



Research Connections: Cumulative Effects

Cumulative Effects of Natural and Anthropogenic Disturbances under Climate Change in Western Canada: Assessing the Trade-Offs Among Long-Term Conservation of Priority Species and Places, Carbon Sequestration and Land Management

Note 7

Lead Researcher: Eliot McIntire **Project Type:** Cumulative Effects **Project Status:** Active (2021–2022)



Addressing cumulative effects: Pursuing advancement through research

Cumulative effects are the changes to economic, environmental, social, and cultural values caused by the combined effects of natural and human-caused disturbances. Cumulative effects are complex and involve many considerations. The impacts of cumulative effects can have devastating outcomes. This is why it is important that researchers study the science of cumulative effects and determine methods and tools to address and mitigate their impacts. Addressing this issue in the context of natural resource development entails the assessment of cumulative effects and decisive management actions to minimize impacts.

To tackle this issue, a Canadian Forest Service (CFS) project aims to create a nimble, flexible and reusable approach to addressing cumulative effects. This approach can be adapted, simplified or made more complex with minimal marginal costs. Using the open SpaDES platform, a simulation platform that can be used to create new model components, the project team will:

- evaluate the cumulative effects of stressors (wildfires, pests, forestry, oil and gas development, roads, and climate) on indicators (woodland caribou, wood supply, carbon, and economic values)
- use optimization models and scenario building to examine trade-offs and synergies among land management options in the western boreal forest

Approach

The project will use optimization models and scenario building to evaluate land management options and assess trade offs among the long-term conservation of high priority species and places, carbon sequestration, and land management. Instead of relying on “experts” and their opinions on various issues, decision-makers will be able to use science based, data-driven model outputs that take all modelled issues and their interactions into consideration to inform decision-making processes. The project will use a co-production approach with ongoing stakeholder engagement. The team will continue working with and creating new, ongoing relationships with scientists, foresters, provincial and territorial governments, Indigenous peoples and other stakeholders.

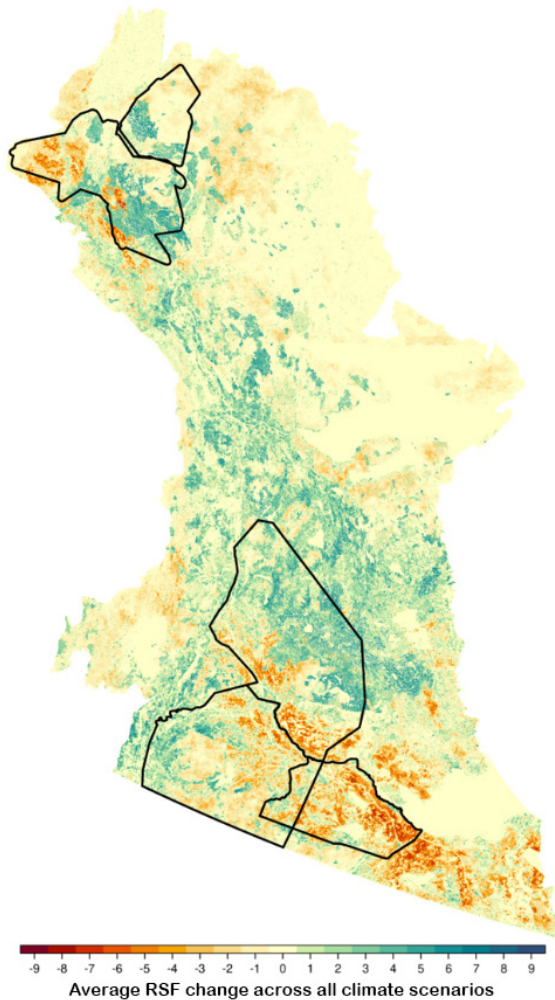


Figure 1: Net effect of climate and other drivers on forecasted habitat quality by the year 2100.

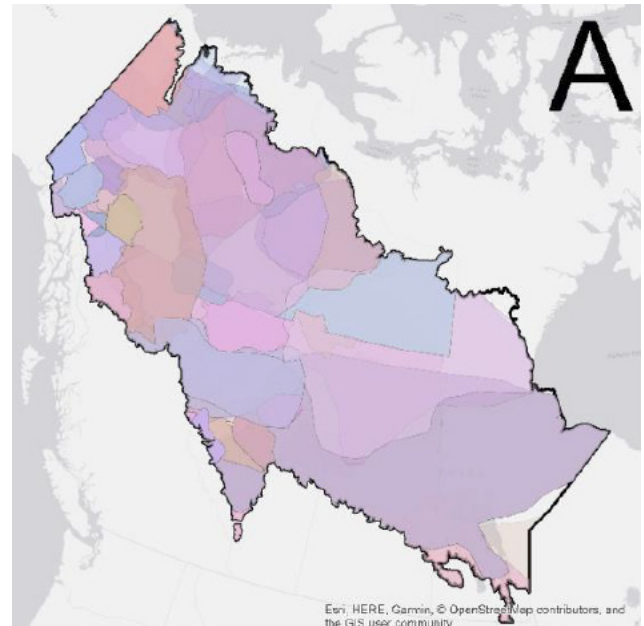


Figure 2: Project study area, consisting of all parts of the Canadian boreal forest west of the Ontario border. This map breaks down the territories of Indigenous peoples within the study area. To find out the territory belonging to each Indigenous nation, see <https://native-land.ca/>.

Anticipated impacts

This research project will support forest ecosystem resilience and sustainable resource development. The project will help improve the environmental performance of forestry, mining, and oil and gas sectors by creating and mobilizing the knowledge, tools and techniques needed to assess, prevent, minimize and mitigate cumulative effects. The results of this project can help minimize unintended impacts to economic, environmental, social, and cultural values by allowing for improved decision-making in natural resource development.

Project Location

Entire western boreal forest of Canada. Initial steps involve case studies that cover subsets of this study area.

Team Members

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Lead researcher contact information

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To learn more about what Canada is doing to address cumulative effects on Canada's forests, check out the links below:

[Information page on cumulative effects in Canada's boreal forests](#)

[National research agenda: Addressing Cumulative Effects of Natural Resources Development in Canada's Forests](#)

[Open Science and Data Platform: A database with access to environmental data and scientific publications that can be used to understand the cumulative effects of human activities](#)