

Placement of Hatchery Carcasses In Streams for Nutrient Enrichment

Historically, large numbers of salmon returned to spawn in their natal streams. After providing fertilized eggs for the next generation, the adults died leaving behind nutrient-rich carcasses. These replenished the entire watersheds with organic nutrients on an annual basis. A large variety of organisms (insects, fish, birds, mammals) fed on the carcasses, while aquatic and terrestrial invertebrates and plants thrived on the released nutrients.

Recent studies show that spawned-out salmon carcasses provide direct food to salmon juveniles and play a key role in maintaining the productivity of salmonid ecosystems. Rearing juveniles consume salmon eggs, feed directly on spawned-out carcasses, and benefit from increased abundance of aquatic invertebrates and algal growth. The presence of carcasses in streams is related to increased juvenile density, growth rate and body size; larger size of juveniles means improved overwintering survival and ultimately increased marine survival to maturity.

During the last century, numbers of salmon carcasses in streams and rivers have decreased. However, a portion of the spent salmon carcasses from several hatchery facilities in B.C are being used to replenish the nutrients in the ecosystem to help future generations of salmon. These carcasses are distributed in their stream of origin for nutrient enrichment.

Numerous factors affect the ultimate benefits of carcass placement in streams. These include original nutrient content in treatment streams, abundance of native salmon spawners, retention and distribution of carcasses in waterways, water temperatures, stream discharge levels, light penetration, and predator and scavenger activity on the carcasses. Proper timing of carcass placement is also important as nutrients should be made available to young salmon upon their emergence from the gravel and to older salmon juveniles inhabiting the stream. For example, the use of carcasses from several species native to the stream, each with a different run timing (e.g., early-run sockeye and late-run coho), will provide a longer nutrient pulse in the stream than if only one species were used.

Fisheries and Oceans Canada has developed guidelines to maximize the benefits from carcass placement, and address concerns over such issues as disease transfer and user conflict. For example, carcasses will be distributed in such a way as to minimize impacts on public-use areas and private property. No diseased or medicated fish will be used, and there will be restrictions on the placement of carcasses outside the watershed in order to minimize the risk of disease transfer. As well, carcass loading densities will reflect the historic spawning abundance and distribution in the treatment stream. Bio-degradable anchors may be used to tether carcasses in place, to improve their retention in streams.

By providing direct benefits to the future generations of salmon, the regulated placement of hatchery carcasses in streams will facilitate salmon stock rebuilding in British Columbia in a manner that is natural, environmentally friendly and effective.
