
EXECUTIVE SUMMARY

In 2018, the Petroleum Technology Alliance of Canada (PTAC) initiated a multi-stage project on the reclamation certification process for sites that were constructed using imported mineral soil pads in peatlands (padded sites). Stage 1 of the project has been completed and identified knowledge gaps for making decisions to accept or reject requests for a change in land use for padded sites during the reclamation certification process. Stage 2 is nearing completion and includes a decision framework and support tools for making decisions related to reclamation certification of padded sites; however, some of the factors that the framework and support tools are based upon, are knowledge gaps. Stage 3 is the field research component of the project to address the knowledge gaps. The pilot study described in this document is a component of Stage 3. The pilot study sought to provide preliminary results for one of the knowledge gaps from Stage 2: *factors that result in sustainable forest ecosystem development on padded sites in peatlands*. As a pilot study, it was also meant to verify methods and identify efficiencies for a large-scale study.

For the pilot study, eight padded sites were selected with the following characteristics:

- abandoned >25 years ago,
- received a reclamation certificate,
- located in the forested Green Area of Alberta,
- within a 100 km radius of Slave Lake, Alberta (for logistics and efficiency), and
- encompassing a range of vegetation characteristics, from sites where trees had infilled to those that remained grass dominated.

In September 2021, measurement of vegetation, soils and information related to pad characteristics were taken on the eight padded sites. Preliminary data analysis was completed to determine if a relationship existed between pad characteristics and vegetation. This relationship would then be used to predict the future vegetation composition and tree growth performance (outcome) based on pad characteristics.

Preliminary results from the pilot study indicated that vegetation which approximates a natural forest can establish on pads, but there are also pads where forest species are not the dominant vegetation cover. Characteristics that influence pad vegetation are predominately pad moisture conditions, cation concentrations in the pad material, and pad dimensions. The pilot study also identified that pads have zones with different vegetation and pad characteristics: pad centre, pad periphery and access road. It should be noted that these results are based on limited replication and results could differ in a large-scale study.

The pilot study validated the research questions, sampling design, measurement and data analysis methods developed for a large-scale study, with some minor amendments. In particular, sufficient replication is required to be able to correlate pad to vegetation characteristics. It is recommended that a large-scale study with a phased approach might be most efficient as this will avoid over-replication.