A test of the biotic resistance hypothesis with native and exotic trout assemblages in stream ecosystems: towards a better understanding of native cutthroat trout restoration options.

Dates:
2009 – 2012

Abstract:
The Logan River, Utah, supports one of the largest remaining meta-populations of Bonneville cutthroat trout; however, as elsewhere, they are threatened by negative interactions with brown trout. Towards a broader goal of gaining a better understanding of native trout restoration options, we tested the hypothesis of biotic resistance in the Logan River using a large-scale, manipulative field study coupled with controlled laboratory and field experiments. Removal of brown trout conducted in 2009 - 2011 from tributary and mainstem habitat suggest that tributary habitat in the lower extent of the Logan River support high densities of exotic brown trout that demonstrate strong density dependence and likely serve as a source of brown trout to the mainstem Logan River, whereas populations in portions of the mainstem Logan River are likely supported by immigration from small impoundments in the lower river. Experiments testing for evidence of biotic resistance demonstrate that the outcome of competition between Bonneville cutthroat trout and brown trout is strongly influenced by the density of native trout. These results suggest that efforts to conserve high density populations or restore impaired populations are likely to increase resistance by native cutthroat trout to the establishment of invasive brown trout, and that mechanical removal of brown trout may be an effective alternative to eradication if native cutthroat trout can establish high density populations.

Funding and collaborators:

Investigators:
Phaedra Budy, Principle Investigator, USGS – UTCFWRU, USU – Watershed Sciences
W. Carl Saunders, Post-doctoral Research Scientist, USU – Watershed Sciences
Gary P. Thiede, Fisheries Biologist, USU – Watershed Sciences
Reed Chaston, Wes Gordon, Konrad Hafen, Undergraduate Researchers, USU – Watershed Sciences

Publications: