Salmon influences on dissolved organic matter in a coastal temperate brownwater stream: An application of fluorescence spectroscopy

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ABSTRACT: We examined how spawning Pacific salmon (genus Oncorhynchus) affect streamwater concentrations of inorganic nitrogen and phosphorus and dissolved organic matter in Peterson Creek, a stream in southeast Alaska. When spawning salmon were present, concentrations of ammonium (NH_4-N) increased by more than 100 times over prespawning levels and concentrations of soluble reactive phosphorus increased by more than an order of magnitude. In contrast, concentrations of nitrate (NO_3-N) increased by only two to three times during spawning and were not significantly higher than at an upstream reference site with no salmon. During spawning, concentrations of dissolved organic carbon and dissolved organic nitrogen were significantly higher in the spawning reach compared with the upstream reference site. The influx of salmon-derived dissolved organic matter (DOM) altered the fluorescence index (FI), which has previously been used to distinguish between terrestrial and aquatic sources of DOM, with the FI increasing significantly during the salmon run. Salmon DOM was rich in protein compared with the DOM derived from the terrestrial portion of the watershed. Spawning salmon may be an important source of labile DOM in Peterson Creek.

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