

# $\delta^{15}\text{N}$ Patterns of Douglas-Fir and Red Alder Riparian Forests in the Oregon Coast Range

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**Abstract:** We used naturally occurring stable isotopes of N to compare N dynamics in near-stream and upslope environments along riparian catenas in N-fixing red alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziesii*) forests in the Coast Range of western Oregon. Based on the existing literature, we expected soil  $\delta^{15}\text{N}$  to be enriched closer to streams owing to inputs of isotopically heavy, marine-derived N by spawning salmon, higher rates of denitrification near the stream, or both. However, it has been unclear what effect red alder might have on soil  $\delta^{15}\text{N}$  patterns near streams. We found a consistent -1‰  $\delta^{15}\text{N}$  signature in red alder foliage, and  $\delta^{15}\text{N}$  of total N in soils under red alder averaged 2.2‰ along sampling transects extending 20 m upslope from the stream. Surprisingly,  $\delta^{15}\text{N}$  of total N in soil under Douglas-fir was progressively depleted nearer to streams, opposite from the pattern expected from N losses by denitrification or N inputs from anadromous salmon. Instead,  $\delta^{15}\text{N}$  of total N in soil under Douglas-fir converged toward soil  $\delta^{15}\text{N}$  values typical of red alder sites. We consider that the historic presence of red alder may have contributed a legacy of lower soil  $\delta^{15}\text{N}$  nearer to streams on sites that are currently dominated by young Douglas-fir forest. FOR. SCI. 54(2):140 – 147.

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