

Modeling Software to Support Indigenous Participation in Impact Assessment

Introduction

Environmental Impact Assessments (EIAs) limit the inclusion of Indigenous knowledge and overlooks the cumulative effects of long-term, overlapping development on traditional lands. To help address these challenges, we developed a web-based cumulative effects assessment (CEA) tool that enables communities to:

1. Respond to project referrals by clearly demonstrating the cumulative effect of proposed projects and existing development on opportunities to practice Indigenous rights.
2. Evaluate long-term risks to Indigenous rights to inform land-use planning.



Purpose & Context

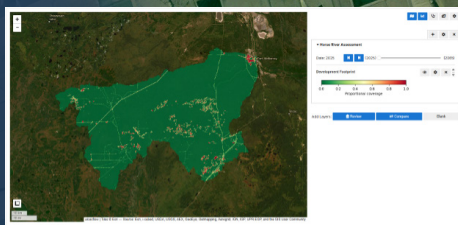
The CEA tool was designed to help Indigenous communities assess both individual projects and long-term cumulative within their territories. The tool maps how multiple overlapping activities—such as oil and gas development, forestry, and mining— affect land access, ecosystem health, and opportunities for Indigenous land use over time. This supports more informed and strategic participation in impact assessment and land-use planning.



Tool Overview

Developed using the ALCES Flow platform, the CEA tool supports three related types of analysis:

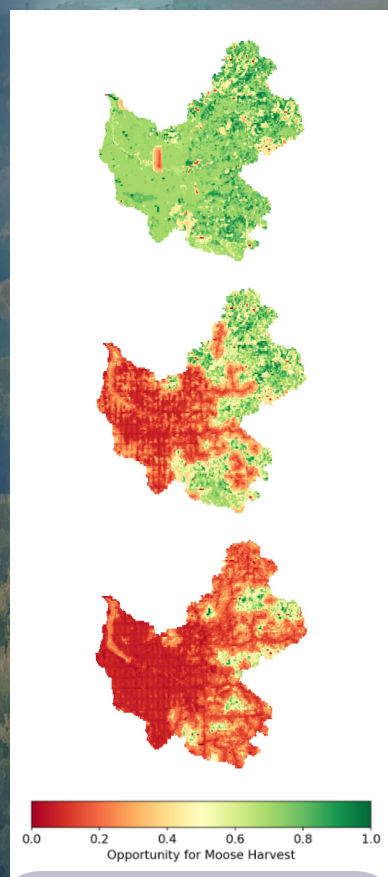
1. Reconstructing past landscape changes to demonstrate historical loss of Indigenous land use opportunities
2. Assessing impacts of proposed projects and existing development relative to precolonial conditions
3. Forecasting development scenarios to identify strategies to secure Indigenous land use opportunities for future generations



The user-friendly tool supports Indigenous-led cumulative effects assessment.

Key Features

- **Accessible Workflow and User Interface:** The streamlined workflow with preloaded data layers means that no GIS or modeling expertise is required.
- **Ecological and Cultural Indicators:** Maps convey impacts to ecosystem intactness, wildlife habitat, and opportunities for Indigenous land uses such as hunting and gathering.
- **Traditional Land Use (TLU) Database:** The tool's integrated TLU database allows identification of culturally significant areas that may be affected by proposed developments.
- **Holistic Assessment of Impacts:** The landscape simulator tracks the cumulative effects of development (agriculture, oil and gas, forestry, mining, settlements, infrastructure), fire, and climate change.
- **Flexibility to Support Ongoing Use:** Assessments are easy to customize by importing new development proposals and study areas.
- **Exportable Outputs:** Maps, graphs, and tables can be easily exported to support community submissions and communications.
- **Advanced Simulation Engine:** While easy to use, the tool harnesses sophisticated modeling approaches such as machine learning to simulate future risks.
- **Supports Indigenous Data Sovereignty:** All data remain confidential, client owned, and stored in Canada.



Model output demonstrating decline in opportunity for Indigenous land use.

Community Benefits & Use



The CEA tool helps Indigenous communities evaluate and communicate the cumulative impacts of development in their territories from a position of informed understanding. It supports both strategic planning over decades and tactical responses to new project proposals. The tool is community-owned and designed for ongoing use beyond the initial project, with training and technical support provided. By enabling community-led cumulative effects assessments, the tool helps strengthen Indigenous participation in land-use decisions.

For more information, visit our website:

