
BROAD-SCALE GENETIC AND COMPOSITIONAL MONITORING OF AQUATIC VERTEBRATE POPULATIONS: A PROOF OF CONCEPT IN THE INTERIOR COLUMBIA RIVER AND UPPER MISSOURI RIVER BASINS

Michael K. Young,* USDA Forest Service, Rocky Mountain Research Station, 800 East Beckwith Avenue, Missoula, Montana 59801, mkyoung@fs.fed.us

Kevin S. McKelvey, USDA Forest Service, Rocky Mountain Research Station, 800 East Beckwith Avenue, Missoula, Montana 59801, kmckelvey@fs.fed.us

Michael K. Schwartz, USDA Forest Service, Rocky Mountain Research Station, 800 East Beckwith Avenue, Missoula, Montana 59801, mkschwartz@fs.fed.us

Monitoring fish and amphibian populations is essential for evaluating conservation efforts and the status and trends of individual species, but measuring abundance is time-consuming and problematic at large scales. Also, relations between fish populations and their surrogates, such as habitat characteristics, are often obscure. As an alternative, genetic assessment and monitoring offers promise as an indicator of population status and trends by providing information on genetic diversity, connectivity among populations, and the prevalence of hybridization with non-native species. We have undertaken intensive sampling of native and nonnative fishes and amphibians in streams monitored by the Pacfish/Infish Biological Opinion Monitoring Program, which includes a spatially comprehensive, random sample of subbasins in the interior Columbia River Basin and upper Missouri River Basin. We have also developed a panel of ~100 single nucleotide polymorphism markers for cutthroat trout, redband trout, and rainbow trout to describe patterns of hybridization and landscape genetic structure. If fully realized, analyses of tissues sampled from over 1500 streams in Montana, Idaho, eastern Oregon, and eastern Washington on federal lands should permit broad-scale evaluations of the status and distribution of much of the aquatic vertebrate fauna and enable detection of responses to climate change. Preliminary results of sampling at nearly 700 sites on almost 300 western Montana and northern Idaho streams indicate that westslope cutthroat trout occupy headwater sites in most of their historical range except in the Kootenai and Missouri River basins, brook trout are more widely distributed than previously recognized, and the taxonomic complexity of sculpins is underappreciated.