

Unlikely gardeners of Pacific Northwest forests

The coastal forests of British Columbia are home to unlikely gardeners - native black and grizzly bears. Their fertilizer of choice? Nitrogen derived from the carcasses of salmon that the bears discard on the forest floor following their meal. Consequently, declines of salmon numbers over the past century are posing problems not just for the bears, their primary consumers, but for the entire food chain. Dr. Thomas Reimchen's lab at the University of Victoria has been using fine scale methods to detect and measure the amount of nutrients in the forest floor derived from salmon. To measure the direct contribution of salmon-derived nitrogen to plant life, members of Dr. Reimchen's lab compared vegetation surrounding salmon streams to nearby control plants beyond the reach of the spawning fish. Using samples from a variety of sites differing in carcass density, the group looked for links between salmon quantity and improved growth rates in plants that grow near rivers and streams. Strikingly, they observed a strong correlation between the density of a given year's salmon run and the subsequent growth in the surrounding forest area.



The data suggests that up to 40% of nitrogen used by riparian plants is salmon-derived, and comparisons between watersheds reveal a direct relationship between salmon density and soil nitrogen content. Altogether, these data suggest that declines in Pacific Northwest salmon populations may have consequences reaching far beyond primary consumers such as bears. Bears are more than just mere users; they provide an important link between nitrogen-rich marine ecosystems and nitrogen-poor terrestrial ecosystems. Moreover, the research has also verified that the bears preferentially consume post-reproductive fish, ruling out earlier speculation that bear predation contributes to the depletion of salmon stocks. These unlikely gardeners demonstrate the fine balance of nature and reinforce the notion that a healthy ecosystem consists of all the organisms in a given area, along with the abiotic factors with which they interact.

To learn more:

Hocking, M.D. and T. E. Reimchen. 2009. Salmon species, density and watershed size predict magnitude of marine enrichment in riparian food webs. *Oikos* 118: 1307-1318

Dr. T. Reimchen's web page: <http://web.uvic.ca/~reimlab/>

Photo: Aboriginal Journeys, Campbell River, BC