

# Novel Research for Exotic Brook Trout Population Eradication Earns IDFG National Award

By Dr. Dan Schill, Idaho Department of Fish and Game

Brook Trout are increasingly targeted for chemical or manual removal in streams and alpine lakes across western North America. However, piscicides are non-selective and politically unpopular in some areas, while complete eradication via manual electrofishing removal is rare. A new method relies on development of a hatchery broodstock whose progeny have no X chromosomes and therefore can produce (if successful in their spawning attempts) only male progeny. Theoretically, if enough YY males are stocked into the target population over time, the wild population will skew toward all males, thus eliminating recruitment and eradicating the population.

Idaho Department of Fish and Game (IDFG) research and hatchery staff have successfully produced a YY Brook Trout broodstock and have begun extensive evaluations of its field performance. The first step involved the successful development of genetic sex markers for Brook Trout. This result, and use of 50 year old sex reversal technology commonly used in commercial aquaculture, enabled development of a YY broodstock comprised of both phenotypic male (sperm-producing) and feminized (egg-laying) YY male fish that were used to produce progeny for field experiments. Population simulations were conducted to quantify how long it would take to eradicate wild Brook Trout populations from Idaho alpine lakes and streams using various combinations of manual suppression and YY male stocking. Results predict that combining YY male stocking and a manual removal program in alpine lakes and streams could eradicate an undesired Brook Trout population in much shorter time periods than when either technique is used alone. In a pilot field study, IDFG stocked YY males into four Idaho streams and sought to confirm their successful spawning. Genetic analysis of fin-clipped fry collected from the stocked streams one year after YY male stocking demonstrated that YY males reproduced successfully in each stream, and that all progeny of YY fish were identified as XY males, as expected. The YY Male approach does not rely on genetic engineering or gene splicing but rather the simple re-arranging of existing chromosomal material and is therefore not a GMO. Based on the above body of work, IDFG has expanded field experiments to a total of 20 waters including 10 alpine lakes and 10 streams.



*Photo: Alpine lakes receiving YY male Brook Trout treatments were stocked using a helicopter and a lot of coordinated helping hands.*

A paper describing YY Brook Trout broodstock development was recently published (*Schill D. J., J. A. Heindel, M. R. Campbell, K. A. Meyer and Elizabeth R. J. M. Mamer. 2016. Production of a YY Male Brook Trout [BROOK TROUT continued on page 8]*

**[BROOK TROUT *continued from page 7*]**

*Broodstock for Potential Eradication of Undesired Brook Trout Populations. North American Journal of Aquaculture 78:1, 72-83*) and a companion paper describing the simulation results is currently in review in the North American Journal of Fisheries Management. This work recently garnered IDFG the 2016 Sport Fish Restoration Outstanding Project Award in the category of Research and Surveys. Given the program success to date, efforts by IDFG have been initiated to investigate YY Male broodstocks for several other exotic species including Common Carp and Lake Trout.



*Photo at right: Successful spawning of YY male Brook Trout results in all male progeny.*

## Bob Hughes Named 2016 AFS Fellow

At the American Fisheries Society Annual Meeting last summer, AFS president Ron Essig recognized eight fisheries professionals named as AFS fellows in 2016. Fellows are designated based on outstanding or meritorious contributions to the diversity of fields that are included in the American Fisheries Society. Western Division members Bob Hughes and Robert Lackey were named fellows in 2016. Lackey was featured in the 2016 Fall issue of the Tributary.

his passion for natural resource conservation and aquatic science stewardship. Over a long and successful career, Bob worked for the Environmental Protection Agency (retired), served as Associate Professor in the Department of Fisheries and Wildlife at Oregon State University, and held numerous chair and advisory positions with academic institutions, resource agencies, and scientific organizations in the United States, Europe, and South America.



Bob Hughes stands out among the many fisheries biologists from the state of Oregon who have distinguished themselves in the field, office, and company of their peers. He is renowned for

Bob has demonstrated top-notch leadership at every level of the American Fisheries Society and spent countless hours working on behalf of its members. He served as ORAFS President (1994-1995), WDAFS President (2006-2007), and President of the AFS (2014-2015). Over the past two decades, Bob chaired numerous AFS standing committees and Sections, including the Water Quality and International Fisheries Sections, and remains active today in AFS affairs. His leadership, dedication, and integrity are a model for those who follow.

*A full list of 2016 AFS Fellows can be found at: <http://fisheries.org/about/awards-recognition/call-for-award-nominations/afs-fellows-program/>*