56	110	96	0.62	0.54
Rainbow trout (hatchery)	215.05	37	32	17.44	15.16
Total		460	400	97.97	85.16
<b><u>Site CH</u></b>					
Brown trout	53.49	475	306	56.03	36.04
Rainbow trout (wild)	106.19	282	181	65.92	42.40
Total		757	487	121.96	78.44
<b><u>Site CL</u></b>					
Brown trout	84.98	290	119	54.42	22.34
Rainbow trout (wild)	111.65	239	98	58.88	24.17
Rainbow trout (hatchery)	146.87	615	252	199.17	81.75
Total		1,144	469	312.47	128.25
<b><u>Site DH</u></b>					
Brown trout	60.71	1,155	807	154.58	108.00
Rainbow trout (wild)	76.44	412	288	69.51	48.56
Rainbow trout (hatchery)	199.92	149	104	65.45	45.73
Total		1,716	1,199	289.54	202.29
<b><u>Site DL</u></b>					
Brown trout	109.55	287	125	69.40	30.15
Rainbow trout (wild)	67.00	359	156	53.05	23.05
Rainbow trout (hatchery)	236.53	72	31	37.46	16.27
Total		718	312	159.90	69.47
<b><u>Site EH</u></b>					
Brown trout	36.39	1,297	583	104.01	46.77
Rainbow trout (wild)	65.04	902	406	129.32	58.15
Rainbow trout (hatchery)	121.41	319	144	85.50	38.45
Total		2,518	1,133	318.82	143.38
<b><u>Site EL</u></b>					
Brown trout	69.69	1,411	694	216.85	106.60
Rainbow trout (wild)	51.24	366	180	41.34	20.32
Rainbow trout (hatchery)	275.22	157	77	95.15	46.78
Owens sucker	0.58	192	94	0.25	0.12
Tui chub	0.30	105	51	0.07	0.03
Total trout		1,934	951	353.34	173.70
Total Fish		2,231	1,096	353.65	173.86

hatchery rainbow trout abundance estimates were at Site CL (615 fish per mile) and Site EH (319 fish per mile), which are both located in areas regularly stocked with hatchery rainbow trout.

The total trout (including hatchery fish) abundance estimates in sites characterized by high-density riparian cover ranged from 757 trout per mile at Site CH up to 4,077 trout per mile at Site BH (Table 5). The low-density riparian cover population estimates for all trout ranged from 460 trout per mile at site BL to 1,934 trout per mile at Site EL. The average abundance for all trout at the high-density riparian cover sites was 2,267 trout per mile compared to an average of 1,064 trout per mile for the low-density riparian cover sites. If the comparison is limited to wild trout only (brown and wild rainbow), the discrepancy between the average abundances in the two different riparian areas is even greater. The average abundance for wild trout at the high-density riparian cover sites was 2,146 wild trout per mile compared to an average of 844 wild trout per mile for the low-density riparian cover sites. The 2006 data suggested that the density of wild trout was 2.5 times greater in the high-density riparian Mammoth Creek sites compared with the low-density sites.

An opposite trend was apparent for the hatchery fish, with lower densities in the high-density riparian areas. The average abundance for hatchery rainbow trout at the high-density riparian cover sites was 117 trout per mile compared to an average of 220 hatchery trout per mile for the low-density riparian sites. It is not clear if this trend has any biological significance, or instead is an artifact of the tendency to release hatchery fish in areas that have little or no riparian cover such as road crossings and areas where a truck can access the creek.

The calculated population estimates were also used in combination with the mean weights for each species to generate a relative population biomass at each site (Figure 10). In terms of biomass, brown trout dominated the fish populations at three of the eight sample sites

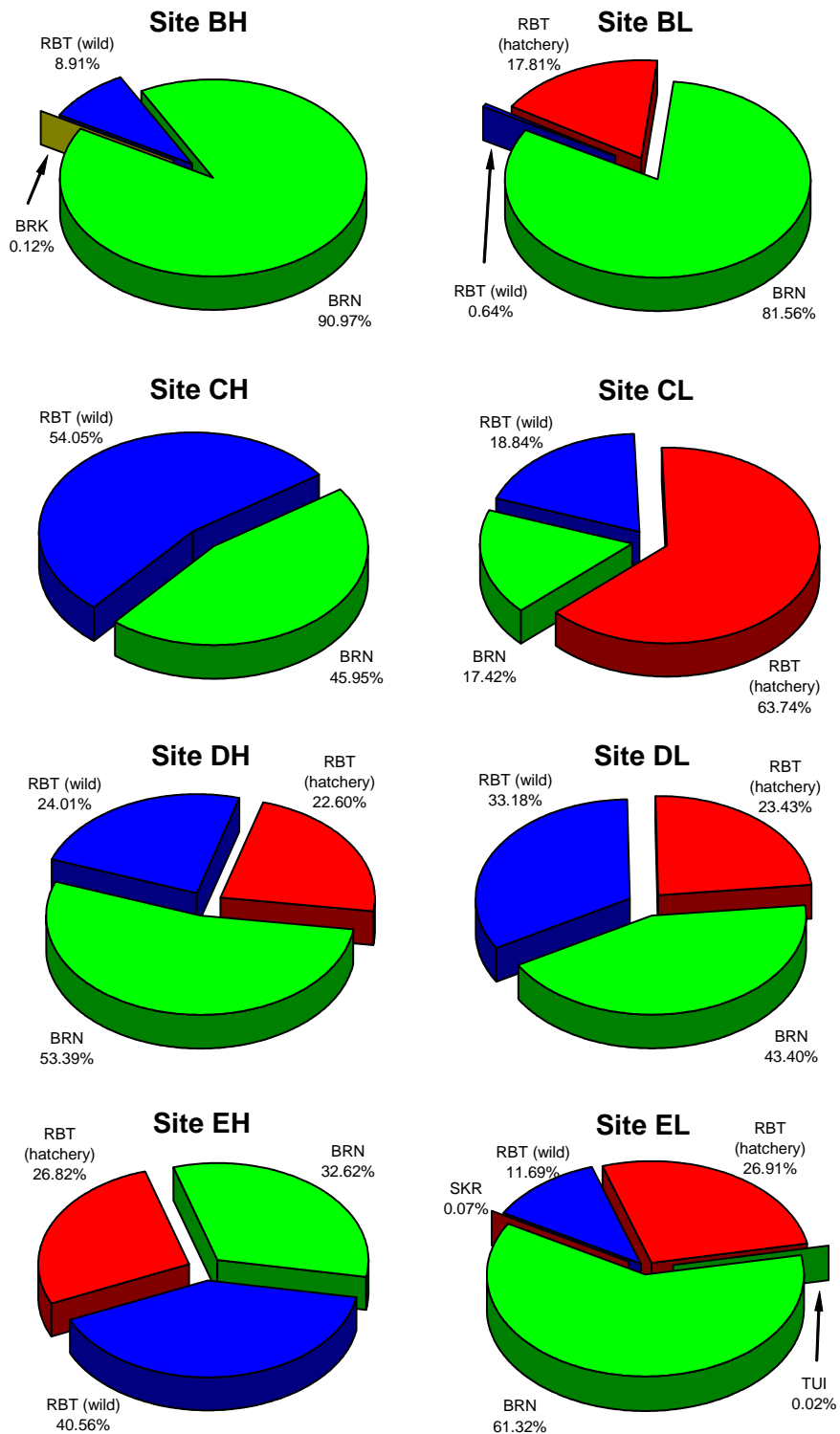


Figure 10. Relative species biomass presented as percentage of total study reach biomass estimates for Mammoth Creek October 2006 electrofishing surveys.

(Sites BH, BL, and EL), contributing between 61 and 91 percent of the estimated total weight. At Site DH, brown trout still made up the major portion of the population biomass, contributing just over half the estimated total weight. At Sites DL and EH, there is a more equitable contribution to the total reach biomass by brown, wild rainbow and hatchery trout. At Site CH, wild rainbow trout made up over half the fish biomass, with brown trout contributing the remainder. Site CL was the only location where hatchery rainbow trout dominated the population biomass, making up almost 64 percent of the estimated fish weight. Site CL is located in an area that was stocked with hatchery rainbow trout two days prior to our survey.

The reach biomass estimates were used to generate standardized biomass estimates of pounds per mile and pounds per acre that could be compared across sites and potentially across years (Table 5). The most commonly used biomass estimate, pounds of fish per acre, is the most representative, since it takes into account differences in sample areas. Total trout biomass estimates for all trout species combined, averaged 120.6 pounds per acre, and ranged from 69.5 pounds per acre at Site DL to 202.3 pounds per acre at Site DH. If only wild trout (both rainbow and brown) are considered, the biomass estimates for all sites average 90 pounds of wild trout per acre, and ranged from 46.5 pounds per acre at Site CL to 156.6 pounds per acre at Site DH.

Examination of trout biomass by species showed that brown trout biomass estimates averaged 61.9 pounds per acre, with range of 22.3 to 108 pounds per acre (Table 5). Wild rainbow trout biomass estimates averaged 28.1 pounds per acre and ranged from 0.5 to 58.2 pounds per acre. Hatchery rainbow biomass estimates averaged 30.5 pounds per acre and ranged from zero to 81.8 pounds per acre (at Site CL, which was located in a recently stocked area of Mammoth Creek).

The total trout (including hatchery fish) biomass estimates in sites characterized by high-density riparian cover ranged from 78.4 pounds per acre at Site CH up to 202.3 pounds per

acre at Site DH (Table 5). The low-density riparian cover biomass estimates for all trout ranged from 69.5 pounds per acre at Site DL to 173.7 pounds per acre at Site EL. The average biomass estimate for all trout at the high-density riparian cover sites was 127 pounds per acre compared to an average of 114.1 pounds per acre at the low-density riparian cover sites. If the comparison is limited to wild trout only (brown and wild rainbow), the discrepancy between the average biomass estimates in the two different riparian cover areas is even greater. The average biomass for wild trout at the high-density riparian cover sites was 105.9 pounds of wild trout per acre compared to an average of 74.2 pounds per acre for the low-density riparian cover sites. The 2006 data suggested that the biomass of wild trout was 1.4 times greater in the high-density riparian Mammoth Creek sites compared with the low-density sites.

An opposite trend was apparent for the hatchery fish, with lower biomass in the high-density riparian areas. The average abundance for hatchery rainbow trout at the high-density riparian cover sites was 21 pounds per acre compared to an average of 40 pounds per acre at the low-density riparian sites. As was the case for the abundance estimates, it is not clear if this trend has any biological significance, or instead is a result of the hatchery planting site selection (i.e., favor truck accessible areas that have little or no riparian cover).

## **Discussion**

The October 2006 fish population sampling in Mammoth Creek demonstrated that multiple-pass removal-depletion sampling using electrofishing techniques can produce resident fish population estimates with tight confidence intervals and a high probability of accuracy.

The electrofishing survey showed the fall 2006 resident fish population in the project area was dominated by brown trout, which made up the largest fraction of the abundance estimates (fish per mile) at six of the eight sample sites, and the largest fraction of the

biomass estimates (pounds per acre) at five of the eight sample sites. Wild rainbow trout while found at all eight sites, dominated the fish populations numerically at one site, and gravimetrically (biomass) at two of the sites. The results of the October 2006 survey also suggested higher densities and biomass of wild trout tended to be associated with the high-density riparian cover habitats. Hatchery rainbow trout dominated the fish populations both numerically and by biomass at one of the sites that located in an area that is regularly stocked with hatchery rainbow trout. Hatchery rainbow trout tended to have higher abundance and biomass indices at the low-density riparian sites, though this may likely more a function of supplementation program and not due to habitat preference.

In October 2006, native fish (suckers and chubs) were found at only the most downstream sample site. Due to their low numbers and small size, native fish contributed little to the overall fish population abundance or biomass indices. The relatively high numbers of native fish noted in lower Mammoth Creek in the early 1990's was likely due to lower stream flows and higher water temperatures that prevailed in the basin during the six-year long drought over that time span (Table 6).

Table 6. Numbers of Owens sucker and tui chub captured during the recent electrofishing surveys in Reach E of Mammoth Creek.

Year	Owens sucker	Tui chub
1992	205	417
1993	425	855
1994	524	392
1995	58	69
1996	84	48
1997	2	2
1999	49	6
2000	18	2
2001	6	2
2002	2	2
2003	54	19
2004	122	30
2005	18	2
2006	11	6

Moyle et al. (1996) speculated that native fishes in the Owens River basin did not generally occur in streams above 4,900 feet elevation. If this is true, the native fishes in lower Mammoth Creek are probably near the limits of their physical range and are able to expand their populations when stream flows remain low for extended periods of time.

The October 2006 length frequency data demonstrated the presence of multiple size/age classes of both brown trout and wild rainbow trout at all the survey sites. The presence of young-of-the-year brown and wild rainbow trout at the survey sites demonstrated that both these species had successful reproduction during 2006. The condition factors for both wild rainbow trout and brown trout at all the sample areas were all well above the 1.0 “healthy” trout threshold. The combination of successful reproduction, presence of multiple size/age classes, and high condition factors, suggest that the resident trout fishery in Mammoth Creek are healthy and continue to be maintained in good condition.

Additional support for categorizing the Mammoth Creek wild trout fishery as in good condition comes is derived from a comparison of the October 2006 biomass estimates in Table 5 to those from Gerstung (1973) shown in Table 7.

Table 7. Relationship between stream width and trout biomass in California waters (Gerstung 1973).

Average Stream Width (feet)	Trout Biomass (pounds per acre)
2 – 5	76
6 – 10	70
11 – 15	35
16 – 25	33
26 – 40	24
41 – 70	13

The stream widths of seven of the eight Mammoth Creek sites are in the 11 to 20 foot ranges (Table 2). These seven sites had an average wild trout (both brown and rainbow)



biomass estimate of 92.9 pounds per acre, and ranged from a low of 46.5 (Site CL) to a high of 156.6 pounds per acre (Site DH). These values are all well in excess of the 33 to 35 pounds per acre found by Gerstung (1973) in similarly sized California trout streams. Even site BL, with a mean width less than 10 feet, had a wild trout biomass estimate of 70.0 pounds per acre. All the available information continues to suggest that the Mammoth Creek basin trout populations are being maintained in good condition.

The 2006 biomass estimates could not be compared to recent survey data since biomass estimates were not calculated. A brief examination of the more recent survey raw data revealed that weights for many of the larger trout were not recorded, making meaningful and accurate weight estimates impossible. In addition, survey area lengths and weights were apparently not measured, or if they were, not reported. The lack of complete and accurate fish weights and survey areas, make it impossible to calculate area-based biomass (i.e. pounds per acre) estimates from the available prior survey data.

A comparison of the standardized abundance estimates (i.e. number of trout per mile) for the October 2006 survey with values from previous surveys showed an increase in brown trout abundance over the 2005 levels in five of the eight study sites, as well as the yearly mean (Table 8). Despite these increases brown trout abundance estimates in October 2006 were still below the fourteen year averages in all but one study area (Site EL).

The 2006 abundance estimates for wild rainbow trout were higher than those from 2005 in six of the eight study sites (Table 9). This trend may have held for Site EL as well, since in 2005 no attempt was made by the DFG survey crews to distinguish between hatchery and wild trout at this site. Despite the general increases over 2005 levels, the 2006 wild rainbow trout abundance estimates are still below the fourteen year average for most of the study sites.

Table 8. Standardized abundance estimates (trout/mile) for brown trout captured at the eight Mammoth Creek electrofishing sites, 1992-2006. Bold numbers indicate highest value for each site. Numbers in parenthesis indicate where the 2006 survey results ranked among the fourteen surveys.

	Sample Site								Yrly Mean
	BH	BL	CH	CL	DH	DL	EH	EL	
2006	3,241 (8 <sup>th</sup> )	313 (13 <sup>th</sup> )	475 (13 <sup>th</sup> )	290 (7 <sup>th</sup> )	1,155 (5 <sup>th</sup> )	287 (13 <sup>th</sup> )	1,297 (9 <sup>th</sup> )	1,411 (4 <sup>th</sup> )	1,059 (12 <sup>th</sup> )
2005	1,320	792	634	194	387	862	704	563	682
2004	3,186	440	1,302	845	880	1,549	1,355	581	1,267
2003	2,869	458	<b>1,901</b>	933	616	1,426	1,390	616	1,276
2002	5,826	898	1,056	246	563	<b>1,672</b>	1,866	264	1,549
2001	4,717	1,707	1,496	246	1,144	1,162	1,461	528	1,558
2000	6,670	634	1,074	88	810	1,162	1,179	<b>2,253</b>	1,734
1999	5,333	1,338	1,443	299	2,200	616	2,182	2,200	1,951
1997	<b>8,589</b>	704	1,690	211	616	1,654	3,819	1,795	<b>2,385</b>
1996	4,840	158	1,302	158	1,901	634	898	1,144	1,379
1995	1,760	546	334	88	616	18	334	1,038	592
1994	4,171	2,253	810	528	<b>4,418</b>	1,584	2,464	405	2,079
1993	2,957	<b>2,658</b>	510	<b>1,232</b>	1,056	510	1,232	158	1,289
1992	3,042	1,848	563	845	1,390	1,584	<b>3,978</b>	194	1,681
1992-2006	4,180	1,053	1,042	443	1,268	1,051	1,726	939	1,463

Table 9. Standardized abundance estimates (trout/mile) for wild rainbow trout captured at the eight Mammoth Creek electrofishing sites, 1992-2006. Bold numbers indicate highest value for each site. Numbers in parenthesis indicate where the 2006 survey results ranked among the fourteen surveys.

	Sample Site								Yrly Mean
	BH	BL	CH	CL	DH	DL	EH	EL	
2006	819 (2 <sup>nd</sup> )	110 (8 <sup>th</sup> )	282 (6 <sup>th</sup> )	239 (8 <sup>th</sup> )	413 (8 <sup>th</sup> )	359 (7 <sup>th</sup> )	902 (2 <sup>nd</sup> )	366 (3 <sup>rd</sup> )	436 (5 <sup>th</sup> )
2005	493	282	70	0	158	158	141	475 <sup>a</sup>	222
2004	422	246	123	35	229	246	88	18	176
2003	669	194	106	35	211	282	158	0	207
2002	<b>1,039</b>	<b>810</b>	123	123	528	475	229	18	418
2001	616	106	88	722	563	422	493	18	379
2000	35	616	405	<b>6,354</b>	528	669	<b>2,253</b>	158	<b>1,377</b>
1999	123	669	546	1,179	686	510	334	194	530
1997	123	123	810	933	722	<b>1,021</b>	810	88	579
1996	282	18	<b>1,690</b>	528	<b>933</b>	229	458	<b>563</b>	588
1995	158	0	53	59	18	88	53	194	78
1994	35	0	581	1,654	387	616	106	0	422
1993	18	0	70	0	299	35	53	18	62
1992	70	0	141	651	546	229	141	0	222
1992-2006	350	227	363	894	444	381	444	151	407

<sup>a</sup> hatchery and wild trout not differentiated at this site; all trout assumed to be wild fish

The fourteen year record of abundance data suggests that the trout populations in Mammoth Creek exhibit wide variations both between years and even between sites within years. These annual variations are probably controlled by a wide variety of environmental and biological variables including stream flows, water temperatures, habitat availability, food availability, reproductive success, year class strength, recruitment, overwinter survival, hatchery stocking practices, and angling pressure. Despite the spatial and temporal variations in trout abundance, evident in the long term Mammoth Creek fish survey data, the wild trout populations in the basin still appear to be in good physical condition.

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## Appendix A

October 2006 Habitat Characteristic Data Sheets

STERWIK  
CONNELL ST

OFF AND REPRODUCTION

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

Stream: MAMMOTH CRK County: MONO Date: 10/15/2006  
 Reach: BH Est. Q: 10 CFS Page: .1 of         
 Air Temp.: @ H2O Temp.: @ Conductivity:         $\mu\text{S/cm}$   
 Air Temp.: @ H2O Temp.: @ Specific Cond.:         $\mu\text{S/cm}$   
 Length: 303 gradient: 1.72% Salinity:        ppt  
 D.O.:        mg/L  
 D.O.:        % Saturation  
 pH:       

(ft) m	(ft) m	(ft) m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	16.1	0.30	0.60	0.50	
30	12.7	0.35	0.60	0.65	
60	17.9	0.30	0.40	0.35	
90	14.7	0.70	0.40	0.30	
120	18.2	0.80	0.45	0.30	
150	11.9	0.60	0.55	1.00	
180	10.1	0.40	0.80	1.10	
210	10.9	0.45	0.55	0.30	
240	14.3	0.60	0.65	0.35	
270	20.2	0.85	0.70	0.45	
303	9.9	0.90	2.00	0.95	
Mean Width		Mean Depth			
14.3 ft		0.61 ft			
Total Area		Total Volume			
4,321.88ft <sup>2</sup>		2,645.52 ft <sup>3</sup>			

GPS Coord. 38.90

Photos: ① COVER ② BOTTOM VIEW  
 ③ BOTTOM X ④ BOTTOM UP  
 ⑤ MID DOWN ⑥ MID UP  
 ⑦ TOP ⑧ TOP DOWN (GR. ON)

Maximum Depth 3.10

**Reach Habitat Characterization:**

Habitat types		
Pool	5	%
Run	15	%
Riffle	80	%
POW	0	%
		%

Substrate types		
finer (< 2mm or 1/16")	0	%
sand (2-7mm or 1/16-1/4")	5	%
gravel (7-75mm or 1/4-3")	20	%
cobble (75-300mm or 3-12")	60	%
boulder (>300mm or >12")	15	%
bedrock	0	%

trout spawning: 755 ft<sup>2</sup>

180  
50  
~~100~~  
125  
32  
50  
64  
50  
90  
64

Fish Cover		
Surface turbulence	30	%
Instream object	15	%
Undercut bank	5	%
Overhanging vegetation (<48")	30	%

Gradient		
FS to top	3.80	
FS to bottom	6.90	
Elev change	3.10	
Distance	180	
Gradient	1.72	



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

Stream: MAAMOUTH CRK County: MONROE  
 Reach: BL Est. Q: N 5 cfs  
 Air Temp.: @ H2O Temp.: @  
 Air Temp.: @ H2O Temp.: @  
 Length: 287 gradient: 1.09%

Date: 10/14/2006  
 Page: .1 of         
 Conductivity:        μS/cm  
 Specific Cond.:        μS/cm  
 Salinity:        ppt  
 D.O.:        mg/L  
 D.O.:        % Saturation  
 pH:       

(ft) m	(ft) m	(ft) m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	10.1	0.15	0.40	0.60	
30	10.1	0.30	0.50	0.20	
60	8.5	0.80	0.80	0.70	
90	9.0	0.20	0.40	0.35	
120	9.3	0.25	0.50	0.60	
150	10.3	0.60	0.65	0.60	
180	8.2	0.20	0.50	0.60	
210	8.4	0.30	0.55	0.40	
240	9.6	0.35	0.50	0.40	
270	9.7	0.30	0.40	0.35	
287	11.2	0.25	0.30	0.30	

Mean Width	<u>9.5</u>	Mean Depth	<u>0.43</u>
Total Area	<u>2723.89</u>	Total Volume	<u>1,180.35</u>

GPS Coord. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

BUCKET  
 Photos: ① COVER ② TOP X  
 ③ TOP DOWN ④ MID UP  
 ⑤ MID DOWN ⑥ BOTTOM K  
 ⑦ BOTTOM UP

Maximum Depth 1.36

Reach Habitat Characterization:

Pool	<u>5</u>	%
Run	<u>15</u>	%
Riffle	<u>80</u>	%
POW	<u>φ</u>	%
		%

finer (< 2mm or 1/16")	<u>φ</u>	%
sand (2-7mm or 1/16-1/4")	<u>5</u>	%
gravel (7-75mm or 1/4-3")	<u>80</u>	%
cobble (75-300mm or 3-12")	<u>10</u>	%
boulder (>300mm or >12")	<u>5</u>	%
bedrock	<u>φ</u>	%

trout spawning: 11635 ft<sup>2</sup>

*60% of reach  
spawningable*

Surface turbulence	<u>5</u>	%
Instream object	<u>5</u>	%
Undercut bank	<u>φ</u>	%
Overhanging vegetation (<48")	<u>10</u>	%

FS to top	<u>4.40</u>
FS to bottom	<u>5.90</u>
Elev change	<u>1.50</u>
Distance	<u>137</u>
Gradient	<u>1.09%</u>

S P2 1045  
 T P2 488 malfunction

$\frac{287}{1.50} = 3$

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

Stream: MAUMDITH CRK County: MOHIO Date: 10/15/2006  
 Reach: CH (repeat) (correct site) Est. Q: ~ 10 cfs Page: .1 of \_\_\_\_\_  
 Air Temp.: 3°C @ 0820 H2O Temp.: 40°C / 95°F @ 0815 Conductivity: 115.9  $\mu$ S/cm  
 Air Temp.: @ H2O Temp.: 6.5°C @ 1205 Specific Cond.: 193.1  $\mu$ S/cm  
 Length: 300 gradient: 3.42 Salinity: 0.1 ppt  
 D.O.: 6.55 mg/L  
 D.O.: 50.5 % Saturation  
 pH: 8.0

(ft)/m	(ft)/m	(ft)/m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	17.5	0.7	1.20	0.95	
30	16.6	1.20	0.60	0.40	
* 60	15.8	1.50	0.35	0.40	
* 90	10.0	0.70	0.95	0.90	
* 120	11.8	1.20	1.15	0.4	
* 150	14.0	0.80	0.70	0.95	
* 180	11.2	1.10	1.00	0.50	
* 210	10.8	0.90	1.00	0.75	
* 240	10.2	1.70	1.40	1.00	
* 270	12.3	1.45	1.50	1.10	
* 300	10.9	0.70	1.05	1.00	
Mean Width		12.8 ft		Mean Depth	0.95 ft
Total Area		3,848.18 ft <sup>2</sup>		Total Volume	3,638.28 ft <sup>3</sup>

GPS Coord. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 4/5 Photos: (1) COVER (2) TOP X  
(3) TOP DOWN (4) MID UP  
(5) MID DOWN  
(6) BOTTOM UP  
(7) BOTTOM X  
(8) BOTTOM X

Maximum Depth 1.80  
 17

**Reach Habitat Characterization:**

Habitat types		
Pool	15	%
Run	40	%
Riffle	35	%
POW	10	%
		%

Substrate types	
finer (< 2mm or 1/16")	0 %
sand (2-7mm or 1/16-1/4")	5 %
gravel (7-75mm or 1/4-3")	20 %
cobble (75-300mm or 3-12")	45 %
boulder (>300mm or >12")	30 %
bedrock	0 %

trout spawning: 54 ft<sup>2</sup>  
 10  
 8  
 30  
 6  
 54

Fish Cover	
Surface turbulence	15 %
Instream object	40 %
Undercut bank	10 %
Overhanging vegetation (<48")	30 %

Gradient	
FS to top	4.15
FS to bottom	8.25
Elev change	4.10
Distance	120
Gradient	

Bottom of THIS CH @ TOP of MCWD'S CH previous  
 Top ~ 300 upstream

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

Stream: MAMMOTH CRK County: MENCO Date: 10/14/2006  
 Reach: CL Est. Q: ~10 CFS Page: .1 of       
 Air Temp.:      @      H2O Temp.:      @      Conductivity:       $\mu$ S/cm  
 Air Temp.:      @      H2O Temp.:      @      Specific Cond.:       $\mu$ S/cm  
 Length: 309 gradient: 1.09% Salinity:      ppt  
 D.O.:      mg/L  
 D.O.:      % Saturation  
 pH:     

	(ft/m)	(ft/m)	(ft/m)			
	Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
B	0	20.2	0.75	1.45	1.75	
	30	8.3	1.60	1.25	1.05	
	60	<del>22.2</del>	0.3	1.05	0.80	
	90	31.3	0.2	0.5	0.7	
	120	24.3	1.05	0.70	1.20	
	150	16.6	1.20	1.00	0.65	
CR	180	18.2	0.60	1.00	0.90	
	210	24.2	0.60	0.75	0.75	
	240	20.9	0.75	0.65	0.75	
	270	19.4	1.15	1.10	0.75	
GR	309	10.5	1.50	1.60	1.65	
Mean Width		20.1 ft	Mean Depth		0.96 ft	
Total Area		6,210.90 ft <sup>2</sup>	Total Volume		5,966.23 ft <sup>3</sup>	

GPS Coord. \_\_\_\_\_  
 \_\_\_\_\_  
 Photos: ① COVER ② TOP X  
 ③ TOP DOWN ④ BOTTOM X  
 ⑤ BOTTOM UP ⑥ MID DOWN  
 ⑦ MID UP

Maximum Depth 2.40

**Reach Habitat Characterization:**

Habitat types		
Pool	5	%
Run	35	%
Riffle	35	%
POW	25	%
		%

Substrate types		
finer (< 2mm or 1/16")	0	%
sand (2-7mm or 1/16-1/4")	5	%
gravel (7-75mm or 1/4-3")	30	%
cobble (75-300mm or 3-12")	35	%
boulder (>300mm or >12")	30	%
bedrock		%

trout spawning: 191 ft<sup>2</sup>

Fish Cover		
Surface turbulence	20	%
Instream object	50	%
Undercut bank	0	%
Overhanging vegetation (<48")	20	%

Gradient		
309 FS to top	4.10	
180 FS to bottom	5.50	
Elev change	1.40	
Distance	129	
Gradient	1.09%	

12  
 8  
 20  
 4  
 35  
 20  
 16  
 24  
 36  
 8  
 8

22.7  
 4  
 22

split more than side

Big Red Heart hook RB C Bottom

1230 ft split channel 60-90

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

Stream: MAMMOTH CRK County: MONO Date: 10 / 12 / 2006  
 Reach: DH Est. Q: ~20 cfs Page: .1 of         
 Air Temp.:        @        H2O Temp.:        @        Conductivity:         $\mu$ S/cm  
 Air Temp.:        @        H2O Temp.:        @        Specific Cond.:         $\mu$ S/cm  
 Length: 320 gradient:        Salinity:        ppt  
3 NETS TOP/BOTTOM / + BLOCK SIDE ONE BOTTOM D.O.:        mg/L  
 D.O.:        % Saturation  
 pH:       

(ft) m	(ft) m	(ft) m				
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth	
0	10.3	1.20	1.25	0.95		
30	8.0	0.60	1.10	1.40		
60	9.8	0.75	1.10	0.85		
90	12.4	0.95	1.80	1.25		
120	11.5	0.95	1.10	0.90		
150	11.2	0.85	0.90	0.45		
180	12.1	0.70	1.0	0.90		
210	12.5	1.40	2.20	1.75		
240	11.9	1.30	1.40	1.20		
270	13.8	2.10	3.15	2.65		
300	13.6	1.80	1.80	1.55		
320	14.6	1.45	1.80	1.85		
Mean Width		11.8 ft		Mean Depth		1.34 ft
Total Area		3,778.67 ft <sup>2</sup>		Total Volume		5,069.71 ft <sup>3</sup>

GPS Coord. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Photos: ① COVER ② TOP ACROSS  
③ TOP DOWN ④ MID UP  
⑤ MID DOWN  
⑥ BOTTOM UP  
⑦ ACROSS @ BOTTOM

2.45  
 Maximum Depth 3.40

**Reach Habitat Characterization:**

Habitat types	
Pool	<u>15</u> %
Run	<u>80</u> %
Riffle	<u>5</u> %
POW	<u>0</u> %

Substrate types	
finer (< 2mm or 1/16")	<u>0</u> %
sand (2-7mm or 1/16-1/4")	<u>10</u> %
gravel (7-75mm or 1/4-3")	<u>20</u> %
cobble (75-300mm or 3-12")	<u>65</u> %
boulder (>300mm or >12")	<u>5</u> %
bedrock	<u>0</u> %

trout spawning: 484 ft<sup>2</sup>  
 10/10  
 10/90  
 64  
 10  
 150  
 90  
 50  
484

Fish Cover	
Surface turbulence	<u>10</u> %
Instream object	<u>20</u> %
Undercut bank	<u>0</u> %
Overhanging vegetation (<48")	<u>45</u> %

Gradient	
FS to top	
FS to bottom	
Elev change	
Distance	
Gradient	

CAN'T SEE  
 20ft

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

Stream: MAMMOTH CRK County: MONO Date: 10/13/2006  
 Reach: DL Est. Q: ~20 cfs Page: .1 of       
 Air Temp.:     @     H2O Temp.:     @     Conductivity:       $\mu$ S/cm  
 Air Temp.:     @     H2O Temp.:     @     Specific Cond.:       $\mu$ S/cm  
 Length: 2.94 gradient: ~~0.27%~~ 0.27% Salinity:      ppt  
 D.O.:      mg/L  
 D.O.:      % Saturation  
 pH:     

*High gradient!  
estimate  
~7%*

(ft) m	(ft) m	(ft) m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	27.8	0.7	0.7	0.35	
30	20.5	1.60	1.70	1.90	
60	15.0	0.2	1.40	1.45	
90	20.1	1.70	1.05	0.15	
120	18.0	0.55	1.10	1.00	
150	16.1	0.95	1.00	1.50	
180	13.5	1.40	0.60	0.65	
210	22.2	0.80	0.40	0.40	
240	17.4	1.80	1.05	0.85	
270	15.4	1.50	0.95	0.40	
294	22.9	0.5	0.55	1.25	
Mean Width		19.0 ft		Mean Depth 0.97 ft	
Total Area		5,583.33 ft <sup>2</sup>		Total Volume 5,431.05 ft <sup>3</sup>	

GPS Coord. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Photos: ① COVER ② Bottom X  
 ③ Bottom UP  
 ④ MID DOWN ⑤ MID UP  
 ⑥ TOP DOWN  
 ⑦ TOP X

Maximum Depth 2.20

**Reach Habitat Characterization:**

Habitat types		
20 Pool	20	%
25 Run	25	%
30 Riffle	30	%
35 POW	25	%
		%

Substrate types		
finer (< 2mm or 1/16")	0	%
sand (2-7mm or 1/16-1/4")	5	%
gravel (7-75mm or 1/4-3")	20	%
cobble (75-300mm or 3-12")	50	%
boulder (>300mm or >12")	25	%
bedrock	0	%

trout spawning: 120 ft<sup>2</sup>  
 75  
 5  
 35  
 5

Fish Cover		
Surface turbulence	35	%
Instream object	35	%
Undercut bank	30	%
Overhanging vegetation (<48")	25	%

Gradient	
FS to top	_____
FS to bottom	_____
Elev change	_____
Distance	_____
Gradient	_____

TOT NO 1  
225 below Weir Gap

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

Stream: Mammoth County: MONO Date: 10 / 12 / 2006  
 Reach: EH Est. Q: ~ 20 cfs Page: .1 of       
 Air Temp.: @ H2O Temp.: 7.2°C / 45°F @ 1600 Conductivity: 86.7 µS/cm  
 Air Temp.: @ H2O Temp.: 7.0°C @ 1815 Specific Cond.: 131.0 µS/cm  
 Length: ~~278~~ - 281 gradient:      Salinity: 0.1 ppt  
 D.O.: 9.41 mg/L  
 D.O.: 78.4 % Saturation  
 pH: 7.5

(ft)/m	(ft)/m	(ft)/m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	23.0	0.50	0.45	1.10	
30	15.1	0.80	0.80	0.60	
60	20.3	1.40	0.70	1.10	
90	17.2	0.35	0.90	0.70	
120	14.6	0.55	1.00	1.05	
150	17.3	0.45	1.30	1.10	
180	18.2	0.90	1.15	1.20	
210	23.3	0.70	0.60	0.50	
240	22.0	0.50	0.55	0.50	
270	15.8	1.35	1.10	0.60	
<del>278</del>	15.0	1.20	1.00	0.40	
281					

Mean Width: 18.3 ft Mean Depth: 0.82 ft  
 Total Area: 5,155.07 ft<sup>2</sup> Total Volume: 4,233.41 ft<sup>3</sup>

GPS Coord.: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Photos: ① Down ② Top Down  
 ③ view of weir from top net  
 ④ Across top ⑤ Top down  
 ⑥ Mid up ⑦ Mid down  
 ⑧ Bottom up  
 ⑨ Across Bottom

Maximum Depth 2.00

**Reach Habitat Characterization:**

Habitat types	
Pool	<u>5</u> %
Run	<u>70</u> %
Riffle	<u>25</u> %
POW	<u>0</u> %
	<u>    </u> %

Substrate types	
finer (< 2mm or 1/16")	<u>5</u> %
sand (2-7mm or 1/16-1/4")	<u>15</u> %
gravel (7-75mm or 1/4-3")	<u>35</u> %
cobble (75-300mm or 3-12")	<u>40</u> %
boulder (>300mm or >12")	<u>5</u> %
bedrock	<u>0</u> %

By pool  
 trout spawning: 860 ft<sup>2</sup>  
 20 x 6 = 360  
 200  
 300

Fish Cover	
Surface turbulence	<u>10</u> %
Instream object	<u>10</u> %
Undercut bank	<u>15</u> %
Overhanging vegetation (<48")	<u>35</u> %

Gradient	
FS to top	<u>    </u>
FS to bottom	<u>    </u>
Elev change	<u>    </u>
Distance	<u>    </u>
Gradient	<u>    </u>

CAN'T SEE

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

Stream: MAMMOTH CRK County: MONO Date: 10/11/2006  
 Reach: EL Est. Q: 120 cfs Page: .1 of           
 Air Temp.: 16°C @ 1235 H2O Temp.: 48.9°F @ 1225 Conductivity: 125.4 µS/cm  
 Air Temp.: @ H2O Temp.: 9.1°C @ 1124 Specific Cond.: 180.2 µS/cm  
 Length: 303' gradient: 0.53% Salinity: 0.1 ppt  
 D.O.: 6.78 mg/L  
 D.O.: 59.3 % Saturation  
 pH: 8.0

(ft) m	(ft) m	(ft) m			
Distance	Width	1/4 Depth	1/2 Depth	3/4 Depth	Mean Depth
0	15.3	1.70	1.60	1.75	
30	13.4	1.25	1.30	1.30	
60	15.6	0.75	1.50	1.75	
90	17.7	0.90	0.75	0.60	
120	13.6	<del>1.70</del>	1.50	1.05	
150	15.2	2.0	1.25	0.40	
180	13.6	0.95	0.50	0.80	
210	14.9	0.25	1.70	1.10	
240	18.9	1.10	1.05	0.70	
270	19.9	0.85	0.30	0.50	
303	20.5	1.10	1.00	0.90	

Mean Width	<u>16.8 ft</u>	Mean Depth	<u>1.09 ft</u>
Total Area	<u>5,084.89 ft²</u>	Total Volume	<u>5,524.04 ft³</u>

GPS Coord. get from MWD  
 \_\_\_\_\_  
 \_\_\_\_\_

- Photos: ① COVER  
 ② ACROSS BOTTOM  
 ③ BOTTOM UP @ 20'  
 ④ MID DOWN ⑤ MID UP @ 120'  
 ⑥ MID UP @ 240'  
 ⑦ TOP ~~ACROSS~~  
 ⑧ TOP DOWN

Maximum Depth 3.25

### Reach Habitat Characterization:

Habitat types	
Pool	<u>25</u> %
Run	<u>55</u> %
Riffle	<u>20</u> %
POW	<u>        </u> %
	<u>        </u> %

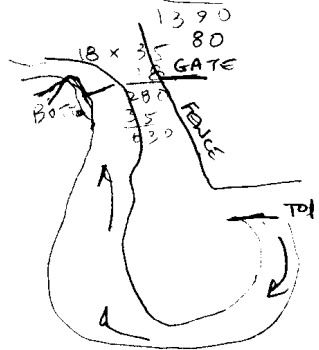
Substrate types	
finer (< 2mm or 1/16")	<u>10</u> %
sand (2-7mm or 1/16-1/4")	<u>15</u> %
gravel (7-75mm or 1/4-3")	<u>30</u> %
cobble (75-300mm or 3-12")	<u>10</u> %
boulder (>300mm or >12")	<u>5</u> %
bedrock	<u>Ø</u> %

trout spawning: 1470 ft²

630  
360  
400  
1390  
80

Fish Cover	
Surface turbulence	<u>5</u> %
Instream object	<u>5</u> %
Undercut bank	<u>20</u> %
Overhanging vegetation (<48")	<u>Ø</u> %

Gradient	
FS to top	<u>6.40</u>
FS to bottom	<u>8.00</u>
Elev change	<u>1.60</u>
Distance	<u>303</u>
Gradient	<u>0.53%</u>



TOP across from green gate  
 BOTTOM @ CHANCE RANCH FENCE LINE

## Appendix B

October 2006 Electrofishing Fish Data Sheets



Bottom Blocknet only  
Top @ Culvert

NOTE: SCALE W/ RING FOR TEMP. W/ 1.55521

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

Stream: Mammoth Creek County: MONO Date: 10/15/2006  
 Reach: BH Est. Q: N 10 CFS Page: 1 of 6  
 Air Temp.: 15°C @ 1510 H2O Temp.: 8.2°C @ 1505 Conductivity: 125.1 microSiemens  
 Blocknets: Top Culvert/Bottom 20' 1/4" mesh Specific Cond.: 183.8 microSiemens  
 Reach Length: \_\_\_\_\_ Salinity: 0.1 ppt  
 Electroshocker Type: \_\_\_\_\_ 47.4°F D.O.: 5.48 mg/L  
8.5°C @ 1740 WS  
 Personnel: Shockers: CINDY GLASE & TIM SALAMONOVICH 47.0 % saturation  
 \_\_\_\_\_ pH: 7.5  
 \_\_\_\_\_ Photos: \_\_\_\_\_  
 Netters: SEAN THOBARN & STEVE EGGERS

Shocker	<u>Cindy</u>	<u>Tim</u>						
Model	<u>12A</u>	<u>11A</u>						
Battery ID	<u>Lewis</u>							
Voltage:	<u>300</u>	<u>300</u>						
Frequency:	<u>60</u>	<u>60</u>						
1st Pass	<u>2336</u>	<u>2301</u>						
2nd Pass	<u>2032</u>	<u>2080</u>						
3rd Pass	<u>1719</u>	<u>1883</u>						
4th Pass								
5th Pass								

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

Pass#	Species	Length	(Weight)	Scale Sample	wt in grams	Notes
1st	BRN	252	114.9	178.7		
	"	213	68.9	107.2		
	RBT	201	65.0	101.1		
	BRN	249	114.1	177.4		BRN 12-37-29 N=192±19 SE=9.56
	"	245	96.5	150.1		BRK 1-0-0 N=1
	"	67	1.9	3.0		RBT 23-10-4 N=39±5 SE=2.46
	RBT	49	1.0	1.6		ALL 126-49-32 N=233±19 SE=9.8
	BRN	80	3.5	5.4		
	"	81	3.8	5.9		
	"	74	2.7	4.2		
	"	83	4.1	6.4		
	RBT	67	2.3	3.6		
	BRN	72	2.7	4.2		
	RBT	64	1.5	2.3		
	"	70	2.7	4.2		
	BRN	73	3.1	4.8		
	"	72	2.9	4.5		
	RBT	56	1.2	1.9		
	BRN	72	3.4	5.3		
	RBT	74	2.9	4.5		
	BRN	78	3.3	5.1		
	RBT	62	1.5	2.3		
	BRN	78	4.6	7.2		
	"	128	22.6	35.1		
	RBT	49	0.5	1.2		

Pennywt (dwt) → wt in grams wt in grams = (dwt) × 1.55521

Pennywt (dwt) × 1.55521 = wt in grams

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

Stream: Mammoth Creek Date: 10/15/2006 Page: 2 of 6

Reach: BH PENNY GRAMS (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1 <sup>st</sup>	RBT	161	36.1	56.1	
	BRN	213	64.9	100.9	
	"	235	96.4	149.9	
	"	93	5.7	8.9	
	"	78	3.8	5.9	
	RBT	45	0.7	1.1	
	BRN	75	3.3	5.1	
	"	80	4.1	6.4	
	"	80	3.8	5.9	
	"	80	3.5	5.4	
	"	79	3.5	5.4	
	"	82	4.5	7.0	
	"	73	2.5	3.9	
	BRBoks	76	2.9	4.5	
	BRN	73	2.4	3.7	
	"	71	2.4	3.7	
	"	76	3.1	4.8	
	"	67	2.3	3.6	
	RBT	47	0.7	1.1	
	"	50	0.6	0.9	
	BRN	76	3.4	5.3	
	"	74	3.2	5.0	
	"	79	3.6	5.6	
	"	78	3.0	4.7	
	"	75	3.3	5.1	
	"	82	3.7	5.8	
	"	85	4.3	6.7	
	"	80	4.3	6.7	
	"	84	4.0	6.2	
	"	81	3.7	5.8	
	"	81	4.2	6.5	
	"	91	5.4	8.4	
	RBT	62	1.4	2.2	
	BRN	80	4.0	6.2	
	"	74	3.0	4.7	
	"	77	2.9	4.5	
	"	70	2.3	3.6	
	"	65	2.1	3.3	
	"	68	2.3	3.6	
	"	80	3.6	5.6	
	RBT	52	1.0	1.6	
	BRN	82	4.3	6.7	
	"	80	4.0	6.2	
	"	83	4.5	7.0	
	"	78	4.2	6.5	

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

Stream: Mammoth Creek Date: 10/15/2006 Page: 3 of 6

Reach: BH Penny GRAMS (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1 <sup>st</sup>	BRN	77	3.0	4.7	
	"	80	4.0	6.2	
	"	79	3.8	5.9	
	"	79	3.5	5.4	
	RBT	52	1.0	1.6	
	BRN	205	64.9	100.9	
	RBT	176	42.1	65.5	
	BRN	274	161.8	251.6	
	"	301	180.1	280.1	
	"	279	130.9	203.6	
	"	74	2.8	4.4	
	"	81	4.1	6.4	
	"	83	4.5	7.0	
	RBT	65	2.0	3.1	
	BRN	76	3.3	5.1	
	"	80	3.6	5.6	
	"	87	4.4	6.8	
	"	82	3.8	5.9	
	"	80	3.9	6.1	
	"	<del>82</del> 68	2.1	3.3	
	"	82	4.2	6.5	
	"	89	4.8	7.5	
	RBT	59	1.6	2.5	
	"	57	1.3	2.0	
	BRN	149	24.6	38.3	
	RBT	48	0.8	1.2	mort.
	"	57	1.5	2.3	mort.
	BRN	80	3.5	5.4	mort.
	RBT	55	1.5	2.3	
	BRN	77	3.0	4.7	
	"	82	3.3	5.1	
	"	78	3.2	5.0	
	"	83	4.4	6.8	
	"	70	2.6	4.0	
	"	84	5.1	7.9	
	"	78	3.2	5.0	
	"	71	2.9	4.5	
	"	81	3.6	5.6	
	"	75	3.2	5.0	
	"	75	3.0	4.7	
	"	86	4.7	7.3	
	"	67	2.0	3.1	
	RBT	67	<del>2.2</del>	<del>3.4</del>	
	"	44	0.5	0.8	
	BRN	147	22.3	34.7	

(dwt) penny wt  $\xrightarrow{\uparrow}$  wt in grams  $\xrightarrow{\uparrow}$

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

Stream: Mammoth Creek Date: 10/15/2006 Page: 4 of 6

Reach: BH PENNY GRAMS (continued)

Pass#	Species	Length	Weight	Scale Circle	Notes
1 <sup>st</sup>	BRN	160	29.3	45.6	1 <sup>st</sup> Pass Total - 126 RBT - 23 BRN - <del>102</del> 95 Brook - 1
	"	75	3.0	4.7	
	"	81	3.7	5.8	
	"	77	3.3	5.1	
	RBT	50	0.9	1.4	
	"	51	1.1	1.7	
	BRN	80	3.9	6.1	
	RBT	65	2.0	3.1	
	"	56	1.2	1.9	
	BRN	79	3.6	5.6	
	RBT	51	0.9	1.4	
2 <sup>nd</sup>	BRN	163	31.0	48.2	2 <sup>nd</sup> Pass Total - 49 RBT - 10 BRN - 39 126 - 49 = 32
	RBT	54	1.4	2.2	
	"	117	11.4	17.7	
	BRN	214	63.1	129.2	
	"	218	79.1	123.0	
	"	73	3.1	4.8	
	"	149	22.6	35.1	
	RBT	50	1.1	1.7	
	BRN	83	4.1	6.4	
	"	91	5.1	7.9	
	"	77	3.2	5.0	
	"	99	5.6	8.7	
	"	78	3.6	5.6	
	"	70	2.6	4.0	
	"	85	4.9	7.6	
	"	70	2.6	4.0	
	RBT	65	1.8	2.8	
	BRN	82	4.0	6.2	
	"	74	3.0	4.7	
	"	73	3.0	4.7	
	"	79	4.0	6.2	
	RBT	46	0.8	1.2	
	"	47	2.8	1.2	
	BRN	71	2.5	3.9	
	"	80	3.5	5.4	
	"	69	2.6	4.0	
	RBT	66	2.1	3.3	
	BRN	78	3.1	4.8	
	"	77	3.5	5.4	
	"	85	5.3	8.2	
	"	77	3.8	5.9	
	"	71	2.7	4.2	
	"	78	3.6	5.6	

$$\text{Penny wts} \xrightarrow{\uparrow} \text{wt in grams} \xrightarrow{\uparrow} \text{wt in grams} = (\text{penny wt} \times 1.55521)$$

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

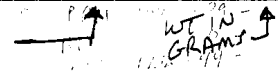
Stream: Mammoth Creek Date: 10/15/2006 Page: 5 of 6

Reach: BH PENNY GRAMS (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
2 <sup>nd</sup>	RBT	56	1.4	2.2	
	"	53	1.2	1.9	
	BRN	76	3.6	5.6	
	"	80	3.8	5.9	
	"	85	4.3	6.7	
	"	72	2.5	3.9	
	"	77	3.2	5.0	
	"	75	3.4	5.3	
	"	70	2.2	3.4	
	"	87	5.4	8.4	
	"	88	4.5	7.0	
	"	80	4.2	6.5	
	RBT	61	1.6	2.5	
	BRN	80	3.5	5.4	
	"	81	4.1	6.4	
	"	83	4.0	6.2	
<hr/>					
3 <sup>rd</sup>	BRN	80	3.8	5.9	
	"	79	3.3	5.1	
	"	78	3.2	5.0	
	"	82	4.3	6.7	
	"	74	3.5	5.4	
	"	77	3.6	5.6	
	RBT	38	0.3	0.5	
	BRN	88	4.7	7.3	
	"	80	4.2	6.5	
	"	76	3.5	5.4	
	"	77	3.1	4.8	
	RBT	45	0.6	0.9	
	BRN	84	4.3	6.7	mont.
	RBT	45	0.7	1.1	
	BRN	62	1.7	2.6	
	"	85	3.9	6.1	
	RBT	53	1.1	1.7	
	"	46	0.7	1.1	
	BRN	83	4.0	6.2	
	"	82	3.8	5.9	
	"	85	4.5	7.0	
	"	68	1.9	3.0	
	"	80	3.4	5.3	
	"	70	2.9	4.5	
	"	84	4.0	6.2	
	"	79	3.5	5.4	
	"	81	3.7	5.8	
	"	77	3.2	5.0	

3<sup>rd</sup> Pass  
 Total - 33  
 BRN - 29  
 RBT - 4

(DWT) PENNY WTS



WT IN GRAMS = DWT X 1.55521



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

Stream: Mammoth Creek County: MONO Date: 10/14/2006  
 Reach: BL Est. Q: \_\_\_\_\_ Page: 1 of 2  
 Air Temp.: 11°C @ 1410 H2O Temp.: 46.4°F @ 1405 Conductivity: 124.5 microSiemens  
 Blocknets: Top/Bottom 20', 1/4" mesh Specific Cond.: 185.5 microSiemens  
 Reach Length: 287 Salinity: 0.1 ppt  
 Electroshocker Type: \_\_\_\_\_ D.O.: 6.83 mg/L  
 Personnel: Shockers: Tim & SEAN % saturation: 57.7  
 pH: 8.0  
 Photos: \_\_\_\_\_  
 Netters: Steve, Cindy

Shocker	<u>SEAN</u>	<u>TIM</u>							
Model	<u>12A</u>	<u>11A</u>							
Battery ID	<u>Columbia</u>	<u>Klatte</u>							
Voltage:	<u>300</u>	<u>300</u>							
Frequency:	<u>60</u>	<u>60</u>							
	<u>1115</u>	<u>1355</u>							
	<u>1045</u>	<u>482?</u>	<u>- malfunction</u>						
	<u>845</u>	<u>941</u>							

Lengths are fork lengths or total lengths in millimeters					Weights are in grams	
Pass#	Species	Length	Weight	Scale Sample	Notes	
<u>1<sup>st</sup></u>	<u>BRN</u>	<u>174</u>	<u>67.2</u>			
	<u>"</u>	<u>140</u>	<u>34.1</u>			
	<u>"</u>	<u>266</u>	<u>206.9</u>			
	<u>"</u>	<u>284</u>	<u>215.4</u>			
	<u>"</u>	<u>244</u>	<u>144.3</u>			
	<u>RBT</u>	<u>58</u>	<u>2.7</u>		<u>mort.</u>	
	<u>BRN</u>	<u>78</u>	<u>5.9</u>			
	<u>"</u>	<u>157</u>	<u>48.8</u>			
	<u>RBT</u>	<u>252</u>	<u>224.9</u>		<u>Hatchery</u>	
	<u>B12N</u>	<u>233</u>	<u>141.3</u>			
	<u>RBT</u>	<u>259</u>	<u>205.2</u>		<u>Flipper (dolphin head) - Hatchery</u>	
	<u>BRN</u>	<u>132</u>	<u>26.1</u>			
	<u>"</u>	<u>75</u>	<u>5.3</u>			
	<u>"</u>	<u>216</u>	<u>110.6</u>			
	<u>RBT</u>	<u>51</u>	<u>1.2</u>			
	<u>BRN</u>	<u>246</u>	<u>171.3</u>			
	<u>"</u>	<u>301</u>	<u>257.4</u>			
<hr/>						
<u>2<sup>nd</sup></u>	<u>BRN</u>	<u>212</u>	<u>128.1</u>			
	<u>"</u>	<u>240</u>	<u>165.6</u>			
	<u>"</u>	<u>76</u>	<u>6.2</u>			
	<u>RBT</u>	<u>66</u>	<u>3.9</u>			
	<u>BRN</u>	<u>279</u>	<u>235.7</u>			
<hr/>						
<u>(OVER)</u>						

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

Stream: Mammoth Creek Date: 10/14/2006 Page: 2 of 2

Reach: BL (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
<u>3<sup>rd</sup></u>	<u>RBT</u>	<u>53</u>	<u>1.4</u>		<u>3<sup>rd</sup> Pass</u> <u>BRN - 0</u> <u>RBT - 2</u>
	<u>11</u>	<u>67</u>	<u>3.6</u>		
				<u>BRN</u>	<u>13-4-0 N=17±1 SE=0.39</u>
				<u>RBT</u>	<u>4-1-2 N=7±3 SE=1.20</u>
				<u>ALL</u>	<u>17-5-2 N=24±2 SE=0.89</u>



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

Stream: Mammoth Creek County: MONO Date: 10/15/2006  
 Reach: CH (correct site) Est. Q: \_\_\_\_\_ Page: 1 of 2  
 Air Temp.: \_\_\_\_\_ @ \_\_\_\_\_ H2O Temp.: \_\_\_\_\_ @ \_\_\_\_\_ Conductivity: \_\_\_\_\_ microSiemens  
 Blocknets: Top/Bottom - 20', 1/4" mesh Specific Cond.: \_\_\_\_\_ microSiemens  
 Reach Length: 306 Salinity: \_\_\_\_\_ ppt  
 Electroshocker Type: SMITH-ROOT BACKPACK D.O.: \_\_\_\_\_ mg/L  
 Personnel: Shockers: ~~STEVE~~ STEVE EGGERS / SEAN THORABEN % saturation \_\_\_\_\_  
 Netters: TIM SALAMUNOVICH / LINDY GLASE pH: \_\_\_\_\_  
 Photos: \_\_\_\_\_

Shocker	Steve	Sean							
Model	11A	12A							
Battery ID									
Voltage:	300	300							
Frequency:	60	60							
1st Pass	1604	1761							
2nd Pass	1720	1621							
3rd Pass	1234	1300							
4th Pass									
5th Pass									

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

Pass#	Species	Length	DWT (Weight)	Seals Sample	GRAMS	Notes
1st	RBT	64	2.3	3.6		
	"	314	200.7	312.1		
	BRN	228	96.7	150.4		
	"	239	107.1	166.6		
	"	90	6.3	9.8		
	"	251	117.1	182.1		
	"	230	87.0	135.3		
	"	243	109.5	170.3		
	ROT	68	2.9	4.5		
	BRN	78	3.9	6.1		
	"	83	4.6	7.2		
	RBT	326	254.8	396.3		
	"	73	3.5	5.4		
	"	299	203.4	316.3		
	"	199	70.5	109.6		
	BRN	193	53.5	83.2		
	"	169	37.5	58.3		
	"	73	3.4	5.3		
	RBT	75	3.5	5.4		
	BRN	78	4.0	6.2		
	"	90	5.9	9.0		
	RBT	69	3.0	4.7		
	BRN	87	5.2	8.1		
	RBT	69	2.9	4.5		
	BRN	82	4.7	7.3		

1st Pass  
BRN - 16  
RBT - 10  
26

THESE ARE PENNY WTS (DWT) → ← WT IN GRAMS = DWT X 1.55521

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

Stream: Memmoth Date: 10/15/2006 Page: 2 of 2  
 Reach: CH (correct) PENNY GRAMS (continued)

Pass#	Species	Length	Weight	<del>Sec</del> <sup>Sample</sup>	Notes
1 <sup>st</sup>	BRN	77	3.9	6.1	
<hr/>					
2 <sup>nd</sup>	RBT	51	0.9	1.4	
"	"	207	80.0	124.4	
"	"	260	127.1	197.7	2 <sup>nd</sup> Pass
"	BRN	172	38.1	59.3	BRN - 8
"	RBT	257	133.1	207.0	RBT - 5
"	BRN	260	123.8	192.5	13
"	"	178	41.2	64.1	
"	"	94	7.4	11.5	
"	"	92	6.6	10.3	
"	"	85	5.8	9.0	
"	"	83	4.7	7.3	
"	"	95	7.0	10.9	
"	RBT	60	1.9	3.0	
<hr/>					
3 <sup>rd</sup>	RBT	60	2.0	3.1	3 <sup>rd</sup> Pass
"	BRN	85	5.1	7.9	BRN - 2
"	"	82	4.3	6.7	RBT - 1
3					

PENNY WTS (DWT)  $\nearrow$  WT  $\nearrow$  IN GRAMS (DWT X 1.55521)

**Thomas R. Payne & Associates Electrofishing Survey, Fish Data Form**

Stream: Mammoth Creek County: Mono Date: 10/17/2006  
 Reach: CL Est. Q: ~10 CFS Page: 1 of 2  
 Air Temp.: 7.5°C @ 0940 H2O Temp.: 42.2°F / 5.5°C @ 0935 Conductivity: 121.3 microSiemens  
 Blocknets: Top/Bottom 20', 44" mesh Specific Cond.: 193.2 microSiemens  
 Reach Length: \_\_\_\_\_ Salinity: 0.1 ppt  
 Electroshocker Type: \_\_\_\_\_ D.O.: 6.65 mg/L  
 Personnel: Shockers: Tim / Steve Wetters: \_\_\_\_\_  
 Wetters: Sean, Cindy pH: 8.0  
 Photos: \_\_\_\_\_

ANGLER  
IN REACH  
DURING SETUP  
3-4 ANGLERS  
DROPS TREEM  
DURING  
EFISH

Shocker	TIM	STEVE							
Model	11A	12A							
Battery ID									
Voltage:	300	300							
Frequency:	60	60							
1st Pass	1940	2166							
2nd Pass	1886	1884							
3rd Pass	1507	1534							
4th Pass									
5th Pass									

Lengths are fork lengths or total lengths in millimeters					Weights are in grams
Pass#	Species	Length	Weight	Scale Sample	Notes
1st	RBT	269	247.7		
	"	226	170.5		Hatchery
	"	264	216.6		"
	"	205	119.2		"
	"	172	65.7		"
	BRN	263	216.4		
	RBT	232	172.8		
	"	222	124.0		Hatchery
	"	156	47.4		
	"	269	224.5		Hatchery
	BRN	164	55.7		
	RBT	194	110.2		Hatchery
	"	206	122.7		"
	"	196	106.8		"
	"	212	127.1		"
	BRN	257	218.6		
	RBT	170	62.5		Hatchery
	"	249	213.1		"
	"	181	90.5		"
	"	208	104.3		"
	"	176	60.2		"
	"	201	126.9		"
	BRN	291	346.9		
	"	257	184.0		
	"	81	6.8		

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

Stream: Mammoth Creek Date: 10/14/2006 Page: 2 of 2

Reach: CL (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes	
1 <sup>st</sup>	BRN	185	84.6			
	RBT	308	393.1		Hatchery	
	"	241	159.8		"	
	"	219	140.1		"	
	"	211	109.0		"	
	"	276	234.3		"	
	"	185	72.2		" missing one eye	
	"	190	93.5			
	"	207	120.8		Hatchery	
	"	179	70.8		" mort. / hook in throat	
	"	216	131.3		"	
	"	188	100.2		"	
	"	222	146.9		"	
	"	241	185.2		"	
	"	291	288.9		"	
	"	221	132.5		"	
	"	283	275.1		"	
	"	202	110.4		"	
	"	207	135.9		"	
	"	265	214.1		"	
"	219	144.4		"		
"	196	114.4		"		
"	BRN	81	6.7			
"	"	91	9.4			
"	RBT	63	3.0			
~~~~~						
2 <sup>nd</sup>	RBT	178	78.4			
	"	208	73.0			
	"	202	118.2		Hatchery	
	"	201	98.6			
	"	305	333.0			
	"	65	3.2			
	"	63	3.4			
	"	BRN	82	7.0		
	"	"	100	10.9		
	"	"	95	10.9		
	"	"	95	9.2		
"	"	86	7.9			
~~~~~						
3 <sup>rd</sup>	BRN	78	6.1			
	RBT	235	150.3			
	BRN	251	178.5		Hatchery	

1<sup>st</sup> Pass  
BRN - 9  
RBT - 41  
50

2<sup>nd</sup> Pass  
BRN - 5  
RBT - 7  
12

3<sup>rd</sup> Pass  
BRN - 2  
RBT - 2  
4

BRN ⇒ 9 - 5 - 2      N = 17 ± 4      SE = 2.00  
RBT ⇒ 41 - 7 - 2      N = 50 ± 1      SE = 0.61  
CL ⇒ 50 - 12 - 4      N = 66 ± 2      SE = 1.09

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

Stream: Mammoth Creek County: Mono Date: 10/12/2006  
 Reach: DH Est. Q: ~20 cfs Page: 1 of 3  
 Air Temp.: @ H2O Temp.: 40.4°F @ 1050 Conductivity: 79.8 microSiemens  
 Blocknets: Top/Bottom 20' small mesh Specific Cond.: 131.8 microSiemens  
 Reach Length: 320 ft Salinity: 0.1 ppt  
 Electroshocker Type: Smith-Root Backpack D.O.: 10.15 mg/L  
 Personnel: Shockers: TIM SALAMUNOVICH 79.0 % saturation  
STEVE EGGERS pH: 7.5  
 Netters: Sean, Cindy Photos:

Shocker	Steve	Tim							
Model	12A	11A							
Battery ID	Lewis	Klutte							
Voltage:	300	300							
Frequency:	60	60							
1st Pass	1284	1723							
2nd Pass	1105	1459							
3rd Pass	943								
4th Pass									
5th Pass									

Lengths are fork lengths or total lengths in millimeters				Weights are in grams	
Pass#	Species	Length	Weight	Scale Sample	Notes
1st	BRN	94	8.6		
	RBT	54	2.2		
	BRN	150	37.8		
	RBT	43	1.0		
	BRN	190	89.3		
	"	197	90.1		
	"	232	133.8		
	"	237	146.3		
	"	232	145.7		
	RBT	207	108.1		
	"	181	67.9		Hatchery
	"	147	48.7		
	BRN	244	184.2		
	"	145	34.5		
	"	145	37.0		
	"	79	5.5		
	"	77	6.1		
	RBT	218	126.9		
	"	281	242.1		Hatchery - Dorsal Funky
	"	286	276.1		" - "
	"	332	438.2		" - "
	BRN	264	193.8		
	RBT	154	41.5		
	BRN	141	36.6		
	RBT	166	65.9		

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

Stream: Mammoth Creek Date: 10/12/2006 Page: 2 of 3  
 Reach: DH (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1 <sup>st</sup>	RBT	171	67.4		Stunted Dorsal - Hatchery
	BRN	156	43.8		
	BRN	78	5.8		
	RBT	156	54.9		
	BRN	83	7.0		
	"	77	5.6		
	"	254	165.2		Skinny <del>          </del>
	"	270	230.6		
	"	325	294.4		Skinny <del>          </del>
	"	86	8.1		
	"	82	7.7		
	"	163	47.0		
	"	80	6.5		
	"	164	49.4		
	RBT	145	39.2		
	BRN	245	156.5		
	"	219	141.4		
	"	217	109.4		
	"	241	143.3		
	RBT	306	346.0		Hatchery - one small, pectoral
	"	225	130.3		" " " "
	"	220	136.3		
	BRN	232	147.4		
	RBT	299	334.3		
	"	260	219.8		
	BRN	142	31.8		
	"	136	27.6		
	"	147	36.2		
	"	153	43.4		
	"	164	42.5		
	"	151	44.1		
	"	152	42.4		
	RBT	195	97.1		Hatchery - Stunted Dorsal
	"	66	3.6		
	"	58	2.3		
	BRN	79	6.2		
	"	84	6.3		
	"	139	25.5		
	RBT	120	20.5		
	BRN	135	27.8		
	"	142	32.5		
	"	141	31.6		
	RBT	147	42.4		
	"	171	56.2		
End 1 <sup>st</sup>					

1<sup>st</sup> Pass BRN - 44  
 RBT - 25  
 Total - 69

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

Stream: Mammoth Creek Date: 10/12/2006 Page: 3 of 3

Reach: DH (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
2 <sup>nd</sup>	BRN	251	146.5		
	RBT	224	134.2		Hatchery
	"	284	242.1		
	BRN	227	126.0		
	BRN	238	164.8		
	"	155	39.1		
	RBT	271	198.1		
	BRN	193	78.6		
	"	134	28.7		
	RBT	63	2.7		
	"	59	2.4		
	BRN	78	5.9		
	"	83	7.3		
	RBT	54	2.0		
	BRN	78	6.4		
	"	82	6.9		
"	82	7.4			
"	81	6.5			
"	74	4.8			
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 0 auto;">                     2<sup>nd</sup> Pass                      BRN - 13                      RBT - 6                      Total - 19                 </div>					
3 <sup>rd</sup>	RBT	251	156.3		
	BRN	206	101.3		
	"	155	39.8		
	"	151	43.9		
	"	153	41.9		
	"	87	8.8		
	"	79	5.9		
	"	80	6.5		
	"	88	7.6		
	"	79	6.2		
	RBT	50	1.8		
	"	53	1.8		
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 0 auto;">                     3<sup>rd</sup> Pass                      BRN - 9                      RBT - 3                      Total - 12                 </div>					
BRN 44-13-9 RBT 25-6-3 All 69-19-12					
$\bar{N} = 70$ SE 3.3 $\bar{N} = 34$ SE 1.0					

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

Stream: Mammoth Creek County: MONO Date: 10/13/2006  
 Reach: DL Est. Q: ~20 cfs Page: 1 of 2  
 Air Temp.: 7°C @ 0915 H2O Temp.: 4.2°C @ 0907 Conductivity: 79.8 microSiemens  
 Blocknets: Top/Bottom 20', 1/4" mesh Specific Cond.: 132.5 microSiemens  
 Reach Length: 294 Salinity: 0.1 ppt  
 Electroshocker Type: [H<sub>2</sub>O Temp 6°C @ 1200] 39.8°F @ 0910 D.O.: 9.93 mg/L  
 Personnel: Shockers: TIM SALAMUNOVICH 76.6 % saturation  
                                 STEVE EGGERS pH: 7.5  
 Netters: Cindy, Sean Photos: \_\_\_\_\_

Shocker	<u>Steve</u>	<u>Tim</u>							
Model	<u>12A</u>	<u>11A</u>							
Battery ID	<u>Klattu</u>	<u>J. Clemm</u>							
Voltage:	<u>400</u>	<u>400</u>							
Frequency:	<u>30</u>	<u>30</u>							
1st Pass	<u>1552</u>	<u>1872</u>							
2nd Pass	<u>1528</u>	<u>1519</u>							
3rd Pass	<u>1376</u>	<u>1467</u>							
4th Pass									
5th Pass									

Lengths are fork lengths or total lengths in millimeters					Weights are in grams
Pass#	Species	Length	Weight	Scale Sample	Notes
<u>1<sup>st</sup></u>	<u>RBT</u>	<u>264</u>	<u>208.9</u>		<u>Hatchery</u>
	<u>BRN</u>	<u>204</u>	<u>86.4</u>		
	<u>"</u>	<u>165</u>	<u>50.1</u>		
	<u>"</u>	<u>222</u>	<u>137.0</u>		
	<u>"</u>	<u>167</u>	<u>54.4</u>		
	<u>"</u>	<u>234</u>	<u>171.6</u>		
	<u>"</u>	<u>246</u>	<u>189.4</u>		
	<u>"</u>	<u>152</u>	<u>40.5</u>		
	<u>"</u>	<u>163</u>	<u>47.5</u>		
	<u>RBT</u>	<u>148</u>	<u>37.9</u>		
	<u>"</u>	<u>155</u>	<u>48.5</u>		
	<u>BRN</u>	<u>239</u>	<u>166.1</u>		
	<u>"</u>	<u>261</u>	<u>217.7</u>		
	<u>"</u>	<u>236</u>	<u>153.6</u>		
	<u>RBT</u>	<u>287</u>	<u>274.1</u>		
<u>BRN</u>	<u>81</u>	<u>6.8</u>			
<u>RBT</u>	<u>78</u>	<u>6.0</u>			
<u>"</u>	<u>70</u>	<u>5.1</u>			
<u>"</u>	<u>64</u>	<u>3.1</u>			
<u>BRN</u>	<u>156</u>	<u>46.6</u>			
<u>2<sup>nd</sup></u>	<u>RBT</u>	<u>266</u>	<u>205.5</u>		<u>Hatchery</u>
	<u>"</u>	<u>70</u>	<u>3.9</u>		
	<u>"</u>	<u>265</u>	<u>184.4</u>		
	<u>BRN</u>	<u>185</u>	<u>77.8</u>		

1<sup>st</sup> Pass  
BRN - 13  
RBT - 7  
20





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

Stream: Mammoth Creek County: MOND Date: 10/12/2006  
 Reach: E.H. Diversion/Gage Est. Q: N20 Page: 1 of 4  
 Air Temp.: @ H2O Temp.: @ Conductivity: microSiemens  
 Blocknets: Top/Bottom 20', V4" mesh Specific Cond.: microSiemens  
 Reach Length: \_\_\_\_\_ Salinity: ppt  
 Electroshocker Type: Smith-Root Backpack D.O.: mg/L  
 Personnel: Shockers: STEVE EGGERS % saturation \_\_\_\_\_  
                                   SEAN THOBABEN pH: \_\_\_\_\_  
                                   Netters: CINDY GLACE Photos: \_\_\_\_\_  
                                               TIM SALAMUNOVICH

LOTS OF  
ANGLERS  
AROUND  
(3-4 ANGLERS)

Shocker	Steve	Sean							
Model	11A	12A							
Battery ID	Clem	Columbia							
Voltage:	300	300							
Frequency:	60	60							
1st Pass	1748	1853							
2nd Pass	1362	1091							
3rd Pass	1145	1057							
4th Pass									
5th Pass									

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

Pass#	Species	Length	Weight	Scale Sample	Notes
1st	RBT	223	127.7		
	"	211	113.5		Worn Fins - Hatchery
	BRN	240	165.2		
	"	296	265.2		
	"	225	131.9		
	RBT	241	168.9		Pec Missing / Hook damage / Hatchery
	"	219	109.2		
	"	194	81.6		Hook Damage
	BRN	239	156.9		
	"	255	218.6		
	"	221	116.6		
	"	228	127.2		
	RBT	181	63.5		
	"	209	122.5		Hatchery - worn caudal
	"	138	32.6		
	"	289	180.5		Hatchery - Deformed caudal
	"	242	131.6		Hatchery
	BRN	165	48.7		
	"	219	110.6		
	"	80	7.0		
	"	81	7.5		
	"	82	5.7		
	RBT	77	5.2		
	BRN	84	7.2		
	"	84	6.4		

BRN-14      RBT-11

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

Stream: Mammoth Creek Date: 10/12/2006 Page: 2 of 4

Reach: EH (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1st	BRN	88	8.8		
	"	85	7.5		
	"	78	5.5		
	"	78	4.6		
	"	72	9.0		
	"	77	5.1		
	"	86	7.7		
	"	83	6.0		
	"	82	6.5		
	"	88	7.5		
	12BT	53	1.8		
	"	65	3.4		
	BRN	77	5.5		
	12BT	61	2.9		
	"	269	244.0		
	"	205	111.7		
	"	218	115.8		
	"	193	77.7		Hatchery
	"	189	75.1		
	"	205	93.2		
	BRN	258	194.3		
	RBT	184	70.7		
	"	175	63.6		Hatchery
	"	140	25.6		"
	"	166	65.9		
	"	180	63.7		Hatchery
	"	154	44.6		
	"	125	27.5		
	"	150	29.4		
	BRN	79	6.5		
	"	78	5.5		
	"	85	8.2		
	"	85	6.7		
	"	90	8.9		
	"	88	7.5		
	"	84	7.1		
	"	73	4.5		
	"	86	6.7		
	RBT	65	3.6		
	"	212	107.4		
	"	124	30.5		
	"	214	135.7		
	"	281	235.6		
	"	209	107.2		
	"	185	70.8		Hatchery

BRN 27  
RBT 18 + 6 = 24

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

Stream: Mammoth Creek

Date: 10/12/2006

Page: 3 of 4

Reach: EH

(continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
<u>1<sup>st</sup></u>	RBT	230	158.3		
	"	220	138.8		Hatchery
	BRN	230	136.1		
	"	177	62.3		
	RBT	238	163.4		
	"	202	88.9		
	"	210	103.3		Hatchery
	"	184	69.8		Hatchery
	"	192	79.3		"
	"	204	86.3		"
	BRN	170	52.9		
	RBT	60	2.1		
	BRN	75	4.9		
	RBT	71	3.8		
	BRN	78	6.1		
	RBT	70	4.5		
	BRN	78	6.3		
	"	80	5.4		
	RBT	72	4.1		
	"	68	4.2		
	"	62	3.1		
	BRN	89	9.1		
	"	73	4.4		
-----					
<u>3<sup>rd</sup></u>	RBT	216	107.1		Note: 2 <sup>nd</sup> pass data after 3 <sup>rd</sup> Hatchery
	"	142	37.0		
	"	162	47.9		
	BRN	94	8.9		
	"	95	11.2		
	"	78	5.1		
	"	80	7.6		
	"	85	8.1		
-----					
<u>2<sup>nd</sup></u>	BRN	85	6.4		
	RBT	218	127.8		Hatchery
	"	213	109.1		
	"	288	315.6		Hatchery
	BRN	82	7.0		
	"	90	8.1		
	"	250	186.1		
	RBT	195	97.9		
	"	147	28.7		
	"	171	50.0		
	"	147	42.3		
	"	194	80.5		

1<sup>st</sup> Pass  
BRN - 44  
RBT - 49  
93

Note: 2<sup>nd</sup> pass data after 3<sup>rd</sup> Hatchery

3<sup>rd</sup> Pass  
BRN - 5  
RBT - 3  
8

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

Stream: Mammoth Creek Date: 10/12/2006 Page: 4 of 4

Reach: EH (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
<u>2<sup>nd</sup></u>	<u>RBT</u>	<u>148</u>	<u>33.7</u>		
	<u>BRN</u>	<u>87</u>	<u>7.5</u>		
	<u>"</u>	<u>85</u>	<u>7.8</u>		
	<u>"</u>	<u>78</u>	<u>6.1</u>		
	<u>"</u>	<u>96</u>	<u>9.8</u>		
	<u>RBT</u>	<u>173</u>	<u>64.5</u>		
	<u>BRN</u>	<u>89</u>	<u>8.9</u>		
	<u>RBT</u>	<u>234</u>	<u>142.7</u>		<u>2<sup>nd</sup> 165</u>
	<u>BRN</u>	<u>211</u>	<u>104.8</u>		<u>BRN - 18</u>
	<u>"</u>	<u>96</u>	<u>10.4</u>		<u>RBT - 13</u>
	<u>"</u>	<u>83</u>	<u>7.3</u>		<u>31</u>
	<u>"</u>	<u>76</u>	<u>5.4</u>		
	<u>"</u>	<u>87</u>	<u>7.9</u>		
	<u>"</u>	<u>87</u>	<u>7.5</u>		
	<u>"</u>	<u>150</u>	<u>38.6</u>		
	<u>RBT</u>	<u>50</u>	<u>1.6</u>		
	<u>"</u>	<u>59</u>	<u>2.4</u>		
	<u>BRN</u>	<u>85</u>	<u>6.8</u>		
	<u>"</u>	<u>85</u>	<u>7.3</u>		
<u>END</u>					
					<del>NOTE: DUE TO IMPROVING</del>
					<del>CONDITIONS WE</del>
					<del>WAS UNABLE TO COMPLETE</del>
					NOTE: IN ORDER TO MAXIMIZE
					REMAINING DAYLIGHT, AFTER
					MAKING SECOND PASS WE
					PLACED THOSE FISH IN LIVE CART
					AND THEN MADE THIRD PASS;
					THEN WE WORKED UP THE
					THIRD PASS FISH (STILL IN
					BUCKETS) FOLLOWED BY THE
					SECOND PASS FISH PREVIOUSLY
					STORED IN THE LIVE CART.

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

Stream: Mammoth Creeks County: MoND Date: 10/11/2006  
 Reach: EL Est. Q: N20 CFS Page: 1 of 3  
 Air Temp.: @ H2O Temp.: 19.1 °C @ 1124 / 48.9 °F Conductivity: 125.4 microSiemens  
 Blocknets: Top/Bottom [20' small mesh (1/4")] 1225 Specific Cond.: 180.2 microSiemens  
 Reach Length: 303' pH=8.0 Salinity: 0.1 ppt  
 Electroshocker Type: 12A & 11A Smith-Root Back pack D.O.: 6.78 mg/L  
 Personnel: Shockers: STEVE EGGERS 59.3 % saturation  
                               SEAN THOBABEN Photos: \_\_\_\_\_  
 Netters: Tim SALAMUNOVICH \_\_\_\_\_  
                               Cindy GLASE \_\_\_\_\_

Shocker	SEAN	STEVE							
Model	11A	12A							
Battery ID	KLATTE	LEWIS							
Voltage:	300	300							
Frequency:	60	60							
1st Pass	1251	1325							
2nd Pass	886	945							
3rd Pass	871	887							
4th Pass									
5th Pass									

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

Pass#	Species	Length <sup>mm</sup>	Weight <sup>g</sup>	Scale Sample	Notes
1st	BRN	409	810.7		
	"	102	12.1		
	RBT	137	34.8		
	"	170	70.7		
	"	133	32.3		
	BRN	108	17.0		
	RBT	152	48.5		
	BRN	111	16.9		
	"	288	292.1		
	RBT	116	21.7		
	BRN	95	10.8		
	"	105	11.2		
	"	119	20.3		
	"	84	8.0		
	"	124	24.6		
	RBT	102	12.9		
	BRN	311	404.5		
	"	82	7.5		Tail broken
	"	77	6.2		
	"	99	11.6		
	"	118	21.9		
	"	101	12.1		
	"	121	21.1		
	RBT	116	19.4		
	BRN	98	11.8		

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

Stream: Mammoth Creek Date: 10/11/2006 Page: 2 of 3

Reach: EL (continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1st	BRN	115	21.0		
	RBT	229	173.5		
	BRN	244	175.8		
	"	85	7.0		
	"	284	305.5		
	"	107	15.6		
	RBT	202	99.2		
	BRN	259	219.4		
	RBT	282	242.1		Deformed max - HATCHERY
	"	333	485.0	HATCHERY	[Puncture wound through abdomen + Deformed pectorals]
	BRN	94	11.2		
	"	115	22.3		
	"	111	17.3		
	"	113	20.2		
	RBT	322	393.1		HATCHERY
	"	115	18.7		
	BRN	94	9.3		
	RBT	167	60.1		Burn on side
	BRN	99	11.5		
	"	88	8.4		
	"	280	280.1		
	"	274	252.5		
	RBT	115	20.8		
	"	156	55.3		
	"	120	24.4		
	BRN	287	260.1		
	"	271	221.7		
	"	122	22.9		
	"	93	10.6		
	"	132	29.2		
	"	105	14.3		
	"	107	15.1		
	"	107	14.9		
	"	96	11.4		
	"	96	11.3		
	"	115	17.2		
	"	112	19.5		
	"	107	16.7		
	"	93	7.3		
	"	75	5.9		
	RBT	117	19.7		
	BRN	103	12.4		
	"	104	13.0		
	RBT	97	12.3		
	"	204	92.5		Hatchery

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

Stream: Mammoth Creek

Date: 10/11/2006

Page: 3 of 3

Reach: EL

(continued)

Pass#	Species	Length	Weight	Scale Sample	Notes
1 <sup>st</sup>	RBT	173	69.1		Hatchery - Frayed Dorsal
	"	256	207.0		
	BRN	291	244.9		
	RBT	122	22.4		
	"	318	284.0		Hatchery <del>352</del> <sup>30-35mm</sup> Hatchery <del>25mm</del>
	BRN	311	337.3		Add <del>13</del> <sup>13</sup> - escaped holding net
2 <sup>nd</sup>	BRN	105	13.7		BSKR (31-35mm) 4 TUI (25mm) } 1 <sup>st</sup> PASS.
	BRN	106	13.7		
	BRN	94	10.7		
	BRN	113	16.7		
	RBT	108	15.7		
	RBT	152	43.9		w
	RBT	254	192.4		Hatchery - frayed D1 deformed pect
	BRN	363	588.5		of kype
	BRN	92	10.6		
	BRN	121	21.5		
	BRN	111	15.8		
	BRN	92	8.8		
	BRN	84	7.2		
	BRN	127	27.2		
	RBT	345	374.7		Hatchery frayed D1
	RBT	284	341.1		Hatchery frayed P1 & P2 > frayed D1
	BRN	77	5.1		
	BRN	104	15.6		
	BRN	95	10.6		
	BRN	106	13.0		
	BRN	127	24.0		
	BRN	240	162.1		
	BRN	81	6.2		
	BRN	84	7.3		
	BRN	91	10.1		TAIL BURN
	SKR	39	0.6		
	SKR	51	1.3		
	SKR	34	0.4		
	TUI	23	0.3		end pass 2
3	BRN	87	6.4		
		94	9.9		
		96	11.5		
		107	15.4		
		93	10.1		
		95	9.6		
	RBT	164	62.8		wild
	SKR	30	0.3		
	TUI	28	0.3		
	SKR	30	0.3		end pass 3

~~30~~  
~~15~~

~~203~~

end pass 3



## Appendix C

MicroFish 3.0 and Program CAPTURE Output for the  
October 2006 Electrofishing Data

Stream: Mammoth Crk, Site BH, 15 Oct 2006

Species: **All trout**

Removal Pattern: 126 49 33

Total Catch = 208

Population Estimate = 233

Chi Square = 2.575

Pop Est Standard Err = 9.825

Lower Conf Interval = 213.645

Upper Conf Interval = 252.355

Capture Probability = 0.523

Capt Prob Standard Err = 0.046

Lower Conf Interval = 0.432

Upper Conf Interval = 0.614

---

Stream: Mammoth Crk, Site BH, 15 Oct 2006

Species: **Rainbow trout (all wild – no hatchery trout captured)**

Removal Pattern: 30 10 5

Total Catch = 45

Population Estimate = 47

Chi Square = 0.332

Pop Est Standard Err = 2.288

Lower Conf Interval = 45.000

Upper Conf Interval = 51.605

Capture Probability = 0.634

Capt Prob Standard Err = 0.084

Lower Conf Interval = 0.464

Upper Conf Interval = 0.803

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 42.39501 .

---

Stream: Mammoth Crk, Site BH, 15 Oct 2006

Species: **Brown trout**

Removal Pattern: 95 39 28

Total Catch = 162

Population Estimate = 186

Chi Square = 2.156

Pop Est Standard Err = 10.459

Lower Conf Interval = 165.396

Upper Conf Interval = 206.604

Capture Probability = 0.492

Capt Prob Standard Err = 0.055

Lower Conf Interval = 0.385

Upper Conf Interval = 0.600

---

Stream: Mammoth Crk, Site BH, 15 Oct 2006

Species: Brook trout

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: Mammoth Crk, Site BL, 14 Oct 2006

Species: **All trout**

Removal Pattern: 17 5 2

Total Catch = 24

Population Estimate = 24

Chi Square = 0.413

Pop Est Standard Err = 0.887

Lower Conf Interval = 24.000

Upper Conf Interval = 25.836

Capture Probability = 0.727

Capt Prob Standard Err = 0.099

Lower Conf Interval = 0.523

Upper Conf Interval = 0.931

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 22.16407 .

---

Stream: Mammoth Crk, Site BL, 14 Oct 2006

Species: **Rainbow trout (all)**

Removal Pattern: 4 1 2

Total Catch = 7

Population Estimate = 7

Chi Square = 2.682

Pop Est Standard Err = 1.195

Lower Conf Interval = 7.000

Upper Conf Interval = 9.924

Capture Probability = 0.583

Capt Prob Standard Err = 0.239

Lower Conf Interval = -.002

Upper Conf Interval = 1.168

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 4.07553 .

---

Stream: Mammoth Crk, Site BL, 14 Oct 2006  
Species: **Rainbow trout (wild)**

Removal Pattern: 2 1 2  
Total Catch = 5  
Population Estimate = 6

Chi Square = 1.651  
Pop Est Standard Err = 3.572  
Lower Conf Interval = 5.000  
Upper Conf Interval = 15.184

Capture Probability = 0.385  
Capt Prob Standard Err = 0.372  
Lower Conf Interval = -.572  
Upper Conf Interval = 1.341

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -3.184378 .

---

Stream: Mammoth Crk, Site BL, 14 Oct 2006  
Species: **Rainbow trout (hatchery)**

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: Mammoth Crk, Site BL, 14 Oct 2006

Species: **Brown trout**

Removal Pattern: 13 4 0

Total Catch = 17

Population Estimate = 17

Chi Square = 1.267

Pop Est Standard Err = 0.389

Lower Conf Interval = 17.000

Upper Conf Interval = 17.824

Capture Probability = 0.810

Capt Prob Standard Err = 0.097

Lower Conf Interval = 0.604

Upper Conf Interval = 1.016

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 16.17598 .

---

Stream: Mammoth Crk, Site CH, 15 Oct 2006

Species: **All trout**

Removal Pattern: 26 13 3

Total Catch = 42

Population Estimate = 44

Chi Square = 0.989

Pop Est Standard Err = 2.309

Lower Conf Interval = 42.000

Upper Conf Interval = 48.658

Capture Probability = 0.627

Capt Prob Standard Err = 0.088

Lower Conf Interval = 0.449

Upper Conf Interval = 0.805

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 39.34229 .

---

Stream: Mammoth Crk, Site CH, 15 Oct 2006

Species: **Rainbow trout (all wild – no hatchery trout captured)**

Removal Pattern: 10 5 1

Total Catch = 16

Population Estimate = 16

Chi Square = 0.896

Pop Est Standard Err = 0.900

Lower Conf Interval = 16.000

Upper Conf Interval = 17.918

Capture Probability = 0.696

Capt Prob Standard Err = 0.129

Lower Conf Interval = 0.422

Upper Conf Interval = 0.970

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 14.08179 .

---

Stream: Mammoth Crk, Site CH, 15 Oct 2006

Species: **Brown trout**

Removal Pattern: 16 8 2

Total Catch = 26

Population Estimate = 27

Chi Square = 0.596

Pop Est Standard Err = 1.730

Lower Conf Interval = 26.000

Upper Conf Interval = 30.557

Capture Probability = 0.634

Capt Prob Standard Err = 0.111

Lower Conf Interval = 0.406

Upper Conf Interval = 0.863

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 23.44265 .

---

Stream: Mammoth Crk, Site CL, 14 Oct 2006

Species: **All trout**

Removal Pattern: 50 12 4

Total Catch = 66

Population Estimate = 66

Chi Square = 0.603

Pop Est Standard Err = 1.091

Lower Conf Interval = 66.000

Upper Conf Interval = 68.180

Capture Probability = 0.767

Capt Prob Standard Err = 0.055

Lower Conf Interval = 0.658

Upper Conf Interval = 0.876

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 63.81968 .

---

Stream: Mammoth Crk, Site CL, 14 Oct 2006

Species: **Rainbow trout (all)**

Removal Pattern: 41 7 2

Total Catch = 50

Population Estimate = 50

Chi Square = 0.356

Pop Est Standard Err = 0.607

Lower Conf Interval = 50.000

Upper Conf Interval = 51.220

Capture Probability = 0.820

Capt Prob Standard Err = 0.055

Lower Conf Interval = 0.709

Upper Conf Interval = 0.931

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 48.78038 .

---



Stream: Mammoth Crk, Site CL, 14 Oct 2006  
Species: **Rainbow trout (wild)**

Removal Pattern: 7 6 1  
Total Catch = 14  
Population Estimate = 14

Chi Square = 2.822  
Pop Est Standard Err = 1.229  
Lower Conf Interval = 14.000  
Upper Conf Interval = 16.655

Capture Probability = 0.636  
Capt Prob Standard Err = 0.154  
Lower Conf Interval = 0.305  
Upper Conf Interval = 0.968

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 11.34522 .

---

Stream: Mammoth Crk, Site CL, 14 Oct 2006  
Species: **Rainbow trout (hatchery)**

Removal Pattern: 34 1 1  
Total Catch = 36  
Population Estimate = 36

Chi Square = 4.248  
Pop Est Standard Err = 0.131  
Lower Conf Interval = 36.000  
Upper Conf Interval = 36.266

Capture Probability = 0.923  
Capt Prob Standard Err = 0.044  
Lower Conf Interval = 0.834  
Upper Conf Interval = 1.012

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 35.73397 .

---

Stream: Mammoth Crk, Site CL, 14 Oct 2006  
Species: **Brown trout**

Removal Pattern: 9 5 2  
Total Catch = 16  
Population Estimate = 17

Chi Square = 0.254  
Pop Est Standard Err = 1.997  
Lower Conf Interval = 16.000  
Upper Conf Interval = 21.235

Capture Probability = 0.571  
Capt Prob Standard Err = 0.157  
Lower Conf Interval = 0.239  
Upper Conf Interval = 0.904

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 12.76531 .

---

Stream: Mammoth Crk, Site DH, 12 Oct 2006  
Species: **All trout**

Removal Pattern: 69 19 12  
Total Catch = 100  
Population Estimate = 104

Chi Square = 2.523  
Pop Est Standard Err = 3.173  
Lower Conf Interval = 100.000  
Upper Conf Interval = 110.282

Capture Probability = 0.645  
Capt Prob Standard Err = 0.055  
Lower Conf Interval = 0.535  
Upper Conf Interval = 0.755

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 97.71796 .

---

Stream: Mammoth Crk, Site DH, 12 Oct 2006  
Species: **Rainbow trout (all)**

Removal Pattern: 25 6 3  
Total Catch = 34  
Population Estimate = 34

Chi Square = 1.031  
Pop Est Standard Err = 0.970  
Lower Conf Interval = 34.000  
Upper Conf Interval = 35.974

Capture Probability = 0.739  
Capt Prob Standard Err = 0.081  
Lower Conf Interval = 0.575  
Upper Conf Interval = 0.904

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 32.02618 .

---

Stream: Mammoth Crk, Site DH, 12 Oct 2006  
Species: **Rainbow trout (wild)**

Removal Pattern: 17 5 3  
Total Catch = 25  
Population Estimate = 25

Chi Square = 1.219  
Pop Est Standard Err = 1.134  
Lower Conf Interval = 25.000  
Upper Conf Interval = 27.341

Capture Probability = 0.694  
Capt Prob Standard Err = 0.103  
Lower Conf Interval = 0.482  
Upper Conf Interval = 0.907

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 22.65887 .

---

Stream: Mammoth Crk, Site DH, 12 Oct 2006  
Species: **Rainbow trout (hatchery)**

Removal Pattern: 8 1 0  
Total Catch = 9  
Population Estimate = 9

Chi Square = 0.127  
Pop Est Standard Err = 0.099  
Lower Conf Interval = 9.000  
Upper Conf Interval = 9.227

Capture Probability = 0.900  
Capt Prob Standard Err = 0.099  
Lower Conf Interval = 0.673  
Upper Conf Interval = 1.127

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 8.772664 .

---

Stream: Mammoth Crk, Site DH, 12 Oct 2006  
Species: **Brown trout**

Removal Pattern: 44 13 9  
Total Catch = 66  
Population Estimate = 70

Chi Square = 1.767  
Pop Est Standard Err = 3.313  
Lower Conf Interval = 66.000  
Upper Conf Interval = 76.610

Capture Probability = 0.606  
Capt Prob Standard Err = 0.073  
Lower Conf Interval = 0.461  
Upper Conf Interval = 0.750

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 63.39012 .

---

Stream: Mammoth Crk, Site DL, 13 Oct 2006  
Species: **All trout**

Removal Pattern: 20 9 5  
Total Catch = 34  
Population Estimate = 37

Chi Square = 0.191  
Pop Est Standard Err = 3.371  
Lower Conf Interval = 34.000  
Upper Conf Interval = 43.837

Capture Probability = 0.548  
Capt Prob Standard Err = 0.111  
Lower Conf Interval = 0.324  
Upper Conf Interval = 0.773

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 30.16327 .

---

Stream: Mammoth Crk, Site DL, 13 Oct 2006  
Species: **Rainbow trout (all)**

Removal Pattern: 7 8 3  
Total Catch = 18  
Population Estimate = 23

Chi Square = 1.628  
Pop Est Standard Err = 7.066  
Lower Conf Interval = 18.000  
Upper Conf Interval = 37.654

Capture Probability = 0.383  
Capt Prob Standard Err = 0.191  
Lower Conf Interval = -.012  
Upper Conf Interval = 0.778

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 8.345619 .

---

Stream: Mammoth Crk, Site DL, 13 Oct 2006  
Species: **Rainbow trout (wild)**

Removal Pattern: 5 6 3  
Total Catch = 14  
Population Estimate = 20

Chi Square = 0.937  
Pop Est Standard Err = 10.039  
Lower Conf Interval = 14.000  
Upper Conf Interval = 41.011

Capture Probability = 0.318  
Capt Prob Standard Err = 0.234  
Lower Conf Interval = -.172  
Upper Conf Interval = 0.808

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was -1.010712 .

---

Stream: Mammoth Crk, Site DL, 13 Oct 2006  
Species: **Rainbow trout (hatchery)**

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

Chi Square = 1.858  
Pop Est Standard Err = 0.544  
Lower Conf Interval = 4.000  
Upper Conf Interval = 5.730

Capture Probability = 0.667  
Capt Prob Standard Err = 0.272  
Lower Conf Interval = -.198  
Upper Conf Interval = 1.531

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 2.270401 .

---

Stream: Mammoth Crk, Site DL, 13 Oct 2006

Species: **Brown trout**

Removal Pattern: 13 1 2

Total Catch = 16

Population Estimate = 16

Chi Square = 3.783

Pop Est Standard Err = 0.561

Lower Conf Interval = 16.000

Upper Conf Interval = 17.195

Capture Probability = 0.762

Capt Prob Standard Err = 0.112

Lower Conf Interval = 0.523

Upper Conf Interval = 1.001

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 14.80458 .

---

Stream: Mammoth Crk, Site EH, 12 Oct 2006

Species: **All trout**

Removal Pattern: 93 31 8

Total Catch = 132

Population Estimate = 135

Chi Square = 0.327

Pop Est Standard Err = 2.504

Lower Conf Interval = 132.000

Upper Conf Interval = 139.957

Capture Probability = 0.702

Capt Prob Standard Err = 0.044

Lower Conf Interval = 0.616

Upper Conf Interval = 0.789

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 130.0428 .

---

Stream: Mammoth Crk, Site EH, 12 Oct 2006

Species: **Rainbow trout (all)**

Removal Pattern: 49 13 3

Total Catch = 65

Population Estimate = 65

Chi Square = 0.345

Pop Est Standard Err = 1.030

Lower Conf Interval = 65.000

Upper Conf Interval = 67.057

Capture Probability = 0.774

Capt Prob Standard Err = 0.054

Lower Conf Interval = 0.666

Upper Conf Interval = 0.882

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 62.94273 .

---

Stream: Mammoth Crk, Site EH, 12 Oct 2006

Species: **Rainbow trout (wild)**

Removal Pattern: 35 11 2

Total Catch = 48

Population Estimate = 48

Chi Square = 0.683

Pop Est Standard Err = 0.972

Lower Conf Interval = 48.000

Upper Conf Interval = 49.955

Capture Probability = 0.762

Capt Prob Standard Err = 0.065

Lower Conf Interval = 0.632

Upper Conf Interval = 0.892

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 46.0451 .

---



Stream: Mammoth Crk, Site EH, 12 Oct 2006  
Species: **Rainbow trout (hatchery)**

Removal Pattern: 14 2 1  
Total Catch = 17  
Population Estimate = 17

Chi Square = 0.654  
Pop Est Standard Err = 0.389  
Lower Conf Interval = 17.000  
Upper Conf Interval = 17.824

Capture Probability = 0.810  
Capt Prob Standard Err = 0.097  
Lower Conf Interval = 0.604  
Upper Conf Interval = 1.016

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 16.17598 .

---

Stream: Mammoth Crk, Site EH, 12 Oct 2006  
Species: **Brown trout**

Removal Pattern: 44 18 5  
Total Catch = 67  
Population Estimate = 69

Chi Square = 0.517  
Pop Est Standard Err = 2.305  
Lower Conf Interval = 67.000  
Upper Conf Interval = 73.599

Capture Probability = 0.663  
Capt Prob Standard Err = 0.066  
Lower Conf Interval = 0.532  
Upper Conf Interval = 0.795

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 64.40065 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006

Species: **All trout**

Removal Pattern: 86 29 10

Total Catch = 125

Population Estimate = 129

Chi Square = 0.068

Pop Est Standard Err = 2.982

Lower Conf Interval = 125.000

Upper Conf Interval = 134.905

Capture Probability = 0.672

Capt Prob Standard Err = 0.047

Lower Conf Interval = 0.578

Upper Conf Interval = 0.766

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 123.0947 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006

Species: **Rainbow trout (all)**

Removal Pattern: 24 5 1

Total Catch = 30

Population Estimate = 30

Chi Square = 0.059

Pop Est Standard Err = 0.510

Lower Conf Interval = 30.000

Upper Conf Interval = 31.044

Capture Probability = 0.811

Capt Prob Standard Err = 0.073

Lower Conf Interval = 0.662

Upper Conf Interval = 0.960

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 28.95637 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006  
Species: **Rainbow trout (wild)**

Removal Pattern: 18 2 1  
Total Catch = 21  
Population Estimate = 21

Chi Square = 0.913  
Pop Est Standard Err = 0.321  
Lower Conf Interval = 21.000  
Upper Conf Interval = 21.670

Capture Probability = 0.840  
Capt Prob Standard Err = 0.080  
Lower Conf Interval = 0.672  
Upper Conf Interval = 1.008

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 20.32955 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006  
Species: **Rainbow trout (hatchery)**

Removal Pattern: 6 3 0  
Total Catch = 9  
Population Estimate = 9

Chi Square = 1.528  
Pop Est Standard Err = 0.461  
Lower Conf Interval = 9.000  
Upper Conf Interval = 10.062

Capture Probability = 0.750  
Capt Prob Standard Err = 0.154  
Lower Conf Interval = 0.396  
Upper Conf Interval = 1.104

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 7.937934 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006

Species: **Brown trout**

Removal Pattern: 52 20 6

Total Catch = 78

Population Estimate = 81

Chi Square = 0.198

Pop Est Standard Err = 2.626

Lower Conf Interval = 78.000

Upper Conf Interval = 86.225

Capture Probability = 0.655

Capt Prob Standard Err = 0.062

Lower Conf Interval = 0.533

Upper Conf Interval = 0.778

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 75.77495 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006

Species: **Owens sucker**

Removal Pattern: 6 3 2

Total Catch = 11

Population Estimate = 11

Chi Square = 1.126

Pop Est Standard Err = 1.270

Lower Conf Interval = 11.000

Upper Conf Interval = 13.830

Capture Probability = 0.611

Capt Prob Standard Err = 0.181

Lower Conf Interval = 0.207

Upper Conf Interval = 1.015

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 8.170433 .

---

Stream: Mammoth Crk, Site EL, 11 Oct 2006

Species: **Tui chub**

Removal Pattern: 4 1 1

Total Catch = 6

Population Estimate = 6

Chi Square = 0.786

Pop Est Standard Err = 0.666

Lower Conf Interval = 6.000

Upper Conf Interval = 7.712

Capture Probability = 0.667

Capt Prob Standard Err = 0.222

Lower Conf Interval = 0.096

Upper Conf Interval = 1.237

The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 4.288437 .

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