

PACIFIC SALMON ENHANCEMENT IN BRITISH COLUMBIA

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The goals of the Canadian Salmonid Enhancement Program (SEP) are to provide for harvest opportunities, mitigate for major habitat losses, rebuild depleted stocks, supplement weak stocks and re-establish extirpated stocks of Pacific salmon. Using hatcheries operated by federal employees, community groups and volunteers, the SEP has provided sizeable components of the Canadian production and catch of chinook, coho and chum salmon since the 1980s. Hatcheries provide substantially higher survivals than natural environments in fresh water (70-80% vs 2-25%). Once released, artificially-propagated fish are subject to the same environmental constraints and high mortality rates as are naturally-propagated fish. Both hatchery-produced and naturally-produced coho and Chinook salmon stocks encountered much lower marine survival in the 1990s compared to the 1970s and 1980s. SEP tag studies show that marine survivals of hatchery salmon stocks have also been extremely variable, in spite of fairly consistent smolt release strategies.

SEP has attempted to fully integrate hatchery production with natural production of endemic wild stocks of Pacific salmon. SEP facilities follow strict operational guidelines to minimize any potential detrimental ecological, genetic or disease effects from hatchery production. These include spawning protocols such as: using local brood stock in paired matings wherever possible, taking eggs from broodstock throughout the extent of the adult migration timing, releasing fry and smolts at a similar weight to wild migrants, and timing releases to coincide with wild migrations, usually with volitional release. The high survival of fish in the hatchery is an important component in the strategy to minimize deterioration of fitness through genetic effects such as in-breeding depression, loss of locally adapted gene complexes, founder effect and domestication selection. Low survival is the greatest genetic danger to fish populations that are in a depressed condition.

Intensive hatchery production, including the rearing of broodstock for their entire lives, can be a valuable tool in reducing the extinction pressure on species at risk. At the other end of the spectrum, hatchery production of large quantities of juveniles during times of high natural survival can augment the harvest benefits that can be derived from salmon stocks. In addition, hatcheries can provide a long-term, reliable replacement for habitats lost from dam construction, urbanization or other modes of habitat degradation, conditions that can only get worse in the future, considering the encroachment of human impacts on the land and water resources of the northeast Pacific coast. The SEP combines habitat restoration and enhancement with its hatchery production to provide assured production of salmon with intact wild genotypes for generations to come.