

# Reintroduction of Bonneville Cutthroat Trout in Northern Wasatch Front Streams, Utah

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## INTRODUCTION

The Bonneville cutthroat trout (*Oncorhynchus clarki utah*; Fig. 1) is the only trout native to the Great Basin, Utah. It occupied ancient Lake Bonneville & was historically abundant in waters throughout the Bonneville Basin. Numbers of Bonneville cutthroat rapidly declined in the late 1800s & early 1900s as a result of habitat modifications, introduction of nonnative fishes, & overharvest (Hepworth et al. 1997). Recovery efforts soon became a priority & a few isolated populations were discovered in Utah in the 1970s. In small canyons along the Wasatch Front, Northern Utah, are many small, isolated mountain streams. Some have populations of Bonneville cutthroat trout and others have Rainbow trout (*Oncorhynchus mykiss*). Rainbow trout populations were introduced in the late 1900s and are now wild & self sustaining. Cutthroat trout populations have recently been reintroduced to creeks that were devoid of trout, in hopes of restoring native populations. Our goal was to focus on whether or not cutthroat trout reintroduction has been successful by comparing it to the already established and successful Rainbow trout populations.



Fig. 2. Sampling Holmes Creek, Davis County

## ANALYSIS METHODS

Mean density of populations of each species was compared between species with a *t*-test. Total length was determined by taking the average length of fish per creek.

Relative weight was compared by plotting the mean & standard deviation for each population.

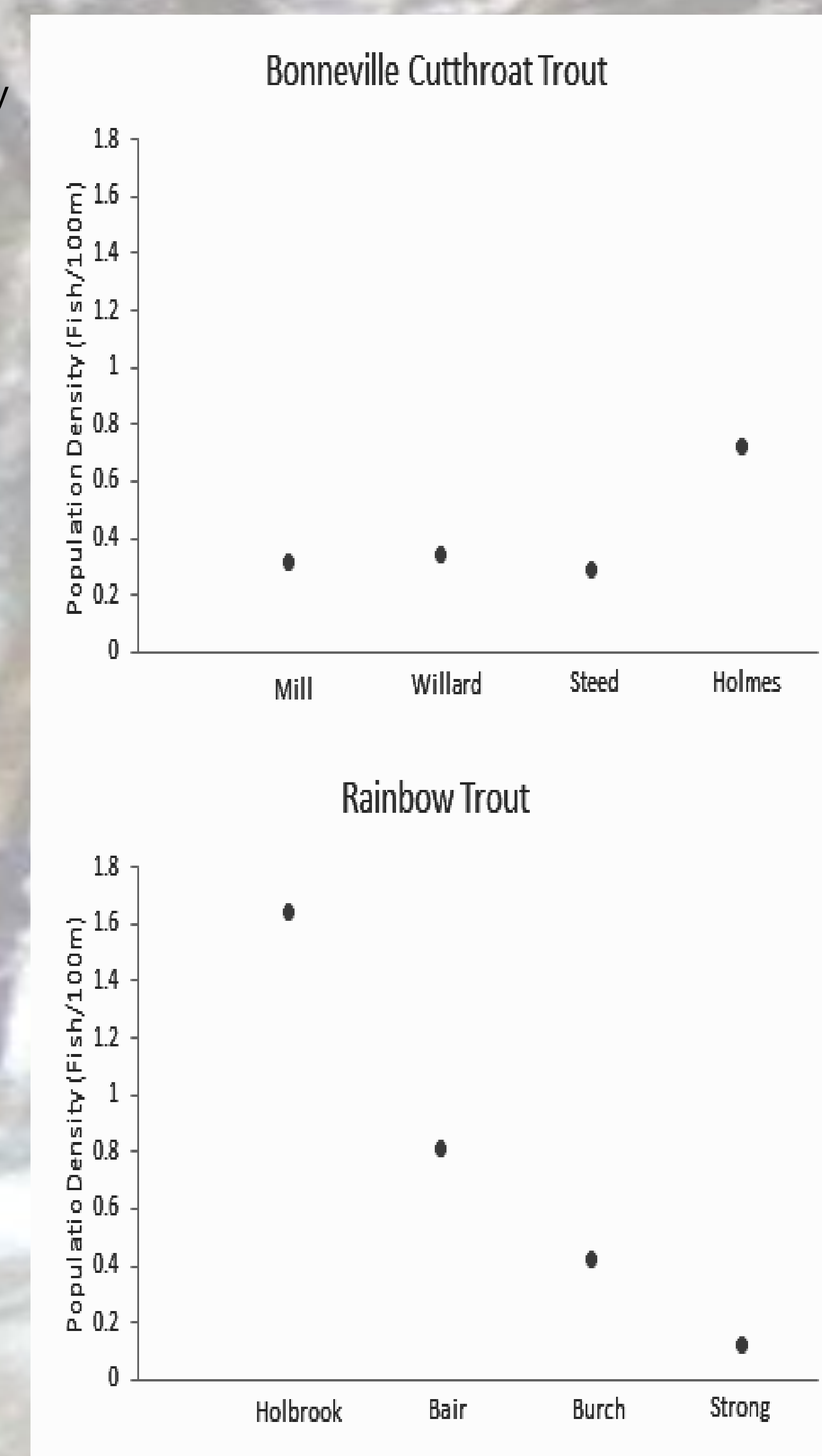


Figure 3. Population density for the two species of trout. Creeks are listed from largest to smallest.

## RESULTS

There was no significant difference in average population density of the two species ( $t = -0.96, df = 7, p = 0.39$ ). However, rainbow trout showed a strong trend of increasing density with larger creek size, whereas Bonneville cutthroat trout did not illustrate this trend (Fig. 3). The trend in the total length differed between the two species. Larger cutthroats were found in larger creeks, however, the total length of the Rainbow trout populations remained consistent throughout the four creeks surveyed (Fig. 4). A large deviation was found in Holbrook, Willard, Burch, and Holmes which indicates reproduction. (It should be noted that the population of cutthroat in Willard creek were stocked with fry two miles upstream two days prior to sampling, which could have influenced our data). Overall, there was little variation in relative weight among creeks and all creeks had scores > 80 (Fig. 5). This indicates that there is an overall healthy population within the creeks surveyed.

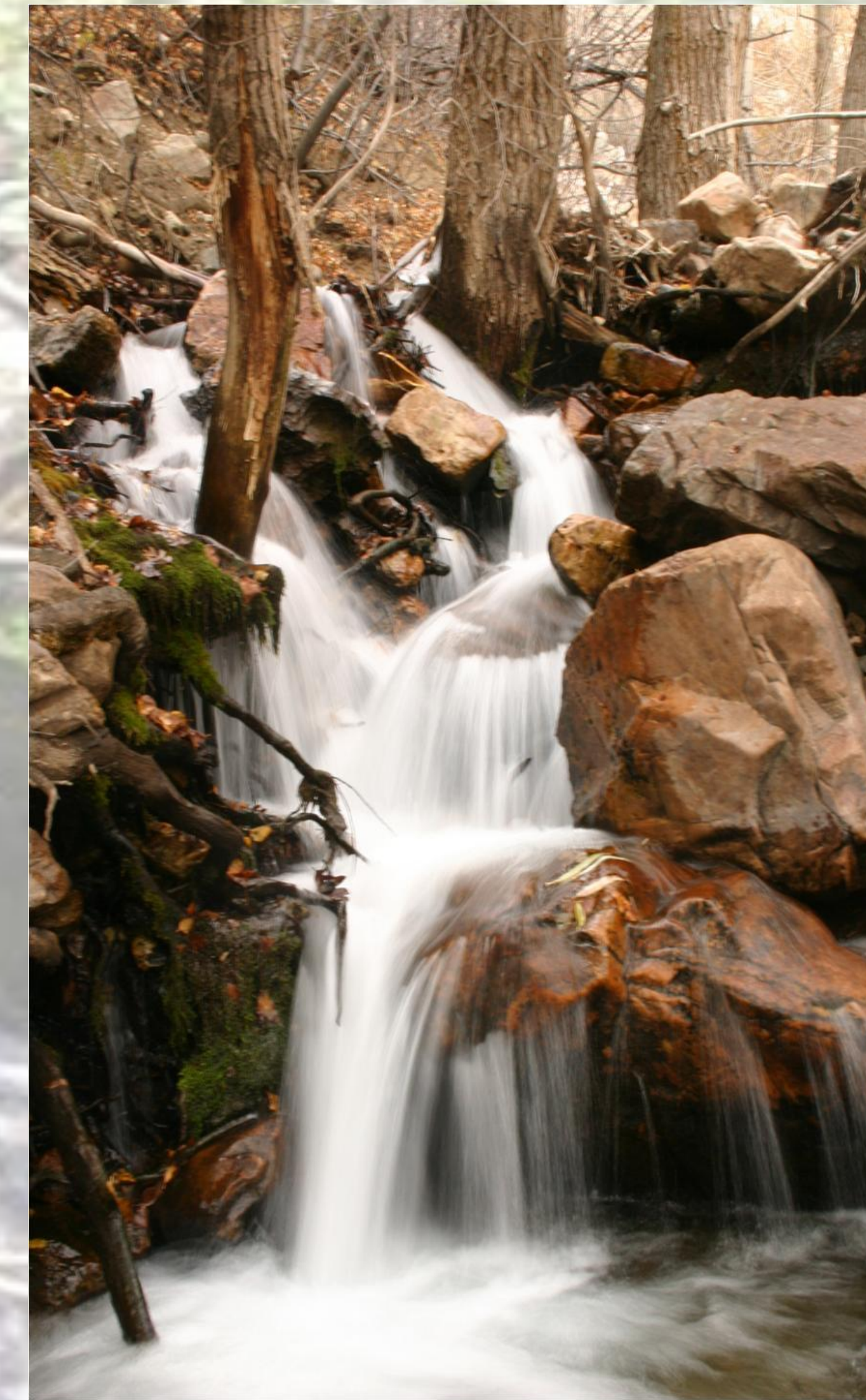


Figure 6. Willard Creek, Box Elder County

## DISCUSSION

The population density of Cutthroat trout was less than that of the Rainbow trout. The trend we see with the Rainbows could be due to the population being established over a long period of time. All four populations of cutthroat have what is considered, a healthy relative weight increasing their fitness. Reproduction was occurring in Willard and Holmes, where we found fish < 70 mm TL (Fig. 7). A possible explanation for the lack of reproduction at Mill and Steed creek may be that Cutthroat utilize a narrow range of substrate for spawning. This, in conjunction with the short growing season of high mountain systems, presents a significant growth disadvantage for age-0 trout (Budy et al. 2012). These creeks are unique because they are small and isolated. Thus, careful management should be implemented to ensure overall success in a changing environment (Novinger and Rahel 2003). A major factor to consider is climate change and how it is affecting these species (Isaak et al. 2012). Possible solutions could be the removal of isolation barriers or the addition of fish ladders (or less expensive alternatives) to allow fish to migrate to cooler and deeper waters as temperatures increase. In conclusion, the reintroduction of Bonneville Cutthroat trout in mountainous streams along the Wasatch Front has proven to be as successful as the Rainbow trout we surveyed in similar streams. For continued success further studies on environmental changes should be implemented.



Fig. 1. Bonneville cutthroat trout, Mill Creek, Davis County

## STUDY AREA & SAMPLING

During fall 2015, eight creeks in Box Elder, Davis, and Weber counties, along the Wasatch Front, were sampled for trout (Figs. 2,6,8). For each species, creeks represented a range of sizes determined by blue-line length on a topographic map (Anderson & Vanderpool 2010). Creeks with each species were paired by size for analyses. Four populated with rainbow trout were, from shortest to longest, Strongs, Burch, Bair, & Holbrook. Four populated with recently reintroduced Bonneville cutthroat trout were, from shortest to longest, Holmes, Steed, Willard & Mill.

Using a backpack electrofisher, trout were sampled in two passes through a 100-m section. Population density was determined by the number of fish found per 100 m of creek. Total length (TL) & weight were obtained from each fish and the relative weight (Neumann et al. 2012) was calculated. Relative weight can be defined as an index of condition determined by dividing the weight of a fish by the length specific standard weight for that species. It has been determined that 100 is an ideal value for fish.

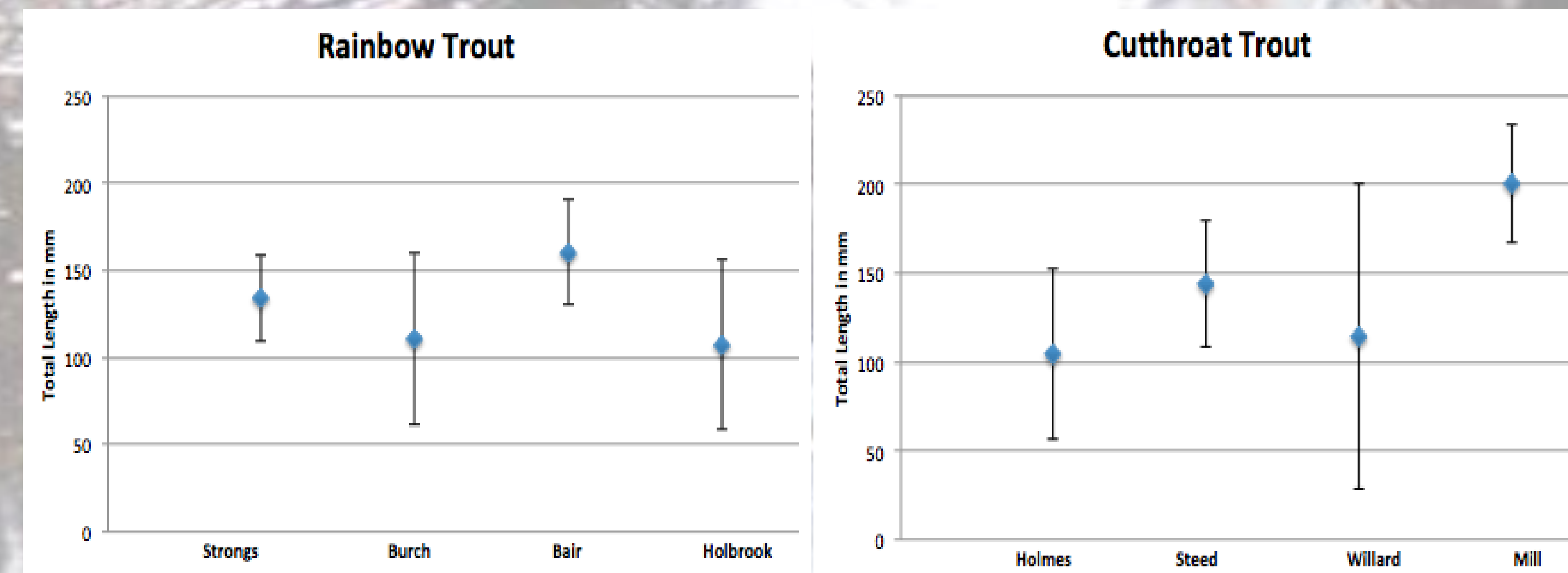


Figure 4. Average total length of species by creek

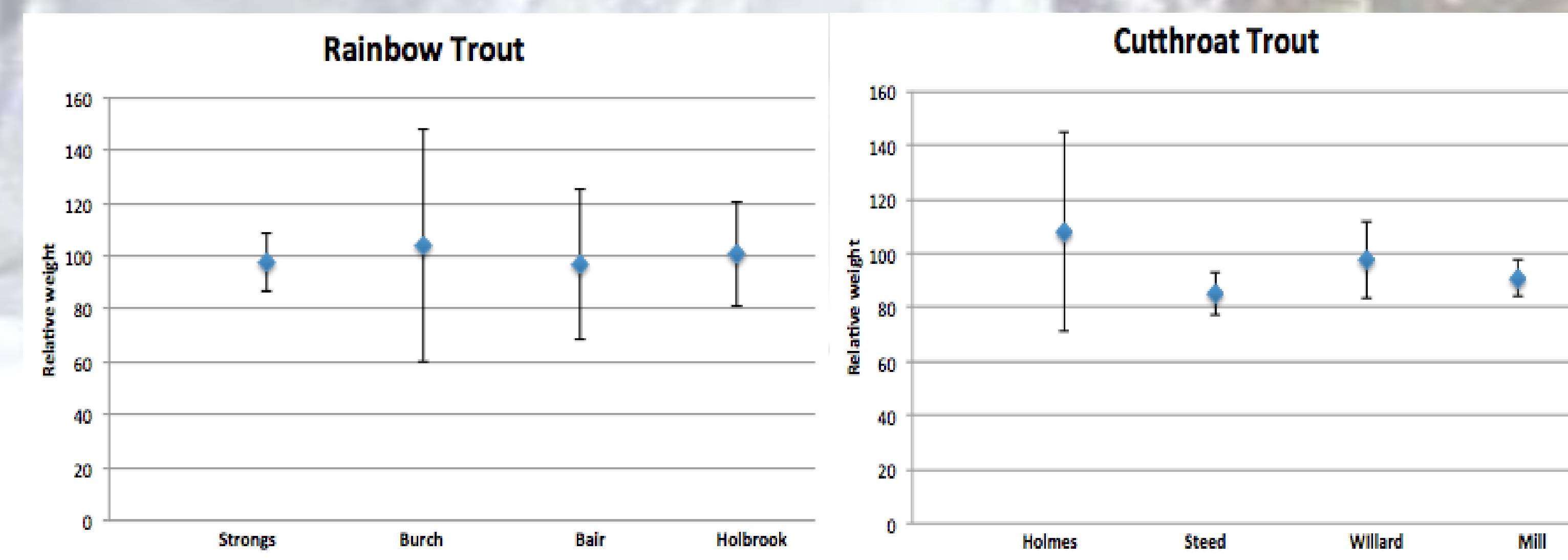


Figure 5. Average relative weight of species by creek

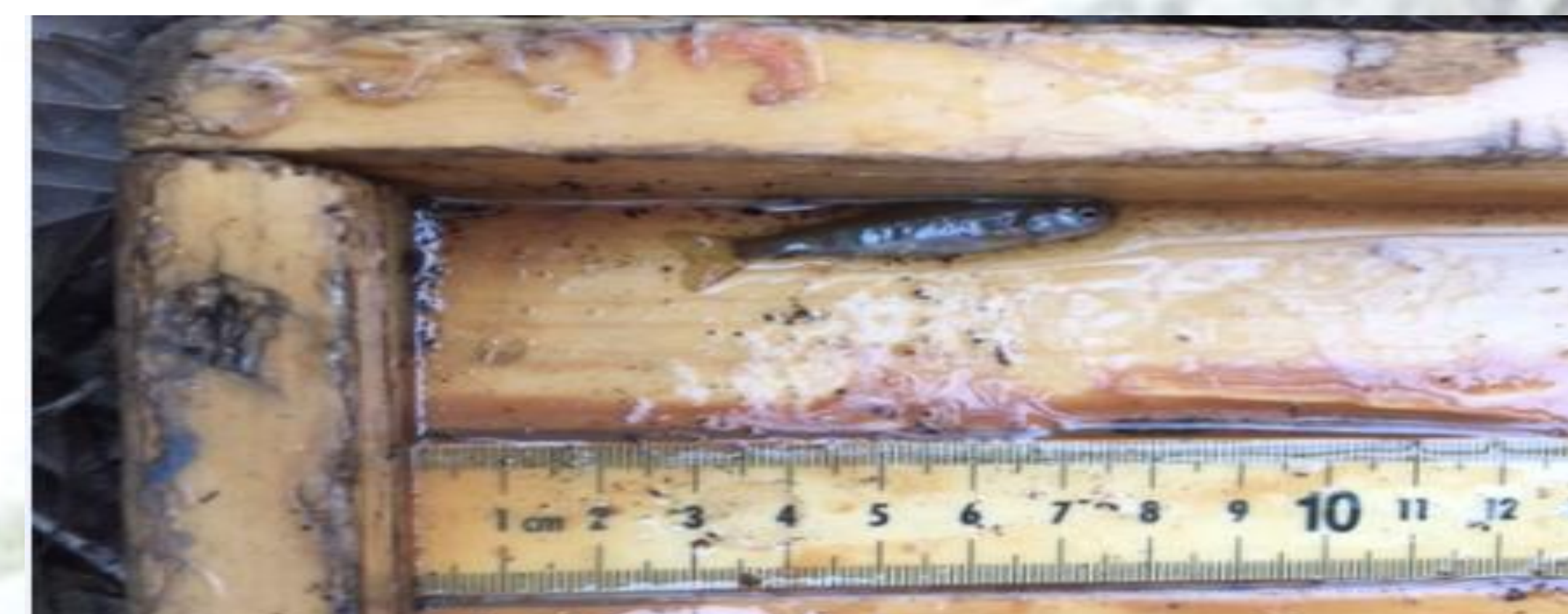


Figure 7. Cutthroat trout fry, Holmes Creek, Davis County



Figure 8. Sampling Willard Creek, Box Elder County

## References:

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