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Soil Carbon and Nitrogen Pools and Assessment of Soil Mitigation of N Removal for Biomass for Energy in the coastal Douglas-fir zone of Oregon, Washington and British Columbia.

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Biomass, carbon and nitrogen pools in soil (1 m depth) and tree components in 68 intensively-managed Douglas-fir plantations in western Oregon and Washington USA, and British Columbia Canada. The potential removal of N with bole-only and total aboveground harvesting was compared to total ecosystem pools of N to determine the relative removals compared to the total ecosystem N pools to assign a risk rating to each potential harvest site for N removal, with <=10% of total removed being a threshhold at which there would be little potential for N removal concerns over a 55-year rotation, and 30% or greater a cause for significan concern or the potential amelioration of losses with N fertilization. Additional research on 22 of the sites for deep rooting and soil C and N pools up to 4 m depth showed that there were unanticipated and formerly unrecognized large pools of C and N below 1 m depth, and as deep as we were capable of sampling (4 m). Analysis of organic matter in the soil profiles indicate significant differences in binding of organic matter to mineral components of soil at depth, dependent on pH-dependent charge sources primarily associated with volcanic activity in the region. Characterization of PZNC and pH dependent charge at one site showed substantial anion exchange capacity and the ability to bind organic acids and DOC leaching through the soil profile.