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EMEND

Ecosystem Management Emulating Natural Disturbance

Reclamation prescriptions—Does one size fit all?

When considering the reclamation of oil and gas sites, it can be easy to seek a one-size-fits-all prescription. A one-size-fits-all treatment can be replicated across all sites and can increase perceived efficiencies. However, this approach is often counter to the natural variability of the boreal forest.

When EMEND started almost 20 years ago, a goal of some partners was to identify a single threshold level of residual structure that balanced biodiversity concerns with economic considerations after harvesting. EMEND research results have shown that there is no universal optimal prescription for all forest types or all groups of organisms. Because forests are highly variable in structure and composition, there are variable responses and variable site conditions to account for.

This note explores lessons from EMEND that can inform reclamation approaches that embrace variation, as opposed to a one-size-fits-all approach.

Key Messages

EMEND research shows the following:

- There is no universal silvicultural treatment (retention level and distribution, site preparation, silvicultural prescription) that is optimal across the wide range of ecological conditions in the boreal forest.
- Attempts to force a one-size-fits-all approach to reclamation are not likely to succeed as local site-limiting factors that are unique to each reclamation site are not addressed.
- Diversity produces diversity. Understanding the unique conditions and limiting factors on each site and developing reclamation prescriptions that suit each site will greatly enhance reclamation success. Key examples include understanding when natural regeneration is likely to succeed or when planting would be a better prescription; determining when site preparation may benefit a site; or determining when different levels of woody materials may be desirable. Efforts to consider landscape scale approaches to managing diversity are also possible in some cases.

A site-specific perspective from understory species

EMEND studies have shown that initial site-level conditions are important for maintaining boreal species diversity. For example, some plants and insects respond positively to a diversity of tree species in a site. Even the presence of a single coniferous tree in a deciduous stand can affect the diversity of species. Similarly, the presence of coarse woody debris or variable microsites on

The boreal forest is naturally variable. EMEND research suggests that there is no single prescription for reclamation success and that variation between sites requires consideration of conditions unique to each site.

About EMEND

Ecosystem Management Emulating Natural Disturbance (EMEND) is a collaborative research project that aims to understand what recovery in the boreal forest looks like following a range of forest harvesting, fire, and silvicultural treatments. As EMEND is grounded in forest ecology science, there are many lessons to be shared with the oil and gas industry to aid in reclamation. This series aims to apply EMEND knowledge to the oil and gas industry.

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By seeking one-size-fits-all reclamation prescriptions or pursuing single thresholds, reclamation advisors risk artificially homogenizing the boreal forest and increasing the chance of reclamation failure.

the forest floor can strongly influence the diversity of species that grow. Such information reinforces moving away from more traditional "neat and tidy" reclamation practices that are focused on one-size-fits-all prescriptions.

Creating small variations in the soil surface, planting overstory and understory species that are adapted to the specific ecological conditions of the site, and maintaining more residual material like coarse woody debris are all important steps. The more companies understand site-limiting factors, the higher the likelihood that reclamation will result in positive outcomes.

A landscape scale perspective from birds

Over the past 20 years, a key finding of EMEND research has been that the diversity of stand types and harvesting levels has created a diversity of habitats for boreal songbirds. Recent work has acknowledged the value of clearcuts for some bird species while other species benefit from stands that have a large number of live trees left. Still other bird species are more likely to benefit from large tracts of old forest free of the extensive influence of edge effects.

This research highlights the necessity for environmental advisors to plan reclamation at a landscape level and to consider that variable reclamation approaches will lead to variable outcomes that will favor diverse ecosystems. Specific examples include considering alternative lease sizes, leaving a range of coarse woody debris volumes, or collaboratively planning large harvest events to achieve landscape management and reclamation objectives.

One-size-fits-all and variation: Working together to guide effective management

To date, one of the most valuable outcomes of EMEND science is that EMEND's partners better appreciate the best management practices that maintain the ecological integrity of the boreal forest. While prescriptions and thresholds can provide guidance for reclamation, appreciating the value of diversity and understanding local site conditions are just as important to help maintain diversity in the boreal forest.

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