

Mine reclamation of subsoil treated by soil amendments and BC native plants

Piotr Dzumek M.Sc. Candidate

Supervisor: Dr. Lauchlan Fraser

Committee members: Dr. John Karakatsoulis, Dr Jonathan Van Hamme, Dr. Eric Bottos

Abstract:

Ecosystem reclamation is a complex process which aims to rebuild the ecological functionality of areas previously disturbed. Due to human activity the area of land needing to be reclaimed constantly increases, same as social expectations and awareness on this aspect. In Canada, mining, being a well developed branch of the economy, has at the same time significantly negative influence on the environment. Degraded ecosystems, usually deeply and on large scale, require advanced reclamation. In mine post closure reclamation, recent attention is directed towards the subsoil, which is often stockpiled as a waste product low in marketable ore. The analysis whether subsoils enriched with locally available and cost-effective amendments coupled with selection of native plant species may serve as an efficient reclamation tool, is the goal of this research. Two separate potting experiments are designed to address thesis objectives, one in the greenhouse and one in the open-air. In large portion, this research is focused on native shrub species as shrubby plants play especially important role in local ecosystems. Moreover, some of them coexist with nitrogen-fixing microorganisms in tight symbiotic relations. Nitrogen is a basic life element and it is often scarce in the soil, particularly in subsoil. Biosolids, soil amendment which is a treated municipal sewage high in nitrogen, and nitrogen fixing plants are proposed as tools to establish sustainable nitrogen cycling in reclaimed post mining lands. It is all because properly functioning N-cycling is deemed to be a key factor of successful reclamation.