

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

STANDING STOCK OF RAINBOW TROUT IN A SECTION
OF INDIAN CREEK, PLUMAS COUNTY, 1992

by

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1992

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INTRODUCTION

In 1976, the Department of Water Resources (DWR) initiated an instream flow program to identify streams that would benefit from flow enhancement to assess instream values and identify trade-offs required to enhance these streams. The Northern District of DWR selected Indian Creek (Figure 1) as one of the streams to study under this program. Initial flow studies by DWR indicated that flow augmentation could double trout habitat in the first 16 km of Indian Creek below the dam (upper Indian Creek) and increase habitat by 25 percent in lower reaches (DWR 1979). As a result of this study, DWR and the Department of Fish and Game decided to reoperate Antelope Reservoir to increase flow releases from 0.1 cms to 0.6 cms year-round on a trial basis. These flows would not impair recreation at Antelope Reservoir.

Sampling of salmonids was begun in upper Indian Creek in 1977. Sampling continued through 1982 on a yearly basis to provide baseline data for project evaluation (Brown 1978, Brown and Haines 1979, Haines and Brown 1980, Villa and Brown 1981, Villa 1982, Bumpass, Smith and Brown 1987a). Fish were not sampled in 1983, 1984, or 1985. Sampling resumed in 1986 and continued in 1987, 1988, 1989, and 1990 (Bumpass, Smith and Brown 1987b, Bumpass and Smith 1989, Bumpass and Brown 1989, Brown 1991). Sampling was also conducted in Indian Creek as it flows through the Genesee Valley in 1989, 1990, and 1992.

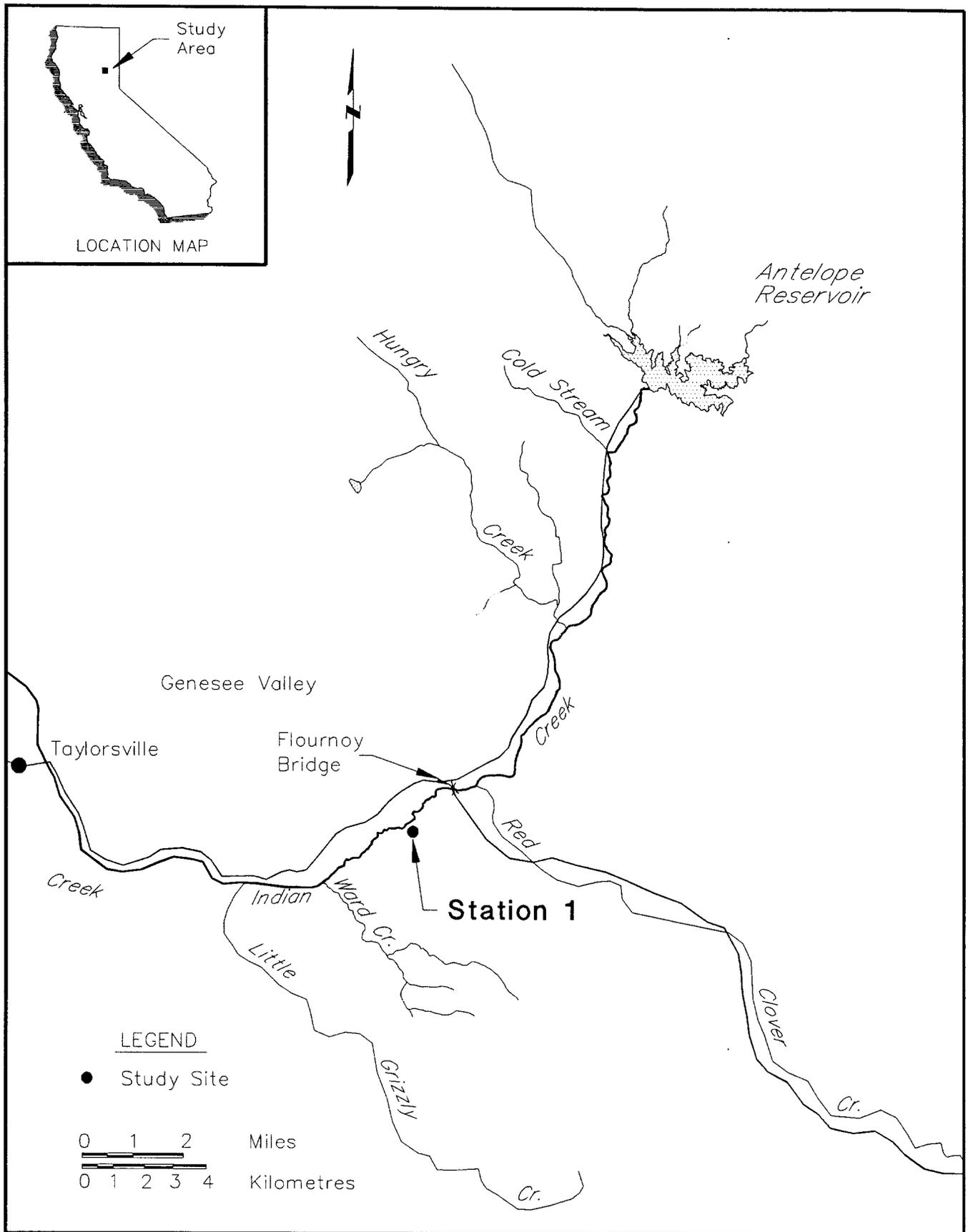


Figure 1. Location of station sampled to estimate standing crop of trout in Indian Creek, Plumas County, 1992.

METHODS

Standing crop of trout was estimated at one station in Indian Creek (Figure 1), Plumas County, in September, 1992. The length, average width, and average depth of the station was measured (Appendix 1). Fish were captured with a battery-powered backpack electroshocker in stream sections blocked by seines. Captured fish were removed from the net-enclosed section on each pass. A standing stock estimate was developed using the two-count method of Seber and LeCren (1967).

The weights of rainbow trout (Oncorhynchus mykiss) were determined by displacement. Weights were measured for all trout caught. Fork length was measured to the nearest millimeter for each trout.

Scale samples were taken from each 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). Standing crop of trout was calculated. Length-weight relationships, coefficient of condition, and 95 percent confidence intervals were also calculated.

RESULTS

Standing Crop

Rainbow trout were the only fish caught in Indian Creek. Biomass was 0.4 g/m². Biomass for trout large enough for fishermen to catch and keep (127 mm FL and larger) was also 0.4 g/m² (Table 1).

TABLE 1. Estimate of Rainbow Trout Standing Crop in Indian Creek, Plumas County, 1992.

Distance from Flourney Bridge (km)	Population Estimate	95 Percent Confidence Interval	Biomass (g/m ²)	Estimate of Catchable Trout (≤127 mm FL)	Biomass of Catchable Trout (g/m ²)
2.9	4	4-4	0.4	4	0.4

Length and Weight

Age group 2+ rainbow trout represented 75 percent of the 4 rainbow trout caught. Age 3+ comprised 25 percent.

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

$$\text{Log}_{10} W = -4.1 + 2.7 \text{Log}_{10} L$$

$$r^2 = 0.98$$

$$N = 4 \text{ (Appendix 2)}$$

Coefficient of Condition

We calculated the coefficient of condition and 95 percent confidence limits for a total of 4 rainbow trout. Coefficient of condition averaged 1.1616 with 95 % confidence interval of 0.9769-1.3464.

DISCUSSION

We sampled Indian Creek in Genesee Valley in 1989, 1990, and 1992. Although the sample stations were large, often exceeding 800 m², we caught few trout. Biomass has been consistently low, averaging 2.1 g/m² (Figure 2). Most of the trout we caught were rainbow trout, but in 1989 one brown trout (Salmo trutta) was caught. Nearly all the trout we caught have been age 2+ and older. Non-game fishes such as Sacramento sucker (Catostomus occidentalis) and Sacramento squawfish (Ptychocheilus grandis) were common in our catch in these sections but they were not enumerated. Trout biomass is probably low in Genesee Valley because of high water temperatures in summer, sparse cover, and sandy substrate.

TABLE 2. Average Standing Crops and Biomass for Rainbow Trout in Indian Creek in Genesee Valley, 1989-1992.

Year	Number of Stations	Average Trout Population Estimate	Biomass g/m ²
1989	7	2	0.18
1990	1	1	0.05
1992	1	4	0.40

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APPENDIX 1

FISH POPULATION STATION ON INDIAN CREEK, PLUMAS COUNTY, SEPTEMBER, 1992

Station 1 - Located about 2.9 km downstream from the Flourney Bridge (UTM 949 359). This station is composed of long, slow pools with riffles at the upper and lower boundaries of the study section. Pools represent 90% of the surface area while riffles make up the remaining 10%. Station 1 is lightly shaded (2%) by willows. Substrate is sand and gravel. The station is 126 m long and has a surface area of 905 m² and a volume of 281 m³ at 0.34 cms.

APPENDIX 2

LENGTH AND WEIGHT OF RAINBOW TROUT
CAUGHT IN INDIAN CREEK, 1992

Fork	
Length	Weight
<u>(mm)</u>	<u>(g)</u>
178	72
160	47
197	92
253	165