

Whitehorse - Tuesday, September 11, 2018

Session #3 - Revegetation in Northern Environments

Time 220pm-240pm

Topic Soil biodiversity and chemistry challenges that must be overcome to achieve reclamation objectives in the Oil Sands.

Abstract One of the primary objectives of the conceptual reclamation planning stage of environmental impact assessment applications is to convey a description of what the landscape will look like at closure, and how the targeted ecological communities can be used by traditional land users. The means by which these objectives will be accomplished must include the salvage, stockpiling (temporary and long-term) and replacement of vast quantities of soil. In many cases soil amendments or reconstructed soils may be required to supplement. There are early examples of successful reclamation, but there are also apparent struggles. These struggles are often 'rooted' in soil biogeochemical processes and soil biodiversity successional pathways that are directly linked to the maturity of the soil ecosystem and succeed along with, and not independent of, the above ground ecological community. Moving peat-mineral mixes, the single largest source of reclamation material, from their native wetland states to 'high and dry' areas have led to some unexpected results. Soil amendment through fertilization has been purported to aid in the short-term establishment of woody species, but may hinder the below-ground ecosystem maturation and thereby hold reclamation in early successional stages longer than intended. The physical act of salvaging soil disrupts fungi hyphae networks that are crucial for nutrient exchange in boreal ecosystems, and the long term reversibility of these effects are only beginning to be studied. The effects to nutrient availability (in particular phosphorus) are well documented and remain a persistent threat to long-term success of reclamation on peat-mineral mixes, despite encouraging short-term revegetation trends. Salinity is not a typical limiting factor to ecosystem development in the Oil Sands region; however on the reclaimed landscape, salinity concerns are not uncommon on overburden waste dumps, and in some circumstances on dry sites such as tailings pond dyke slopes.

This presentation will link soil biogeochemical and biodiversity lessons learned through academic and applied research over the last few decades to the logistical challenges oil sands operators face to reclaim their mine sites. The ultimate goal of this presentation is to shed light on how this knowledge can be applied to detailed reclamation and end land use plans that improve the probability of success and satisfying the public's and traditional land users' expectations for Oil Sands operators to achieve equivalent end land use capability.

Presenter(s) Lisa Kempenaar, Golder Associates Ltd

Bio(s) Lisa has been working in reclamation for about 17 years. Her work has ranged from native plant collection and propagation research, to conceptual and detailed reclamation design, to development of reclamation success criteria and monitoring protocols. Most recently, Lisa has been working with Golder's Mine Environment Team specializing in Mine Closure and Reclamation Planning across western Canada and internationally.