THE USE OF CRYOPRESERVED MILT TO MAINTAIN GENETIC DIVERSITY IN CAPTIVE BROODSTOCKS

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EXTENDED ABSTRACT ONLY- DO NOT CITE

Captive broodstock programs have become increasingly prevalent over the last 20 years to address declines that have landed many populations of native fish species on the doorstep of extinction. Small populations are subject to a variety of genetic hazards that can affect their ability to survive including: loss of genetic variability, loss of heterozygosity, inbreeding, and genetic drift. For situations where captive or *ex situ* propagation is deemed necessary, the utilization of cryopreserved milt can be employed to offset or minimize the risk associated with each of these hazards. This is particularly true for captive breeding programs involving semelparous species such as Pacific salmon. In these cases, cryopreserved milt can be used from males that spawned in previous years to increase genetic variability within a year-class as well as increase effective population size in male-limited cohorts. The Idaho Department of Fish and Game initiated hatchery intervention efforts for Snake River sockeye salmon in 1991 and for Snake River spring chinook salmon in 1995. Programs differ with respect to methodologies and objectives yet both routinely cryopreserve milt from specific male donors. Annually, pedigree and/or genetic identity information is used to construct spawning matrices prioritized among unrelated or genetically dissimilar males and females. Cryopreserved milt may be incorporated into spawning designs to enable additional crosses to be made that reduce the risk of inbreeding. However, it should be noted that the use of cryopreserved milt remains a better broodstock management tool than production tool. Archived milt should be used prudently and sparingly to

minimize the incidence of spawning related individuals and to increase the genetic variability in future spawning generations.