Title: **Subalpine forest regeneration decreases DOM exports, but increases DOM reactivity to headwater streams**

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Project Abstract: The headwater forest ecosystems of the western U.S. generate a large portion of the dissolved organic matter (DOM) transported across North America. Land cover type, specifically tree species composition and structure in these headwater forests affect the quantity and characteristics of DOM transferred from terrestrial to aquatic ecosystems. Disturbance and management reset headwater forest species composition, with lasting effects on watershed carbon cycling. We investigated the role of forest land cover change between old growth and regenerating second-growth subalpine forest hillslopes in regulating the character and reactivity of DOM. Inputs of DOM derived from litter leachates and exports of DOM from lateral subsurface flow at the base of trenched hillslopes were evaluated during a three-year period (2016-2018) at the Fraser Experimental Forest in northcentral Colorado, USA. Differences in land cover type between old-growth and regenerating forest correlated with changes in DOM composition and reactivity. Subsurface flow draining the old-growth forest was higher in dissolved organic carbon (DOC) and total dissolved nitrogen (TDN). DOM composition from the old-growth forest had higher C:N ratio and was molecularly more complex and more aromatic than DOM from regenerating forest. DOM derived from the second-growth forest was more consistent with signatures of microbial processing. DOM from the second growth forest also had significantly higher biological oxygen demand (BOD) compared to the old-growth forest. Our findings demonstrate that changes in forest species composition and associated litter alter the composition and reactivity of DOM from liter and exports to adjacent aquatic ecosystems. Mixtures of old-growth and second-growth forests are common across headwater landscapes, and this study elucidates how these forest types drive a coupling between the composition and reactivity of DOM transferred from terrestrial to aquatic ecosystems.