



Natural Resources
Canada

Ressources naturelles
Canada

Natural Resources Canada

Regional Assessment Working Group – June 5, 2025
Colter Kelly – Office of the Chief Scientist
Cody Devoe – Lands and Minerals Sector

Canada

Natural Resources Canada (NRCan)

NRCan works to improve the quality of life of Canadians by ensuring that our natural resources are developed sustainably, providing a source of jobs, prosperity and opportunity, while preserving our environment and respecting our communities and Indigenous peoples.



Minister of Energy and
Natural Resources - The
Honourable Tim Hodgson



NRCan Research

Natural Resources Canada (NRCan) is a science-based department with a diverse mandate, which enhance the understanding of natural resources, as well as their development and potential effects, including cumulative effects, within Canada

NRCan's broad scientific research portfolio provides a foundation for more comprehensive knowledge generation of cumulative effects assessment.



NRCan Contribution to Assessments Under IAA

Under the *Impact Assessment Act*, NRCan is required to contribute expertise to inform assessments across Canada.

Regulatory role: *Explosives Act*



NRCan provides expertise to support the Agency in **assessing significance of adverse effects within federal jurisdiction**



NRCan provides expertise to support the Agency in **describing the section 22 factors that need to be considered in an IA to inform decision-making**



NRCan provides specialized expertise to the Agency, a government or another federal authority **to either fill a gap in expertise or address an issue specific to a project**



Contributions to Regional Assessment can vary depending on the expertise and requirements outlined in the Terms of Reference.



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Tools and Applications

[Open Science and Data Platform \(OSDP\)](#)

Open access to federal, provincial, territorial government science, data, and regulatory information relevant to major projects across Canada.

[Canada Centre for Mapping and Earth Observation](#)

Collecting and making high quality interoperable Earth Observation and mapping data available.

[Mine Permit Navigator](#)

Tool to inform what permits are needed for mining projects. In prototype testing phase, rollout planned within the year.

[Risk Assessment Framework for Cumulative Effects](#)

Risk and impacts-based cumulative effects assessment framework for scoping regional cumulative effects issues to guide present and future project and regional assessment.



Example of NRCan data on OSDP: [Wetland Inventory](#)



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Open Science and Data Platform

The Open Science and Data Platform provides access to science, data, publications and information about development activities across the country that can be used to understand the cumulative effects of human activities to support better decisions in the future.

Search by keywords

Use quotes to match phrases (e.g., emissions "air quality")

[Keyword Search Help](#) 

8,557 Datasets 144,175 Publications 579 Monitoring Stations 21,508 Development Activities 155 Content Collections

Search Options

Partial match on ANY words ▾

[Return to previous search](#)

Search by Map

 Explore by area

Search by location using the interactive map or add layers to the map.



[Learn about cumulative effects](#)

Learn why it is important to assess the combined impacts of past, present and future human activities and natural processes.



[Learn about development activities](#)

Consult information and data available on a wide range of topics relevant to development activities.

Regulatory

Major projects (IAAC), Fisheries (DFO), Navigable Waters (TC), Major pipelines (CER), Nuclear (CNSC), Provincial (BC) (20,000+)

Science

Federal Open Science and Technology Repository publications from science-based departments/agencies (145,000+)

Data

Geospatial and non-geospatial data from federal, provincial and territorial contributors (8,500+)

Central integrated hub providing access to science, data, and regulatory information relevant to major projects across Canada, enabling access for proponents, Indigenous communities and public for transparent, evidence-based regulatory processes



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Open Science and Data Platform: [Northern Ontario Curated Collection](#)

Resources to Understand Cumulative Effects in Northern Ontario

The content in this collection has been selected to support the understanding of cumulative effects in the area surrounding the region referred to as the Ring of Fire area in Northern Ontario, located approximately 540 kilometres northeast of Thunder Bay. This collection features data and scientific publications within the area delineated by several large secondary watersheds in Northern Ontario: Attawapiskat, Ekwane, Lower Albany, Upper Albany, and Winisk watersheds.

The Ring of Fire is a region of interest for several reasons including but not limited to: its global significance as a carbon reservoir and biodiverse critical habitat for several species, its role in supporting Indigenous communities, its global significance as a carbon reservoir and biodiverse critical habitat for several species.

The region is home to one of the largest deposits of chromite on the continent. It plays an integral role in Canada's transition to a clean economy through their use in manufacturing solar panels, and wind turbines. However, the region is particularly sensitive to cumulative effects. A wide range of ecological benefits, including the storage of an estimated 35 billion tonnes of carbon in the watersheds in the region support a wealth of biodiversity including critical habitats for species including Woodland Caribou. Given the importance of the region with respect to cumulative effects, this content collection was created to assemble geographic information to help understand cumulative effects in the watershed regions surrounding the Ring of Fire.



| Layer Name | Visibility |
|---|-------------------------------------|
| First Nations Location | <input checked="" type="checkbox"/> |
| Caribou Range Boundary | <input checked="" type="checkbox"/> |
| Ecoregions | <input checked="" type="checkbox"/> |
| Canadian Impact Assessment Inventory | <input checked="" type="checkbox"/> |
| Critical minerals advancement in Canada | <input checked="" type="checkbox"/> |
| Wildlife values site | <input checked="" type="checkbox"/> |
| Indigenous Mining Agreements | <input checked="" type="checkbox"/> |
| Fire Disturbance Area | <input checked="" type="checkbox"/> |
| Ontario Road Network: Route Element | <input checked="" type="checkbox"/> |
| Indigenous Community Infrastructure | <input checked="" type="checkbox"/> |
| Ontario Hydro Network - Intercourse | <input checked="" type="checkbox"/> |
| Aquatic resource area - Intersegment | <input checked="" type="checkbox"/> |
| Clean power generating capacity (MW) | <input checked="" type="checkbox"/> |
| Database of the Distribution of Species in Canada | <input type="checkbox"/> |



Earth Observation for Cumulative Effects



[Understanding Canada's land from space - GEO.CA](#)



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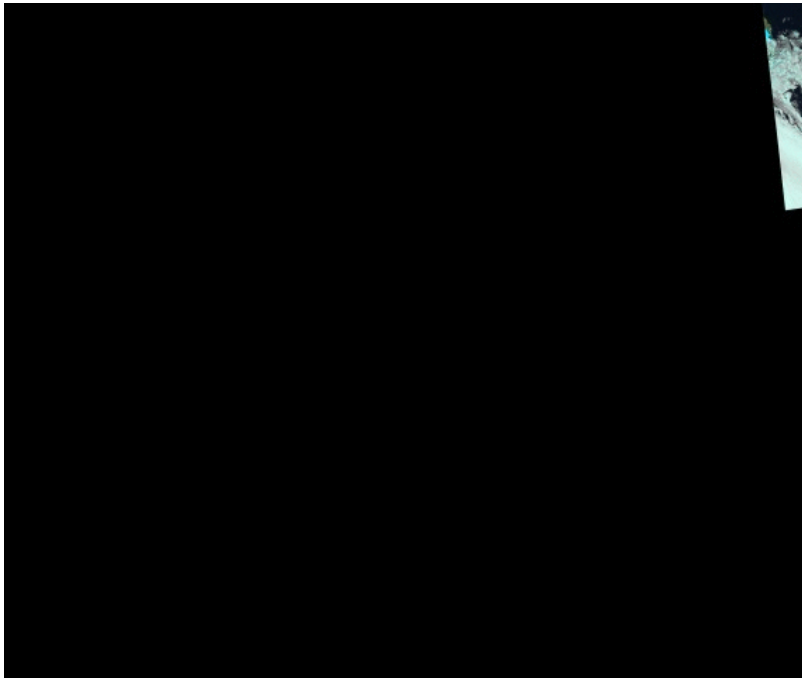
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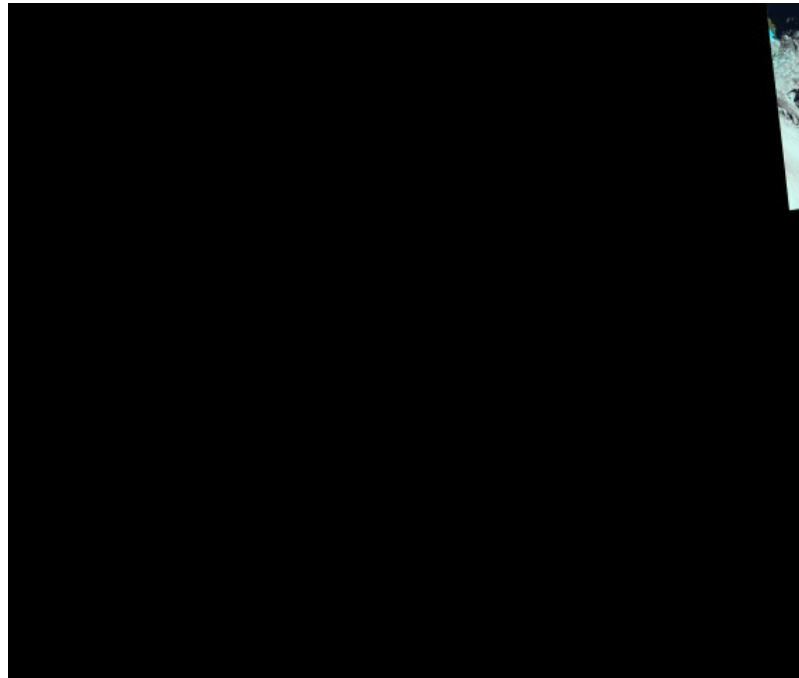
Earth Observation for Cumulative Effects

25 Year Records (MODIS/VIIRS)

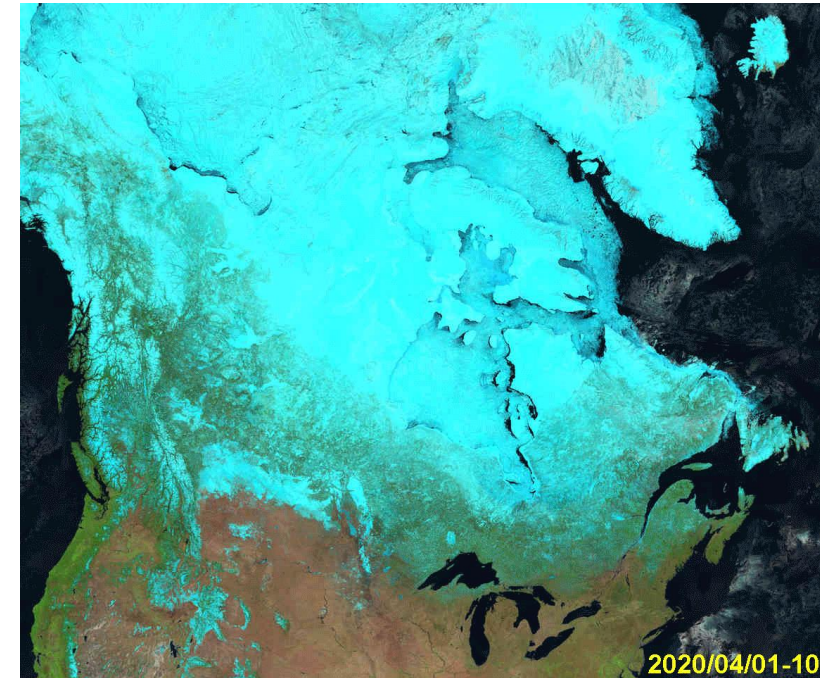
Single Granule



10-day Composite



Seasonal Dynamics



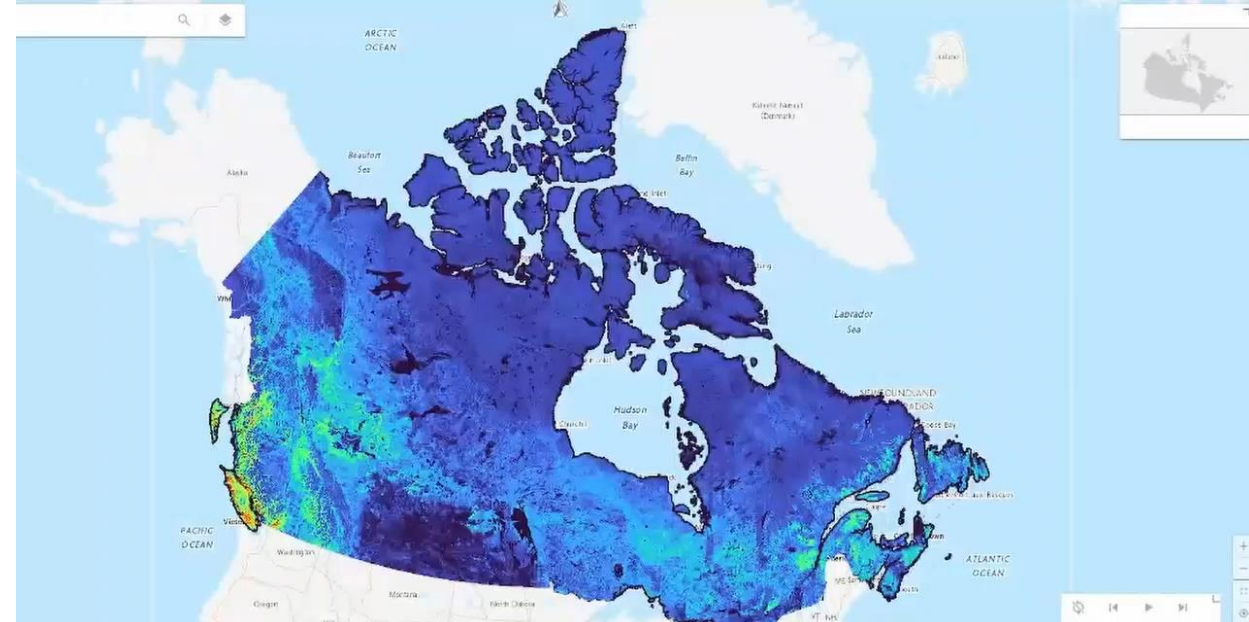
- Changes across Canada's Arctic
- Multi-Year Coastal Ice Trends

- Summer Minimum Snow/Ice (MSI)
- Water Body Fraction Map of Canada

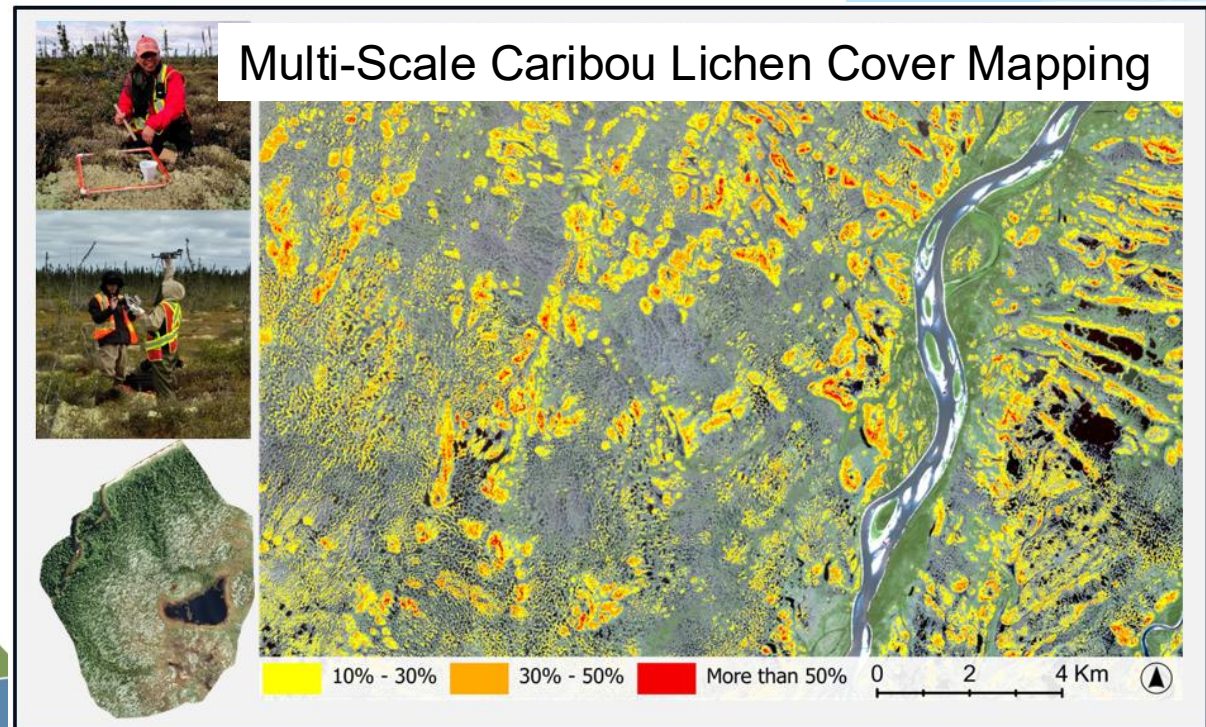
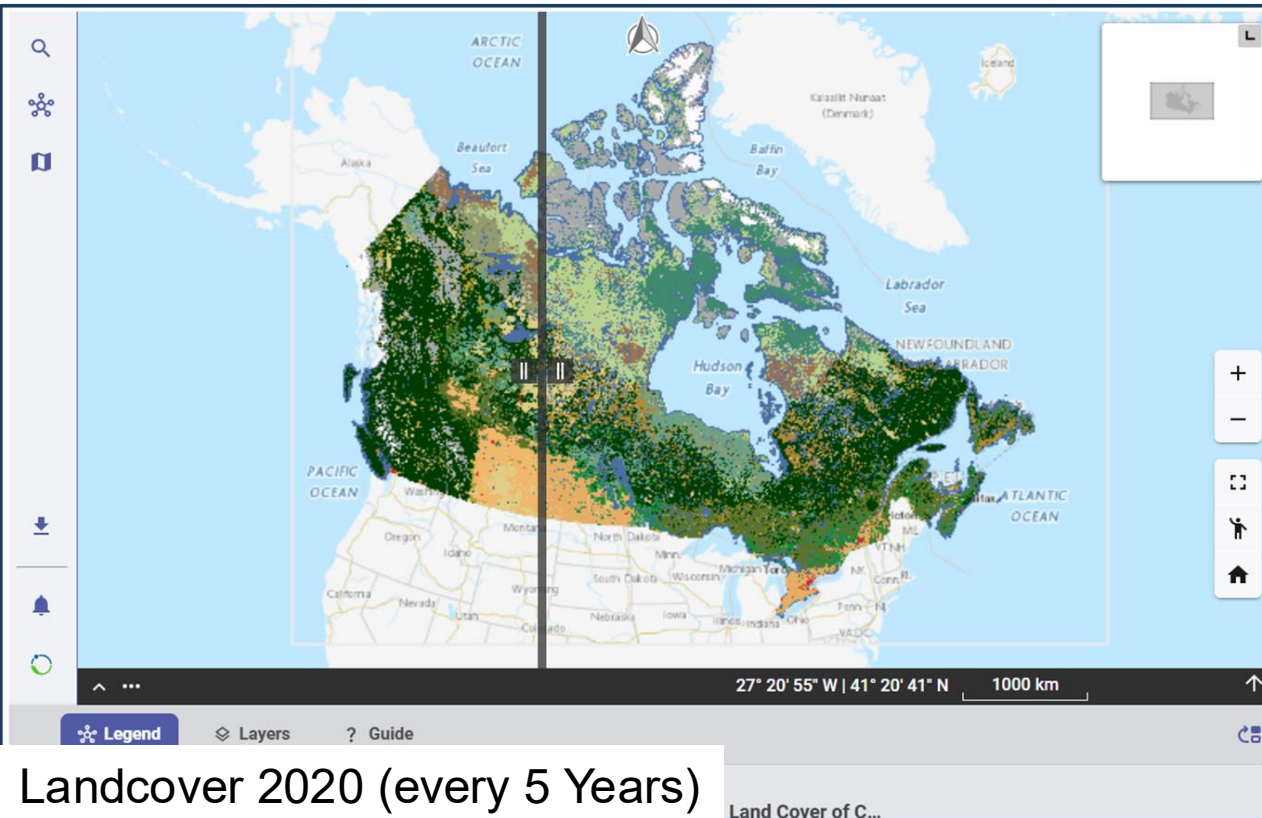


Earth Observation for Cumulative Effects

Time-series are intended to be used by scientists and decision-makers to monitor and quantify conditions and changes resulting from human and natural disturbances



Monthly Leaf Area Index 2019-2023



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Plain-language report (*in development*) describing some of the EO results related to the Ring of Fire Area.

Hydrosphere

Chapter 1: Terrestrial Water Storage

Chapter 2: Surface Water Dynamics

Chapter 3: Lake and River Ice

Biosphere

Chapter 4: Vegetation Cover

Chapter 5: Landcover and Land Use

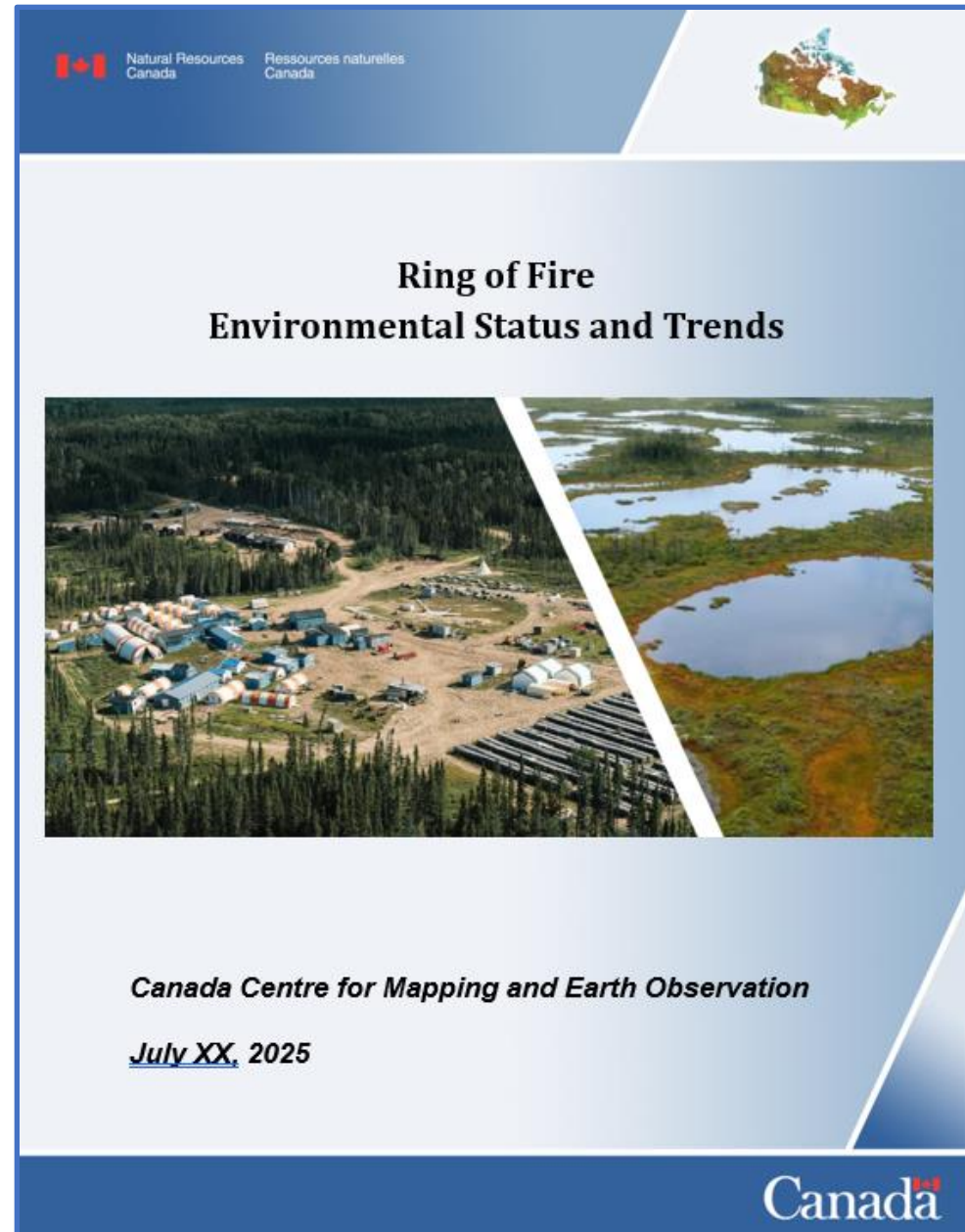
Chapter 6: Caribou Lichen Availability

Chapter 7: Beaver Engineering

Cryosphere

Chapter 8: Permafrost Dynamics

Chapter 9: Snow Dynamics



Mine Permit Navigator

When the user selects activities that apply to their project...

...the Mine Permit Navigator provides information on what legislation may apply and why...

...and information on who to contact, and the process milestones.

Canada.ca · Natural Resources Canada · Mine Permit Navigator · Guided Search

Guided Search

The Mine Permit Navigator will ask you to identify activities you plan to include in your mining project. Based on the activities you select, the tool will:

- Identify federal legislation that may apply to your project.
- Provide information on how to apply for permits and authorizations.

From the dropdown list below, select all the categories of work that apply to your project.

Please select activities

Constructing a new mine or expanding an existing one

Back

The Mine Permit Navigator related some typical activities that occur as part of mining projects to the categories you've selected. Please click on each activity that you think you will undertake as part of your mining project. By selecting CONTINUE, you can learn more about the federal legislation that may regulate these activities and the approvals that might be required.

- Constructing a new mine or expanding an existing one

| | | | |
|--|--|---|--|
| <input checked="" type="checkbox"/> Mining and milling | <input type="checkbox"/> Camp construction | <input type="checkbox"/> Timber removal | <input checked="" type="checkbox"/> Tailings pond |
| <input type="checkbox"/> Pipelines | <input type="checkbox"/> Settling pond | <input type="checkbox"/> Explosives | <input type="checkbox"/> Radiocommunications and radar |

Based on the categories and activities you selected, you may have responsibilities under the following legislation:

- [Species at Risk Act \(2002\)](#)
- [Canadian Environmental Protection Act \(1999\)](#)
- [Transportation of Dangerous Goods Act \(1992\)](#)
- [Migratory Birds Convention Act \(1994\)](#)
- [Fisheries Act \(2019\)](#)
- [Impact Assessment Act \(2019\)](#)
- [Explosives Act \(1985\)](#)
- [Canadian Navigable Waters Act \(1985\)](#)

Answer some questions to learn more about these Acts and how they apply to your project:

Species at Risk Act (2002)

The federal *Species at Risk Act* (SARA) may apply if your activities may harm, harass, capture, or kill a species at risk, or damage or destroy their critical habitat. You may need review by federal authorities responsible for the Act including Fisheries and Oceans Canada (DFO) and Environment and Climate Change Canada (ECCC).

SARA applies to aquatic species at risk and their habitat regardless of location and generally applies to terrestrial species at risk only located on federal lands. SARA applies to critical habitat for terrestrial species at risk listed as endangered or threatened on non-federal lands.

The following resources may aid you in answering questions regarding your planned activities and how they may impact species at risk:

- SARA defines different levels of risk as special concern, threatened, endangered or extirpated in the [Interpretation section of the Species at Risk Act](#).
- The [Schedule 1 list of wildlife species at risk](#).
- The [species at risk public registry](#) is a list of species at risk that may be filtered by various attributes, including broad geographic location.
- The [map of aquatic species at risk](#).
- The [Critical Habitat Map](#).

[Start Questions](#) [Learn More](#)

Your results:

Species at Risk Act (2002)

You may have responsibilities

[View less](#)

Reason Approval May Be Required

Subsection 81(1) of the *Species at Risk Act* (SARA) provides that no person shall destroy any part of the critical habitat of a listed endangered or threatened terrestrial species at risk that is on non-federal lands. Subsection 81(2) states that this prohibition applies only to the portions of the critical habitat that the Governor in Council, on the recommendation of the Minister of the Environment (the Minister), specifies by Order.

Subsection 81(4) requires that, if the Minister forms the opinion that any portion of critical habitat is not effectively protected by the laws of the province or territory, and there are no measures in or provisions under SARA or any other Act of Parliament that protect the particular portion of the critical habitat, the Minister must recommend that the Governor in Council make an order that extends the prohibition against the destruction of critical habitat to that portion.

Critical habitat will be considered destroyed if part of the critical habitat is degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. Destruction may result from a single or multiple activities at one point in time or from the cumulative effects of one or more activities over time.

A SARA permit would always be required if destroying critical habitat would result in affecting an individual, or damaging or destroying the residence of individuals of a species that is protected under the Act (e.g., an aquatic species at risk; a species at risk on federal lands; migratory bird species at risk; and, species protected through a federal order or regulation).

You may have your activity that would otherwise be prohibited under the *Species at Risk Act* authorized if your activity is at least one of the following:

- scientific research relating to the conservation of the species and being conducted by qualified persons
- benefiting the species or required to enhance the species' chance of survival in the wild
- incidentally affecting the species (its purpose is not to affect the species)

As long as all 3 of the following conditions are met:

- all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted
- all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals
- the activity will not jeopardize the survival or recovery of the species

Contact Information

It is recommended to engage with regulators as early as possible in your permitting process.

Canadian Wildlife Service Environment and Climate Change Canada, Gatineau QC K1A 0H3; Phone: 1-800-868-6767; Email: enviroinfo@ec.gc.ca

How to Apply

To apply for a permit for an activity affecting a listed species in any national park, national historic site or national marine conservation area administered by Parks Canada (protected heritage areas), visit: [research and collection permits](#).

For other activities, you should contact the specific protected heritage area directly. Their contact details are available on the Parks Canada website.

To apply for a permit for activities affecting a listed aquatic species, visit: [permitting under the Species at Risk Act](#).

To apply for all other permits under the *Species at Risk Act*, please use the SARA E-permitting System: [species at risk permit system](#).

Application and Regulatory Guidance

Timelines



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Risk Assessment Framework for Cumulative Effects Assessment

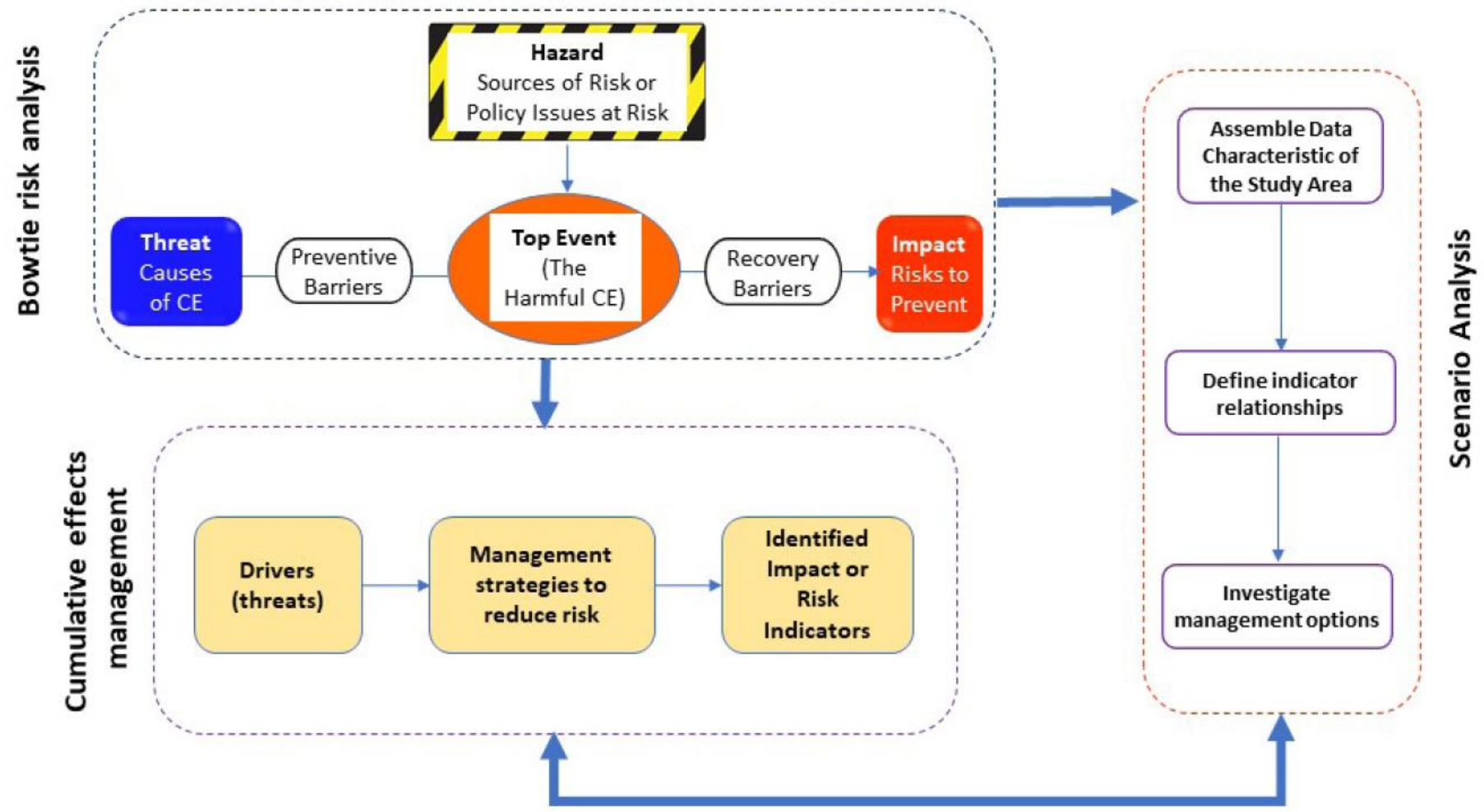
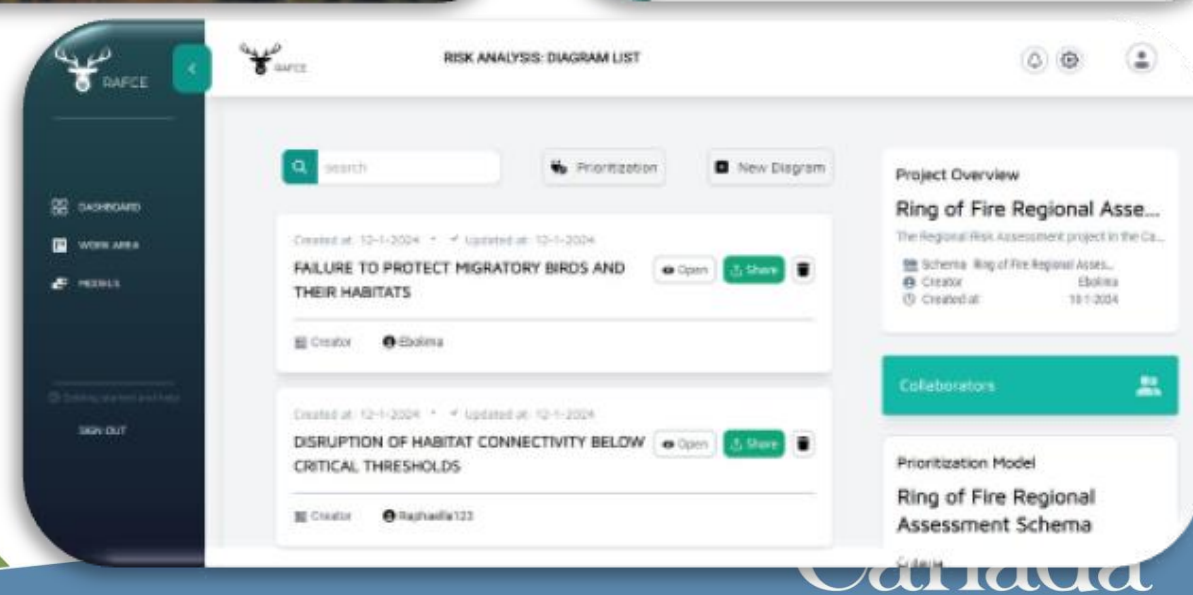
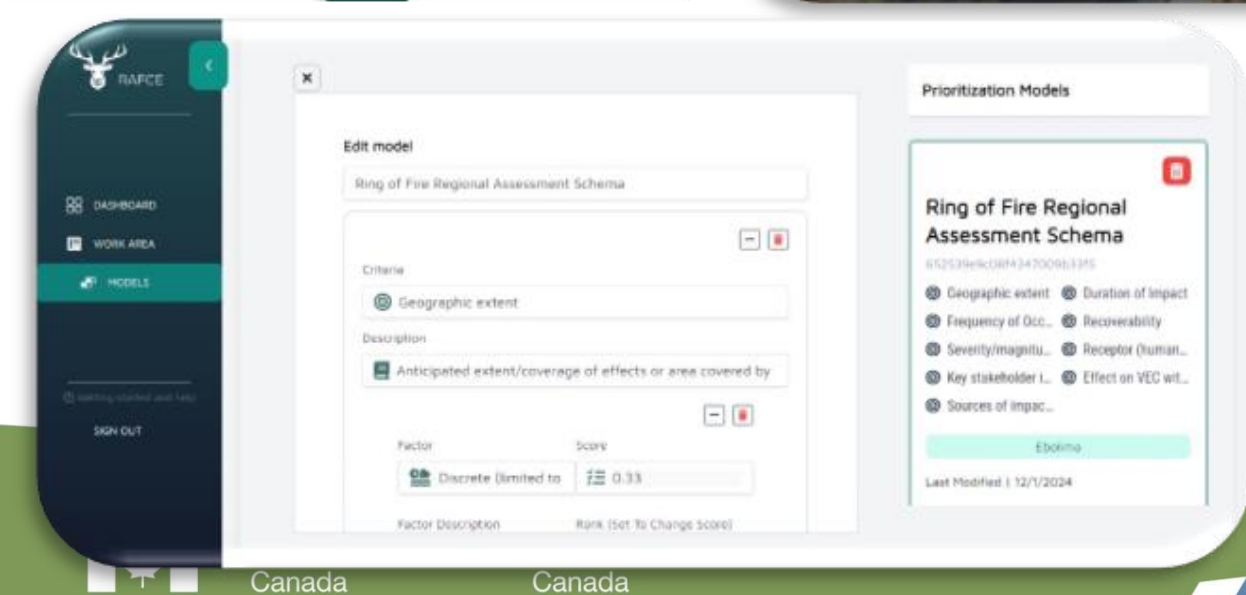
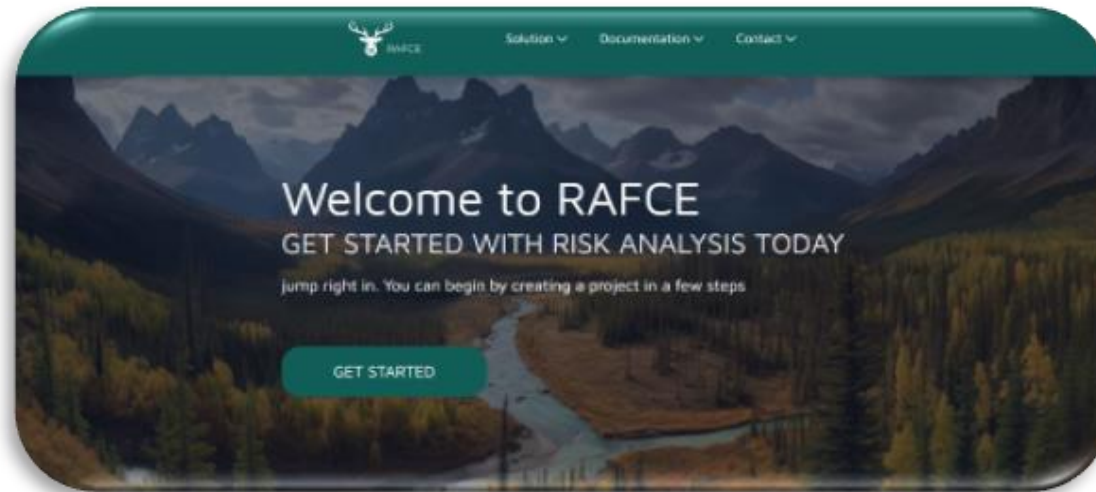


Figure 1. Integrated Risk and Scenario Based Framework for Regional-Scale Cumulative Effects Assessment.

Risk Assessment Software for Cumulative Effects Assessment



The Canadian Critical Minerals Strategy

Increase the supply of responsibly sourced critical minerals and support the development of domestic and global value chains for the green and digital economy



1. Supporting economic growth, competitiveness, and job creation



2. Promoting climate action and environmental protection



3. Advancing reconciliation with Indigenous peoples

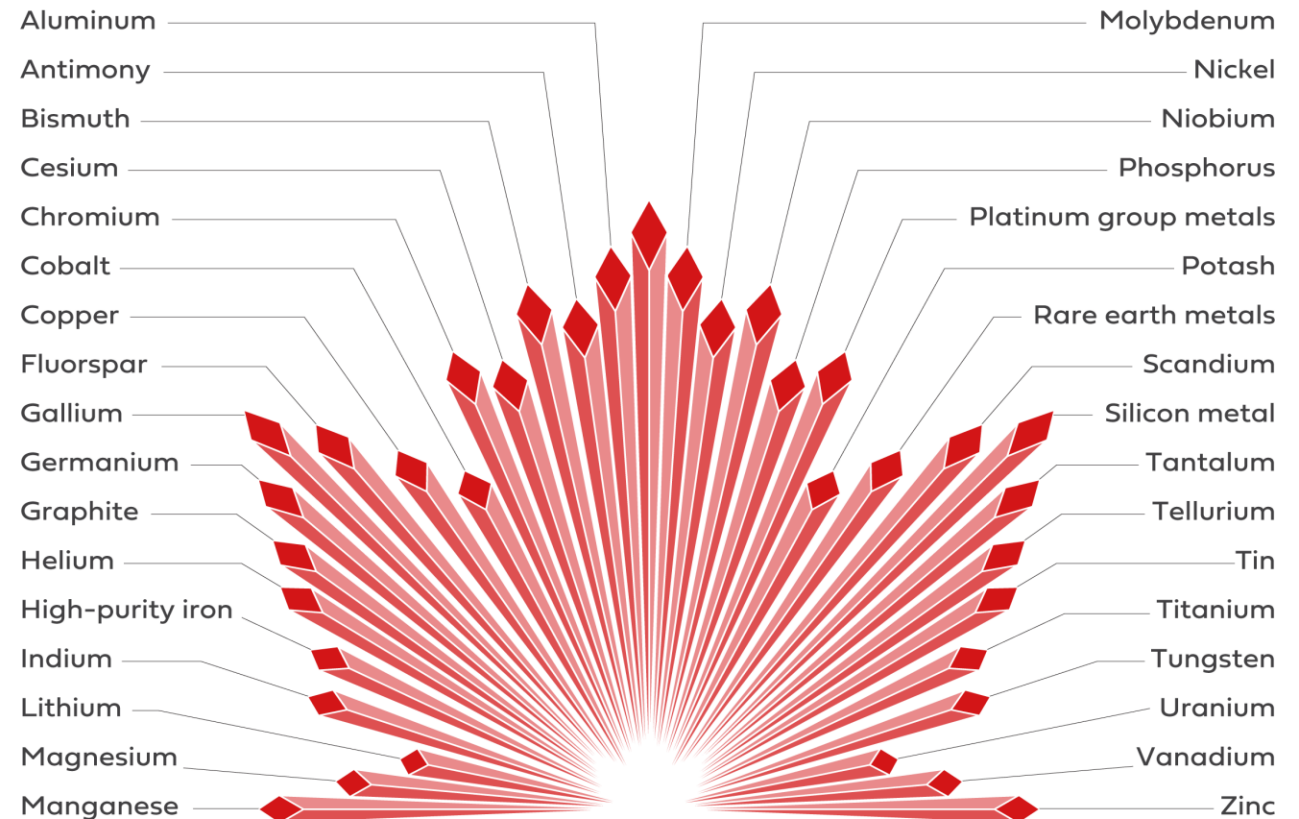


4. Fostering diverse and inclusive workforces and communities



5. Enhancing global security and partnerships

Canada's 34 critical minerals



Critical Minerals Infrastructure Fund (CMIF)

The Critical Minerals Infrastructure Fund (CMIF) will provide up to \$1.5 billion in federal funding until 2030 for clean energy and transportation infrastructure projects necessary to enable the sustainable development and expansion of critical minerals in Canada. The CMIF currently offers two types of funding support:

CMIF Contribution funding supports preconstruction activities to advance infrastructure projects to a “shovel ready” state; and shovel ready infrastructure projects that support construction and deployment activities.

A call for proposals is currently open, offering up to \$500 million. Further information is available on the [website](#).

Application deadlines:

- June 27, 2025 for Stream 1 – Preconstruction
- March 4, 2026 for Stream 2 – Shovel ready

CMIF Indigenous Grants funding supports Indigenous engagement, participation and capacity building related to infrastructure projects that would enable critical minerals development.

A call for proposals be launched in the coming months. Information will be available on the [website](#).



Additional Resources

[Natural Resources Canada \(NRCan\)](#)

- [NRCan role in Impact assessments](#)

[NRCan FAAR response – ROF](#)

[Overview of Cumulative Effects Research at NRCan](#)

[Open Science and Data Platform \(OSDP\)](#)

- [Resources to Understand Cumulative Effects in Northern Ontario](#)

[Finding Lichen for Caribou](#)

[Frontiers | A modelling approach to inform regional cumulative effects assessment in northern Ontario](#)

[Geo.ca](#)

[Understanding Canada's land from space - GEO.CA](#)

- [Critical minerals resources](#)



Annex: NRCan expertise relevant to the Regional Assessment in the Ring of Fire Area



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Forests and Forestry

Hydrology of forest areas: Description of potential impacts of projects on the hydrology of surrounding watersheds (surface waters) and description of mitigation measures.

Biodiversity and species at risk habitat (including woodland caribou): Description of potential impacts of projects on forest vegetation, biodiversity, and habitat for key species, including caribou; loss of habitat area and quality; changes in predator movements due to habitat modification, and identification of mitigation measures.

Forest soil and vegetation: Description of potential changes in soil quality, loss, compaction, erosion, carbon, etc. that could lead to a reduction in soil productivity, including methods used to clear trees and shrubs as well as potential impacts on forest vegetation, biodiversity and species of cultural value.

Change of use and recovery of forested land: Description of how projects may alter land use, potential impacts (e.g., capacity for carbon storage), identification of mitigation measures and remediation.

Cumulative effects in forest landscapes: Assessment of natural and anthropogenic disturbances under climate change in forest landscapes, including predictive modelling and balancing economic, environmental and social objectives.

Forest data: National forest data and mapping products are available for many forest attributes including tree species, forest fragmentation, disturbance and recovery, for different temporal and spatial scales.

Climate change mitigation and adaptation strategies: Assessing forest resilience and vulnerability to climate change impacts including mitigation and adaptation forest management options

Wildland fire management: Provides wildland fire intelligence and predictive services. Conducts research that develops and evaluates wildland fire risk reduction approaches to strengthen wildland fire and forest resilience

Peatlands: Mapping, carbon emission and removal modelling and impacts of forest disturbance, including within the Hudson Bay and James Bay lowlands.



Geology, Hydrogeology and Geochemistry

Geology: Description of the nature of the superficial formations and their depth, the nature of the bedrock

Land processes: Description of the nature of the geohazards, permafrost occurrence, processes and stability.

Aquifer characterization: Description of surface water/groundwater interactions and groundwater flow using hydrogeological modelling.

Environmental geochemistry: Description of geochemical content such as chromium in natural environmental archives (lake sediments, tree rings, and peat) and other types of samples (surface water, groundwater, soil and rock).

Acid drainage and metal leaching: Our expertise encompasses assessing acid rock drainage and metal leaching in various mining materials, such as ore, mine waste rock, construction materials, tailings, and open-pit walls. This extends to understanding potential issues related to acidic mine drainage and metal leaching in mining waste, involving geochemical analysis and prevention/control technology development.

Mine wastes: Assessment of acid rock drainage and metal leaching (ARD/ML), including new emerging risks from metals such as platinum, palladium, etc., and use of this ARD/ML assessment to evaluate the alternatives to the management, treatment and disposal of mine wastes including mine water, processing effluent, waste rock, tailings and sludge.



Mining Economics and BAT

Baseline economic conditions: Contribution of the mining industry to baseline economic activity, including direct and indirect gross domestic product (GDP) and employment.

Mineral markets: Mineral market analyses and potential impacts of a project on commodity markets and supply chains (local and global).

Economic and fiscal impacts: Potential direct, indirect and induced impacts of a project on GDP and employment; potential impacts of a project on government revenues from taxes and royalties and public expenditures.

Local and regional economic impacts: Description of potential positive (including new economic opportunities) and negative/positive impacts of a project on local and regional economies and populations.

Offers specialized knowledge in **greenhouse gas (GHG)** emissions reduction, encompassing Best Available Techniques (BAT) and Best Environmental Practices (BEP), as well as expertise in energy policy. This includes a focus on GHG emissions mitigation, including BAT and BEP, within the context of evaluating mining projects.



Decision Support and Open Data

NRCan in collaboration with ECCC leads the [Government of Canada's Open Science and Data Platform](#), a public facing tool providing **single window access** to federal, provincial and territorial data, science and regulatory information to support the understanding of cumulative effects and inform impact assessment processes.

Baseline data: development of baseline data describing the status and trends of ecosystem parameters (biosphere, hydrosphere and cryosphere) across the Canadian landmass.

Decision-making tools: Development of decision-making tools through multidisciplinary science and collaborative partnerships to help land managers and decision-makers prepare and respond to cumulative effects and regional challenges in Canada, including the Ring of Fire area.

