Natural Resources Canada | Ressources naturelles Canada

Research Connections: Cumulative Effects

Optimization and monitoring of restoration practices in the in-situ oil sands of Alberta

Note 14

Lead Researcher: Jaime Pinzon **Project Type:** Cumulative Effects and Caribou **Project Status:** Active (2021–2022)

Need/Drivers

The industrial footprint associated with the exploration and development of the in-situ oil sands in Alberta has a significant impact on forest connectivity, influencing forest interior habitats, biodiversity and the overall cumulative impacts on ecosystem health. This has a direct negative influence on caribou populations. Restoration of disturbed habitats and mitigation of industrial footprints have become important tasks for the oil and gas (O&G) industry, which is now placing considerable effort into accelerating forest recovery. The implementation of key restoration treatments may help improve the recovery of woodland caribou populations, particularly in heavily fragmented areas within caribou ranges. The goals of this project are to: 1) enhance and expand current practices in restoration programs, particularly ground preparation treatments along seismic lines, which may help accelerate the restoration of critical caribou habitat; and 2) understand the impact of such practices on other important ecological properties, such as biodiversity. This project should result in a better understanding of the potential risks and cumulative effects of forest disturbances associated with current restoration practices, and will help develop mitigation strategies.

Approach

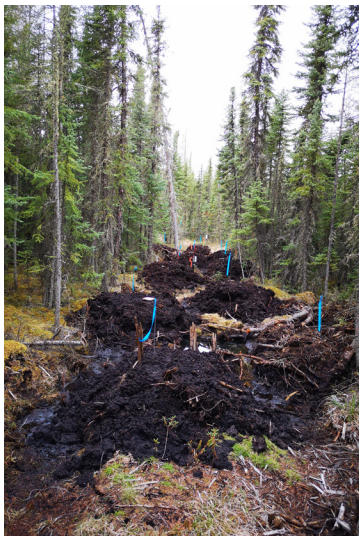
The overarching objective of this project is to optimize and monitor the implementation of silvicultural practices following in-situ O&G exploration and development in Alberta, in the context of facilitating restoration success and addressing operational challenges. To meet this objective, this project has been broken down into components, each one targeting a particular restoration practice. Some of the major components of the project include monitoring ecological restoration success following mounding on seismic lines, assessing responses to alternative ground preparation techniques both on seismic lines and OSE sites, monitoring biodiversity following interim reclamation of soil stockpiles, and evaluating the role of wildfire to mitigate the industrial footprint.

The three key research gaps addressed by this project are:

- understanding how ecosystem properties are being affected (positively or negatively) by various restoration treatments prescribed in formal restoration guidelines for Alberta
- enhancing the understanding of ecosystem recovery and risk of restoration through monitoring
- optimization of the operational and scientific basis for restoration techniques

Anticipated Impacts

As research results become available, the project may contribute to more informed decisions about restoration on linear features, particularly within caribou ranges. Though caribou-focused restoration of linear features has been gaining much attention, ecological restoration encompasses a much broader scope. Results from this research will inform stakeholders about wider responses to restoration. This will include biodiversity and site conditions, which are expected to contribute to a better understanding of recovery trajectories and a more comprehensive approach to assessing restoration success.



Left: Untreated site; seismic line at the Evergreen Learning and Innovation Centre (Grande Prairie, AB).
Middle: Mounding treatment application (Winter 2018).
Right: Mounded seismic line (Summer 2019) at the same location; mounds have been planted with black spruce and larch seedlings.

Project Location

Various locations across Alberta (Grande Prairie, Conklin, Spirit River, Drayton Valley, Janvier and Fort McMurray).

CFS Team Members

Jaime Pinzon (NoFC), Dani Degenhardt (NoFC), Anna Dabros (NoFC), Richard Krygier (CWFC), Katalijn MacAfee (NCR), Philip Hoffman (NoFC), Natalia Startsev (CWFC)

Collaborators

Doug Kulba (Evergreen Learning and Innovation Society), Maria Strack and Bin Xu (University of Waterloo/NAIT-BRI), Amanda Schoonmaker (NAIT), Robert Albricht (ConocoPhillips), Kaitlynn Hatfield and Melonie Zaichkowsky (Canfor), Scott Nielsen (University of Alberta)

Publications

Pinzon, J., A. Dabros, F. Riva & J. Glasier. 2021. Short-term effects of wildfire in boreal peatlands: does fire mitigate the linear footprint of oil and gas exploration? *Ecological Applications*, 31(3): e02281 (DOI: https://doi.org/10.1002/eap.2281).

Riva, F., J. Pinzon, J. H. Acorn & S. E. Nielsen. 2019. Interactive effects between seismic line corridors and wildfire determine plant and butterfly assemblages in disturbed boreal peatlands. *Ecosystems*, 23(2): 485–497 (DOI: https://doi.org/10.1007/s10021-019-00417-2).

Pinzon, J. & K. MacAfee. 2020. Natural Resources Canada Evergreen Restoration Trial: Virtual Tour. Natural Resources Canada, Canadian Forest Service, Northern Forestry Center, Edmonton, Alberta. https://kuula.co/post/79tvT/collection/7lfpY.

Cat. no. Fo3-4/14-2022E-PDF
ISSN 2563-9455 ISBN 978-0-660-43434-6

Canada