

Linking Landscape Characteristics and High Stream Nitrogen in the Oregon Coast Range: Red Alder Complicates Use of Nutrient Criteria

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Red alder (a nitrogen-fixing tree) and sea salt inputs can strongly influence stream nitrogen concentrations in western Oregon and Washington. We compiled a database of stream nitrogen and landscape characteristics in the Oregon Coast Range. Basal area of alder, expressed as a percent of watershed area, accounted for 37% and 38% of the variation in summer nitrate and total nitrogen concentrations, respectively. Relationships between alder and nitrate were strongest in winter when streamflows are highest. Distance to the coast and latitude, which are likely surrogates for sea salt inputs, and watershed area were also related to nitrate concentrations in an all-subsets regression analysis, which accounted for 46% of the variation in summer nitrate concentrations. The lowest-AIC model did not include developed or agricultural land cover, probably because few watersheds in our database had substantial levels of these land cover classes. Our results provide evidence, at a regional scale, that background sources and processes cause many Coast Range streams to exceed proposed nutrient criteria, and that alder exerts a dominant control of stream N concentrations across this region.