



## **Vectors and mechanisms for marine-derived nutrient storage in upland river systems**

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Marine-derived nutrients are delivered to most of British Columbia's coastal and interior river channels and floodplains with the return and die-off of Pacific salmon. Abundant carbon, nitrogen and phosphorus is transferred to the terrestrial component of the catchment by animals feeding on the fish and defecating nutrients on the soil. In the river, the fish die-off results in a burst of increased soluble and particulate nutrients which may, or may not be transported out of the system in the flowing water. A mechanism for the retention of these marine-derived nutrients has been determined through a series of studies in natural and artificial spawning channels and in large scale flumes. Evaluation of the composition (C/N, bacteria) and structure (flocculated and disaggregated particle size) of gravel-stored sediment in these systems indicates that a flocculation-mediated delivery of nutrients is occurring. In the presence of abundant bacteria, associated with the decay of fish carcasses, fine-grained sediments ( $< 63 \mu\text{m}$ ) are flocculating with the organic matter altering the settling behaviour of these particles. This mechanism for increased sedimentation ensures that some portion of the nutrient pulse associated with the fish die-off is retained in the river channel promoting future productivity for the river and the fish stocks.