

LANDSCAPE DISTRIBUTION AND BIOLOGICAL DIVERSITY OF CUTTHROAT TROUT IN THE SNAKE RIVER HEADWATERS, WYOMING

Mark A. Novak, USDA Natural Resources Conservation Service, 585 Shepard Way, Helena, MT 59620, mark.novak@mt.usda.gov

Dan Mahony, USDI National Park Service, P.O. Box 168, Yellowstone National Park, WY 82190

Jeffrey L. Kershner, U.S. Geological Survey-BRD, Northern Rocky Mountain Science Center, P.O. Box 173492, Bozeman, MT 59717-3492

We used a landscape scale approach to facilitate the synthesis of ecological, morphological, genetic, and life history information regarding the distribution and organization of Yellowstone cutthroat trout, (*Oncorhynchus clarkii bouvieri*) and fine spotted Snake River cutthroat trout, (*Oncorhynchus clarkia*) subspecies, in the Snake River headwaters of northwest Wyoming. Our work focused on the largely connected stream networks up and down stream of Jackson Lake dam. Systematic sampling allowed us to hierarchically analyze for morphological or geographic structuring from the stream reach

to basin scale. Differences in landscape distribution were observed, with the large-spotted morphotype decreasing in occurrence along a north-south gradient. Multivariate analysis of spotting patterns can discriminate between the large-spotted and fine-spotted morphotypes, with < 10 percent misclassification rates. We were unable to genetically differentiate between the morphotypes using an 1150 bp region of the ND1-ND2 mitochondrial genome, however, two genetic clades and differences among drainages were apparent. We observed a range of mobility by cutthroat trout that exhibited resident and fluvial life histories. Ranging behavior of fluvial migrants varied from < 5.0 km in headwater streams, to > 40.0 km in larger rivers with complex seasonal movements among several streams. As climate changes, future conservation of cutthroat trout in the Snake River headwaters should continue to emphasize maintenance of phenotypic variability, protection of existing genetic structure, as well as restored habitat connectivity to sustain life history variability. Conserving the biological diversity exhibited by these native cutthroat trout need not be encumbered by taxonomic distinction, especially given that a changing climate may favor one or neither of the morphotypes.