

**Environment and Climate Change Canada Response to FAAR Request – Ring of Fire Regional Assessment**

**January 26, 2021**

**Attachments:**

ECCC- RoF FAAR response - CWS G&Cs for funded projects in RoF RA study area.xlsx

ECCC- RoF FAAR response - CWS DataSetsWithinProposedBoundary.xlsx

ECCC- RoF FAAR response - CWS AdditionalDataSets.xlsx

	<b>FAAR Questions</b>	<b>Response</b>
<b>PART I</b>	Include any relevant information on associated Indigenous, public or other consultation or engagement activities or projects/activities and identify any partners or collaborations	
<b>1.</b>	<b>Area(s) of expertise</b> and ECCC mandate in relation to the regional assessment	<p>Wildlife and Habitat:</p> <ul style="list-style-type: none"> <li>• Migratory birds, their nests, eggs, and habitat</li> <li>• Species at risk, their habitat and critical habitat including recovery strategies and action plans for “endangered,” “threatened,” and “extirpated” species; management plans for species “of special concern”</li> <li>• Ecological function of wetlands</li> <li>• Invasive species</li> <li>• Ecotoxicological impacts/ecological risk assessment of contaminants of concern and effects on biota</li> <li>• Wildlife Environmental emergency advice and guidance in relation to possible accidents and malfunctions involving unplanned or uncontrolled releases or spills of Hazardous substances to the environment having a potential to result? in adverse effects to Migratory Birds and SARA-listed species under ECCC’s jurisdiction</li> </ul> <p>Air quality:</p> <ul style="list-style-type: none"> <li>• Baseline/ambient air quality</li> <li>• Sources of emissions</li> <li>• Emissions estimation and measurement</li> <li>• Air quality impact pathways and assessment</li> <li>• Mitigation</li> <li>• Dispersion modeling</li> <li>• Air Quality policies and regulations</li> <li>• Follow-up monitoring</li> <li>• Photochemical modeling (limited expertise)</li> <li>• Air quality modelling expertise at a regional scale</li> </ul> <p>Surface water quality and quantity:</p>

- Baseline methods/models
- Contamination sources to surface water quality
- Wastewater, seepage and runoff effects
- Management of contaminated soils or sediments
- Review of inputs to, outputs of and scoping of water quality effects modelling
- Assessment of management of mining waste (tailings, waste rock and others) including considerations of metal leaching and acid rock drainage
- Analysis of potential of soil and aquatic sediments to contaminate surface water
- Effects on groundwater quality that would then impact surface water quality
- Assessment of potential for air-based contamination of surface water (i.e., deposition)
- Bioaccumulation of contaminants (e.g. selenium, mercury) downstream of the project
- Follow-up and monitoring
- For water quantity: baseline (surface water hydrology, streamflow rates data and modeling, flooding and extreme events management, drainage control, water levels, water balances), effects to water quantity, follow-up monitoring

Climate and Meteorology:

- Meteorology – long term climate patterns and norms, climate parameters selected for assessments, selection of representative stations, extremes (wind, precipitation) used for design
- Marine meteorology – winds, waves, and weather when used for oil spill modelling
- Sea ice – Ice extent, ice thickness, ice expanse, hazards and icebergs

Climate change:

- Climate change science to inform evaluation of potential changes to the environment and project resilience to effects of climate change
- Climate change policy and national climate change projections
- Global and regional climate change modelling
- Estimates of GHG emissions
- Mitigation measures and determination of Best Available Technologies/Best Environmental practices
- Carbon sinks\*
- Credible plans to achieve net-zero GHG emissions by 2050
- National GHG projections

\* Performing a carbon sinks analysis in the context of a regional assessment may require a substantial amount time and resources. If expertise were required, ECCC would assess its capacity to determine how/to what extent it can provide support.

Environmental Emergencies:

		<ul style="list-style-type: none"> <li>• Environmental emergency management planning advice and guidance in relation to possible accidents and malfunctions involving unplanned or uncontrolled releases or spills of Hazardous substances to the environment having a potential to result in adverse environmental effects to fish or fish habitat, aquatic species or migratory birds</li> <li>• Environmental Emergency (E2) Plan guidance in respect of Schedule 1-listed substances in the Environmental Emergency Regulations under the Canadian Environmental Protection Act 1999</li> <li>• Atmospheric transport and dispersion modelling of contaminants in air; and fate and behaviour, hydrologic trajectory modelling of contaminants in water</li> <li>• Environmental Emergency Modelling, providing expertise for Meteorological and Environmental inputs to dispersion modelling for: Volcanic Atmospheric Emergencies, Atmospheric nuclear emergencies, local and regional atmospheric emergencies, aquatic emergencies (modelling of oil spills), transport and dispersion models, Canadian Urban Dispersion Modelling ambient air pollutant concentrations</li> </ul>
2.	<b>Regulatory authority(s)</b> in relation to physical works/activities in the Ring of Fire area	<p><b><i>Fisheries Act – Pollution Prevention Provisions</i></b></p> <p><a href="http://laws.justice.gc.ca/eng/acts/F-14">http://laws.justice.gc.ca/eng/acts/F-14</a></p> <p>The federal minister of Environment and Climate Change is responsible for the administration (including the enforcement) of the pollution prevention provisions of the <i>Fisheries Act</i>, subsection 36(3).</p> <p>Subsection 36(3) of the <i>Fisheries Act</i> states that, unless otherwise authorized by regulations meeting specific criteria, “no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substances or any deleterious substance that results from the deposit of the deleterious substance may enter any such water”.</p> <p>In the definition of deleterious, the <i>Fisheries Act</i> includes “any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.” Subsection 36(3) makes no allowance for a mixing or dilution zone.</p> <p>In the absence of a regulation authorizing their release, and to the extent that the substance is a prescribed substance or that it can be demonstrated that this substance is a "deleterious substance" as defined in paragraph subsection 34(1) of the <i>Fisheries Act</i>, any release from the construction, operation, reclamation or decommissioning stages of the Project, to any waters frequented by fish, may constitute a violation of the <i>Fisheries Act</i>.</p> <p><b><i>Metal and Diamond Mining Effluent Regulations under the Fisheries Act</i></b></p> <p>Authorization to use a water body frequented by fish as a Tailings Impoundment Area under subsection 5(1) of the <a href="#">Metal and Diamond Mining Effluent Regulations</a> (MDMER) of the <i>Fisheries Act</i>.</p> <p>Subsection 36(3) of the <i>Fisheries Act</i> prohibits the deposit of a deleterious substance in waters frequented by fish unless authorized by regulations. The MDMER authorizes the deposit of a deleterious substance under specified conditions, including deposits into a Tailings Impoundment Area (TIA) that is a water or place set out in Schedule 2 of the Regulations. Environment and Climate Change Canada (ECCC) is responsible for the pollution prevention provisions of the Fisheries Act and the implementation of the MDMER.</p>

Consultations under MDMER

ECCC consulted with the following Indigenous communities in 2019 on Schedule 2 Amendments to the MDMER for the Hardrock Mine project: Aroland First Nation, Ginoogaming First Nation, Animbiigoo Zaagi'igan Anishinaabek First Nation, Long Lake #58 First Nation, Red Sky Independent Métis Nation, and the Métis Nation of Ontario. ECCC provided Participant funding for participation in these consultations as follows:

- Aroland First Nation (Matawa Tribal Council) - participant funding related to consultations for schedule 2 amendments to the MDMER for the Hardrock Mine Project – FY 2019-20 – Project GCXE20E005
- Long Lake #58 First Nation (Matawa Tribal Council) - participant funding related to consultations for schedule 2 amendments to the MDMER for the Hardrock Mine Project – FY 2019-20 – Project GCXE20E003
- Animbiigoo Zaagi'igan Anishinaabek (AZA) First Nation – participant funding related to consultations for schedule 2 amendments to the MDMER for the Hardrock Mine Project – FY 2019-20 – Project GCXE20E006
- Ginoogaming First Nation – participant funding related to consultations for schedule 2 amendments to the MDMER for the Hardrock Mine Project – FY 2019-20 – Project GCXE20E007

**Canadian Environmental Protection Act, 1999**

<http://laws.justice.gc.ca/eng/acts/C-15.31>

ECCC is responsible for the administration and enforcement of the *Canadian Environmental Protection Act, 1999* (CEPA). CEPA is aimed at preventing pollution and protecting the environment and human health. One of CEPA's major thrusts is the prevention and management of risks posed by harmful substances. This includes products of biotechnology, marine pollution, vehicle, engine and equipment emissions, fuels, hazardous waste, environmental emergencies and other sources of pollution.

Authority to require emergency plans for toxic or other hazardous substances set out in Schedule 1 to the *Environmental Emergency Regulations* (E2 Regulations) is provided in Part 8 of CEPA. The E2 Regulations are aimed at enhancing the protection of the environment and human life and health by promoting the preparedness for response to and recovery from environmental emergencies. The E2 Regulations require those who own, have charge, management or control of toxic and hazardous substances set out in Schedule 1 to the E2 Regulations at or above the specified thresholds to provide required information on the substance(s), their quantities and to prepare and implement environmental emergency plans. ECCC provides expertise related to emergency plans for projects to ensure they remain consistent with the requirements of CEPA. Further, ECCC's reviews of accidents and malfunctions are also based on the Department's mandated interests as they relate to the pollution prevention provisions of the Fisheries Act and the *Migratory Birds Convention Act*.

Under CEPA, the Canadian Ambient Air Quality Standards (CAAQS) have been established for fine particulate matter (PM2.5), ground-level ozone, nitrogen dioxide and sulphur dioxide. Although the CAAQS are not legally-binding, federal, provincial, and territorial governments have agreed to work collaboratively to implement actions to improve air quality and to report on the achievement of the CAAQS on a regular basis. The CAAQS are underpinned by air quality management levels which call for progressively more rigorous actions by jurisdictions as air quality approaches or exceeds the CAAQS.

***Environmental Emergency Regulations 2019 under the Canadian Environmental Protection Act***

The *Environmental Emergency Regulations 2019*, made under the *Canadian Environmental Protection Act, 1999*, require those in possession of listed hazardous substances, exceeding specific quantity and storage levels, to prepare, implement and exercise an Environmental Emergency plan (E2 plan).

The E2 plan must provide details on prevention, preparedness, response, and recovery measures in the event of an environmental emergency. E2 plans are risk management tools. They allow the regulated community to plan for and manage the consequences of chemical substance releases if there is an uncontrolled, unplanned or accidental release into the environment.

In accordance with the *Environmental Emergency Regulations, 2019*, regulated persons must:

- Report company and substance information to Environment and Climate Change Canada (ECCC) within prescribed timelines.
- Prepare, bring into effect and periodically exercise an environmental emergency plan for each applicable hazard category when meeting or exceeding specific quantity and/or storage thresholds, within prescribed timelines.
- Ensure that the public is notified of the possibility and potential consequences of an environmental emergency, as well as of the measures that would be taken by a regulated party to protect human life and health, and the environment before, during and after a possible environmental emergency.
- Activate the applicable measures set out in the E2 plan in the event of an environmental emergency.
- Report environmental emergencies to ECCC.
- Submit updated information on company and regulated substances, and E2 plan where applicable, every 5 years.

***Species at Risk Act***

ECCC is responsible for the overall administration and enforcement of the *Species at Risk Act, 2002* (SARA). The federal Minister of Environment and Climate Change and the Parks Canada Agency is responsible for species at risk found in national parks, national historic sites or other protected heritage areas, as well as for all other non-aquatic species at risk. The federal Minister of Fisheries and Oceans is responsible for aquatic species at risk.

The purpose of SARA is to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened. Schedule 1 of SARA provides a list of wildlife species at risk in Canada that are considered extirpated, endangered, threatened, or of special concern.

SARA provides measures for the protection of listed threatened, endangered or extirpated species and their residences. Subsection 32(1) of SARA states that no person shall kill, harm, harass capture or take an individual of a wildlife species listed as an extirpated, endangered or threatened, and Section 33 states that no person shall damage or destroy the residence of one or more individuals of a wildlife species listed as endangered or threatened or as an extirpated species if a recovery strategy recommends the reintroduction of the species into the wild in Canada.

Finally, another consideration related to the environmental assessment of projects under the *Impact Assessment Act* is found in Section 79 of SARA. This section requires that the person responsible for the environmental assessment notify the competent minister(s) in writing if the Project is likely to affect a listed wildlife species or its critical habitat, and identify the adverse effects that the Project will have. If the Project is carried out, the person must “ensure

that measures are taken to avoid or lessen those effects and to monitor them.” The measures taken must be consistent with any applicable recovery strategy or action plan under SARA.

For species listed in Schedule 1 of the *Species at Risk Act* (SARA) as Extirpated, Endangered or Threatened, a permit may be required from ECCC (e.g. under section 73 of SARA) for activities that affect a listed terrestrial wildlife species, any part of its critical habitat, or the residences of its individuals, where those prohibitions are in place. Such permits may only be issued: if 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; and if the activity will not jeopardize the survival or recovery of the species.

Currently, prohibitions are in place regarding individuals and residences for species listed under SARA as Extirpated, Endangered or Threatened, and on federal lands, including First Nation reserve land, as well as for individuals and residences of birds listed under the *Migratory Birds Convention Act, 1994* wherever they occur. Furthermore, prohibitions may be in force on land other than federal land pursuant to other orders or regulations under SARA. It is possible that further prohibitions may come into force in the future through orders in Council for individuals, residences and critical habitat on non-federal lands and / or through ministerial order for critical habitat on federal lands. It is also possible that, over the course of the assessment or after the assessment, additional species could be listed under SARA; permits may be required for project activities that affect these additional species. Proponents are advised to monitor for such developments on the SARA Registry <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>.

Examples of activities that could require a *Species at Risk Act* permit include:

- Site preparation (clearing, grubbing, site access, staging, blasting);
- Construction and operation of temporary and permanent works and infrastructure;
- Creation of new roads, rail lines, or power lines;
- Infilling of wetlands or watercourses;
- Any monitoring that requires capture/release of individuals; and
- Sensory disturbance effects (artificial lighting, noise, vibration, human activity, vehicular traffic).
- Species surveys that would affect individuals or residences (including capture/release of individuals);

ECCC will require detailed information on the potential effects of physical works or activities in the Ring of Fire area, including locations and/or occurrences of species at risk, their use of habitat and critical habitat within the project area, and specific effects on federal land, before ECCC can determine whether a SARA permit is required.

Links to publicly available documents:

- [Guidelines for permitting under Section 73 of Species at Risk Act https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/policies-guidelines/permitting-under-section-73.html](https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/policies-guidelines/permitting-under-section-73.html)
- [Species at Risk Permitting Policy https://species-registry.canada.ca/index-en.html#/consultations/2983](https://species-registry.canada.ca/index-en.html#/consultations/2983)

Section 73 of the *Species at Risk Act* (SARA) describes requirements for consultation with Indigenous communities:

- 73(4) If the species is found in an area in respect of which a wildlife management board is authorized by a land claims agreement to perform functions in respect of wildlife species, the competent minister must consult the wildlife management board before entering into an agreement or issuing a permit concerning that species in that area
- 73(5) If the species is found in a reserve or any other lands that are set apart for the use and benefit of a band under the *Indian Act*, the competent minister must consult the band before entering into an agreement or issuing a permit concerning that species in that reserve or those other lands

ECCC's consultation activities with Indigenous communities would begin following receipt of a SARA permit application. These activities would typically begin with an initial letter to the band council or wildlife management board responsible for the lands where the activity is proposed. This initial contact is then followed by emails, phone calls and/or in person discussions as appropriate. Consultation on SARA permits will be coordinated with consultation during the assessment where possible.

As per section 73 of the *Species at Risk Act*, there is no public participation in the process to issue a SARA permit. If a permit is issued, the description of the activity and how SARA's preconditions were met will be posted on the SARA Registry here: <https://species-registry.canada.ca/index-en.html#/permits>

Under SARA, ECCC also consults on:

- Changes to schedule 1 of SARA including adding a new species, and reclassifying or removing a listed species, based on new or updated assessments conducted by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In Ontario, groups consulted include Indigenous peoples known to have the species on their lands; concerned groups and individuals including industries, resource users, landowners and environmental non-governmental organizations; and the provincial government.
- Recovery documents mandated under SARA. In Ontario, recovery documents must be prepared in consultation and cooperation with every aboriginal organization that it is considered will be directly affected by the recovery document, the provincial government, any federal government department who has authority over federal land or other areas on which the species is found, and any other person or organization considered appropriate.
- Orders or regulations for the protection of critical habitat. When such orders or regulations affect a reserve or any other lands that are set apart for the use and benefit of a band under the *Indian Act*, the Minister of Indigenous Services and the band must be consulted before making the order or regulation.

Consultations include public posting of information, letters, phone calls and in-person meetings. Consultations under SARA occur regularly in the RoF region, particularly with First Nation communities. Consultations for listing, recovery and protection of species are a legal requirement under SARA and are not considered to directly impact the RA. As such, additional details have not been provided here, but can be provided on request.

**Migratory Bird Convention Act**

Among others, ECCC is responsible for implementing the *Migratory Birds Convention Act, 1994* (MBCA), which provides for the protection of migratory birds through the *Migratory Birds Regulations* and the *Migratory Birds Sanctuary Regulations*. The MBCA protects all migratory birds, their nests and eggs anywhere they are found in Canada, including ocean waters, and prohibits the dumping of substances harmful to birds in waters or areas frequented by

		<p>them. The MBCA does not provide an avenue for a permit or authorization for economic development activities contravening the Act. To minimize the possibility of contravening the law, proponents must understand the potential effect(s) of their activities on migratory birds, nests, and eggs and implement appropriate avoidance and mitigation measures.</p>
<p><b>3.</b></p>	<p><b>Expert information or knowledge</b>  - Include all existing research, reports and data sets</p>	<p>In addition to the areas of expertise outlined in questions 1 and 2 please find additional input on existing research, reports and data sets</p> <p><b>AIR</b></p> <p>The following datasets are available on the Federal Geospatial Platform.</p> <ul style="list-style-type: none"> <li>• Air quality analysis for criteria air pollutants (O3, PM2.5, PM10, NO2, SO2) (Regional Deterministic Air Quality Analysis Cumulative Effects products; RDAQA 2013-2019, air quality surface analysis) – 2013 to 2019  <a href="https://gcgeo.gc.ca/geonetwork/metadata/eng/0a8f138e-2598-42a8-a7ad-0ebc09fdb5e">https://gcgeo.gc.ca/geonetwork/metadata/eng/0a8f138e-2598-42a8-a7ad-0ebc09fdb5e</a></li> <li>• Wildfire pollution (Pollution from wildfires Cumulative Effects products; RAQDPS-FW 2013-2019, wildfires contribution to PM2.5 pollution) - 2013-2019  <a href="https://gcgeo.gc.ca/geonetwork/metadata/eng/1e42f630-a435-4c23-a293-d7cc5709f3bd">https://gcgeo.gc.ca/geonetwork/metadata/eng/1e42f630-a435-4c23-a293-d7cc5709f3bd</a></li> <li>• Hotspots (Wildfire hotspots Cumulative Effects products; Hotspots 2013-2019 as identified by the Canadian Wildland Fire Information System) - 2013-2019  <a href="https://gcgeo.gc.ca/geonetwork/metadata/eng/574c32db-aba7-4919-9c9f-c58398754173">https://gcgeo.gc.ca/geonetwork/metadata/eng/574c32db-aba7-4919-9c9f-c58398754173</a></li> <li>• Meteorological reanalysis, including precipitation – 1980-2018  Meteorological reanalysis available on Canadian Meteorological Centre (CMC) archiving system HPNLS. Contact ECCC for access.  Precipitation data available on CaSPAr (Canadian Surface Prediction Archive) available on CMC archiving system. Contact ECCC for access.</li> </ul> <p>Air quality Reanalysis for 2013 to 2019 should be available by May/June 2021.</p> <p><b>WATER</b></p> <p>Information on data from the Hydrometric Monitoring program, for stations in the Ring of Fire area, can be found below under Policies, Programs and Initiatives.</p> <p><b>CLIMATE</b></p> <p>The Canadian Climate Data and Scenarios website (<a href="http://climate-scenarios.canada.ca/?page=main">http://climate-scenarios.canada.ca/?page=main</a>) provides multi-model ensemble projections of future climate specific for Canada. Projections of temperature, precipitation and several additional variables are available. The website also links to statistically downscaled climate projections, observed data, derived data products, seasonal forecasts, guidance documents and the recent Canada’s Changing Climate Report, 2019 (<a href="https://changingclimate.ca/CCCR2019/">https://changingclimate.ca/CCCR2019/</a>). Many of these datasets are available as part of the broader collection of climate data, information and resources available through the Canadian Centre for Climate Services (<a href="https://www.canada.ca/climate-services">https://www.canada.ca/climate-services</a>).</p>

Information on data from the Atmospheric Monitoring program, for stations in the Ring of Fire area, can be found below under Policies, Programs and Initiatives.

#### **WILDLIFE/HABITAT**

ECCC has a variety of information, expertise and data with respect to wildlife and their habitat. Specific to the Ring of fire region the following information is available:

- Reports on SAR published on the SARA registry
- Surveys and monitoring of migratory birds and their habitats.

The SARA registry houses documents relating to the administration of SARA including COSEWIC status assessments, recovery documents, consultation documents, critical habitat orders and supporting information. The SARA registry should be referred to for the latest reports and information relating to SAR in the RoF region. <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>. Available information on caribou is published on the SAR registry. For further information on Woodland Caribou, boreal population (hereafter boreal caribou) please see the following reports and references therein

Environment and Climate Change Canada. 2020. Amended Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. xiii + 143pp.

Environment and Climate Change Canada. 2018. Action Plan for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada – Federal Actions. Species at Risk Act Action Plan Series. Environment and Climate Change Canada, Ottawa. vii + 28 pp.

As the final determination of the geographical and temporal boundaries of the RA have not yet been made, ECCC is providing all available information irrespective of dates of collection in two separate lists relating to:

- i) Potential geographical RA boundaries proposed for birds and species at risk (SAR) in Part 2 Q2 and;
- ii) A wider geographical scope that includes the Ontario portion of the James Bay and Hudson Bay coasts and the Ontario shield to the west of the Ring of Fire (RoF) region. This information is not directly relevant to the boundary proposed for migratory birds and SAR in Part 2 Q2, but may be relevant if the eventual boundaries of the RA are large than what is proposed here.

#### **Data Sets ECCC Can Provide – See Attachments to this Response**

The attached Excel file “ECCC- RoF FAAR response - CWS DataSetsWithinProposedBoundary.xlsx”- contains information about data sets directly relevant to the potential geographical RA boundaries proposed for birds and SAR in Part 2 Q2. Fig 1 shows approximate survey locations for the different data sets. Note that not all survey locations within these data sets fall within the proposed geographical boundaries.

The attached Excel file “ECCC- RoF FAAR response - CWS AdditionalDataSets.xlsx” contains information about available data sets that may be relevant to the RA if the final geographical boundary is broader than that proposed in Part 2 Q2. Fig 1 shows approximate survey locations for the different data sets. Even in the case of a broad geographical approach for the RA, this data is expected to have limited use for the RA beyond setting a broad context for the Far North of Ontario as a whole.

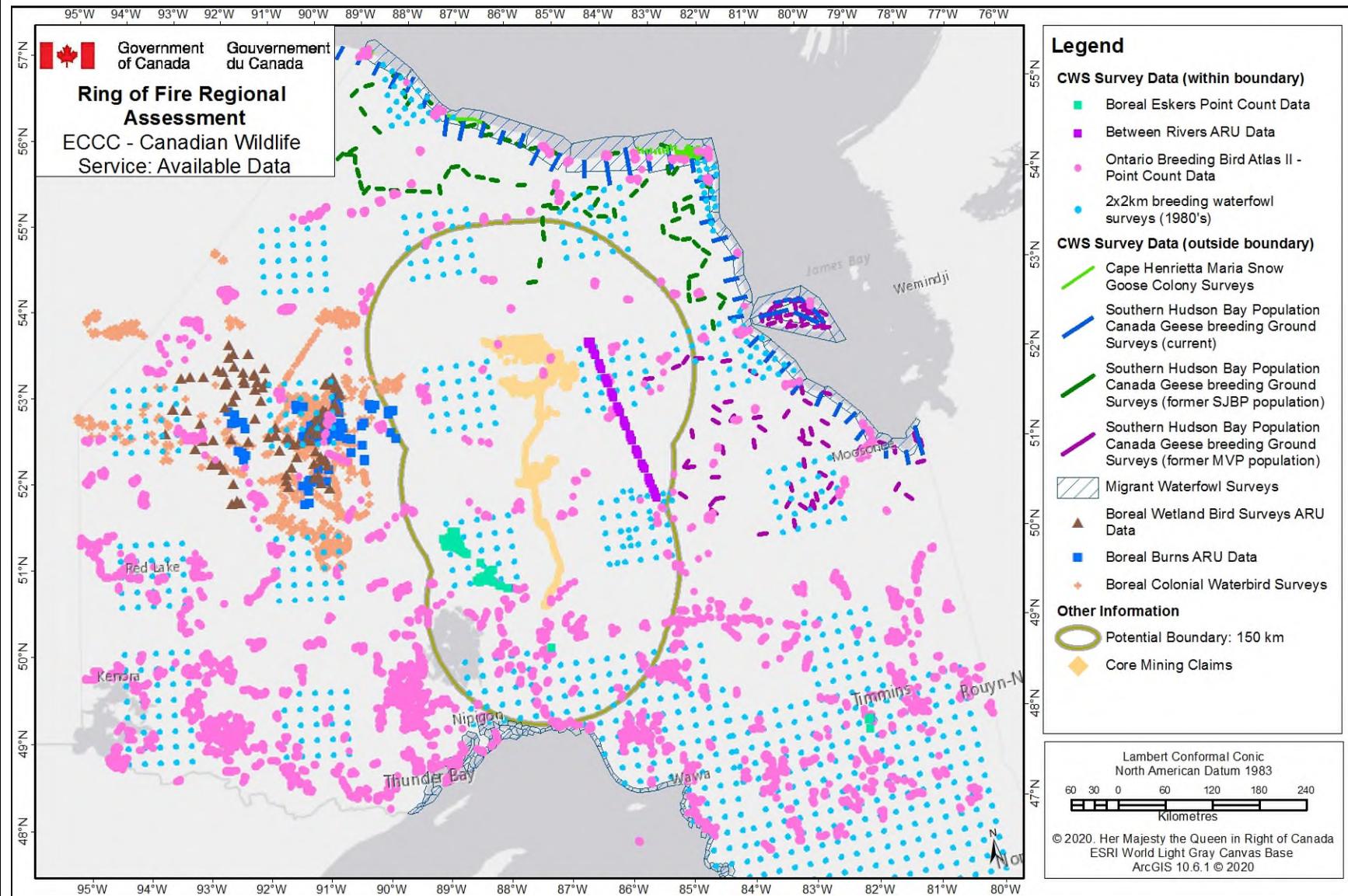


Fig 1: Available CWS-ON survey data across the Far North of Ontario. The potential 150km boundary is proposed as the potential geographic boundary for birds and non-caribou SAR, see Part 2 Q2 for details.

**Reports**

The following list provides reports of relevance to the potential geographical RA boundaries proposed for birds and SAR in Part 2 Q2.

Abraham, K.F. 2014. Waterfowl in Ontario's Boreal Region: Looking Back, Looking Forward. Report prepared for Ducks Unlimited Canada. Kingston, Ontario. 97 pp.

Baldwin, D. and Neave, E. 2013. Upland Habitat Patterns within the Boreal Shield/Hudson Plain Transition. Unpublished report. Environment Canada, Toronto, Ontario.

Cadman, M.D., Eagles, P.F.J. and Helleiner, F.M. Eds 1987. Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo, Ontario. 617pp [https://www.birdsontario.org/]

Cadman, M.D., Sutherland, D.A., Beck, G.G., Lepage, D. and Couturier, A.R. Eds. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature. Toronto, xxii + 706 pp. [https://www.birdsontario.org/]

Environment Canada. 2013. Bird Conservation Strategy for Bird Conservation Region 7 in Ontario: Taiga Shield and Hudson Plains. Canadian Wildlife Service, Environment Canada. Ottawa, ON. 87 pp + appendices. [http://nabci.net/wp-content/uploads/BCR-7-ON-FINAL-Aug-2013.pdf]

Environment Canada. 2014. Bird Conservation Strategy for Bird Conservation Region 8 in Ontario Region: Boreal Softwood Shield. Canadian Wildlife Service, Environment Canada. Ottawa, ON. 132 pp. + appendices [http://nabci.net/wp-content/uploads/BCR-8-ON-FINAL\_11September2014.pdf]

Hebert, Craig. 2013. Monitoring impacts of Ring of Fire development using waterfowl. Multi-element data set. Data collected from 11 Canada Goose goslings from 2 locations on the western shore of James Bay (~70 (YAT2) and 130 km (YAT4) north of the mouth of the Attawapiskat River). Collections were done by OMNR.

Johnson, C.C, Sutherland, G.D., Neave, E., Leblond, M., Kirby, P., Superbie, C. and McLoughlin, P.D. 2020. Science to inform policy: Linking population dynamics to habitat for a threatened species in Canada. *Journal of Applied Ecology* 57:1314-1327.

Lukina, A.O., Boutin, C., Rowland, O., and Carpenter, D.J. 2016. Evaluating trivalent chromium toxicity on wild terrestrial and wetland plants. *Chemosphere* 162 (2016): 355-364. Research conducted in collaboration with OMNRF.

Spatialworks. 2016. Mapping and assessment of the web of conservation lands in the boreal softwood shield. Unpublished report prepared on contract to Canadian Wildlife Service – Ontario region.

Thompson, L.M., Klutsch, C.F.C., Manseau, M., Wilson, P.J. 2019. Spatial differences in genetic diversity and northward migration suggest genetic erosion along the boreal caribou southern range limit and continued range retraction. *Ecology and Evolution* 9:7030-7046

The following list provides reports that may be relevant if the RA geographical boundaries proposed for birds and SAR in Part 2 Q2.

Badzinski, S. 2013. Sea Duck Joint Venture. Annual Project Summary for Endorsed Projects. FY 2013. Unpublished report. [https://seaduckjv.org/wp-content/uploads/2014/11/SDJV-PR82-Badzinski-annrpt-FY13.pdf]

		<p>Brook, R., Brown, G. and Badzinski, S. 2018. 2018 Preliminary spring survey results for Interior Canada Geese. Unpublished Report.</p> <p>Brook, R.W., Abraham, K.F., Middel, K.R. and Ross. R.K. 2012. Abundance and habitat selection of breeding scoters (<i>Melanitta spp.</i>) in Ontario’s Hudson Bay Lowlands. Canadian Field-Naturalist 126(1): 20–27.</p> <p>Friis, C. 2019. James Bay Shorebird Project. Unpublished report. [<a href="https://static1.squarespace.com/static/58908d5a37c5811e7fce78e0/t/5fda2d6f3dbb5a0dfe6037e7/1608134014600/Report2019.pdf">https://static1.squarespace.com/static/58908d5a37c5811e7fce78e0/t/5fda2d6f3dbb5a0dfe6037e7/1608134014600/Report2019.pdf</a>]</p> <p>Hudson Bay Project. 2019. The Hudson Bay Project: 2019 Annual Progress Report. 46 pp.</p> <p>Lamb, J.S., Paton, P.W.C., Osenkowski, J.E., Badzinski, S.S., Berlin, A.M., Bowman, T., Dwyer, C, Fara, L.J., Gilliland, S.G., Kenow, K., Lepage, C., Mallory, M.L., Olsen, G.H., Perry, M.C., Petrie, S.A., Savard, JP.L., Savoy, L., Schummer, M., Spiegel C.S., and McWilliams S.R. 2019. Spatially explicit network analysis reveals multi-species annual cycle movement patterns of sea ducks. Ecological Applications 00(00):e01919. 10.1002/eap.1919</p> <p>Lamb, J.S., Paton, P.W.C., Osenkowski, J.E., Badzinski, S.S., Berlin, A.M., Bowman, T., Dwyer, C, Fara, L.J., Gilliland, S.G., Kenow, K., Lepage, C., Mallory, M.L., Olsen, G.H., Perry, M.C., Petrie, S.A., Savard, JP.L., Savoy, L., Schummer, M., Spiegel C.S., and McWilliams S.R. 2020. Assessing year-round habitat use by migratory sea ducks in a multi-species context reveals seasonal variation in habitat selection and partitioning. Ecography 43: 1–18</p> <p>Ross, R.K. 1984. Use of the James Bay and Hudson Bay coasts of Ontario by dabbling ducks. Environment Canada, Canadian Wildlife Service. Occasional Paper Number 54: 63-69</p> <p>Ross, R.K. 1982. Duck distribution along the James and Hudson Bay coasts of Ontario. Le Naturaliste canadien 109: 927-932</p> <p>Sea Duck Joint Venture. 2015. Atlantic and Great Lakes sea duck migration study: progress report June 2015. Unpublished report. [<a href="https://seaduckjv.org/science-resources/atlantic-and-great-lakes-sea-duck-migration-study/">https://seaduckjv.org/science-resources/atlantic-and-great-lakes-sea-duck-migration-study/</a>]</p> <p>U.S. Fish and Wildlife Service. 2019. Waterfowl population status, 2019. U.S. Department of the Interior, Washington, D.C. USA [<a href="https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/Waterfowl/WaterfowlPopulationStatusReport19.pdf">https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/Waterfowl/WaterfowlPopulationStatusReport19.pdf</a>]</p>
4.	<p><b>Policies, Programs or Initiatives:</b> List and summarize the past, current and planned policies, programs or initiatives of your department or agency that may be relevant to the regional assessment. Include an outline of related funding initiatives in this response and provide information on geographic locations, next steps and timing for the program/initiative</p>	<p><b>AIR</b></p> <p>The Air Quality Management System is a comprehensive approach for reducing air pollution in Canada and is the product of unprecedented collaboration by the federal, provincial and territorial governments and stakeholders. Air zones are a place-based approach to manage local air quality. Provinces and territories will delineate and manage air zones within their boundaries with the goal to drive continuous improvements in air quality and to prevent the Canadian Ambient Air Quality Standards (CAAQS) from being exceeded. Air management is guided by an Air Zone Management Framework to ensure proactive measures are taken to protect air quality in accordance with the principles of continuous improvement and keeping clean areas clean. (<a href="https://www.ccme.ca/en/resources/air/aqms.html">https://www.ccme.ca/en/resources/air/aqms.html</a>).</p> <p><b>CLIMATE</b></p> <p>Atmospheric Monitoring</p>

Currently ECCC has automatic Reference Climate Stations at Peawanuck, Big Trout Lake, Lansdowne House and Moosonee. These “Atmospheric Monitoring” sites observe air temperature, humidity, precipitation accumulation, precipitation intensity, snow depth, air pressure, and wind speed and direction. A plan to expand the network to include at least 6 new stations is under review due to funding. Possible locations are Deer Lake, Muskrat Dam, Fort Severn, Ogoki/Marten Falls, Webequie and Fort Albany.

ECCC Climate information is available at <http://climate.weather.gc.ca/> or through the Ontario Climate Services office [http://climate.weather.gc.ca/contactus/climate\\_services\\_e.html](http://climate.weather.gc.ca/contactus/climate_services_e.html).

Official weather warnings and forecasts are available at <http://weather.gc.ca/> and real-time weather observations are available in XML format on the ECCC datamart at <http://dd.weather.ec.gc.ca/observations/swob-ml/>

## **WATER**

Hydrometric Monitoring by the National Hydrometric Service (conducted in partnership with the province of Ontario):

Water Survey Ontario collects and transmits continuous water level data and computes discharge data at hydrometric stations across Northern Ontario. Ontario. Some stations have longer histories than others do. Gauges are funded by both ECCC and MNRF, primarily, within the Canada-Ontario Agreement on Hydrometric Monitoring. The program is subject to resource availability and this is verified on a yearly basis. Water Quality data is usually not collected, but sampling has in recent years become a funded activity by MNRF/MOEE for 5 stations in the Ring of Fire area during the “open-water” (non-winter) months. Funding for this Water Quality activity is verified on an annual basis by the Administrators of the Canada-Ontario Agreement on Hydrometric Monitoring. Management of Surface water flow activities is guided by national standards of the Hydrometric program within the National Hydrologic Service, and additionally by the Ontario Hydrometric Program Coordinators Committee (OHPCC, both ECCC and MNRF representatives are the co-leads). The OHPCC meets 4-6 times/year to ensure efficient operations of hydrometric stations, and to discuss operational issues and general discussions, including the topics of network planning and new gauge installation. National Standards for the work of Hydrometric Program can be found in the WSC Operational Library: [https://drive.google.com/drive/folders/1cPFXTu3qBNZXM9fvHo6\\_5\\_whFlvmO1fq](https://drive.google.com/drive/folders/1cPFXTu3qBNZXM9fvHo6_5_whFlvmO1fq)

Additional information about the NHP can be found here: <https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/monitoring/survey/hydrometric-program-national-partnership.html>

ECCC has assisted with baseline water quality sample collection at the 5 hydrometric sites in the Ring of Fire area for 2017-2019 (04FC013, 04FC001, 04FC002, 04FB001 04EA001). Samples were analysed by MOECC. Water quality sampling was not done in 2020 in light of the pandemic.

ECCC-Water Survey has assisted with site selection, and actively completes hydrometric data collection and computations for 20 stations in the Far North. Stations are funded by ECCC and MNRF. One Water Flow monitoring station was installed during initial discussions of the Ring of Fire and continues to be operated and funded directly by MSC within the area considered to be “Ring of Fire” (Hydrometric Station 04FC003). Water quality data is usually not collected, but sampling has in recent years become a funded activity by MOEE at five of these stations within the Ring of Fire area, during the “open-water” (non-winter) months.

Archived data is available to the public on-line (<https://wateroffice.eg.gc.ca>), and provisional data is available on-line for web-scraping in a “Data Mart” section.

**GREENHOUSE GASSES**

The Strategic Assessment of Climate Change (SACC), revised October 2020, outlines information that the proponent should provide during the impact assessment process on GHG emissions, impacts on carbon sinks, GHG mitigation measures, including Best Available Technologies/Best Available Practices (BAT/BEP), and climate change resilience; the circumstances in which an upstream GHG assessment will be required; and the circumstances in which a credible plan for achieving net-zero GHG emissions by 2050 will be required. The SACC will enable consistent, predictable, efficient and transparent consideration of climate change throughout federal impact assessments.

**WILDLIFE/HABITAT**

**Planned data-collection initiatives**

ECCC-CWS is planning, or in the early stages of conducting, field surveys that will significantly improve understanding of wildlife in the RoF region, focused on VCs under ECCC’s mandate. All projects are subject to resource availability and approvals. Brief project descriptions are provided below.

Waterfowl and Waterbird Surveys

Planning is underway to conduct a series of helicopter surveys focused on waterfowl (ducks, geese and swans) and other water birds (gulls, terns, loons, etc.) to collect baseline information on their abundance, distribution and habitat use/association within the RoF region. Surveys are tentatively planned for spring (mid/late May – early June) 2021 and 2022. The sampling design and spatial extent of planned surveys is largely still under development, but the intention is to provide new and updated data for survey plots surrounding the RoF mining claims area and planned road corridors.

Terrestrial bird Surveys

Fieldwork anticipated for 2021 will target the most extreme baseline data gaps for terrestrial birds in the area of the RoF mining claims. A contract is being developed that will involve the collection of breeding bird song and calling amphibian data at up to 1200 locations across 90 plots in the RoF region (Fig 2). Within these 90 plots, contractors will deploy automated recording units at 240 locations and will record bird point counts at an additional 960 locations during the 2021 breeding season. The sampling design incorporated ecoregions, major rivers, and land cover into the designations of plots and survey sites. Data collected will provide abundance and occurrence information that will enable ECCC to improve the accuracy of models of baseline conditions and impact scenarios.

Should resources be available, further surveys will be undertaken, with a likely emphasis on the context for the proposed road projects connecting RoF mining claims to Ontario’s all-season road network. Surveys will be conducted with a similar density as the above project with an aim of gathering baseline data from a regional perspective in the area of the planned North-South road corridor.

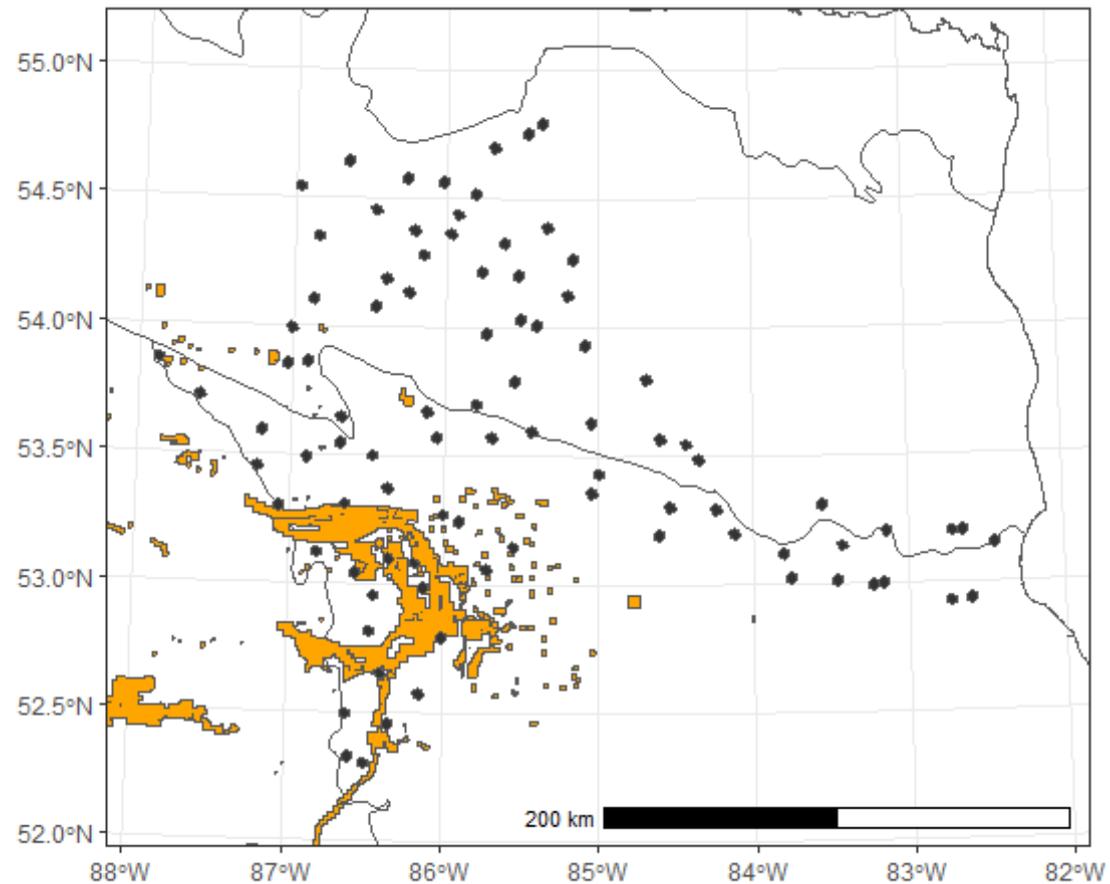


Figure 2: Anticipated 2021 survey locations (black dots) for acoustically detected breeding birds and amphibians. Mining claims (orange) and national ecoregion boundaries (grey lines) are also shown.

Caribou Fecal DNA Surveys

ECCC is securing a contractor to conduct systematic aerial distribution surveys across the provincial Missisa range of the Woodland Caribou, Boreal population (hereafter, Boreal Caribou) in February/March 2021. The contractor will conduct an aerial fixed-wing distribution survey followed by the collection of caribou fecal pellets. The collected caribou fecal pellets will be analysed by ECCC in partnership with the Canadian Forest Service (CFS) and Trent University. The lab analysis will include DNA profiling of individual caribou, and additional data including reproductive hormones, diet and microbiome. This analysis will yield insights including caribou abundance, landscape connectivity, demographic structure (i.e., Boreal Caribou and Caribou, Eastern Migratory population (hereafter, Eastern Migratory Caribou)), dispersal, pregnancy rate, diet, and health. Depending on the outcomes of this first year of work, and resource availability, further surveys may be planned for 2022.

Relevant G&C agreements in 20-21

The following two grants and contributions (G&C) agreements have been put in place in FY20-21 in the RoF region. Conversations with Indigenous groups in the RoF region to discuss potential G&Cs for 21-22 and 22-23 are ongoing. Note that the terms and conditions of many funding contribution agreements with Indigenous recipients stipulate that all intellectual property rights created in association with the project remain the property of the recipient.

Project Proponent /G&C funding recipient: Matawa First Nations Management

Project title: Building capacity in Matawa member First Nations for acoustic monitoring of birds and bats in northern Ontario

Project purpose: ECCC's contribution shall enable the recipient to support the Matawa member First Nations in biodiversity monitoring (birds and bats, including Species at Risk) in the area known as the Ring of Fire in northern Ontario. This 3-year project involves the collaborative development of survey designs, deployment of acoustic recording devices (including community environmental monitor training), interpretation of acoustic files, and development of data summary, communication and engagement tools.

Project Proponent /G&C funding recipient: Webequie First Nation

Project title: Building Capacity through Traditional Knowledge to Conserve and Protect Boreal Woodland Caribou for Future Generations

Project purpose: ECCC's contribution shall enable the recipient to develop a living database of Traditional Knowledge and western science that will contribute to creation of a Woodland Caribou Atlas relevant to caribou populations in Webequie First Nation traditional territory, build community capacity, and contribute to all future conservation and recovery efforts of local caribou.

**Additional wildlife-related policies, programs and initiatives**

The attached Excel file "ECCC- RoF FAAR response - CWS G&Cs for funded projects in RoF RA study area.xlsx" lists ECCC-CWS G&C agreements from 2007-2008 to 2020-2021, relevant to the RoF region, and associated reports.

**The following list provides ECCC-CWS policies, programs and initiatives active in 2021-2022, that may be of relevance to the RoF region.**

*Cumulative Effects* – Funding available through G&C opportunities to:

- Build capacity and engage Indigenous communities to advance the use and integration of Indigenous Knowledge and participation in Regional Assessments; and,
- Continue to support clear and transparent evidence-based decision making in the Impact Assessment process by developing Open Data tools to effectively manage and enhance access to user-friendly biodiversity information.

Habitat Conservation and Protection Programs – Funding available through G&C opportunities

Continue to support efforts of partners and Indigenous Peoples to: restore, conserve, connect and protect habitat, in particular contributing to the federal government's commitments to protecting 25% of Canada's land and ocean by 2025; and to help manage priority habitats, including ECCC's Protected Areas, and promote their value to Canadians.

- *Convention on Wetlands of International Importance (Ramsar Convention)* - To lessen the loss of wetlands and to ensure their conservation and sustainable wise use for future generations. Canadian conservation-based stakeholders work together to designate and effectively manage Ramsar sites. Two Ramsar sites occur in the vicinity of the RoF region; Polar Bear Provincial Park and Southern James Bay.

- *Federal Policy on Wetland Conservation (FPWC)* - To promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future. The FPWC advocates wetland conservation through the full range of federal decisions and responsibilities. Cabinet directed that the FPWC be applied to all policies, plans, programs, projects, and activities carried out by the federal government. This policy commits federal departments to the goal of no net loss of wetland functions in the following three situations:
  - On federal lands and waters,
  - In areas affected by the implementation of federal programs where the continuing loss or degradation of wetlands has reached critical levels, and
  - Where federal activities affect wetlands designated as ecologically or socio-economically important to a region. Due to local circumstances where wetland losses have been severe, in some areas no further loss of any remaining wetland area may be deemed essential.
  - Within these three situations no further loss of wetland area may be required where wetland losses have been severe
- *Protected Areas* - To designate and effectively manage a network of marine and terrestrial National Wildlife Areas (NWAs) and Migratory Bird Sanctuaries (MBSs) for the benefit of migratory birds and species at risk. Co-management of sites is sought where possible. Three MBSs occur in the vicinity of the RoF region; Hannah Bay MBS, Akimiski Island MBS and Moose River MBS.
- *Indigenous Protected and Conserved Areas & other PCA Protected Areas* - To expand Canada's network of protected and conserved areas, including Indigenous protected and conserved areas to contribute to Canada Target 1 of conserving 25% of Canada's terrestrial and inland water areas by 2025
- *Indigenous Guardians Pilot Program* - To support Indigenous Peoples in exercising their responsibilities in protecting and conserving ecosystems, developing and maintaining sustainable economies, and continuing the profound connections between Canadian landscape and Indigenous culture
- *North American Waterfowl Management Plan (NAWMP)* - To conserve and restore wetlands, associated uplands and other key habitats for waterfowl and other wildlife populations through the Habitat Joint Ventures partnerships. The RoF region is part of the Eastern Habitat Joint Venture.

Species at Risk Program – Funding available through G&C opportunities

Continue to advance delivery of the Pan Canadian Approach to Transforming Species at Risk (SAR) Conservation in Canada and Indigenous-led SAR conservation, with increased focus on projects delivering on the ground action with multi-species benefits.

- *Aboriginal Fund for Species at Risk (AFSAR)* - To support the development of Indigenous capacity to participate actively in the implementation of the Species at Risk Act. AFSAR also supports projects that will prevent species, other than species at risk, from becoming a conservation concern. Past and current AFSAR projects are shown in attached file [CWS ON RoF FARRresponseGandClist.xlsx].
- *Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada* – In collaboration with the provinces and territories, the Pan-Canadian approach focuses on conservation of multiple species and ecosystems. Conservation efforts are concentrated on the following three priorities across Canada:
  - Priority species: Priority species have special meaning for Indigenous Peoples and most Canadians. Delivering conservation outcomes for targeted priority species can have significant co-benefits for other species at risk, wildlife in general, and related biodiversity values. Six federal, provincial and territorial shared priority species have been identified of which one, Boreal Caribou, occurs in the RoF region.
  - Priority places: Priority places are selected to have significant biodiversity, concentrations of species at risk, and opportunities to advance conservation efforts. There are two types of priority places; federal-provincial-territorial priority places and community-nominated priority places. There are currently no priority places in northern Ontario.
  - Priority sectors and threats: The pan-Canadian approach to species at risk requires collaborative action with partners and stakeholders to implement mitigation measures and to identify opportunities to improve conservation outcomes for species at risk. Key sectors identified

		<p>under the pan-Canadian approach include agriculture, forestry, and urban development. Key threats include invasive alien species, wildlife disease, and illegal wildlife trade.</p> <ul style="list-style-type: none"> <li>• <i>Indigenous Partnerships</i> - To support First Nations, Inuit, and Métis efforts to conserve species at risk in a manner that recognizes and enables Indigenous peoples' leadership in the management of lands and resources. The program provides directed funding to Indigenous partners for: <ul style="list-style-type: none"> <li>• Building capacity to lead the design and implementation of conservation measures for species at risk and their habitat that consider existing and future interests of partner communities;</li> <li>• Negotiating and implementing agreements with interested First Nations, Inuit, and Métis that support Indigenous-led conservation of at-risk species;</li> <li>• Supporting the meaningful participation of First Nations, Inuit, and Métis in the implementation of the Species at Risk Act.</li> </ul> </li> <li>• <i>Habitat Stewardship Program</i> - To support projects that contribute directly to the recovery objectives and population goals of species at risk listed on Schedule 1 of the Species at Risk Act and prevent others from becoming a conservation concern.</li> </ul> <p><u>Migratory Birds and Other Wildlife Programs</u> – Funding available through G&amp;C opportunities Domestic monitoring, conservation action, and management initiatives for migratory birds and other wildlife to deliver evidence-based products that directly support the Pan Canadian Approach to Species at Risk, including listing/recovery, climate change, priority sectors, priority species, conservation planning/action, and Indigenous engagement.</p> <ul style="list-style-type: none"> <li>• <i>NAWMP – Species Wildlife Health</i> - To support projects that are focused on migratory game birds that are important from a North American Waterfowl Management Plan perspective.</li> <li>• <i>Wildlife Health</i> - To provide country-wide surveillance and support across the country in relation to wildlife health. Projects aim to support: <ul style="list-style-type: none"> <li>• Health and threat monitoring (e.g. parasites, pathogens and diseases, including White-nose syndrome),</li> <li>• Assessment of information about these wildlife health issues,</li> <li>• Knowledge mobilization, and</li> <li>• Program management.</li> </ul> </li> <li>• <i>Powley</i> - To provide funding to Métis organizations to gather information on their harvest of migratory birds and be able to participate in cooperative migratory bird conservation and management</li> <li>• <i>Bird Monitoring and Conservation</i> - To support migratory bird conservation by engaging organizations (especially environmental non-government Organizations and universities, but also other levels of government) in delivery of various projects related to monitoring, management, and conservation of migratory birds</li> </ul> <p><u>Operational Framework for Use of Conservation Allowances</u>- This framework sets the parameters, based on existing legislated authorities, practice and policy, for how and when conservation allowances should be used or recommended by Environment Canada. Conservation allowances are the third step of the mitigation hierarchy, a three-step approach that first examines options to avoid and minimize environmental impacts. The framework applies where Environment Canada has a role related to the review or approval of proposed land- or resource-use activities, including those that occur on federal lands or waters, projects, or activities that are subject to federal legislation, actions that would affect Aboriginal and/or treaty rights, or when Environment Canada has environmental protection or conservation objectives that would be affected by the proposed activity.</p>
5.	Outline any additional responsibilities, information or	The Accord for the Protection of Species at Risk and the Canada-Ontario Agreement on Species at Risk, outline how the federal and Ontario provincial government cooperate on conservation and protection of SAR.

	knowledge and any <b>partners or collaborations</b> that have not been specified, above.	
PART 2	To contribute to the design of the regional assessment process and development of the terms of reference, please provide information or advice in relation to the items below.	
1.	<b>Potential outcomes</b> of the regional assessment	<p>In the absence of details on the design and objectives of the regional assessment, ECCC can provide the following high-level suggestions on potential outcomes. ECCC expects to be able to provide more specific advice on potential outcomes once more details on the scope of the regional assessment have been determined in conjunction with the Province of Ontario.</p> <p>Inventory and assessment of the current state of knowledge of the environment in the Ring of Fire area</p> <ul style="list-style-type: none"> <li>• This could include wildlife and habitats, including species at risk such as Caribou and migratory birds, air and water quality, etc.</li> <li>• Analysis to identify priority data gaps, the information required to fill them, and the parties to be involved (i.e. federal, provincial, indigenous groups, other)</li> </ul> <p>A cumulative effects model to determine future cumulative effects based on development scenarios, factoring in climate change considerations</p> <ul style="list-style-type: none"> <li>• Developing guidance and frameworks for future project impact assessments</li> </ul> <p>Establishment of standard mitigation to guide future planning and project development</p> <ul style="list-style-type: none"> <li>• This may include the identification of areas of high ecological value where there could be implications for development (e.g. unique mitigation measures)</li> </ul>
2.	<b>Relevant geographic and temporal boundaries</b>	<p>Geographic and temporal boundaries will vary depending on the valued component considered and the activities and projects being scoped into the assessment. ECCC can provide further detailed advice on appropriate geographic and temporal boundaries once more information on the scope of the regional assessment becomes available. In the interim ECCC offers the following comments for consideration.</p> <p><b>AIR</b></p> <p>Air Zone 1 (Majority of Northern Ontario) - Areas with limited pollution from either point or non-point sources or transboundary influence; where the management activities focus on maintaining good air quality.</p> <p><b>CLIMATE CHANGE</b></p> <p>Given the potential for changes in future climate in the study area, there is also the potential for climate change to alter environmental conditions relevant to future projects in the study area (such as due to changes in precipitation or extreme events). Ideally, the temporal boundaries of the Regional Assessment should extend over the time-period for which potential project activities may occur in the area (e.g. to end of century).</p> <p><b>WILDLIFE</b></p> <p>The boundaries of the RA should be defined with respect to the specific questions to be asked by the RA committee, and with an understanding of the types, locations and life span of the developments to be included in the RA, as well as the valued components to be considered, and what scales are relevant (e.g. watershed, wildlife range, etc.). As this information becomes available, the following advice should be revisited and updated.</p>

At present, it is not clear which portion of the currently planned development will be included in the scope of the RA. ECCC recommends it include, at a minimum, the main crescent of mining claims known as the Ring of Fire, the proposed Webequie Supply Road and Marten Falls Community Access Road (including route alternatives), and the associated N-S mining claims as shown in Fig 3. The upcoming Northern Road Link and any other upcoming potential developments should also be considered for inclusion in the scope of the future development considered by the RA.

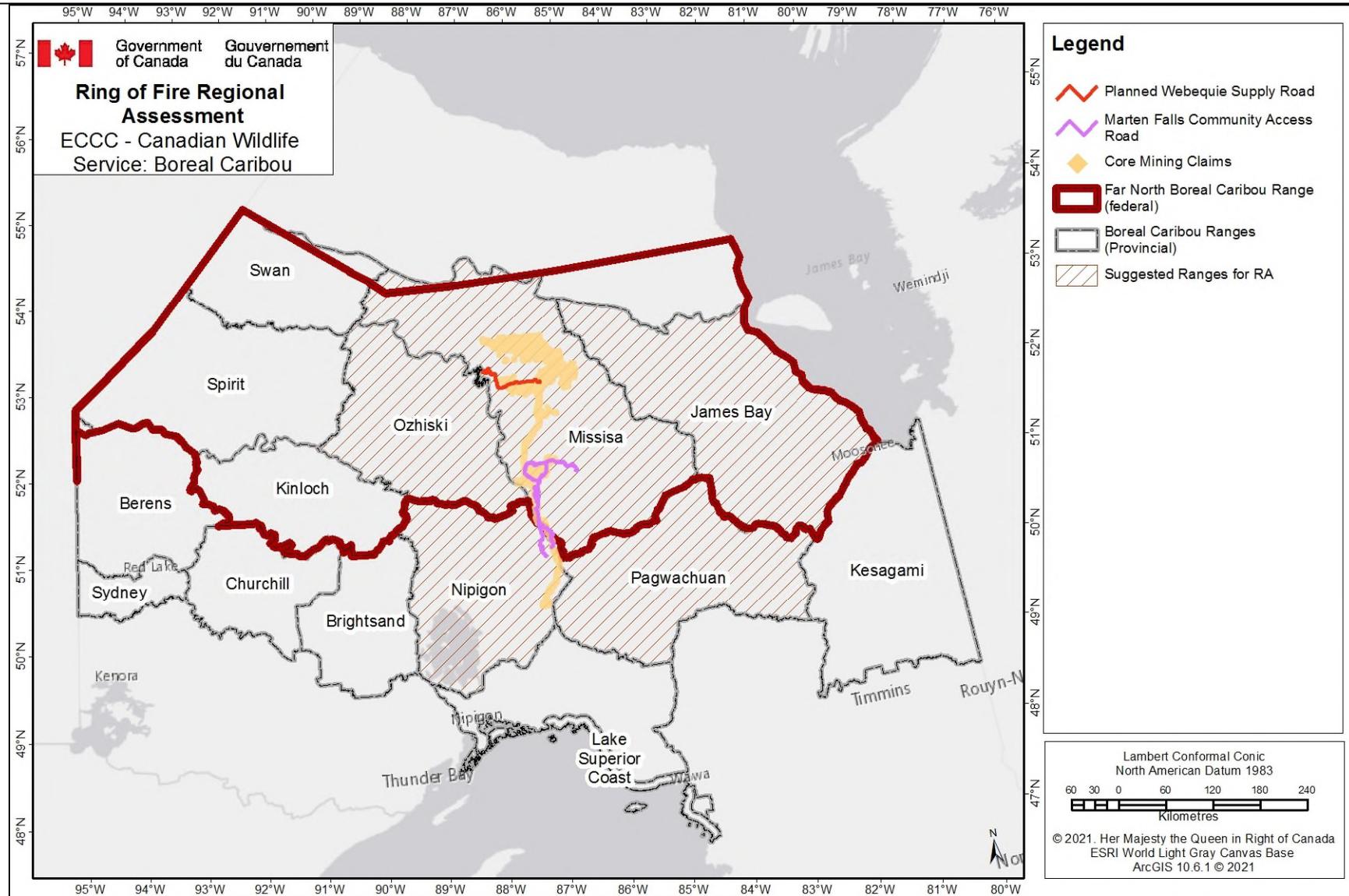
#### **Geographical boundaries**

ECCC's recommendation related to geographical boundaries is defined by ECCC's mandate to consider migratory birds, SAR, and their habitats, particularly wetlands. ECCC recognizes that the eventual spatial extent of the RA may be larger than what is defined by ECCC's mandate. However, it is understood that geographic boundaries relevant to particular VCs can be a subset of the total spatial scope of the RA. As such, ECCC recommends the following considerations for identifying geographical boundaries for i) Boreal Caribou, ii) Eastern Migratory Caribou and iii) migratory birds and other SAR.

#### **Boreal Caribou**

The RoF mining claim crescent and the mining claims along the planned North-South road corridor overlap the border with four Boreal Caribou provincial ranges; Missisa, Ozhiski, Nipigon and Pagwachuan. Caribou in this area are generally widespread, and collaring data demonstrates movement of Boreal Caribou between the Missisa range and the James Bay range to the east as well as the Swan range to the northwest. The boundary between the Missisa and James Bay ranges was delineated by the province of Ontario for logistical purposes (i.e., to select an area of reasonable size to survey), and does not reflect any major ecological pattern. In addition, the James Bay range is hydrologically downstream of the mining crescent, and therefore potentially at risk of downstream impacts of development. Boreal Caribou rely directly and indirectly on the entire range, and move over large distances both within and between ranges to complete their lifecycle. As the Missisa, Ozhiski, Nipigon and Pagwachuan provincial ranges are likely to be directly effected by development, and the caribou in the James Bay range will potentially be impacted by downstream effects, and due to the regular movement of boreal caribou within and between these ranges, ECCC recommends the full extent of the following five ranges, Missisa, Ozhiski, Nipigon, Pagwachuan and James Bay be considered as the spatial extent for the Boreal Caribou under the RA.

Impacts of disturbance for boreal caribou persist for at least 40 years ([https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/ri\\_boreal\\_caribou\\_science\\_0811\\_eng.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/ri_boreal_caribou_science_0811_eng.pdf)). A reasonable temporal boundary for assessment of cumulative effects would be 40 years after the life cycle of proposed projects.



### Eastern Migratory Caribou

The Eastern Migratory Caribou in Ontario form part of the Southern Hudson Bay herd, which extends from Cape Henrietta Maria west across the Ontario-Manitoba border. Within this range, caribou move from the coast to spend the winter inland, and return to the coast for the summer, where they breed and calve. Therefore, Eastern Migratory Caribou's range overlaps with the RoF mining claims, and the Boreal Caribou ranges every winter. Similar to the Boreal Caribou, Eastern Migratory Caribou rely directly or indirectly on the entire range to complete their lifecycles, and there is no recognized ecological

subdivision of the Southern Hudson Bay herd, suitable for the purposes of the RA. Therefore, ECCC recommends that the Ontario portion of the Southern Hudson Bay range of Eastern Migratory Caribou be used as the spatial extent for Eastern Migratory Caribou under the RA.

Migratory birds and non-caribou SAR

With respect to ECCC's mandate for migratory birds, and non-caribou SAR and their habitats, ECCC's goal is to provide considerations for defining a spatial extent that serves each of the following purposes:

- Reflection of the extent and expected pathways of anticipated effects
- Provide an ecologically defensible context for IA projects related to development in the RoF region, both individually and collectively
- Identification of existing datasets with respect to their known direct relevance to the RA and/or to project IAs

ECCC's suggested approach is to define a boundary informed by an analysis of the extent of anticipated effects of development and ecologically relevant land cover. Fig 3 is offered as an illustration of potential spatial boundaries in relation to the distribution and abundance of birds and non-caribou SAR. This illustration is not intended to represent the mandates of other RoF partners on these species (e.g. water- or air-driven toxicological effects on birds and other wildlife). The map shows the RoF mining claim crescent, mining claims along the planned road corridors, and three potential boundaries at 50, 100 and 150 km from the mining claims shown. The final application of this approach is likely to result in different boundaries for different groups or species, depending on scale (for example different boundaries might be needed for wolverine compared to Yellow-banded Bumble Bee). Nevertheless, ECCC does not anticipate that it would be necessary to define a boundary much larger than the largest 150 km boundary presented as an example in Fig 3.

With respect to existing datasets, the largest of the illustrated boundaries was used to approximate those that might be expected to have direct relevance to the RA, and to identify datasets that may be helpful in addressing particular objectives and questions (some of which may be led by other RA partners) (see response to part 1 Q3).

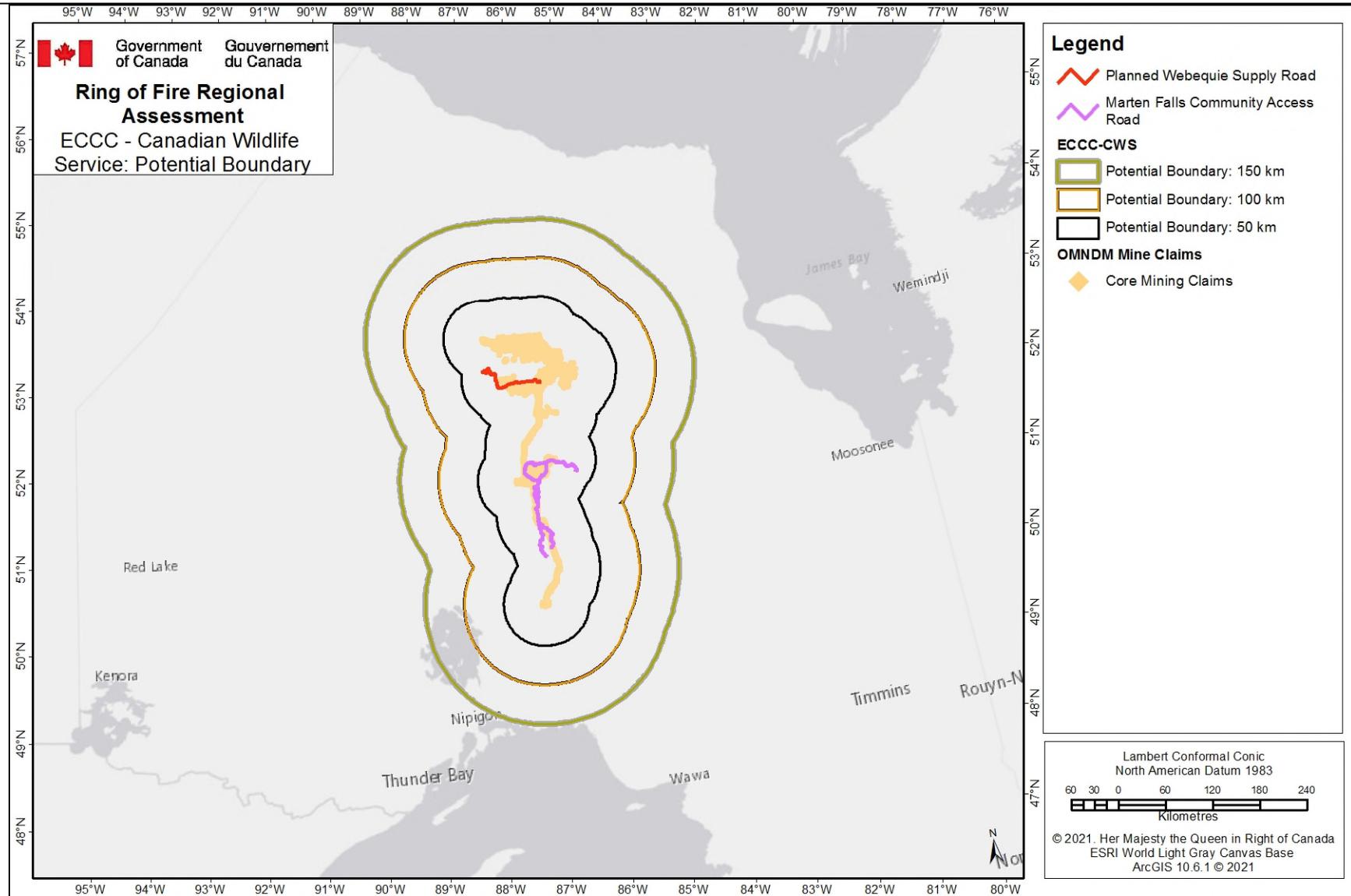


Figure 3: Map shows RoF mining claims, planned Webequie Supply Road and Marten Falls Community Access Road and three potential boundaries at 50, 100 and 150km from the claims. This map is intended as an illustration of potential spatial boundaries, not a final product; analysis will be used to define the final boundary relevant to migratory birds and non-caribou SAR.

3.	<p><b>Factors to be considered</b> in the regional assessment</p>	<p><b>AIR and WATER</b></p> <p>Mining</p> <p>The construction, operation, and decommissioning of mines can result in adverse effects on air and water quality. Mining operations, processing (crushing and milling), and activities associated with combustion (including transportation) can result in the emission of contaminants such as sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub> and PM). Activities that cause a physical disturbance to land and ore material, such as earth moving, land clearing, blasting, crushing, and transportation, can also introduce particulate matter (e.g., dust and soot) to the surrounding region. The emission of these air contaminants can result in local or regional degradation of ambient air quality, with potential impacts on human health as well as on sensitive ecosystem receptors. Furthermore, emissions of air contaminants may add cumulatively to the emissions from other activities, contributing to degradation of air quality in the region.</p> <p>When contaminants settle out of the air in the surrounding environment, their deposition may result in adverse impacts to terrestrial and aquatic ecosystems. For example, metals and polycyclic aromatic hydrocarbons (PAHs) emissions from mining activities may result in elevated concentrations of these contaminants in water, soil, flora, and fauna. Emissions of NO<sub>x</sub> and sulphur dioxide (SO<sub>2</sub>) may also lead to acidification and potential exceedance of ecosystems' critical loads. Air contaminant emissions can result in contamination of nearby land and waterbodies, and may affect plants, wildlife, and fish and fish habitat.</p> <p>The activities linked to the construction, operation, and decommissioning of mining projects can have adverse effects on the quality of groundwater and surface water, as well as on the hydrological regimes of watercourses and water bodies. Contaminants may enter waterbodies through wastewater discharge, seepage, or spills resulting in adverse effects on water quality.</p> <p>A mine project may include exposure of potentially metal-leaching rock to air and water. Interaction between water, air and the exposed rock could then lead to the leaching of metals into the receiving environment and water body, resulting in adverse effects on water quality.</p> <p>Mining operations can expose rock that contain soluble minerals. When water passes over or through them, these minerals can dissolve in water and result in highly saline runoff; this runoff drains into water bodies thereby altering salinity levels and resulting in adverse effects on water quality.</p> <p>Surface water quantities could change by alteration of surface flows, potentially affecting water quality. Furthermore, the production of process-affected water has the potential for contaminants to enter groundwater through seepage from the tailings disposal areas, contaminants that could transport to surface waters downstream. The effectiveness of closure plans for mines can affect long-term surface water quality.</p> <p>Mining projects may result in adverse effects to surface water quality through "drawdown" of the water table – that is, a lowering of the water table underground. Water table drawdown can happen because of construction of open pits, underground mines as well as through pumping out groundwater that seeps into an open pit or underground mine. It can also happen due to removal of water from constructed wells for water-intensive operational processes in the mine. The "drawdown" of a water table can have an impact on surface water quality by reducing the quantity of groundwater available to recharge surface water bodies. This, in turn, could reduce the total volumes of water in nearby lakes or rivers and potentially increase the concentration of contaminants in those water bodies, thereby resulting in adverse effects on water quality.</p>
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#### Road and Rail

Projects that involve rail traffic and projects which will result in an increase in demand for rail traffic as a direct result of the project (e.g., mining projects where product will be transported by rail) have the potential to adversely affect air quality. More specifically, the combustion of fossil fuels to power the rail engines can result in the emission of air contaminants such as sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), and fine particulate matter (PM<sub>2.5</sub>). When some contaminants settle out of the air in the surrounding environment, their deposition may result in acidification and potential exceedance of ecosystems' critical loads. The emission of these air contaminants can result in local or regional degradation of ambient air quality, with potential impacts on human health as well as sensitive ecosystem receptors.

Projects that involve on-road vehicles and mobile off-road machines for construction, operation and decommissioning, or that lead to an increase in road traffic (e.g. hauling of material by truck from mine to shipping terminal), have the potential to adversely affect air quality. More specifically, the combustion of fossil fuels can result in the emission of air contaminants such as sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), and fine particulate matter (PM<sub>2.5</sub>). When some contaminants settle out of the air in the surrounding environment, their deposition may result in acidification and potential exceedance of ecosystems' critical loads. The emission of these air pollutants can result in local or regional degradation of ambient air quality, with potential impacts on human health as well as sensitive ecosystem receptors.

#### Pipelines, Transmission Lines and other Linear projects

Activities related to the construction, operation, closure and/or dismantling of pipelines for fuel could have adverse effects on air and water quality. The combustion associated with these activities, such as the use of engines (road, off-road, stationary) or the operation of compressor stations, cause the emission of contaminants such as particulate matter (PM, PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen oxides (NO<sub>x</sub>), and sulphur oxides (SO<sub>x</sub>). These activities can also be the source of the emission of other potentially hazardous substances, such as volatile organic compounds (VOCs), hydrogen sulphide (H<sub>2</sub>S), polycyclic aromatic hydrocarbons (PAHs), and carbon monoxide (CO). The emission of these air pollutants can lead to local or regional degradation of ambient air quality that is likely to have negative effects on human health as well as on sensitive receptors in the ecosystem. These activities could also adversely affect the quality of surface and groundwater, as well as the hydrological regime of rivers and water bodies. Various activities, in particular the crossings of watercourses during the construction of the gas pipeline, hydrostatic tests, construction and maintenance of access roads, the excavation or reworking of soils, sediments, or rock, as well as drilling and blasting, could release harmful substances into nearby streams and waterbodies. Stormwater runoff, acid rock drainage and metal leaching, wastewater discharge, as well as groundwater resurgences could also affect surface and groundwater quality. Activities that physically disturb the soil or rock, such as earthworks, land clearing, blasting and transport, can produce dust (particulates). These emissions could lead to a degradation of air quality as well as the deposition of contaminants in terrestrial and aquatic environments.

Activities related to the construction, operation, closure and dismantling of transmission lines could have negative effects on air and water quality. Dust (particulates) can be released into the atmosphere leading to a degradation of air quality as well as the deposition of contaminants in terrestrial and aquatic environments. Clearing land, establishing hard surfaces, and discharging wastewaters into surface water and groundwater could impact water quality.

#### Construction Activities

Activities related to construction include transportation (use of vehicles), land clearing and demolition, and chemicals usage. These can lead to emissions of particulate matter (PM, PM<sub>10</sub> and PM<sub>2.5</sub>), volatile organic compounds (VOCs), and other substances affecting air quality as well as the deposition of contaminants in terrestrial and aquatic environments. Pollutants from construction activities can seep into groundwater or discharge into surface water.

#### **ENVIRONMENTAL EMERGENCIES**

Spill Preparedness is a necessary component for various project types that poses a risk of accidental spills or releases to the environment. It is usually based on a risk analysis that is derived from an assessment of the likelihood of a spill incident and its potential consequences. Components of such an analysis would normally include:

- Qualitative assessment of potential worst-case accident scenarios and their potential consequence impacts, including likely environmental receptors and pathways
- Quantitative assessment of potential alternative accident scenarios, including spill frequency and volume estimates
- Mitigation strategies (passive and active) to limit or contain such impacts
- Integrity management plans for critical infrastructure and safety equipment
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Emergency Management Plans need to reflect a consideration of all potential accidents and malfunctions and must take into account regional conditions and environmental sensitivities. On the assumption that a catastrophic incident is likely to occur during the lifespan of a project, ECCC recommends that proponents commit to certain mitigation strategies, contingency plans and response capabilities commensurate with their project's environmental risks.

These include, but are not limited to:

- Spill Contingency and Emergency Response systems and measures based on "worst-case" scenarios, and higher-probability but lower-consequence "alternative" accident scenarios
- Training programs and annual exercise regimes
- Staff certification and continuous improvement programs
- Environmental sensitivity research and mapping
- Contaminant fate & behaviour trajectory modelling and atmospheric transport & dispersion modelling through all seasons of the year
- Spill counter-measures testing and practice
- Contractual arrangements with certified Response Organizations
- Multi-organizational mutual aid agreements for response
- Community awareness and education initiatives
- Community emergency notification and communications procedures
- Spill research and development programs
- Follow-up monitoring for recovery

ECCC generally recommends that environmental emergency prevention, preparedness, response and recovery plans, reflect a consideration of applicable standards and best practices including the following:

- Canada Standards Association (CSA) *Emergency Planning for Industry* (third edition of CAN/CSA-Z731-03). <http://shop.csa.ca/en/canada/injury-prevention/z731-03-r2014/inv/27019912003>

- Canadian Standards Association (CSA). *Designing for the Environment* (CAN/CSA-Z762-95). Toronto: CSA, 1995; 2011. <http://shop.csa.ca/en/canada/design-for-the-environment/z762-95-r2011/inv/27002291995>.
- Canadian Standards Association (CSA). *Guideline for Pollution Prevention, Environmental Technology: A CSA Information Product* (General Instruction No. 1, Z754-94). Toronto: CSA, 1994. <http://shop.csa.ca/en/canada/environmental-management-systems/z754-94-r2001/inv/27001861994>
- *2016 Emergency Response Guidebook* (ERG2016) accessible at <http://www.tc.gc.ca/eng/canutec/guide-menu-227.htm>
- Council for Reducing Major Industrial Accidents/Conseil pour la reduction des accidents industriels majeurs (CRAIM) *Risk Management Guide for Major Industrial Accidents* (2002 edition) accessible at: <https://www.craim.ca/guides/>
- Environment and Climate Change Canada. *A Field Guide to Oil Spill Response on Marine Shorelines*. March 2010. <http://publications.gc.ca/site/eng/366655/publication.html>

**GREENHOUSE GASSES**

Existing and future activities within the Ring of Fire region may hinder or contribute to the Government of Canada’s ability to meet its commitments in respect of climate change.

Factors 22(1)(i) of the Impact Assessment Act requires that the assessment of a designated project assesses the extent to which the effects of the designated project hinder or contribute to the Government of Canada’s ability to meet its commitments in respect of climate change such as the Paris Agreement, Canada’s 2030 target and Canada’s goal of net-zero emissions by 2050.

As such, the regional assessment should consider GHG emissions, impacts on carbon sinks and mitigation measures as per the guidance provided in the Strategic Assessment of Climate Change (SACC) (revised October 2020).

**CLIMATE CHANGE**

In general, climate change may alter the likelihood or magnitude of sudden weather events such as extreme precipitation that can contribute to flooding, as well as contribute to longer-term changes such as sea level rise, permafrost thaw and changes to migration patterns. Changes related to warming are already evident in many parts of Canada, and are projected to continue in the future with further warming. If not properly considered, such changes may cause issues such as equipment failures that can threaten the environment, human health and safety, interrupt essential services, disrupt economic activity, and incur high costs for recovery and replacement.

Potential climate changes in the Ring of Fire area, such as possible changes in mean and extreme precipitation and temperature and related environmental conditions, may alter baseline conditions. Consideration of potential climate change effects, including implications for climate sensitive aspects of future project design and associated effects on the environment, is therefore of relevance for those projects where climate over the project lifetime is projected to be different from past and current climate in the area. The regional assessment should provide information on how climate may change in the Ring of Fire study area.

**WILDLIFE AND HABITAT**

The following would be beneficial as valued components under the RA:

- Birds, migratory birds and their habitats
- Species listed as Extirpated, Endangered, Threatened or Special Concern under SARA, and their habitats (note that this list will change over time as changes are made to the species listed under SARA), including caribou
- Species assessed as Endangered, Threatened or Special Concern by COSEWIC that may be listed under SARA in the future, and their habitats (note that this list will change over time as more species are assessed/reassessed by COSEWIC)
- Wildlife of importance to Indigenous peoples (e.g. hunted species, species of cultural importance) and their habitats. ECCC does not have a complete list of these to share; such a list should be developed by local Indigenous communities. However, this list may include Moose, Muskrat, Swans, Geese and Ducks, Sandhill Crane, American Woodcock, Ruffed Grouse, Spruce Grouse, Willow Ptarmigan among others.
- Wetland function

Assessment over large areas is necessary for caribou, but may not be required for other valued ecosystem components. In cases where expected impacts may be more localized, smaller study areas may suffice. Allowing different geographic boundaries for different ecosystem components may help limit the scope of the regional assessment and prioritize resources.

Important habitat features that support migratory birds, SAR and other wildlife in the RoF region should be considered throughout the RA. Additional habitat features may be added to this list as understanding of wildlife habitat associations in the region grows. Water bodies, wetlands, watercourses; riparian habitat; river banks or other eroded habitats; artificial water sources; forest, tree patches, solitary trees (especially old decaying trees); forest edges and tree rows; ridges, including eskers; caves and mines; cliffs, rock outcrops, exposed bedrock, talus, and other karst topography; buildings, bridges, and other anthropogenic features, including linear features; sources of artificial lighting attracting insects; critical habitat; and any other habitat features known to be important in the area should be considered important habitat features.

The following SARA-listed migratory bird species are known to occur or are likely to occur in the RoF region:

- Bank Swallow (Threatened),
- Barn Swallow (Threatened),
- Canada Warbler (Threatened, reassessed Special Concern by COSEWIC),
- Common Nighthawk (Threatened, reassessed Special Concern by COSEWIC),
- Evening Grosbeak (Special Concern),
- Horned Grebe, Western population (Special Concern),
- Olive-sided Flycatcher (Threatened, reassessed Special Concern by COSEWIC),
- Rusty Blackbird (Special Concern),
- Yellow Rail (Special Concern),
- Whip-poor-will (Threatened).
- In addition, Lesser Yellowlegs, which has been assessed Threatened by COSEWIC, also occurs in the RoF region.

Other terrestrial SARA-listed species known to occur or are likely to occur in the RoF region include:

- Little Brown Myotis (Endangered),
- Monarch (Special Concern, reassessed Endangered by COSEWIC, non-breeding),

- Northern Myotis (Endangered),
- Short-eared Owl (Special Concern),
- Wolverine (Special Concern),
- Woodland Caribou, Boreal population (Threatened),
- Yellow-banded Bumble Bee (Special Concern).

In addition, Caribou, Eastern Migratory population, which has been assessed Endangered by COSEWIC is also likely to occur in the RoF region.

Depending on the scope and boundaries of the regional assessment, the following additional terrestrial SARA-listed species occurring along the James Bay and Hudson Bay coasts may also need to be included:

- Buff-breasted Sandpiper (Special Concern),
- Bobolink (Threatened),
- Eastern Meadowlark (Threatened),
- Henslow's Sparrow (Endangered),
- Polar Bear (Special Concern),
- Red-necked Phalarope (Special Concern),
- Red Knot rufa subspecies (Endangered, recently reassessed by COSEWIC as three different designatable units:
  - Red Knot rufa subspecies (Northeastern South America wintering population) DU4, Special Concern;
  - Red Knot rufa subspecies (Southeastern USA / Gulf of Mexico / Caribbean wintering population) DU5, Endangered;
  - Red Knot rufa subspecies (Tierra del Fuego / Patagonia wintering population), DU3, Endangered)

In addition, two COSEWIC assessed species; Harris's Sparrow (Special Concern), Hudsonian Godwit (Threatened), occur along the James Bay and Hudson Bay coasts.

#### Caribou

The Missisa and James Bay boreal caribou ranges are among the least disturbed ranges in Canada, making the Ring of Fire an area of national importance for boreal caribou. Available information on the status of these populations comes from a 2014 provincial assessment informed by 2008-2013 data which found relatively low survival and recruitment rates even in undisturbed areas. Available information suggests the populations may be vulnerable even though disturbance is low. Baseline data collection and ongoing monitoring is necessary to assess effects of development on these populations. Consideration of the cumulative effects of proposed development on caribou behaviour may help mitigate impacts.

#### **Wildlife and Habitat, general:**

There is the potential for development in the RoF region to adversely affect SAR and migratory birds and other wildlife through a variety of mechanisms including: mortality, habitat loss, habitat disturbance, changes in habitat connectivity, poaching, sensory disturbance and changes to ecological relationships such as predator-prey relationships, and food availability. Boreal Caribou may be particularly vulnerable to the impacts of development as they are wide-ranging and move throughout the area to access required habitat as needed through their annual cycle. In addition, the local population of Boreal Caribou is under-studied and the region is largely undisturbed. As a result, data regarding the local population and its expected response to RoF developments is lacking. There is also the potential for adverse effects of development on wetland function including direct loss of wetlands, hydrological changes, changes in geomorphological processes, and release of harmful substances. The impacts of future development in the region are difficult to reliably predict due to

the i) the complicated nature of the potential future development, including different types of development with different lifecycles overlapping in space and time, ii) the added impact of the opening up of a previously remote area with low levels of human population to increasing human use and iii) the complex ecological setting, where the proposed developments straddle two quite different ecoregions in which the impacts of development need to be predicted. In addition, the current understanding of potential impacts is limited because there is minimal development in the region from which to extrapolate impacts. Therefore, it will be important to consider the potential for and interaction of cumulative effects from many types of physical activities and/or projects that have been or will be carried out for all of the issues described below in both the shield to the west of the planned development and in the lowlands to the east. Understanding and predicting cumulative effects in this complicated system will likely require sophisticated cumulative effects modelling that accounts for natural variability and disturbance, climate change as well as anthropogenic disturbance.

The following comments describe anticipated factors to be considered, but is limited by current understanding of the types of future developments (mining and all-season roads), and by understanding of impacts in this complicated region, where impacts particularly in the vast peatlands areas are difficult to predict.

#### Wildlife and Habitat, Mining

The activities linked to the construction, operation, and decommissioning of a mine and associated infrastructure could have negative effects on terrestrial wildlife, including migratory birds and SAR (amphibians, arthropods, birds, lichens, terrestrial mammals, mosses, reptiles, and vascular plants) listed under SARA, and their habitat, and to wetland function.

The nature of effects to wildlife and habitat (including residences and critical habitat defined under SARA) can vary based on a number of factors, including: project location, duration, scale, and configuration; ancillary project activities (land clearing, dredging, flaring, marine shipping); existing cumulative effects; the type of habitat that may be disturbed; and sensitivity of species found in the project area. The pathway through which potential effects are conveyed will depend on the land, air, and water constituents associated with the site along with the behavioral adaptability, presence and interaction with the species limiting factor (e.g., habitat supporting staging, nesting, roosting foraging or movement) and population resilience. These factors may be accounted for and support reliable decision making if both information on effects pathways and analyses supported by sufficient data foundations can be achieved.

#### Wildlife and Habitat, Linear Projects

The activities linked to the construction, operation, and decommissioning of linear projects in the RoF region could have negative effects on terrestrial wildlife, including migratory birds and SAR (amphibians, arthropods, birds, lichens, terrestrial mammals, mosses, reptiles, and vascular plants) listed on (SARA), their habitat, and wetlands. These impacts will be particularly important in this region, which currently has no all-season roads or other large linear disturbances. Fragmentation of habitat by roads can impact all wildlife, but species that move over large distances within the region during their annual cycle including caribou and Wolverine are particularly vulnerable to linear projects. In addition, all anthropogenic disturbance, including clearing of land is associated with increased predation rates on Boreal Caribou.

The nature of effects to wildlife and habitat (including residences and critical habitat defined under the SARA can vary based on a number of factors, including: project location, duration, scale, and configuration; ancillary project activities (land clearing, dredging, flaring, marine shipping); existing cumulative effects; the type of habitat that may be disturbed; and sensitivity of species found in the project area. The pathway through which potential effects are conveyed will depend on the land, air, and water constituents associated with the site along with the behavioral adaptability, presence and interaction with the species limiting factor (e.g., habitat supporting staging, nesting, roosting or foraging) and population resilience.

The impacts of roads, railways, and power lines in particular has the potential to be a permanent impact on the region, both in terms of the impacts on wildlife, habitats and wetlands discussed below, but also in terms of increasing the access to the region, and therefore the level of human disturbance and predator access in general.

Migratory birds and species at risk and their habitat, Mining

Exploration and construction of mines and associated infrastructure often require large-scale land clearing activities, which leads to destruction, disturbance and fragmentation of habitat (e.g., foraging, nesting, hibernating, movement), habitat avoidance, sensory disturbance, and the inadvertent disturbance and destruction of individuals, nest and eggs of migratory birds and SAR. There is a higher risk that these effects would be more impactful for migratory birds that are also SAR and species where habitat is sensitive to disturbance (e.g., wetlands) or where there is already a high degree of cumulative effects to habitat or individuals. Destruction and/or disturbance of habitat can have increased impacts on SAR individuals, residence and their critical habitat, which can lead to changes in prey and predator dynamics, loss of food resources, loss of breeding areas, changes in migration or movement, and increased risk of mortality. Boreal Caribou in particular can be affected by mining through a combination of direct and functional habitat loss, habitat disturbance and development of linear features directly associated with mines, such as roads and seismic lines (i.e. habitat fragmentation). In addition, all anthropogenic disturbance, including clearing of land and the development of linear features in particular, is associated with increased predation rates to Boreal Caribou. The effects of habitat alteration on Boreal Caribou can reduce the viability of local populations through the reduction of habitat quality and quantity, through reductions in habitat connectivity and through increased predation rates. Loss of habitat connectivity within or between ranges is particularly detrimental to Boreal Caribou, which rely on large-scale movements between different habitat types across the region to complete their life-cycle.

The construction of mines may create new hibernation habitat for bat SAR, specifically Little Brown Myotis and Northern Myotis. Bats using these new hibernacula would potentially be exposed to direct impacts while exploring the potential new habitat and while using mines as hibernacula, such as injury or collisions from machinery and exposure to toxic substances. Once a mine is inhabited by bats infected by White-nose syndrome, there is the possibility of spread of fungal spores to other mines via contaminated equipment, including clothing and boots of people working in the mines. Decommissioning of mines has the potential to impact bats by removing hibernacula.

The construction, operation and decommissioning of mines may impact wildlife directly and indirectly through impacts to habitat through changes in geomorphological processes (e.g., sedimentation processes, water quality and quantity). Additionally, birds that land on and/or frequent wastewater (e.g., submerged tailings in tailings ponds, pit water) have the potential to come into contact with toxic substances which can result in on- and off-site mortality. During construction, operation, maintenance and decommissioning, there is the potential for harmful substances to enter or be spilled into the receiving environment that may negatively affect wildlife. Depending on the nature of the release (e.g., toxicity, volume release, exposure pathways), effects to wildlife could be acute, chronic or both. Changes to water quality and quantity can affect migratory birds, wildlife, and their habitat.

Noise, vibrations and light from construction and operation activities may result in habitat disturbance, which can lead to avoidance of use. Boreal Caribou are particularly sensitive to sensory disturbance, and show diminished use of these areas (i.e., functional habitat loss). They can also face chronic stress and negative energetic consequences from fleeing disturbances. For birds, attraction to lights at night or in poor visibility conditions during the day may cause them to collide with lit structures or their vertical support structures, resulting in injury or death. In other instances, birds can get disoriented while circling a light source, and may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk from predation. Wildlife could be adversely affected by sensory disturbance during construction and operation, as a result of noise and vibrations from blasting and

operation of machinery. Noise from construction and operation activities can result in changes of vocalizations in species that rely on vocal communication.

Migratory birds and species at risk and their habitat, Linear Projects

Individual mortality and the destruction of nests and eggs or any other structure necessary for the reproduction and survival of species of risk could occur during all project phases of linear projects, particularly during site preparation, right-of-way maintenance and project dismantling. Mortality in migratory birds and SAR could also occur due to collisions with vehicles or infrastructure associated with roads during construction and operation. Further, creation of clearings in upland habitat could attract Eastern Whip-poor-will and Common Nighthawk, both migratory birds that are also SARA-listed (Threatened), to areas where there is vehicular traffic, thereby increasing collision risk. The direct mortality impacts of linear infrastructure are likely to be most severe for i) species that move over large areas, and are therefore more likely to encounter linear infrastructure, ii) migratory birds that are also SAR, and species where habitat is sensitive to disturbance (e.g., wetlands) or iii) where there is already a high degree of cumulative effects to habitat or individuals.

Construction of linear projects can cause the loss, fragmentation and alteration of habitat, and can negatively impact the reproduction, migration and wintering of affected species. The fragmentation of habitat due to the combined physical presence of linear infrastructure and sensory disturbance associated with the infrastructure likely presents the potential for the largest adverse effect of linear projects on wildlife, and is independent of the size/operational use of the road. Habitat fragmentation reduces connectivity of habitat, separating populations of wildlife and impacting movement, foraging and genetic connectivity. Mammals with relatively large sizes, low reproductive rates and high mobility, such as caribou and Wolverine, are likely to be particularly susceptible to indirect impacts of habitat fragmentation through linear infrastructure. In addition, construction of linear infrastructure can facilitate movement of predators within the boreal forest to areas not previously accessible to predators and hence can increase the abundance, distribution and hunting efficiency of species that prey on Boreal Caribou. Additional predation associated with linear infrastructure can be highly detrimental to Boreal Caribou.

Migratory birds and SAR could be affected by sensory disturbances during the construction, operation, and decommissioning of linear projects. Some examples of potential sources of sensory disturbance include noise from various project activities, lights, vibrations from excavation and blasting work and the operation of machinery, as well as the presence of workers. The amount, duration, frequency, and timing of noise are important to understand potential effects. Sensory disturbance may make adjacent habitats unsuitable for use by wildlife and cause avoidance effects in many species. Caribou in particular avoid roads due to sensory disturbance.

Construction and operation of linear projects may have a particular adverse affect on migratory birds and SAR in upland habitats (e.g. eskers). Upland habitats in the RoF region may provide breeding habitat for migratory birds, and maternal roosting habitat for bats (which are considered residences under SARA), and may potentially be used as travel corridors by caribou and other wildlife. Road and other linear disturbance are likely to be biased toward eskers and similar geological features, due to the presence of aggregates used in construction and maintenance, and therefore species associated with those upland habitats are likely to experience adverse effects. In this region, eskers and related features are uncommon and potentially ecologically important elements of the landscape. Development impacts to these features may therefore be disproportionate to the area affected (i.e. requirement for land use planning maps).

Import and spread of invasive plant species can occur during road construction, operation, and maintenance, and linear features are more likely to create conduits for the transport of invasive species. One example is *Phragmites australis* (European Common Reed) which could be a substantial threat to the extensive wetland habitat within the region. The spread of invasive species into habitats used by migratory birds and SAR may pose a threat to wildlife.

Linear disturbances may also have other negative effects on wildlife, particularly by facilitating the movement of predators in the area, thereby increasing predator abundance, distribution and hunting efficiency. In addition, construction of roads may also promote access to the region and increased harvesting pressure, which may affect wildlife.

Construction, operation and decommissioning of roads can also lead to the accidental release of oil or chemicals into the environment. These spills could have adverse effects if these substances make their way into the habitats frequented by migratory birds and SAR. Salt and grit used in the operation of roads can impact migratory birds and SAR by attracting birds and animals to roads to consume the salt or grit, and can affect adjacent habitat through changes in water quality.

#### Wetlands, Linear Projects

The activities linked to the construction, operation, and decommissioning of linear infrastructure could have negative effects on wetlands and their ecological functions. ECCC notes that the wetlands of this region include extensive, globally significant peatlands. Land clearing activities associated with construction of linear infrastructure have the potential to lead to direct wetland loss. Wetland function can be indirectly affected by construction, operation and maintenance and decommissioning of linear infrastructure through hydrogeological changes, and changes in geomorphological processes (e.g., sedimentation processes, water quality and quantity). Adverse effects could occur to water quality as a result of spills or oil, fuel or other chemicals and runoff or salts or grit use during roadway operation. Runoff of salt in particular has the potential to impact water quality in exposed wetlands. Construction of linear infrastructure is likely to alter existing wetland and upland hydrology (e.g. wetlands may dry up or upland areas could be submerged) and thus to affect the quality or availability of habitat for migratory birds and SAR. The planned roads will cross large areas of wetlands which will be permanently and unpredictably impacted by changes in hydrology both upstream and downstream of the roads, and permanently exposed to the risk of spills and changes in water quality associated with run-off. The spatial extent of these impacts is difficult to predict but has the potential to extend considerable distances.

The activities linked to the construction, operation, and decommissioning of a linear project can contribute to the introduction and spread of invasive plant species. A linear disturbance is more likely to create introduction and dispersal pathways for invasive species like the European Common Reed. The spread of invasive species may pose a threat to wetlands and the wildlife using them both along the length of the planned infrastructure and throughout the region as the invasive species spread.

#### Wetlands, Mining

The activities linked to the construction, operation, and decommissioning of mines could have negative effects on wetlands and their ecological functions. ECCC notes that the wetlands of this region include globally significant bogs and extensive peatlands. Land clearing activities associated with construction of mines have the potential to lead to direct wetland loss. Wetland function can be indirectly affected by construction, operation, maintenance and decommissioning of mines through hydrogeological changes, and changes in geomorphological processes (e.g., sedimentation processes, water quality and quantity). Adverse effects could occur to water quality as a result of chemical spills or runoff of sediments from construction areas near waterways. Carrying out the project, particularly the activities related to construction, is likely to alter existing wetland and upland hydrology (e.g. wetlands may dry up or upland areas could be submerged) and thus to affect the quality or availability of habitat for migratory birds and SAR. Destruction and alteration of wetland habitat is likely to cause negative effects on or harm migratory birds and SAR that use these areas during the breeding season (including Boreal Caribou, Yellow Rail), as well as for foraging, resting and migration.

<p>Input or advice on <b>any other aspect</b> of the design of the regional assessment and development of the terms of reference</p>	<p><b>CUMULATIVE EFFECTS</b></p> <p>A cumulative effects assessment within a project-level assessment focuses only on those components of the environment being considered in the project assessment and where there is a residual effect after application of mitigation measures.</p> <p>Research and academic literature on best practices for regional cumulative effects initiatives identify the following common elements:</p> <ul style="list-style-type: none"> <li>• <u>Scoping</u>: the selection of valued components and indicators of their state or condition as well as the identification of drivers (both human and natural) that would influence the valued component. Drivers could include, for example: natural variation in a population, the degree of habitat fragmentation, changes to climate, etc.</li> <li>• <u>Analysis</u>: modeling the relationships between the drivers and the valued components and also modeling how the drivers interact with each other. It would also include the identification of plausible scenarios for the state and interaction of the drivers and an evaluation of effects to each of the valued components under those scenarios. For example, one could model the effects to caribou in a no development, moderate development or high development scenarios.</li> <li>• <u>Conclusions, Mitigation and Recommendations</u>: the interpretation of the importance of the predicted effects, identification of measures to mitigate effects, and in some cases recommendations to decision-makers.</li> <li>• <u>Follow-up and Monitoring</u>: Most of the time, follow-up would include monitoring and a process for adaptive management.</li> </ul> <p><b>Approaches to Generating Science Inputs</b></p> <p>Project IAs would benefit from an RA that is designed in part to demonstrate, at a high level, preferred approaches to generating science inputs to decision making. As for the RA, each project IA must evaluate existing data with respect to defined information needs, must develop a path to generate information from the analysis of data, and must identify and address data gaps in relation to their importance. As for the RA, individual project IAs require that expertise, data and analysis be combined to generate defensible decisions (e.g. spatial and temporal boundaries). An RA that demonstrates clarity and scientific rigour in these approaches would reinforce these qualities in the individual project IAs. The RA should result in a framework and land use planning maps to guide development by identifying hot spot areas to avoid, ideal locations for supporting infrastructure (roads, rail, power lines, etc.), areas with important ecological features, important areas for Indigenous land use, etc.</p>
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