

## Vegetation Community Dynamics on Soil Islands in Oil Sands Reclamation.

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**Abstract:** The objective of land reclamation following oil sand mining in the boreal forest of northern Alberta, Canada is to re-establish a functioning ecosystem. Re-establishment includes the development of natural vegetation communities. However, there is still information that is lacking about plant community dynamics on reclamation sites. Vegetation community establishment changes substantially during early development years; therefore, it is key to monitor the progression of communities and soil across reclamation areas. Reclamation practices use soil from forest floor-mineral mix (FFMM), which has higher plant diversity, and peat-mineral mix (PMM), which has greater tree regeneration. An attempt to optimize the benefits of both soil types is a reclamation technique known as “Islands” reclamation, based on forest harvesting and natural landscape patterns. This technique integrates islands of FFMM within a matrix of PMM. The islands of FFMM are indented to serve as a “lifeboat” or colonizing centre to native species post-disturbance. Vegetation assessments (species richness and cover classes) will be done within 27 islands of varying size. Species area curves will be developed to determine optimum size establish native vegetation communities. We expect to see higher diversity as area and time increases. To determine vegetation community spatial patterns, transects were placed along the boundary between FFMM and PMM. Surveying was done in 2015 and will be re-measured in 2019. Vegetation communities are expected to be dispersing further into the FFMM-PMM soil boundary compared to 2015. Understanding how reclamation practices can influence vegetation community dynamics is an important step in developing new methods and targets for oil sand reclamation. Island reclamation will help overcome a large obstacle of re-establishing a diverse native vegetation community, while taking advantage of the ecological differences in available reclamation soil.

**Keywords:** plant community, plant egress, land reclamation, restoration ecology, soil salvage, soil placement, reclamation soils, minable oil sands

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  3. This study will take place at Canadian Natural Resources Limited’s Horizon oil sands, located approximately 75km northwest of Fort McMurray, Alberta, Canada.