Emily Dennis – Soil 500 Abstract

MSc Student, UNBC, supervisor Michael Preston

Abstract: The logging industry is a significant economic driver in British Columbia (BC), yet the long-term impacts of poor soil management on forest productivity remain poorly understood. Post-harvest practices such as soil compaction and organic matter removal can disrupt nutrient and carbon cycling, processes influenced by soil microbial communities. The long-term soil productivity (LTSP) study was established to evaluate these effects across North America. This research investigates the impact of soil management practices on soil and tree productivity, as well as above- and below-ground carbon stocks, at three LTSP sites in BC, planted with lodgepole pine (Pinus contorta) and hybrid white spruce (Picea glauca) 30 years ago. The study focuses on how soil management affects soil organic carbon stocks, including light fraction (LF), particulate organic carbon (POC), and mineral-associated organic carbon (MAOC), as well as tree growth and health. Additionally, we examine how microbial community composition may help explain differences observed across treatment plots. Nine plots (40 x 70 m) were established at each site, with three organic matter removal treatments (OM1: stems only, OM2: stems and crowns, OM3: whole tree and forest floor) and three compaction treatments (C0: no compaction, C1: light compaction of 2 cm, C2: heavy compaction of 4 cm). In 2023, soil samples were analyzed for total organic carbon and other chemical parameters. Preliminary results suggest that spruce growth is more hindered by organic matter removal compared to pine, with volume decreases observed in forest floor removal treatments. Both above- and below-ground carbon pools showed declines in organic matter removal treatments. This study provides valuable insights into the long-term effects of soil management on nutrient cycling and carbon sequestration, contributing to improved forest management practices in BC and beyond.