Rainbow Trout Abundance and Population Structure in Creeks Along the Wasatch Front, Utah

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Introduction

Several creeks drain off the Wasatch Mountains in northern Utah (e.g., Fig. 1). They deliver water as an invaluable resource to communities along the Wasatch Front, but they also contain an abundance of life. Some of these creeks contain rainbow trout (*Oncorhynchus mykiss*) populations and we wanted to know how these populations differed among creeks in relation to habitat conditions. It has been shown that the habitat size measured as pool depth and watershed area can affect trout population size. When there are deeper pools and greater habitat area, there will be greater trout abundance (Harig and Fausch 2002).

Fig. 1. Burch creek in Ogden, Utah has a population of rainbow trout.

Methods

We sampled 28 creeks from Brigham City to Bountiful, between September 7, 2009 and July 27, 2010. Backpack electrofishing was conducted at each creek in 100 m stretches (Fig. 3). Each stretch was fished twice to improve sampling accuracy. Fishing was conducted upstream of major man made structures. Fish were measured to the nearest millimeter standard length and released. Habitat conditions were measured at each site. Ten preliminary measurements were taken to determine average wetted width, after which, twenty transects were spaced one average wetted width apart along the sample stretch. Along each transect we measured maximum depth(Fig. 6), wetted width(Fig. 7), and percent of silt. Creek length (blue-line distance), drainage circumference, maximum drainage elevation, and creek slope were taken from USGS topographical maps. Stepwise linear regression was used to assess the relation of these habitat variables to the number, average length, maximum length, and skewness of length distribution in each rainbow trout population. Pearson correlations were used to determine what habitat variables were correlated with predictor variables.

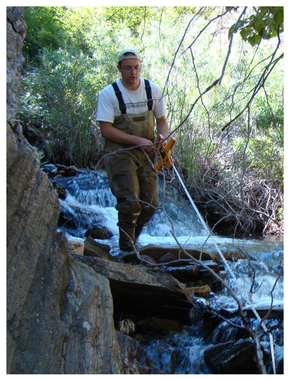

Fig. 2. Zak Knight measuring out 100 m in Centerville Creek, Centerville, Utah.

Fig. 3. Wes Swenson, Chris Hoagstrom, and Lessie Swenson Backpack electrofishing in Left Fork of Farmington creek in Farmington, Utah.

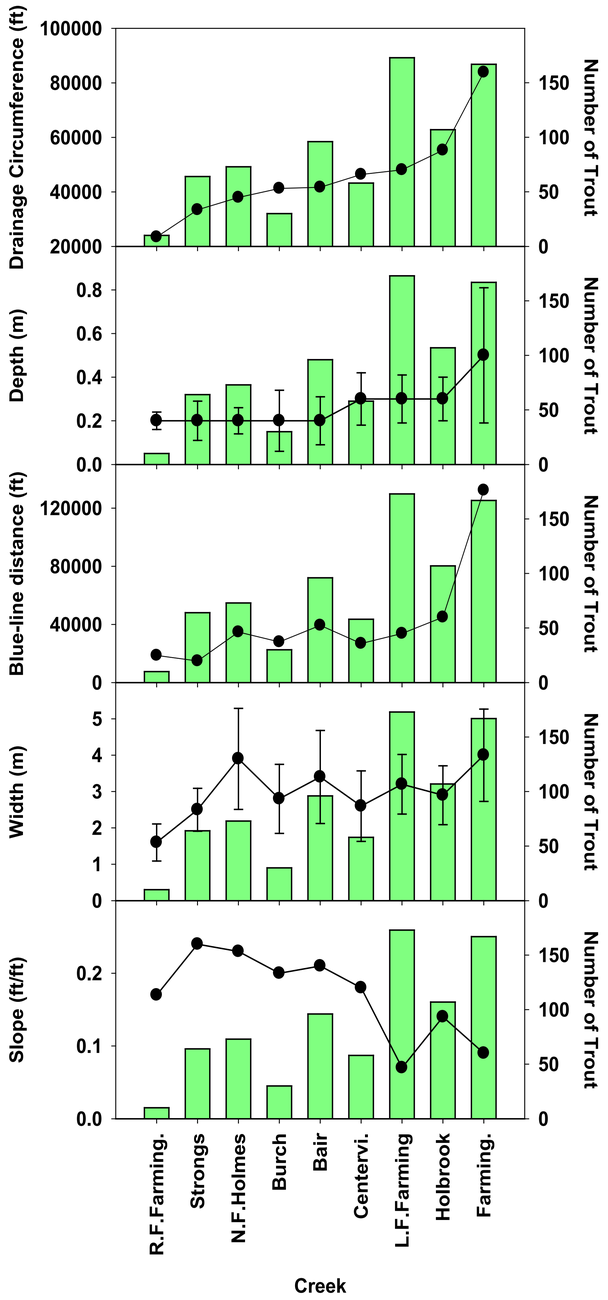

Fig. 4. Number of rainbow trout (*Oncorhynchus mykiss*) per creek (bars) versus drainage and creek characteristic s (points) associated with trout abundance.

Fig. 5. Rainbow trout (*Oncorhynchus mykiss*) live in at least 9 creeks along the northern Wasatch front. This picture was taken from Strongs Creek, Ogden, Utah.

Results

Right Fork of Farmington, Strongs, North Fork of Holmes, Burch, Bair, Centerville, Left Fork of Farmington, Holbrook and Farmington creeks had rainbow trout populations. Drainage circumference alone was a fairly strong predictor of rainbow trout abundance (F = 9.5, df = 1, 7, P = 0.02, r^2 = 0.58). Depth (r = 0.94, P < 0.01), blue-line distance (r = 0.93, P < 0.01), width (r = 0.67, P = 0.05), and slope (r = -0.63, P = 0.07) were all correlated with drainage circumference. All of this suggests that larger creeks in larger canyons supported more trout (Fig. 4). No habitat variables were predictive of any other trout population characteristics. That is, average length, maximum length, and skewness of the length distribution were unrelated to habitat characteristics.

Fig. 6. Tim Healy and Jared Eames Measure the depth of Burch creek in South Ogden, Utah.

Fig. 7. Bryce Galbraith measures the wetted width of Parish Creek in Centerville, Utah.

Discussion

It is not surprising that larger creeks support larger populations of rainbow trout. Harig and Fausch (2002) also found that watershed area (analogous to drainage circumference in this study) was the best indicator of trout abundance. Since all of our study creeks were in the same region and presumably receive similar amounts of precipitation, one would expect that creeks with larger drainages would have more streamflow, creating more space and deeper pools for trout. If creeks were not isolated within individual canyons their potential to support more trout would presumably be greater. For example, the Right Fork of Farmington Creek had the smallest drainage circumference and presence of a few trout there may have been due to its connection to main Farmington Creek.

Relations between creek size and rainbow trout population size may be useful for determining which fishless creeks along the northern Wasatch Front have potential to support trout and will help identify creeks that are unsurveyed but may contain trout. However, the lack of relations between creek size and trout population structure suggests new studies will be needed to determine factors that influence trout size and survival along the northern Wasatch Front.

References

Harig, A. L. and K. D. Fausch. 2002. Minimum Habitat Requirements For Establishing Translocated Cutthroat Trout Populations. *Ecological Applications.* 12(2) pp.535-551.

Acknowledgements

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