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ESTIMATES OF FALL 2000 CUTTHROAT TROUT POPULATION DENSITIES IN BURNOUT CREEK & JAMES CANYON CREEK, TRIBUTARIES TO ELECTRIC LAKE, HUNTINGTON CREEK DRAINAGE

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INTRODUCTION

Electric Lake, Huntington Canyon, Emery County, Utah, has a population of cutthroat trout originating from the original Strawberry Reservoir population (a mixture of Yellowstone cutthroat trout and Colorado River cutthroat trout). These trout spawn in the tributaries to Electric Lake. The land beneath this area is being mined for coal and eventual subsidence will occur. The Utah Division of Wildlife Resources requested that Canyon Fuel Company's, Skyline Mines (HC 35 Box380, Helper, Utah 84526) establish base line data on the fish and macrobenthos in both Burnout Creek and James Canyon Creek. These are tributaries to Electric Lake. This report focuses on the fall 2000 fish population estimates.

METHODS

Burnout Creek was sampled on October 16, 2000 and James Canyon Creek was sampled on October 17, 2000. Both streams enter Electric Lake near the upstream end of the reservoir. A total stream length of 162 meters (528 feet) was marked off in each stream. The designated stream length began at the reservoir high water mark as determined from shoreline bench marks (beach and littoral shelf) and vegetation. Fish populations estimates were based on removal summation sampling applied to the measured sections of stream. The fish were captured with a Smith-Root Model 12 battery powered backpack electrofisher. All captured fish were transferred to buckets and were held in flow-through holding pens until three passes had been completed. Fish were then identified, counted and measured to the nearest millimeter. The catch data from each run were then used to project the population size with the Zippen removal summation method (Moran 1951; Zippen 1956, 1958).

RESULTS AND DISCUSSION

Two waterfalls were located within the 162 meter section of Burnout Creek. The first waterfall was 97 meters upstream from the high water line. This waterfall was a partial barrier to upstream fish movement but the presence of a plunge pool indicated that fish passage was possible. The second waterfall was 30 meters above the first. This waterfall appeared to be a stronger barrier to fish passage, although it was low enough to be potentially passable, especially during high water periods. The sample reach extended an additional 35 meters above the second waterfall.

Based on the Zippen removal-summation estimate, the population size between the high water mark and the first waterfall was 280 fish. One 51mm cottid was collected in this portion of Burnout Creek, and the remainder of fish were cutthroat trout. The trout density, based on linear meters of stream was 2.89 fish per meter (0.88 fish per foot). The majority of these were young of the year (See Figure 1). The trout had a mean length of 61.12mm (standard deviation =16.43). A small number of fish were over 100 mm in total length and these appear to be holdovers from the previous year. These fish make up less than 5% of the population. The first waterfall does appears to act as a partial barrier to spawning trout. We estimated 22 fish between the first and second waterfall, less than a tenth of the density below the waterfall. These fish were smaller, having a mean length 60.05 mm (standard deviation = 18.60) and consisted almost entirely of young of the year individuals. Only one fish appeared to be from the previous year's cohort (Figure 2). The density between the two waterfall was 0.73 fish per meter (0.22 fish per linear foot). The low numbers above the first waterfall may be due to fewer spawning trout successfully ascending the first waterfall, or it could relate to downstream movements of fry and young of the year, since they would be unable to reenter the upper section once they had drifted over the waterfall. All fish were confined to the lower two sections of Burnout Creek. No fish were collected above the second falls.

The total population estimate, for Burnout Creek, between high water mark and the second waterfall was 304 fish. This translates to an average of 2.39 fish per linear meter of stream over the two sections. If the distance above the second waterfall is included, the total is still 304 fish, but with the

additional distance, the number of fish per linear meter of stream falls to 1.90 fish.

James Canyon Creek did not have any waterfalls within the 162 meter section sampled. We estimated a total trout population size of 587 fish using the Zippen removal-summation estimator. This is a density of 3.62 fish per meter (1.11 per linear foot). Three cottids, 120 mm, 114 mm, and 87 mm total length, were also collected. No young of the year cottids were collected, indicating that no cottid reproduction has occurred in the stream this year. The cottids in James Canyon Creek, as in Burnout Creek, may have migrated into the stream from another source population in the upper Huntington Creek drainage. The trout in James Canyon Creek were about 20% more abundant than those in Burnout Creek. The mean total length of the trout in James Canyon Creek was 59.03 mm (standard deviation = 19.06).

The size structure of the trout in the two streams may also be indicative of some differences in habitat between the streams. While we did not examine scales or otoliths to determine age, the size frequency histograms (Figures 1-3) show several distinct cohorts which we interpret as being age 0, age I, and in the case of James Canyon Creek, age II fish. The largest specimens in James Canyon Creek were over 180mm in length, which we assumed were from the 1998 year class, or potentially older. Based on this age designation, approximately 3.6% of the fish collected in Burnout Creek were age I, with the remaining 96.4% being young of the year. James Canyon Creek, in contrast, had about 8.5% of the population in the size range of what we would expect were one year old individuals (age I). Two additional fish were potentially 2 year old residents (about 0.5%). The remaining 91% of the population would have been age 0 fish. James Canyon Creek had more deep pools and associated undercut banks than did Burnout Creek, and this may have been important in survival of the fish, not only through the summer, but also in terms of overwintering. The presence of the waterfalls in Burnout Creek suggests that the topsoil may be slightly thinner in that drainage. Both stream were incised with steep, often vertical banks, and we noted that the banks in James Canyon Creek seemed higher than those in Burnout Creek. In both streams we noted the presence of water voles (Microtus richardsonii), with higher numbers of individuals being seen in James Canyon Creek. The burrowing activities of these large semiaquatic voles was likely one of the main factors in

modifying the stream banks (Zeveloff 1988) so that more cover was available to the trout.

LITERATURE CITED

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Zeveloff, S. I. 1988. Mammals of the Intermountain West. University of Utah Press. 365 pp.

Zippen, C. 1956. An evaluation of the removal method of estimating animal populations. Biometrics 12:163-169.

Zippen, C. 1958. The removal method of population estimation. Journal of Wildlife Management 22:82-90.

Figure 1. Length frequency histogram for Burnout Creek below the first waterfall. Total sample size = 260 individuals.

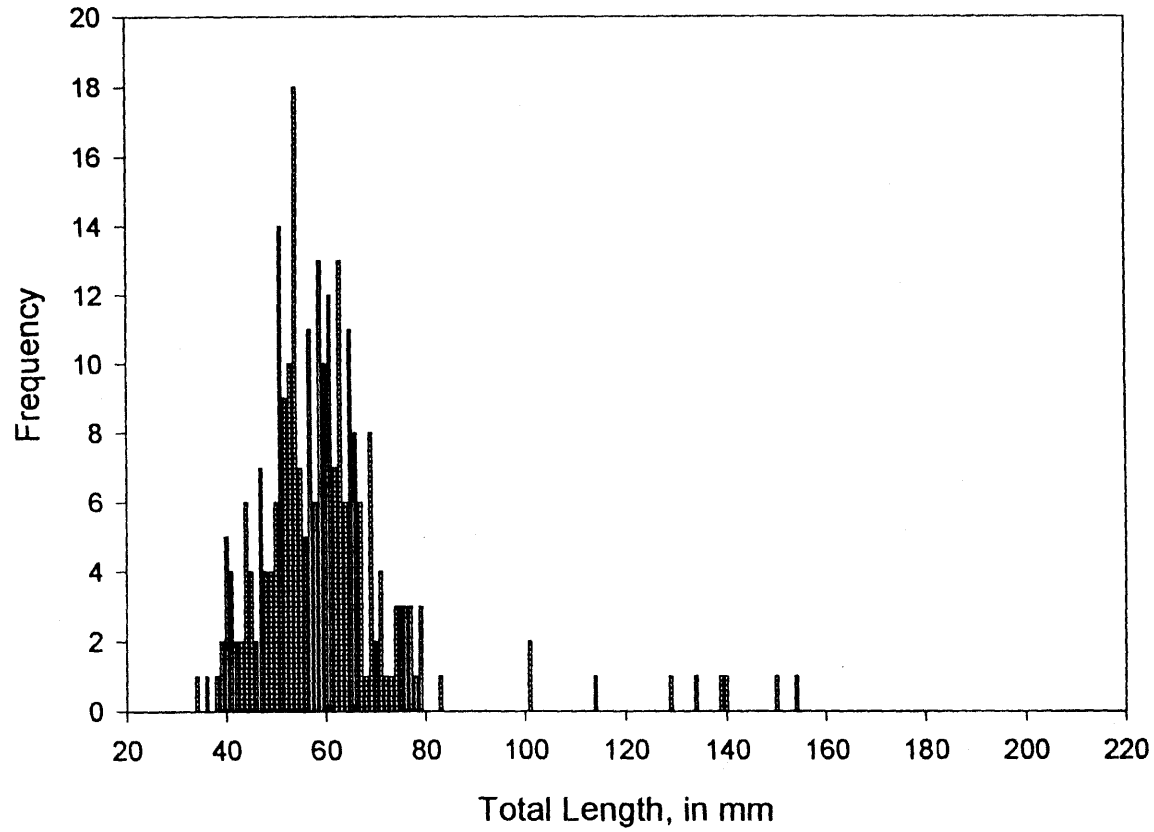

Figure 2. Length frequency histogram for Burnout Creek, above the first waterfall. Total sample size = 21 individuals.

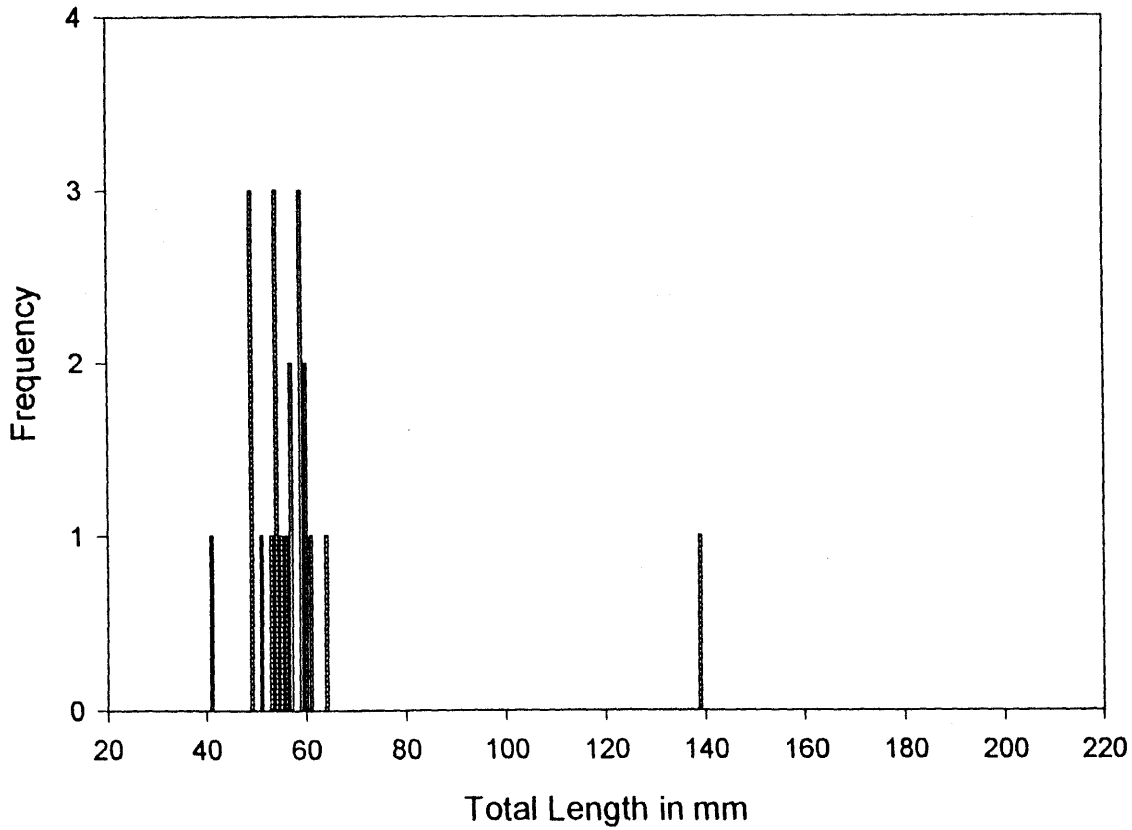
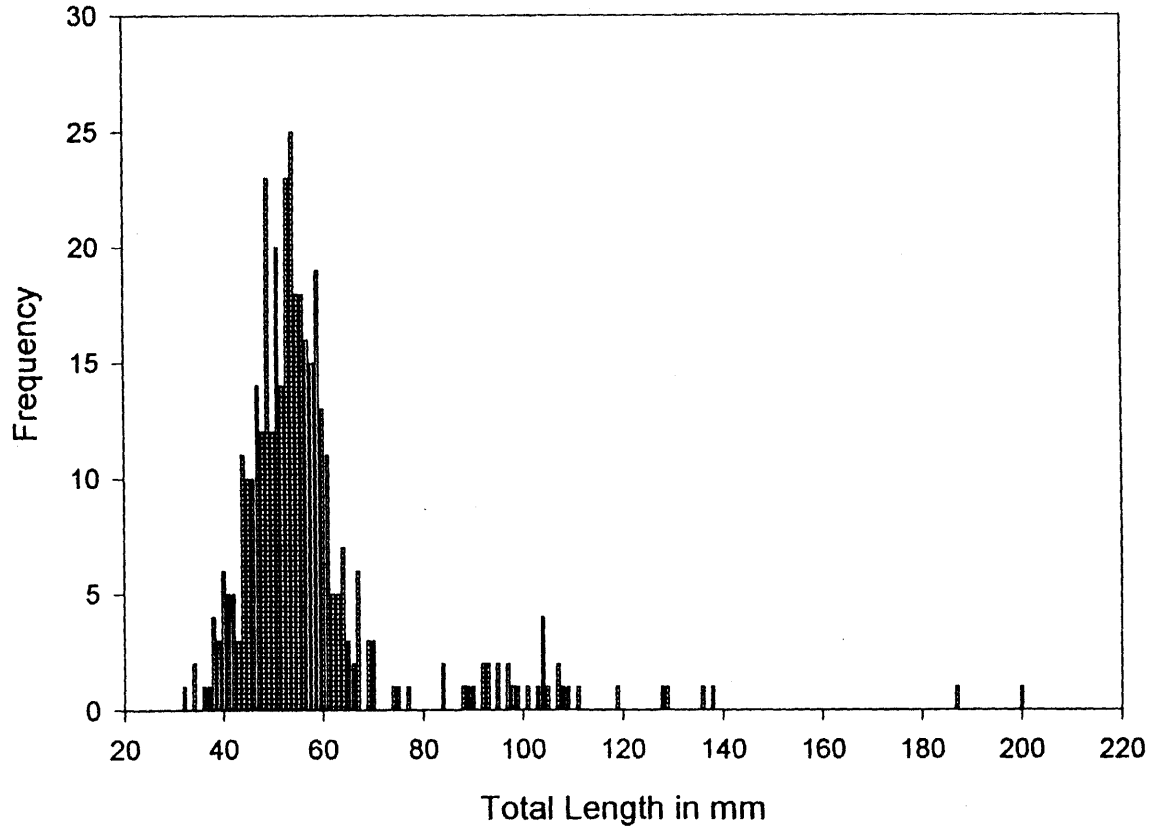
Figure 3. Length frequency histogram for James Canyon Creek. Total sample size = 376 individuals.