

FISHERIES MANAGEMENT IN WILDFIRE AND DROUGHT CONDITIONS ACROSS NORTHERN COLORADO MOUNTAIN REGION

INTRODUCTION

As water resources in Colorado have become greatly limited and highly regulated, due to climate change and resulting factors like drought and wildfire, the need for adaptable fisheries management techniques only prove to be more crucial as time goes by. In this project, we specifically looked at the impacts of regulated flow and drought on the Blue River, as well as genetic analysis of post-wildfire trout within various creeks and streams across northern Colorado. Beyond field work, a significant amount of this project entailed detailed fish diet processing through aquatic insect identification, which took place in a laboratory located at Colorado State University. Techniques employed during this internship included backpack electrofishing, tote-barge electrofishing, food web sampling using Surber samplers and rock scrubbing, mark-recapture using PIT tags for trout population estimates, general in-field fish processing (weight, length measurements, gastric lavage, fin clips, scale collection, etc.) and data recording. Overall, my involvement helped inform 3 individual graduate students in their work towards Master's degrees within Warner College. Special thanks to stakeholders from Blue Valley Ranch, US Forest Service, and the National Park Service who made this work possible.

GOALS

- Learn various fisheries sampling techniques including electrofishing
- Acquire experience in population study methods through mark-recapture (PIT tagging) and multi-pass depletion
- Assist with aquatic invertebrate identification in collected fish diets
- Engage with different stakeholders on both private and public lands
- Gather perspective on graduate school and Master's projects

Figure 1. Collecting aquatic invertebrates at Blue Valley Ranch



LABORATORY/FIELD WORK

Blue Valley Ranch

I attended 3 separate sampling events that took place on the Blue River near Kremmling, Colorado. These field days primarily included backpack electrofishing which temporarily stuns fish so crew members with nets can easily capture them for further processing and data collection. However, tote-barge electrofishing which uses a generator strapped to a rudimentary boat to collect larger trout was also used. After collecting fish along a 100-meter stretch, we took weight, fork length, fin clips (for genetic data), scales (for age estimates), and pumped the stomachs of brown trout (*Salmo trutta*) and mottled sculpin (*Cottus bairdii*) to gather diets for future laboratory analysis. For our tote-barge sampling, we collected weight, fork length, and scanned/inserted PIT tags for trout population estimates.

Kanno Laboratory

To compliment the field work undertaking at Blue Valley Ranch, lab work entailed sorting through the aquatic insects found in the diets collected during our fish processing. This required careful study of the possible species found in the area and a detailed work through of the contents of the diet.

Figure 2. Emerging stonefly case along the Blue River



Trout Genetics - Little Beaver Creek and Across Northern Colorado

On two separate projects, our crew travelled to Little Beaver Creek, as well as several areas around in and around Rocky Mountain National Park, Red Feather Lakes, and the Poudre Canyon. For both studies, we used backpack electrofishing to perform a 2-pass depletion population assessment on brook trout (*Salvelinus fontinalis*). Measurements like fin clips, weight, fork length, and total length were collected from the fish obtained.

Intern:

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Mentors:

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Dr. Brett Johnson – FWCB Professor, Dept. Fish, Wildlife and Conservation Biology, Warner College
Dan Schroder – Summit County Director, CSU Extension

Figure 3. Taking length measurements of brook trout



TAKE AWAYS

- Learned about different methods of fisheries management and ecological study design in practice
- Expanded sphere of knowledge from terrestrial wildlife ecosystems to freshwater aquatic environments
- Gathered practical ID knowledge of all major aquatic invertebrate down to order and family
- Functioned electroshocking backpack
- Taken away a great appreciation of graduate school, including master's students work both in the lab and in the field

Figure 4. Backpack electrofishing in Little Beaver Creek

