Challenges in forest reclamation of marginal lands: a balance between site conditions and seedling quality

Simon Landhäusser

University of Alberta, Renewable Resources, Edmonton, Canada (simon.landhausser@ualberta.ca)

Forest loss and degradation is occurring worldwide, but at the same time efforts in forest restoration are ever increasing. While approaches to restoration often follow specific stakeholder objectives, regional climates and the degree of site degradation also play an important role in the prioritization of restoration efforts. Often the restoration of degraded lands can satisfy only few measurable objectives; however, to design and restore resistant and resilient ecosystems that can adapt to changing conditions, there is a need for new and adaptive management approaches.

Mining and other resource extraction industries are affecting more and more forested areas worldwide. A priority in the reclamation and certification of forest lands disturbed by industrial activity is their expeditious redevelopment to functioning forests. To rehabilitate these heavily disturbed areas back to forest ecosystems, planting of trees remains one of the most effective strategies for the redevelopment of a continuous tree canopy on a site. It is well understood that access to good quality seedling stock is essential to achieve establishment success and early growth of seedlings. However, most reclamation areas have challenging initial site conditions and these conditions are often not a single factor but a combination of factors that can be additive or synergistic. Therefore successful forest restoration on degraded lands needs to consider multiple objectives and approaches to minimize trade-offs in achieving these objectives.

To meet these demands, new methods for the production and evaluation of seedling stock types are needed to ensure that that seedlings are fit to grow on a wide range of site conditions or are particularly designed to grow in very specific conditions. Generally, defining seedling quality is difficult as it is species specific and results have been mixed; likely influenced by site conditions, further reiterating the need to carefully evaluate sites allowing appropriate seedling qualities to be identified. In this presentation, I will show results from a range of studies that explored the role of seedling characteristics in response to challenging site conditions and explore the need for a balance between the recognition and improvement of limiting site conditions and the availability of quality seedling stock in forest restoration.