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DEPARTMENT OF FISH AND GAME

STANDING STOCKS OF FISHES IN SECTIONS OF LITTLE LAST CHANCE CREEK, PLUMAS COUNTY, 1981

by

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INTRODUCTION

The Department of Water Resources (DWR) initiated an instream flow program in 1976 to identify streams that would benefit from flow enhancement and to assess instream values. The Northern District of DWR selected Little Last Chance Creek below Frenchman Reservoir (Figure 1) as one of the streams to study under this program.

Department of Fish and Game (DFG) biologists studied trout populations in Little Last Chance Creek in 1976, 1981, and 1986. Rainbow trout (Oncorhynchus mykiss) and brown trout (Salmo trutta) were the only game fish caught each year. Sacramento suckers (Catostomus occidentalis) were also caught each year (Brown 1976 and Bumpass et al. 1989).

The purpose of this report is to describe the results of periodic fish sampling at established stations in Little Last Chance Creek in 1981 for the purpose of evaluating the effects of the operation of Frenchman Reservoir on populations of trout in the creek.

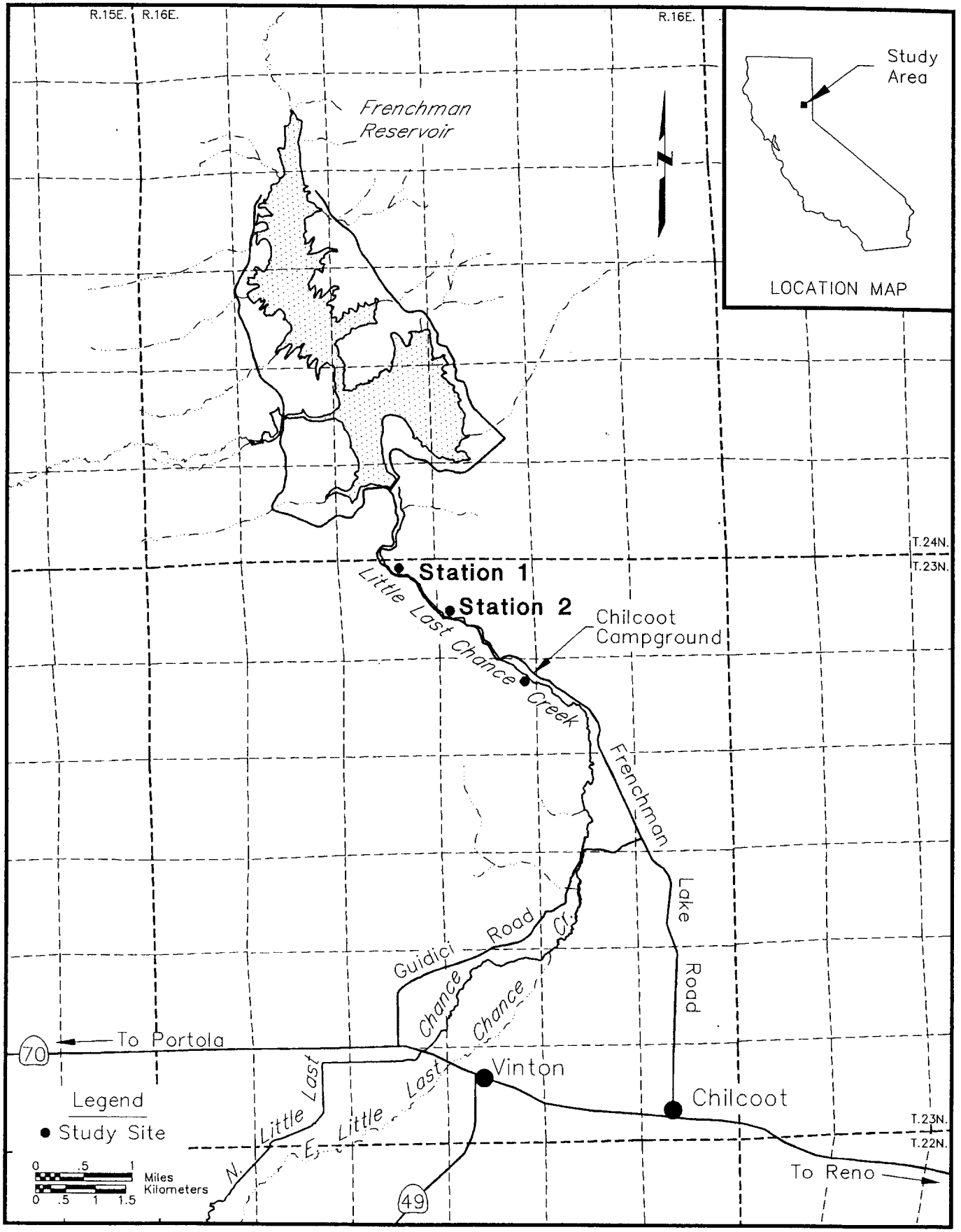

Figure 1. Stations Sampled to Estimate Standing Stocks of Fish in Little Last Chance Creek, Plumas County, 1981.

METHODS

Standing stocks of fishes were estimated in two stations in Little Last Chance Creek (Figure 1) in Plumas County. Stations were intentionally selected to be near stations sampled in previous DFG studies (Appendix 1). Markers had previously been placed in trees along the stream to identify station boundaries. Stations varied in length from 41.0 to 42.4 m. The length, average width, and average depth of each station were measured. Fish were captured with a battery-powered backpack electroshocker in stream sections blocked by seines. Trout were also caught in other stream reaches to provide additional information for age and growth studies. Captured fish were removed from the net-enclosed section on each pass. Standing stock estimates were developed using the two-count method of Seber and LeCren (1967) or the multiple-pass method of Leslie and Davis (1939) with limits of confidence computed using a formula proposed by DeLury (1951).

The weights of brown trout, rainbow trout, and Sacramento sucker were determined by displacement. Weights were measured for all fish caught. Fork length (FL) of each fish caught was measured to the nearest millimeter.

Scale samples were taken only from brown trout and rainbow trout over 100 mm in length. Scales were mounted dry between

microscope slides, and their images were projected on a NCR microfiche reader at a magnification of 42x. Scale measurements for the calculation of growth were recorded to the nearest millimeter along the anterior radius of the anterior-posterior axis of the scale.

Geometric mean functional regressions were used to describe the body-scale and length-weight relationships (Ricker 1975). Estimation of true mean growth rate was calculated using methods of Ricker (op. cit.).

Distribution of all fish caught is listed according to location. Standing crops of brown trout and rainbow trout were calculated for individual stations where the species of interest were caught and combined for the entire creek. Age and growth were calculated for the population. Mean individual growth was calculated only for brown trout and rainbow trout. Length-weight relationships were determined for brown trout and rainbow trout in Little Last Chance Creek. The coefficient of condition and 95 percent confidence intervals were calculated for both brown trout and rainbow trout.

RESULTS

Distribution

Brown trout and rainbow trout were caught in stations 1 and 2. Sacramento suckers were caught in station 2 (Table 1).

TABLE 1. Distribution of Fishes in Sections of Little Last Chance Creek, Plumas County, 1981.

	Station Number	
	1	2
Distance below Frenchman Dam (km)	1.6	3.2
Brown trout	X	X
Rainbow trout	X	X
Sacramento sucker		X

Standing Crop

Rainbow trout were the most common game fish caught in Little Last Chance Creek. Rainbow trout biomass averaged 4.0 g/m^2 in two stations. Biomass of rainbow trout large enough for most fishermen to catch and keep ("catchable trout" are at least 127 mm FL) averaged 3.5 g/m^2 (Table 2). Brown trout biomass averaged 2.7 g/m^2, while biomass for catchables averaged 2.3 g/m^2 (Table 3).

Sacramento suckers were the only non-salmonid fish caught in Little Last Chance Creek. Biomass was 4.6 g/m^2 at one station (Table 4).

TABLE 2. Estimate of Rainbow Trout Standing Crop in Little Last Chance Creek, Plumas County, 1981.

Distance Below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m)	Estimate of Catchable Trout (≥127 mm FL)	Biomass of Catchable Trout (g/m^2)
1.6	27	26-27	4.0	3	3.3
3.2	7	7-7	3.9	1	3.6

TABLE 3. Estimate of Brown Trout Standing Crop in Little Last Chance Creek, Plumas County, 1981.

Distance Below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m^2)	Estimate of Catchable Trout (≥127 mm FL)	Biomass of Catchable Trout (g/m^2)
1.6	3	3-3	2.4	3	2.4
3.2	9	5-13	3.0	3	2.2

TABLE 4. Estimate of Standing Crop of Nongame Fishes in Little Last Chance Creek, Plumas County, 1981.

Distance Below Frenchman Dam (km)	Species	Population Estimate	95% Confidence Interval	Biomass (g/m^2)
3.2	Sacramento sucker	28	24-39	4.6

Age and Growth

The formula L = 5.2 + 0.2 S describes the relationship between the fork length (L) and enlarged scale radius (S) of 6 rainbow trout caught in Little Last Chance Creek. The coefficient of correlation (r^2) is 0.89. The formula was L = 12.2 + 0.2 S for 17 brown trout caught in Little Last Chance Creek, while the value for r^2 is 0.72. Instantaneous population growth rate for age interval 1-2 brown trout was greater than for age interval 1-2 rainbow trout. Instantaneous mean individual growth rate was also higher for age interval 1-2 brown trout (Table 5 and Table 6).

TABLE 5. Growth Rates for Rainbow Trout Caught in Little Last Chance Creek, Plumas County, 1981.

	Population Growth			Mean Individual Growth		
Age Interval	Length Interval (mm)	Difference of Natural Logarithms	Instantaneous Growth Rate Gx	Length Interval (mm)	Difference of Natural Logarithms	Instantaneous Growth Rate Gx
1-2	107-191	0.579	1.737	111-191	0.543	1.629

TABLE 6. Growth Rates for Brown Trout Caught in Little Last Chance Creek, Plumas County, 1981.

	Population Growth			Mean Individual Growth		
Age Interval	Length Interval (mm)	Difference of Natural Logarithms	Instantaneous Growth Rate Gx	Length Interval (mm)	Difference of Natural Logarithms	Instantaneous Growth Rate Gx
1-2	125-245	0.673	2.154	126-245	0.665	2.128

Age 1+ rainbow trout averaged 158 mm FL. No age 2+ rainbow trout was caught, but age 3+ trout averaged 300 mm FL (Table 7). Age 1+ brown trout averaged 223 mm FL. Age 3+ trout averaged 352 mm FL (Table 8).

TABLE 7. Calculated Fork Length of Rainbow Trout from Little Last Chance Creek, Plumas County, 1981.

Age	Number of Fish	Length at Capture (mm)	Calculated Lengths at Successive Annuli 1	2	3
1	4	158	107		
2	0	-	-	-	
3	2	300	111	191	263
Number of back-calculations			6	2	2
Weighted means (mm)			108	191	263
Increments (mm)			108	83	72

TABLE 8. Calculated Fork Length of Brown Trout from Little Last Chance Creek, Plumas County, 1981.

Age	Number of Fish	Length at Capture (mm)	Calculated Lengths at Successive Annuli 1	2	3
1	16	223	125		
2	0	-	-	-	
3	1	352	126	245	311
Number of back-calculations			17	1	1
Weighted means (mm)			126	245	311
Increments (mm)			126	119	66

Length and Weight

Age group 0+ rainbow trout represented 88 percent of the catch. Ages 1+ and 3+ trout represented 3 percent and 9 percent respectively (Figure 2)(Appendix 2). Age 0+ brown trout made up 64 percent of the catch. Ages 1+ represented 36 percent (Figure 3) (Appendix 3).

The relationship between length (L) and weight (W) of rainbow trout is:

$$\text{Log}_{10}\ W = -5.0 + 3.0\ \text{Log}_{10}\ L$$

$$r^2 = 0.99$$

N = 33 (Figure 4) (Appendix 4)

The same relationship for brown trout is:

$$\text{Log}_{10}\ W = -5.3 + 3.2\ \text{Log}_{10}\ L$$

$$r^2 = 0.99$$

N = 11 (Figure 5) (Appendix 5)

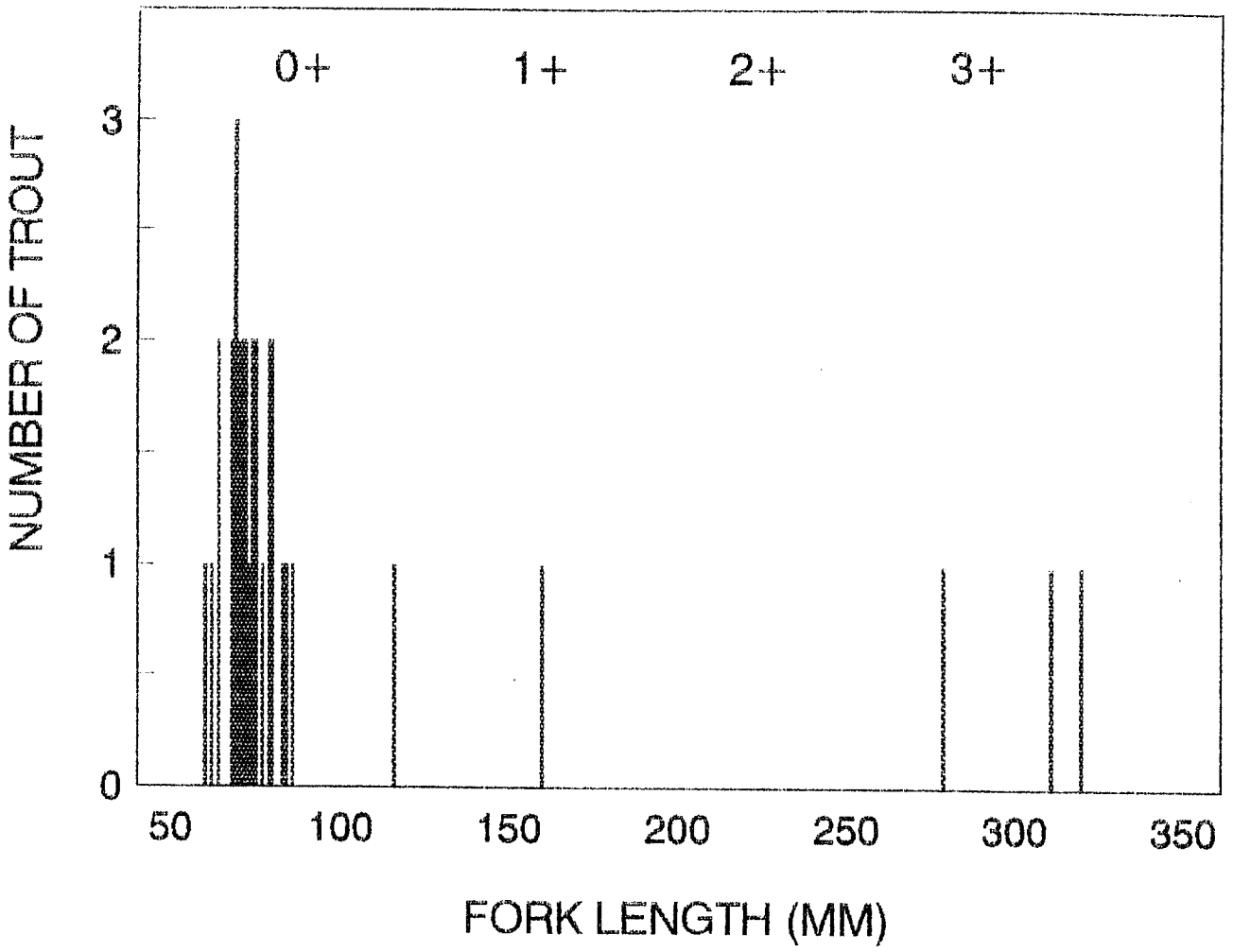

FIGURE 2. Length, observed frequency, and age of rainbow trout caught in Little Last Chance Creek, Plumas County, 1981.

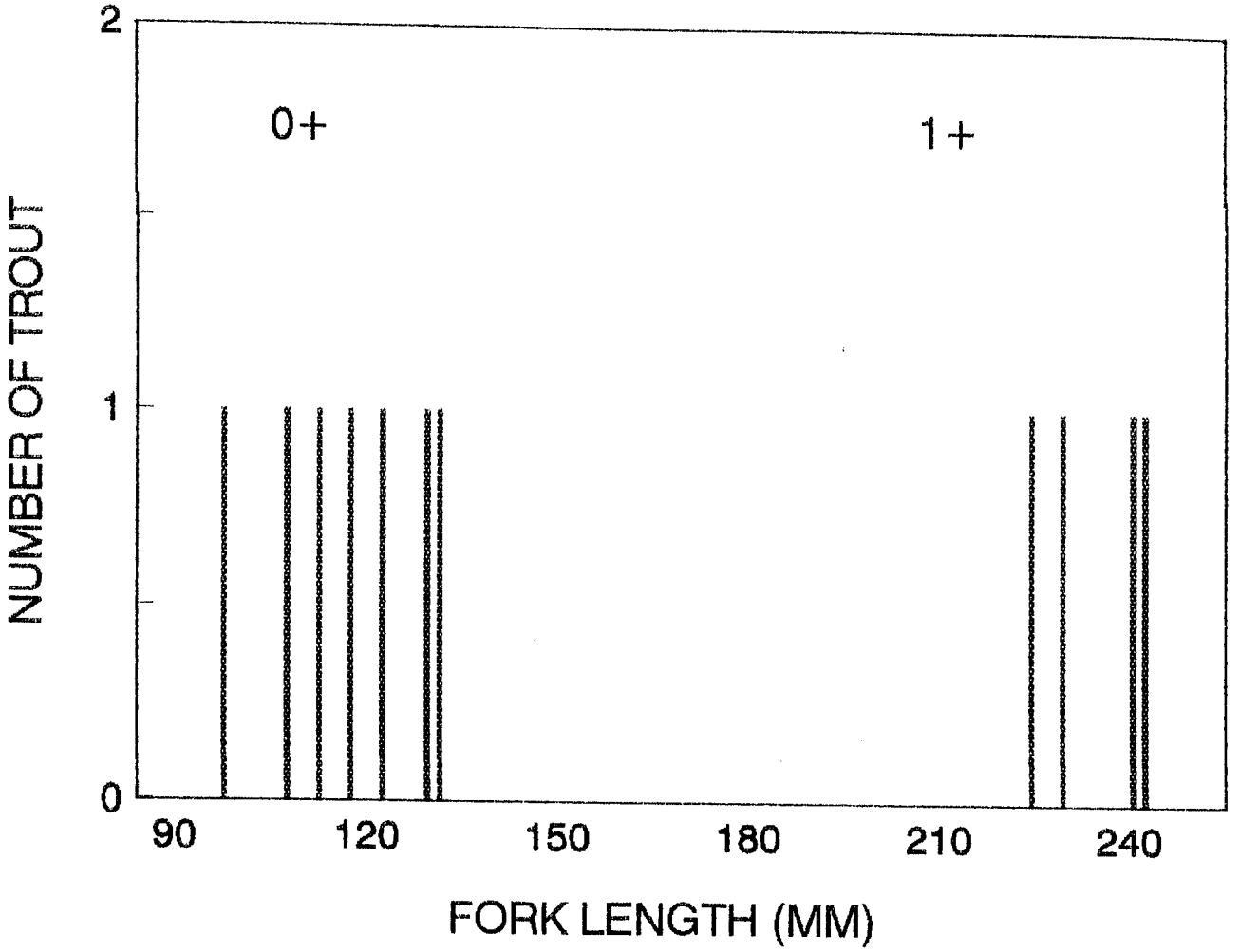

FIGURE 3. Length, observed frequency, and age of brown trout caught in Little Last Chance Creek, Plumas County, 1981.

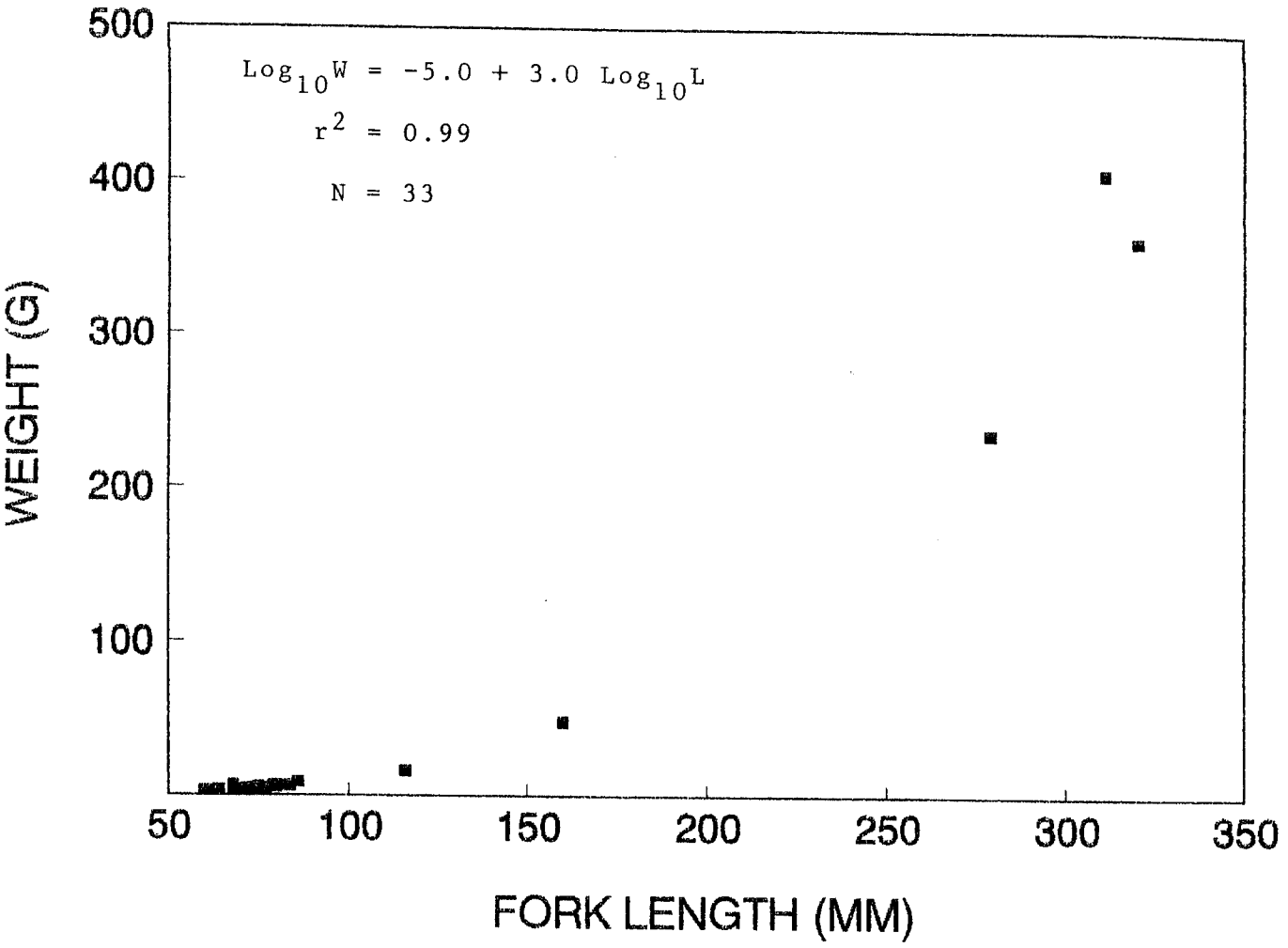

FIGURE 4. The relationship between length and weight of rainbow trout caught in sections of Little Last Chance Creek, Plumas County, 1981.

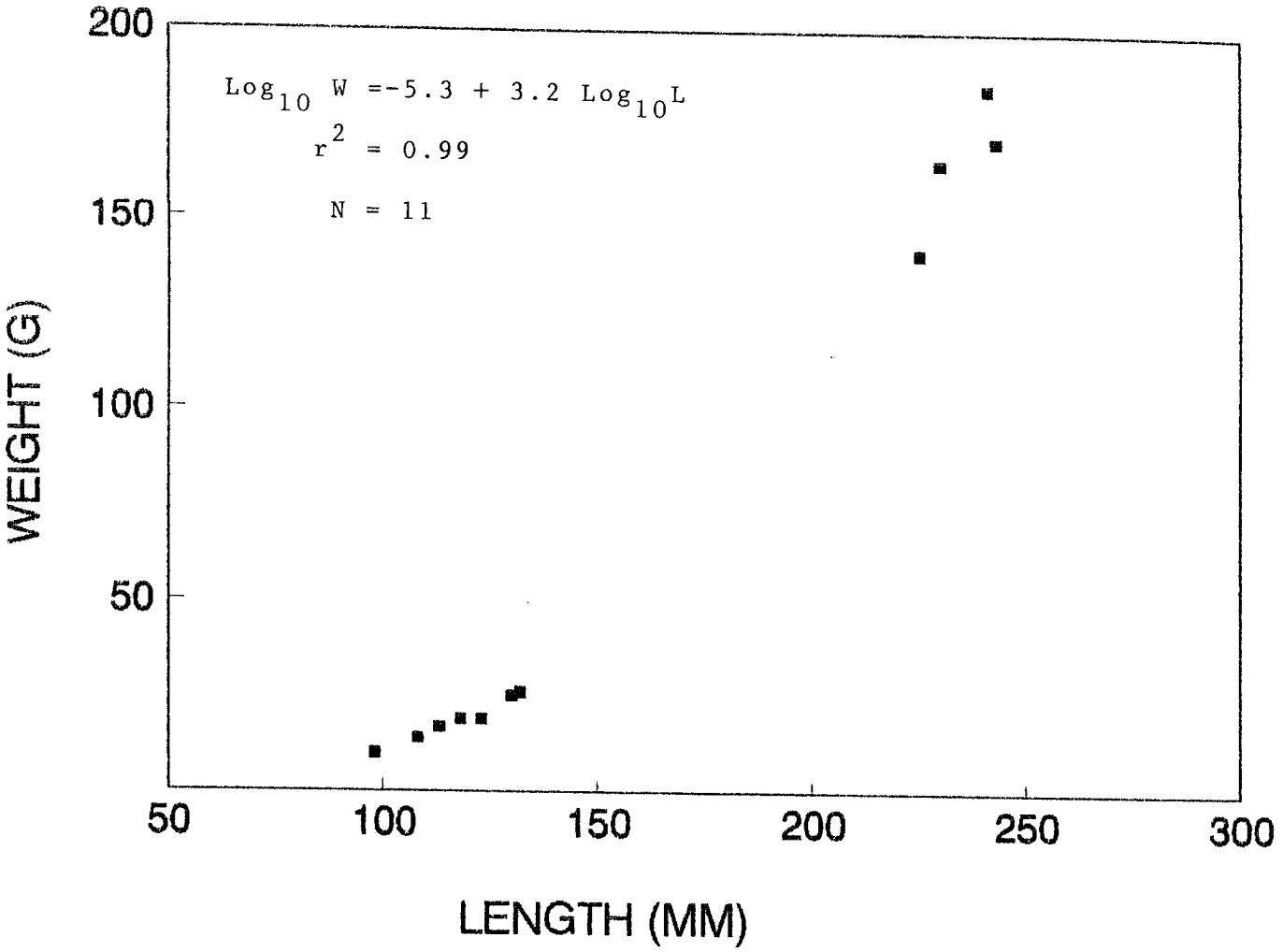

FIGURE 5. The relationship between length and weight of brown trout caught in sections of Little Last Chance Creek, Plumas County, 1981.

Coefficient of Condition

We calculated the coefficient of condition and 95 percent confidence limits for 33 rainbow trout and 11 brown trout (Table 9).

TABLE 9. Condition of Rainbow Trout and Brown Trout in Little Last Chance Creek, 1981.

Age Group	Number of Fish	Coefficient of Condition	95% Confidence Interval
Rainbow Trout			
0+	29	1.1242	0.7704-1.4781
1+	1	1.1719	-
2+	0	-	-
3+	3	1.1757	0.9400-1.4114
Combined	33	1.1304	0.7913-1.4695
Brown Trout			
0+	7	1.1140	1.1140-1.2130
1+	4	1.2746	1.1446-1.4047
Combined	11	1.1727	0.9850-1.3598

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APPENDIX 1

PERMANENT FISH POPULATION STATIONS FOR
LITTLE LAST CHANCE CREEK, PLUMAS COUNTY
SEPTEMBER 1981

Station 1 (1-Mile Station) - Located 1.6 km below Frenchman Dam just downstream from the first bridge at elevation of 1659 m MSL in NW 1/4 of NE 1/4, Section 4, T23N, R16E. This station begins in a rapid beneath the bridge carrying Frenchman Lake Road, then enters a pool with a deeply undercut room-sized boulder on the right bank. The remainder of the station is a short rapid and a shallow pool/run. About 55 percent of the station is pool and 45 percent rapid. Substrate is boulder, rubble, and sand. The station is 42.4 m long with a surface area of 234 m^2 and a volume of 59 m^3 at a flow of 7 cms.

Station 2 (2-Mile Station) - Located 3.2 km below Frenchman Dam adjacent to the upper end of a large turnout at an elevation of 1610 m MSL in NW 1/4 of SW 1/4, Section 3, T23N, R16E. This station begins in a large plunge pool followed by two shallow pool/run areas and two short rapids. About 45 percent of the station is pool and 55 percent rapid. Substrate is boulder, rubble, and sand. The station is 41 m long with a surface area of 192 m^2 and a volume of 58 m^3 at a flow of 7 cms.

APPENDIX 2

LENGTH AND NUMBER OF RAINBOW TROUT
CAUGHT IN LITTLE LAST CHANCE CREEK, 1981

Fork Length (mm)	Frequency
60	1
62	1
64	2
68	2
69	3
70	2
71	2
72	2
73	1
74	2
75	2
77	1
79	2
80	2
83	1
84	1
86	1
116	1
160	1
279	1
311	1
320	1

APPENDIX 3

LENGTH AND NUMBER OF BROWN TROUT
CAUGHT IN LITTLE LAST CHANCE CREEK, 1981

Fork Length (mm)	Frequency
98	1
108	1
113	1
118	1
123	1
130	1
132	1
225	1
230	1
241	1
243	1

APPENDIX 4

LENGTH AND WEIGHT OF RAINBOW TROUT
CAUGHT IN LITTLE LAST CHANCE CREEK, 1981

Fork Length (mm)	Weight (g)
60	3
62	3
64	3,3
68	4,6
69	3,4,4
70	4,4
71	4,4
72	4,4
73	4
74	5,5
75	5,5
77	5
79	6,6
80	6,7
83	6
84	6
86	9
116	16
160	48
279	235
311	405
320	360

APPENDIX 5

LENGTH AND WEIGHT OF BROWN TROUT
CAUGHT IN LITTLE LAST CHANCE CREEK, 1981

Fork Length (mm)	Weight (g)
98	10
108	14
113	17
118	19
123	19
130	25
132	26
225	140
230	165
241	185
243	171