



## USING HATCHERY SALMON CARCASSES FOR NUTRIFICATION OF FRESHWATER ECOSYSTEMS WHILE REDUCING ASSOCIATED FISH HEALTH RISKS.

Returning adult salmon are a unique vector for the delivery of marine nutrients into the freshwater ecosystem. The importance of these nutrients to consumers such as raccoons, bear, eagles and even man has been recognized for some time. Recent research also suggests that a significant portion of nitrogen in plants and animals in streams where adult salmon are abundant is derived from those returning adults (Mathison 1988, Kline et al. 1993). Marine-derived nutrients from returning adult salmon have been found to make a significant contribution to riparian vegetation and even old-growth forests (Reimchen 1994, Bilby et al. 1996). In streams in interior British Columbia, Johnston et al. (1997) found that where salmon carcasses were abundant, up to 60% of the nitrogen in benthic insects was derived from the carcasses. They also found that juvenile salmon show higher growth rates in streams where adult salmon spawn than in streams without spawning adults. Use of hatchery salmon carcasses as a source of these marine-derived nutrients was found to increase the density of age 0+ coho and age 0+ and 1+ steelhead in small, southwestern Washington streams (Bilby et al. 1998).

The deliberate distribution of hatchery salmon carcasses into watersheds for purposes of nutrification can have a positive ecological benefit to natural salmonid stocks. This practice may, however, also pose a fish health risk to these stocks if not properly managed. It is well recognized that disease organisms present in salmon carcasses can be transmitted to other salmonids following the release of these organisms into water or through their direct consumption. In order to reduce this risk, the HSRG recommends:

- Certifying that adult broodstock is free of viral pathogens prior to planting. The adult sampling level should be a minimum of 60 fish for carcass plantings within the same watershed and 150 fish for plantings in different watersheds within the same fish health management zone.
- Freezing carcasses prior to planting to reduce the infectious titers of pathogenic organisms in the salmon carcasses. This measure will decrease the risk of transmission of certain of these disease organisms (see, for example, Margolis 1977 for a metazoan parasite, and Evelyn 2001 for two important bacterial fish pathogens).
- Planting carcasses only within the historic range of the species being used for nutrient enhancement.
- Avoiding the planting of adults or juveniles that may have died of infectious disease. This would include pre-spawning adult mortalities and juvenile mortalities from hatchery ponds.



## **References**

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