Cutthroat Trout Population Response to Instream Habitat Improvement Efforts

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Introduction

- Habitat degradation from human activities frequently damages elements of habitat that organisms require for growth and reproduction.
- Heavy livestock grazing near streams leads to removal of streamside vegetation. The loss of woody inputs from riparian areas can cause streams to have a simplified channel morphology.
- Stream channel simplification reduces the amount of pool habitat available for stream-dwelling organisms.
- Some organisms, such as salmonid fishes, are dependent upon pool habitat and populations are limited by its availability.
- In South East Idaho, many of the last genetically pure populations of cutthroat trout exist in small headwater streams located on public lands, which are exposed to regular livestock grazing.
- As a result, these cutthroat trout populations are limited by the unsuitable habitat they currently occupy, and may benefit from habitat improvement.

Objectives

- Examine how instream habitat improvements alter the size-frequency of salmonids in degraded streams
- To test the effectiveness of instream structures at increasing fish biomass in the presence of continued grazing activity.

Methods

- Four streams in South East Idaho containing only native cutthroat trout were selected for study.
- Each stream was assigned a 500 meter control and treatment section. Two streams have the treatment section established above the control and two have it below the control.
- Fish populations were sampled in July 2016 by two pass electrofishing. The length and mass of each fish captured was recorded.
- Instream structures were installed in August 2016 using a post driver to pound posts vertically into the stream bed in a row across the stream.
- Wood was placed above the posts to produce a pool upstream of the structure, and cause water to flow over the structure.
- Nine structures were installed in the treatment sections of each stream.
- In July 2017 the fish populations were resampled using two-pass electrofishing and the length and mass of each fish was recorded.

Results

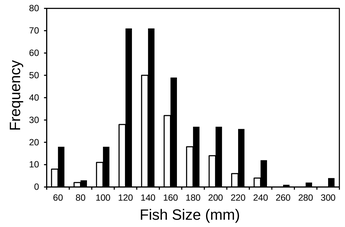

Figure 1: Size frequency distribution of fish captured in treatment sections binned in 19 mm size categories. White bars represent fish population structure in July 2016 and the black bars are July 2017.

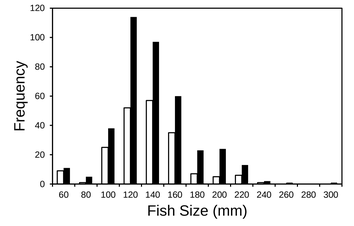

Figure 2: Size frequency distribution of fish captured in control sections binned in 19 mm size categories. White bars represent fish population structure in July 2016 and black bars are July 2017.

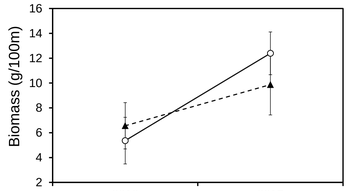

Figure 3: Change in mean fish biomass (± 1 SE) between July 2016 and July 2017. Open circles represent treatment sections and closed triangles are control sections.

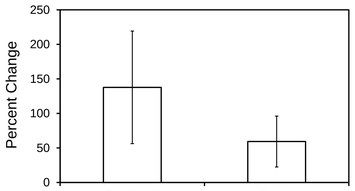

Figure 4: Mean percent change (± 1 SE) in fish numbers between July 2016 and July 2017.

Conclusions

- Both treatment and control sections showed an increase in fish abundance from 2016 to 2017.
- In 2017 the treatment sections contained higher densities of fish from larger size classes. This may indicate that structures were effective at creating quality habitat, as larger fish typically occupy and defend the most profitable foraging locations in streams.
- Treatment sections also had a greater increase in average biomass compared to control sections, however there was considerable variation between streams.
- Although both treatment and control sections showed an increase in fish abundance treatment sections had more than double the percent increase in fish numbers. Again, there was substantial variation between streams.
- Our results indicate that instream structures alter fish population structure by increasing the availability of suitable habitat for fish from larger size classes.
- Despite between stream variation in fish response, overall the instream structures appear to be effective at increasing salmonid biomass in degraded streams.

Acknowledgements

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