

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

STANDING STOCKS OF FISHES IN SECTIONS
OF HUNGRY CREEK, PLUMAS COUNTY, 1990

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, assess instream values, and identify actions such as habitat manipulation that could enhance these streams. The Northern District of DWR selected Indian Creek below Antelope Reservoir (Figure 1) as one of the streams to study under this program. Major tributaries to Indian Creek (such as Hungry Creek) have been sampled to add to our understanding of trout population dynamics in the system.

Hungry Creek (Figure 1) is an important source of rainbow trout (Oncorhynchus mykiss) in the Indian Creek system above Flournoy Bridge. Wild rainbow trout are rarely caught in Indian Creek above the mouth of Hungry Creek, but they are common below that point (Brown MS). Although we have caught rainbow trout in Hungry Creek by angling, no electrofishing surveys have been conducted there.

The purpose of this study was to sample of fish in Hungry Creek. The information gathered and reported here will increase our understanding of trout populations, distribution, and relative abundance in Indian Creek and its tributaries.

METHODS

Standings stocks of fishes were estimated in one station in Hungry Creek (Figure 1). The length, average width, and average depth of the station were

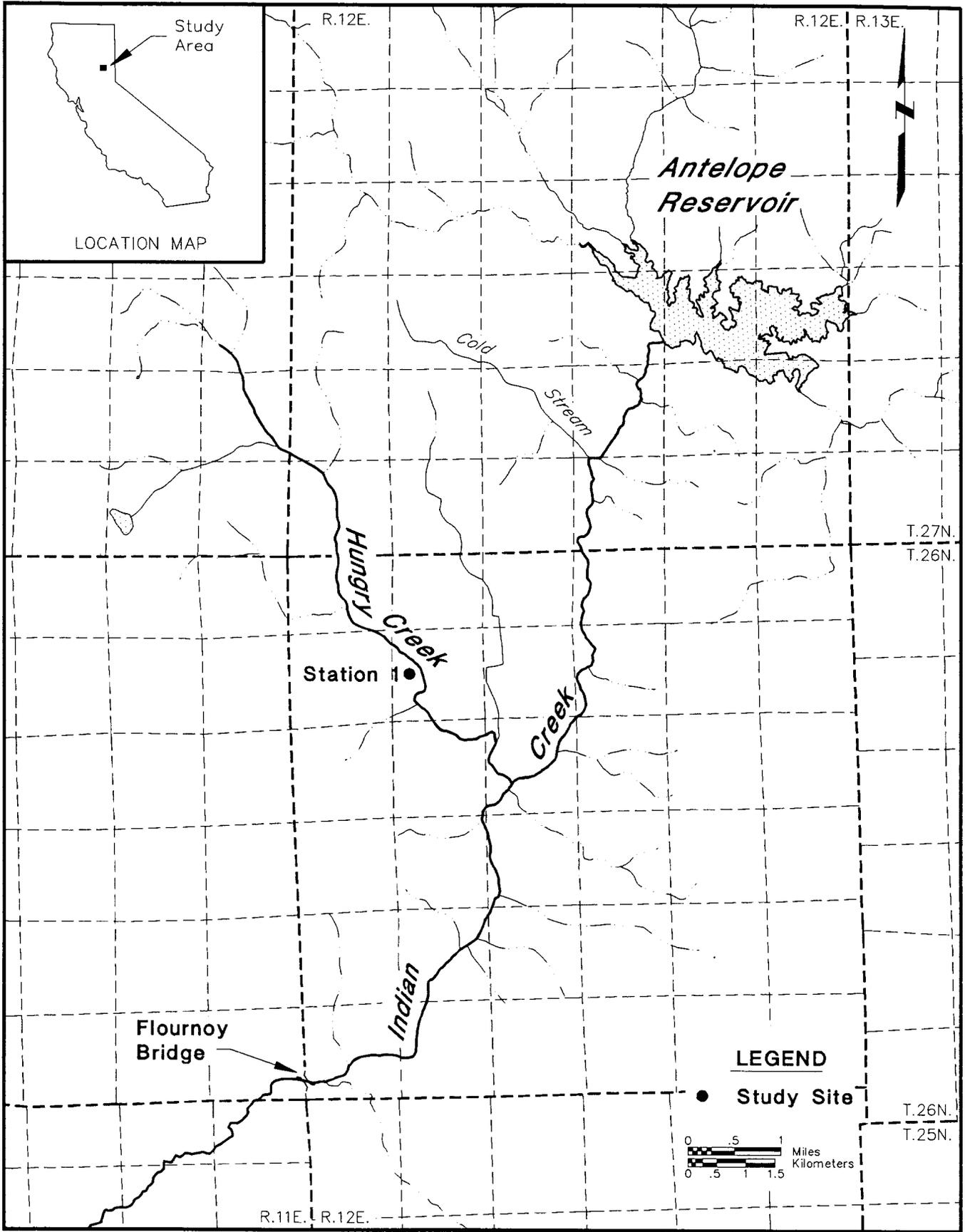


Figure 1. Stations sampled to determine biomass of fishes in Hungry Creek, Plumas County, August 1990.

measured (Appendix 1). Fish were captured with a battery-powered backpack electroshocker in a stream section blocked by seines . Captured fish were removed from the net-enclosed section on each pass. Standing stock estimates were developed using the multiple-pass methods of Leslie and Davis (1939) with limits of confidence computed using a formula proposed by DeLury (1951).

The weights of rainbow trout and brown trout (Salmo trutta) 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 from rainbow trout and brown trout that measured at least 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).

Standing stocks of rainbow trout and brown trout were calculated for the individual station. Age was calculated for rainbow trout; however, population growth and mean individual growth were not calculated because there was only one age interval. The length-weight relationship was determined for rainbow trout in Hungry Creek. The coefficient of condition and 95 percent confidence intervals were calculated only for rainbow trout.

RESULTS

Standing Stocks

Rainbow trout were the most common gamefish caught in Hungry Creek. The biomass was 2.8 g/m² at the one station. The biomass for rainbow trout large enough for fishermen to catch and keep (≥ 127 mm FL) was 0.3 g/m² (Table 1). The biomass for brown trout was 2.4 m/m², while the biomass for catchables was also 2.4 g/m² (Table 2).

Age and Growth

Too few rainbow trout were caught to establish a significant relationship between fork length and enlarged scale radius.

TABLE 1. Estimate of Rainbow Trout Standing Stock in Hungry Creek, Plumas County, 1990.

Population Estimate	95% Confidence Interval	Biomass (g/m ²)	Estimate of Catchable Trout (≥ 127 mm FL)	Biomass of Catchable Trout (g/m ²)
76	74-80	2.8	1	0.3

TABLE 2. Estimate of Brown Trout Standing Crop in Hungry Creek, Plumas County, 1990.

Population Estimate	95% Confidence Interval	Biomass (g/m ²)	Estimate of Catchable Trout (≥ 127 mm FL)	Biomass of Catchable Trout (g/m ²)
4	4-7	2.4	3	2.4

Age 1+ rainbow trout averaged 114 mm FL (Table 3). One rainbow trout was 162 mm FL, but all scales taken from this trout were regenerated so age could not be assigned.

TABLE 3. Calculated Fork Length in Millimeters of Rainbow Trout From Hungry Creek, Plumas County, 1990.

Age	Number of Fish	Length at Capture (mm)	Calculated Lengths at Successive Annuli
			1
1	6	114	72
Number of back-calculations			6
Weighted means (mm)			72
Increments (mm)			72

Length and Weight

Age group 0+ rainbow trout represented 68 percent of the catch. Age 1+ and fish made up 32 percent (Figure 2).

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

$$\text{Log}_{10} W = -5.7 + 3.0 \text{Log}_{10} L$$

$$r^2 = 0.97$$

N = 74 (Figure 3) (Appendices 2 and 4)

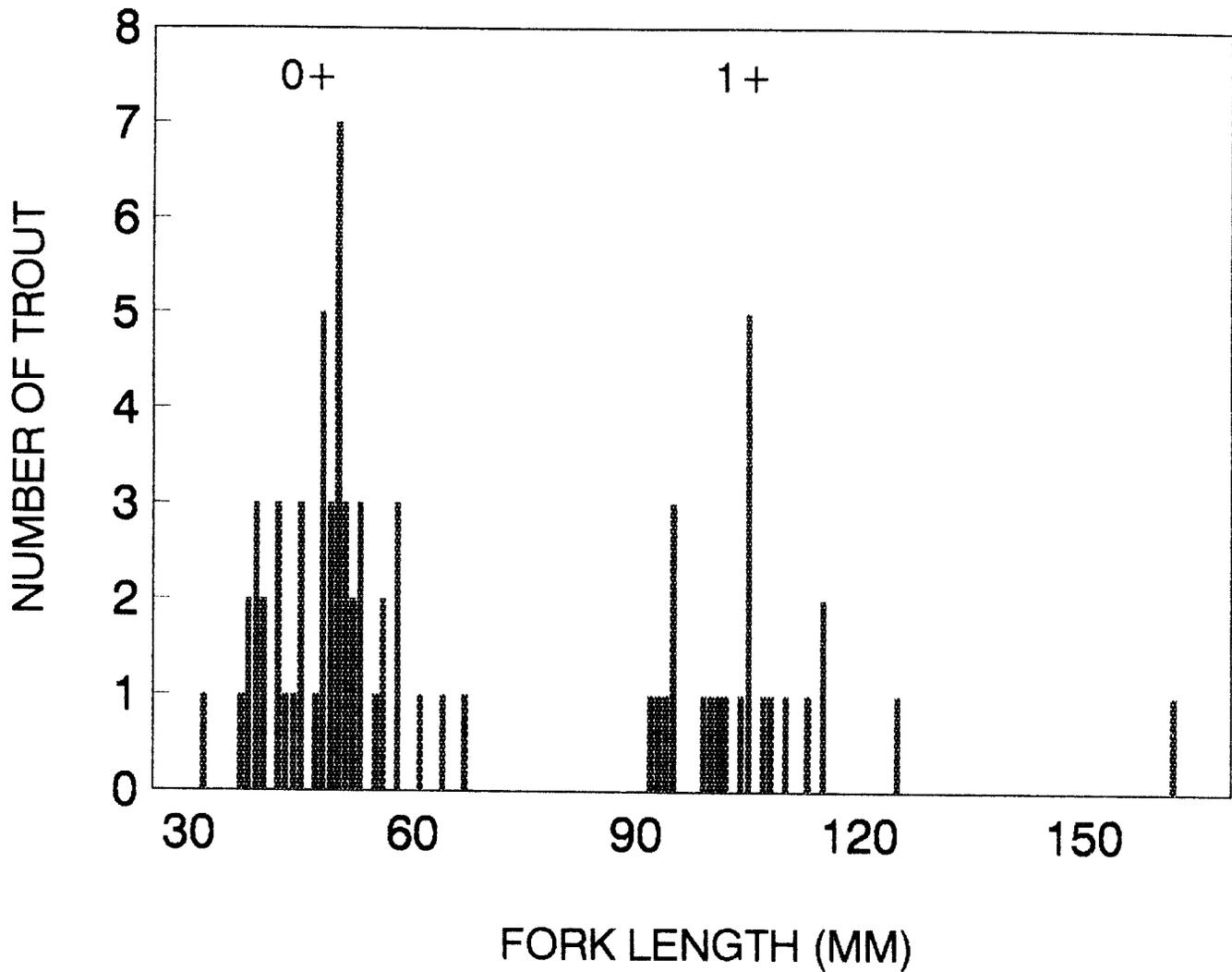


FIGURE 2. Length, observed frequency, and age of rainbow trout caught in Hungry Creek, Plumas County, 1990.

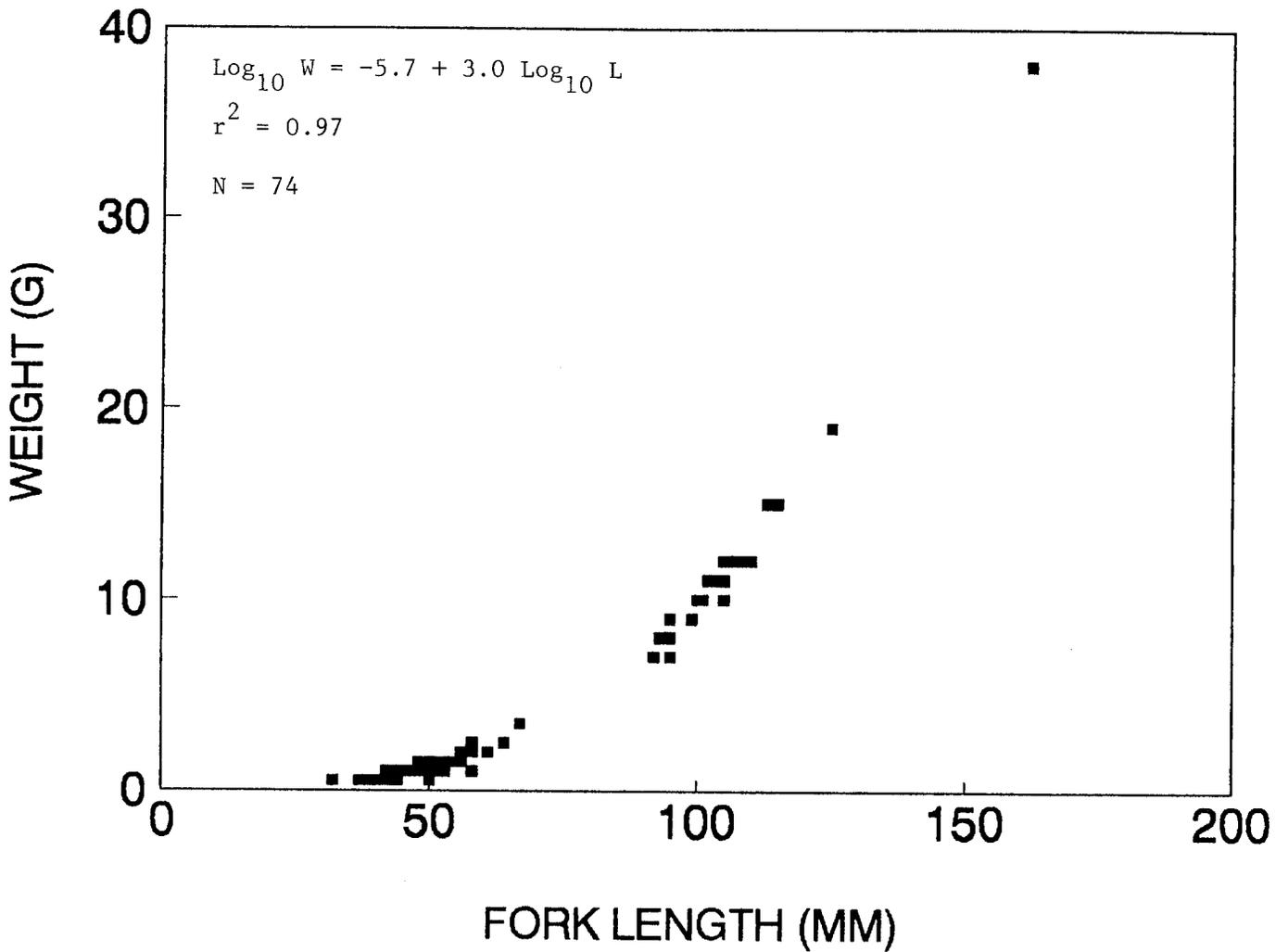


FIGURE 3. The relationship between length and weight of rainbow trout caught in sections of Hungry Creek, Plumas County, 1990.

Too few brown trout were caught to calculate the relationship between length and weight (Appendices 3 and 5).

Coefficient of Condition

We calculated the coefficient of condition and 95 percent confidence limits for a total of 74 rainbow trout (Table 4). There is no significant difference between the coefficient of condition for either age group of rainbow trout we tested ("t" test 0.05 level).

TABLE 4. Condition of Rainbow Trout in Hungry Creek, Plumas County, 1990.

Age Group	Number of Fish	Coefficient of Condition	95 % Confidence Interval
0+	50	0.9643	0.5108-1.4178
1+	23	0.9663	0.8542-1.0784
Combined	74	0.9653	0.5887-1.3419

LITERATURE CITED

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APPENDIX 1

PERMANENT FISH POPULATION STATION HUNGRY CREEK, PLUMAS COUNTY SEPTEMBER 1990

Station 1 - Station 1 is located 3.4 stream kilometers above the confluence of Hungry Creek and Indian Creek (UTM 996 447). This station is heavily shaded by riparian vegetation. The substrate is predominately bedrock and cobbles. Most of this section is riffle (65%); however, a pool at the head and middle of the section make up 35% of the surface area. The station is 39.5 m long, has a surface area of 130.4 m² and a volume of 14.3 m³ at 0.042 cms.

APPENDIX 2

LENGTH AND NUMBER OF RAINBOW TROUT
CAUGHT IN HUNGRY CREEK, 1990

Fork Length (mm)	Number of Fish	Fork Length (mm)	Number of Fish
32	1	64	1
37	1	67	1
38	2	92	1
39	3	93	1
40	2	94	1
42	3	95	3
43	1	99	1
44	1	100	1
45	3	101	1
47	1	102	1
48	5	104	1
49	3	105	5
50	7	107	1
51	3	108	1
52	2	110	1
53	3	113	1
55	1	115	2
56	2	125	1
58	3	162	1
61	1		

APPENDIX 3

LENGTH AND NUMBER OF BROWN TROUT
CAUGHT IN HUNGRY CREEK, 1990

Number of Fish	Fork Length (mm)
1	75
1	205
1	213
1	236

APPENDIX 4

LENGTH AND WEIGHT OF RAINBOW TROUT
CAUGHT IN HUNGRY CREEK, 1990

Fork Length (mm)	Weight (g)
32	0.5
37	0.5
38	0.5(2)
39	0.5(3)
40	0.5(2)
42	0.5(2), 1
43	1
44	0.5
45	1(3)
47	1
48	1(3), 1.5(2)
49	1(3)
50	0.5, 1(2), 1.5(4)
51	1, 1.5(2)
52	1.5(2)
53	1(2), 1.5
55	1.5
56	1.5, (2)
58	1, 2, 2.5
61	2
64	2.5
67	3.5
92	7
93	8
94	8
95	7, 8, 9
99	9
100	10
101	10
102	11
104	11
105	10, 11(2), 12(2)
107	12
108	12
110	12
113	12
115	15(2)
125	19
162	38

APPENDIX 5

LENGTH AND WEIGHT OF BROWN TROUT
CAUGHT IN HUNGRY CREEK, 1990

Fork Length (mm)	Weight (g)
75	4
205	92
213	91
236	130