Genetic Analysis of Brown Trout To Understand Population Declines in Southwestern Montana

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A precipitous decline in brown trout populations in southwestern Montana rivers is threatening Montana's sportfishing industry, valued at more than $375 million annually. Although the cause of the decline is not well-understood, fisheries biologists are working hard to conserve remaining fish and wish to examine the genetics of existing populations to understand diversity (or lack thereof), reproduction rates, and inheritance/age-class distributions. The first step in investigating population genetics is identifying microsatellites in the population. Microsatellites allow identification of familial inheritance, which then enables biologists to track age-class cohorts and examine population dynamics. This project uses microsatellites identified in related species such as rainbow trout, bull trout, and salmon to find microsatellites in brown trout, which can then be used to trace genetics in brown trout populations. Seventeen microsatellites have been identified and tested on genetic material obtained from fin clips of twelve brown trout from the Big Hole River. These microsatellites have been arranged in four multiplexes using a combination of polymerase chain reaction (PCR) and software analysis, facilitating efficient future processing and analysis of brown trout DNA.