10. Vegetation, Wetlands and Protected Areas

The purpose of **Chapter 10** is to characterize the existing environment, Project-environment interactions and potential residual Project and cumulative effects of the Project on Vegetation, Wetlands and Protected Areas. The Project has the potential to cause adverse effects to these components of the biophysical environment through the clearing of vegetation, stripping and grubbing, removal and stockpiling of unsuitable materials for construction, disrupting surface and groundwater movement, and dewatering lakes and ponds within the Project footprint, including Rose Lake and Pike Lake South. Changes in the biophysical environment can also influence aquatic and terrestrial ecosystems, and the people that use natural resources or ecosystem services (e.g., surface water, ground water, fish, and wildlife). Therefore, the Vegetation, Wetlands and Protected Areas assessment consequently provides information that is used to support the assessments of other biophysical and socio-economic VECs, such as provision of habitat for wildlife, and support for surface water quality and quantity.

10.1 Approach to the Effects Assessment

The methods and assessment presented in this chapter were developed in consideration of the requirements under the provincial *Environmental Protection Act*, with specific consideration of the requirements set out in the provincial Environmental Impact Statement Guidelines (EIS Guidelines) for the Project issued by the Minister of Environment and Climate Change (Government of Newfoundland and Labrador 2024a). A table of concordance to the EIS Guidelines is provided in the Executive Summary. The assessment of Vegetation, Wetlands and Protected Areas followed the overall effects assessment approach and methods (**Chapter 4, Effects Assessment Methodology**).

Where possible, comparison to the outcomes of the assessment of Vegetation, Wetlands and Protected Areas completed within the previous EIS have been made to highlight where effects to Vegetation, Wetlands and Protected Areas have been reduced through consideration of environmental design features and mitigation or where new adverse effects may be introduced and require additional consideration in Project planning.

10.2 Integrating Engagement from Indigenous Groups and Local Stakeholders

Champion has been engaging with potentially effected Indigenous groups and local community stakeholders since the acquisition of the Project in 2021. The overall approach and methods for the incorporation of engagement feedback into the EIS is discussed in detail in **Chapter 22, Engagement**.

Issues and concerns related to Vegetation, Wetlands and Protected Areas raised by Indigenous groups and local stakeholders and how these issues and concerns were addressed through the assessment are summarized in Table 10-1, including cross references to where comments were considered or addressed in the chapter.

Table 10-1: Summary of Issues and Concerns Related to Vegetation, Wetlands and Protected Areas by Indigenous Groups and Local Stakeholders

Comment Theme	How it is Addressed in the Assessment	Where it was Addressed in the Assessment	Indigenous Group or Local Stakeholder	Raised in the Alderon EIS (Yes / No)
Potential effects on wildlife habitat and minimizing effects	Clearing related habitat loss is minimized by designing the smallest footprint possible and through stewardship agreements.	Section 10.5.3.2	Labrador City	Yes
Potential effects on wetland resources	Effects on wetlands are mitigated through avoidance, minimized footprint, and stewardship agreements.	Section 10.5.3.3	Labrador City	Yes
Wetland avoidance, loss, and offsetting	Effects on wetlands are mitigated through avoidance, minimized footprint, and stewardship agreements.	Section 10.5.3.3	Labrador City	Yes
Concern for environmental protection	Mitigation measures are implemented for each predicted effect.	Section 10.5.3.2	Innu Nation	Yes

Comment Theme	How it is Addressed in the Assessment	Where it was Addressed in the Assessment	Indigenous Group or Local Stakeholder	Raised in the Alderon EIS (Yes / No)
Potential effects on endangered tree lichen in the Duley Lake Provincial Park	There are no endangered lichens recorded for the Duley Lake Provincial Park. The Park protects a landscape type called "Lichen Woodland". Access road-related effects are minimized by designing the smallest footprint possible and through stewardship agreements.	Section 10.5.3.4	Riordan Lake Cabin Owners Association	No
Wetland avoidance, loss, and offsetting	Labrador City expressed interest in a Stewardship Agreement with Champion. Labrador City would like Champion to acknowledge the stewardship agreement, which was made with Alderon, but the number provision shall reflect inflation and be adjusted to 2024 numbers.	Section 10.5.3.4	Labrador City	Yes
Wetland avoidance, loss, and offsetting	Strawberry Lake will be designated as a MU as compensation for the loss of the Pike Lake South MU in the stewardship agreement.	Section 10.5.3	Labrador City	Yes

EIS = Environmental Impact Statement; MU = management unit.

10.3 Assessment Scoping

This section identifies key issues for Vegetation, Wetlands and Protected Areas, defines and provides a rationale for the selection of VECs for this assessment scoping, and identifies the measurable parameters selected for the assessment, and defines assessment boundaries for Vegetation, Wetlands and Protected Areas.

10.3.1 Key Issues

Key issues often relate to the potential environmental, social, economic, and health effects of a proposed project. Key issues identified for the Project reflect the primary concerns raised by regulatory authorities, Indigenous groups, and local stakeholders, including local residents, cabin owners, business owners and other interested parties.

To identify key issues related to vegetation, wetlands and protected areas, the following sources were reviewed:

- Section 4.1 of the EIS Guidelines, which summarized key issues from regulatory agencies and feedback received on the Project Registration and draft EIS Guidelines
- the record of engagement (Chapter 22), which captures engagement input received through meetings, phone calls, letters, and interviews
- past experience with mining projects in Labrador
- the key issues identified in the previous EIS
- the Vegetation and Wetland Baseline Report (Annex 3B), which included an updated ELC for the Project

Key issues related to vegetation follow:

- reduction in area of vegetation communities by type
- negative changes in species richness based on community-level assessment using ELC
- reduction in vegetation percentage cover
- introduction of invasive plant species

Key issues related to wetlands follow:

- direct wetland area loss through partial or total infilling by wetland type
- wetland degradation or loss due to changes in local hydrology, as expressed by visual indicators
- reduced wetland functions, such as support to surface water quality and quantity and provision of habitat, as measured using the WESP-AC
- changes in vegetation species composition, cover, and diversity, including the introduction of invasive species, as observed using the 2023 WSP baseline wetland delineation data

Key issues related to protected areas follow:

- reduction in area of protected areas
- introduction of invasive plant species

10.3.2 Valued Environmental Components and Measurable Parameters

Vegetation, wetlands and protected areas were selected as a VEC due to their crucial ecological functions, such as providing habitat and forage, and their hydrological roles in erosion and flood control, groundwater regulation, and recharge. These functions are essential for maintaining the health of natural ecosystems and offer cultural benefits, including recreational and spiritual values. Of particular importance is the possible provision of habitat for a range of species, including those protected under the *Species at Risk Act* (SARA), *Endangered Species Act* (ESA; provincial), *Migratory Birds Convention Act*, and *Fisheries Act*. In addition, wetlands are protected by regulation and both federal and provincial "no net loss" policies. Recognizing the potential interactions between Project activities and the wetland and vegetation environment, as well as their interactions with wildlife and other biological and physical environments, vegetation, wetlands and protected areas have been selected as a VEC. Project activities have the potential to affect:

- distribution and abundance of vegetation species (including SAR and SOCC) and vegetation communities
- wetlands and their functions
- local protected areas

The assessment of vegetation focuses on plant species and community diversity, including SAR and SOCC. Wetlands are defined in the federal and provincial policies as land such as bogs, fens, marshes, swamps, and shallow waters that are permanently or temporarily submerged or saturated by water near the soil surface, for long enough periods of time that aquatic processes are occurring. These aquatic processes are characterized by plants that are adapted to saturated soil conditions, wet, or poorly drained soils, and biotic conditions found in wet environments. The assessment of vegetation, wetlands and protected areas is closely linked to or informed by the effects assessment for:

- air quality (**Chapter 5**)
- groundwater (**Chapter 7**)
- surface water (**Chapter 8**)
- freshwater fish and fish habitat (**Chapter 9**)
- wildlife, including avifauna (Chapter 10)

Measurable parameters are used to characterize changes to attributes of the environment from the Project, other human developments, and natural factors. The changes in measurable parameters are used to assess change and predict overall effects on VECs. Six measurable parameters were identified and used for the vegetation, wetlands and protected areas VECs. Table 10-2 summarizes the vegetation, wetland and protected area VECs, the rationale for their selection, and associated measurable parameters.

Table 10-2: Valued Environmental Components, Rationale for Selection, and Measurable Parameters

VEC	Rationale for Selection	Measurable Parameters	Linkages to other VECs
Vegetation	— Alteration or loss of habitat could affect vegetation species presence (including SAR and SOCC), ecosystem health, and biodiversity. — The spread of invasive species is a potential threat to species diversity as they can outcompete native vegetation, including SAR and SOCC — There is potential to be exposed to changes in air quality resulting from the Project.	— Area of vegetation communities by type — Species richness at the community level — Vegetation percentage cover at the community level	— Air quality — Wetlands — Wildlife, including avifauna
Wetlands	— Wetland function is an important indicator in accordance with federal policy. — Wetlands provide habitat for a range of species. Including species protected under the SARA, ESA (provincial), *Migratory Birds Convention Act,* and *Fisheries Act.*	— Alteration or loss of wetland function: functions of affected wetlands (both direct and indirect) using WESP-AC — Wetland area by wetland type: estimated proportion of wetland area (ha) within the LSA that has the potential to be affected by physical disturbances	— Groundwater — Surface water — Fish and fish habitat — Vegetation — Wildlife, including avifauna
Protected areas	— Protected areas are part of a conservation network which protects valued land types and habitat for SOCC and provides recreational and educational opportunities.	— Area of conservation land in the region	— Vegetation — Wetlands — Wildlife, including avifauna

VEC = valued environmental component; WESP-AC = Wetland Ecosystem Services Protocol for Atlantic Canada; LSA = local study area; SAR = species at risk; SOCC = species of conservation concern; SARA = *Species at Risk Act.*

10.3.3 Assessment Boundaries

Assessment boundaries define the spatial and temporal extents of the assessment for each VEC. The spatial boundaries for Vegetation, Wetlands and Protected Areas are defined in Table 10-3 and shown in Figure 10-1, and consist of the SSA, a local study area (LSA), and a larger regional study area (RSA).

The SSA includes the proposed infrastructure for the Project (i.e., the Project footprint) with an additional buffer to reflect existing uncertainty in the final design of the Project and so that adverse effects to VECs are not underestimated. The SSA is constrained to avoid certain features, including major lakes, the Québec-Labrador provincial border and sensitive features, like the Wahnahnish Lake Protected Public Water Supply Area. The SSA represents the smallest scale of assessment and an area (4,323 ha) where the potential direct effects of the anticipated Project will be assessed.

The LSA includes the SSA plus an additional buffer and represents the scale to which potential direct or indirect effects to Vegetation, Wetlands and Protected Areas from the Project are anticipated. The LSA area for the assessment of Vegetation, Wetlands and Protected Areas is approximately 5,105 ha. In the previous EIS (Alderon 2012) the LSA was based on the extent of available aerial imagery, a much larger area of approximately 16,100 ha, but this was not rationalized in terms of potential Project effects. The reduction of the LSA area is driven by the need for a more focused effect assessment at the LSA.

The RSA includes the LSA but also takes in a larger area to help to ensure the regional variability of vegetation habitat and wetlands is captured, in addition to providing context to the Vegetation, Wetlands and Protected Areas potentially affected in the LSA. The RSA covers an area of approximately 39,914 ha and is defined as the ELC study area presented in the 2023 Wetland and Vegetation Baseline Study (WSP 2024) and 2025 Addendum (WSP 2025).

Table 10-3: Spatial Boundaries for Assessment of Vegetation, Wetlands and Protected Areas Valued Environmental Components

Study Area	Area (ha)	Description/Rationale
SSA	4,323	Includes the Project footprint plus additional buffered areas to incorporate a level of uncertainty into the Project design so that effects are not underestimated. The SSA was defined using bounding points around the outermost components of the Project footprint.
LSA	5,105	The LSA includes the Project footprint and an added buffer, covering approximately 5,105 ha. This area represents the potential for direct and indirect disturbance to vegetation, wetlands and protected areas and aligns with the survey area for the baseline study.
RSA	39,914	The RSA encompasses the LSA and extends to approximately 39, 914 ha, including the regional variability of vegetation habitats and wetlands. It provides context to the vegetation, wetlands and protected areas observed in the LSA.

SSA = site study area; LSA = local study area; RSA = regional study area.

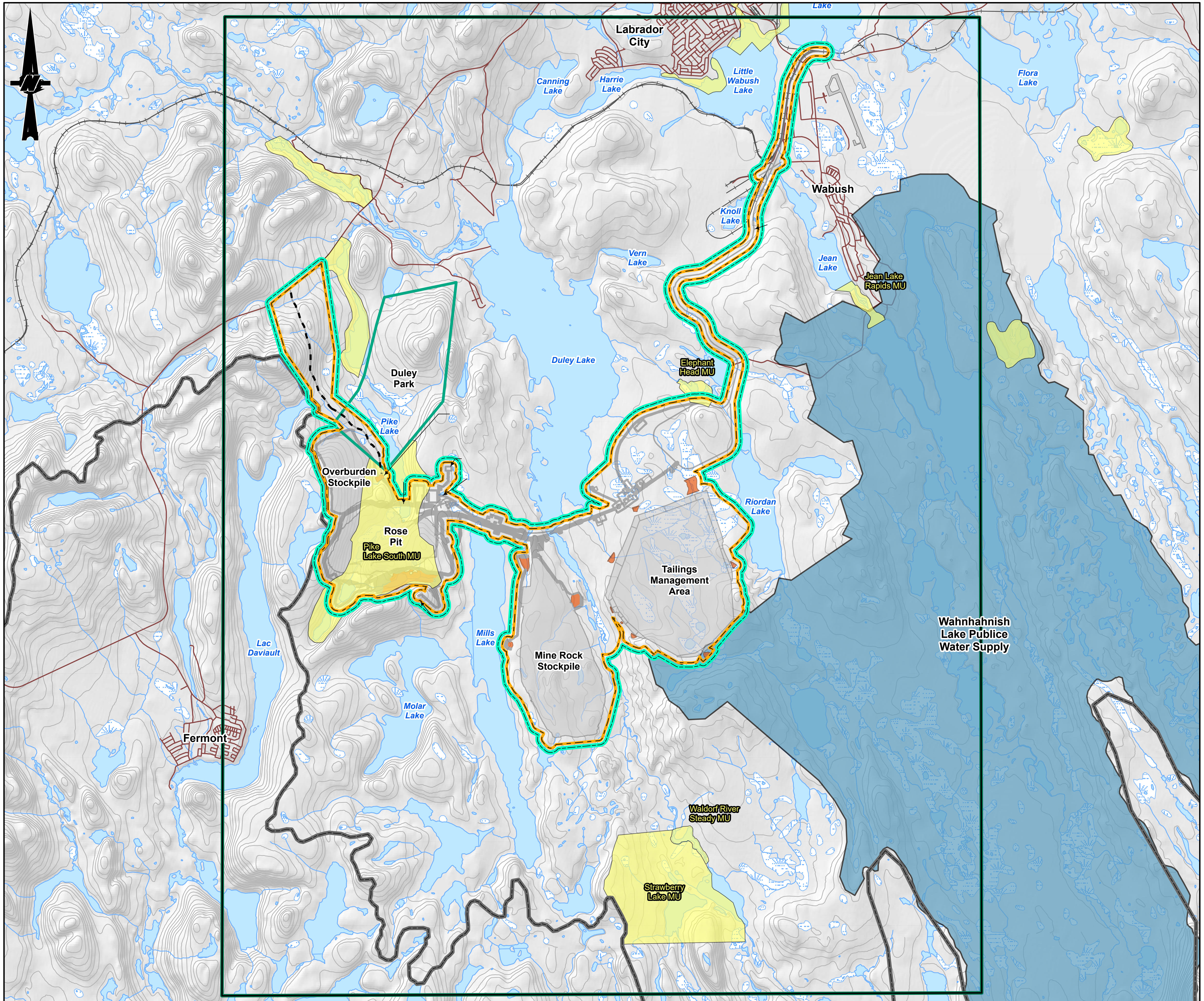
The temporal scope of the assessment focuses on the 40-year period from initial construction to the end of decommissioning and rehabilitation (i.e., Closure) as defined by the following Project phases:

- **Construction phase (referred to as Construction)**–includes site preparation, mine, process plant and site infrastructure development, and commissioning the structures, systems, and components. The duration of the Construction phase is expected to be four years.
- **Operations and Maintenance phase (referred to as Operations)**–includes the mining and milling of iron ore, production and shipment of iron ore concentrate, tailings management, management of mine rock, waste management, water management, release of treated effluent, site maintenance and transportation of staff and materials to and from the site. The Operations phase initiates with one year of pre-development mining (i.e., ramp-up) and concludes when processing is complete and is expected to extend over 26 years.
- **Decommissioning and Rehabilitation phase (referred to as Closure)**–includes accelerated flooding of the Rose Pit, re-establishment of passive surface water drainage following the pit-flooding period, and recontouring and revegetating disturbed areas. Physical infrastructure that is not required during Post-closure monitoring and for other activities required to achieve the Project's decommissioning criteria and to return the Project site to a safe and stable condition will be removed. The active Closure phase is expected to be 10 years.

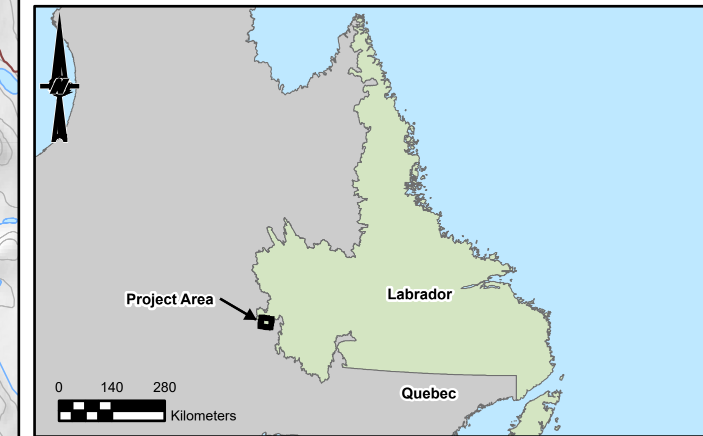
During Construction, activities such as site preparation and infrastructure development immediately reduce vegetation and wetlands, increase erosion risk, and alter drainage. These effects are immediate and long-lasting.

During Operations, mining, production, waste and water management, and transportation occur. Hydrology changes affect groundwater and wetlands, while dust and emissions effect air quality. Invasive species spread due to site traffic, and site development grows incrementally.

During Closure, activities include pit flooding, restoring water drainage, recontouring, revegetation, and removing infrastructure. These efforts aim to restore natural water flow, groundwater levels, and native vegetation. Residual effects on water may require ongoing monitoring.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Site Study Area
- Local Study Area
- Regional Study Area
- Conservation Area Management Unit
- Potential Access Road

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
VEGETATION, WETLANDS AND PROTECTED AREAS SPATIAL BOUNDARIES

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	GB
APPROVED	JMC

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	0	10-1

10.4 Existing Environment

The existing environment for Vegetation, Wetlands and Protected Areas generally formed the basis against which the residual Project and cumulative effects were assessed. The existing environment also represents the outcome of historical and current environmental and socio-economic pressures that have shaped the observed condition of Vegetation, Wetlands and Protected Areas. Environmental and socio-economic pressures or factors were either natural (e.g., weather, wildfire, predation, disease, climate change) or human related (e.g., industrial development, forestry, changing business models, fishing, hunting).

Baseline studies were initially completed in 2011-2012 by Stassinu Stantec in support of the Alderon EIS. Updated baseline studies were conducted to support the characterization of the Vegetation, Wetlands and Protected Areas within the existing environment in 2023 by WSP. The Vegetation baseline study was used to identify and characterize the breadth of habitats within the region (SSA, LSA and RSA), while documenting any encounters of SAR or SOCC. The wetland study was focused on wetland delineation and functional assessment using the WESP-AC protocol, while documenting any encounters of SAR or SOCC. The Vegetation and Wetland baseline report is included in Annex 3B.

A supplemental addendum to the Vegetation and Wetland baseline report was prepared by WSP in 2025 to further assess the potential for the occurrence of SAR and SOCC within the assessment area, with a particular focus on species which have subnational ranks required to be assessed as outlined in the Final EIS Guidelines. In addition, the addendum report provides an updated ELC and discussion for the assessment area. The updated ELC used the field data collected for the initial baseline report to inform the final ELC product. The Vegetation and Wetland supplemental addendum report is included in Annex 3B.

10.4.1 Ecological Context

Western Labrador contains two ecozones, the Boreal Shield and the Taiga Shield (Statistique Canada 2017). While both ecozones share some similarities in terms of climate and vegetation, the Boreal Shield is more diverse in terms of flora and fauna and has a more varied landscape compared to the Taiga Shield's predominantly flat terrain and harsher climate. The RSA covers an area of approximately 39,914 ha and is located entirely within the Boreal shield ecozone. The Boreal Shield Ecozone is the largest Terrestrial ecozone in Canada, covering nearly 20% of the country's landmass. It stretches from northern Saskatchewan to Newfoundland, forming a continuous belt of boreal forest that overlaps with the Canadian Shield. It features a diverse landscape of rolling uplands, lowlands, and numerous lakes and wetlands formed by glacial activity, with exposed Precambrian bedrock. The climate varies from humid continental in the south to subarctic in the north, resulting in long, cold winters and short, warm summers. Dominated by boreal forests, the region includes species such as white spruce, black spruce, balsam fir, and various broadleaf trees in the southern areas. The Boreal Shield is home to a variety of wildlife, including woodland caribou, moose, black bears, wolves, and numerous bird species. The Boreal Shield Ecozone in Labrador is contained within southeastern Labrador where it is primarily coastal, extending north to Hamiliton Inlet and the area around lake Melville. A massive rolling plain of ancient bedrock blanketed with gravel, sand, and other glacial deposits, its topography is comprised of broadly rolling uplands that form poorly drained depressions covered by lakes, ponds, and wetlands.

The Mid Subarctic Forest ecoregion in central and western Labrador features flat and rolling plateaus dominated by moist forests over coarse textured till and glaciofluvial deposits. Glacial activity is evident through numerous drumlins and eskers. The region experiences short cool summers with mean daily temperatures of 11°C to 13°C and long cold winters with temperatures ranging from -17°C to -22°C, along with annual rainfall of 900 to 1,100 mm and snowfall of 3.5 to 4.5 m. Common vegetation includes black spruce, which thrives in poorly drained sites and upland lichen woodlands, white spruce and balsam fir on well-drained protected slopes, and larch, trembling aspen, and jack pine. Wetlands like string bogs and fens are prevalent, especially in the southern parts of the ecoregion.

The Wabush Eco-district, a small area in western Labrador covering 133,900 ha (0.5% of Labrador's landmass), ranges in elevation from 524 to 904 m (mean 631 m). It has an average annual temperature of -3.1°C and receives 849.1 mm of precipitation. The terrain, characterized by fractured bedrock, supports open lichen-spruce woodlands, with lakes, ponds, and wetlands in the lowlands. Lower hillslopes feature closed black spruce and balsam fir stands, while upper hillslopes have open black spruce stands mixed with white spruce and birch. Wetlands cover less than 1% of the eco-district, and 12.6% is open water. Forest fires have considerably effected the area, with 15.7% previously burned.

10.4.2 Methods

The following sections describe the methods used to gather information about the existing environment for vegetation, wetlands and protected areas.

10.4.2.1 Vegetation

10.4.2.1.1 Previous EIS Baseline Study Methods

Vegetation plots were conducted to support satellite-based classification of ecotypes and vegetation in the Project area. Surveys took place within the Study Area during two periods: July 25 to 31 and September 28 to October 4, 2011. Detailed sampling of dominant ecotypes was performed at representative sites throughout the Study Area. The objective was to collect data on local vegetation species distributions and occurrence patterns to characterize ecosystem units, refine ecotype classification, and verify the accuracy of preliminary vegetation maps. Sampling efforts targeted a wide range of habitats, plant communities, and biophysical features.

Ground truthing of ecotypes was conducted at three levels of detail (Alderon 2012): full plots, ground inspections, and visual inspections. Each sample plot was located using a GPS for precise positioning. Plot boundaries were delineated to encompass homogenous vegetation communities.

- **Full plots**—These plots provided comprehensive ecological data and were used to develop ecosystem unit (ecotype) descriptions and summary statistics. Data collection followed the standards outlined in the "Standard for Terrestrial Ecosystem Mapping in British Columbia."
- **Ground inspections**—These abbreviated plots provided basic ecological data for confirming identified ecosystem units and characterizing ecosystem attributes.
- **Visual inspections**—These inspections involved qualitative assessments to verify ecotype classifications.

Soil pits were excavated at a minimum depth of 60 cm or to the C layer to characterize soil profiles. Soil data were recorded in accordance with the standards mentioned above.

Rare Plant Survey (Stassinu Stantec 2012a)

A pre-survey literature review was completed to determine the potential presence of listed SAR and SOCC. The literature review included consulting Committee on the Status of Endangered Species in Canada status reports, recovery strategies, action plans, regional flora guides (e.g., Flora of North America, Flora of Canada, Gray's Manual of Botany), and other published literature. In addition, an Atlantic Canada Conservation Data Centre (ACCDC) search was untaken to identify occurrences of rare species in the area. The ACCDC search identified 18 rare vascular plant species (Schedule 1 SARA listed, or with a subnational rank of S1, S2, S1S2 or SU) which may occur in the area.

The literature review was used to facilitate the development of a Survey Plan to provide direction on where rare plant surveys should be completed. Rare plant surveys were conducted over two survey periods (five days in July-August 2011 and five days in mid-July 2012) by a field team consisting of a botanist and a vegetation ecologist. Surveys were completed within areas within and proximal to Project components and within other areas considered to have the highest potential for the occurrence of rare plant species. Specific higher potential survey areas include wetlands, floodplains of slow-moving rivers and streams and unique rock outcrops and landforms.

A stratified sampling method was used whereby the field team used a random meander method to survey habitat types with the highest probability of supporting rare plants (e.g., fens). If a microhabitat was encountered that was deemed to have a higher probability for the occurrence of a rare plant during the random meander survey, it was surveyed more intensely (stratified sampling).

When a rare plant species was encountered its geographic position was recorded and the area searched to determine if there were multiple individuals and/or clusters of individuals, with the number of individuals/clusters recorded along with a descriptor of the species distribution (widely scattered, evenly distributed or densely clumped) and an estimate of the area of distribution.

Ecological Land Classification (Stassinu Stantec 2012a)

The ELC mapping for the Alderon EIS was guided by the British Columbia Terrestrial Ecosystem Mapping inventory standards, mapped at a scale of 1:35,000. This system describes vegetation, soil, and terrain characteristics using air photo interpretation and field data collection. The classification and mapping were derived from existing literature, relevant reports, and field surveys, ensuring consistency with other regional projects.

Data collection and processing used RapidEye 5m multispectral images across 12 scenes and high-resolution ortho-photos. Field surveys provided essential data on vegetation and wildlife habitats, which were used to train a supervised classification algorithm. The supervised classification focused on vegetated areas, with training areas collected in ArcGIS 10.1. The Gaussain Maximum Likelihood algorithm assigned pixels to ELC Ecotypes based on these training areas.

For non-vegetated areas, an unsupervised classification method was employed, using Normalized Difference Vegetation Index to identify and mask these regions. This process created 20 spectral classes, which were manually aggregated into five ELC classes: Exposed Earth/Anthropogenic, Open Water, Shallow Water with Vegetation, Cloud, and Shadow.

Post-processing involved combining the vegetated and non-vegetated grids into one seamless dataset and applying a majority filter to reduce classification errors. The final ELC grid was exported to Environmental Systems Research Institute grid format. Field data supported habitat models, incorporating LIDAR data, terrain mapping, and high-resolution aerial photographs.

Wildlife habitat assessments were conducted alongside the ELC mapping to evaluate habitat suitability for selected species and to identify wildlife use of various ecosystem units based on animal signs. These surveys aimed to provide data for the development of wildlife habitat mapping and to assist in characterizing the Project's effects on wildlife habitat. More information about the wildlife habitat modelling can be found in **Chapter 11, Wildlife**.

10.4.2.1.2 Updated Baseline Study Methods

Vegetation plots were completed from June 16 to 21, 2023 and August 5 to 10, 2023. WSP used ecotypes identified in previous studies (Stassinu Stantec 2012a) to guide vegetation plot survey locations and intensity. Larger ecotypes were sampled more frequently for adequate species composition representation. Vegetation plot surveys were conducted in 14 ecotypes and jack pine stands (classified as rare, S1 by Atlantic Canada Conservation Data Centre). Each survey plot was a randomly selected 250 m^2 area within a representative ecotype area. Data collected included species present, percent cover, humus depth, slope, moisture regime, drainage, disturbance indications, and substrate composition. Species were categorized into strata layers (tree, tall shrub, low shrub, herbaceous, moss/lichen). Humus depth was measured by excavating a small pit or using a probe in wetland areas. Moisture regime was classified into nine classes from very xeric to hydric, and soil drainage was rated on a seven-point scale from very rapidly drained to very poorly drained. Photographs were taken of survey plots, species, and excavated pits.

To assess the potential for SAR within the SSA and baseline study area, a review of the Species at Risk Public Registry administered by Environment and Climate Change Canada was conducted. This involved searching for vascular plant, lichen, and moss species listed under Schedule 1 of the SARA for Newfoundland and Labrador (NL) to identify potential candidate species. For each species, the corresponding Committee on the Status of Endangered Species in Canada status report was reviewed to determine potential presence in the area and typical habitat requirements. Similarly, the *Endangered Species List Regulations* under the ESA (provincial) was consulted to identify listed species within the province of NL. For each species, the applicable information sheet and/or Species Status Advisory Committee status report was reviewed to determine if the species was likely to occur in the area based upon known distributions and habitat requirements.

While not protected by federal or provincial legislation, SOCC are considered rare due to low numbers, reduced distributions, or habitat restrictions. Species are ranked at global, national, and sub-national (provincial) scales, referred to as G-Rank (Global-Rank), N-Rank (National-Rank), and S-Rank (Subnational-Rank), using a scale from 1 to 5, with lower numbers indicating greater rarity and sensitivity to disturbance. The ACCDC provides sub-national species rarity rankings (S-Rank) for NL. ACCDC maintains a searchable geo-referenced database of rare plants throughout the province. To assess the potential presence of SOCC within the local and regional area of the Project, WSP requested a data search within the baseline study area.

Updated Ecological Land Classification (WSP 2024)

The ELC process utilized previously collected field data from a specific geographic location (a plot centre point) within a habitat to generate a habitat specific polygon through the assessment of aerial imagery (i.e., the boundary of a habitat around a specific survey point was delineated through visual image analysis). This approach is considered more accurate than relying solely on a pixel-based approach (i.e., a single pixel or few pixels which cover the area of the field plot).

The imagery used for the development of the ELC was Sentinel-2 Level-2A surface reflectance imagery. This imagery is multispectral comprised of red, green, blue, near infrared and short-wave infrared spectral bands. In addition, to the Sentinel imagery high resolution airborne red, green, blue imagery was used for training, validation, visual evaluation of the classification results and for the generation of habitat polygons.

The development of the ELC uses an object-based image analysis approach where the mean shift algorithm is used to segment the study area into homogenous image objects (with each object having similar spectral characteristics) with each segment used as the basic classification unit. The support vector machine algorithm and radial basis function kernel was used to determine the characteristics of each habitat class. Once verified, a combination of the habitat specific polygons, image spectral bands and segmentation results and input into the support vector machine model and applied to the entire ELC area to generate the ELC image. Resulting ELC mapping is shown in Figures 10-2a to 10-2g.

10.4.2.2 Wetlands

Initial wetland surveys were completed in 2012 by Stassinu Stantec (Stassinu Stantec 2012b), identifying and classifying wetlands within the RSA. In 2023, WSP conducted an updated wetland assessment for selected wetlands in the LSA using the WESP-AC, which provides a more comprehensive evaluation of wetland functions. In 2025, WSP updated the ELC analysis to identify changes in the habitat since the previous ELC was completed in 2012. The updated ELC model demonstrated substantially improved accuracy (up to 90%) for most ELC types. Wetland areas in the RSA have been adjusted according to the latest ELC mapping.

The Alderon ELC study area used in the Stassinu Stantec 2012 wetland baseline report is approximately the same as the RSA for the current EIS. The 2012 Alderon project development area (PDA) and the current SSA are also comparable. The 2012 LSA and the current LSA are not comparable, as the Stassinu Stantec LSA was defined by the area of available aerial imagery whereas the current LSA is based on an evaluation of the possible extent of indirect Project effects on vegetation and wetlands

10.4.2.2.1 Previous Baseline Study Methods

Field surveys conducted from September 28 to 30, 2011, collected information on wetland functional characteristics within the study area (Stassinu Stantec 2012b). These functional assessments were based on the NovaWET field methodology and carried out by a team of terrestrial ecologists. NovaWET is designed to assess the condition and functions of wetlands, the surrounding landscape, and the contributing watershed. The methodology has been adapted from rapid assessment methods used in various US states and from method reviews and earlier versions of NovaWET. The NovaWET field methodology was applied to a representative suite of 19 wetland sites within the study area. The results of these surveys were used to inform desktop assessments of potential wetland functions within the study area.

A desktop study provided regional context for the occurrence and distribution of wetlands in the study area. Spatially referenced field data guided the use of high-resolution ortho-rectified aerial images and topographical mapping to delineate and classify wetlands. Contiguous wetland areas were mapped, recording the percentage, class, form, and physiognomic vegetation for all dominant wetland types (i.e., >10% by area). When a contiguous wetland comprised multiple classes (e.g., fen and marsh), separate polygons were used, with descriptors indicating they were part of the same wetland.

10.4.2.2.2 Updated Baseline Study Methods

Wetland surveys were completed within the SSA and RSA between August 1st and August 3rd, 2023 (WSP 2024). This included wetland delineation, species composition determination, and functional assessment using field data. Wetland identification was based on hydrophytic vegetation, hydric soils, and wetland hydrology, following US Army Corps of Engineers 2012 guidelines. Wetland boundaries were digitally marked using GPS with ±5 m accuracy, supplemented with high-resolution LiDAR where necessary. Updated wetland functional assessments were completed using the WESP-AC non-tidal calculator for NL, generating scores and ratings for wetland functions and benefits. Resulting updated wetland mapping is shown below in Figure 10-3.

10.4.2.3 Protected Areas

Characterization of protected areas within the RSA was undertaken including consultation with provincial regulators, municipalities of Labrador City and Wabush, and stakeholder engagement. Regional provincial parks were identified and Stewardship Zones associated with the Wabush Habitat Conservation Plan (EHJV 2009), Labrador City Habitat Conservation Plan (EHJV 2017).

10.4.3 Results

The following sections present an overview of baseline information for vegetation, wetlands and protected areas from the 2012 Alderon EIS and supporting studies, followed by the recent update studies by WSP.

10.4.3.1 Vegetation

10.4.3.1.1 Previous Baseline Study

The ELC mapping for the Alderon EIS identified several distinct habitat types. At lower elevations, forests were predominantly composed of black spruce, with balsam fir on mineral substrates and tamarack on organic soils. Depressional areas with poor drainage and high-water tables supported shrub and graminoid-dominated wetlands. Well-drained upland sites featured hardwood and mixedwood stands, including white spruce and white birch, particularly on south-facing slopes. Moist, rich soils on north-facing slopes and drainage channels supported white birch stands.

High elevations were characterized by black spruce, which became increasingly stunted with elevation. Shrub communities, mainly dwarf birch and willows, were prevalent across elevations. Historical fires led to shrub-dominated communities in previously forested areas. Alpine communities, through small and patchy, were dominated by dwarf willows, dwarf birch, crowberry, alpine bearberry, bog bilberry, and lichen species.

Burns from fires in the mid to late 1990s covered large expanses, particularly in the southern section. These areas became sites of post-fire shrub regeneration, with young regenerating stands of coniferous, mixed coniferous, and deciduous species. Regenerated cover was expected to reach 25 to 75 percent within 16 to 20 years post-fire, with conifer species becoming dominant after 25 to 50 years. After 50 years, the landscape could be classified as a forest.

10.4.3.1.2 Updated Baseline Study

Vegetation survey plots were completed in each of the fourteen ecotypes, with additional plots in Jack Pine Stands (two plots) and Alder Thicket (one plot) due to their unique characteristics. Surveys were conducted within both the SSA and baseline study area to capture the variability of each ecotype. A total of 61 survey plots were completed from June 16 to 21, 2023, and August 5 to 10, 2023. This timing allowed for data collection during the blooming period of early flowering species (June) and the blooming or seed-bearing period of late flowering species (August).

Table 10-4 presents the updated ELC categories for the Kami Mining Project with the previous ELC categories from the previous EIS. The classification system includes habitats such as Alpine Heath, Hardwood Forest, and Mixedwood Forest which cover areas of 790, 560, and 18,300 ha, respectively. The largest category is Black Spruce-Labrador Tea-Feathermoss, spanning 12,230 ha, followed by Open Water at 6,600 ha. Other notable categories include Burn/Regeneration (5,830 ha), Black Spruce-Lichen (2,090 ha), and Developed Land (2,830 ha). Riparian habitats are represented by Riparian Thicket (380 ha) and Riparian Marsh (Fen) (300 ha). Various fen types, including Patterned Shrub Fen (1,430 ha) and Graminoid Fen (1,320 ha^2), are also classified. Additionally, the table includes categories for regenerating areas such as Hardwood Burn/Regeneration (1,450 ha) and specific vegetation types like Alder Thicket (450 ha) and Jack Pine (580 ha).

The changes in ELC areas between the 2012 EIS and this current EIS are explained mostly by improvements in technology which increased the model accuracy from about 50% in 2012 up to about 90% at present. The boundaries between ELC types are gradual and the differences between ELC types can be subtle, so the interpretation at a point is quite sensitive to quality of detection method and analysis sophistication, both of which have improved over time. In general, the largest ELC areas are still large, and the smaller areas are still small, so the regional ELC representation remains broadly comparable.

Table 10-4: Ecological Land Classification Comparison Between Stantec and WSP Areas

ELC Category	Stantec ELC Area (ha)	WSP ELC Area (ha)	Change in Area (ha) (WSP-Stantec)	% Change
Alder Thickett	0	450	450	N/A
Alpine Heath	100	790	690	690
Black Spruce-Labrador Tea -Feathermoss	9,150	12,230	3,080	33.7
Black Spruce-Lichen	1,970	2,090	120	6.1
Black Spruce/Tamarack-Sphagnum Woodland	4,960	1,810	-3,150	-63.5
Burn/Regeneration	7,690	5,830	-1,860	-24.2
Hardwood Forest	540	560	20	3.7
Jack Pine	0	580	580	N/A
Mixedwood Forest	1,750	1,830	80	4.6
Non-Patterned Shrub Fen (includes Graminoid Fen)	930	560	-370	-39.8
Patterned Shrub Fen	310	1,430	1,120	361.3
Riparian Marsh (Fen)	60	300	240	400
Riparian Thickett	30	380	350	1,166.7
Tamarack/Black-Spruce-Feathermoss (Water Track)	3,010	340	-2,670	-88.7
Open Water	5,450	6,600	1,150	21.1
Shallow Water with Vegetation	500	0	-500	N/A
Developed Land	2,240	2,830	590	26.3
Non-ELC (ELC type could not be determined)	950	0	-950	N/A
Total Area	39,640	39,910	270	0.7

Note: The ELC type Burn/Regeneration consists of three classes of various burn/regeneration ELC types (hardwood, softwood, mixed wood) which have been combined for this table since the characteristics between the three burn/regeneration classes are subtle.

ELC = ecological land classification; N/A = not applicable.

A review of the Species at Risk Registry for vascular plants, lichens, and mosses in NL identified 11 SAR in the province. However, based on Committee on the Status of Endangered Species in Canada status reports and other information from the Species at Risk Registry website (ECCC 2023), it was determined that the occurrence of any SAR in the assessment area is unlikely due to known species distributions, climatic variables, and habitat requirements.

A review of the *Endangered Species List Regulations* identified 34 vascular plant, moss, or lichen species listed as endangered, threatened, or vulnerable within the province. Based on Species Status Advisory Committee status reports and information from the Government of NL website (Government of Newfoundland and Labrador 2024b), it was determined that it is unlikely any of these listed species may occur in the Project area due to known species distributions, climatic variables, and habitat requirements. Generally, species listed under the ESA (provincial) are found in more temperate locations, areas with maritime influence, or specific restricted habitats (e.g., limestone barrens on the northern peninsula of insular Newfoundland). There are historical records of the endangered Mountain Bladder Fern in the area (Smokey Mountain – Labrador City), but it is listed as endangered only for the insular portion of the province and not as threatened or vulnerable within Labrador (Government of Newfoundland and Labrador 2024b).

Additionally, an ACCDC data search did not identify any federally or provincially listed SAR within the baseline study area. Furthermore, vegetation surveys conducted during preliminary baseline studies for the Kami Mining Project by Stassinu Stantec (2012c), WSP field surveys in 2023 and subsequent borehole drilling program permits surveys (SEM 2024) did not document any listed SAR in the area.

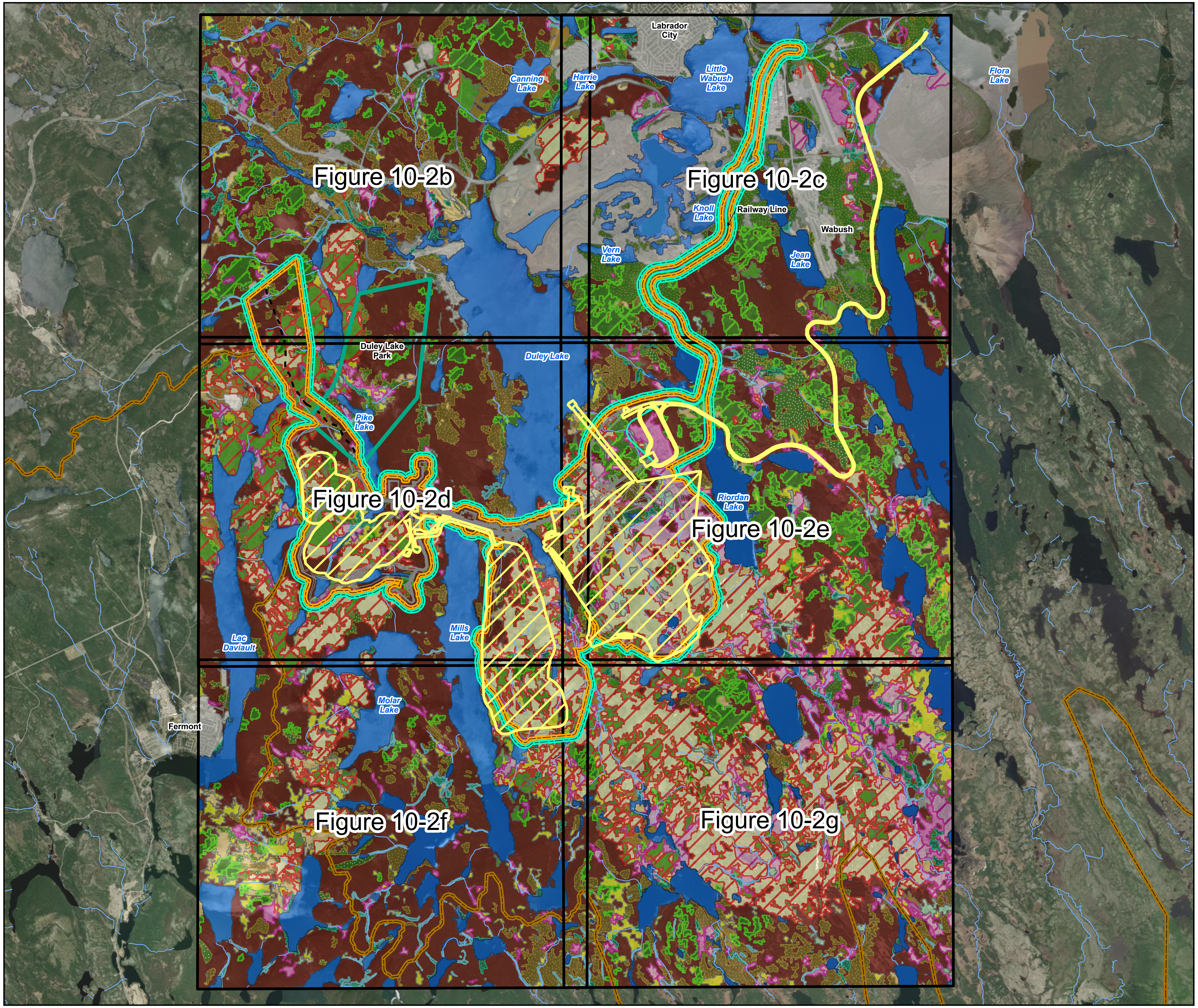
Table 10-5 lists plant SOCC and their associated rankings, that have the potential to occur within the SSA and/or RSA. Over time species rarity ranks appear to be changing as a result of additional survey efforts within Labrador. Specifically, species such as Woods Valerian (*Valeriana dioica*) and American False Hellebore (*Veratrun viride*) have been downgraded from an S1 rarity rank to an S2 rarity rank between 2012 and 2020, likely as a result of the initial baseline surveys from 2011-2012.

Table 10-5: Plant Species of Conservation Concern with the Potential to Occur within the Site Study Area or Regional Study Area

Common Name (Scientific Name)	S-Rank	SARA	G-Rank	Data Source	Identified within SSA	Identified within RSA
Jack Pine (*Pinus banksianna*)	S1	N5	G5	Stassinu-Stantec, WSP, ACCDC	Yes	Yes
Alpine Sweet-vetch (*Hedysarum americanum*)	S2S3	N5	G5	Stassinu-Stantec	Yes	Yes
Trailing arbutus (*Epigaea repens*)	S2S3	N5	G5	Stassinu-Stantec	Yes	Yes
Green spleenwort (*Asplenium viride)*	S1S2	N5	G5	ACCDC	No	No
Beautiful Sedge *(Carex concinna)*	S2	N5	G5	ACCDC	Yes	Yes
Mountain Bladder Fern *(Cypripedium montana)*	S2	N4N5	G5	ACCDC	No	No
Small Yellow Lady's Slipper (*Cypripedium parviflorum*)	S1	N5	G5	ACCDC, Stassinu Stantec,	Yes	Yes
Daisy Fleabane (*Erigeron hyssopifolius*)	S2	N5	G5	ACCDC	No	Yes
Limestone Polyplody (*Gymnocarpium robertianum*)	S1	N3N4	G5	ACCDC, Stassinu Stantec	No	No
Marsh Muhly (*Muhlenbergia glomerata*)	S2?	N5	G5	ACCDC, Stassinu Stantec	No	Yes
Northern Valerian (*Valeriana dioica subsp.*)	S2	N4N5	G5T4T5	ACCDC,	Yes	Yes
Green False Hellebore (*Veratrum viride var. viride)*	S2	N2	G5TNR	ACCDC, WSP, SEM (Boreal)	Yes	Yes
Vasey Oatgrass (*Danthonia intermedia*)	S2S3	N5	G5	Boreal	No	Yes

Note: No SAR (SARA Schedule 1 or ESA [provincial] listed) were found during 2012/2013 baseline, 2023 baseline surveys or identified by ACCDC. ACCDC = Atlantic Canada Conservation Data Centre (2023). Stassinu Stantec = Stassinu Stantec Limited Partnership (2012c) consultant report. Boreal = Overdale and Boreal Environmental rare plant survey for exploration boreholes (SEM 2024) consultant report. WSP= 2023 Baseline Surveys (2023) Consultant Report.

SAR = species at risk; SARA = *Species at Risk Act*; SSA = site study area; RSA = regional study area; ACCDC = Atlantic Canada Conservation Data Centre; ESA = *Endangered Species Act*.



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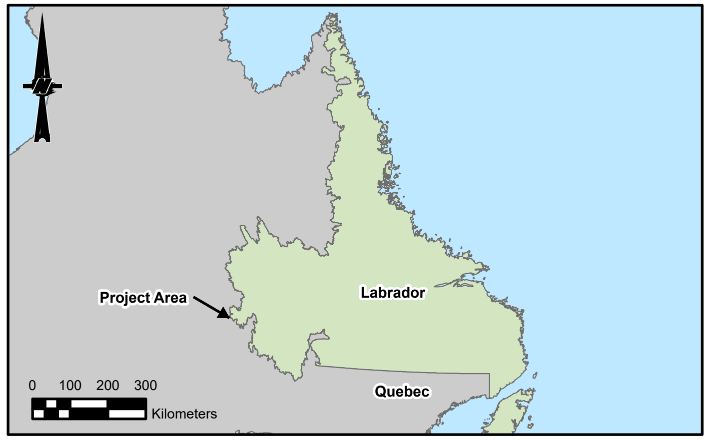

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- Proposed Access Road and Railway Corridor
- River/Stream
- Index Map
- Site Study Area
- Local Study Area
- Alderon EIS Project Development Area (PDA)
- Duley Lake Park
- Labrador/Quebec Boundary

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Ecological Land Classification

- Alder Thickett
- Alpine Heath
- Black Spruce-Labrador Tea -Feathermoss
- Black Spruce-Lichen
- Black Spruce/Tamarack-Sphagnum Woodland
- Developed Land
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- Riparian Thickett
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- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

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NOTE(S)
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PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
VEGETATION COMMUNITIES (KEY MAP)

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	SR
PREPARED	GM
REVIEWED	GB
APPROVED	JMC

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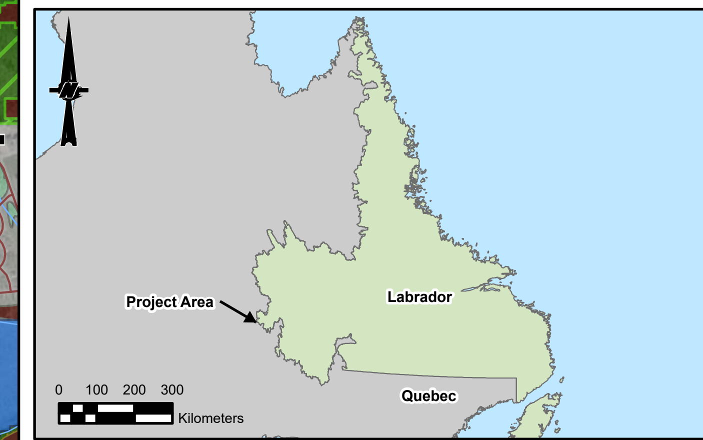

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- Potential Access Road
- Existing Railway
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APPROVED	JMC

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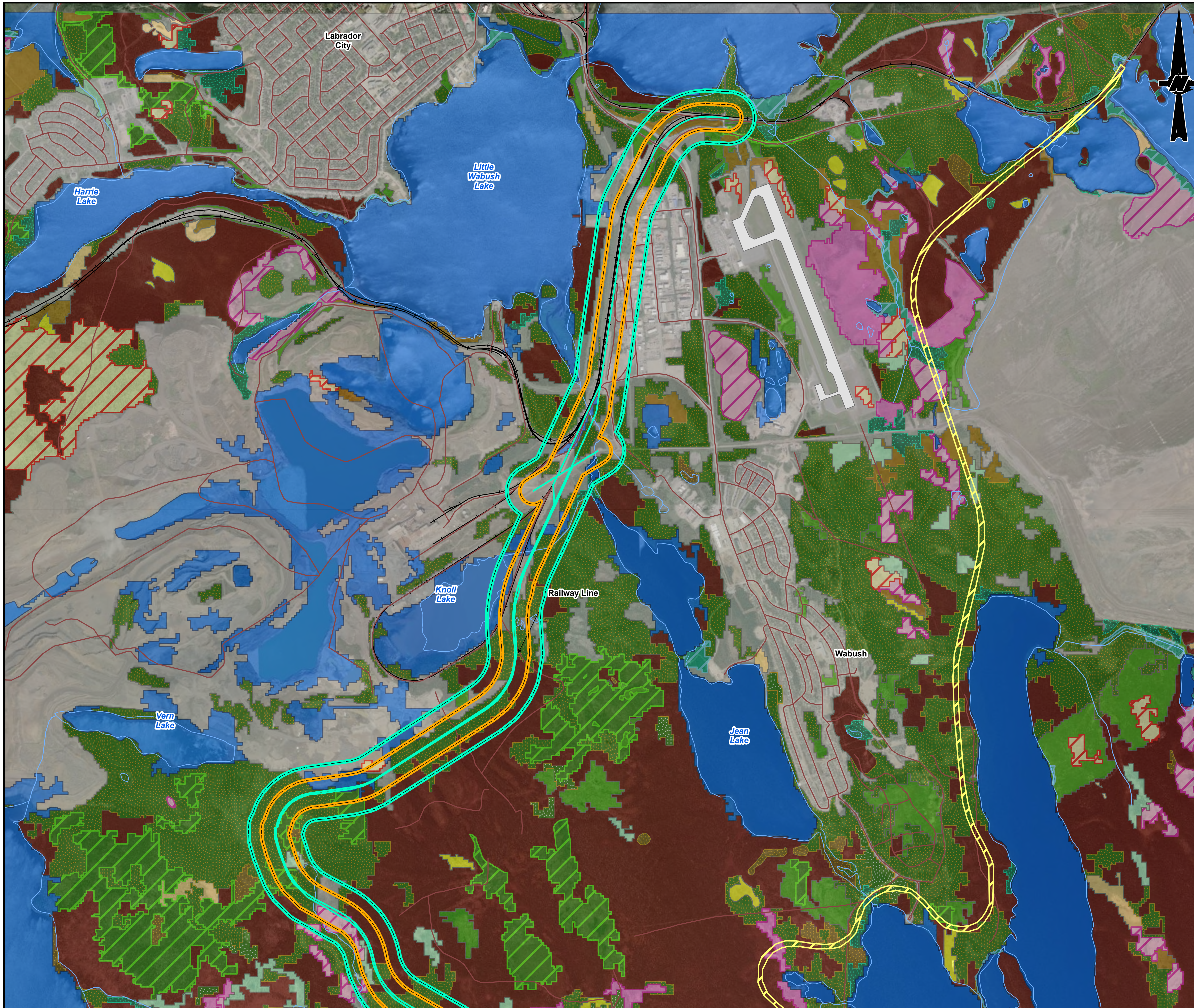

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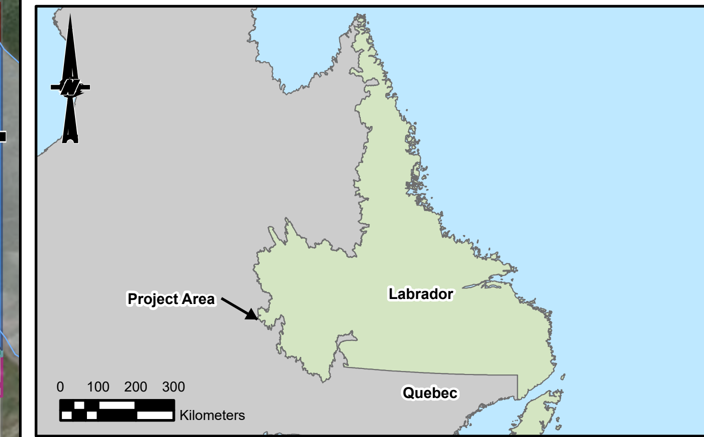

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- Proposed Access Road and Railway Corridor
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- River/Stream
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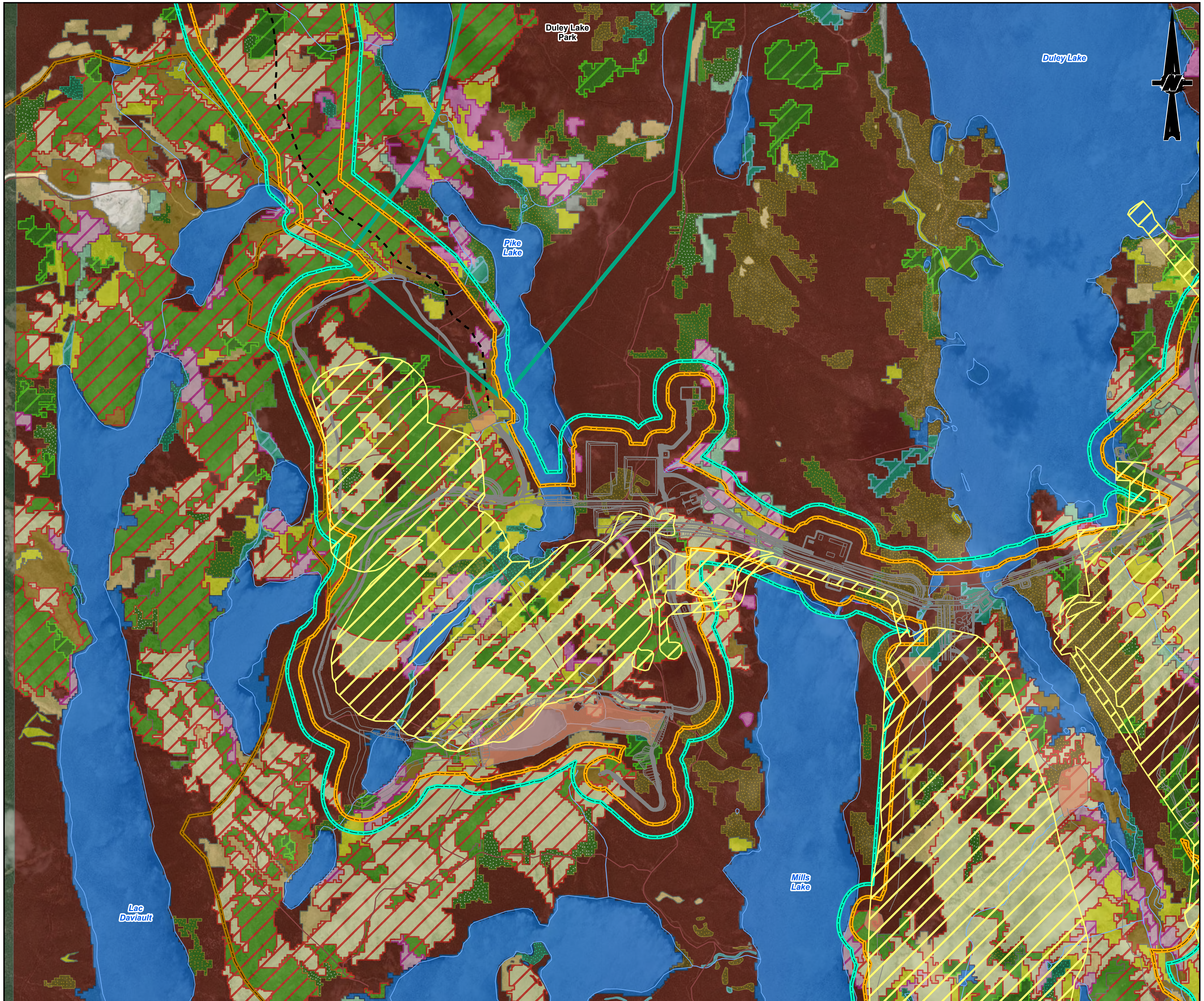

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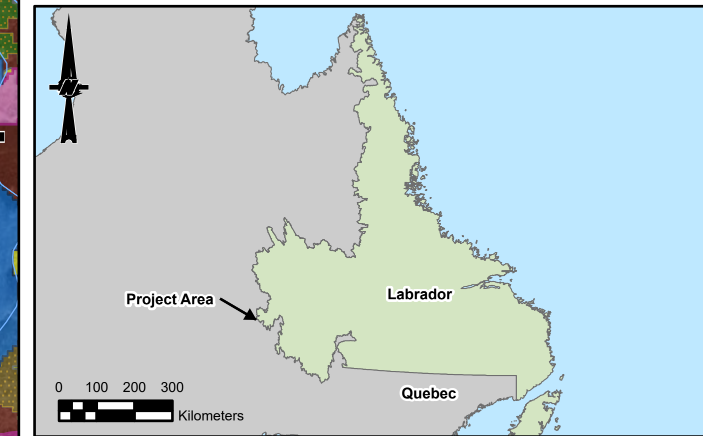

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- Potential Access Road
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- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Local Study Area
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- Duley Lake Park
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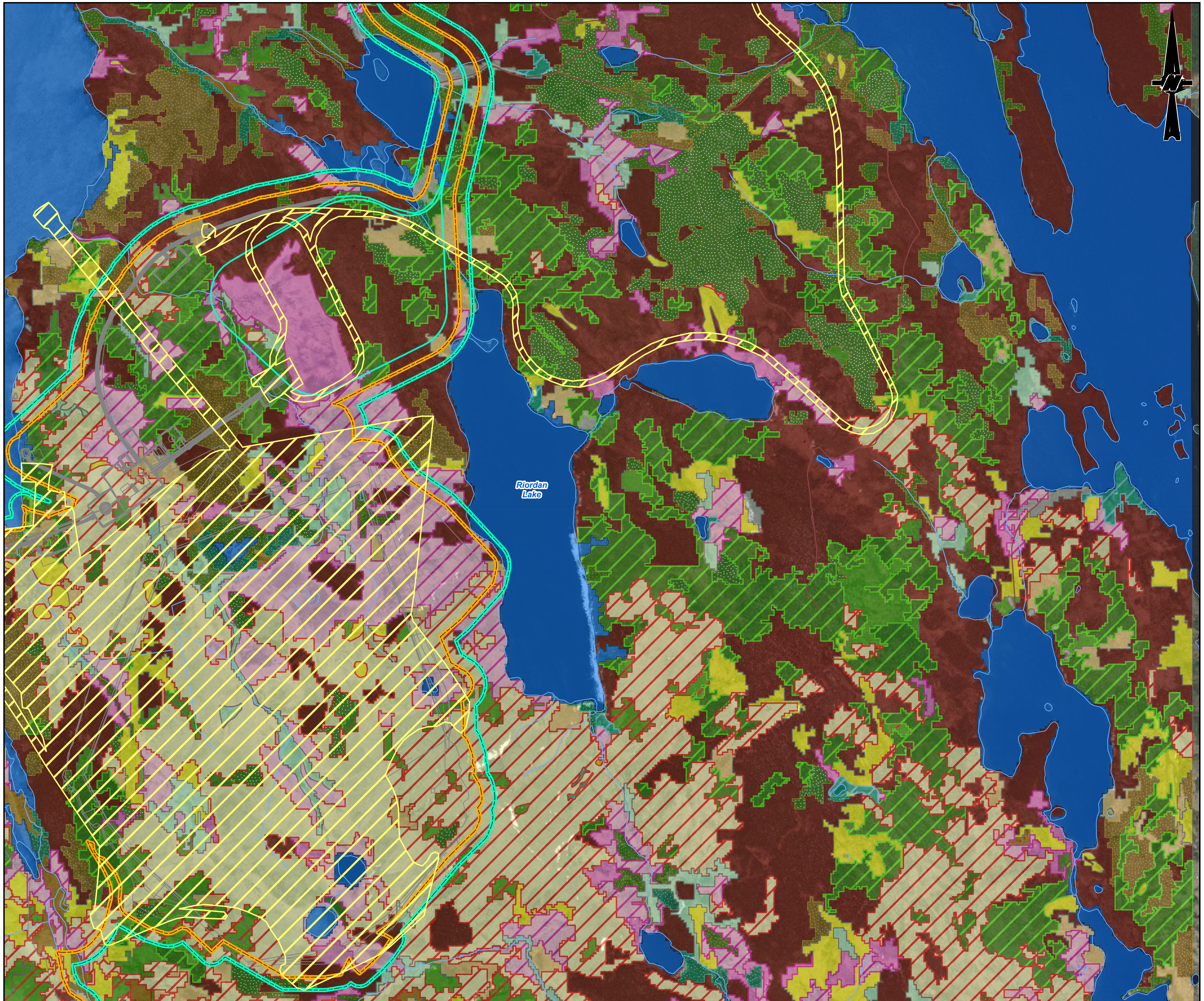

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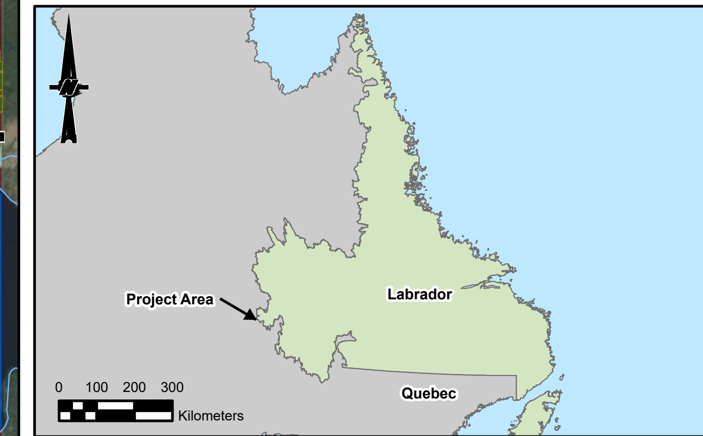

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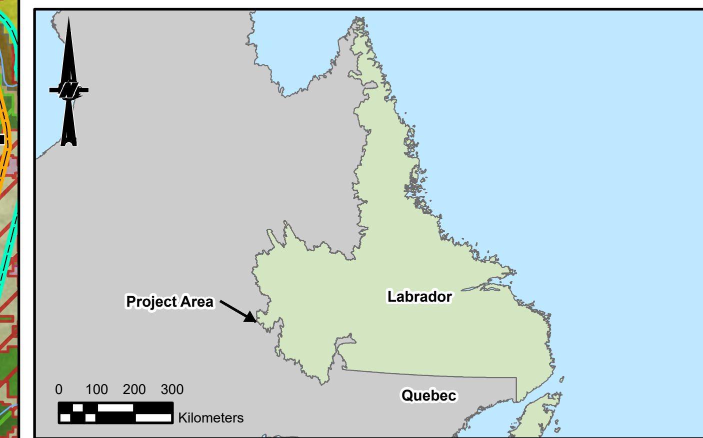

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Legend

- Existing Road
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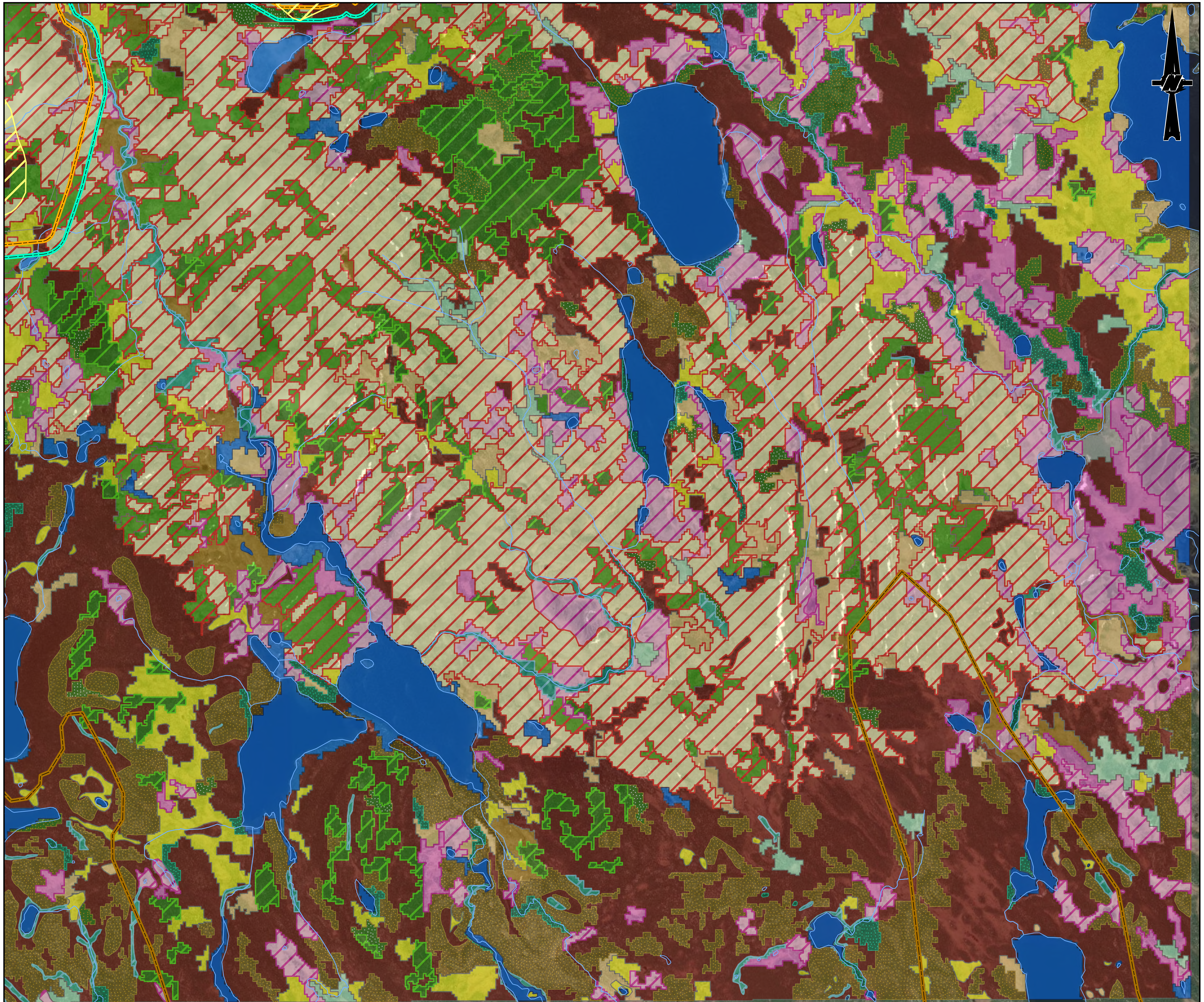

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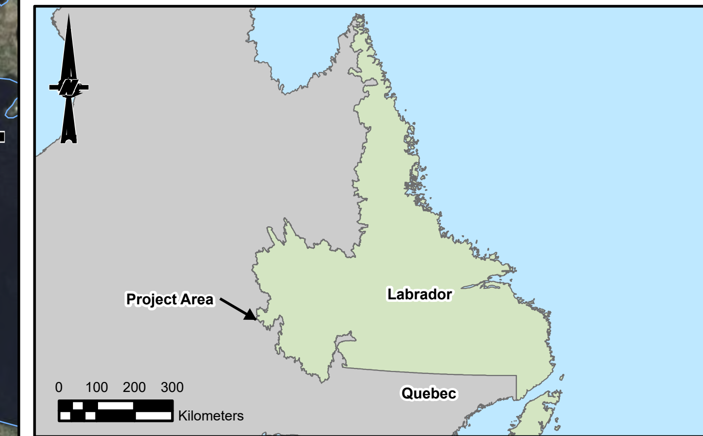

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Legend

- River/Stream
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- Non-Patterened Shrub Fen
- Patterned Shrub Fen
- Riparian Marsh (Fen)
- Riparian Thickett
- Softwood Burn/Regeneration
- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

0 0.28 0.55 1.1
1:30,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
VEGETATION COMMUNITIES

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	SR
PREPARED	GM
REVIEWED	GB
APPROVED	JMC

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	0	10-2g

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Existing Disturbances in the Study Area

Western Labrador has experienced major wildfire activity, particularly in recent years. On average, NL sees approximately 118 wildfires annually, burning around 22,993 ha of land. These fires can be caused by natural events, such as lightning strikes, or human activities. In 2024, the region faced one of its most severe wildfire seasons, with multiple fires threatening populated areas. Notably, a wildfire near Labrador City grew rapidly, expanding from 600 ha to over 10,000 ha within a few hours due to changing weather conditions (CBC 2024).

Historical and cultural practices also play a role in the region's fire history. Indigenous Peoples and early settlers in Labrador used fire deliberately for various purposes, such as creating berry habitats and altering caribou routes.

Factors influencing the extent and duration of resulting fires would be dependent on response times and effectiveness of suppression efforts. They may also depend on weather conditions at that time.

The magnitude of environmental effect is largely dependent on the scale and intensity of these forest fires. Reversibility of physical effects is high as most vegetation will regenerate over time (depending on severity). The presence of infrastructure (e.g., roads built for other purposes) could allow access into remote areas for suppression efforts, and maintaining those roads subsequently improves accessibility to those areas.

The potential for Project-related fires will be mitigated through proper planning, Project design, and the use of state-of-the-art best management practices, including employee training, proper storage and handling of flammable fuels and chemicals, reducing combustible materials within work areas (e.g., clearing brush), and using spark arrestors on all equipment. All Project activities will be conducted in accordance with applicable legislation (e.g., *Forest Fire Regulations* under the *Forestry Act*). Burning vegetative debris will be completed in accordance with permits issued by the Ministry of Natural Resources. Firefighting equipment obtained from Duley Lake will be kept pressurized and ready for use throughout the Construction and Operations phases should an emergency arise. A plan will be developed and implemented prior to the start of Construction, including an Emergency Response Plan with specific procedures for responding to forest fires and firefighting capability. Responsible, trained individuals will be available on-site, and Wabush staff and equipment will provide initial suppression activities.

Forest harvesting in NL is managed by the Department of Natural Resources, with some elements handled by the Forestry and Agrifoods Agency. The region has a history of forest harvesting dating back to the early 1900s, with current activities primarily focused in Happy Valley-Goose Bay, North West River, Cartwright, and Port Hope Simpson. The province is divided into 24 Forest Management Districts, with 18 in Newfoundland and six in Labrador. The LSA and RSA are almost entirely within Forest Management District (FMD) 22, intersecting the western extent of FMD 19. FMD 22 is the largest in the province, covering approximately 8 million ha. The district contains only sporadic commercial forest stands, predominantly comprising Black Spruce as well as other boreal species. This district has not been heavily utilized for large-scale commercial harvesting due to its remote location and lack of infrastructure. However, there are plans to increase commercial activities within this area. The annual allowable cut for FMD 22 is established at an average volume of approximately 1 Mm^3 per year over five years. Commercial logging in some areas is constrained by environmental considerations such as wildlife habitat protection (Government of Newfoundland and Labrador 2025).

The District 22 Management Plan considered forest management actions in response to potential developments, including mining industry expansion. There are two scheduled actions in the event of such development:

1. Participate in any consultations on potential new developments.
2. Monitor new developments so that timber is used before additional area is disturbed.

10.4.3.2 Wetlands

The ELC study area used by Stassinu Stantec is approximately the same area as the current RSA and the Alderon PDA is comparable to the current EIS SSA. A comparison of wetland areas in the RSA and SSA is presented in Table 10-6 and Table 10-7. The updated wetland area mapping is presented in Figure 10-3.

The Alderon wetland LSA was based on the area of available aerial images (approximately the mining lease area), whereas the current LSA was based on the predicted range of potential Project related indirect effects (about 100 m beyond the SSA) and these are not comparable.

Table 10-6: Comparison of Wetland Ecotypes Within the Regional Study Area

Class	ELC Type	WSP ELC (2025)		Stassinu Stantec ELC (2012)	
		Area (ha)	% of RSA	Area (ha)	% of RSA
Fen	Black Spruce/Tamarack-Sphagnum Woodland	1,807	4.53	4,960	12.51
	Tamarack/Black-Spruce-Feathermoss (Water Track)	342	0.86	3,010	7.59
	Patterned Shrub Fen	1,427	3.58	310	0.78
	Non-Patterned Shrub Fen	555	1.39	930	2.35
	Graminoid Fen	1,318	3.30	Combined with Non-Patterned Shrub Fen	
Marsh	Riparian Thickett	380	0.95	30	0.08
	Riparian Marsh (Fen)	297	0.75	60	0.15
	Shallow open water with vegetation (2012 only)	N/A	N/A	500	1.26
	Total Area:	**6,126**		**9,800**	

ELC = ecological land classification; RSA = regional study area; N/A = not applicable.

Table 10-7: Comparison of Wetland Ecotypes Within the Project Footprint

Class	ELC Type	Champion SSA (2025)		Alderon PDA (2012)	
		Area (ha)	% of ELC in the RSA	Area (ha)	% of RSA
Fen	Black Spruce/Tamarack-Sphagnum Woodland	133.02	7.36	303.80	6.13
	Tamarack/Black-Spruce-Feathermoss (Water Track)	76.74	22.44	317.60	10.55
	Patterned Shrub Fen	343.87	24.09	44.80	14.45
	Non-Patterned Shrub Fen	88.12	15.86	142.30	15.30
	Graminoid Fen	190.05	14.42	Combined with Non-Patterned Shrub Fen	
Marsh	Riparian Thickett	30.89	8.13	0.70	2.33
	Riparian Marsh (Fen)	16.94	5.69	0.50	0.83
	Shallow open water with vegetation (2012 only)	N/A	N/A	27.4	5.48
	Total Area:	**879.63**		**837.10**	

ELC = ecological land classification; PDA = project development area; RSA = regional study area; N/A = not applicable.

The wetland study completed by Stassinu Stantec in 2012 characterized a total of 287 wetland polygons covering an area of 1,673 ha within the Alderon LSA, ranging from less than 0.05 ha to over 500 ha. Two wetland classes were identified: fen and marsh. Fens constitute the majority of wetland habitat, while marshes are less abundant and primarily located along the shorelines of certain waterbodies and watercourses (Stassinu Stantec 2012b). The 2012 ELC analysis identified approximately 9800 ha of wetland type polygons in the RSA.

The updated ELC mapping identified approximately 6,126 ha of wetland in the RSA with several changes in the area of specific wetland types (Table 10-6). All areas have changed significantly but the general order is approximately similar (i.e., the larger ones remain larger, and the smaller ones remain smaller). Most of the change is attributed to increased accuracy of the ELC modelling from about 50% up to about 90%. Some change is suspected to be due to possible misidentification of timber harvested areas in 2012 as a low-growing wetland type. Some change is suspected to be due to the over prediction of Tamarack/Black-Spruce-Feathermoss (Water Track) within the large Patterned Shrub Fen, which was found to be represented by very narrow bands using the more accurate modelling method. The total area of wetland ELC within the RSA has decreased about 30%, based on the reinterpretation of some wetland types to forest areas. The total area of wetland ELCs within the PDA and SSA was very close in similarity, possibly due to the added effort of field verification within the Project footprint by each study (Table 10-6). The ELC data for the RSA indicate there are 865 wetlands ranging in area from 0.1 ha up to 805 ha and an average wetland area of 7.08 ha.

Seven selected wetland areas within the LSA were surveyed by WSP from August 1st to August 3rd, 2023 (WSP 2024). These wetlands ranged in size from 6.2 to 387.5 ha and were classified as fen, fen bordered by a treed swamp, or marsh bordered by a shrub swamp. Soil pits revealed histosols over 40 cm deep, with a high-water table and visible surface water. Wetlands were slightly basic (pH 7.30 to 7.74) or mildly acidic (pH 5.24 to 5.46), indicating calcareous or mildly acidic soils. A total of 85 identifiable plant species were encountered, with no SAR found. The only SOCC encountered was Green False Hellebore, found in Wetlands 1, 4, and 5. The WESP-AC functional assessment method was applied. A comparison of WSP delineated wetland areas is presented in Table 10-8, including the Alderon type, size and functions present. Table 10-9 shows the results of the WSP WESP-AC analysis for the 7 field verified wetlands.

The precise boundaries identified in recently field delineated wetlands are quite different from Alderon wetland mapping and generally larger, sometimes incorporating multiple smaller Alderon wetland areas. This is not unusual as the ELC mapping is prone to underestimate wetlands areas where forest wetland boundaries have complex and very broad transition zones in areas of low topographic relief and where the cool moist climate causes regional vegetation communities to be composed of "wet-site" tolerant plant species. Some differences are also due to the way that the ELC lumps wetland areas. The WSP Wetland 6 field survey was stopped at administrative boundaries and do not include the other half of the same wetland which is captured in the Alderon ELC. WSP Wetland 7 was not identified in the Stassinu Stantec wetland ELC mapping. In general, it is likely that field delineation would reveal larger wetland extents for many ELC-based wetlands and may identify additional wetlands that are not currently identified by the ELC modelling methodology. As an example, the WSP ELC modelling only shows 584 ha of wetland ELC type within the WSP field verified wetland area of 927.7 ha (for all seven WSP wetlands), suggesting that in this location, the ELC has underestimated the actual wetland area by 37%. It is likely the level of accuracy would improve in locations with higher topographic relief and fewer actual wetlands.

The wetland function evaluations from each study area were not directly comparable. The NovaWET method produces "present/absent" results which the WESP-AC method produces grouped function "high-moderate-low" results. The two datasets broadly agree that the support of fish and fish habitat is lower while habitat support for terrestrial species is higher. The value of the WESP-AC method is that the criteria measurement is more rigorous and less subject to differences in surveyor experience. The WESP-AC results in the selected wetlands where Project effects will be large, provides a stronger baseline characterization with which to compare during post-construction monitoring. The WESP-AC method also provides evaluation of current wetland condition and wetland risk, which are not included in the Nova WET method, that measure the degree to which existing wetlands are already effected or are at risk of future effects from existing external sources. The assessment of the selected wetland in the Project footprint indicate that these wetlands currently receive some level if effects from existing local land uses (except for WL4) and have future risk factors related to nearby developments.

It is notable that WSP WL4 includes the Elephant Head MU and WESP-AC results corroborate the presence of higher quality wetland functions, including aquatic and transition habitat which would be ideal for waterfowl.

Wildlife species most associated with wetlands, and have been observed in regional wetland ELC areas, include moose, beaver, muskrat, American toad, osprey, slate-coloured junco, American robin, gray-jay, cedar waxwing, greater yellow-legs, common merganser, Lincoln's sparrow, northern flicker, rusty blackbird, spotted sandpiper, Swainson's thrush, tree swallow, vesper sparrow, wetland sparrow, Wilson's snipe, winter wren, yellow-shafted flicker, and short-eared owl. Potential effects on wetland associated wildlife species are discussed in Chapter 11. No SAR species were observed in the SSA or LSA during recent field surveys in 2023.

Table 10-8: Comparison of WSP Field Verified Wetlands with Previous Data

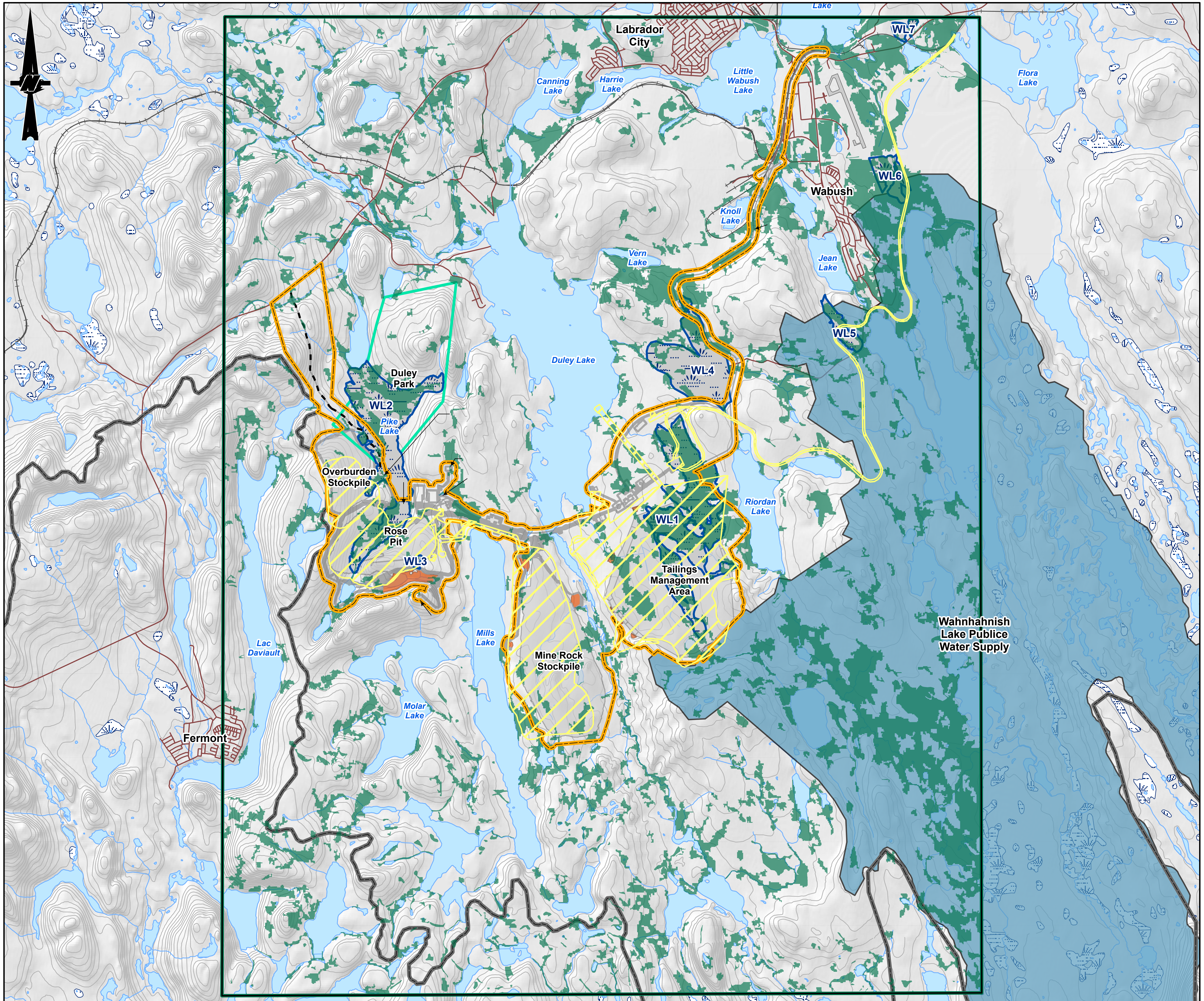
WSP Wetland No.	WSP Type	Wetland Area (ha)	Alderon Wetland No.	Alderon Type	Alderon Type Simplified	Wetland Area (ha)	Alderon Wetland Functions (X = Present)								
							Surface Water Detention	Sediment and Other Particulate Retention	Streamflow Maintenance	Carbon Sequestration	Shoreline Stabilization	Fish Habitat	Stream Shading	Waterfowl and Waterbird Habitat	SOCC Habitat
1	Fen	376.3	209	Slope Fen and Atlantic Ribbed Fen	Fen	517.36	X	-	X	X	X	-	X	X	X
			4	Slope Fen and slope fen	Fen	2.51	-	-	-	X	-	-	-	-	X
2	Fen	387.5	32	Shore Fen and Stream Fen	Fen	2.82	-	-	X	X	X	-	X	X	X
			34	Slope Fen	Fen	17.13	-	-	-	X	X	-	-	-	X
			33	Lacustrine Marsh (Shore Fen)	Fen	2.14	X	X	X	X	X	X	-	X	X
			31	Shore Fen	Fen	0.38	-	-	X	X	X	-	X	X	X
			30	Slope Fen	Fen	2.9	-	-	-	X	X	-	-	-	X
			29	Lacustrine Marsh (Shore Fen)	Fen	1.09	X	X	X	X	X	X	-	X	X
			23	Stream Fen	Fen	0.37	-	-	X	X	X	-	-	X	X
			152	Slope Fen and Slope Fen	Fen	0.08	-	-	-	X	X	-	-	-	X
			151	Slope Fen	Fen	1.27	-	-	-	X	X	-	-	-	X
			21	Slope Fen	Fen	0.99	-	-	-	X	-	-	-	-	X
			20	Slope Fen	Fen	0.61	-	-	-	X	-	-	-	-	X
			19	Lacustrine Marsh (Shore Fen)	Fen	18.68	X	X	-	X	X	X	X	X	X
			163	Slope Fen	Fen	4.28	-	-	X	X	X	-	-	-	X
			162	Lacustrine Marsh (Shore Fen)	Fen	0.17	X	X	X	X	X	X	-	X	X
			9	Atlantic Ribbed Fen	Fen	2.1	X	-	-	X	X	X	X	X	X
			12	Stream Fen	Fen	2.02	-	-	-	X	X	-	X	-	X
			13	Lacustrine Marsh (Shore Fen)	Fen	0.45	X	X	X	X	X	X	-	X	X
			14	Shore Fen	Fen	0.19	-	-	X	X	X	-	-	X	X
			156	Atlantic Ribbed Fen and Slope Fen	Fen	29.37	X	-	X	X	X	-	-	X	X
			158	Slope Fen	Fen	1.85	-	-	-	X	-	-	-		X
			159	Atlantic Ribbed Fen and Slope Fen	Fen	11.41	X	-	X	X	X	-	-	X	X
					Total Area:	100	-	-	-	-	-			-	-
3	Fen	6.2	140	Atlantic Ribbed Fen and Slope Fen	Fen	5.08	X	-	X	X	X	-	-	X	X
			141?	Slope Fen	Fen	0.28	-	-	-	X	-	-	-	-	X
4	Fen bordered by a Treed Swamp	231.9	252	Atlantic Ribbed Fen and Stream Fen and Slope Fen	Fen	32.58	X	-	X	X	X	-	X	X	X
			253	Lacustrine Marsh (Shore Fen)	Fen	0.67	X	X	X	X	X	X		X	X
			245	Stream Fen and Atlantic Ribbed Fen and Slope Fen	Fen	51.55	X	-	-	X	X	-	X	X	X
			259	Shore Fen	Fen	0.13	-	-	X	X	X	-	-	X	X
			246	Atlantic Ribbed Fen and Slope Fen	Fen	8.01	X	-		X	X	-	-	X	X
			247	Lacustrine Marsh (Shore Fen)	Fen	0.12	X	X	X	X	X	X	-	X	X
			248	Slope Fen	Fen	3.71	-	-	-	X	X	-	-	-	X
			249	Slope Fen	Fen	1.04	X	-	-	X	X	-	-	-	X
			250	Lacustrine Marsh (Shore Fen)	Fen	0.13	X	X	X	X	X	X	-	X	X
			235	Lacustrine Marsh (Shore Fen) and Slope Fen	Fen	2.08	X	X		X	X	X	-	X	X
					Total Area:	100	-	-	-	-	-	-	-	-	-
5	Fen bordered by a Treed Swamp	38.2	278	Atlantic Ribbed Fen and Slope Fen	Fen	-	X		X	X	X		-	X	X
			279	Lacustrine Marsh (Shore Fen)	Fen	2.73	X	X	X	X	X	X	-	X	X
6	Fen bordered by a Treed Swamp	52.4	283	Atlantic Ribbed and Slope Fen	Fen	107.94	X	-	X	X	X		-	X	X
7	Marsh bordered by a Shrub Swamp	16.9	New	-	-	-	-	-	-	-	-	-	-	-	-

SOCC = species of conservation concern;- = not applicable.

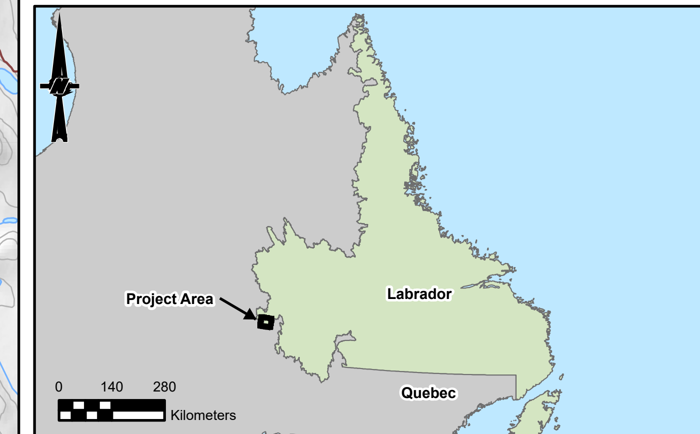
Table 10-9: Wetland Ecosystem Services Protocol for Atlantic Canada Summary Ratings for Grouped Functions for WSP Field Verified Wetlands

Grouped Wetland Functions	Wetland 1 (WL1)		Wetland 2 (WL2)		Wetland 3 (WL3)		Wetland 4 (WL4)		Wetland 5 (WL5)		Wetland 6 (WL6)		Wetland 7 (WL7)	
	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit
Hydrologic		Higher		Higher		Higher		Higher		Higher		Higher		Higher
Water Quality	Lower	Higher	Lower	Higher	Higher	Higher	Moderate	Higher	Moderate	Higher	Lower	Higher	Moderate	Higher
Aquatic Support	Moderate	Higher	Moderate	Higher	Lower	Moderate	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher
Aquatic Habitat	Higher	Moderate	Higher	Moderate	Higher	Moderate	Higher	Moderate	Higher	Moderate	Higher	Higher	Higher	Moderate
Transition Habitat	Moderate	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher
Wetland Condition		Lower		Lower		Lower		Higher		Lower		Moderate		Moderate
Wetland Risk		Higher		Higher		Higher		Higher		Higher		Higher		Higher

Note: Grey shading indicates values that are not ranked by the WESP-AC calculator.
WESP-AC = Wetland Ecosystem Services Protocol for Atlantic Canada.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA	BASEMAP INFORMATION
Proposed Project Infrastructure	Road
Proposed Sediment Pond	Railway
Regional Study Area	Watercourse
Site Study Area	Contour
Alderon EIS Project Development Area (PDA)	Duley Lake Park
Field Verified Wetland	Bog/Wetland
ELC Wetland	Waterbody
Potential Access Road	Labrador/Quebec Boundary
	Public Water Supply

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
WETLAND AREAS

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	GB
APPROVED	JMC

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	0	10-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

10.4.3.3 Protected Areas

In 2005, the Town of Labrador City and the Town of Wabush signed Wetland Habitat Stewardship Agreements with the Government of NL through the Stewardship Association of Municipalities (Stewardship Association of Municipalities 2019). These areas are identified and protected through the town's municipal plans and development regulations. Labrador City has nine MUs aimed at maintaining and enhancing waterfowl and wildlife populations. The wetlands in this area provide important habitats for various bird species along migration routes. Protected land in MUs includes a 15-m buffer from the high-water mark along the shorelines of designated ponds, rivers, or wetlands. The Wabush Habitat Conservation Plan covers all municipal planning boundaries except for certain development areas, establishing seven MUs for important wetland or upland areas within Wabush's boundaries. Table 10-10 refers to the MUs within Labrador City and Wabush. The total area of MUs in the RSA is 3,247 ha.

Table 10-11 presents information about wetlands in the Municipal Management Areas. The Wetland Habitat Stewardship Agreements discourage developments that would result in net loss of habitat or habitat degradation (Town of Labrador City 2018; Town of Wabush 2018). However, Councils may establish mitigation techniques to be used by the developer to reduce habitat degradation. Any loss of habitat within a Habitat MU in Labrador City or Wabush can be addressed by improving existing habitat, identifying new habitat areas for protection or by offsetting through programming or financial compensation for unavoidable losses. New protected land can be within the existing wetland, an adjoining wetland or in another appropriate location within the planning area.

There are four protected areas which are adjacent to or overlap the proposed infrastructure of the Project, three of which are MUs, one within the municipality of Labrador and two within Wabush, including:

- Elephant Head MU – will be in close proximity to the Project footprint.
- Pike Lake South MU – this MU overlaps with the Rose Pit.
- Jean Lake Rapids MU – located near a proposed crossing.
- Duley Lake Provincial Park –there will be an overlap of the overburden stockpile into the Duley Lake Provincial Park.

The Duley Lake Provincial Park is in the western part of the RSA and is overlapped by the Project footprint. The RSA also overlaps with the municipal boundaries of Labrador City and Wabush. Both towns, through an agreement with the province, have committed to conserving and protecting wetlands within specified Stewardship Zones. With the assistance of the Eastern Habitat Joint Venture, habitat conservation plans have been developed to guide and govern activities that could negatively effect wetlands and waterfowl in these conservation areas (EHJV 2009, 2017). Within each Stewardship Zone, there are specific MUs representing important wetlands important for waterfowl during nesting, brood-rearing, feeding, and staging. In Labrador City, the MUs overlapping the Study Area include Little Wabush Lake, Wabush Narrows, Walsh River, Pike Lake North, and Pike Lake South. Similarly, in the Town of Wabush, the MUs include Jean Lake Rapids, Elephant Head, Angel Lake, and Waldorf River Steady. The descriptions of these wetlands and associated upland areas are considered appropriate representations of the ecosystems encompassed by these MUs and the larger Stewardship Zones. There are approximately 2,351 ha of protected area in the RSA.

Table 10-10: Labrador City and Wabush Management Units

MU	Area (ha)	Location Relative to Project and Ecological Significance
Labrador City Non Town-Site MUs (1,039 ha)		
Lac Virot	64	Western edge of the municipal planning area; rich, active breeding area for waterfowl, particularly at wetlands in the northern section of the MU.
Pike Lake North and South	741	Lakes are located on the eastern side of Route 500, south of the entrance to Duley Lake Provincial Park Reserve; both MUs border the Park and include ponds, bogs and streams; northern MU supports nesting, breeding and staging waterfowl; southern MU also has habitat for many waterfowl and upland birds.
Walsh River	117	Immediately northwest of Walsh River bridge; river and adjacent ponds and streams provide nesting and breeding habitat for a variety of avifauna; MU is northwest of the privatized portion of Duley Lake Provincial Park Reserve.
Ironstone River	117	A small steady river with associated bogs and uplands located in the Ironstone River, noteworthy for waterfowl.

MU	Area (ha)	Location Relative to Project and Ecological Significance
Labrador City Town Site MUs (175 ha)		
Beverly Lake	N/A	At the eastern shoreline of Beverly Lake; provides habitat for Belted Kingfisher, bordered in the north by the town's previous municipal boundary; west side extends south along Route 500, and ends at Tamarack Creek; important area for waterfowl.
Tamarack Creek	N/A	Extends from outlet of Beverly Lake to inlet of Wabush Lake; considerable development here, yet serves as feeding area for numerous waterfowl and provides nesting/feeding areas for Osprey; the Labrador West Agricultural Society's Alex Duffett Community Garden is located here.
Wabush Narrows	N/A	Extends from the southern end of Tamarack Creek MU to Wabush Narrows; important for hundreds of waterfowl availing of the open water and shoreline for feeding during migration in late April; the sandy shoreline near a floatplane dock is unique within the municipal planning area for its number of species and terrain.
Little Wabush Lake	39	North shore has undergone development; includes habitat for migratory waterfowl and shorebirds; the MU extends south to the municipal boundary and west toward Harnie Lake.
Wabush MUs (2,033 ha)		
Jean Lake Rapids	34	Within space designated for recreation and watershed purposes only; one of the few places where the Harlequin duck has been observed (Alderon 2012.); is traversed by a bridge and access road.
Elephant Head	30	Within space designated for recreation and watershed purposes only; one of the few places where the Harlequin duck has been observed (Alderon 2012); is traversed by a bridge and access road.
Flora Lake East	73	Provides important habitat for waterfowl; far from habitation, roads or current development; this pond and associated bog and uplands provide habitat for several species of waterfowl.
Flora Lake West	79	Provides nesting habitat for waterfowl.
Wahnahnish River	1,383	Largest of the MUs for Wabush, Wahnahnish River provides a chain of habitats used by a variety of waterfowl; of particular interest is the association between the river and a series of eskers rich in berries, which form an integral part of the diet of these waterfowl.
Angel Lake	408	Adjacent to the Wabash River MU, provides waterfowl staging and breeding habitat.
Waldorf River Steady	26	Occurs along the western edge of the municipal planning area; includes an associated lake and river segment with an esker that is attractive for waterfowl.
MU Total Areal Extent	**3,247**	**Total MU area within the RSA**

MU = management unit; RSA = regional study area; N/A = not applicable.

Table 10-11: Area and Wetland Present within Municipal Management Units and Duley Lake Provincial Park

MU		Area (ha) of MU	Wetland Area (ha)	Rationale for Conservation Status
Municipal MUs	Angel Lake	407	N/A	Habitat for staging, nesting, and breeding waterfowl.
	Elephant Head	31	10	Encompasses a lake and some surrounding wetlands, which are important habitat for nesting waterfowl and provides feeding opportunities for Canada Goose.
	Jean Lake Rapids	34	0.4	Harlequin duck is regularly observed in the rapids of this area.
	Little Wabush Lake	39	N/A	Habitat for migratory waterfowl and shorebirds.
	Wabush Narrows	N/A	N/A	Staging area during spring migration.
	Pike Lake North	128	N/A	Habitat for nesting, breeding, and staging waterfowl.
	Pike Lake South	610	0.41	Waterfowl habitat.
	Waldorf River Steady	26	0.3	Provides good feeding opportunities for waterfowl.
	Walsh River	117	N/A	Habitat for nesting and breeding waterfowl and other birds.
	Total	**1,390**	**N/A**	Habitat for waterfowl and other birds.
Duley Lake Provincial Park Reserve		763	73	Protection of open lichen woodland, which is representative of the ecoregion.
Duley Park Private		198	N/A	Campground portion of the Duley Lake Provincial Park Reserve

MU = management unit; N/A = not applicable.

10.5 Effects Assessment

The effects assessment for the Vegetation, Wetlands and Protected Areas VECs are presented in the following sections. The effects assessment is described for all VECs together, including methods to assessing effects (Section 10.5.1), effect pathway screening (Section 10.5.2), residual Project effect analysis (Section 10.5.3) and residual cumulative effect analysis (Section 10.5.4).

10.5.1 Methods

10.5.1.1 Effect Pathway Screening

Interactions between Project components or activities, and the corresponding potential changes to the environment that could result in a potential effect to the Vegetation, Wetlands and Protected Areas VEC were identified by an effect pathway screening. The effect pathway screening was then used to inform the residual Project and cumulative effect analyses for the Vegetation, Wetlands and Protected Areas VEC. The first part of the analysis was to identify the potential effects pathways for each phase of the Project. Each pathway was initially assumed to have an interaction that would results in potential effects on Vegetation, Wetland and Protected Areas VEC.

Potential pathways from Project activities to vegetation, wetland and protected areas VEC were identified using the following:

- review of the Project Description (**Chapter 2**) and scoping of potential effects by the EIS team for the Project
- input from engagement (Chapter 22)
- scientific knowledge
- review of EISs for similar mining projects, including the previous EIS (Alderon 2012)
- previous experience with mining projects
- consideration of key issues (Section 10.3.1)

Potential adverse effects of the Project were then identified, and practicable mitigation was applied to avoid, minimize and/or rehabilitate effects to the vegetation, wetlands and protected areas VEC. Avoidance and minimization are widely recognized as the most important for biodiversity conservation (BBOP 2016). Avoidance designs and actions integrated into the Project were developed iteratively by the Project's EIS team. The effectiveness of mitigation measures proposed for each effect pathway was assessed to determine whether the mitigation would address the potential Project effect such that the pathway was eliminated, would result in a negligible adverse effect on Vegetation, Wetlands and Protected Areas or if residual adverse effects remained.

This effect pathway screening was a preliminary assessment that was intended to focus the effects analysis on effect pathways that required a more quantitative or comprehensive assessment of effects on VECs. Using scientific knowledge, feedback from consultation, logic, experience with similar developments, and an understanding of the effectiveness of mitigation (i.e., level of certainty that the proposed mitigation would work), each effect pathway was categorized as one of the following:

- **No effect pathway**–The effect pathway could be removed (i.e., the effect would be avoided) by avoidance measures and/or additional mitigation so that the Project would result in no measurable environmental change relative to existing conditions or guideline values (e.g., air, soil, or water quality guidelines), and, therefore, would have no residual effect on vegetation, wetlands and protected areas.
- **Negligible effect pathway–**With the application of mitigation, the effect pathway could result in a measurable but minor environmental change relative to existing conditions or guideline values, but the change is sufficiently small that it would have a negligible residual effect on vegetation, wetlands and protected areas VEC (e.g., a decrease in wetland surface water quality due to mining effluent will be effectively mitigated since effluent discharge concentrations must meet guidelines). Therefore, further detailed assessment of the residual effect is not warranted as the effect pathway would not be expected to result in a significant residual Project or cumulative effect to vegetation, wetlands and protected areas.
- **Residual effect pathway–**Even with the application of mitigation, the effects pathway is still likely to result in a measurable environmental change relative to existing conditions or guideline values that could cause a greater-than-negligible adverse or positive effect on vegetation, wetlands and protected areas and warrants additional assessment.

Project interactions determined as no effect pathway or negligible effect pathways were not carried forward for further assessment. Residual effect pathways that could result in changes to the environment with one or more associated measurable parameter and have the potential to cause a greater than negligible effect on vegetation and wetland VECs were carried forward to the residual Project effects analysis (Section 10.5.3) and residual cumulative effects analysis (Section 10.5.4).

10.5.1.2 Residual Project Effect Analysis

The residual effects analysis measures and describes the effects of the Project on vegetation, wetlands and protected areas relative to existing conditions. The residual effects analysis was conducted using the temporal snapshot identified for the assessment (Section 10.3.3). Residual effects are described for each of the measurement indicators for the residual effect pathways identified including:

- Effects on vegetation communities within the RSA is measured as changes in area by ELC type. Effects on plant SOCC populations are correlated with the relative abundance of preferred habitat represented by ELC type. Changes in ELC relative abundance is used as an indicator of regional plant species diversity.
- Reductions in wetland function within the RSA is primarily measured as changes in wetland area by type measured using remote sensing techniques and GIS analysis. Satellite imagery and aerial photographs are used to map wetland boundaries and monitor changes over time. Field surveys provide ground truth data to validate remote sensing results. Metrics such as the percentage change in wetland area are calculated to quantify the effects of development.
- Effects on hydrology of selected wetlands in the LSA are assessed by observing visible indicators such as water level fluctuations, hydroperiod, and the presence of hydrological features like channels and ponds. These observations help determine the extent of wetland loss and alteration. Monitoring of local groundwater levels associated with mine operation may support understanding of hydrological changes.
- Changes in quality of selected wetlands in the LSA are evaluated by monitoring wetland functions (baseline versus post-construction) using the WESP-AC.
- Effects on protected areas within the RSA, in the context of vegetation and wetlands, is measured by changes in area, vegetation diversity, and wetland functionality.

The residual effects analysis used a reasoned narrative to describe anticipated changes to each measurable parameter caused by the Project. This narrative description of anticipated effects is the foundation for the residual effects classification. Residual effects are summarized or classified in tabular form using effects criteria, which is intended to provide structure and comparability across VECs assessed for the Project. The residual effects classification uses nature, magnitude, geographic extent, duration, timing, frequency, reversibility, and probability of occurrence as criteria. The approach to classify each residual effect criterion is provided in Table 10-12. Following classification of residual Project effects, the analysis also evaluates the significance of residual Project effects using threshold criteria or standards beyond which a residual effect is considered significant. The VEC specific definitions of significant effects are provided in Section 10.5.1.4.

Table 10-12: Definitions Applied to Effects Criteria Classifications for the Assessment of Vegetation, Wetlands and Protected Areas

Criterion	Rating	Definition
Nature	Positive	Change in measurable parameter results in net improvement or benefit to the vegetation, wetlands and protected areas
	Neutral	Change in measurable parameter results in no change to the vegetation, wetlands and protected areas
	Adverse	Change in measurable parameter results in net degradation or loss to the vegetation, wetlands and protected areas
Magnitude	Qualitative narrative or numeric quantification	Change in measurable parameter is described by effect size (e.g., 10% or less loss of areas is a small magnitude, >10% is moderate, and >20% is a high magnitude [loss])
Geographic extent	SSA	Change in measurable parameter is confined to the SSA
	Local	Change in measurable parameter extends outside the SSA but within the LSA
	Regional	Change in measurable parameter extends beyond the LSA but is confined to the RSA
	Beyond regional	Change in measurable parameter extends beyond the RSA
Duration	Qualitative narrative or numeric quantification	Short term: Effect is limited to the Construction or Closure phase of the Project Medium term: Effect occurs through the duration of the Project Long term: Residual effect extends beyond the life of the Project
Timing	Qualitative narrative or numeric quantification	Change in measurable parameter is described with a focus on seasonality (Project effects on vegetation, wetlands, and protected areas are relatively insensitive to seasonality)

Criterion	Rating	Definition
Frequency	Occasional	Change in measurable parameter is expected to occur rarely (e.g., once or a few times)
	Periodic	Change in measurable parameter is expected to occur consistently at regular intervals or associated with temporal events (e.g., during hot, dry climatic conditions)
	Continuous	Change in measurable parameter is expected to occur all the time
Reversibility	Reversible	Change in measurable parameter is reversible within a clearly defined time period
	Irreversible	Change in measurable parameter is predicted to influence the component indefinitely
Probability of occurrence	Unlikely	Change in measurable parameter is not expected to occur, but not impossible
	Possible	Change in measurable parameter may occur, but is not likely
	Probable	Change in measurable parameter is likely to occur, but is uncertain
	Certain	Change in measurable parameter will occur
Ecological and socio-economic context	Qualitative narrative or numeric quantification	Change in measurable parameter is described by the perception of an effect that considers sensitivity and resilience of VECs (ecological context), and the cultural and social significance placed on certain VECs and the unique values, customs or aspirations of local communities or Indigenous groups

SSA = site study area; LSA = local study area; RSA = regional study area; VEC = valued environmental component.

10.5.1.3 Residual Cumulative Effect Analysis

The cumulative effects assessment builds on the results of the residual Projects effects assessment and considers the incremental changes that were predicted to have a likely residual adverse effect on Vegetation, Wetlands and Protected Areas. This would include the effects of past and current projects or past climate-related changes (i.e., forest fires), which contribute to existing conditions upon which residual Project effects are assessed. For the EIS, the description of the existing environment characterizes the environment already affected by past and current projects and activities; therefore, the cumulative effects assessment focused on analyzing the effects of other RFDs in combination with the Project. Although positive residual effects are characterized in the residual Project effects analysis, they are not carried forward to the cumulative effects analysis, as the Project benefits from other past, present and RFDs or activities are unlikely to be known or publicly disclosed (e.g., Benefit Agreements with Indigenous groups or local community stakeholders).

The cumulative effects assessment followed a three-step process:

1. Identify RFDs and potential cumulative effects that overlap in time and space with residual effects.
2. Identify and describe any additional mitigation measures, if applicable.
3. Characterize residual cumulative effects, using the same criteria defined for the residual Project effects analysis (Table 10-12).

Chapter 4 provides a list of known RFDs and physical activities with potential residual effects that could overlap spatially and temporally with the Project's residual environmental effects. Figure 4-4 (Chapter 4) presents the location of identified RFDs. This list was considered in the identification of RFDs for the assessment of cumulative effects to Vegetation, Wetlands and Protected Areas. Following the identification of applicable RFDs, residual Project effects to Vegetation, Wetlands and Protected Areas were evaluated for temporal and spatial overlap with the effects of RFDs to identify potential cumulative effects. The evaluation was completed qualitatively based on publicly available information (e.g., Project Registrations or EIS reports) describing the environmental effects of RFDs. If effects from these RFDs overlapped spatially or temporally with the residual Project effects to Vegetation, Wetlands and Protected Areas, then potential cumulative effects were identified. If no spatial or temporal overlap existed for the residual Project effects and RFDs identified in Chapter 4, then a cumulative effects assessment was not required.

Based on the assessment of potential cumulative effects, an assessment was made regarding whether additional mitigation measures, beyond those proposed for the Project, were required to address potential cumulative effects. Where applicable, additional mitigation measures were identified.

Cumulative residual effects were described, as applicable, for each of the measurement indicators for the residual effect pathways identified for non-cumulative residual effects in Section 10.5.1.2. Classification of cumulative residual effects would be identical, taking into consideration the additional potential effects of other RDFs.

Following classification of residual cumulative effects, the analysis also evaluated the significance of residual Project effects using threshold criteria or standards beyond which a residual environmental effect was considered significant. The definition of a significant effect for the Vegetation, Wetlands and Protected Areas is provided in Section 10.5.1.4.

10.5.1.4 Significance Determination

A significant adverse residual effect on vegetation is defined as one that:

- threatens the long-term persistence or viability of a vegetation community in the RSA, including effects that include a detectable decline in species dependent upon that habitat (e.g., SAR or regionally significant concern)
- reduces the area of any ELC habitat type greater than 20% within the RSA

A significant adverse residual effect on wetlands is one that:

- results in the permanent loss of a wetland type (class and form), and its associated habitat, within the RSA
- results in non-compliance with Section 5.1 of the NL Policy for Development in Wetlands or the federal Policy on Wetland Conservation
- affects more than 10% of wetlands, regionally (greater than 10% of wetland area within the RSA)
- results in the degradation, alteration, or loss of wetland function within the LSA and RSA, either physically, chemically, or biologically, in quality or extent, in such a way as to cause a detectable decline in the distribution or abundance of wetlands and/or associated functions dependent upon that habitat (e.g., SAR or regionally significant concern), such that the likelihood of its long-term viability within the LSA and RSA is substantially reduced as a result

A significant adverse residual effect on protected areas is one that:

- results in the permanent reduction in protected area greater than 20% in the RSA

10.5.2 Effect Pathway Screening

The effect pathway screening predicts potential effects pathways that are then evaluated considering proposed mitigation to predict whether the effect pathway had the potential to cause residual adverse or positive effects. The effectiveness of mitigation measures proposed for each effect pathway was assessed to determine whether the mitigation would address the potential Project effect such that the effect pathway was eliminated or would result in a negligible adverse effect on a VEC. Each effect pathway was categorized as one of the following:

- **No effect pathway** (i.e., avoidance measures and/or mitigation results in no residual effect on vegetation, wetlands and protected areas)
- **Negligible effect pathway** (i.e., mitigation results in negligible effect of vegetation, wetlands and protected areas)
- **Residual effect pathway** (i.e., effect that is greater than negligible and carried forward for further assessment)

The effects pathway screening is summarized in Table 10-13. The subsections following the table provide rationale used to assign potential effects to the no effect pathway and negligible effect pathway categories and list residual effect pathways. Each Project component/activity identified as a residual effect pathway was carried forward for detailed assessment in Section 10.5.3.

Table 10-13: Potential Effects Pathways for Vegetation, Wetlands and Protected Areas

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities **Closure** — Accelerated pit flooding — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Area loss:** Site preparation, including vegetation clearing, earthworks, and construction of the mine site and linear features (roads, rail line, pipelines, conveyors) can contribute to the direct loss of vegetation, wetlands and protected areas during the Construction phase.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Minimize the size of the Project footprint by implementing design elements to constrict the Project footprint where possible and minimize effects on vegetation and wetland habitat. Using existing road infrastructure, including the existing access roads and watercourse crossings. — Construction phasing to minimize open cleared areas at one time. — Implement buffer zones around wetlands where possible, use silt fencing as required and utilize settling ponds to minimize the release of sediment laden water to wetlands. — Minimize disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent possible. — Implement progressive re-grading and reclamation of the overburden stockpile (starting during Operations, where applicable), and the mine rock stockpile and TMF (starting during Closure). — Restore and revegetate areas where non-permanent Project features have been removed. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	Residual effect pathway

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Processing iron ore concentrate — Site traffic, including transportation of personnel and materials to and from the site **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Deposition of fugitive dust and metal pollution to vegetation and wetlands:** Site traffic including transportation of personnel and materials to and from site, mining activities and store of mine waste (i.e., overburden, mine rock and tailings) can generate fugitive dust that deposit to vegetation, wetlands and protected areas during all Project phases. Fugitive dust can contain contaminants of potential concern, including metals which could affect vegetation and wetlands.	— Implement mitigation measures presented in Chapter 5, Air Quality and Climate. This includes, but is not limited to: – Application of water and/or suppressants should be applied to site roads and access roads, as necessary. – Establishing and enforcing speed limits on site and access roads will reduce dust production. – Minimize haul route distances, thereby reducing fuel consumption and fugitive emissions from equipment. – All crushed iron ore stockpiles would be covered with dust collection technology to minimize fugitive dust and silica from crushed ore stockpiles. – Minimize areas of vegetation clearing and soil disturbance to reduce the generation of fugitive dust. – Use the best available pollution control technology at material transfer points – Implement a Project-specific Environmental Protection Plan that includes mitigation to reduce dust emissions during all Project phases. — Implement the Environmental Effects Monitoring Program (**Chapter 20, Environmental Management, Monitoring, and Follow-Up**), which includes measures for monitoring air quality, surface water quality, wetlands and SAR/SoCC.	Residual effect pathway
	Surface water changes: Construction of facilities and site water management infrastructure can alter watershed areas leading to changes in natural runoff. Road development, including culverts and bridge installation can alter hydrology. Construction of TMF starter dams, pit flooding, and final site water management infrastructure can alter water flow. Handling, storage, treatment, and discharge of contact water; sewage collection; runoff from stockpiles/tailings may alter water chemistry and contaminate wetlands.	— Minimize disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent possible. — Implement mitigation measures presented in Chapter 8, Surface Water. This includes but is not limited to: — Design, construct and operate water management infrastructure in accordance with applicable permits, approvals, and best industry practices to minimize impact to surface water in receiving waterbodies — Recycle and re-use process water to reduce freshwater intake and release to environment including Duley Lake, to the extent practicable — Develop a site-specific water treatment plant and waste water treatment plant to treat contaminants in effluent and sanitary sewage to appropriate release limits in accordance with site-specific water quality objectives, federal and provincial standards and regulations, and permit conditions. — Provide adequate contact water storage capacity to manage run-off, seepage and inflows from the pit, Project infrastructure and disturbed areas — Avoid placing soil stockpiles near waterbodies (i.e., maintaining 150 m buffer from waterbodies and watercourses), and near natural drainage features, unless required for temporary storage — Schedule work in sensitive areas to avoid periods (e.g., spring freshet) that may result in high flow volumes and/or increased erosion and sedimentation, to the extent practical. — Routinely inspect and maintain containment and conveyance structures (i.e., roadside ditches and culverts) to limit the risk of road wash-out or sediment release to the environment. — Mitigation measures for in-water works will include erosion and sedimentation measures including temporary settling ponds, which will be used to collect water and allow for suspended particles to settle prior to the discharge of water to the natural environment — Instream construction will either be avoided or limited to when watercourses are not flowing, or are frozen to the bottom, where possible. — Use standard methods and mitigation for culvert/bridge installations to maintain habitat connectivity for watercourses. — Alignment of site roads will be designed to minimize stream crossings and avoid sensitive habitat as feasible. – Design cross drainage structures to convey the maximum instantaneous flow resulting from a 1:10-year flood event. — Implement the Environmental Effects Monitoring Program (Chapter 20, Environmental Management, Monitoring, and Follow-Up), which includes measures for monitoring air quality, surface water quality, wetlands and SAR/SoCC.	Residual effect pathway

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation or Enhancement Measures	Effect Pathway Screening

Construction
— Site preparation, including vegetation clearing and earthworks
— Handling and storage of overburden
— Road development, including culverts and bridge installation
— Construction of facilities and infrastructure
— Construction of TMF starter dam
— Handling and storage of mine rock
— Construction of water management infrastructure
— Operating mobile mining equipment
— Site traffic, including transportation of personnel and materials to and from the site
Operations and Maintenance
— Open pit mining, including blasting and crushing ore and mine rock
— Operating mobile mining equipment
— Handling and storage of overburden, mine rock, and ore
— Processing iron ore concentrate
— Site traffic, including transportation of personnel and materials to and from the site
Closure
— Removal of infrastructure, restoration and revegetation of facilities and infrastructure
— Site traffic, transportation of personnel and materials to and from the site
	Groundwater changes: Dewatering activities can lower groundwater and lake levels, contribute to drying of wetlands. Accelerated pit flooding during mine closure can result in changes to local groundwater levels.	— Use dewatering wells strategically to minimize effect, monitor groundwater levels and wetland hydrology, during construction, and restore water level post-construction. If affected wetlands provide sensitive habitat (i.e., habitat utilized by a critically imperiled/imperiled SOCC) use mitigative measures to maintain wetland hydrology (e.g., pumping and discharging of water into wetlands).
		— Implement mitigation measures presented in Chapter 7, Groundwater. This includes, but is not limited to:
		  — Beneficial re-use of treated water (i.e., to remove suspended solids) should be completed where possible to mitigate the anticipated temporary local recharge deficits.
		  — Dewatering infrastructure (i.e., sump pumps or wells) will be installed in accordance with applicable regulations.
		  — Water withdraw will be completed in accordance with provincial and federal standards and licence/permit conditions and industry best standards
		  — Wells will be equipped suitably (i.e., with variable-frequency drive pumps) to allow effective control of dewatering rates within permitted rates.
		  — Implement water transfers from Duley Lake to Pike Lake as a key water management tool.
		  — Monitor flows before and after construction to quantify the changes in flow and their effects on the aquatic environment and apply adaptive management as necessary.
		— Implement the Environmental Effects Monitoring Program (Chapter 20, Environmental Management, Monitoring, and Follow-Up), which includes measures for monitoring groundwater, wetlands and SAR/SoCC.
			Residual effect pathway

	Spill contamination: Site traffic, including transportation of personnel and materials to and from site and operating mobile equipment could result in an accidental spill of fuel or oil. Refuelling of mobile and non-mobile mining equipment.	– Standard spill prevention measures should be employed. These should include maintaining spill kits within all equipment so that minor spills can be contained; maintain larger spill kits throughout site should additional equipment be required for spill containment; have a spill response centre and team available to respond to larger spills. – During initial site works establish designated refuelling areas on hardened surfaces to catch accidental spills, located at least 50 m from any waterbody. – As the site workings and mining operations begin, have easily mobile equipment (e.g., haul trucks) refuel at designated refuelling stations (e.g., refuelling ditch) designed with a hard surface and proper grading so that any fuel spill is contained (adequate spill response equipment will be maintained at refuelling stations). Less mobile equipment (e.g., drill rigs and earth moving equipment) will be refuelled in place on a hard level surface as per-applicable regulations using a mobile fuel truck (adequate spill response equipment will be maintained at the refuelling location). – Non-mobile equipment (e.g., generators) will have double containment to contain any spilled fuel or leaking fuel. Double containment will be inherent, or the equipment will be located within a bermed area with an impervious liner to contain any spilled/leaking fuel. – Should a spill occur, implement the mitigation and response measures outlined in the Emergency Response Plan.	No effect pathway

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Processing iron ore concentrate — Site traffic, including transportation of personnel and materials to and from the site **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Wetland Contamination** Handling and storage of overburden, mine rock and ore can cause contamination from runoff/leachate. Operation of TMF can cause potential seepage from tailings/contamination in surface water. Handling, storage, treatment, and discharge of contact water, sewage collection, treatment and surface discharge can contaminate wetlands, and alter water chemistry.	— Implement contact water (i.e., run-off, seepage and treated discharge) mitigations presented in Chapter 8, Surface Water. This includes, but is not limited to: – Blend acid-generating material with non-potentially acid-generating material to reduce acid-generating potential. – Characterize, identify, and manage potentially acid generating mine rock to prevent localized acid mine drainage and minimize metal leaching. – Construct runoff and seepage collection ditches around the overburden stockpile, mine rock stockpile, tailing management facility and other Project facilities and divert seepage to collection ponds and effluent treatment plant. – Maintain water management infrastructure during Closure until water quality in the Rose Pit has reached acceptable discharge quality – Install engineered cover system on mine rock stockpile, and the TMF during Closure to promote positive passive drainage, limit ponding, and support revegetation – Routinely test surface and seepage water during Closure – During Closure, maintain seepage collection and mine water management systems associated with the mine rock stockpile as required to collect, convey and manage contact water for discharge to the bottom of the flooded pit through Closure and Post-Closure. — Implement buffer zones around wetlands where possible, use silt fencing as required and utilize settling ponds to minimize contact water released to wetlands. — Implement the Environmental Effects Monitoring Program (Chapter 20, Environmental Management, Monitoring, and Follow-Up), which includes measures for monitoring groundwater, surface water, wetlands and SAR/SoCC.	Negligible effect pathway
	Habitat Fragmentation Site clearing and linear infrastructure (e.g., roads, rail line, conveyors, pipelines), including culverts and bridge installation can create habitat fragmentation.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Minimize the size of the Project footprint by implementing design elements to constrict the Project footprint where possible and minimize effects on vegetation and wetland habitat. Using existing road infrastructure, including the existing access roads and watercourse crossings. — Reduce road widths to minimize impact on habitat fragmentation. — Construction phasing to minimize open cleared areas at one time. — Implement progressive re-grading and reclamation of the overburden stockpile (starting during Operations, where applicable), and the mine rock stockpile and TMF (starting during Closure). — Restore and revegetate areas where non-permanent Project features have been removed. — Instream construction will either be avoided or limited to when watercourses are not flowing, or are frozen to the bottom, where possible. — Use standard methods and mitigation for culvert/bridge installations to maintain habitat connectivity for watercourses. — Alignment of site roads will be designed to minimize stream crossings and avoid sensitive habitat as feasible. — Design cross drainage structures to convey the maximum instantaneous flow resulting from a 1:10-year flood event. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	Negligible effect pathway
	Introduction of Invasive Plant Species Equipment transported to site from outside the region (e.g., new excavation equipment) could be conduit for the arrival of invasive species in the area. Removal of infrastructure, restoration, and revegetation of facilities and infrastructure can lead to exposed soils and allow for the introduction of invasive plant species.	— Upon initial arrival of mobile equipment from elsewhere (outside the region) to which visible soil is adhered will undergo a washdown at a designated washdown location to remove potential sources of propagules (e.g., seeds/spores) of potentially invasive plants. The washdown area will be monitored the establishment of invasive species. If invasive species are encountered, they will be removed and destroyed by incineration. — Maximize the use of native plant species for revegetation, soil stabilization, and erosion control	Negligible effect pathway

TMF = tailings management facility; N/A = not applicable; SOCC = species of conservation concern.

10.5.2.1 No Effect Pathways

The following Project interactions are predicted to result in no effect pathway to Vegetation, Wetlands and Protected Areas and are not carried forward in the assessment.

Spill Contamination (Construction, Operations and Maintenance, and Closure)

The assessment of the effects pathway for site traffic, including transportation of personnel and materials to and from the site, identifies accidental spills of fuel or oil as potential effects on wetlands and vegetation. The rationale for categorizing the spill contamination as a no effect pathway is based on the implementation of standard spill prevention measures. Standard spill prevention measures include:

- **Proper storage and handling**–ensuring that fuel and other hazardous materials are stored in appropriate containers and handled with care to prevent leaks and spills
- **Regular maintenance and inspections**–conducting routine maintenance and inspections of equipment to identify and address potential leaks or mechanical issues.
- **Establish refuelling areas**–set up designated refuelling areas on hardened surfaces to catch accidental spills, located at least 50 m from any waterbody. Refuelling stations will be installed for mobile equipment (e.g., haul trucks, service vehicles and passenger vehicles) as indicated. For less mobile equipment (e.g., drill rigs, earth moving equipment) refuelling will occur in place on a hard level surface using mobile fuel trucks. Spill containment equipment will be maintained at any refuelling location to be utilized should a spill occur.
- **Spill containment systems**–implementing containment systems such as berms, dikes, and drip pans to capture and incidental spills and prevent them from reaching wetlands
- **Emergency response plan–**developing and maintaining spill prevention, control, and countermeasure plans that outline procedures for preventing, containing, and clearing up spills. These plans help to ensure that all necessary resources are available to manage spills effectively. A preliminary Emergency Response Plan is provided in Annex 5C.

By adhering to these protocols, the risk of spills contaminating wetlands and vegetation is substantially avoided.

10.5.2.2 Negligible Effect Pathways

The following Project interactions are predicted to result in negligible effect pathways to Vegetation, Wetlands and Protected Areas and are not carried forward in the assessment.

Wetland Contamination (Construction, Operations and Maintenance, and Closure)

The assessment pathway for wetland contamination from handling and storage of overburden identifies soil compaction and contamination from wetlands from runoff as potential effects. Additionally, the handling, storage, treatment, and discharge of contact water, as well as sewage collection, treatment, and surface discharge, can lead to contamination of wetlands and altered water chemistry. The rationale for categorizing wetland contamination as a negligible effect pathway was based on the implementation of effective mitigation measures. These mitigation measures follow:

- **Store overburden away from wetlands**–By strategically locating overburden storage areas away from wetlands, the risk of direct contamination from runoff is substantially reduced. This spatial separation helps to ensure that any potential contaminations have a lower likelihood of reaching sensitive wetland areas.
- **Use containment systems to prevent runoff**–Implementing containment systems, such as berms, liners, and sediment traps, helps to control and manage runoff, preventing it from entering nearby wetlands. This measure is crucial in mitigating the risk of contamination from heavy metals and other pollutants that may be present in the overburden.
- **Revegetate storage areas promptly–**Prompt revegetation of overburden storage areas with native plant species helps to stabilize the soil, reduce erosion, and minimize the generation of runoff. Vegetation acts as a natural barrier, trapping sediments and absorbing water, which further reduces the risk pf contaminants reaching wetlands. This measure also contributes to the restoration of habitat and supports biodiversity.
- **Use treatment systems to remove contaminants**–Treatment systems are employed to remove contaminants from contact water and sewage before discharge. These systems help to ensure that the water quality meets regulatory standards and minimizes the risk of contamination to wetlands.

- **Monitor discharge quality**–Regular monitoring of discharge quality is conducted so that the treated water meets environmental standards and does not negatively effect wetland ecosystems. This includes testing for pollutants and adjusting treatment processes as needed.
- **Use wetland buffer zones**–Establishing buffer zones around wetlands helps to filter and absorb any residual contaminants before they reach sensitive wetland areas. These buffer zones act as a protective barrier, reducing the risk of contamination and preserving the natural hydrology and water quality of wetlands.

The combination of these mitigation measures effectively addresses the effect pathways through which overburden handling and storage is greatly reduced, justifying the classification of this effect as a negligible effect pathway. The implementation of these measures helps to ensure that potential contaminants are effectively managed. These measures are standard practices in the mining industry and are effective in preventing environmental contamination. Chapter 8 provides additional details and analysis of surface water quality effects from the Project.

Habitat Fragmentation (Construction, Operations and Maintenance, and Closure)

The assessment pathway for habitat fragmentation from road development, including culverts and bridge installation, identifies alternations to hydrology and habitat fragmentation as potential effects on wetlands and vegetation. The rationale for categorizing habitat fragmentation as a negligible effect pathway is based on the implementation of effective mitigation measures including:

- **Design culverts and bridges to maintain natural water flow**–Properly designed culverts and bridges help to ensure that natural water flow is maintained, preventing alterations to wetland hydrology. This helps to preserve the ecological functions of wetlands, such as flood control and habitat provision. By allowing water to flow, these structures minimize the disruption to wetland ecosystems and reduce the risk of habitat fragmentation.
- **Minimize road width**–Reducing the width of roads minimizes the physical footprint of the development, thereby decreasing the extent of habitat loss and fragmentation. Reducing road width, when possible, requires less clearing of vegetation and reduce the barrier effect on wildlife movement. This approach helps to maintain connectivity between habitats and supports the movement of species across the landscape.
- **Use existing road infrastructure**–Using existing roads and watercourses crossings minimizes the need for new construction, thereby reducing the overall effect on wetlands and vegetation. This strategy leverages already distributed areas, avoiding additional habitat fragmentation and preserving more of the natural environment.

The combination of these mitigation measures effectively addresses the effect pathways through which road development could effect wetland and vegetation. The implementation of these measures helps to ensure that potential disruptions to wetland hydrology and habitat connectivity are effectively managed.

Surface Water Changes (Operations and Maintenance, and Closure)

The assessment pathway for surface water changes from the construction of facilities and infrastructure identifies permanent loss of vegetation and increased impervious surfaces leading to runoff as potential effects on wetlands and vegetation. The rationale for categorizing surface water changes as negligible effect pathway is based on the implementation of effective mitigation measures including:

- **Cluster development to minimize footprint–**By clustering development, when possible, the overall footprint of the Project is reduced, thereby minimizing the area of watershed loss and the extent of impervious surfaces.
- **Maintaining natural hydrology outside the Project footprint**–Ensuring that natural hydrology is maintained outside the Project footprint involves designing drainage systems that mimic natural water flow and implementing measures to prevent runoff from impervious surfaces.

The combination of these mitigation measures, and additional mitigation measures included in Chapter 8, Surface Water, effectively addresses the effect pathways through which the construction of facilities and infrastructure could effect Vegetation, Wetlands and Protected Areas. By clustering development to minimize the footprint, where possible and maintaining natural hydrology outside the Project footprint, the potential severity of surface water changes is substantially reduced. Surface water changes are predicted to result in residual effects during the Construction phase and these residual effects have been carried forward to the residual Project effect analysis.

Fugitive Dust and Metal Pollution (Construction and Closure)

The assessment pathway for operating mobile mining equipment identifies dust generation and metal pollution as potential a effect on wetlands and vegetation. The rationale for categorizing dust and metal pollution as a negligible effect pathway is based on the implementation of mitigation measures. Standard dust control measures include:

- **Implementing and Enforcing speed limits –** limiting the speed of haul trucks and other mobile equipment will reduce the dispersion of fugitive dust.
- **Water spray systems**–regularly applying water to roads and work areas to suppress dust particles and prevent them from becoming airborne
- **Chemical suppressants**–using specifically designed liquids applied to surfaces to control dust
- **Misting systems**–installing local exhaust ventilation to capture airborne particles at their source

The combination of these mitigation measures and additional mitigation measures included in Chapter 5, Air Quality and Climate, effectively addresses the effect pathways through which operating mobile mining equipment could effect wetlands and vegetation. By implementing standard dust control and spill prevention measures, the generation and spread of dust is substantially reduced, and any accidental spills of gas and fuel are promptly contained and cleaned up before they can effect wetlands. Given the robust nature of these mitigation measures, the likelihood of dust and metal pollution affecting wetlands and vegetation is greatly reduced, justifying the classification of this effect as a negligible effect pathway. The implementation of these measures helps to ensure that potential contaminants and dust are effectively managed. Fugitive dust and metal pollution are predicted to result in residual effects during the Operations phase and these residual effects have been carried forward to the residual Project effect analysis.

Invasive Plant Species (Closure)

The assessment pathway for invasive plant species from Post-closure site restoration activities as potential effects on wetlands and vegetation. The rationale for categorizing habitat fragmentation as a negligible effect pathway is based on the implementation of effective mitigation measures:

- **Restore native species**–Design restoration landscapes with native and/or non-invasive plant species.
- **Monitoring and removal**–Monitor restoration landscapes and adjacent vegetated areas and wetlands for the presence of invasive species and implement removal techniques as appropriate; Include presence of invasive species as a target of wetland environmental effects monitoring.

The combination of these mitigation measures effectively addresses the effect pathways through which site restoration activities could effect vegetation communities and wetlands.

10.5.2.3 Residual Effect Pathways

The following Project interactions were predicted to be residual effect pathways to vegetation, wetlands and protected areas and were advanced for further assessment of residual effects (Section 10.5.3):

- area loss (Construction, Operations and Maintenance)
- surface water changes (Construction)
- groundwater changes (Construction, Operations, Closure)
- dust and metal pollution (Operations and Maintenance)

10.5.3 Residual Project Effect Analysis

This section provides results of the residual Project effects analysis for Vegetation, Wetlands and Protected Areas for the residual effects pathways identified in Section 10.5.2.3.

Methods for completing the residual Project effects analysis for Vegetation, Wetlands and Protected Areas is presented in Section 10.5.1.2 (Table 10-12).

10.5.3.1 Vegetation

This section discusses the potential residual effects of the Project on vegetation communities including area loss (of ELC represented in the RSA), and dust (during the Operations phase, causing negative effects on local vegetation).

Area Loss

Table 10-14 shows the area of ELC type within the proposed Project footprint as represented by the SSA in the current assessment and by the PDA in the 2012 Alderon EIS. The "% of ELC Affected" is the proportion of each ELC type that is directly affected by the SSA/PDA and the "% of ELC in the RSA" is the proportion of the entire RSA represented by that ELC type. The purpose of this summary was to understand if there was a large effect by the SSA relative to a ELC type that has a small representation in the RSA.

Table 10-14: Summary of Ecological Land Classification Area Losses in the Project Footprint

ELC Type	Champion (2025)			Alderon (2012)		
	SSA (ha)	% of ELC Affected	% of ELC in the RSA	PDA (ha)	% of ELC Effected	% of ELC in the RSA
Alpine Heath	100.86	12.81	1.97	4.40	4.40	0.25
Hardwood Forest	99.59	17.78	1.40	26.10	4.83	1.36
Hardwood Burn/Regeneration	375.29	25.80	3.64	442.50	12.98	8.60
Mixedwood Forest	247.94	13.58	4.58	125.80	7.19	4.41
Mixedwood Burn (2012 only)				44.00	8.30	1.34
Black Spruce-Labrador Tea – Feathermoss	944.85	7.72	30.65	321.60	3.51	23.08
Black Spruce-Lichen	148.45	7.09	5.24	47.50	2.41	4.97
Softwood Burn/Regeneration	1,167.95	26.68	10.97	464.60	12.39	9.46
Black Spruce/Tamarack-Sphagnum Woodland	133.02	7.36	4.53	303.80	6.13	12.51
Tamarack/Black-Spruce-Feathermoss (Water Track)	76.74	22.44	0.86	317.60	10.55	7.59
Patterned Shrub Fen	343.87	24.09	3.58	44.80	14.45	0.78
Non-Patterned Shrub Fen	88.12	15.86	1.39	142.30	15.30	2.35
Graminoid Fen (included in Non-patterned Fen in 2012)	190.05	14.42	3.30			
Riparian Thickett	30.89	8.13	0.95	0.70	2.33	0.08
Riparian Marsh (Fen)	16.94	5.69	0.75	0.50	0.83	0.15
Water (including 2025 shallow open water with vegetation)	134.20	2.03	16.52	19.40	0.36	13.75
Shallow open water with vegetation (2012 only)				27.40	5.48	1.26
Developed Land	87.12	3.08	7.09	13.90	0.62	5.65
Alder Thickett (hardwood forest in Stantec mapping)	77.02	16.98	1.14			
Jack Pine (TL/BS/Sphag Fen in Stantec mapping; planted)	60.16	10.45	1.44			
Non-ELC (2012 only; cloud and shadow cover)				30.60	3.22	2.40
Total Area:	4,323.06			2,377.50		

ELC = ecological land classification; SSA = site study area; RSA = regional study area; PDA = project development area.

The larger effects on total ELC types represented in the RSA are for Tamarack/Black-Spruce-Feathermoss (Water Track), Hardwood Burn/Regeneration, Patterned Shrub Fen, and Softwood Burn/Regeneration. The Project footprint includes greater than 20% of each of these ELC types in the RSA; therefore, these should be considered in more detail to characterize the severity of Project effects. The Hardwood and Softwood Burn/Regen ELCs are part of a continuously renewing disturbance cycle that will be present in the region in relatively large proportions so long as wildfires are active. Therefore, the Project effects on burn/regen type ELCs is temporary and will be restored naturally over time. Patterned Shrub Fen is the next most affected by the SSA with a 24.09% reduction for this ELC which represents 3.58% of the RSA. This also likely is a permanent loss. The area of Patterned Shrub Fen remaining outside the SSA will be 1,083.74 ha (a loss of -343.92 ha in the RSA). Since Patterned Shrub Fen is a wetland area which requires special mitigation for loss of wetland function (see Section 10.5.3.3, below), and over a thousand ha of this ELC type will remain in the Post-closure period, it is considered that the RSA will continue to have a sustainable functioning amount of this ELC type. Finally, Tamarack/Black-Spruce-Feathermoss (Water Track) will be reduced by 22.44% in the RSA, to a new total area of 265.19 ha (a loss of 76.73 ha in the RSA). This ELC type is also a wetland area that will be subject to mitigation requirements related to loss of wetland function, and since 265 ha will remain Post-closure it is considered that the ELC type will be adequately represented in the RSA to support natural diversity and unique natural functions. All other ELC effects summarized in Table 10-11 are considered relatively minor due to smaller effect areas and the requirement for wetland mitigation for some types. It should also be noted that some ELC losses are associated with the Pike Lake South MU for which special mitigation is also required through stewardship agreements (see Section 10.5.3.4, below).

It should be noted that the above areas of effect are highly conservative, representing maximum possible effect areas, and are likely to be much smaller considering the added 100 m buffer from the design footprint and that no assumptions have been made with respect to the effectiveness of mitigation applied within the SSA during final design and Construction.

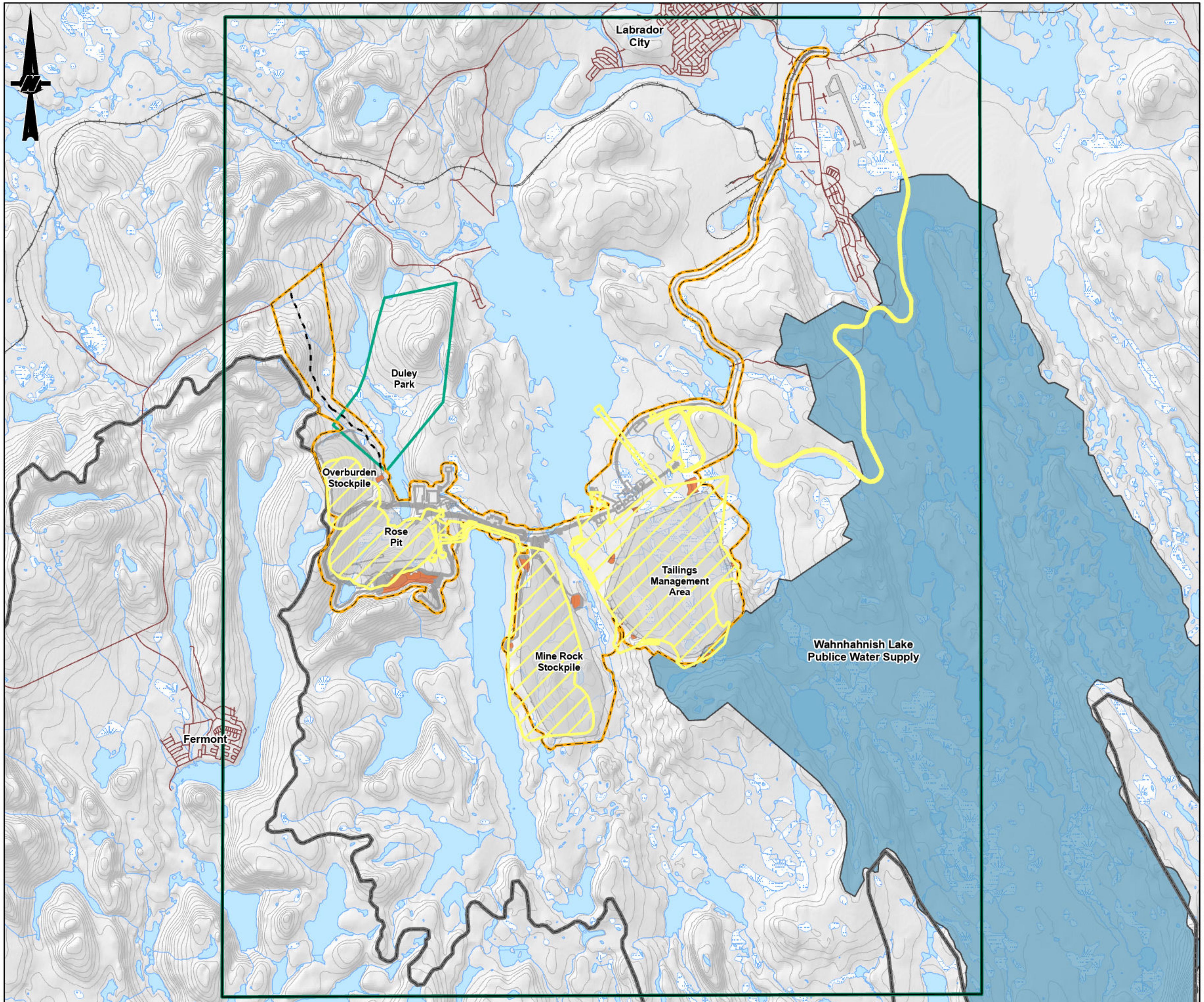
A comparison of the 2012 EIS effect estimate with the current SSA effects is complicated because of the change in ELC areas caused by the higher accuracy of the recently updated mapping. Also, the two effect areas are different as the 2012 PDA was only 2,377.50 ha whereas the more conservative SSA in the current assessment is 4,323.06 ha. Table 10-4 provides a comparison of the Alderon PDA with the Champion SSA. Looking at the percent effects overall, provides a general indication that most ELC types will be only slightly reduced in the RSA and there will remain relatively large areas of all ELC types in the region following Kami Mining Project development.

The SSA was defined to include all infrastructure required for the Kami Mining Project, including access roads and rail connections, and a buffer was included to address uncertainty for the final design. The SSA includes more lands than required for the Project. In fact, the SSA is twice as large as the anticipated Kami Mining Project infrastructure. It is important to note that portions of the SSA will not be used as part of the final design. The intent is to provide flexibility for the future design phase, by having a larger buffer to accommodate for design changes or Project optimizations. Table 10-15 provides a comparison of the possible maximum area of effect, within the SSA (Project footprint plus 100 buffer) and the Project Footprint (excluding the 100 m buffer). The current EIS proposes an area of 1,971 ha (area of effect without the 100 m buffer), compared with a larger area of 2,377 ha previously proposed for Project infrastructure in the previous EIS.

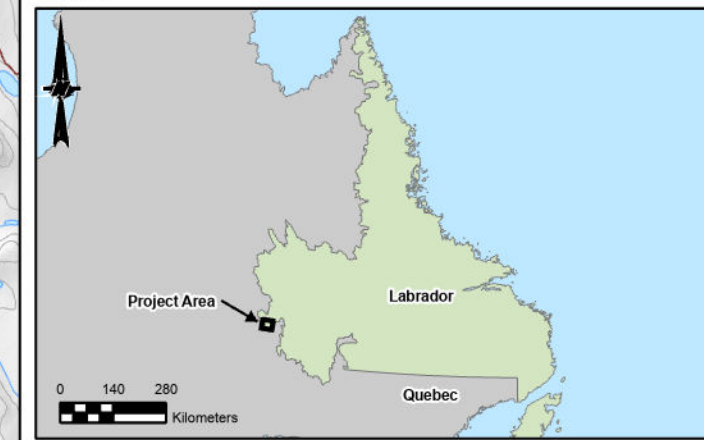
Table 10-15: Overview of Vegetation Effect Areas

Project Area	Champion (2025) (ha)	Alderon (2012) (ha)
2012 Project Development Area (PDA)	-	2,377
2025 SSA	4,323	-
2025 Project Footprint (SSA excluding 100 m buffer)	1,971	-
100 m buffer	2,351	-

PDA = project development area; SSA = site study area; - = not applicable.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Site Study Area
- Previous EIS Project Development Area (PDA)
- Potential Access Road

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
COMPARISON OF ALDERON PROJECT DEVELOPMENT AREA WITH CHAMPION SITE STUDY AREA

CONSULTANT

Kami

YYYY-MM-DD	2025-07-09
DESIGNED	----
PREPARED	GM
REVIEWED	SG
APPROVED	JMC

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	10-4

Species of Conservation Concern

Associated with the potential loss of area of vegetated habitats is the loss of SAR/SOCC species within the SSA. While no SAR (federally or provincially listed) have been identified in the SSA or the larger RSA, a number of SOCC have been identified to occur in the area. Specifically, twenty-seven species of SOCC which have rarity ranks up to S2S3 have been identified to occur in the region. Table 10-12 outlines the SOCC species which occur in the area, their typical habitats, their sub-national, national and global rarity ranks, their presence in the SSA, and the habitat class where they were observed if applicable. However, one species has been identified as introduced and for another the identification is under review (it may have been mis-identified and is actually a species with a S4S5 sub-national rarity ranking). Of these species 14 have been identified (including the possibly mis-identified species) to potentially occur within the SSA based upon historical and recent field surveys. Six of these species are ranked S2S3, while five species are ranked S1 or S2 with all species having national and global rankings indicating the species is secure nationally and globally. As outlined above the general lack of significant loss of any habitat type within the SSA compared to what is available in the RSA should help to ensure that there is adequate habitat available for the persistence of the identified SOCC within the region. It should be noted that the SSA includes a buffer to allow for adjustments in the final positioning of Project elements. Therefore, depending upon the final Project design SOCC which are currently located in the SSA may not be affected by direct Project effects (i.e., will not be removed or specific mitigations applied to minimize potential effects upon the species).

Table 10-16: Plant Species of Conservation Concern Identified in the Regional Study Area

Common Name	Scientific Name	Habitat	Observed ELC Habitat	S-Rank (2020)	N-Rank	G-Rank	Source (See notes)	Observed in SSA[a] (Yes/No/ Undetermined)
Black Bentgrass[b]	*Agrostis gigantea*	Disturbed habitats including fields, roadsides and ditches	Riparian Thickett	No Rank	No Rank	G4G5	B	No
Green Spleenwort	*Asplenium viride*	Shaded, moist, calcareous rock outcrops, such as limestone, dolomite, or shale cliffs, and talus slopes	N/A	S1S2	N5	G5	A	Undetermined
Northern Clustered Sedge	*Carex arcta*	Wet locations within coniferous woods (swampy), thickets and meadows	N/A	SU	N5	G5	C	Yes
Beautiful Sedge	*Carex concinna*	Moist to dry meadows, riverbanks, thickets, floodplains, and open woodlands typically on calcareous substrates	N/A	S2	N5	G5	A, D, E	Yes
Common Comandra	*Comandra unbellata*	Swamps/bogs, dry sandy/rocky soils, early successional forests, and rich mesic sites	N/A	S1	N5	G5	D	Undetermined
Snakewort	*Conocephalum salebrosum*	Moist, shaded areas along stream sides, springs and moist rock faces	Riparian Thickett	S2S3	N5	G5	B	Yes
Small Yellow Lady's-Slipper	*Cypripedium parviflorum*	Shady, damp forest understory of mixed forests, open meadows and along streams in acidic soils	N/A	S1	N5	G5	A, E	Yes
Mountain Bladder Fern	*Cystopteris montana*	Wet woodlands or along water courses; has an affinity for calcareous substrate	N/A	S2	N5	G5	A, D	Undetermined
Vasey Oatgrass	*Danthonia intermedia*	Open woods, rocky slopes, boreal/alpine meadows	N/A	S2S3	N5	G5	C	Yes
Trailing Arbutus	*Epigaea repens*	Forest floor of coniferous forests, barrens (which may be boggy), serpentine areas, on limestone ledges and on mountain tops	Softwood Burn/Regeneration, Black Spruce-Lichen	S2S3	N5	G5	A, B, E	No
Meadow Horsetail	*Equisetum pratense*	Meadows and wet woodlands	N/A	S2S3	N5	G5	D	Undetermined
Daisy Fleabane	*Erigeron hyssopifolius*	Open woods, gravel areas, roadsides, riverbeds, rock ledges and crevices	Tamarack/Black Spruce-Feathermoss (Water Track)	S2	N5	G5	A, E	No
Limestone Polypody	*Gymnocarpium robertianum*	Cool, moist, shaded habitats, over alkaline or calcium-rich substrates	N/A	S1	N3	G5	A	Undetermined
Alpine Sweet-Vetch	*Hedysarum americanum*	Tundra, cliffs, beaches, river edges, in imperfectly to moderately drained sites on sand, silt or till substrates	N/A	S2S3	N5	G5	A, D, E	Yes

Common Name	Scientific Name	Habitat	Observed ELC Habitat	S-Rank (2020)	N-Rank	G-Rank	Source (See notes)	Observed in SSA[a] (Yes/No/ Undetermined)
Foxtail Barley, Squirreltail Grass	*Hordeum jubatum subsp. jubatum*	Meadows, prairies, edges of riverbeds/lakes, roadsides and disturbed habitats often in association with saline habitats	N/A	S2S3	N5	G5	A, D	Undetermined
Running Pine[c]	*Lycopodium clavatum*	Moist shady areas in coniferous forests, fields, meadows, forest edges, disturbed habitats with well-drained soil	Softwood Burn/Regeneration	S1S3	N5	G5	B, C	Yes, but possibly mis-identified
Two-Eyed Berry	*Mitchella repens*	Shady mossy woods, scrubby heath/bog and dwarf spruce thickets	N/A	No Rank	N5	G5	B	No
Marsh Muhly	*Muhlenbergia glomerata*	Bogs, alkaline fens, lake and stream banks, ditches and gravel slopes	Non-Patterned Shrub Fen	S2?	N5	G5	A, E	Yes
Bog Muhly	*Muhlenbergia uniflora*	Bogs, wet meadows and along freshwater shorelines in sandy/peaty soils	Patterned Shrub Fen	S2S3	N5	G5	B	Yes
Blunt Sweet Cicely	*Osmorhiza depaupperata*	Moist/mesic open forests and forest margins	N/A	S2	N5	G5	D	Undetermined
Jack pine, Labrador pine	*Pinus banksiana*	Post fire succession areas, in flat dry areas, and on hills where soils are sandy	Jack Pine, Black Spruce-Lichen	S1	N5	G5	A, B, E	Yes
Small Pondweed	*Potomogeton pusillus*	Shallow areas of lakes and streams	N/A	S2S3	N5	G5	D	Undetermined
Greenish-Flowered Wintergreen	*Pyrola chlorantha*	Coniferous and deciduous forests within moist to dry substrates	Black Spruce-Labrador Tea-Feathermoss	S2S3	N5	G5	A, E	Yes
Little Yellow Rattle	*Rhinanthus minor*	Meadows, clearings, roadsides, slopes/hillsides, stream sides, lake edges, swamps, muskeg margins, and within floodplain woods; commonly over calcareous soil or rocks	Tamarack/Black Spruce-Feathermoss (Water Track)	SU	N5	G5	B	No
Hoary Willow	*Salix candida*	Floodplains, bogs, fens and meadows over calcareous soils	N/A	S2S3	N5	G5	B	Yes
Northern Valerian	*Valeriana dioica subsp. sylvatica*	Wet to moist meadows and along stream banks	Tamarack/Black Spruce-Feathermoss (Water Track)	S2	N5	G5	A, B, E	Yes

Common Name	Scientific Name	Habitat	Observed ELC Habitat	S-Rank (2020)	N-Rank	G-Rank	Source (See notes)	Observed in SSA[(a)] (Yes/No/ Undetermined)
Green False Hellebore	*Veratrum viride var. viride*	Moist clearings and shaded woodlands	Non-Patterned Shrub Fen, Tamarack/Black Spruce-Feathermoss, (Water Track), Riparian Thickett, Black Spruce/Tamarack-Sphagnum Woodland, Black Spruce-Labrador Tea-Fathermoss	S2	N5	G5	A, B, C, D, E	Yes

A 2023 ACCDC Rare Plant Search B 2023 Field Surveys C 2024 Rare Plant Surveys for Drilling Program

D Stassinu Stantec Rare Plant Pre-Survey Literature Search E Stassinu Stantec Rare Plant Surveys (2011-2012)

(a) Yes = Species was observed within SSA during field surveys; No = Species was observed during field surveys but not in the SSA; Undetermined = Documented occurrence of the species in the area through literature review/ACCDC searches.

(b) Identified as an exotic species.

(c) The identification of this species is questionable. It is likely the species may be One-Cone Ground Pine (Lycopodium lagopus) which has an S-Rank of S4S5.

ELC = ecological land classification; N/A = not applicable; SSA = site study area; ACCDC = Atlantic Canada Conservation Data Centre.

Fugitive Dust and Metal Pollution

In Chapter 5, Air Quality and Climate, a residual Project effect is predicted in the Operations phase for TPM and PM_{10} as exceedances of regulatory guidelines (for human health risk) ranging from 120 to 3,687 µg/m3 in 24 hours. The maximum range of dust exceedances is about 4 km from the site, but very high concentrations, greater than about 500-1000 µg/m^3 are restricted to ranges within about 100 to 300 m. As an example, a typical unpaved road may generate around 400-500 µg/m^3 in a 24-hour period under busy traffic conditions (Farmer 1993), which can cause relatively minor effects on local vegetation. The potential effect of higher TPM (dust) on local vegetation may be locally significant, including mortality of sensitive plant species and changes in species diversity through replacement with tolerant plant species. Such effects are most severe immediately adjacent to the source and are reduced at a logarithmic rate with distance from the site boundary (Farmer 1993; Turner 2013; Cichosz and Marek 2024). The interaction between dust and vegetation species is complex and distance of significant effects can vary but in general, where the local vegetation community is dense forest, the effects are limited to 20-100 m, as a dense vegetation screen is effective at capturing fugitive dust. However, where vegetation is low growing, dust effects have been observed at distances of several hundred metres (Farmer 1993; Turner 2013). Experience shows that dust concentration is less important than the sensitivity of exposed plant species in predicting negative effects (Cichosz and Marek 2024). One common outcome of open cast mining related dust is the transformation of local vegetation communities by the elimination of sensitive species followed by recruitment of dust tolerant species (Farmer 1993; Cichosz and Marek 2024) which can sometimes cause an increase in species diversity. In worst case scenarios, a belt of severely effected vegetation (stunted or dead) can develop, up to 20 m wide at some sites (Farmer 1993, Cichosz and Marek 2024).

Mitigation Measures

Efforts have been made already by Champion to reduce the footprint and to design the Project facilities to reduce environmental effects. During final design and Construction, Champion will continue to make efforts to avoid wetland ELC and to minimize the Project footprint to the extent possible. For terrestrial ELCs, there will be an opportunity to restore regional ELC types during Closure and Post-closure site rehabilitation. Detailed mitigation and monitoring activities will be described in the Project-specific Environmental Protection Plan.

Based on the assessment of potential effects, an assessment was made regarding whether additional mitigation measures, beyond the standard measures proposed for the Project, were required to address potential residual effects on vegetation.

During the Closure phase, revegetation efforts are aligned with optimal growing seasons for native species to help to ensure successful establishment. Revegetation should use a phased approach where the initial goal is to facilitate the development of a natural vegetative cover of primarily early successional species (e.g., graminoids, forbs and shrubs), which over time will transition a more climax community (forested woodlands). To facilitate community development, it may be necessary to complete multiple plantings over time with varied species composition (e.g., initial plantings/sowing of seeds of native grasses, forbs and pioneering shrub species; followed by later plantings of native tree species).

Mitigation for dust and air quality effects are presented in Table 10-13 and detailed in Chapter 5, Air Quality and Climate. Additional mitigation described here addresses specific aspects of interaction with vegetation communities. Standard methods may be intensified if needed to further reduce local effects from dust. Application of this mitigation would be in response to visible effects on local vegetation communities.

Post construction surveys for SOCC could be utilized to identify sensitive areas (i.e., where SOCC occur) which may be affected by dust. If these areas are identified additional dust suppression activities (e.g., enhanced water application at these locations) could be utilized to minimize the suspension of dust.

10.5.3.2 Wetlands

This section discusses the potential residual Project effects on wetlands of area loss, changes in surface water and groundwater changes, and dust (effects on wetland vegetation), causing a net loss of wetland function.

Area Loss

The main wetland effect predicted for the Project is the displacement of wetland areas through quarrying and infilling related to mining and mining related infrastructure. For this assessment, a highly conservative effect footprint has been adopted including the design Project footprint plus a 100 m buffer (the SSA) to account for further changes during the design finalization. The previous assessment used a smaller total effect footprint, just 2,377 ha, versus 4,323 ha for the current assessment. Table 10-4 provides a comparison of the Alderon PDA with the Champion SSA. The wetland areas within the SSA may be effected by the final design, but only wetlands within the Project footprint will suffer direct effects and have a high likelihood of being permanently lost. Table 10-17 provides an overview of possible effect areas. The SSA area is currently estimated to contain 879.63 ha of wetland, while the Project footprint covers 442.84 ha. The previous assessment assumed that several Project activities would have temporary effects only such as power lines, pipeline, conveyor systems and access roads. This was not adopted for the current assessment as the design is not final and Post-closure condition objectives are considered less certain. Note that the Alderon PDA was overlain on the new 2025 ELC mapping, revealing an updated wetland effect area of 558.58 ha. It makes sense that there are smaller changes between the old and new ELC within the Project footprint as this area was the focus of field verification surveys in both studies and would have been much more accurate.

The predicted area of permanently effected wetland (442.84) has decreased compared to the Alderon assessment (572 ha) due to an approximately 40% reduction in the eastern access road effects through realignment and an overall refinement of the site infrastructure design with optimized storage areas.

Table 10-17: Overview of Wetland Effect Areas

Project Area	Champion (2025)	Alderon (2012)
2012 Project Development Area (PDA)	-	572 (old ELC map)
2025 Site Study Area (SSA)	879.63	-
2025 Project Footprint (SSA excluding 100 m buffer)	442.84	558.58 (new ELC map)
100 m buffer	436.79	-

ELC = ecological land classification; SSA = site study area; PDA = project development area; - = not applicable.

Surface Water Changes

Wetlands within and immediately adjacent to the Project footprint within and riparian wetlands associated with the lakes downgradient from the site, within the LSA, will be subject to changes in surface hydrology. Potential effects on wetlands are related to both surface water hydrology and quality. Approximately 148.38 ha of wetland area is located within the LSA which may be subject to indirect effects on surface water, but those effects are likely to be temporary and reversable. Note that the actual effect area in the LSA will likely be a small fraction of all wetlands present, perhaps 5% to 10% (or less).

Effects could arise from discharges of effected site water from the mine areas or changes in the annual surface water flow into receiving wetland areas. Potential effects could include changes in wetland vegetation types, and functions, or in extreme cases the loss of wetland area from infilling or drying out. The assessment of surface water quantity (Chapter 8) concluded that while at some watersheds of local streams (watercourses), predicted net change to surface water quantity (flows, discharges, surpluses) exceeded ±10%, the net change to Duley Lake outlet was predicted to be within ±10% during the Project lifespan and was considered to be within the natural variation of flows.

Groundwater Changes

The currently proposed Project includes substantially more complicated manipulation of local lake levels than the project proposed in the previous EIS. These include draining, damming, and multiple water withdrawals lasting months or years, initially to prepare the site for mining development, then to keep the pit dry during Operations and finally to accelerate the pit refilling during Closure. Changes in local groundwater levels have the potential to effect wetlands adjacent to the site and the lakes where associated riparian wetlands are dependant on natural lake levels for annual hydrogeological balance.

Approximately 148.38 ha of wetland area is located within the LSA which may be subject to indirect effects on groundwater, but those effects are likely to be temporary and reversable. Note that the actual effect area in the LSA will likely be a small fraction of all wetlands present, perhaps 5% to 10% (or less).

Changes in depth to water table of tens of centimetres in wetlands can change the type of vegetation that grows there. These changes could be subtle and take months or years to develop. These effects could affect the functions provided within a wetland and in extreme cases could "dry out" portions of a wetlands. In Chapter 7 (Groundwater), effects to groundwater quantity during Construction and Closure and groundwater quality during all Project phases were predicted to be negligible, following the implementation of mitigation measures. Residual effects to groundwater quantity during Operations were predicted, as the open pit mine will lower the water levels in the surrounding overburden and bedrock extending approximately ~1 km from the mine, which would primarily effect WL2. With the implementation of water management approaches, including water diversions from Duley Lake to maintain water levels in Pike Lake, it is predicted that water levels in Pike Lake would be maintained during Project Operations (as noted above), and hydrological effects to this wetland are predicted to be low in magnitude. Since the local water table is expected to return to normal Post-closure, such effects would be temporary. Monitoring of visible hydrological indicators in selected wetlands in the LSA will be incorporated into the Wetland EEMP as part of the Environmental Management Plan.

Monitoring will be required during Construction, Operations, and Closure. Groundwater monitoring results will be used to help assess observed changes in wetlands (if any) during the implementation of the EEMP.

Fugitive Dust and Metal Pollution

As described above, for vegetation, relatively high concentration air quality (dust) emissions are predicted (Chapter 5, Section 5.5.2) within about 100-300 m from the site boundary. Also, like vegetation, the potential effect of higher TPM (dust) on wetlands may be intensified locally, including mortality of sensitive plant species and changes in species diversity through replacement with tolerant plant species (Farmer 1993; Turner 2013; Cichosz and Marek 2024). Experience has shown that dust effects and distance of effects are complex, but wetlands are at a higher risk due to two factors, low herbs, mosses and lichens are generally more sensitive to dust effects (Farmer 1993) and they typically have low growing vegetation and sparse woody structure so effects may extend farther from the site boundary (Farmer 1993; Turner 2013).

WSP WL4, including the Elephant Head MU, will be within 100 m of the eastern access road. Lower concentrations of TPM would be expected from the traffic related dust than for the mining activities but could be as high as 400-500 $\mu g/m^3$ in 24 hours. Such levels can produce observed effects on vegetation but are site specific and highly variable. Severe effects are usually limited to less than 20 m from the roadway (Farmer 1993).

Mitigation Measures

Based on the assessment of potential effects, an assessment was made regarding whether additional mitigation measures, beyond the standard measures proposed for the Project, were required to address potential residual effects on Wetlands. Standard methods may be intensified if needed to further reduce local effects from dust. Application of this mitigation would be in response to visible effects on local wetlands. Monitoring will be required during Construction, Operations, and Closure. Ambient air quality monitoring results will be used to help assess observed changes in wetlands (if any) during the implementation of the EEMP.

10.5.3.3 Protected Areas

This section discusses the potential residual Project effects of Area Loss on protected areas in the RSA.

Area Loss

The Project will result in adverse effects on protected areas, primarily through the loss of habitat within these areas. Site preparation and construction activities, such as ground disturbance, clearing, grading, and excavation, will lead to the direct loss of the Pike Lake South MU (612 ha or 6.1 km^2). This loss of habitat is comprises a portion of WL2 and other riparian habitat, in addition to habitat for many waterfowl and upland birds. There is a small Project footprint in Duley Lake Provincial Park for the increased overburden stockpile area (about 30 ha) and the realigned western access road (about 2 ha; 1,250 m x 16 m). Additionally, the educational and environmental awareness roles provided by these protected areas will be undermined, and the provincial regulators expressed the concern that the precedent set by this Project could weaken other municipal stewardship agreements and habitat conservation plans, further exacerbating the negative effect on protected areas. The effects of area loss in protected areas will occur primarily, if not exclusively, during the Construction phase of the Project.

Mitigation Measures

The following mitigation measures were proposed in the initial EIS (Alderon 2012) related to changes in protected areas during the Construction phase:

- Employ measures listed for other potential Project effects.
- Establish a replacement protected area that performs the regional protection functions of the Pike Lake South management area.
- Pursue a corporate Stewardship Agreement.

The following mitigation measures have been implemented:

- Designation of the Strawberry Lake MU (612 ha, 6.12 km^2) as compensation for the loss of Pike Lake South MU with a ratio of 1:1. This area was chosen as it was determined to be similar in habitat function to the Pike Lake South area, containing 12 of the 16 habitat composition classes identified there (EHJV 2017). This new conservation area serves the additional bonus that it directly buffers the Waldorf River Steady MU under the Town of Wabush's Municipal Stewardship Agreement. With the addition of Strawberry Lake MU, the total number of MUs for Labrador City remains at nine.
- Jean Lake Rapids were avoided by adjusting Project planning. During the design update, Protected Areas were avoided to the extent possible, including the realignment of the main access road and rail line. With this adjustment, Protected Areas south of Jean Lake (Jean Lake Rapids MU) will not be affected.
- A Stewardship Agreement between the Alderon and the Town of Labrador City was previously established, ensuring mining activities are conducted in a way which minimizes environmental effect and fosters a collaborative relationship with the municipality of Labrador City. Champion intends to proceed with this agreement. The Stewardship Agreement also includes rehabilitation initiatives which includes a federal Fisheries Comprehensive Plan to enhance aquatic and wetland productivity within in the municipal planning area for Labrador City. Chapter 9, Fish and Fish Habitat and TSD IX, provide additional fish details on the planned fish habitat compensation proposed for the Project.

10.5.3.4 Residual Effects Characterization

Vegetation

Most ELC types will be displaced in the RSA ranging from 2.5% to 25% of their relative abundance. This estimate is conservative, as the SSA predicts a larger area of vegetation loss (3,433 ha, approximately 10.2% of non-wetland habitat in the LSA) than the proposed Project footprint of 1,971 ha, which is smaller than the area of 2,377 ha previously proposed for Project infrastructure in the previous EIS. In most cases the remaining area is large enough to support the existing ecological functions that they represent at a slightly reduced level. To this end, a moderate magnitude of effect is predicted. For terrestrial ELC types, the effect is adverse and temporary during the Construction and Operations, prior to rehabilitation activities during the Closure phase. Some ELC types are wetlands, and some are located within protected areas which are subject to required mitigation as described in Sections 10.5.3.2 and 10.5.3.3.

It is predicted that elevated dust concentrations during Operations will have observable adverse effects on vegetation communities immediately adjacent to the mine site, perhaps up to 100 m (i.e., in the LSA), resulting in a high magnitude effect. Effects may include reduced growth or mortality in sensitive plant species leading to changes in local species diversity or reduced density. Effects are expected to be limited to the LSA and relatively small proportions of any ELC type (less than 5%) within the RSA. Affected vegetation communities will recover after operations cease and the site is restored.

Residual effects of dust upon SOCC will likely be restricted to within the immediate vicinity of Project components (e.g., roads) but may extend to 100 m as indicated above. However, the implementation of dust suppression measures (e.g., adding water to road surfaces during dry-dusty conditions) will minimize and effects of dust upon SOCC.

Wetlands

The SSA area is currently estimating a loss of 879.63 ha of wetland, or approximately 14% of wetlands in the RSA, resulting in a moderate magnitude effect. This estimate is conservative, as Project footprint covers 442.84 ha. Comparing the Alderon PDA with the updated 2025 ELC mapping, an updated wetland effect area of 558.58 ha is predicting, showcasing a reduction in area loss when comparing the Project footprint to what was assessed in the previous EIS. The effect is predicted to be long-term and irreversible, as wetlands within certain areas of the Project (i.e., WL2) will be flooded instead of rehabilitated as wetlands.

During the design update, wetland areas were avoided to the extent possible, including the realignment of the main access road and rail line. With this adjustment wetland areas south of Wabush airport (WSP WL6) and south of Jean Lake (WSP WL5) were completely avoided. WL4, including the Elephant Head MU, is within the 100 m buffer of the Project footprint along the eastern access road and railway alignment. Although technically within the SSA, it is anticipated that the wetland will be avoided during final design and Construction. Therefore, no direct losses are expected.

Effects to surface hydrology, water quality and groundwater hydrology are predicted to be low, following the implementation of mitigation measures outlined in Chapter 7 (Groundwater) and Chapter 8 (Surface Water). Mitigation will be implemented for potential effects on wetlands within and adjacent to the Project, particularly a Project-specific Environmental Protection Plan will be developed, subject to regulatory review and approval, prior to construction. Monitoring of groundwater and surface water levels and water quality will be incorporated into the EEMP, subject to regulatory review and approval, prior to construction.

It is likely that elevated dust concentrations predicted during Operations will have observable effects on wetlands immediately adjacent to the mine site, perhaps up to 100 m (i.e., in the LSA), resulting in a high magnitude effect. Effects may include reduced growth or mortality in sensitive plant species (especially low growing herbs and mosses) leading to changes in local species diversity or reduced density. Effects are expected to be limited to the LSA and relatively small proportions of any ELC type (less than 5%) within the RSA. Effected wetland areas will recover after the Operations phase and as the site is restored during the Closure phase.

Protected Areas

Clearing and other activities associated with the construction of the Rose Pit and the Project, during the Construction phase and activities associated with the operation and maintenance, and decommissioning and reclamation of the Project will result in the loss of the Pike Lake South MU. The regional protection functions currently being performed by the Pike Lake South MU will be maintained with the new Protected Area, Strawberry Lake MU. The total effect footprint in Duley Lake Provincial Park will be approximately 32 ha, representing 4.2% of the park total area (763 ha) and 1.4% of all protected areas in the RSA (2,351 ha). Therefore, although the direct effects within protected areas will be adverse, the net effect magnitude will be low.

A summary of residual Project environmental effects is presented in Table 10-18.

Table 10-18: Characterization of Residual Effects on Vegetation, Wetlands and Protected Areas

Residual Effect	Criterion	Rating/Effect Size
Vegetation		
Area Loss	Nature	Adverse
	Magnitude	Moderate (3,433 ha, 10.2% of non-wetland habitat in RSA)
	Geographic Extent	Local
	Duration	Medium term
	Timing	All seasons
	Reversibility	Reversible for areas with rehabilitation and closure planning revegetation) and irreversible for the area of the Pit, which will be flooded during the Closure phase
	Frequency	Periodic (mainly during Construction)
	Probability of occurrence	Certain
	Ecological and socio-economic context	Loss of specific habitats would reduce the habitat available for recreational activities (e.g., loss of burned habitat utilized for berry picking)
Dust (Air Quality)	Nature	Adverse
	Magnitude	High (TPM 500-2,000 µg/m^3 in 24-hr within LSA at some locations)
	Geographic Extent	Local (including not more than 5% of ELC in the RSA)
	Duration	Medium term
	Timing	All seasons
	Reversibility	Reversible
	Frequency	Continuous
	Probability of occurrence	Probable effect relative to regulatory NLAAQ guidelines, effects severity uncertain for vegetation
	Ecological and socio-economic context	Reduced species diversity resulting in effects on wetland functions, such as provision of habitat for wildlife and SAR (if present)

Table 10-18: Characterization of Residual Effects on Vegetation, Wetlands and Protected Areas

Residual Effect	Criterion	Rating/Effect Size
Wetlands		
Area Loss	Nature	Adverse
	Magnitude	Moderate (Up to 879.63 ha could be affected, 14% of WL in RSA)
	Geographic Extent	Local
	Duration	Long term (permanent)
	Timing	All seasons
	Reversibility	Irreversible
	Frequency	Continuous during Project lifetime
	Probability of occurrence	Certain
	Ecological and socio-economic context	Changes in wetland areas would reduce wetland functions
Surface Water Changes	Nature	Adverse
	Magnitude	Low (Up to 148 ha of wetland in the LSA could be affected, ~2.4% in the RSA)
	Geographic Extent	Local
	Duration	Medium term
	Timing	All seasons
	Reversibility	Reversible
	Frequency	Continuous during Project lifetime
	Probability of occurrence	Probable
	Ecological and socio-economic context	Changes in wetland hydrology could degrade wetland functions
Groundwater Changes	Nature	Adverse
	Magnitude	Low (Up to 148 ha of wetland in the LSA could be affected, ~2.4% in the RSA)
	Geographic Extent	Local
	Duration	Medium term
	Timing	All seasons
	Reversibility	Reversible
	Frequency	Continuous during Project lifetime
	Probability of occurrence	Probable
	Ecological and socio-economic context	Changes in wetland groundwater could degrade wetland functions
Dust (Air Quality)	Nature	Adverse
	Magnitude	High (TPM 500-2,000 μg/m^3 in 24-hr within LSA at some locations)
	Geographic Extent	Local (including not more than 5% of ELC in the RSA)
	Duration	Medium term
	Timing	All seasons
	Reversibility	Reversible
	Frequency	Continuous
	Probability of occurrence	Probable effect relative to regulatory NLAAQ guidelines, affects severity uncertain for wetlands
	Ecological and socio-economic context	Reduced species diversity resulting in effects on wetland functions, such as provision of habitat for wildlife and SAR (if present)

Table 10-18: Characterization of Residual Effects on Vegetation, Wetlands and Protected Areas

Residual Effect	Criterion	Rating/Effect Size
Protected Areas		
Area Loss	Nature	Adverse
	Magnitude	Low (32 ha; 4.2% of the park, 1.4% of protected areas in the RSA)
	Geographic Extent	Local
	Duration	Long term (permanent)
	Timing	All seasons
	Reversibility	Irreversible
	Frequency	Continuous during Project Lifetime
	Probability of occurrence	Certain
	Ecological and socio-economic context	Loss of protected areas can lead to ecological degradation such as habitat fragmentation and disruption of ecosystem services and can contribute to socio-economic challenges such as reduced recreational opportunities and cultural effect

RSA = regional study area; TPM = total particulate matter; μg/m³ = microgram per cubic metre; LSA = local study area; ELC = ecological land classification; NLAAQ = Newfoundland and Labrador Ambient Air Quality Standard; WL = wetland; < = less than; SAR = species at risk.

10.5.3.5 Significance Determination

Vegetation

Based on the significance definitions in Section 10.5.1.4, potential effects on non-wetland vegetation communities, and SAR/SOCC (which utilize those habitats) within the SSA (3,433.42 ha) would generally be restricted to an area equal to less than 10.2% of area for each habitat class within the RSA. Hardwood Burn/Regeneration and Softwood Burn/Regeneration are the only two non-wetland habitat classes which exceed the potential 20% habitat loss threshold (25.8% and 26.7%, respectively). However, the presence of a large amount of these habitats is likely on a more regional scale (i.e., beyond the RSA). Specifically, within the Wabush Eco-District 15.7% of its area (21,022.30 ha) has been previously burned. Based upon the comparatively small proportion that non-wetland habitats make up of the SSA compared to the RSA, and the abundance of previously burned habitats within the larger eco-district it is considered that permanent effects on vegetation in the RSA will be **not significant**.

An additional 495.42 ha of non-wetland habitat located in the LSA may be affected by dust. However, through the use of mitigative measures (e.g., dust suppression) and best management practices it is considered that temporary effects upon non-wetland vegetation in the RSA will be **not significant**.

Effects upon SOCC are closely tied with loss of their habitats. In general, as described above for vegetation and below for wetlands the displacement of specific habitat types within the SSA it typically low in comparison to what is available in the RSA. Given that there is adequate habitat available of each habitat class outside of the RSA it is considered that permanent effects on SOCC in the RSA will be **not significant**.

Wetlands

As stated previously, the main wetland effect predicted for the Project is the displacement of wetland areas through quarrying and infilling related to mining and mining related infrastructure. The wetland areas within the SSA have a high likelihood of being permanently lost. This area of possible effects is conservatively estimated to be 879.63 ha; however, the anticipated likely direct effect area will be closer to 440 ha. The disturbance of wetland area by infilling and excavation is prohibited by regulation and requires approval and the provision of compensation for loss of wetland function. The permanent residual effects on wetland area and function will be offset by a commitment to the Strawberry Lake Stewardship Agreement; therefore, it is considered that the permanent effects on wetlands in the RSA will be **not significant**.

There is 148.38 ha of wetland area located within the LSA which conservatively may be subject to indirect effects on surface water and groundwater and dust, but it is considered likely that the actual area of wetland effects may be closer to 15 ha). Such effects are expected to be temporary and reversable. Because any "net loss" in wetland function is non-compliant with federal and provincial policy objectives and requires mitigation (i.e., offsetting), and based on the significance definitions in Section 10.5.1.4, the potential effects on wetlands from changes in surface water, groundwater, and dust emissions in the LSA could be significant. Similar to above, temporary effects on wetland function will be offset by a commitment to the Strawberry Lake Stewardship Agreement; therefore, it is considered that the net temporary effect on wetlands in the RSA will be **not significant**.

Protected Areas

The primary adverse effect is the loss of Pike Lake South MU, totalling 610 ha which will be compensated by the designation of the Strawberry Lake MU, with an equivalent area of 610 ha. This new protected area will maintain the regional protection functions previously provided by the Pike Lake South MU. The direct effect footprint in Duley Lake Provincial Park will be approximately 32 ha, representing 4.2% of the park total area (763 ha) and 1.4% of all protected areas in the RSA (2,351 ha),. The measurable effects are restricted to an area far below the 20% threshold of total conservation areas in the RSA. Based on the significance definitions in Section 10.5.1.4, the potential residual effects on protected areas are considered **not significant**.

10.5.4 Residual Cumulative Effects Analysis

10.5.4.1 Reasonably Foreseeable Developments and Potential Cumulative Effects

Following the assessment of Project effects discussed in the sections above, an assessment of potential cumulative effects was conducted for other projects and activities (Table 10-19) that have the potential to interact with the Project's RFDs. Six projects were identified that had the potential to contribute to the cumulative effects, five of which are mines and one road improvement project. These projects range from 6 to 60 km from the Kami Mining Project.

All the RFDs have physical footprints outside the RSA for Vegetation, Wetlands, and Protected areas; therefore, direct effects such as area loss are not applicable. No potential interaction with surface water or groundwater within the RSA was identified. Similarly, no reasonably foreseeable effects from introduction of invasive species were identified for the RFDs within the RSA. Only dust from RFDs may migrate into the RSA airshed and become a potential source of cumulative effects; therefore, the remainder of the assessment focuses on dust.

The potential cumulative effects of dust (TPM and PM_{10}) was assessed as part of the Air Quality and Climate Chapter (Chapter 5). The assessment conclusion is that potential cumulative effects with identified RFDs, specifically the Scully Lake Tailings Impoundment Project, are unlikely to result in greater than negligible contributions to the predictions of COCs from the Project.

Table 10-19: Other Projects and Activities Considered in the Cumulative Effects Assessment

Project Name or Physical Activity	Description of Project Effects	Approximate Direct Distance to Kami Mining Project Site	Status/Timing	Interaction with Residual Effects to Vegetation, Wetlands, and Protected Areas from Kami Mining Project
Scully Mine Tailings Impoundment Area Expansion Project	TACORA Resources Inc. proposes expanding the tailings impoundment area of the Scully Mine, an iron ore mine located in Wabush, NL. As proposed, the Scully Mine Tailings Impoundment Area Expansion Project would expand the existing tailings impoundment area by up to 1,411 ha, allowing for the full use of the mine's ore reserves and for operations to continue until 2047. The existing tailings impoundment area is expected to reach full capacity around 2025.	13 km	Anticipated start in 2025 and expand operations by 22 years	Incidental contribution to dust effects in the LSA during Operations. **Considered to be a negligible cumulative effect.**
Rio Tinto IOC Western Hillside Tailings Pipeline – Iron Ore Company of Canada	A new Tailings Management Plan that would include optimizing the available space of the existing Wabush Lake tailings storage facility and using the Western Hillside. The Project would consist of developing an access road and pipeline alignment, transmission lines, pumps and pumphouses, and a modified strategy for tailings deposition into Wabush Lake.	15 km	The Minister announced that the Project was released from an Environmental Assessment on May 17, 2024	Incidental contribution to dust effects in the LSA during Construction. **Considered to be a negligible cumulative effect.**
Rio Tinto IOC Smallwood North Extension Project	Expansion to the boundaries of the existing Smallwood Pit to support ongoing operations in Labrador City. The proposed extension of Smallwood Pit is located within IOC's existing mining leases and encompasses approximately 160 ha. The proposed project includes extending the Smallwood North pit to the north, development of a new waste dump, construction of new power lines, construction of new pit dewatering wells and the development of surface water handling systems.	25 km	The Minister announced that the Project was released from an Environmental Assessment on July 21, 2021	Incidental contribution to dust effects in the LSA during Operations. **Considered to be a negligible cumulative effect.**

Project Name or Physical Activity	Description of Project Effects	Approximate Direct Distance to Kami Mining Project Site	Status/Timing	Interaction with Residual Effects to Vegetation, Wetlands, and Protected Areas from Kami Mining Project
Labrador City Humphrey South Iron Ore Extension	A 370-ha extension to the Humphrey South Pit iron ore deposit that will include development into the White Lake area to support its existing operations in Labrador City. The project consists of an extension of the Humphrey South Pit to the east and south, development of a waste dump south of White Lake, extension of the Carol waste dump, power lines, dewatering wells, and surface water-handling systems.	20 km	Condition of release from Environmental Assessment met on December 11, 2024	Incidental contribution to dust effects in the LSA during Operations. **Considered to be a negligible cumulative effect.**
Bloom Lake Iron Mine - Increasing Tailings and Waste Rock Storage Capacity	Increasing tailings and waste rock storage capacity for Bloom Lake Iron Mine. The project's objective is to increase the capacity of the accumulation areas to allow annual production of 7.5 Mt of concentrate/year from 2019 to 2021 and 16 Mt of concentrate/year from 2022 to 2040 (i.e., for an estimated operating life of 21 years).	17 km	*Fisheries Act* authorization provided in 2024	Incidental contribution to dust effects in the LSA during Operations. **Considered to be a negligible cumulative effect.**
Route 389 Improvement Project between Fire Lake and Fermont	Improving Route 389 between Fire Lake and Fermont (kilometres 478 to 564) to increase the flow and safety of the road and, in addition, improve the link with NL and facilitate access to natural resources. The work includes building 55.8 km of new right-of-way road and improving existing road, for a total length of 69.5 km.	60 km	Environmental Assessment approved in 2019	Incidental contribution to dust effects in the LSA during Construction. **Considered to be a negligible cumulative effect.**

NL = Newfoundland and Labrador; LSA = local study area; IOC = Iron Ore Company of Canada; Mt = million tonne.

10.5.4.2 Mitigation Measures

It is determined that no additional mitigation measures are required to address potential cumulative effects on Vegetation, Wetlands and Protected Areas. As described in Section 10.5.3.2, the primary mitigation for Project residual dust effects is to reduce dust generation at the source using standard methods.

10.5.4.3 Residual Cumulative Effects Characterization

As the assessment of RFDs indicates that potential cumulative effects are negligible, there are no predicted residual cumulative effects.

10.5.4.4 Significance Determination

Based on this analysis, potentially significant cumulative effects are not predicted.

10.5.4.5 Climate Change

In addition to human activities, climate change and related effects (e.g., extreme weather, increased frequency and intensity of extreme weather events, wildfires) may contribute cumulatively to vegetation and wetland loss and alteration. Current climate change projections under a high greenhouse gas emissions model (Shared Socioeconomic Pathway 5-8.5) predict summer temperatures to rise by +1.9°C and winter temperatures to rise by +6.0°C by 2060 in Happy Valley-Goose Bay (roughly 530 km east of the Project area) (Neilsen 2023). A Climate Projections Study (Finnis and Daraio 2018) projects similar changes by mid-century in Wabush where daily mean temperatures are predicted to rise by +2.8°C in the summer and as much as 5.8°C in the winter (Finnis and Daraio 2018). These increases would result in noticeable changes in precipitation, rising ambient temperatures, shorter winters, and permafrost thaw (Neilsen 2023). These climate changes will in turn affect vegetation and wetlands.

Changes to climate could also result in an increase in frequency and intensity of extreme weather events. Labrador is subject to severe weather events like heavy rainfall, blizzards, and hurricanes, all of which could result in habitat loss and alteration. The northwestern Atlantic Ocean, the Labrador Sea, and the Gulf of St. Lawrence are some of the stormiest areas in North America (Savard et al. 2016). Climate projections suggest that substantial changes in wind speed are unlikely to be impacted by climate change but there is likely to be a northward shift in storm tracks that will affect storm frequency and intensity in the East Coast region (Loder et al. 2013). Storms, like hurricanes, can result in substantial vegetation and wetland loss and alteration. Storms moving up the eastern seaboard or across the continent impact precipitation events in Labrador (Lemmen and Warren 2016). Thus, more frequent and intense storms, together with increased precipitation due to ocean warming, is expected to increase the risk of floods (US EPA 2022). Flooding events can affect vegetation species populations and wetlands.

Climate change mediated increases in temperature also affect insect populations. Because insect development and physiology are strongly tied to temperature, rising temperatures will result in insect range expansions, and increased over-winter survival, reproductive success, and a risk of invasive species (Skendžić et al. 2021). This could increase the risk of outbreaks of common boreal forest pest species, such as the eastern hemlock looper, *Lambdina fiscellaria fiscellaria*, (Government of Canada 2010) or spruce budworm, *Choristoneura fumiferana* (Fewster et al. 2022), which in turn would lead to loss and alternation of applicable vegetation species. The eastern hemlock looper, a subspecies found in Atlantic Canada, feeds primarily on balsam fir and eastern hemlock. When these tree species become scarce, the looper will readily feed on many other coniferous species as well as deciduous species (Skinner 2025). Spruce budworm also feed primarily on balsam fir, as well as white spruce, but will feed on other conifers when food is scarce. Depending on the intensity of defoliation, this could lead to more frequent and more intense wildfires (Fewster et al. 2022).

Changes to climate could also result in an increase in frequency and intensity of wildfires. Labrador is prone to wildfires, with the most recent fire occuring in 2024, covering an area of 19,059 ha. An increase in the frequency and intensity of wildfires could alter the distribution and composition of upland habitat patches or reduce the size of wetlands on the landscape. Additionally, forest age structure is predicted to change at the landscape scale as a result of an increase in the frequency and intensity of fire associated with climate change (Thompson et al. 1998; Nituch and Bowman 2013).

Because of the uncertainty in direction and magnitude, it was conservatively assumed that climate change would have an adverse cumulative effect on vegetation and wetlands.

10.6 Prediction Confidence and Uncertainty

A key element of a comprehensive environmental assessment is the prediction of future conditions of the environment as a result of the project from previous and existing projects and activities and RFDs. Given that environments change naturally and continually through time and across space, assessments of effects and predictions about future conditions embody some degree of uncertainty (CEA Agency 2018).

The purpose of the prediction confidence and uncertainty section is to identify the key sources of uncertainty and qualitatively describe how uncertainty was addressed for vegetation, wetlands and protected areas to increase the level of confidence that effects would not be larger than predicted, including the potential need for monitoring and adaptive management that can reduce uncertainty over time (Section 4.10).

Confidence in effects analyses can be related to the following elements for vegetation, wetlands and protected areas:

- adequacy of the baseline data for providing an understanding of the existing conditions
- the nature, magnitude, and spatial extent of future fluctuations in ecological, cultural, and socio-economic variables, independent of effects from the Project and other developments (e.g., climate change, fire, flood, developments)
- assumptions, conditions, and constraints of quantitative model inputs
- understanding of Project-related effects on complex social-ecological systems that contain interactions across different scales of time and space (e.g., how and why the Project would influence wildlife and Indigenous Land and Resource Use)
- knowledge and experience with the type of effect in the system
- knowledge of the effectiveness of proposed Project environmental design features or mitigation for avoiding or minimizing effects
- uncertainties associated with the exact location, physical footprint, activity level, and the timing and rate of future developments

As with other disciplines, uncertainty in the vegetation, wetlands, and protected areas VEC begins with the precise Project footprint, for which a conservative SSA was proposed which adds a 100 m buffer to the latest design Project elements to address the possibility that minor design changes may yet occur during final design or construction. Assuming design changes (if any) are small, this will result in a conservative effect assessment which generally slightly overestimates effect severity.

Baseline mapping of vegetation communities and wetlands is reliant mostly on remote sensing and modelling, with a limited field verification program. The accuracy of the recent modelling improved substantially (from the 2012 levels of around 50%) up to around 90%. Field verification of selected wetlands in the LSA indicate that accuracy of wetland modelled boundaries may be somewhat less than 90%. However, such levels are considered representative of regional trends with acceptable accuracy.

Future conditions with respect to climate change and regional land use trends is relatively uncertain and has been treated as indicative only for the purpose of this assessment.

The certainty of effectiveness of proposed mitigation for potential effects on wetlands in the LSA (i.e., areas directly adjacent or very near the Project footprint) although relatively well understood, is not 100%. Therefore, since a loss of wetland function must be addressed in compliance with regulations and policies, a limited operational and/or Post-closure monitoring program would confirm the EIS predictions. These EEMPs would also include re-assessment of wetland functions in selected wetlands in the LSA which were surveyed in the 2023 baseline study (WSP 2024).

Substantial design alterations of local surface water and groundwater conditions are planned which will require mitigation and monitoring. Hydrological and hydrogeological modelling is extremely complex and operational/Post-closure conditions may vary from predicted outcomes. Effects of changes in surface water balance and groundwater levels may have effects on wetlands that take time to develop, thus monitoring of wetland hydrology in the LSA is recommended.

Uncertainties in baseline data, prediction models and effects assessment were considered in a manner that increased confidence on effects assessment. Overall, the confidence level of assessment was considered to be high for vegetation, wetlands and protected areas.

10.7 Monitoring, Follow-up, and Adaptive Management

This section presents a summary of the identified monitoring and follow-up required to confirm effects predictions and address uncertainty identified in Section 10.5.4.5.

Specifically, follow-up and monitoring programs will be used to:

- Evaluate the effectiveness of reclamation and other mitigation actions, and modify or enhance as necessary through monitoring and developing updated mitigation measures (if needed).
- Identify unanticipated negative effects, including possible accidents and malfunctions.
- Contribute to the overall continual improvement of the Project.

Relevant monitoring plans include:

- The Environmental Effects Monitoring Program (Annex 5E) which will include:
  - Wetland monitoring
  - Ambient air quality monitoring
  - Invasive species identification
  - Groundwater and surface water monitoring

The EEMP will include construction-based monitoring requirements and long-term monitoring requirements for wetlands. To mitigate the long-term effects of the construction on the wetlands appropriately trained approved personnel will monitor key early indicators of wetland health and provide that data to the tracking, interpretation and application of adaptive management, if required.

After consultation with regulatory agencies, the required sampling and assessment parameters for long term monitoring of the wetlands will be established. Trained personnel will collect data required for the long-term assessment and the information will be tracked to allow for assessment of trends in the date.

The Wetland monitoring program will include return visits to selected wetlands in the LSA where baseline conditions were gathered in 2023, including a functional assessment using the WESP-AC. The monitoring schedule should be established in consultation with regulators, possibly including site visits to selected wetlands in the LSA to document that Project mitigation measures are effective and confirm the actual total wetland effect area, for the purpose of establishing commitments to offset loss of wetland function.

The ambient air quality, groundwater and surface water monitoring programs are associated with other VECs but the results would be analyzed in the context of potential effects on nearby wetlands in the LSA. Invasive species have some potential to effects to wetlands if left unmanaged, could become practically non-mitigable. Invasive species identification is also incorporated into the EEMP and would include review of wetland areas adjacent to the Project.

10.8 Predicted Future Conditions Should the Project Not Proceed

The predicted future condition of the environment for Vegetation, Wetlands and Protected Areas if the Project does not proceed is relatively insensitive to climate change over the proposed Project timescale of ~40 years. Although wildfires are likely to increase in frequency due to higher temperatures and increased storm activity, it is likely that fire management effort around Wabush and Labrador City will also increase in response; therefore, change in regional vegetation communities from more frequent wildfires is not anticipated. The next most likely large change in the Project area absent the proposed Kami Mining Project would be the implementation of a different mining project by others later. Global mining economy is the main driver of mining development pressure and is relatively difficult to predict but long-term trends over 40 years are likely to include future periods of strong mining interest in the demonstrated ore deposits at the site. Should no mining take place within the next 40 years, based on historical events, it seems unlikely that any other major development would occur and that the current conditions would persist relatively unchanged, subject to timber harvesting, and recreational activities. Small incremental expansion of existing developed areas would be expected to be less than 5%.

10.9 Key Findings and Conclusions

Vegetation

The primary effect upon vegetation for the Project is through the direct displacement (clearing) of terrestrial vegetation areas during mine site development and construction of associated infrastructure. While non-wetland vegetation communities within the SSA will be displaced by mine development, these effects may be largely temporary and carefully planned rehabilitation activities can hasten the re-establishment of Post-closure vegetation communities. However, non-wetland habitats located in pit areas will likely be permanently replaced by water due to the Post-closure mine pit flooding. The potential area of direct effects associated with the mining pit and mine infrastructure development (SSA) is conservatively assumed to be 3,433 ha or approximately 10.2% of non-wetland habitat in the LSA. It is also predicted that in-direct effects from elevated dust concentrations during Operations will have observable adverse effects on vegetation communities immediately adjacent to the mine site, perhaps up to 100 m (i.e., in the LSA), resulting in a high magnitude effect. Effects are expected to be limited to the LSA and relatively small proportions of any ELC type (less than 5%) within the RSA. Affected vegetation communities will recover after operations cease and the site is restored.

Due to relatively small proportions of the ELC types effected in the SSA, compared to the remaining ELC areas available in the RSA it is considered that the overall effects on non-wetland vegetation communities will be **not significant**. This conclusion is very similar to effect predictions in the previous EIS, although it should be noted that vegetation communities was not treated as a separate VEC but included with the discussion of wildlife habitat (Alderon 2012). It should also be noted that a comparison of the 2012 EIS effect estimate with the current SSA effects is complicated because of the change in ELC areas caused by the higher accuracy of the recently updated mapping. The 2012 PDA was only 2,377.50 ha whereas the more conservative SSA in the current assessment is 4,323.06 ha. When considering only the Project infrastructure, the current EIS proposes an area of 1,971 ha, compared to a larger area of 2,377 ha previously proposed for Project infrastructure in the previous EIS, reflecting how Champion has centralized the footprint of the Project.

While the Project may affect vegetation SOCC and their habitats the effects are not extensive, as their habitats are well represented in the RSA and likely within the larger western Labrador region. As a result, the Project effects will not hinder the species ability to persist in the area and are, therefore, considered **not significant**.

This conclusion is like the effect predictions in the 2012 Alderon EIS for SAR and SOCC, although the previous EIS addressed all SAR and SOCC species within a single chapter. The current environmental assessment process has assessed SAR and SOCC within the individual chapters (e.g., this chapter and wildlife); therefore, the conclusions presented here are for vegetation SOCC only.

Wetlands

As stated previously, the main wetland effect predicted for the Project is the displacement of wetland areas through quarrying and infilling related to mining and mining related infrastructure. The wetland areas within the SSA have a high likelihood of being permanently lost. The area of possible effects within the SSA is conservatively estimated to be 879.63 ha; however, the anticipated likely direct effect area in the Project footprint will be closer to 440 ha. There is 148.38 ha of wetland area located within the LSA which conservatively may be subject to indirect effects on surface water and groundwater and dust, but it is considered likely that the actual area of wetland effects may be closer to 15 ha. Such effects are expected to be temporary and reversable. The residual effects on wetland area and function will be offset by a commitment to the Strawberry Lake Stewardship Agreement; therefore, it is considered that the overall effects on wetlands will be **not significant**.

This conclusion is very similar to effect predictions in the previous EIS, although it should be noted that the area of directly effected wetland in the Project footprint (442.84 ha) has decreased compared to the Alderon assessment (572 ha) due mostly to an approximately 40% reduction in the eastern access road effects through realignment and an overall refinement of the site infrastructure design with optimized storage areas.

Protected Areas

The primary adverse effect is the loss of Pike Lake South MU, totalling 610 ha which will be compensated by the designation of the Strawberry Lake MU, with an equivalent area of 610 ha. This new protected area will maintain the regional ecological functions previously provided by the Pike Lake South MU. The total effect footprint in Duley Lake Provincial Park will be approximately 32 ha, representing 4.2% of the park total area (763 ha) and 1.4% of all protected areas in the RSA (2,351 ha). The measurable effects are restricted to an area far below the 20% significance threshold of total conservation areas in the RSA; therefore, the potential residual effects on protected areas are considered **not significant**.

The predicted area of effect is similar to the 2012 Alderon EIS, although access road alignment changes avoided the previous encroachment in the Jean Lake Rapids MU but added footprint within the southwest edge of Duley Lake Provincial Park.

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11. Wildlife

The purpose of **Chapter 11, Wildlife,** is to characterize the existing environment, Project-environment interactions, and potential residual and cumulative effects of the Project on wildlife—specifically, Species at Risk (SAR) and migratory birds, bats, and other wildlife (collectively referred to here as wildlife, unless otherwise specified). The Project has the potential to cause adverse effects on these components of the biophysical environment through removing existing natural vegetation, altering final terrain and soil composition and/or plant species composition, removing or altering wetlands, altering freshwater bodies, depositing dust, emitting fossil fuels, generating noise, and artificial lighting. Changes in wildlife can also influence the people that use natural resources (e.g., hunting or cultural practices) or ecosystem services (e.g., pest control). Therefore, the wildlife assessment draws heavily from assessments of other biophysical and socioeconomic Valued Environmental Components (VECs) and, at the same time, is used to support the assessments of other VECs, where applicable.

11.1 Approach to the Effects Assessment

The methods and assessment presented in this chapter were developed in consideration of the requirements under the provincial *Environmental Protection Act*, with specific consideration of the requirements set out in the provincial Environmental Impact Statement (EIS) Guidelines for the Project issued by the Minister of Environment and Climate Change (Government of NL 2024a). A table of concordance to the EIS Guidelines is provided in the Executive Summary. The assessment of wildlife followed the overall effects assessment approach and methods (**Chapter 4, Effects Assessment Methodology**).

Where possible, comparison to the outcomes of the assessment of wildlife completed within the previous EIS have been made to highlight where effects on wildlife have been reduced through consideration of environmental design features and mitigation or where new adverse effects may be introduced and require additional consideration in Project planning.

11.2 Integrating Engagement from Indigenous Groups and Local Stakeholders

Engagement activities on the Project with Indigenous groups and local stakeholders was first initiated in 2011 as part of the previous Alderon Iron Ore Corporation (Alderon) 2012 EIS (the previous EIS). Following acquisition of the Project in 2021, Champion has been engaging with potentially affected Indigenous groups and local community stakeholders. The overall approach and methods for the incorporation of engagement feedback into the EIS is discussed in detail in **Chapter 22, Engagement**.

Engagement efforts included:

- weekly fieldwork updates to public stakeholders
- community open houses and in-person meetings with Indigenous Rightsholders and public stakeholders
- participation in Labrador West Alliance meetings
- establishment of the Kami Working Group
- formal correspondence through letters and direct outreach

responses to inquiries via telephone, email, and virtual meetings

As part of Champion's engagement approach, Champion also prioritized re-engaging with stakeholders from the previous Alderon Iron Ore Corporation (Alderon) 2012 EIS (the previous EIS). This effort included:

- meeting with affected stakeholders from the previous project to validate past issues and concerns

assessing current issues and challenges faced in Labrador West

Issues and concerns related to wildlife raised by Indigenous groups and local stakeholders and how these issues and concerns were addressed through the assessment are summarized in Table 11-1, including cross references to where comments were considered or addressed in the chapter. A detailed discussion of engagement is provided in Chapter 22.

Table 11-1: Summary of Issues and Concerns Related to Wildlife by Indigenous Groups and Local Stakeholders

Comment Theme	How It Is Addressed in the Assessment	Where It Is Addressed in the EIS	Indigenous Group or Stakeholder (local or regulator)	Raised in Alderon EIS (yes/no)
Potential effects on wildlife and wildlife habitat: bird habitat	Effects on critical bird habitat are discussed in Chapter 11, Wildlife, and appropriate mitigation measures are discussed in Section 11.5.4.2.	Chapter 11, Wildlife, Section 11.5.4.2	NunatuKavut Community Council	No
Potential effects on caribou and caribou habitat	Effects on caribou and their habitat are discussed in Section 11.4.4.3 and it has been determined that the Project area does not overlap with any caribou habitat. Therefore, effects will be minimal if any.	Chapter 11, Wildlife, Section 11.4.4.3	Newfoundland and Labrador's Department of Fisheries, Forestry and Agriculture	n/a
Potential effects on caribou and caribou habitat	Effects on caribou and their habitat are discussed in Section 11.4.4.3. It has been determined that the Project area does not overlap with any currently occupied caribou habitat. Therefore, effects on the George River caribou herd will be minimal to absent.	Chapter 11, Wildlife, Section 11.4.4.3	Impact Assessment Agency of Canada	n/a
Cumulative effects on caribou and caribou habitat	Cumulative effects on caribou and their habitat are discussed in Section 11.5.4. It has been determined that the Project area does not overlap with any currently occupied caribou habitat. Therefore, effects on the George River caribou will be minimal to absent.	Chapter 11, Wildlife, Section 11.5.3.	Impact Assessment Agency of Canada	n/a

EIS = Environmental Impact Statement; n/a = not applicable.

11.3 Assessment Scoping

This section identifies key issues for wildlife, defines and provides a rationale for the selection of wildlife VECs, identifies the measurable parameters selected for the assessment, and defines assessment boundaries for the wildlife VECs.

11.3.1 Key Issues

Key issues often relate to the potential environmental, social, economic, and health effects of any proposed project. Key issues identified for the Project reflect the primary concerns raised by regulatory authorities, Indigenous groups, and local stakeholders including residents, cabin owners, business owners and other interested parties.

To identify key issues related to wildlife, the following sources and notes were reviewed:

- Section 4.1 of the EIS Guidelines, which summarized key issues from regulatory agencies and feedback received on the Project Registration
- The record of engagement (Section 11.2), which captures engagement input received through meetings, phone calls, letters, and interviews
- The key issues related to wildlife identified in the previous Kami EIS
- Past experience with mining projects in Labrador
- The Wildlife Baseline Report (Annex 3C)

- The Avifauna Baseline Report (Annex 3D)
- The updated Ecological Land Classification Report (Annex 3B)
- The Vegetation and Wetland Baseline Report (Annex 3B)
- The Vegetation, Wetlands, and Protected Areas EIS chapter (**Chapter 10**)
- The Noise, Vibration, and Light EIS chapter (**Chapter 6**)

The Surface Water EIS chapter (**Chapter 8**)

Based on a review of the above sources, key issues related to wildlife include the following:

- Bird Habitat: Concerns about effects on critical bird habitats were raised by the NunatuKavut Community Council. These effects and appropriate mitigation measures are addressed in Section 11.5.4.2.
- Caribou and Caribou Habitat: Multiple stakeholders, including Newfoundland and Labrador's Department of Fisheries, Forestry, and Agriculture and the Impact Assessment Agency of Canada, expressed concerns about impacts on caribou and their habitat. It was determined that the Project area does not overlap with any currently occupied caribou habitat, thus minimizing potential effects. These discussions are found in Section 11.4.4.3.
- Cumulative Effects on Caribou and Caribou Habitat: The cumulative effects on caribou and their habitat were also a concern, particularly for the George River caribou herd. The assessment concluded minimal effects due to the lack of overlap with the current range of the caribou herd. This is detailed in Section 11.5.3.
- A reduction in habitat quantity and quality
  - vegetation
  - wetlands
  - fresh water
- Changes to habitat distribution
  - connectivity
  - sensory disturbance (noise, vibration, light)
- Changes in wildlife species abundance, composition, and diversity.
- Project effects on key species, including:
  - caribou (migratory and boreal), migratory birds, plants, and SAR/related habitats
  - avifauna species (harlequin duck, common nighthawk, bank swallow, spruce grouse, short-eared owl, and peregrine falcon)
  - bat species (hoary bat and northern myotis)
  - large mammals (moose and black bear)
  - furbearing mammals (beaver and American marten)
  - amphibian species (wood frog and two-lined salamander)

11.3.2 Valued Environmental Components and Measurable Parameters

VECs are aspects of the biophysical, cultural, and socioeconomic environments that are considered to have scientific, social, cultural, economic, historical, archaeological, or aesthetic importance (Beanlands and Duinker 1983). VECs are identified to be of concern by the proponent, scientists, government agencies, Indigenous Peoples, or the public (IAAC 2018). The selection of appropriate VECs allows an environmental assessment to be focused on those aspects of the biophysical, cultural, and socioeconomic environments that are of greatest importance, and facilitates decision making by regulatory agencies with respect to a project.

Wildlife was selected as a VEC because of the potential for interactions between Project activities and wildlife species and their habitat, and protected areas (Table 11-2). This VEC includes avifauna, bats, and other wildlife. **Avifauna** (birds) encompass migratory and non-migratory species (waterfowl, raptors, shorebirds, wetland birds, and passerines). Avifauna provide recreational, domestic (food supply), and economic benefit for residents of western Labrador, and are of importance to resource managers and are regulated under the Newfoundland and Labrador *Wildlife Act*. Additionally, migratory birds are federally protected under the *Migratory Birds Convention Act, 1994* (MBCA). Avifauna species may also be federally protected under the *Species at Risk Act* (SARA) and/or provincially protected under the Newfoundland and Labrador *Endangered Species Act* (NL ESA). **Bats** provide important ecosystem services by consuming large quantities of insects that can damage important timber species and agricultural crops. Several species are federally protected under SARA, and all species in Labrador are provincially protected under NL ESA. **Other wildlife** includes ungulates, furbearers, small mammals, amphibians, and reptiles. Ungulates and furbearers provide recreational, domestic (food supply), and economic benefit to residents of western Labrador, and are important to resource managers and are regulated under the Newfoundland and Labrador *Wildlife Act*. Small mammals, amphibians, and reptiles are important prey items and indicators of environmental health.

Table 11-2: Description of *Species at Risk Act*, Committee on the Status of Endangered Wildlife in Canada, and the Atlantic Canada Conservation Data Centre

SARA	COSEWIC	ACCDC
— Begins with a species assessment that is conducted by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). — Species specialist subcommittees assess and assign the status of wildlife species. — Once a species is added to Schedule 1 it is subject to legal protection, and mandatory recovery planning required under SARA. — The Act provides federal legislation to prevent wildlife species from becoming extinct and to support their recovery. — Under the Act, an ongoing process of monitoring, assessment, response, recovery, and evaluation will be undertaken to improve the status of the species. — COSEWIC and SARA categorize rare species into three main groups according to their status within the province: – **Endangered**: A wildlife species facing imminent extirpation or extinction. – **Threatened**: A wildlife species likely to become endangered if limiting factors are not reversed. – **Special Concern**: A wildlife species that may become a threatened or endangered species due to a combination of biological characteristics and identified threats.	— Species are selected based on their risk of becoming extinct or nationally extirpated based on assessment results by the species specialist subcommittees and Aboriginal Traditional Knowledge Subcommittee. — Eligible species are prioritized and added to the species specialist subcommittees candidate list to determine level of priority: – **Group 1** Wildlife Species have highest priority for COSEWIC assessment. – **Group 2** and **3** Wildlife Species have medium and lower priority for COSEWIC assessment. — Species identified in Group 1 are reviewed and ranked accordingly by COSEWIC. High priority species are placed on the COSEWIC candidate list to be included in a wildlife species status report. — COSEWIC and SARA categorize rare species into three main groups according to their status within the province: – **Endangered**: A wildlife species facing imminent extirpation or extinction. – **Threatened**: A wildlife species likely to become endangered if limiting factors are not reversed. – **Special Concern**: A wildlife species that may become a threatened or endangered species due to a combination of biological characteristics and identified threats.	— The ACCDC is part of the Nature Serve network, a non-governmental agency that maintains conservation data for the Atlantic Provinces. — S1, S2, and S3 ranked species are considered extremely rare to uncommon within their respective ranges. — S4 and S5 ranked species are considered widespread, abundant to common and apparently or demonstrably secure.

SARA = *Species at Risk Act*; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; ACCDC = Atlantic Canada Conservation Data Centre.

Because there are several species that fall under each VEC, a screening process was completed to select target VECs for each taxonomic group. Species explicitly identified in the EIS Guidelines were prioritized. Subsequently, wildlife species were not selected as VECs if:

- there is little likelihood of interacting with the Project (e.g., presence of migratory birds in the area is limited to stopovers during spring and/or fall migration)

species were represented by other species that use similar habitats and are predicted to be similarly or less influenced by the Project

Measurable parameters are used to characterize changes to attributes of the environment from the Project, other human developments, and natural factors. The changes in measurable parameters are used to assess change and predict overall effects on VECs. Three measurable parameters were identified and used for the wildlife VECs:

- **Habitat availability** (i.e., habitat quantity and quality)—Changes to the amount of habitat (e.g., hectares) of different quality habitat (e.g., high, moderate, low, poor) can affect wildlife abundance. For example, high-quality habitat supports all survival and reproductive needs. By contrast, low-quality habitat provides minimal survival and reproductive needs. Project effects on habitat availability are measured as changes to the proportion of different quality habitat.
- **Habitat distribution** (i.e., habitat arrangement and connectivity)—Changes to spatial configuration and connectivity of habitats, and the spatial distribution and movement of animals. An area was considered well connected if the landscape facilitates wildlife movement between habitat patches. Movement between patches is a function of the degree of hostility or risk of the landscape (i.e., matrix) between suitable habitat patches, distance between suitable patches, and the movement ability (i.e., mobility) of the VEC. For example, animals may still travel across poor or unsuitable habitats, but a moose would likely be more successful than an American toad due to differences in mobility (i.e., moose have higher mobility than toads). Most bird and bat VECs have high mobility by flying over unsuitable or risky habitat patches. Generally, the assessment assumed that an increase in linear feature density (e.g., more roads and trails) would be correlated with a reduction in habitat connectivity for all VECs. Spatial distribution and movement of animals may also be affected by indirect effects from other VECs. For example, noise, vibrations, and light may lead to sensory disturbance causing displacement. By contrast, lights may attract some species and lead to increased mortality. Chemicals may act as hazards or attractants.

Survival and reproduction—Changes to animal abundance from altering survival and/or recruitment. Survival can be directly affected by loss of habitat, collisions with trains and construction vehicles, and contamination. Survival and breeding success may be indirectly affected by changes in predation/hunting pressure due to improved access to habitat, as well as stress through sensory disturbance if individuals are unable to leave an area. Survival and reproduction also considered the results from the ecological health risk assessment and exposure of aquatic and terrestrial species or receptors to chemical substances or metals (i.e., constituents of potential concern [COPCs]).

Each measurement indicator was assessed quantitatively where sufficient information existed to support a numerical assessment, and qualitatively where necessary, with the support of scientific literature.

Table 11-3 summarizes the wildlife VECs, the rationale for selection, and measurable parameters.

Table 11-3: Valued Environmental Components, Rationale for Selection, and Measurable Parameters

Valued Environmental Component	Rationale for Selection	Measurable Parameters	Linkages to Other VECs
— SAR Birds and Migratory Birds — Bats — Ungulates — Furbearers — Small Mammals — Amphibians and Reptiles	— Identified in the EIS Guidelines and by Indigenous groups as a species (group) of interest, particularly as a food source — Federal and/or provincial SAR protected by legislation — Ecological, cultural, and socioeconomic importance — Potential exposure to changes in air, noise, light, soil, surface water, vegetation cover, wetland cover, dietary items, resulting from the Project	— Habitat amount (ha/km^2) — Habitat quality – ability to support survival and breeding needs (high, moderate, low, poor) — Habitat distribution (arrangement and connectivity) — Density and distribution of individuals — Sensory disturbance (noise levels, vibrations, light intensity) — Hazards and attractants (light intensity, chemical concentrations) — Survival (change in abundance) — Reproduction (number of offspring and survival)	— Air Quality — Vegetation, Wetlands and Protected Areas — Surface Water — Noise, Vibration and Light — Community Health and Well-Being VEC

SAR = Species at Risk; EIS = Environmental Impact Statement; VEC = Valued Environmental Component.

11.3.3 Assessment Boundaries

Assessment boundaries define the spatial and temporal extents of the assessment for each VEC. The spatial boundaries for wildlife are defined in Table 11-4 and shown in Figure 11-1, and consist of the site study area (SSA), a local study area (LSA), a larger area for quantifying potential effects that corresponds to the vegetation regional study area (RSA), and a much larger RSA to examine potential cumulative effects of Project and other reasonably foreseeable projects (RFPs) in the region.

The SSA includes the proposed infrastructure for the Project (i.e., the Project footprint) with an additional 100 m buffer to reflect uncertainty in the final design of the Project and so that potential adverse effects on VECs are not underestimated. The SSA has a total area of 4,323 ha, which includes more lands than required for the Project. In fact, the SSA is twice as large as the anticipated Kami Mining Project infrastructure. The SSA is constrained to avoid certain features, including major lakes, the Québec–Labrador provincial border, and sensitive features, like the Wahnahnish Lake Protected Public Water Supply Area. The SSA represents the smallest scale of assessment and an area where the potential direct effects of the anticipated Project can be predicted with confidence. The SSA represents a conservative approach to predicting effects because of the addition of the buffer. There was no comparable assessment boundary in the previous EIS, which did not include access roads or new railway line as part of the Project infrastructure (Alderon 2012).

The Project infrastructure encompasses an area of 1,972 ha (Table 10-15 in Chapter 10, Vegetation, Wetlands, and Protected Areas), whereas, a larger area was proposed in the Alderon EIS (2,377 ha) (Alderon 2012). Champion has implemented optimization measures to further reduce the project footprint since the acquisition of the project. Although effort has been made to minimize the Project footprint and avoid sensitive features to the extent possible, the footprint may deviate once Construction begins due to unanticipated constraints on site. Therefore, a buffer surrounding the footprint was applied to examine potential Project effects and allow for flexibility in the Project design within the buffered area. This is known as the SSA, as described below.

The LSA includes the SSA plus an additional 500 m buffer where most direct potential effects on wildlife from the Project are anticipated to have the greatest effect, particularly for smaller, less mobile species. It also represents small-scale indirect effects on wildlife VECs from changes in biophysical VECs, such as changes to vegetation and avoidance of Project activities that create sensory disturbance (i.e., a zone of influence). The LSA is approximately 8,071 ha (80.7 km^2; Figure 11-1). The LSA has the same 100 m buffer distance as the LSA of the previous EIS (which had a total area of 71 km^2) (Alderon 2012).

The ecological land classification area—generally referred to hereafter as vegetation RSA for consistency with other chapters—is used to quantify changes in wildlife habitat availability and distribution in the SSA and LSA relative to surrounding habitat. This draws on the ecological land classification analysis completed as part of the wetland and vegetation assessment, which also corresponds to the vegetation RSA. The ecological land classification area covers an area of approximately 39,914 ha (399.14 km^2) and is described in detail in the Wetland and Vegetation Baseline Study (WSP 2025), and briefly described in Section 11.4.1.3. This is the scale at which detailed vegetation cover is available to quantify availability of different cover types. It includes the LSA and also a larger area to capture the regional variability of habitat. It also captures the farthest extent of potential indirect effects, such as air, noise, light, and contamination. This scale allows a quantitative assessment of potential Project effects on more mobile wildlife. This is also consistent with the approach in the previous EIS. The ecological land classification (ELC) in the current EIS examines similar habitat types and a similar area compared to the ELC in the previous EIS (Section 11.4.1.3).

The wildlife RSA includes the LSA in addition to a 40 km buffer, providing broader context for the qualitative assessment of potential cumulative effects (Chapter 4, Effects Assessment Methodology) and the potential effects of accidental events (**Chapter 18, Accidents and Malfunctions**) on wildlife. The RSA encompasses Labrador City, the Town of Wabush, and Fermont, Québec. It contains several existing mining operations, including Tacora's Sully Mine, Rio Tinto's Iron Ore of Canada Mine, Champion's Bloom Lake Mine, and ArcelorMittal's Mont-Wright Mine. Although no new developments are occurring within the RSA, several mining operations are active and one roadway is being expanded—these are captured in the cumulative effects assessment (Section 11.5.4).

The RSA overlaps with the following proposed nature reserves in Québec: Riviere Moisie Aquatic Reserve, lac Gensart Biodiversity Reserve, and lac Menistouc Biodiversity Reserve. It also contains nine Management Units from Labrador City: Lac Virot, Pike Lake North and South, Walsh River, Ironstone River, Beverley Lake, Tamarack Creek, Wabush Narrows, and little Wabush Lake. Additionally, the RSA encompasses seven Management Units from the town of Wabush, including Jean Lake Rapids, Elephant Head, Flora Lake East and West, Wahnahnish River, Angel Lake, and Waldorf River Steady.

The wildlife RSA is 701,154 ha (7,012 km^2; Figure 11-1) and is larger compared to the previous EIS (i.e., maximum extent of indirect effects; 1,993 km^2; Alderon 2012). This larger RSA boundary was selected because it provides broader scale context to capture and assess potential Project effects and is linked to aquatic-related pathways. It also provides a relevant scale for considering large predator-prey dynamics that may be influenced by the Project, based on average home range size of large mammals in the region. This scale is also more appropriate for a cumulative effects assessment of interactions of Project activities with other activities in the area, which are described in Section 11.5.4.

The wildlife RSA was used in the assessment of woodland caribou where there were linkages to effects from other assessments of intermediate components and VECs, such as effects on water quality, vegetation ecosystems, moose, and wolf/associated predator-prey dynamics. However, for woodland caribou, a quantitative assessment was also completed at scale of each caribou range to provide a more complete understanding of the magnitude, geographic extent, duration, and context of predicted effects from habitat alterations due to the Project, previous and existing developments, and RFDs. The analysis at the range-scale level was used to assess habitat loss to support information on the status of critical habitat (i.e., 65% undisturbed habitat or not more than 35% disturbed habitat) in the individual ranges (ECCC 2020). A qualitative assessment of the George River herd was also completed to provide relevant ecological context for predicted effects from the Project on caribou that seasonally and/or historically inhabited the area. In the case of amphibians, the wildlife RSA is much larger than typical home ranges or dispersal distances of amphibians. Therefore, for the purposes of examining cumulative effects of RFDs for amphibians, the vegetation RSA will be used.

Table 11-4: Spatial Boundaries for Assessment of Wildlife Valued Environmental Components

Study Area	Area (ha)	Description/Rationale
Project footprint	1,972	Includes the Project footprint without any additional buffer.
SSA	4,323	Includes the Project footprint plus an additional 100 m buffered areas to incorporate a level of uncertainty in the Project design so that potential effects are not underestimated. The SSA was defined using bounding points around the outermost components of the Project footprint.
LSA	8,071	— 500 m buffer around the SSA — Defined by the expected extent of the direct and small-scale potential indirect effects (i.e., ZOIs) from the Project on surrounding wildlife and wildlife habitat — Provides local context for assessing potential effects on wildlife VECs

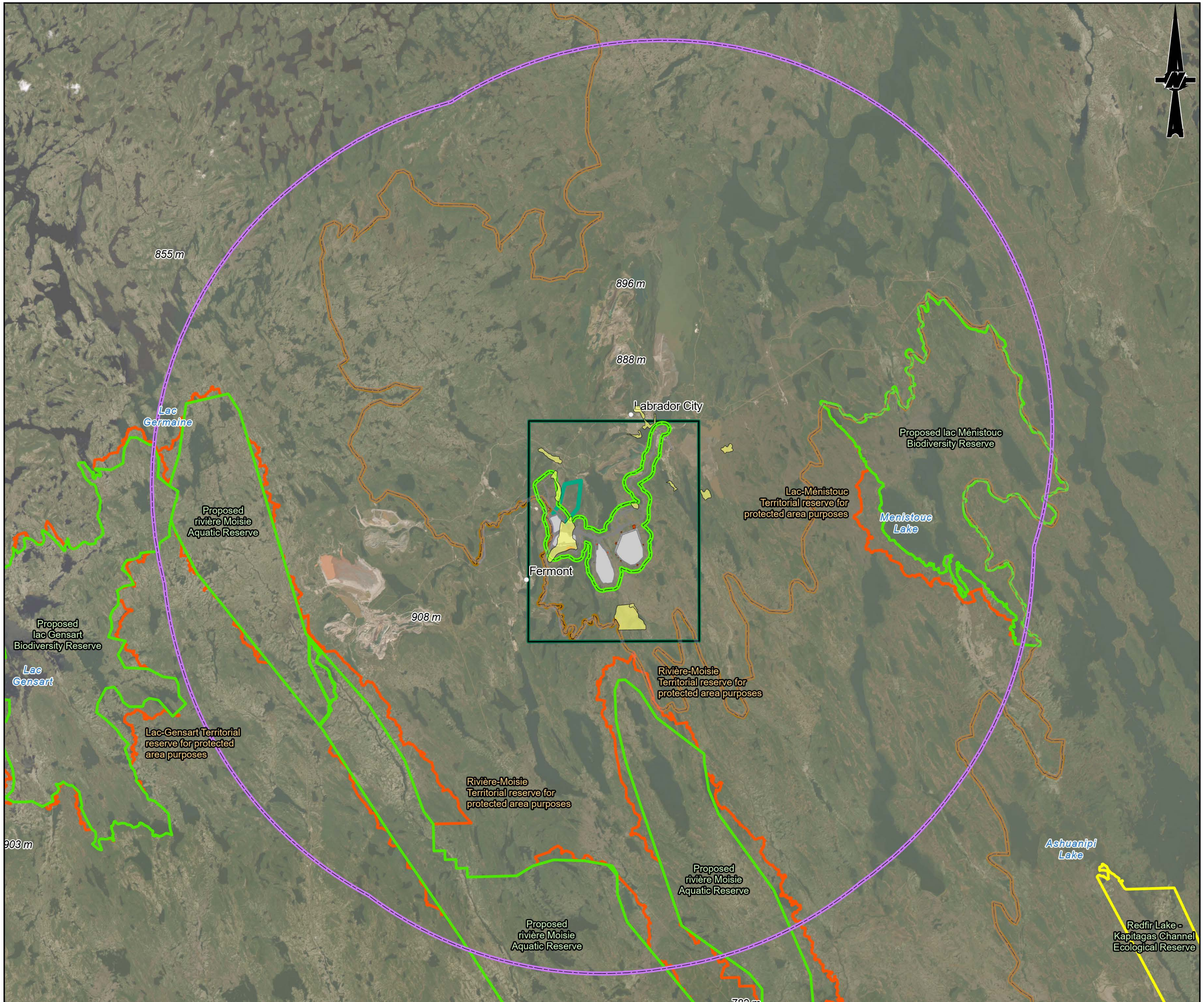
Study Area	Area (ha)	Description/Rationale
RSA	701,154	— 40 km buffer around the SSA — Includes Wabush Lake watershed and Churchill River crossing the middle of the RSA — Provides broader scale context to capture and assess potential Project effects and is linked to aquatic-related pathways — Relevant scale for considering large predator-prey dynamics that may be influenced by the Project, based on average home range size of large mammals in the region — Appropriate scale for a cumulative effects assessment on wildlife VECs and the scale at which significance was determined (except for caribou and amphibians)
Vegetation RSA	39,913.54	— Scale at which quantitative assessment of changes in habitat could be made due to availability of fine-scale vegetation cover data. Scale for cumulative effects assessment on amphibian VECs

SSA = site study area; LSA = local study area; ZOI = zone of influence; VEC = Valued Environmental Component; RSA = regional study area.

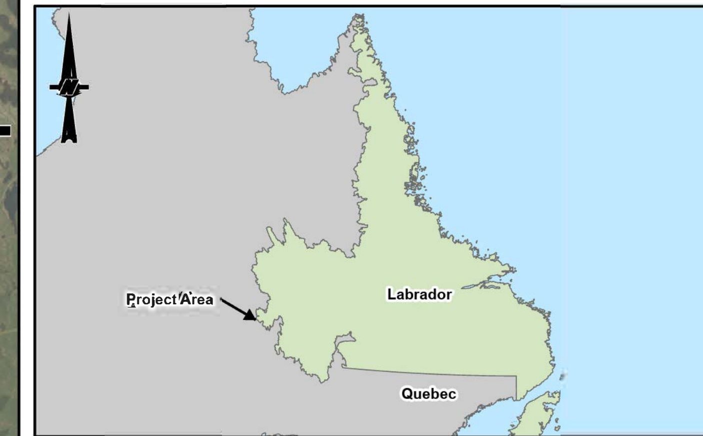
The temporal scope of the assessment focuses on the 40-year period from initial construction to the end of decommissioning and reclamation (i.e., closure) as defined by the following Project phases:

- **Construction phase (referred to as Construction)**—Includes site preparation, mine, process plant and site infrastructure development, and commissioning the structures, systems, and components. The duration of Construction is expected to be four years.
- **Operations and Maintenance phase (referred to as Operations)**—Includes the mining and milling of iron ore, production and shipment of iron ore concentrate, tailings management, management of mine rock, waste management, water management, release of treated effluent, site maintenance and transportation of staff and materials to and from the site. Operations initiate with one year of pre-development mining (i.e., ramp-up) and concludes when processing is complete. This phase is expected to be 26 years.
- **Decommissioning and Rehabilitation phase (referred to as Closure)**—Includes accelerated flooding of the Rose Pit, re-establishment of passive surface water drainage following the pit-flooding period, and recontouring and revegetating disturbed areas. Physical infrastructure that is not required during Post-closure monitoring and for other activities required to achieve the Project's decommissioning criteria and to return the Project site to a safe and stable condition will be removed. Closure is expected to be 10 years.

Some wildlife species are resident in the Project area year-round (e.g., many terrestrial mammals, upland gamebirds) and may change habitat use patterns among seasons (e.g., bats, black bears). Others are present seasonally as they migrate to the area to breed (e.g., many forest songbirds, migratory bats, raptors, and owls), or they may pass through with brief stopovers during spring and fall migration (e.g., harlequin ducks). Therefore, potential Project effects on wildlife may vary seasonally.



KEY MAP



SCALE 1:20,000,000

LEGEND

- LABRADOR/QUEBEC BOUNDARY
- PROPOSED PROJECT INFRASTRUCTURE
- PROPOSED SEDIMENT POND
- WILDLIFE LOCAL STUDY AREA (LSA)
- WILDLIFE REGIONAL STUDY AREA (RSA)
- VEGETATION REGIONAL STUDY AREA (RSA)
- DULEY LAKE PARK
- CONSERVATION AREA MANAGEMENT UNIT
- ECOLOGICAL RESERVE
- RESERVE FOR PROTECTIVE PURPOSES
- PROPOSED RESERVE

0 3.75 7.5 15

1:400,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
1. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TERRAIN REFERENCE: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
WILDLIFE ASSESSMENT BOUNDARIES

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-1

11.4 Existing Environment

The existing environment for wildlife formed the basis against which the residual Project and cumulative effects were assessed. The existing environment also represents the outcome of historical and current environmental and socioeconomic pressures that have shaped the observed condition of wildlife. Environmental and socioeconomic pressures or factors were either natural (e.g., weather, wildfire, predation, disease, climate change) or human related (e.g., industrial development, forestry, changing business models, fishing, hunting).

Generally, the existing environment is based on available Indigenous Knowledge (Section 11.4.1.1.1), a literature review of findings from the previously approved EIS (Alderon 2012), data from online databases (Section 11.4.1.1.2), as well as specific field surveys that supplemented the previous EIS (Section 11.4.1.2).

Taxonomic groups surveyed during targeted field surveys for the previous EIS included:

- **Waterfowl** (2011)—Focused on identifying and counting waterfowl species in specific habitats to detect SAR or Species of Conservation Concern (SoCC).
- **Forest songbirds** (2011, 2012)—Conducted to assess species diversity of songbird species in forested areas, and to detect SAR or SoCC.
- **General wildlife** (2023 to 2024, via passive camera survey)—Used camera traps to capture images of wildlife species that may occur within the survey area.
- **Bats** (2023, 2024)—Aimed at locating bat roosts, to determine usage by bats within the survey area, and bat species detected in the area using passive monitoring equipment.

Migratory birds (2023, including early-season migratory birds and migratory breeding songbirds)—Counting and identifying migratory bird species, during their early-spring season and the breeding season, to detect any SAR or SoCC.

It is assumed that the existing environment is similar to that described in the previously approved EIS (Alderon 2012). Notable differences, if they exist, will be highlighted for each respective VEC. For instance, in July 2024, there was a large forest fire (i.e., approximately 14,000 ha in size) near Labrador City. Additionally, the conservation status of several species has changed.

11.4.1 Methods

11.4.1.1 Information Sources

11.4.1.1.1 Indigenous Knowledge

Engagement activities for the Project included Indigenous groups and local stakeholders which included weekly field updates, open houses and public meetings, establishing working groups, and frequent communication and correspondence (Chapter 22, Engagement). During these events, issues and concerns related to wildlife raised by the Indigenous groups and local stakeholders were addressed and are summarized in Table 11-1.

11.4.1.1.2 Literature Review

The following resources were used during background reviews to assist in describing existing conditions for wildlife:

- information on wildlife for cultural, Traditional, or subsistence use from Indigenous communities, groups, and Traditional Land-Based Rightsholders
- ELC and Wildlife Species Habitat Analysis, Alderon Iron Ore Corp (Alderon 2012)
- Environment and Climate Change Canada (ECCC) Species at Risk database (Government of Canada 2025)
- *Endangered Species List Regulations* under the NL ESA (Government of NL 2024a)
- species descriptions from various wildlife societies
- Committee on the Status of Wildlife in Canada (COSEWIC) assessment and status reports for relevant VECs
- ECCC recovery strategies for relevant VECs
- Government of Newfoundland and Labrador status reports for relevant VECs
- Government of Newfoundland and Labrador Provincial 2025–2026 Hunting and Trapping Guide
- Avifauna Baseline Report (Annex 3D)

- Wildlife Baseline Report (Annex 3C)
- applicable reports and peer-reviewed journal articles from other publicly available sources

Caribou global positioning system radio collar data was requested from the Government of Newfoundland and Labrador and the Government of Québec, but not received in time to incorporate into the assessment of current habitat availability and use for the draft EIS

11.4.1.2 Project-Specific Field Studies

Early-Season Migratory Bird Surveys

In line with the Quebec Iron Ore Data Gap Analysis, which highlighted the need for migratory bird surveys, field surveys were conducted during the late-spring to early-summer period in 2023 to evaluate the occurrence of avifauna within the LSA. This temporal period generally coincides with winter break-up and the availability of open water to support both resident breeders and species destined for more northern regions. Focal species for this effort included waterfowl (ducks and geese), shorebirds, birds of prey, and other species associated with aquatic habitats (e.g., terns, kingfishers). Field staff travelled by vehicle, boat, and by foot to survey all accessible aquatic habitats within the LSA that were likely to support these species groups. Surveys were conducted across various wetland habitats, including large lakes with rocky shorelines, smaller ponds with emergent vegetation, shallow meandering streams, and sphagnum bogs with standing water. Species identification and breeding status were determined using a combination of visual, auditory, and behavioural cues.

Point Count Surveys for Migratory Breeding Songbirds

Early-morning point count surveys for breeding birds were conducted at 71 locations from June 11 to 18, 2023, by two experienced biologists. The surveys followed standard procedures used in Newfoundland and Labrador, identifying all bird species within a 400 m radius based on vocal and physical characteristics. Locations were chosen to cover accessible areas within the LSA, and additional data on weather, habitat, and other wildlife were collected. Surveys were not conducted during inclement weather. Incidental observations of birds and nesting sites were also recorded, providing a comprehensive description of the bird community for effective Project mitigation.

Passive Wildlife Camera Survey

Four trail cameras were deployed within the Project area on 20 September 2023, to evaluate occurrence of local species. The cameras were checked on 30 January 2024, but only cameras 1 and 4 could be accessed due to snow conditions. Batteries were subsequently changed, and data were retrieved from the Secure Digital memory cards. All cameras were retrieved on 6 November 2024, and they were still functioning at the time of retrieval.

Passive Acoustic Bat Monitoring Survey

To determine if bat activity varies across years and how proposed Project activity may affect bats, acoustic remote units (ARUs; Mini Bat 2 and SM4BAT FS, Wildlife Acoustics) were deployed in four locations within the LSA in 2023 and 2024. In 2023, ARUs were deployed between June 16 and September 8, 2023, at Duley Lake, Mills Lake, and Mid Lake (in proposed Rose Pit) and between August 1 and September 8, 2023, at Harris Lake. In 2024, ARU deployment was delayed until July 31, due to wildfires in the area. As requested by regulators, ARUs remained in place for the full extent of fall migration period and were retrieved on November 5, 2024. One ARU was placed in the Rose Pit mine, where activity was highest in 2023, and two others in similar habitats, including wetlands and treed areas, and one in Duley Lake Provincial Park. Recording parameters were set to limit environmental noise while maximizing bat species detection. Acoustic data were analyzed using Kaleidoscope Pro auto-ID and manually verified by a bat expert. Weather data conditions were monitored and obtained from the nearest available weather station, which was located at Wabush Airport, roughly 14 km from the Project site. Files were analyzed and identified to species or species groups, providing insights into habitat quality based on activity levels.

Bat Roost Habitat Survey

Roost searches were conducted in the Rose Pit mine area to determine if roost availability explained the high bat activity recorded there in 2023 during the passive acoustic bat monitoring surveys. Additional searches were conducted in similar habitats adjacent to the Project area in Duley Lake Provincial Park. Due to difficult terrain, personnel used vantage points and binoculars to scan for potential roosts, providing a qualitative assessment of roost habitat. Locations of potential roosts were recorded using handheld Global Positioning System. Suitable roosts for most species consist of large-diameter trees that are dead or dying and possess cracks, crevices, exfoliating bark, or woodpecker cavities. Hoary and eastern red bats roost in deciduous tree foliage, hanging from branches.

11.4.1.3 Ecological Land Classification Habitat Analysis

An ELC was completed as part of Chapter 10, Vegetation, Wetlands, and Protected Areas, which was used to examine potential effects on habitat availability for wildlife VECs. ELC types and scale were similar to those used in the previous EIS (Table 11-5). There are slight deviations between the current and previous ELC, likely due to differences in definitions of habitat types and the current ELC using more accurate models. For instance, Alder Thicket is a separate ELC type in the current EIS because it is distinctive and associated exclusively with areas of previous disturbance, whereas it was included in the hardwood ELC type in the previous EIS. Similarly, Jack Pine is a separate ELC type in the current EIS because it is also distinctive and appears to have been planted in areas of previous disturbance along roadsides, whereas it was included as part of the Black Spruce/Tamarack-Sphagnum Woodland in the previous EIS. The total wetland coverage was likely higher in the previous EIS because open, vegetated areas were likely misinterpreted as wetlands.

The suitability of each of these ELC types was then classified as either high, moderate, low, or poor for each VEC (Annex 3B). **High-quality** habitat is defined as habitat that meets all life history needs (breeding, foraging, and overwintering for year-round residents). **Moderate-quality** habitat is defined as habitat that meets at least one life history need. **Low-quality** habitat is defined as habitat that where a species may use infrequently, such as passing through or as a stopover. **Poor-quality** habitat is defined as all remaining habitat not otherwise classified as high, moderate, or low quality. High-quality habitat defined here is roughly equivalent to primary habitat defined in the previous EIS, moderate-quality habitat is equivalent to secondary habitat, and low- and poor-quality habitat are roughly equivalent to tertiary habitat (Alderon 2012, Appendix Y).

Table 11-5: Ecological Land Classification Comparison Between Previous and Current Areas

Ecological Land Classification Category	Previous ELC Area (ha)	Current ELC Area (ha)	Change in Area (ha)
Alder thicket	0	4,450	450
Alpine heath	100	790	690
Black spruce-Labrador tea-feathermoss	9,150	12,230	3,080
Black spruce-lichen	1,970	2,090	120
Black spruce/tamarack-sphagnum woodland	4,960	1,810	-3,150
Burn/regeneration	7,690	5,830	-1,860
Hardwood forest	540	560	20
Jack pine	0	580	580
Mixedwood forest	1,750	1,830	80
Non-patterned shrub fen (includes graminoid fen)	930	560	-370
Patterned shrub fen	310	1,430	1,120
Riparian marsh (fen)	60	300	240
Riparian thicket	30	380	350
Tamarack/black spruce-feathermoss (water track)	3,010	340	-2,670
Open water	5,450	6,600	1,150
Shallow water with vegetation	500	0	-500
Developed land	2,240	2,830	590
Non-ELC	950	0	-950
Total area	39,640	39,910	n/a

Note:
The ELC type Burn/Regeneration consists of three classes of various burn/regeneration ELC types (hardwood, softwood, mixedwood), which have been combined for this table since the characteristics between the three burn/regen classes are subtle.
ELC = Ecological Landscape Classification; n/a = not applicable.

11.4.2 Species at Risk Birds and Migratory Birds

Information Review

Engagement with Indigenous groups and the public revealed concerns about potential effects on avifauna and their habitats. Species such as mourning dove, American robin, eastern bluebird, gray-cheeked thrush, bald eagle, great horned owl, common loon, boreal owl, northern hawk owl, phalaropes, snowy owl, wood duck, and harlequin duck have been observed in the area and were identified as species of concern by residents of Labrador City/Wabush. The Naskapi First Nation identified ptarmigan and geese as additional species of concern as they are hunted throughout the province. Many of these species are protected under the Migratory Birds Convention Action (MBCA) except for hawks, owls, and eagles.

A review of previous surveys and online databases revealed a total of 137 avifauna species with potential to occur within the SSA, LSA, and/or RSA (Appendix 11A). Of these, 10 are listed as either Endangered, Threatened, or Vulnerable/Special Concern under SARA and/or NL ESA.

Previous Environmental Impact Statement Surveys

Waterfowl Surveys

Nine aerial surveys for waterfowl were conducted from late May through mid-September 2011 to assess the distribution and abundance of migratory avifauna during three periods of activity: spring staging and breeding pairs (May 20, May 31, June 8), brood rearing (July 12 and 27), and fall staging (August 17, August 24 to 25, September 8, September 14 to 15). Field maps prepared from geographic information system data and National Topographic Series maps were used to search all areas of open water and potential habitat within the 400 km^2 study area. The survey team, comprising three observers and a helicopter pilot, reviewed safety procedures before each survey. Observations were keyed to American Ornithological Union abbreviations for consistency. Although not taxonomically considered waterfowl, common loons were included due to their similar ecology and use of wetland habitats. Fifteen species of waterfowl were recorded, with the most abundant being common merganser, common goldeneye, Canada goose, American black duck, ring-necked duck, and common loon. Most waterfowl in the study area are migrants, although American black duck are known to occupy areas of open water outside of the breeding season in Wabush.

Forest Songbird Surveys

The forest songbird surveys conducted from June 27 to July 1, 2011, and from July 2 to 8, 2012, assessed the relative abundance of bird species in areas identified for current and future exploration, including the proposed Kami railway, tailings management facility (TMF), Rose Pit, and other locations. In 2011, 50-point count surveys were completed over five mornings and confirmed the occurrence of white-throated sparrow, ruby-crowned kinglet, American robin, dark-eyed junco, and yellow-rumped warbler. The 2012 surveys, conducted in the proposed rail infrastructure corridor east of Wabush and two proposed protected areas, recorded similar species, with the addition of the fox sparrow. Both years' surveys noted the presence of the olive-sided flycatcher, a listed species. The surveys involved a lead ornithologist and a field technician using Global Positioning System, maps, and compasses for navigation, accessing sites by helicopter, by truck, and on foot, and recording all avifauna and other wildlife observed.

Current Environmental Impact Statement Surveys

Early-Season Migratory Bird/Waterfowl Surveys

Follow-up surveys for waterfowl were completed during the 2023 season; spring break-up occurred earlier than usual in the Labrador West region, resulting in mostly ice-free waterbodies during the survey period from June 7 to 11. All suitable habitats were surveyed. Seven species of waterfowl were recorded initiating breeding, including Canada goose, red-breasted merganser, common merganser, common goldeneye, American black duck, and green-winged teal. Other wetland-associated species detected included common loon, Wilson's snipe, and common tern. These species are consistent with those detected as part of the baseline surveys for the previous EIS and are typical for boreal regions at this latitude. The presence of paired individuals indicates local breeding. Breeding status was further corroborated by long-term observations submitted to eBird.

Point Count Surveys for Migratory Breeding Songbirds

Follow-up surveys for forest songbirds were completed in the 2023 surveys. All available terrestrial habitats within the LSA were sampled during a single round of point counts between June 11 and 18, 2023, focusing on mature black spruce forest and post-fire regenerating forest. The six most common species detected were ruby-crowned kinglet, white-throated sparrow, yellow-rumped warbler, hermit thrush, American robin, and Tennessee warbler. These species were expected given their known distribution in western Labrador and prevalence in eBird records. These observations are consistent with those detected as part of the baseline surveys for the previous EIS. Some species likely inhabit the SSA but were not detected due to low density, secretive behaviour, and limited survey time. The bird community in the SSA reflects the broader composition described for western Labrador.

Valued Environmental Component Selection

The previously approved EIS examined potential effects of Project activities on numerous avian species, including greater yellowlegs, northern harrier, osprey, gray jay, boreal chickadee, short-eared owl, common loon, common goldeneye, Barrow's goldeneye, olive-sided flycatcher, common nighthawk, rusty blackbird, gray-cheeked thrush, Lincoln's sparrow, Tennessee warbler, spruce grouse, and Canada goose (Alderon 2012). The previous EIS concluded that, following appropriate mitigation, the avian community was unlikely to experience large adverse effects from change in habitat, distribution, and movements, or change in mortality risk and health (Alderon 2012). However, EIS Guidelines from Newfoundland and Labrador Department of Natural Resources explicitly requested the current EIS consider migratory birds protected by the MBCA (landbirds and waterfowl) and species under provincial jurisdiction, including raptors and upland gamebirds. The Guidelines specifically mentioned the following avian species:

- bank swallow (Riparia riparia)
- common nighthawk (*Chordeiles minor)*
- harlequin duck (Histrionicus histrionicus pop. 1)
- "partridge" (this typically refers to grouse and ptarmigan species)
- peregrine falcon (Falco peregrinus anatum)

short-eared owl (*Asio flammeus)*

Each of the five species listed above are representative of the key guilds specified by Newfoundland and Labrador Department of Natural Resources. These species have been selected as VECs for their respective guilds and no other species were considered because they were assessed in the previous EIS. In the case of "partridge," this was identified as important to Indigenous groups. However, the only partridge species in Canada is the gray partridge (*Perdix perdix*), which is introduced and typically found only in the prairies (Birds Canada 2024). It is, therefore, assumed "partridge" refers generally to upland gamebirds, including grouse and ptarmigan. There are two grouse species in Labrador, ruffed grouse (*Bonasa umbellus*) and spruce grouse (*Falcipennis canadensis*). Both species have similar habitat needs and life histories. However, spruce grouse have slightly more restrictive habitat needs, as they are typically found only in coniferous forests, whereas ruffed grouse use a variety of forest types and riparian areas. Because they have more restrictive needs, spruce grouse are at a higher risk of being affected by Project activities compared to ruffed grouse (Government of NL 2025e). For these reasons, spruce grouse was selected as a VEC.

Details regarding their federal and provincial conservation status, including changes in their status since the previous EIS, are provided in Table 11-6. A summary of their habitat preferences and detection in the SSA as part of the previous and current EIS are also provided in Table 11-6. A more detailed description is provided below for each species, including general biology, habitat availability, and distribution in the LSA and ELC (vegetation RSA), as well as threats to survival and reproduction.

Table 11-6: Avian Species Valued Environmental Components

Species Name	Federal Listing Under SARA Previous EIS (2012) Current EIS (2025)	Provincial Listing Under NL ESA Previous EIS (2012) Current EIS (2025)	Habitat Preferences	Representative Species for Other Birds in Study Areas	Rationale	Detected in Previous EIS (Alderon 2012)	Detected in Current EIS (Annex 3D)
Bank swallow (*Riparia riparia*)	Not listed (2012) Threatened (2017)	Not listed (2012) Threatened (2025)	Nest in colonies along banks or cliffs near water bodies, such as riverbanks, lakeshores, and coastal areas. Will utilize sandpits, quarries, and buildings. Bank swallows forage in open areas, including fields and wetlands (COSEWIC 2013a).	Passerine	Identified in EIS Guidelines	No	No
Common nighthawk (*Chordeiles minor*)	Threatened (2012) Special Concern (2025)	Threatened (2012) Vulnerable (2025)	Breed in a variety of open habitats, including open forests with cuts or burns, prairies with short grass, dry bogs, rocky areas, and urban areas with gravel (COSEWIC 2018).	Nocturnal birds	Identified in EIS Guidelines	No	Yes
Harlequin duck (*Histrionicus histrionicus pop. 1*)	Special Concern (2012) Special Concern (2025)	Vulnerable (2012) Vulnerable (2025)	Breed in fast-flowing waters, typically in remote areas. They utilize coastal marine areas during the non-breeding season (COSEWIC 2013b).	Waterfowl	Identified in EIS Guidelines	No	No
Peregrine falcon (*Falco peregrinus anatum*)	Special Concern (2012) Not at Risk (2025)	Vulnerable (2012) Vulnerable (2025)	Peregrine falcons in Canada prefer to nest on high, steep cliffs or ledges, often near water bodies. In urban environments, they utilize human-made structures. Foraging typically occurs in open areas (COSEWIC 2017b).	Raptor	Identified in EIS Guidelines	No	No

Species Name	Federal Listing Under SARA Previous EIS (2012) Current EIS (2025)	Provincial Listing Under NL ESA Previous EIS (2012) Current EIS (2025)	Habitat Preferences	Representative Species for Other Birds in Study Areas	Rationale	Detected in Previous EIS (Alderon 2012)	Detected in Current EIS (Annex 3D)
Short-eared owl (*Asio flammeus)*	Special Concern (2012) Special Concern (2025)	Vulnerable (2012) Threatened (2025)	Short-eared owls prefer open habitats such as grasslands, tundra, and wetlands. They are ground nesters that typically breed in open landscapes (COSEWIC 2021).	Diurnal owls	Identified in EIS Guidelines	No	No
Spruce grouse (*Falcipennis canadensis)*	-	-	Prefer coniferous and mixedwood forests, forest edges and openings, additionally older burnt lands and blueberry barrens (Government of NL 2025c).	Upland gamebird	"Upland gamebird" and "partridge" identified in EIS Guidelines	Yes	Yes

SARA = *Species at Risk Act*; EIS = Environmental Impact Statement; NL ESA = Newfoundland and Labrador ESA; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; GovNL = Government of Newfoundland and Labrador.

11.4.2.1 Bank Swallow

11.4.2.1.1 Habitat Availability

Bank swallows are migratory, arriving in Canada in mid-April to late May to breed and departing in late August. Bank swallows are part of a guild of species known as aerial insectivores and require relatively open land and aquatic habitat where they can hunt insects during flight. Suitable foraging habitats may include natural grasslands, pastures, hayfields, and croplands, as well as rivers, creeks, lakes, wetlands, sewage lagoons, and coastal waters. They typically nest in colonies along rivers, lakes, and coastal areas where they nest in vertical banks made of silt or sand suitable for excavating nest burrows (Special Status Advisory Committee 2009). However, bank swallows are adaptable birds that nest in a variety of natural and anthropogenic habitats. For instance, they have been observed nesting in human-made environments, such as sand and gravel pits, road cuts, and stockpiles of soil (COSEWIC 2013a). Potentially suitable ELC types for bank swallows within the SSA include developed land and wetlands. Although bank swallows are known to breed in Labrador, none were observed in the wildlife LSA during baseline surveys conducted for the previous EIS or the current EIS. There were, however, incidental and historical reports of bank swallows in the area (eBird; Annex 3D).

Under existing conditions, highly suitable habitat within proximity of foraging habitat was not identified for bank swallows within the LSA and RSA (Table 11-7). Moderately suitable habitat is found in 41.98% of the wildlife LSA (3,235.71 ha) and 37.46% of the vegetation RSA (14,952.15 ha). Low suitability covers 12.58% of the wildlife LSA (969.64 ha) and 10.74% of the vegetation RSA (4,284.82 ha). The majority of habitat is classified as poor suitability, accounting for 45.44% of the wildlife LSA (3,502.00 ha) and 51.08% of the vegetation RSA (20,676.57 ha).

Table 11-7: Bank Swallow Habitat Availability in Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[(a)]	Wildlife LSA		Vegetation RSA[(b)]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	0	0	0	0
Moderate	3,235.71	41.98	14,952.15	37.46
Low	969.64	12.58	4,284.82	10.74
Poor	3,502.00	45.44	20,676.57	51.80
Total	7,707.35	100.00	39,913.54	100.00

(a) Bank swallow habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC used to assess habitat is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area.

11.4.2.1.2 Habitat Distribution

Bank swallows have an extensive distribution across Canada during the breeding season, breeding in all provinces and territories except Nunavut (COSEWIC 2013a). In Labrador, bank swallows breed in locations including Churchill Falls, Goose Bay, and the Northwest River (COSEWIC 2013a). Bank swallows are known to breed in Labrador and throughout the Labrador City Region (eBird), though they were not detected during the 2014 (AMEC Environment and Infrastructure 2014) or 2023 (Annex 3D]) avifauna field programs.

Bank swallows typically forage within proximity of nesting colonies (300 to 600 m radius, depending on breeding stage). Therefore, bank swallow distribution is dictated by availability of suitable nesting habitat near suitable foraging habitat. The wildlife LSA is dominated by boreal coniferous species (e.g., spruce and jack pine) and mixedwood forests, which were classified as poor habitats for bank swallows (Appendix 11B). Wetlands also dominate the landscape, which were classified as moderate habitat for bank swallows as these would provide suitable foraging habitat but would not likely provide suitable nesting habitat.

Moderate-suitability habitats are distributed throughout the wildlife LSA under the existing environment conditions (Figure 11-2) but are largely concentrated in the central and east sections. Low- and poor-suitability bank swallow habitat is associated with forested and closed habitats, which predominate the wildlife LSA. The wildlife LSA provides only 22% of the moderately suitable habitat available across the larger vegetation RSA, suggesting the LSA does not uniquely provide good habitat for bank swallows. Little Wabush Lake, which partially occurs within the northeastern region of the vegetation RSA, has been identified as critical bank swallow habitat (ECCC 2022a). Highway 500 (Labrador) and Highway 389 (Québec) bisect the wildlife RSA southwest to northeast, and a railroad bisects the wildlife RSA west to east (Figure 11-1), but these are unlikely to affect movement and connectivity of bank swallows (COSEWIC 2013a).

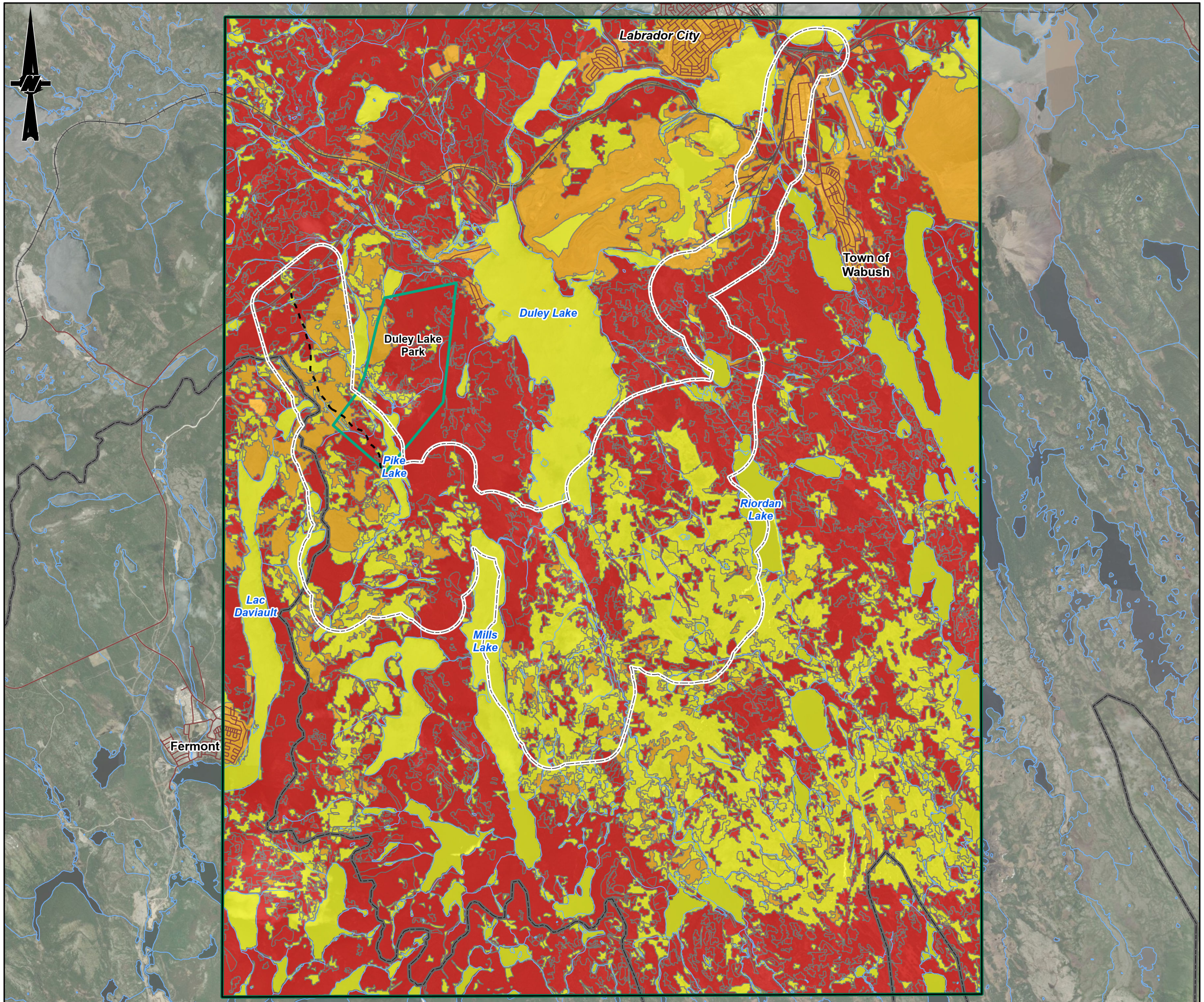
Bank swallows have not been associated with any management units within the RSA; however, they may use the wetlands within these areas as foraging grounds (e.g., Elephant Head Management Unit). Overall, suitable bank swallow habitat is limited in the wildlife LSA and throughout the vegetation RSA.

11.4.2.1.3 Survival and Reproduction

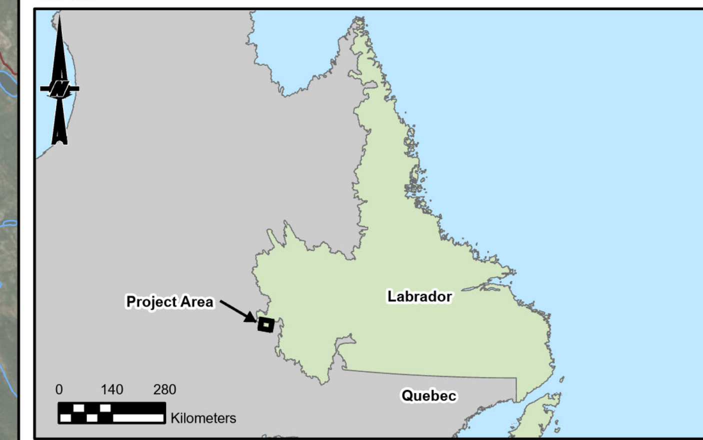
The bank swallow has experienced severe population declines throughout North America and was designated as Threatened by COSEWIC in 2013 (COSEWIC 2013a), and subsequently federally listed as Threatened under SARA in 2017. It was listed as Threatened in the Province of Newfoundland and Labrador in 2020. The bank swallow conservation status has changed since the previous EIS as it was not listed federally or provincially at that time. In Canada, the bank swallow, its nest, eggs, and habitat are protected under the MBCA.

The survival of bank swallows is closely tied to habitat and food availability. Human activities, including aggregate extraction and erosion control projects, can have effects on bank swallow natural habitats. However, anthropogenic habitats, including sand and gravel pits, can provide alternative nesting sites (Burke et al. 2019). Climate change and the decline in aerial insect populations pose additional threats to bank swallow survival. Bank swallows are colonial nesters, forming large colonies in suitable habitats. They typically lay four to five eggs per clutch, with the breeding season starting in late May to early June (COSEWIC 2013a). Reproductive success can vary between natural and artificial habitats. For example, bank swallows nesting in aggregate pits can initiate nesting earlier and produce more fledglings per successful nest compared to those in natural lakeshore habitats (Burke et al. 2019).

The bank swallow faces several major threats that contribute to its declining population. Habitat loss due to erosion control projects, flood control measures, and aggregate extraction activities reduces available nesting sites (ECCC 2021; COSEWIC 2013a). Agricultural practices, such as the conversion of pastureland to cropland, diminish suitable foraging areas, affecting the availability of food resources (ECCC 2021). Additionally, increased predation and parasitism lead to higher mortality rates among both adult and juvenile bank swallows (ECCC 2021). Collisions with vehicles also poses a threat, especially in areas where bank swallows forage near roads (ECCC 2021).



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Bank Swallow Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
1. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

BANK SWALLOW HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.2.2 Common Nighthawk

11.4.2.2.1 Habitat Availability

Common nighthawks are migratory and arrive in Canada between early May and early June and depart between mid-August and mid-September. The common nighthawk nests on bare ground, typically in dry, well-drained sites with camouflage (e.g., woody debris) and nearby shade (COSEWIC 2018). Nesting habitat, therefore, includes open forests with cuts, burns, or rock outcrops, prairies with short grass or bare patches, rocky areas like quarries and gravel pits, sandy coastal habitats, and settled areas such as railways, gravel roads, airports, and urban areas with gravel roofs (Farrell et al. 2017; COSEWIC 2018). In boreal regions, including Labrador, outcrops and post-burn habitats can provide important nesting areas (Farrell et al. 2017). Foraging areas include open areas with flying insects, which may include marshes, fens, agricultural fields, and post-burn habitats. Additionally, common nighthawks can be found feeding in flocks around sources of artificial lighting that attracts insects (Campbell et al. 2006; COSEWIC 2007b).

The common nighthawk's breeding and nesting habitat includes those found within the SSA, including softwood/hardwood burn and regeneration habitat types, and bare ground/anthropogenic areas identified in the previous EIS (Alderon 2012) and Annex 3D (2023). Potential suitable foraging areas within the SSA include burn/regeneration areas, riparian thickets, riparian marshes, and open water. Two individuals have been reported in Labrador West Region (2023, eBird). They were not detected during the 2023 Avian Baseline Surveys (Annex 3D). However, an active nest was identified in the SSA during a follow-up survey as part of the previous EIS (AMEC Environment and Infrastructure 2014).

Under existing conditions, the common nighthawk habitat availability in the wildlife LSA and vegetation RSA shows limited high-suitability habitat, with 1.76% of the wildlife LSA (135.99 ha) and 1.97% of the vegetation RSA (787.27 ha) (Table 11-8). Moderate suitability is the most prevalent, covering 57.62% of the wildlife LSA (4,440.81 ha) and 53.44% of the vegetation RSA (21,329.52 ha). Low-suitability habitats account for 31.05% of the wildlife LSA (2,393.19 ha) and 36.03% of the vegetation RSA (14,381.11 ha). Poor suitability is found in 9.57% of the wildlife LSA (737.36 ha) and 8.56% of the vegetation RSA (3,415.63 ha).

Table 11-8: Common Nighthawk Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[(a)]	Wildlife LSA		Vegetation RSA[(b)]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	135.99	1.76	787.27	1.97
Moderate	4,440.81	57.62	21,329.52	53.44
Low	2,393.19	31.05	14,381.11	36.03
Poor	737.36	9.57	3,415.63	8.56
Total	7,707.35	100.00	39,913.54	100.00

(a) Common nighthawk habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.2.2.2 Habitat Distribution

The common nighthawk is a long-distance migrant, breeding in North America and wintering in South America. During breeding in Canada, the common nighthawk range includes all provinces and territories, except for Nunavut. In Newfoundland and Labrador, the common nighthawk breeds in the southern part of Labrador (Government of NL 2025i. Though known to breed throughout Labrador City region, population densities are considered low. Within common nighthawk breeding range, movement and foraging are restricted to open spaces. Therefore, common nighthawk local distribution is limited by availability of suitable exposed ground for nesting and open habitat for feeding.

Typical common nighthawk foraging home range size is 86 ha, while nests may be clustered (25 to 75 m apart) in patches of suitable habitat (NS Department of Lands and Forestry 2021). The wildlife LSA is dominated by boreal coniferous species (e.g., spruce and jack pine) and mixedwood forests, which are generally classified as poor habitat for common nighthawks as tree canopies are too dense to provide suitable nesting and foraging habitat. Wetlands also dominate the landscape, which were classified as moderately suitable habitats for common nighthawk as they provide suitable foraging habitat but would not support nesting opportunities (Appendix 11B). High-suitability habitat, consisting of alpine heath, is limited to small, isolated patches throughout the LSA and RSA. Moderately suitable habitat, consisting of wetlands, developed lands, and post-burn forest, is relatively evenly distributed across the LSA and RSA, and the same is true of low-quality habitat (Figure 11-3). Poor-quality habitat occurs in small patches scattered across the central section of the LSA and RSA, as well as the northern section of the RSA, with a few patches in the southern section as well. The wildlife LSA provides only 21% of the highly and moderately suitable habitat available across the larger vegetation RSA, suggesting the LSA does not uniquely provide good habitat for common nighthawks.

Highway 500 (Labrador) and 389 (Québec) bisect the wildlife RSA southwest to northeast, and a railroad bisects the wildlife RSA west to east (Figure 11-1). While roads and railways may restrict some wildlife, common nighthawks may nest in gravel surfaces associated with these linear features (COSEWIC 2018). Overall, suitable common nighthawk habitat is widely distributed but mixed with low- and poor-suitability areas.

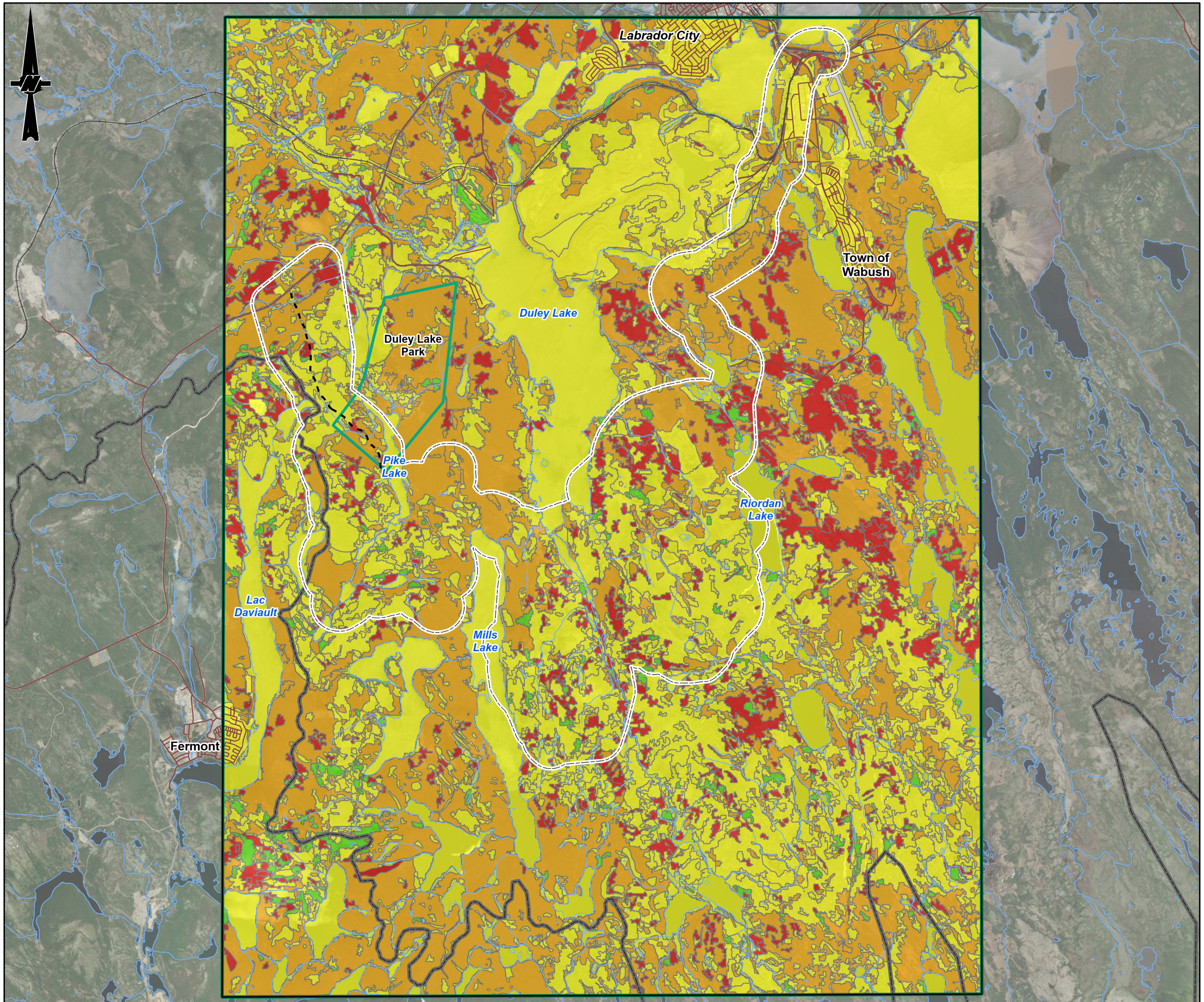
Though none of the Management Areas within the RSA are associated with common nighthawk habitat, the open water accompanying many of these areas are likely to be used as foraging grounds for common nighthawk. This includes Flora Lake East and West, Pike Lake North and South, and the Wahnahnish River Management Units.

11.4.2.2.3 Survival and Reproduction

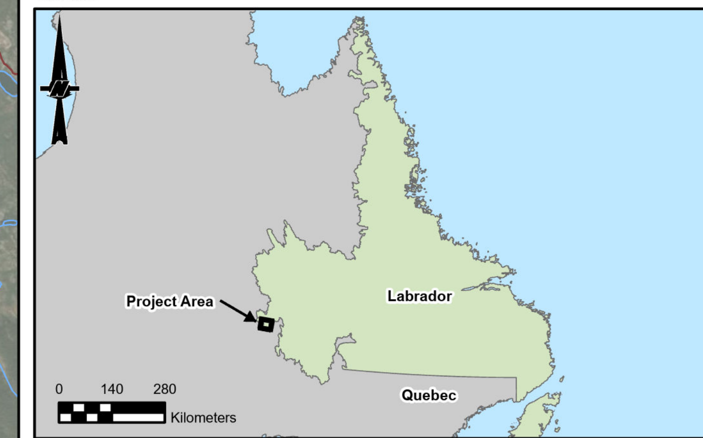
The common nighthawk is currently federally listed as Threatened in Canada, which has not changed since it was first listed in 2010. This designation reflects notable population declines, but the species remains relatively abundant in suitable boreal habitats (COSEWIC 2018). In Labrador, the common nighthawk is provincially classified as Threatened. In Canada, the common nighthawk, its nest, eggs, and habitat are protected under the MBCA.

The common nighthawk's survival and reproduction are closely linked to the availability of flying insects, which they forage on during flight. Like other insectivores, this species has experienced a sizable long-term decline (1968 to 2005) throughout its breeding range (COSEWIC 2007b). In Canada, this population has been on the decline due to increased use of pesticides in agriculture causing a decrease in insect availability (COSEWIC 2018). The species is monogamous, typically lays two eggs, and raises only one brood per season due to its long-distance migration (COSEWIC 2018). Nesting success varies, with predation being a notable cause of nesting failure (Kantrud and Higgins 1992), highlighting the need for camouflage.

The common nighthawk is experiencing a decline in population due to several threats. Habitat loss is a major concern, driven by urban development, agricultural expansion, and forestry pesticides, which reduces available nesting sites (COSEWIC 2018; ECCC 2016). However, some developments can provide benefits to the species. For instance, clear-cut areas in forests can create open spaces that are suitable for nesting. These areas mimic the natural open habitats that common nighthawk prefer, such a gravel beaches, burned-over areas, and prairies. Similarly, they can also nest on flat gravel rooftops, which resemble natural nesting sites. The use of pesticides in agriculture, particularly those targeting spruce budworm, largely diminish the availability of aerial insects, which are a primary food source for common nighthawk (COSEWIC 2018). Fire suppression in forested habitats reduces the availability of open areas and bare ground necessary for foraging and nesting. Additionally, predation by domestic and wild animals, such as raccoons, opossums, cats, also pose a threat to both adult and juvenile common nighthawks in parts of its North American range.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Common Nighthawk Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
1. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

COMMON NIGHTHAWK HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-3

11.4.2.3 Harlequin Duck

11.4.2.3.1 Habitat Availability

The harlequin duck primarily uses shallow, fast-flowing rivers and streams during the breeding season where they feed on aquatic invertebrates and nest on shores. During the winter they move to rocky coastlines in eastern Labrador and Greenland. Key moulting and staging areas are often protected within parks or reserves (COSEWIC 2013b). In Labrador, they prefer narrower, warmer, and less acidic rivers during the summer. Harlequin ducks were not observed during any of the baseline surveys conducted as part of the previous EIS or the current EIS. There is a reported record of a harlequin duck from 2006 in the area (eBird, Annex 3D).

Under existing conditions, the harlequin duck habitat availability in the wildlife LSA and vegetation RSA shows no areas of high or moderate suitability (Table 11-9). The only potentially suitable breeding habitat might be found on Walsh River. Low-suitability habitats cover 9.92% of the wildlife LSA (764.43 ha) and 16.52% of the vegetation RSA (6,595.22 ha). Most of the habitat is classified as poor suitability, accounting for 90.08% of the wildlife LSA (6942.92 ha) and 83.48% of the vegetation RSA (33,318.32 ha).

Table 11-9: Harlequin Duck Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	0	0	0	0
Moderate	0	0	0	0
Low	764.43	9.92	6,595.22	16.52
Poor	6,942.92	90.08	33,318.32	83.48
Total	7,707.35	100.00	39,913.54	100.00

(a) Harlequin duck habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.2.3.2 Habitat Distribution

The eastern population of harlequin duck breeds in Newfoundland, Labrador, New Brunswick, Québec, and Nunavut. Within this population, harlequin ducks segregate into two populations on their wintering grounds: the Eastern North American Wintering Population and the Greenland Wintering Population (COSEWIC 2013b). In Labrador, the breeding distribution range consists of most of the mainland region of Labrador. Only two individuals have been reported around the Labrador City region (1999 and 2005; eBird) which suggests that they do not breed in this portion of Labrador or regularly utilize this region as staging or over-wintering habitat. Harlequin ducks were not detected in the SSA during breeding bird surveys in 2011/2012 surveys (Alderon 2012), 2014 (AMEC Environment and Infrastructure 2014), or 2023 (Annex 3D). Walsh River, located northwest of Duley Lake Provincial Park, may provide suitable breeding habitat. They may utilize the open water ELC type within the SSA as a staging area and overwintering habitat, but generally their preferred habitat is coastal.

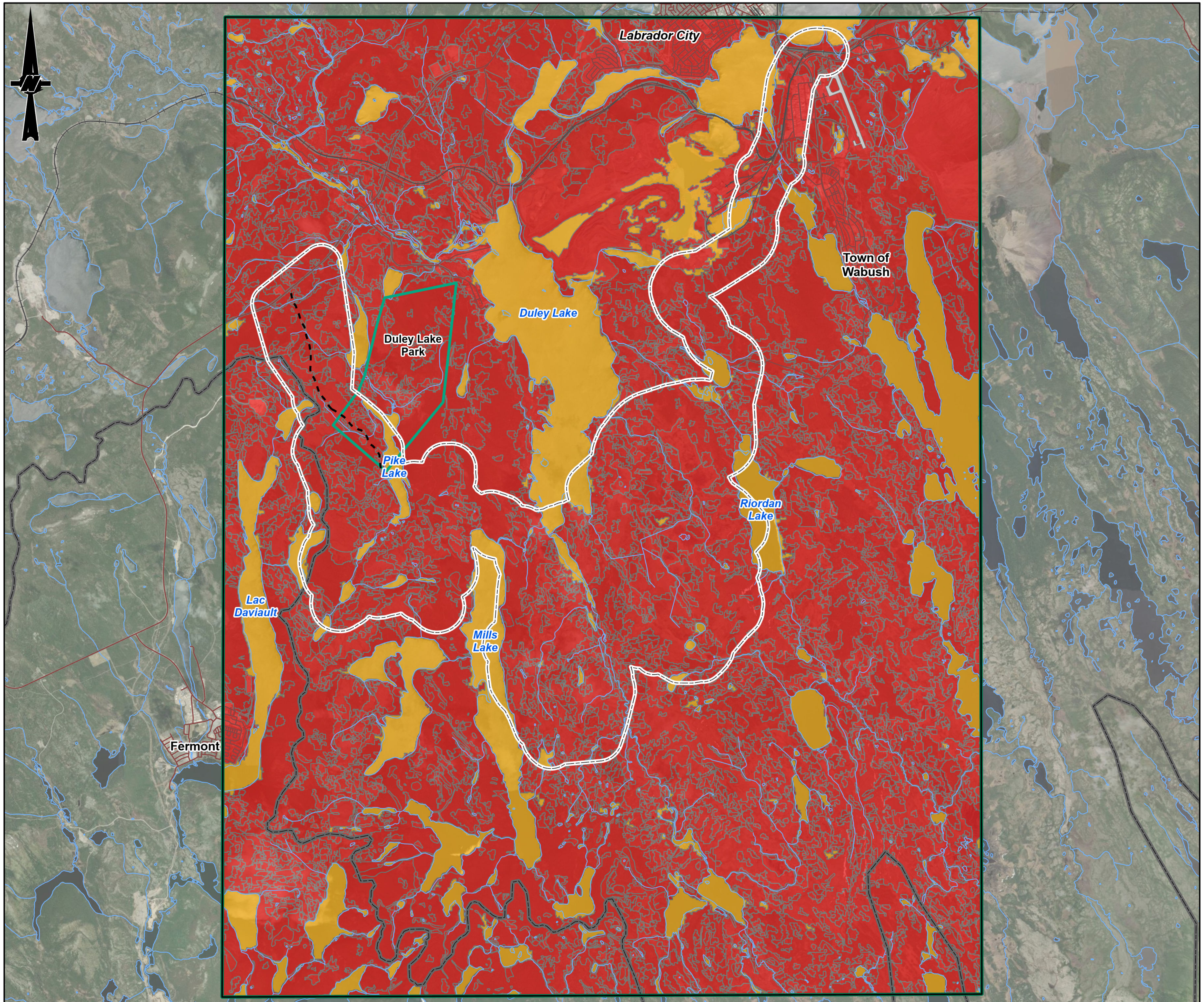
Breeding densities of harlequin ducks along streams and rivers in Québec were estimated from 0.06 to 0.32 pairs/km. (Brodeur et al. 2008a). The wildlife LSA does not likely contain any suitable habitat for harlequin ducks, and the only potentially suitable breeding habitat in the RSA may be on Walsh River, flowing from Duley Lake (Figure 11-4). Harlequin ducks have been observed (e.g., eBird) within the Jean Lake Rapids and Elephants Head Management Unit, which is located within the RSA. However, the suitability of other streams in the RSA could not be assessed as data regarding depth and flow are unavailable. Similarly, the vegetation RSA does not contain any high or moderate habitat for the harlequin duck, with 83.48% of the RSA and 90.08% of the LSA being of poor quality (Figure 11-4).

11.4.2.3.3 Survival and Reproduction

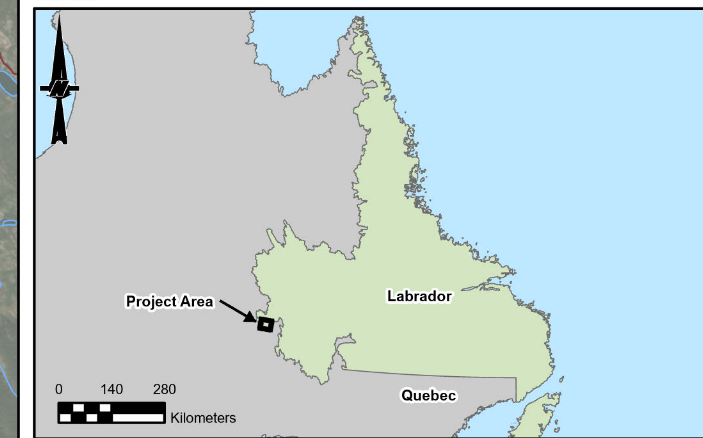
The eastern population of harlequin duck has been federally listed as Special Concern under SARA since it was added to the list in 2003. Though initially designated as endangered by COSEWIC, it was downlisted to special concern in 2001 due to increased research, monitoring, and inventory (Thomas and Robert 2001). It is provincially listed as Vulnerable in the Province of Newfoundland and Labrador in 2004, though the population of this sea duck has experienced an increase in its distribution and abundance.

Harlequin ducks have delayed sexual maturity and low annual production. Females may breed at one year old but are more successful at five years. Males mate at three years or older. They raise one brood per season, with clutch sizes varying by region. Reproductive success varies annually, with some years seeing widespread failure due to unsuccessful nesting. Females lead their broods to moulting/wintering grounds, where the family group separates. Pair bonding occurs on wintering grounds, with courtship starting in October. Pairs reunite during winter and return to specific breeding sites (COSEWIC 2013b).

The harlequin duck faces numerous challenges to its survival. Habitat loss and degradation are concerns, driven by hydroelectric development, forestry activities, and coastal development, which reduce available nesting and foraging sites (ECCC 2007). Pollution, particularly from oil spills and chemical substances, pose a threat to harlequin ducks, as they are highly susceptible to oiling due to their occurrence in coastal and marine environments (ECCC 2007). Additionally, human disturbances, including recreational activities and boating, can disrupt their breeding and foraging behaviours (ECCC 2007).



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Harlequin Duck Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

HARLEQUIN DUCK HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.2.4 Peregrine Falcon

11.4.2.4.1 Habitat Availability

There are two subspecies of peregrine falcon in Labrador (*Falco peregrinus anatum/tundris*). These subspecies overwinter in Central to South America (COSEWIC 2017b) and migrate north where they breed in a variety of habitats, including artic tundra, coastal islands, desert canyons, and urban areas. In Labrador, they primarily nest on coastal and riparian cliffs and forage in open areas and nearby water sources (Rodrigues 2010; White et al. 2002). The peregrine falcon has a flexible diet, consisting primarily of other birds but its diet can also include small mammals and insects. Along the Atlantic coast of Labrador, they feed primarily on black guillemot (*Cepphus grille*), a colonial seabird (Holroyd and Banasch 2012). Peregrine falcons depend on cliffs/bluffs along large waterbodies for nesting and open areas for feeding, and they avoid dense forested environments (Dennhardt and Wakamiya 2013).

There is only one account of this species in the Labrador west region (two individuals in 2007; eBird), which suggest it does not breed locally. Peregrine falcons were not detected in the SSA during breeding bird surveys in 2014 (AMEC Environment and Infrastructure 2014) or 2023 (Annex 3D).

Under existing conditions, the peregrine falcon habitat availability in the wildlife LSA and vegetation RSA shows no areas of high suitability (Table 11-10). Moderate-suitability habitats cover 48.11% of the wildlife LSA (3,707.76 ha) and 45.53% of the vegetation RSA (18,173.89 ha). Low-suitability habitats account for 12.58% of the wildlife LSA (969.64 ha) and 10.74% of the vegetation RSA (4,284.82 ha). Poor suitability is found in 39.31% of the wildlife LSA (3,029.94 ha) and 43.73% of the vegetation RSA (17,454.83 ha). The total areas are 7,707.35 ha for the wildlife LSA and 39,913.54 ha for the vegetation RSA.

Table 11-10: Peregrine Falcon Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	0	0	0	0
Moderate	3707.76	48.11	18173.89	45.53
Low	969.64	12.58	4284.82	10.74
Poor	3029.94	39.31	17454.83	43.73
Total	7707.35	100.00	39913.54	100.00

(a) Peregrine falcon habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.2.4.2 Habitat Distribution

The peregrine falcon breeds in coastal and mountainous regions across much of northern Canada. In Labrador, peregrine falcons are found along coastal cliffs and major rivers. Within Labrador, their breeding range extends from Cape Chidley to Black Tickle and includes some of the larger river valleys in the north (COSEWIC 2017b). They have high breeding side fidelity, often reusing the same nest sites for decades. Approximately 60 to 70 nesting sites have been recorded in northern Labrador (Government of NL 2025e). They are also found in urban areas, adapting to nesting on buildings and other structures (Gahbauer et al. 2015). Therefore, peregrine falcon movement and distribution is determined by cliffs/bluffs along large waterbodies for nesting and open areas with available prey, and they avoid dense forested habitats (Dennhardt and Wakamiya 2013). Given that they are known to occur in urban areas, development does not appear to adversely affect their movement.

The *anatum* subspecies' typical foraging range is 5 km^2, but its home range can extend from 100 to 500 km^2 (Nelson 1990; White et al. 2002). This suggests only a single peregrine could potentially occupy the wildlife LSA and relatively few would occupy the ELC and wildlife RSA. The wildlife LSA is dominated by boreal coniferous species (e.g., spruce and jack pine) and mixedwood forests, which are classified as poor habitat for this species; however, any open water ELC habitat is considered moderate since it can make for suitable foraging habitat (Figure 11-5). The wildlife LSA provides only 20% of the moderately suitable habitat available across the larger vegetation RSA, suggesting the LSA does not uniquely provide good habitat for bank the peregrine falcon. Overall suitable peregrine falcon habitat is generally poor through both the LSA and vegetation RSA, due to the lack of available breeding habitat.

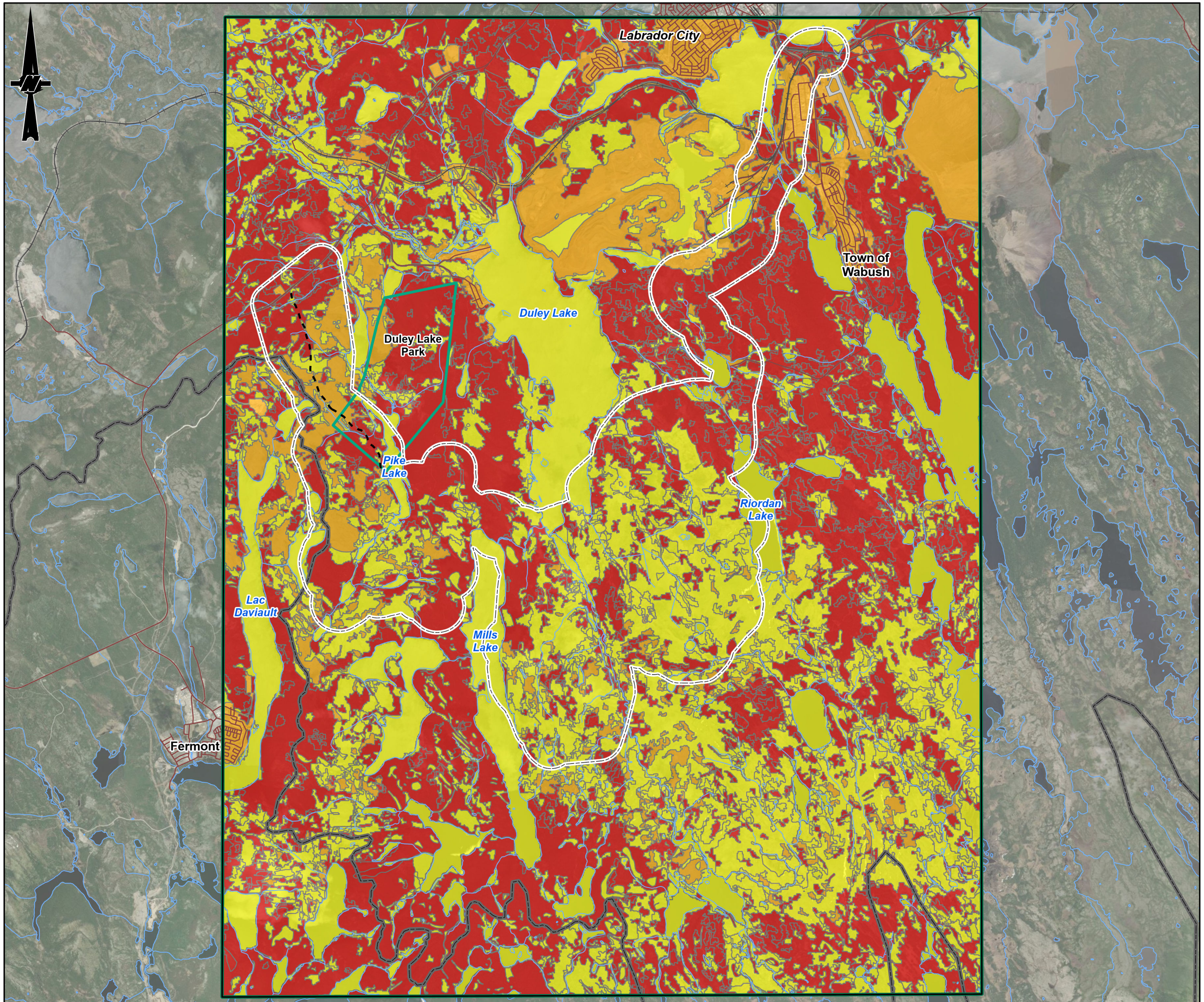
The peregrine falcon is not associated with any of the management areas within the RSA.

11.4.2.4.3 Survival and Reproduction

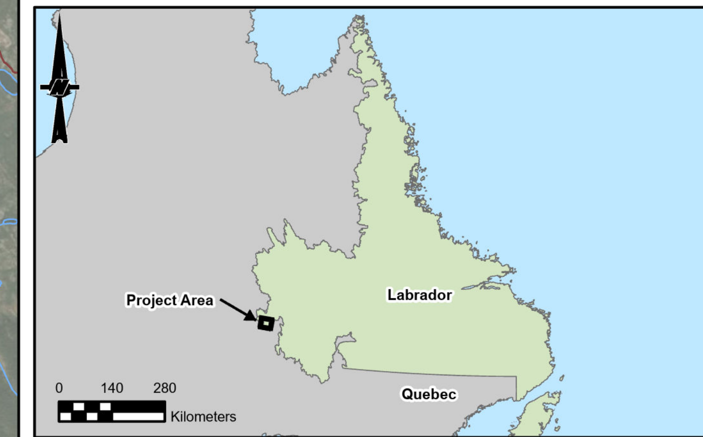
The peregrine falcon is currently not federally listed under SARA in Canada; however, it is listed provincially as vulnerable in Newfoundland and Labrador and has been since 2002. The peregrine falcon was designated Special Concern by COSEWIC in April 2007 but was re-examined and designated Not at Risk in 2017 (COSEWIC 2017). It was delisted due to populations rebounding after the ban of organochlorine pesticides (e.g., dichlorodiphenyltrichloroethane) and re-introduction into suitable habitat throughout its range (COSEWIC 2017).

Peregrine falcons lay eggs in scrapes on cliff edges, preferring high cliffs with wide fields of view for hunting and territory defence (COSEWIC 2017b). They often use alternate ledges for nesting and roosting, and some sites are consistently occupied despite disturbance (COSEWIC 2017b; Gahbauer et al. 2015).

Potential threats to the survival and reproduction of peregrine falcon within the wildlife LSA includes exposure to toxic chemicals and heavy metals. Peregrine falcons are highly susceptible to chemical contamination through bioaccumulation. Additionally, human disturbance of nesting sites, alteration of nesting and wintering habitats, and continued use of chemicals, such as pesticides, pose considerable risks to their populations (ECCC 2015). The banning of dichlorodiphenyltrichloroethane in 1985 and reduction of use in the 1970s led to a recovery in peregrine falcon populations, but ongoing threats from other pollutants and habitat disturbances remain.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Peregrine Falcon Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

PEREGRINE FALCON HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.2.5 Short-Eared Owl

Short-eared owls are crepuscular hunters and exhibit a distinctive buoyant-like flight pattern. Unlike many owls, they can be active at any time of the day but primarily hunt in twilight hours. The short-eared owl is federally listed as Special Concern in Canada and has been since it was added to the SARA list in 2012. In 2008, COSEWIC assessed the short-eared owl as Special Concern but has since upgraded the species to Threatened in 2021, due to updated population estimates being much lower than previously assessed (COSEWIC 2021). In the Province of Newfoundland and Labrador, it has been listed as Vulnerable, since 2001.

11.4.2.5.1 Habitat Availability

Short-eared owls breed in a variety of open habitats such as grasslands, arctic tundra, taiga, bogs, marshes, abandoned fields, and sand-sage shrubland. They breed in suitable unforested habitats with proximity to small mammals likely a primary factor determining their nest site choice in inland areas (COSEWIC 2008). Due to the extensive open, post-fire habitat within and around the SSA, it is probable that short-eared owls regularly breed in this area.

Short-eared owls have a nearly global distribution and are associated with grasslands and barrens in the subarctic and temperate environments (Schmelzer 2005). They breed in suitable unforested habitats with concentrations of small mammals (COSEWIC 2008). Short-eared owls are believed to be widespread breeders in Labrador, specifically along coastal areas (Schmelzer 2005).

In the existing conditions, the short-eared owl has no areas of high-suitability habitat in both the wildlife LSA and vegetation RSA (Table 11-11). Moderate-suitability habitats cover 32.84% of the wildlife LSA (2531.04 ha) and 21.21% of the vegetation RSA (8466.24 ha). Low-suitability habitats account for 11.32% of the wildlife LSA (872.13 ha) and 8.89% of the vegetation RSA (3547.11 ha). Poor suitability is found in 55.85% of the wildlife LSA (4304.18 ha) and 69.90% of the vegetation RSA (27,900.18 ha).

Table 11-11: Short-eared Owl Habitat Availability in Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[(a)]	Wildlife LSA		Vegetation RSA[(b)]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	0	0	0	0
Moderate	2,531.04	32.84	8,466.24	21.21
Low	872.13	11.32	3,547.11	8.89
Poor	4,304.18	55.85	27,900.18	69.90
Total	7,707.35	100.00	39,913.54	100.00

(a) Short-eared owl habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.2.5.2 Habitat Distribution

Between 2003 and 2009, short-eared owls were frequently observed in the Labrador City region, including near mining tailings and the Wabush airport (eBird). However, they were not observed in the SSA during the breeding bird surveys conducted in 2014 (AMEC Environment and Infrastructure 2014) or 2023 (Annex 3D). ELC types that may provide suitable habitat to short-eared owls include graminoid fen and patterned shrub fen.

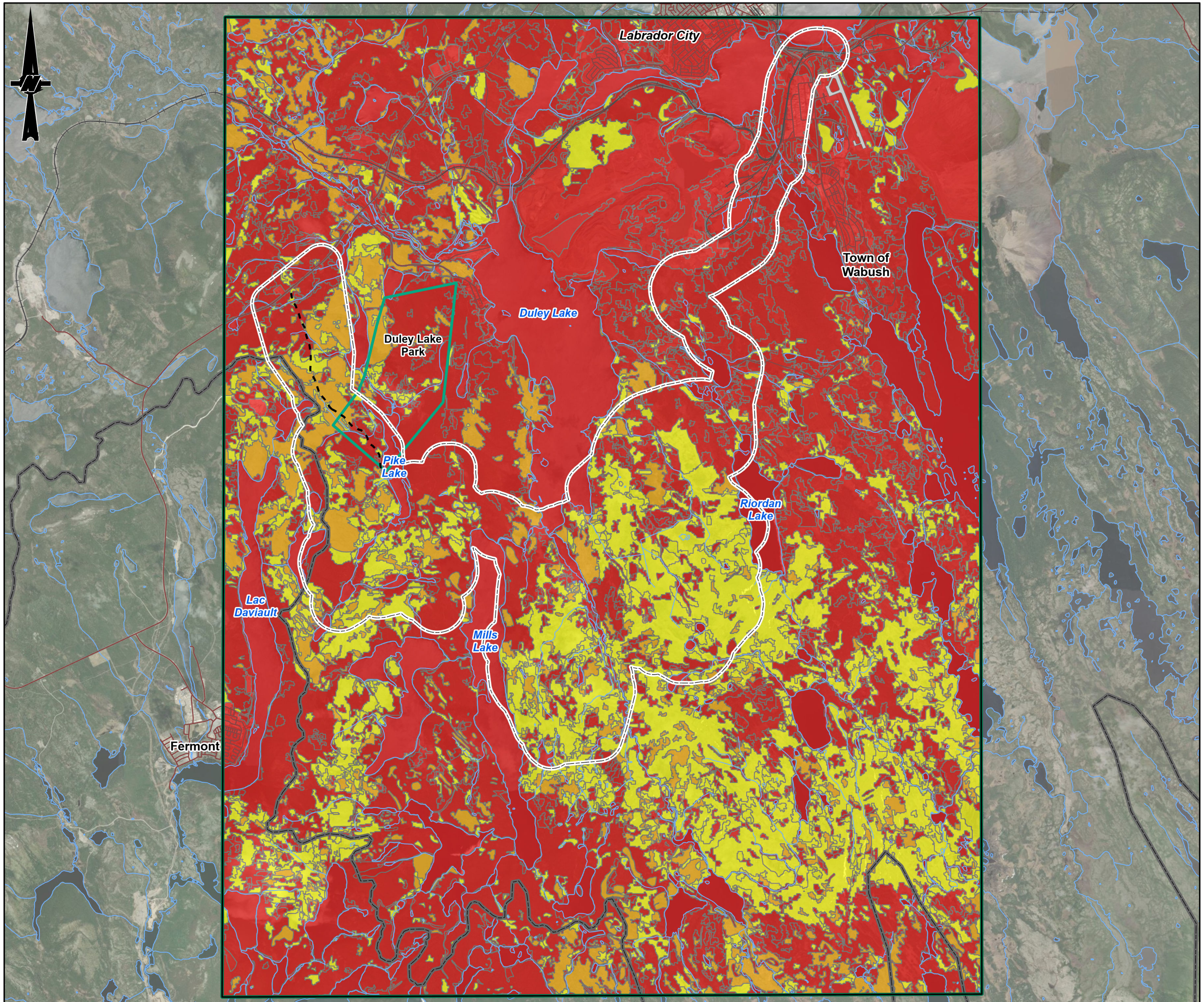
Within the wildlife LSA, the only suitable breeding habitat for the short-eared owl consists of wetlands, including the following ELC types: graminoid fen, non-patterned shrub fen, and patterned shrub fen. Additionally, alpine heath and softwood burn/regeneration areas have been identified as suitable foraging habitats. Together, these habitats constitute the moderate-suitability habitat within both the wildlife LSA and vegetation RSA, making up 32.84% of the LSA and 21.21% of the RSA. Within the LSA, this moderate habitat is mostly found around the Rose Pit feature and along the southeast LSA boundary. Within the larger RSA, moderate habitat is concentrated within the burn/regeneration area in the southeast portion (Figure 11-6). The majority of both the LSA and RSA constitute poor-quality habitat, as most of these areas are forested (e.g., alpine heath, black spruce). Short-eared owl typical home range is 71 to 121 ha (0.62 km radius). The wildlife LSA provides 30% of the moderately suitable habitat available across the larger vegetation RSA, suggesting that the LSA may play a role in supporting the habitat needs of the short-eared owl within the region. However, there is still no high-habitat suitability in either the LSA or RSA (Figure 11-6).

Management areas within the RSA that may contribute to suitable habitat for the short-eared owl include the Ironstone River, this area includes bogs and uplands, which are ideal for short-eared owls to nest and hunt. The Ironstone River and associated wetlands could provide microhabitats for small mammal prey species. Additionally, Pike Lake North and South has ponds, bogs, and streams within these units that could offer ideal nesting and breeding habitats. The northern units support for nesting, breeding, and staging waterfowl indicates a healthy ecosystem that could also support short-eared owls.

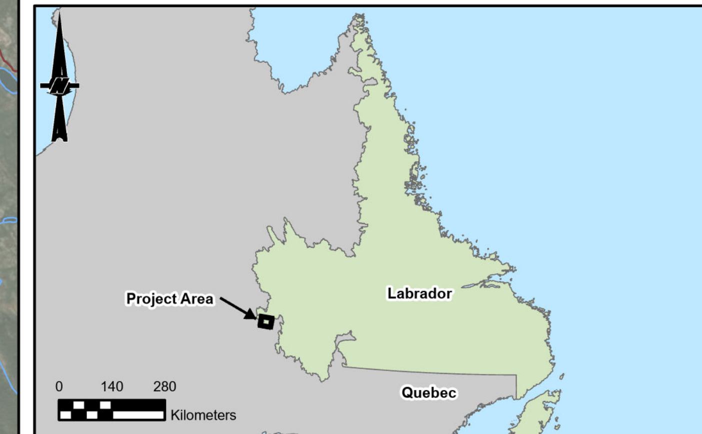
11.4.2.5.3 Survival and Reproduction

The survival of short-eared owls is influenced by habitat composition, weather conditions, and prey availability. Since they primarily inhabit open grasslands, tundra, and wetlands, the absence of mammalian predators and minimal human disturbance has been shown to enhance nest survival (Kampfer et al. 2022). However, extreme weather events, such as high winds and prolonged high temperature, can negatively effect fledging survival by reducing hunting success and increasing thermoregulation costs (Kampfer et al. 2022). Short-eared owls are ground-nesting birds that lay eggs from late April through early June (COSEWIC 2008). The average hatching success is around 5.6 young per nest, with a high probability of nest survival in favourable conditions (Kampfer et al. 2022). The availability of small mammals, particularly voles, is crucial for their reproductive success, as it directly affects the owl's ability to feed their young (Kampfer et al. 2022; COSEWIC 2008).

Short-eared owls face several threats which contribute to their declining population. Habitat loss and degradation, driven by agricultural intensification, urbanization, and the conversion of grasslands to croplands reduces, nesting and foraging habitats, particularly in low artic habitats that are prone to shrubification because of climate change (COSEWIC 2021; COSEWIC 2008). The encroachment of invasive pant species further degrades their habitat by altering the structure of grasslands (COSEWIC 2021). Additionally, the use of pesticides in agricultural diminishes the availability of small mammals, which are a primary food source for the short-eared owls (COSEWIC 2021).



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Short-eared Owl Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
SHORT-EARED OWL HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.2.6 Spruce Grouse

11.4.2.6.1 Habitat Availability

Spruce grouse are found throughout boreal forests, including in Labrador. This species was not previously assessed in the Alderon EIS; however, they were identified as a species of interest in the EIS Guidelines. In Labrador, spruce grouse nest in natural depressions with grass and leaves. Females will lay between four to seven eggs, which will hatch after approximately 24 days (Government of NL 2025c). Outside their breeding season, they can be found in conifer and mixed forests, along forest edges, and under open canopies. They can also be found in regenerating burnt landscapes and in open blueberry fields (Government of NL 2025c).

Spruce grouse were observed during the forest songbird surveys and were observed on a wildlife camera (Annex 3C). Spruce grouse primarily inhabit conifer forests where they feed on pine and spruce. They can adapt to fire-burned landscapes, but they are sensitive to clear cutting and single species plantations (Government of Canada 2015a).

In the existing environment, high-suitability habitat covers 37.06% of the wildlife LSA (2,856.46 ha) and 42.05% of the vegetation RSA (16,783.10 ha) (Table 11-12). Moderate suitability is found in 3.05% of the wildlife LSA (235.46 ha) and 5.24% of the vegetation RSA (2,092.56 ha). There are no areas classified as low suitability. Poor-suitability habitats account for 59.88% of the wildlife LSA (4,615.43 ha) and 52.71% of the vegetation RSA (21,037.88 ha).

Table 11-12: Spruce Grouse Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	2,856.46	37.06	16,783.10	42.05
Moderate	235.46	3.05	2,092.56	5.24
Low	0	0		0.00
Poor	4,615.43	59.88	21,037.88	52.71
Total	7,707.35	100.00	39,913.54	100.00

(a) Spruce grouse habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.2.6.2 Habitat Distribution

Spruce grouse are found throughout Canada, except for Prince Edward Island (Government of NL 2025c). This species is often found on the ground in conifer forests and along roadsides but can also be seen perched high in trees where they primarily feed on conifer seeds and needles specifically from jack pine, black spruce, and occasionally larch. On the ground, they forage on flowers, fruit of small plants, mushrooms, small arthropods, and terrestrial snails (Cornell Lab of Ornithology 2025).

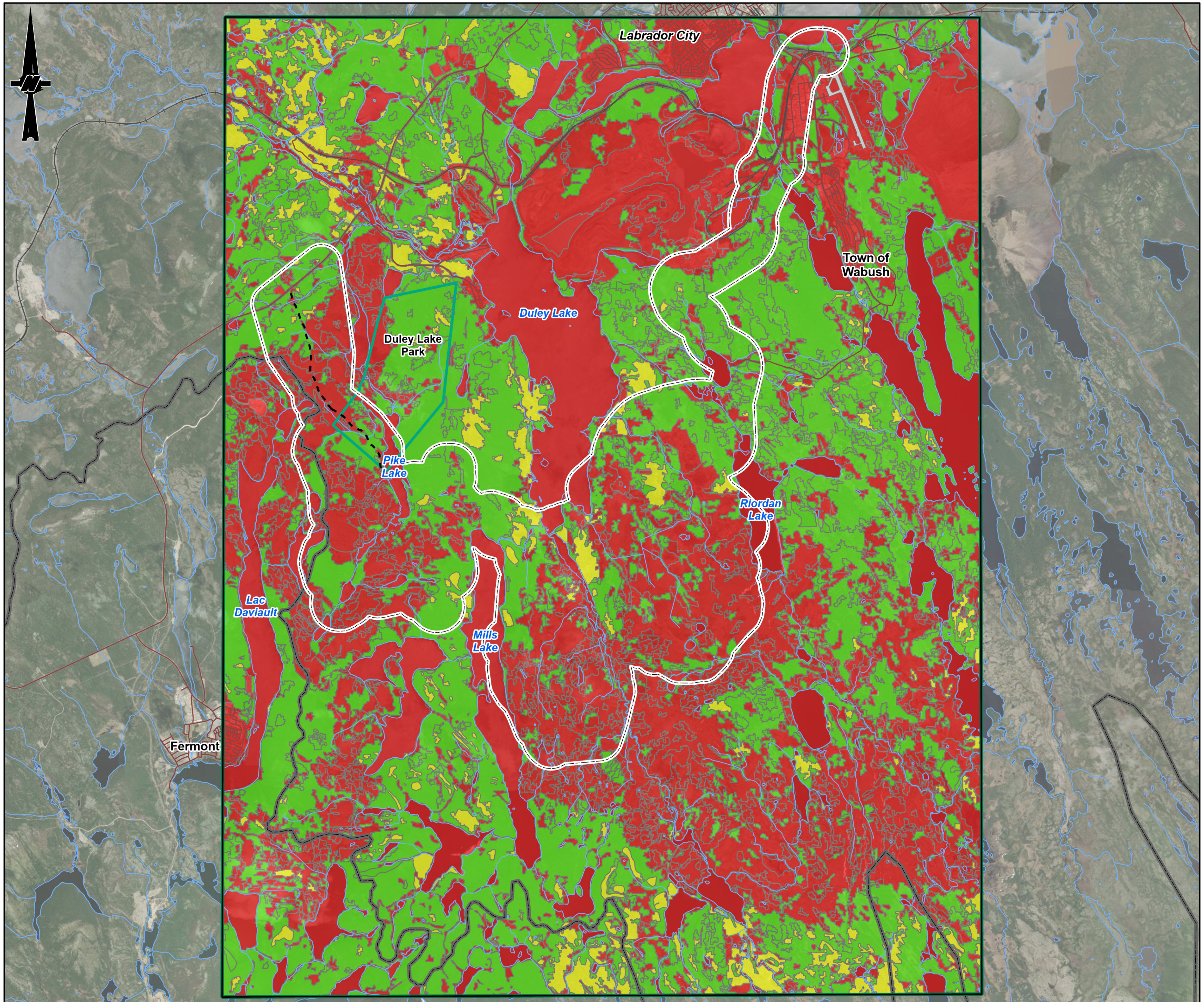
Within both the wildlife LSA and vegetation RSA, the landscape is dominated by boreal coniferous species (e.g., spruce and jack pine) and mixedwood forests, which have been identified as high-quality habitat for the spruce grouse. There is also an abundance of open water throughout both the LSA and RSA which is classified as poor habitat for the spruce grouse. The wildlife LSA provides only 16% of the highly/moderately suitable habitat available across the larger vegetation RSA, suggesting the LSA does not uniquely provide good habitat for spruce grouse. The highly/moderately suitable habitat is distributed somewhat evenly across the LSA and RSA, interspersed with patched of unsuitable habitat (Figure 11-7).

The presence of mixedwood forests and hardwood forests in Duley Park suggest potential suitable habitats for spruce grouse. The Walsh River Management Unit provides nesting and breeding habitat for a variety of avifauna, this may include spruce grouse, particularly in the surrounding uplands and bogs of the management unit, since spruce grouse prefer dense, boreal forests.

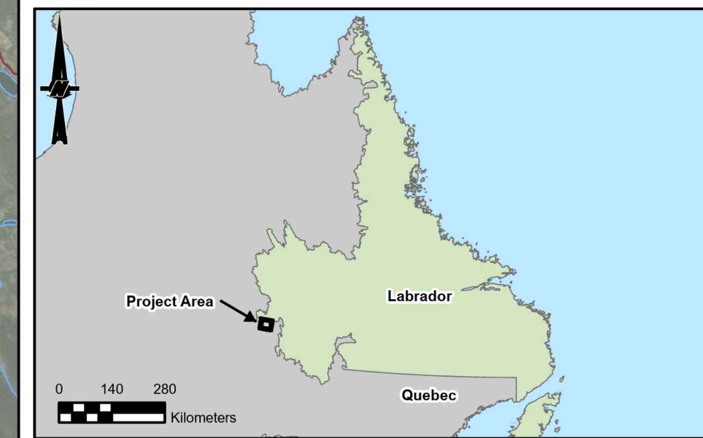
11.4.2.6.3 Survival and Reproduction

Spruce grouse nests are often found near the base of trees where there is overhanging vegetation to protect and conceal the nest from predators. Nests are made from dead needles and leaves and are occasionally lined with breast feathers (Cornell Lab of Ornithology 2025). Threats to spruce grouse include predation by lynx, fox, and large birds of prey like the American goshawk. Additionally, they are popular game birds for locals (Government of NL 2025c).

Currently, there are no conservation concerns in the spruce grouse population in Canada, and the spruce grouse remains stable within Newfoundland and Labrador. However, some potential threats to the survival and reproduction of the spruce grouse within the LSA and RSA can include habitat loss and alteration, and noise pollution from potential mining activities.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Spruce Grouse Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

SPRUCE GROUSE HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.3 Bats

Information Review

Bats were not included in the Alderon EIS because they were not listed under any jurisdiction at that time. However, little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-colored bat (*Perimyotis subflavus*) were emergency listed as Endangered (Schedule 1) in 2014 under SARA due to dramatic declines resulting from the spread of white-nose syndrome. These three species are also listed as Endangered (Schedule A) under the NL ESA. Three additional species, hoary bat (*Lasiurus cinereus)*, eastern red bat (*Lasiurus borealis)*, and silver-haired bat (*Lasionycteris noctivagans*), were assessed as Endangered in 2023 by COSEWIC and are currently under review for listing by SARA. These three species are also listed as Endangered (Schedule A) under NL ESA. As a result, bats were identified as a potential key issue in the final EIS Guidelines for the Kami Project (Government of NL 2024c). Champion was directed to describe the existing environment and potential direct and indirect effects of the Project on bats. In addition, Champion was directed to consider the cumulative effects on bats.

The Atlantic Canada Conservation Data Centre (ACCDC) report revealed the potential for myotis species to occur in the area. The ACCDC report did not indicate the potential for bat hibernacula in the area. Moreover, the literature review suggests bats are unlikely to hibernate in the area as suitable hibernation conditions are unlikely at latitudes above 55 degrees (Moisan 1996).

Current Environmental Impact Statement Surveys

Acoustic surveys confirmed the presence of little brown myotis, northern myotis, hoary bat, eastern red bat, and silver-haired bat. In 2023, a total of 375 bat recordings were detected. Of these, 167 were confirmed SAR species and 25 were confirmed SoCC species, and the remaining files could not be identified to species or species groups. In 2023, bat activity was highest (n = 299/375) in the Rose Pit location (Mid Lake) compared to the remaining three locations and lowest (n = 8/375) at Harris Lake (BAT01). This pattern was most notable for the SAR species as 149/175 passes confirmed as SAR were detected at Mid Lake. The lower activity at Harris Lake can be partially explained by the shorter monitoring period.

In 2024, a total of 355 bat passes were detected. Of these, 31 were confirmed SAR species and 246 were confirmed SoCC species. The remaining passes could not be reliably identified to species and were identified to species groups. As in 2023, Rose Pit had the highest number of bat detections (n = 147/355), with Duley Lake Provincial Park having the second most detections (n = 111/355). The remaining two locations in the northeast of the SSA had lower bat detections with the pond having 86/355 and wetland having by far the least of all (n = 11/355). This pattern was consistent for the SAR and SoCC species.

A roost search conducted in 2024 within the proposed Rose Pit footprint and Duley Lake Provincial Park suggests roosting habitat in the area is limited. Generally, trees are primarily live, small, and lack cavities or exfoliating bark, making them unsuitable for roosting bats. Most dead trees are black spruce with many branches, making the trunk inaccessible for bats. In the proposed Rose Pit mine area, roost habitat suitability is low to moderate, with most areas dominated by shrubs and small dead trees. However, past wildfire sites on south-exposed slopes had several large dead trees with potential roosting features, though these were inaccessible for accurate measurement. In Duley Lake Provincial Park, roost habitat suitability is low due to dense spruce forests and a lack of suitable dead or decaying trees. Nearby houses and worker accommodations may provide alternative roosting habitats but were not searched. Suitable roosting habitat for hoary and red bats is unlikely in both areas due to the absence of deciduous trees.

Valued Environmental Component Selection

Little brown and northern myotis are both considered "resident" species as they do not migrate south for the winter. The two species have similar habitat needs and life histories. However, northern myotis has a more limited distribution and more restrictive habitat needs compared to little brown myotis. Northern myotis are, therefore, more vulnerable to perturbations compare to little brown myotis. For this reason, northern myotis was selected as a VEC for residential bat species. Hoary, eastern red, and silver-haired bats are all migratory species. Hoary and eastern red bats share similar habitat needs and life histories as they both roost in foliage and can produce up to four pups. Hoary bats are more likely than red bats to be found at northern latitudes. Therefore, hoary bats were selected as a VEC for migratory bats. Silver-haired bats have overlapping habitat needs with the myotis species as they typically forage in edge habitat and roost under exfoliating bark and in cracks and crevices. Therefore, potential Project effects on their migratory movements are captured by hoary bats and potential effects on their foraging and roosting habitat are captured by northern myotis (Table 11-13).

Table 11-13: Bat Species Valued Environmental Components

Species	Federal Listing under SARA Previous EIS (2012) Current EIS (2025)	Provincial Listing under NL ESA Previous EIS (2012) Current EIS (2025)	Habitat Preferences	Representative Species for other Wildlife in Study Areas	Rationale
Northern myotis (*Myotis septentrionalis*)	n/a (2012) Endangered (2025)	n/a (2012) Endangered (2025)	Foraging: Old - growth/mature forest interiors; wetlands Roosting: Old-growth/mature forests; wetlands	Resident bat species; little brown myotis	Not previously assessed; change in listing; specified in EIS Guidelines
Hoary bat (*Lasiurus cinereus*)	n/a (2012) Not on Schedule 1 (assessed as Endangered by COSEWIC; under consideration for listing under Schedule 1 SARA)	n/a (2012) Endangered (2025)	Old-growth/mature forests for roosting and foraging – particularly in large forest gaps/edges; open meadows, fields, grasslands, agricultural land for foraging; wetlands for roosting and foraging; hardwood species preferred for roosting, as well as hemlock	Migratory bat species; eastern red bat, silver-haired bat	Not previously assessed; change in listing; specified in EIS Guidelines

SARA = *Species at Risk Act*; n/a = not applicable; EIS = Environmental Impact Statement; NL ESA = Newfoundland and Labrador *Endangered Species Act*; COSEWIC = Committee on the Status of Endangered Wildlife in Canada.

11.4.3.1 Northern Myotis

11.4.3.1.1 Habitat Availability

Northern myotis typically forage in mature forest interiors, as well as over ponds and wetlands. They roost under exfoliating bark and in cracks and crevices of mature hardwood and softwood trees. This species relies on these specific habitats for foraging and roosting, making the availability of mature forests and wetland areas crucial for their survival. The presence of mature and old-growth forests, as well as wetlands and calm freshwater bodies, are essential for the northern myotis to thrive (ECCC 2018b). In the winter, this species hibernates in caves and abandoned underground mines.

In the existing environment, the northern myotis habitat availability in the wildlife LSA and vegetation RSA shows varying levels of suitability (Table 11-14). High-suitability habitat covers 33.43% of the wildlife LSA (2,575.87 ha) and 38.92% of the vegetation RSA (15,535.81 ha). Moderate suitability is found in 26.00% of the wildlife LSA (2,004.03 ha) and 16.45% of the vegetation RSA (6,564.86 ha). Low-suitability habitats account for 33.40% of the wildlife LSA (2,574.47 ha) and 38.22% of the vegetation RSA (15,253.59 ha). Poor suitability is found in 7.17% of the wildlife LSA (552.87 ha) and 6.41% of the vegetation RSA (2,559.28 ha).

Table 11-14: Northern Myotis Habitat Availability in Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	2,575.97	33.42	15,535.81	38.92
Moderate	2,004.03	26.00	6,564.86	16.45
Low	2,574.47	33.40	15,253.59	38.22
Poor	552.87	7.17	2,559.28	6.41
Total	7,707.35	100.00	39,913.54	100.00

(a) Northern myotis habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.3.1.2 Habitat Distribution

The northern myotis was first recorded in south-central Labrador in 2013 (Broders et al. 2013). This region represents the northern extent of their range, indicating that their distribution is limited to areas where suitable habitats are available. The species' reliance on mature forests and wetlands means that their distribution is closely tied to the presence of these habitats. The availability of roosting sites in mature trees and foraging areas over ponds and wetlands determines the distribution of northern myotis within this region (Broders et al. 2013; Burns et al. 2015). Access to calm bodies of fresh water for drinking is also important. Northern myotis was detected during the passive acoustic bat monitoring surveys in 2023 (Annex 3C).

The management units within the LSA and RSA provide a variety of habitats that could be beneficial for the northern myotis. For instance, the Pike Lake North and South Management Units, which include ponds, bogs, and streams, offer suitable foraging areas over water bodies and wetlands. The presence of mature trees in these areas provides essential roosting sites, supporting the bat's need for secure and stable habitats.

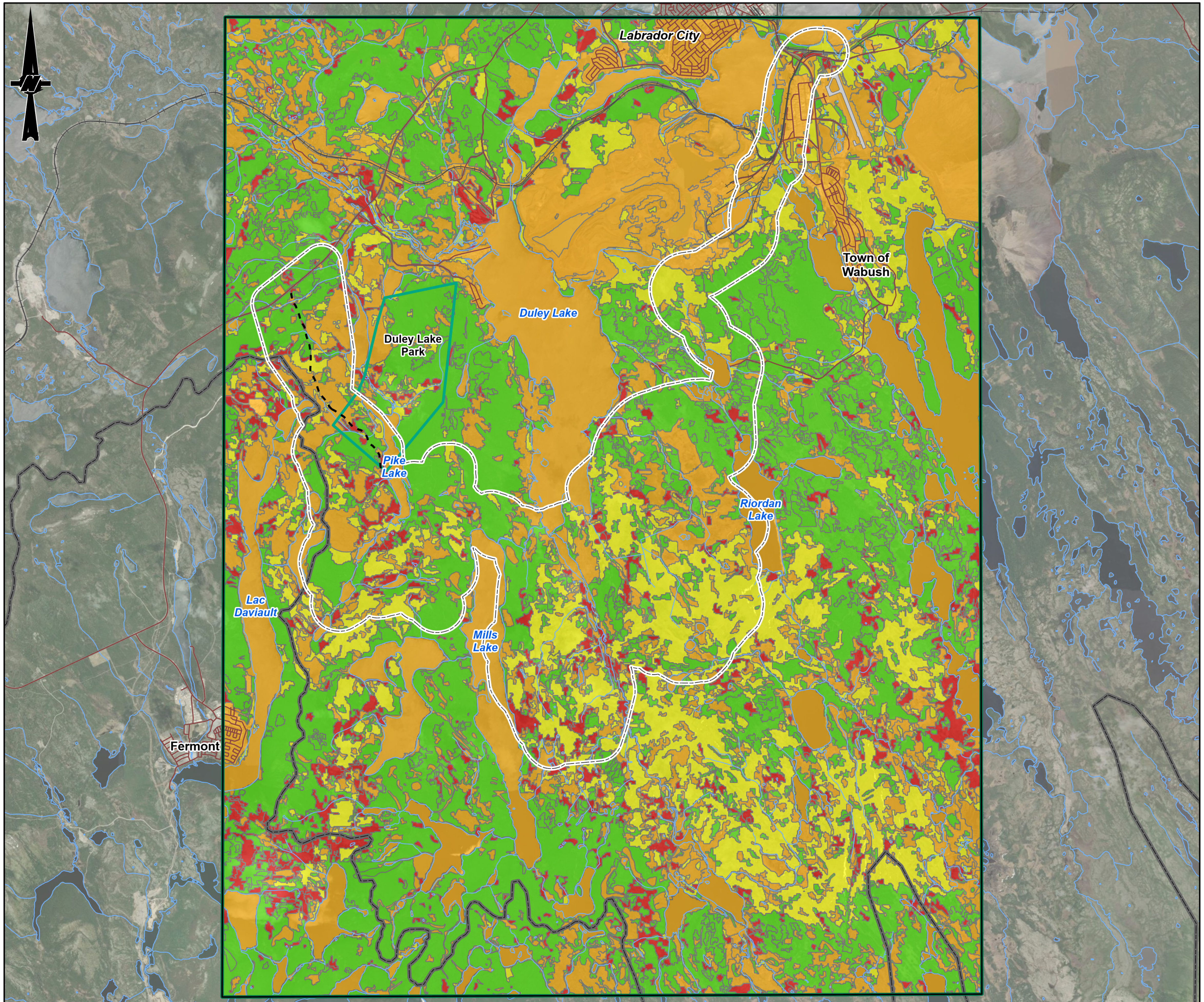
The Walsh River and Ironstone River Management Units, with their adjacent ponds and streams, offer similar benefits. These areas provide calm bodies of fresh water for drinking, which is important for the northern myotis. The relatively undisturbed nature of these habitats aligns with the bat's preference for avoiding highly disturbed landscapes. The Lac Virot Management Unit, located at the western edge of the municipal planning area, is another rich breeding area for waterfowl, indicating the presence of wetlands that could serve as foraging grounds for the northern myotis.

The LSA has a higher concentration of moderate-quality habitat (26%) compared to the RSA's 16.45%; however, the RSA offers a greater extent of high-quality habitats (38.92%) compared to the LSA's 33.42%, suggesting better overall conditions for the northern myotis in the RSA (Figure 11-8). The high-quality habitat is more scattered in the LSA, mostly around Pike Lake, the Rose Pit, and the upper eastern portion, whereas the high quality in the RSA is broad and covers a much more extensive sizable area. Additionally, the LSA contributes only 20% of the high- and moderate-quality habitats found within the larger RSA, underscoring the limited availability of optimal conditions within the LSA.

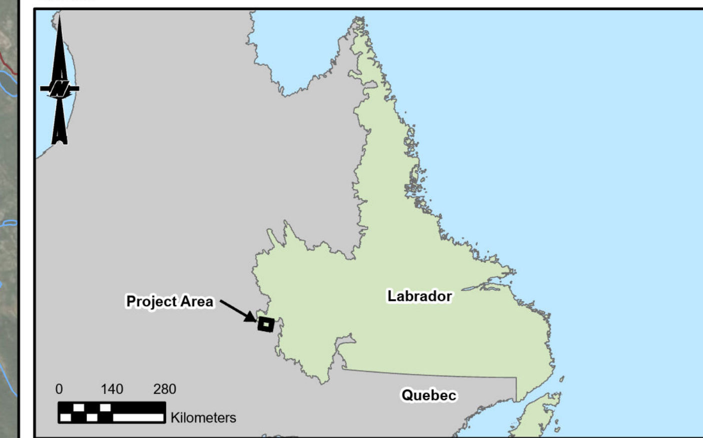
11.4.3.1.3 Survival and Reproduction

Northern myotis have life histories characterized by long lifespans and low reproductive rates, with females typically producing only one pup per year. This makes them vulnerable to disturbances that effect their survival and reproductive success. The species has suffered dramatic population declines due to white-nose syndrome, a fungal disease caused by *Pseudogymnoascus destructans*, which infects hibernating bats (Frick et al. 2010; ECCC 2018b). The disease has led to widespread declines: northern myotis is listed as Endangered under Schedule 1 of SARA and NL ESA and ranked Critically Imperiled (S1) by ACCDC. Due to their slow life histories and critically low population numbers, any factor affecting their survival and reproductive success has widespread negative consequences for population persistence. Although white-nose syndrome poses the most substantial threat to northern myotis, additional threats include potential loss or degradation of suitable foraging and roosting habitat, as well as threats to survival during hibernation (ECCC 2018b). Air, water, and light pollution may also pose a risk, but the severity of these risks is not known. Fatalities at wind farms due to collisions with turbines and barotrauma can also have considerable effects on populations.

Potential threats to the survival and reproduction of the northern myotis within the LSA and RSA can include habitat loss and alteration, and noise pollution from potential mining activities.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Northern Myotis Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
NORTHERN MYOTIS HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-8

11.4.3.2 Hoary Bat

The hoary bat is a migratory species that comes to Canada to breed and migrates south to overwinter. They are aerial insectivores that feed on larger nocturnal Diptera and Hymenoptera, as well as smaller Coleoptera (beetles).

11.4.3.2.1 Habitat Availability

Compared to myotis species, hoary bats are larger and less agile, which confines them to edge habitats and open spaces for commuting and foraging. They roost by hanging from branches in the foliage of hardwood trees, making the availability of these specific habitats crucial for their survival (COSEWIC 2023). Access to calm bodies of fresh water for drinking is also important. They typically avoid highly disturbed landscapes, such as urban areas and mines (COSEWIC 2023).

Under existing conditions, hoary bat habitat availability in the wildlife LSA and vegetation RSA shows varying levels of suitability (Table 11-15). High-suitability habitats cover 3.05% of the wildlife LSA (235.46 ha) and 5.24% of the vegetation RSA (2,092.56 ha). Moderate suitability is the most prevalent, covering 84.34% of the wildlife LSA (6,500.38 ha) and 80.56% of the vegetation RSA (32,153.97 ha). Low-suitability habitats account for 6.55% of the wildlife LSA (504.96 ha) and 5.97% of the vegetation RSA (2,383.13 ha). Poor suitability is found in 6.05% of the wildlife LSA (466.55 ha) and 8.23% of the vegetation RSA (3,283.88 ha).

Table 11-15: Hoary Bat Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	235.46	3.05	2,092.56	5.24
Moderate	6,500.38	84.34	32,153.97	80.56
Low	504.96	6.55	2,383.13	5.97
Poor	466.55	6.05	3,283.88	8.23
Total	7,707.35	100.00	39,913.54	100.00

(a) Hoary bat habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = ecological land classification.

11.4.3.2.2 Habitat Distribution

The distribution of hoary bats in Canada is closely tied to the availability of suitable edge habitats and open spaces. These habitats are essential for their foraging and commuting activities. Hoary bats roost in the foliage of trees, which means their distribution is influenced by the presence of hardwood trees for roosting sites; however, they also make use of hemlock. The migratory nature of hoary bats means they are found in Canada during the breeding season and migrate south for the winter, highlighting the importance of habitat availability in both their breeding and overwintering ranges (COSEWIC 2023). Hoary bats were detected more than any other bat species during the passive acoustic bat monitoring surveys in 2023 Annex 3C).

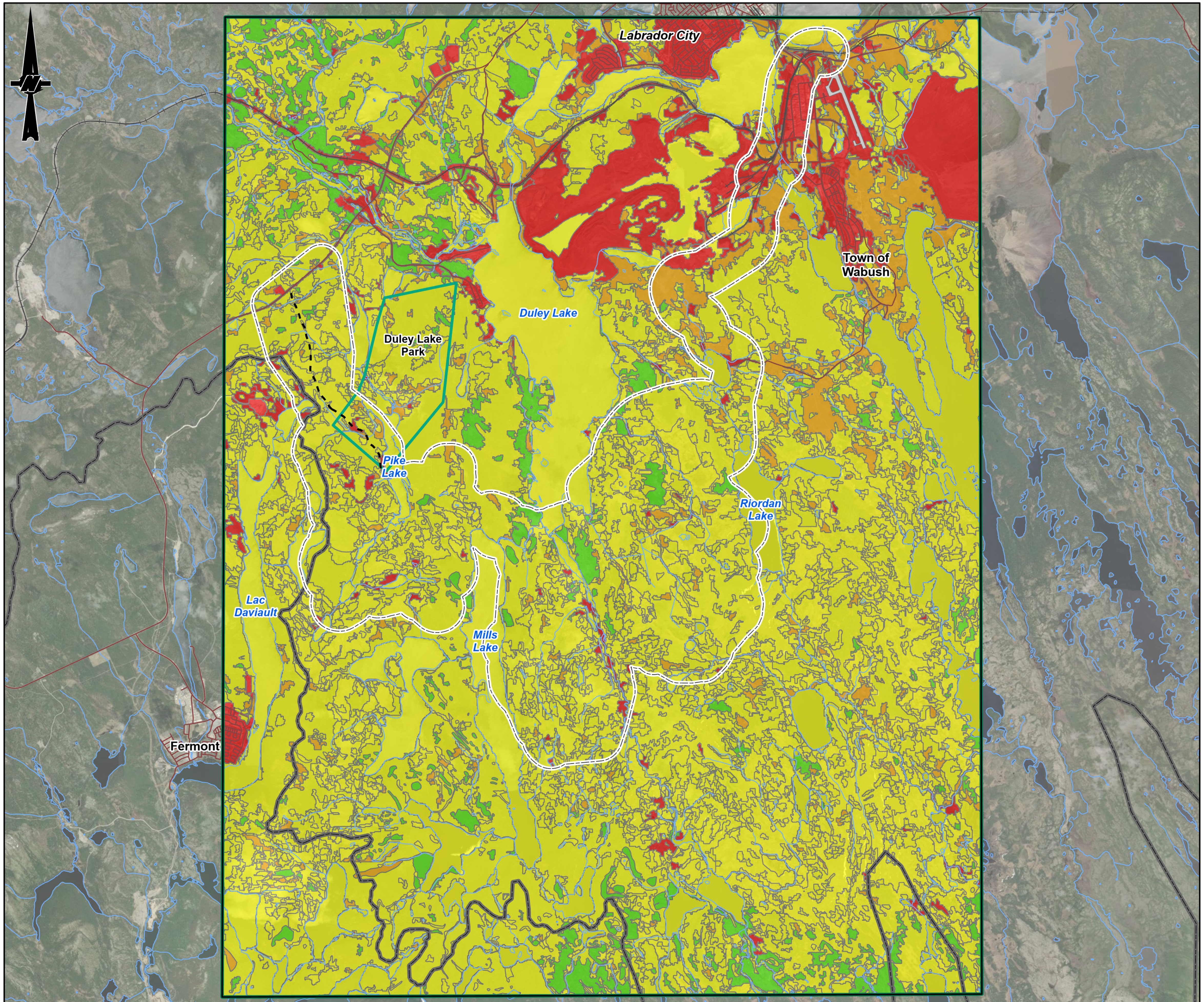
The Management Areas within the RSA provide a variety of habitats that could be beneficial for the hoary bat. For instance, the Pike Lake North and South Management Units, which include ponds, bogs, and streams, offer edge habitats and open spaces that are ideal for the hoary bat's commuting and foraging activities. The presence of calm bodies of fresh water in these areas also provides essential drinking resources. Additionally, the Walsh River and Ironstone River Managements offer similar benefits with their adjacent ponds and streams. The availability of hardwood trees in these areas is crucial for roosting, and the relatively undisturbed nature of these habitats aligns with the hoary bat's preference for avoiding highly disturbed landscapes.

Within the LSA, high-quality habitats are primary concentrated around areas such as the tailings management facility and mine rock stockpile, which may offer suitable edge habitats and open water for foraging (Figure 11-9). Moderate-quality habitats are much broader and widespread throughout the LSA. The LSA has a higher concentration of moderate-quality habitats (84.34%) compared to the RSA (80.56%), indicating that decent conditions for the hoary bat are more prevalent within the LSA. However, the RSA offers a greater extent of high-quality habitats (5.24%) compared to the LSA (3.05%), suggesting better overall conditions for the hoary bat in the RSA. Additionally, the LSA only provides 19% of the high-/moderate-quality habitat available across the larger RSA, highlighting the limited extent of optimal conditions within the LSA.

11.4.3.2.3 Survival and Reproduction

Although this species may produce up to four pups each year, they are characterized as having slow life histories. Therefore, any factor affecting survival and reproductive success can have large effects on population persistence. Hoary bats have been suffering population declines largely due to the cumulative effects of wind energy (COSEWIC 2023). As migratory species, they are particularly vulnerable to disturbance that effect their survival and reproductive success. COSEWIC recently assessed hoary bats as endangered, and they are currently under review for listing as Endangered under Schedule 1 of SARA. Their migratory populations are ranked as critically imperilled (S1M) by ACCDC, although there is insufficient information to rank their breeding populations. They typically avoid highly disturbed landscapes, such as urban areas and mines (COSEWIC 2023).

Potential threats to the survival and reproduction of the hoary bat within the LSA and RSA can include habitat loss and alteration, and noise pollution from potential mining activities.



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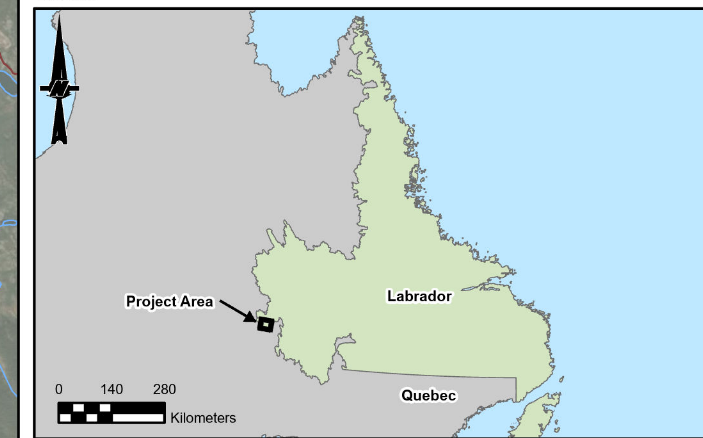


SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Hoary Bat Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

HOARY BAT HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-9

11.4.4 Woodland Caribou

Information Review

Caribou were not a separate VEC in the previously approved EIS, but they were considered as part of the "Birds, Other Wildlife and Their Habitats and Protected Areas" VEC (Section 20, Alderon 2012). Cumulative effects on caribou were identified as a key issue for the previous EIS; however, wildlife surveys and interviews with residents and stakeholders indicated caribou herds did not overlap the Project area at that time (2012). As such, potential effects of the Project on caribou were not anticipated (Alderon 2012). The Canadian Environmental Assessment Agency concluded that the Project did not overlap with any critical habitat defined for boreal caribou and was not likely to cause notable adverse effects on wildlife and their habitat, including caribou (CEA Agency 2013).

Consultation with Indigenous groups, the public, and federal regulators about the current EIS revealed concerns about potential direct and cumulative effects of the Project on caribou, and specifically on the George River caribou herd (Chapter 22, Engagement).

Previous Environmental Impact Statement Surveys

Two aerial winter wildlife surveys were completed, on January 27, 2012, and March 27, 2012. Aerial transects spaced at 2 km intervals were flown throughout the wildlife RSA. Neither caribou nor their sign were detected during the surveys.

Current Environmental Impact Statement Surveys

There were no field surveys conducted for caribou as part of this EIS. Caribou were not observed incidentally during other surveys.

Valued Environmental Component Selection

Caribou (migratory and boreal) are included as a VEC in this EIS because they were identified as a potential key issue in the Final EIS Guidelines for the Project (Government of NL 2024c), and Champion was explicitly requested to describe the existing environment and potential direct and indirect effects of the Project on caribou. In addition, Champion was directed to consider the cumulative effects on caribou and the ability of Indigenous Peoples to exercise their rights to harvest the George River Caribou Herd (Government of NL 2024c).

11.4.4.1 Habitat Availability

There are two woodland caribou ecotypes that occur in Labrador and may currently or historically interact with the Project's wildlife study areas (i.e., the LSA and RSA): the forest-dwelling boreal ecotype (Designatable Unit 6) (COSEWIC 2011) and forest-tundra eastern migratory ecotype (Designatable Unit 4) (COSEWIC 2011). Both boreal and migratory caribou are considered important cultural species to many First Nations communities and are harvested as a food source in Labrador by Indigenous hunters (NunatuKavut 2011).

The Project occurs in proximity to the federally delineated ranges of the NL1 (Lac Joseph) and QC6 (Québec) boreal caribou ranges, the provincially delineated ranges of Manicouagan and Caniapiscau boreal caribou local populations, and the historical range of the George River eastern migratory range. The wildlife LSA does not overlap with boreal caribou range but does overlap with the historical range of the George River migratory caribou range (Table 11-16, Figure 11-10). The wildlife RSA overlaps with the NL1, QC6, Manicouagan and Caniapiscau boreal caribou ranges, and the historical range of George River (Table 11-16). The current southern extent of the George River herd is approximately 200 km north of the Project (Government of NL 2025h) and does not overlap with the wildlife LSA or wildlife RSA.

Table 11-16: Caribou Ranges Intersected by the Wildlife Local Study Area and Regional Study Area

Caribou Range	Total Area of Range (ha)[(a)]	Overlap with Local Study Area[(a)]		Overlap with Wildlife Regional Study Area[(b)]	
		Area (ha)	% of LSA	Area (ha)	% of RSA
Boreal Caribou Ranges					
NL1 – Lac Joseph	5,812,237	0	0	3,098	0.4
QC6 – Québec (federal range)	62,347,748	0	0	464,191	66.6
Manicouagan (QC provincial range)[(c)]	4,283,985	0	0	105,385	15.0
Caniapiscau (QC provincial range)	12,024,032	0	0	151,463	21.6
George River Migratory Caribou					
Historical range	89,907,049	8,071	100	701,154	100
Current range (2025)	-[(d)]	0	0	0	0

Notes:

Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.

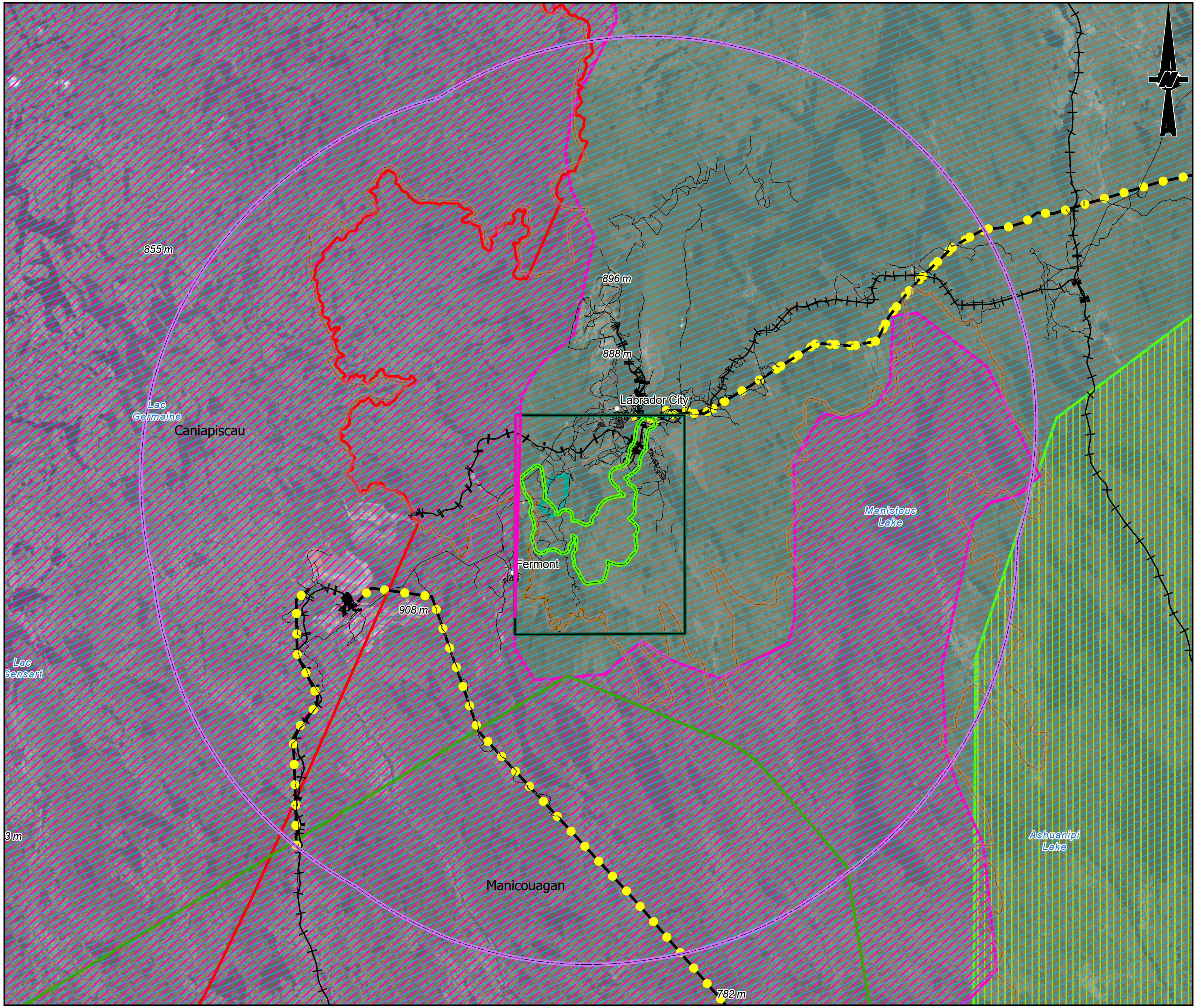
(a) Sources of spatial files for federal and provincial ranges: ECCC 2024a; ESRI Canada 2025; Quebec Data Partnership 2023.

(b) LSA = 8,071 ha; RSA = 701,154 ha.

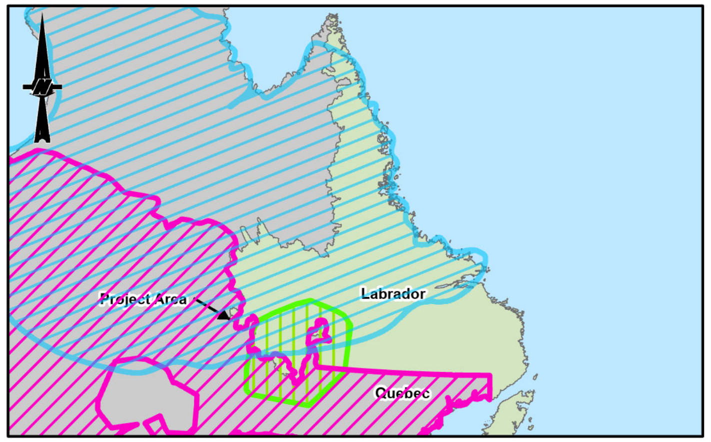
(c) While they share the same name, the provincially delineated Manicouagan range (part of federal QC6) does not overlap with the QC5 range identified as Manicouagan in the federal Recovery Strategy (ECCC 2024b).

(d) The spatial boundary of the current range of the George River Migratory Caribou herd was requested from the Government of Newfoundland and Labrador, but it was not received in time for inclusion in the draft EIS.

LSA = local study area; RSA = regional study area; QC = Québec; ECCC = Environment and Climate Change Canada; ESRI= Environmental Services Research Institute; EIS = Environmental Impact Statement.



KEY MAP



SCALE 1:20,000,000

LEGEND

- LABRADOR/QUEBEC BOUNDARY
- WILDLIFE LOCAL STUDY AREA (LSA)
- WILDLIFE REGIONAL STUDY AREA (RSA)
- EXISTING ROAD
- RAIL
- RECREATION TRAIL
- TRANSMISSION LINE

CARIBOU RANGES

- LAC JOSEPH
- QUÉBEC
- RIVIÈRE GEORGE HISTORICAL RANGE
- CANIAPISCAU
- MANICOUAGAN
- VEGETATION RSA

CARIBOU_51_RANGES_AIRES_CLIP

CARIBOU RANGES

- QUÉBEC
- ROAD
- RECREATION TRAIL
- TRANSMISSION LINE
- RAIL LINE

0 3.75 7.5 15
1:400,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
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2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
FEDERAL AND PROVINCIAL WOODLAND CARIBOU RANGE BOUNDARIES IN LABRADOR AND PROJECT STUDY AREAS

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-10

Woodland caribou require large, contiguous tracts of habitat so the species can space apart from other ungulates and predators. Woodland caribou primarily select mature to old forest in peatland-dominated landscapes that have a high abundance of lichens (primary food source); typically, these areas are in black spruce bogs and black spruce-tamarack fens (Stuart-Smith et al. 1997; Rettie and Messier 2000; Schmelzer et al. 2004; ECCC 2020). The selection of boreal wetland and low-productivity peatland complexes is also an important anti-predator strategy to create spatial separation from other prey species, which reduces the risk of encounters with predators (Bergerud et al. 1984; Rettie and Messier 2000; James et al. 2004; ECCC 2020).

Critical habitat for boreal caribou is defined in the recovery strategy as "the area within the boundary of each range that provides an overall ecological condition… which maintains a perpetual state of a minimum of 65% of the area as undisturbed habitat; and biophysical attributes required by boreal caribou to carry out life processes" (ECCC 2020). The Project's wildlife LSA and wildlife RSA intersect the Boreal Shield East Ecozone. Biophysical attributes specific to caribou ranges in Labrador were described in the federal recovery strategy (Table H-6) (ECCC 2020) and include:

- open coniferous forests, eskers and upland plateaus, dominated by black spruce
- poorly drained sites characterized by extensive ribbed fen-string bog complexes bordered by black-spruce sphagnum stands
- well drained sites and rivers uplands containing open lichen woodlands
- calving habitat in muskegs, lakes and islands, peninsulas of large lakes, and mature dense conifer stands
- post-calving, summer and rutting habitat in mature dense coniferous forests, treed bogs, open and forested wetlands, peninsulas and islands, shorelines
- winter habitat in lichen woodlands, ice-covered water bodies, regenerating burns (with shrub and *Cladina mitis* understory)

Caribou habitat suitability mapping by the Province was not available for this assessment. However, ELC mapping was completed for the vegetation RSA (39,910 ha; Chapter 10, Vegetation, Wetlands, and Protected Areas), which is approximately five times larger than the wildlife LSA (Figure 11-1). A review of the ELC mapping relative to the description of biophysical attributes for Labrador's caribou ranges (ECCC 2020) was completed to develop a qualitative understanding of the suitability of land cover classes in the Project area relative to caribou habitat needs. The three largest landcover classifications in the vegetation RSA are black spruce-labrador tea- feathermoss (12,230 ha; 30.6% of the vegetation RSA), open water (6,600 ha; 16.5% of the vegetation RSA), and burn/regeneration (5,830 ha; 14.6% of the vegetation RSA). The largest landcover class (black spruce – labrador tea – feathermoss) supports the biophysical attributes necessary for caribou to carry out life processes in all seasons, while open water acts as important winter habitat. Other suitable caribou habitat types in the vegetation RSA that occur in lesser amounts include black spruce-lichen (2,090 ha), black spruce/tamarack-sphagnum woodland (1,810 ha), tamarack/black-spruce-feathermoss (340 ha; Table 10-4 in Chapter 10, Vegetation, Wetlands, and Protected Areas). Developed land covered approximately 7.0% (2,830 ha) of the vegetation RSA (Table 10-4 in Chapter 10, Vegetation, Wetlands, and Protected Areas). Anthropogenic disturbances in the existing environment include towns, mines and associated tailing disposal areas, forestry harvest, roads, and railways.

ECCC determined that a threshold of 65% undisturbed habitat is necessary within a boreal caribou range to support a self-sustaining local population (except for SK1, which has a threshold of 40% undisturbed habitat) (ECCC 2020). In their 2020 assessment, ECCC found that 14% of the Lac Joseph range (NL1) was disturbed from a combination of wildfires occurring in the last 40 years and anthropogenic sources (plus 500 m buffer around anthropogenic disturbances), and 32% of the Québec (QC6) range were disturbed by the combination of wildfires and anthropogenic sources (plus 500 m buffer around anthropogonic disturbances) (ECCC 2020). The Province of Québec undertook a similar assessment of habitat and population condition for the local populations they identified through refinement of the federal ranges (particularly QC6). The Manicouagan range was assessed as 32.7% disturbed as of 2019, which includes 7.7% natural disturbances and 25.0% anthropogenic disturbances. The percent disturbed was updated to 29.0% in the 2024 federal Progress Report (7% fire and 23% anthropogenic) (ECCC 2024b). Approximately 70% of the Manicouagan range occurs south of the provincial forestry limits, and forest harvest activities are the main source of anthropogenic disturbance in this range (Government of Québec 2021) (ECCC 2024b). The Caniapiscau range was assessed as 16.3% disturbed as of 2018. Over 95% of the delineated range for this local population is north of the provincial forestry boundary, and most disturbances (14.7% of 16.3% total) were attributed to wildfires (Government of Québec 2021). The primary anthropogenic disturbance in this range is the Caniapiscau hydroelectric dam. The percent disturbed was updated to 9% in the 2024 federal Progress Report (7% fire and 1% anthropogenic disturbance) (ECCC 2024b). These values for NL1, QC6, Manicouagan and Caniapiscau boreal caribou ranges (Table 11-17) all exceed the minimum threshold of undisturbed habitat (> 65%) deemed necessary for a population to be self-sustaining (ECCC 2020).

Table 11-17: Disturbed and Undisturbed Caribou Habitat among Boreal Caribou Ranges

Habitat Suitability	NL1 – Lac Joseph[a]		QC6 – Québec[a]		Manicouagan (QC Provincial Range)[b, c]		Caniapiscau (QC Provincial Range)[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)
Natural Disturbances	639,346	11	11,222,595	18	299,879	7	961,923	8
Anthropogenic Disturbances	116,245	2	8,105,207	13	985,317	23	120,240	1
Total Disturbed	**755,591**	**13**	**18,704,324**	**30**	**1,242,356**	**29**	**1,082,163**	**9**
Undisturbed	5,056,646	88	43,643,424	70	3,041,629	71	10,941,869	91
Total Range Size	**5,812,237**	**100**	**62,347,748**	**100**	**4,283,985**	**100**	**12,024,032**	**100**

Notes:
Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Source: Table A8 in ECCC 2024.
(b) Source: Table A7 in ECCC 2024.
(c) While they share the same name, the provincially delineated Manicouagan range (part of federal QC6) does not overlap with the QC5 range identified as Manicouagan in the federal Recovery Strategy (ECCC 2024b).
QC = Québec; ECCC = Environment and Climate Change Canada.

Natural and anthropogenic disturbances were calculated in the wildlife LSA and wildlife RSA to determine existing habitat suitability for caribou. The calculation of disturbances in the study areas followed the federal approach to determining available caribou habitat, which includes adding a 500 m buffer to all anthropogenic disturbances (EC 2011). Approximately 53% (4,278 ha) of the wildlife LSA is disturbed in the existing environment; this includes 83 ha (1.0%) of natural disturbances (wildfires from the past 40 years) and 4,195 ha (52%) disturbed from anthropogenic disturbances (Table 11-18, Figure 11-11, Figure 11-12). Approximately 18% (125,452 ha) of the wildlife RSA is disturbed in the existing environment, including 23,762 ha (3.4%) from wildfires and 101,689 ha (14.5%) from anthropogenic disturbances (Table 11-18, Figure 11-11, Figure 11-12). Anthropogenic disturbances in the wildlife study areas are primarily attributed to roads, towns, mines and associated infrastructure, transmission lines, railroads, and forestry.

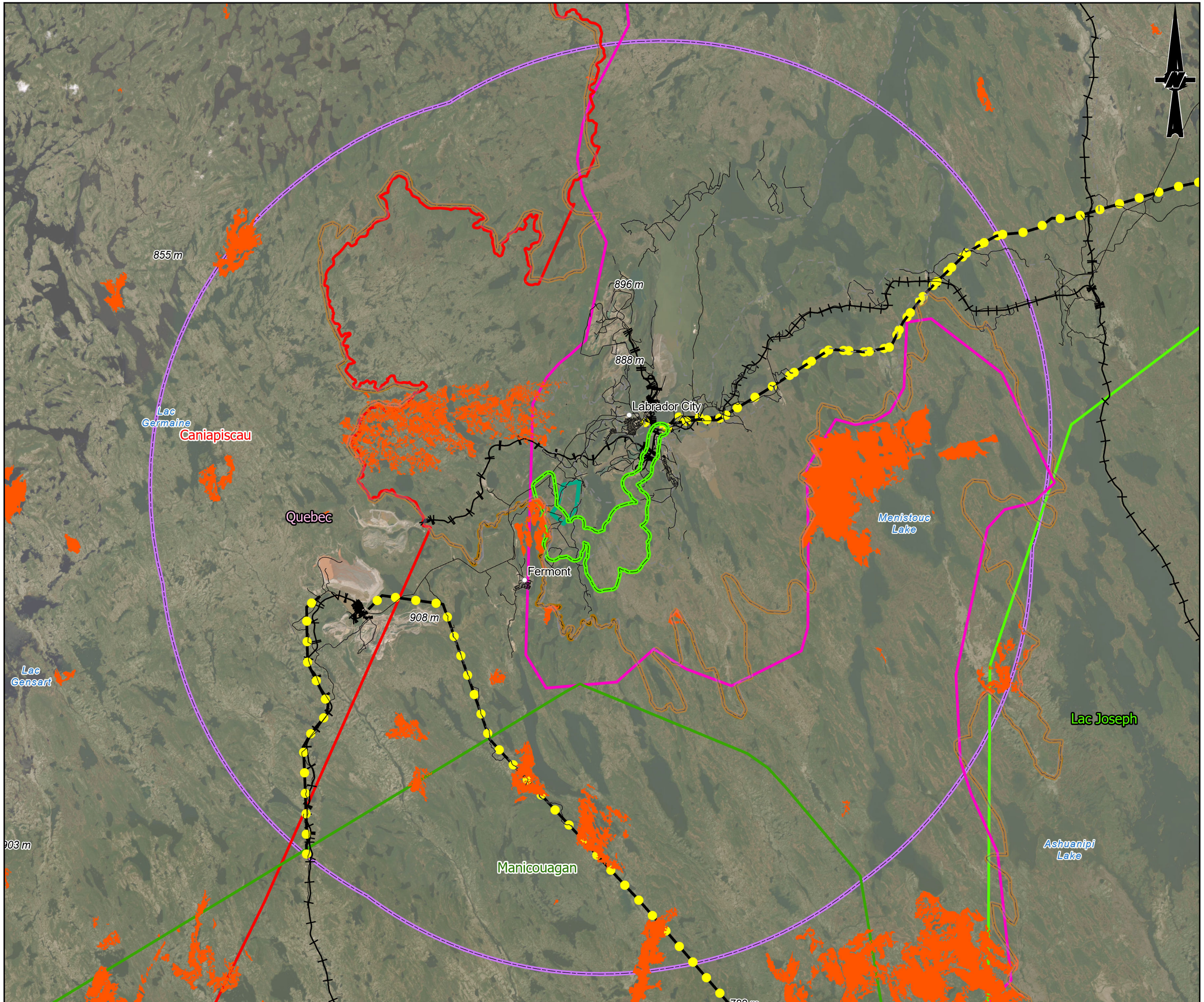
Table 11-18: Disturbed and Undisturbed Caribou Habitat in the Wildlife Local Study Area and Wildlife Regional Study Area

Landcover	Wildlife LSA		Wildlife RSA	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
Natural Disturbances[a]	82.3	1.0	23,760.9	3.4
Anthropogenic Disturbances[b]	4,195.5	52.0	101,688.1	14.5
Total Disturbed	4,277.8	53.0	125,448.9	17.9
Water	445.6	5.5	111,371.4	15.9
Undisturbed	3,347.7	41.5	464,333.6	66.2
Total	8,071	100.0	701,154	100.0

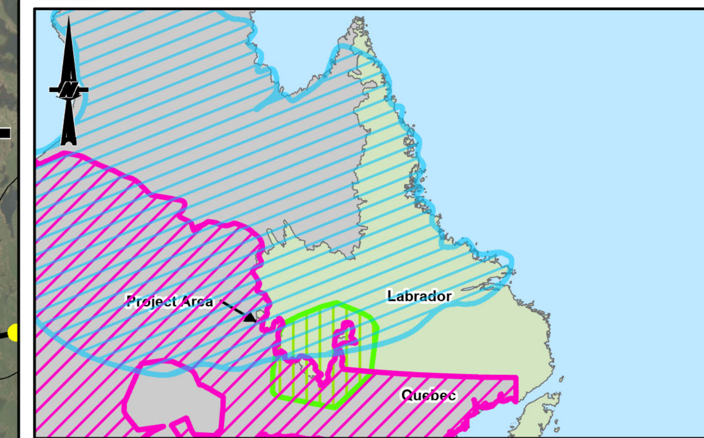
Notes:
Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Wildfire based on a fire history period (1983 to 2023).
(b) Linear and non-linear disturbances, including but not limited to cutlines, trails, transmission line, railroad, rough roads, existing access road, highways, clearings, forest harvest areas, unknown disturbances (plus a 500 m buffer).
LSA = local study area; RSA = regional study area.

Baseline field surveys completed in 2011 and 2012 did not detect caribou in the RSA (Alderon 2012). A caribou baseline survey completed in winter 2012 for the Iron Ore Company of Canada (IOC) Mine Expansion in Labrador City did not detect any sign (tracks or individuals) of caribou (SNC-Lavalin Environment 2012). That survey area overlapped with the current wildlife LSA and most of the wildlife RSA. Although there is suitable habitat available in the vegetation RSA (which is larger than the wildlife LSA and smaller than the wildlife RSA), the existing anthropogenic disturbances (mining activities and infrastructure, roads, trails) in the wildlife study areas have reduced habitat availability and has likely resulted in caribou avoidance of the study areas in the existing environment[1].

[1] Caribou telemetry data have been requested from the Government of Newfoundland and Labrador and the Government of Québec but were not received in time to incorporate into the assessment of current habitat availability and use for the EIS.



KEY MAP



SCALE 1:20,000,000

LEGEND

- LABRADOR/QUEBEC BOUNDARY
- WILDLIFE LOCAL STUDY AREA (LSA)
- WILDLIFE REGIONAL STUDY AREA (RSA)
- WILDFIRES (1983 - 2024)
- EXISTING ROAD
- RAIL
- RECREATION TRAIL
- TRANSMISSION LINE

CARIBOU RANGES

- LAC JOSEPH
- QUÉBEC
- CANIAPISCAU
- MANICOUAGAN

0 3.75 7.5 15

1:400,000 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
1. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
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2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

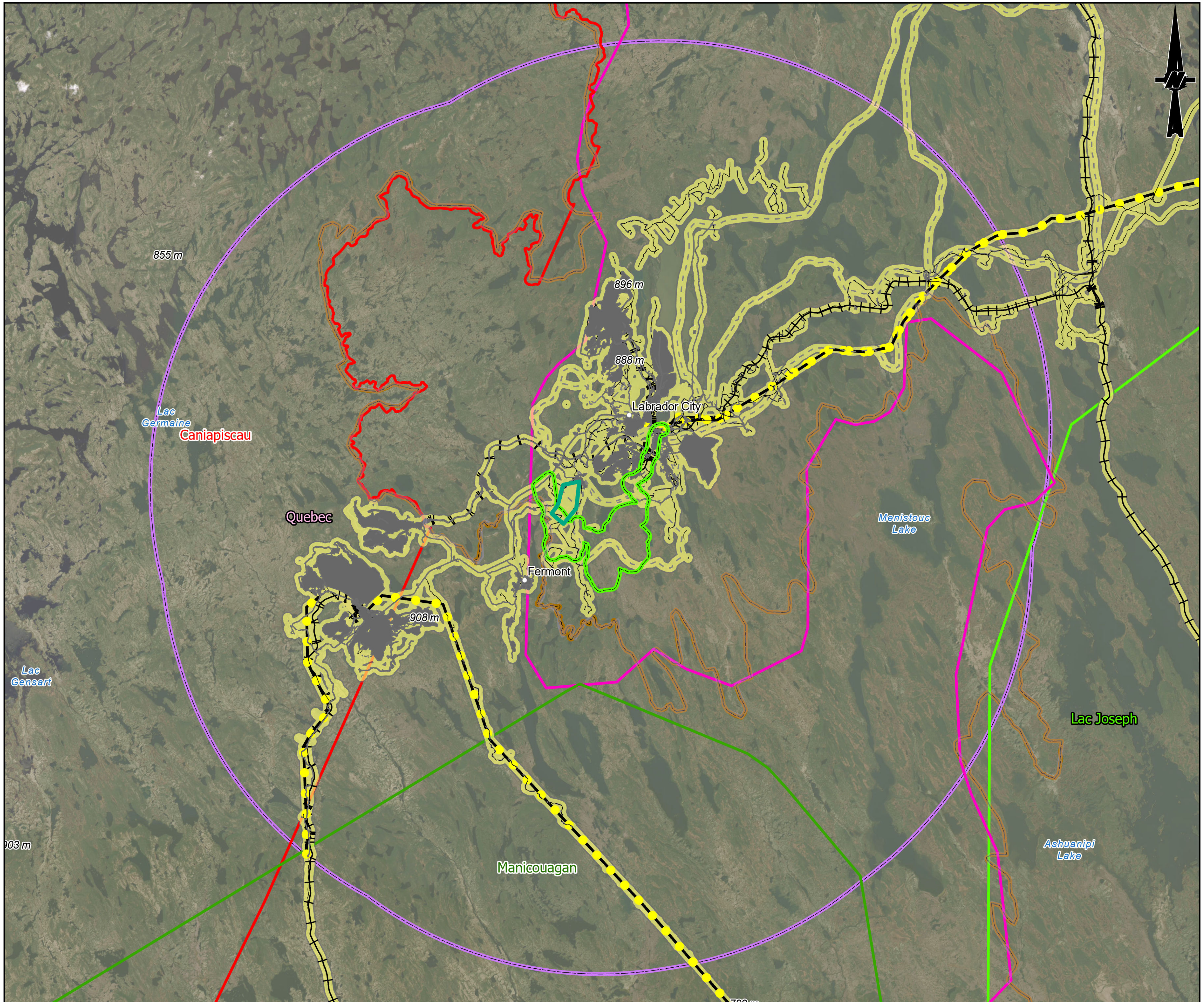
TITLE
WILDFIRE DISTURBANCE IN THE WILDLIFE LOCAL STUDY AREA AND WILDLIFE REGIONAL STUDY AREA

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-11



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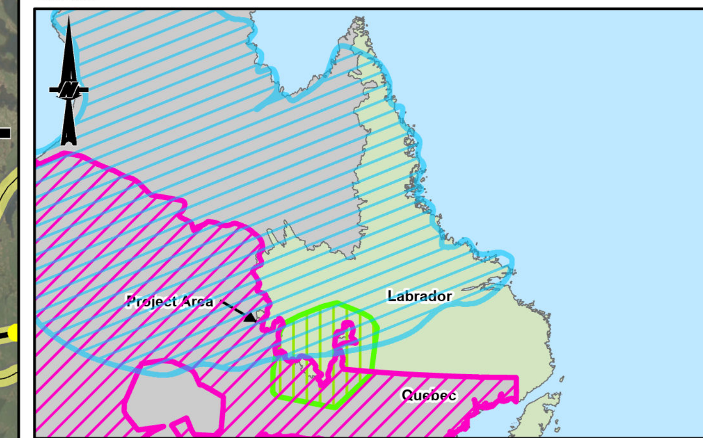

SCALE 1:20,000,000

LEGEND

- LABRADOR/QUEBEC BOUNDARY
- WILDLIFE LOCAL STUDY AREA (LSA)
- WILDLIFE REGIONAL STUDY AREA (RSA)
- BUFFERED ANTHROPOGENIC DISTURBANCE AREA
- DEVELOPED LAND
- EXISTING ROAD
- RAIL
- RECREATION TRAIL
- TRANSMISSION LINE

CARIBOU RANGES

- LAC JOSEPH
- QUÉBEC
- CANIAPISCAU
- MANICOUAGAN

0 3.75 7.5 15
1:400,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
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2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
ANTHROPOGENIC DISTURBANCE IN THE WILDLIFE LOCAL STUDY AREA AND WILDLIFE REGIONAL STUDY AREA

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-12

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11.4.4.2 Habitat Distribution

Well-distributed habitat is necessary to facilitate movement and access to resources across space and time (Johnson et al. 1992; Rettie and Messier 2000; Nathan et al. 2008). Prior to human settlement, the arrangement and connectivity of caribou habitat across Labrador would have been influenced by natural disturbances such as fire, blowdown events, and insect infestations. In the NL1 boreal caribou range, the historical northern calving range was abandoned after 1970, possibly due to flooding from hydroelectric development and increased traffic on the Trans-Labrador Highway (Schmelzer et al. 2004). The current range boundary for NL1 is south of the Trans-Labrador Highway. Range retraction of boreal woodland caribou across their distribution in Canada has been attributed to several factors including forest fires, overhunting, and anthropogenic disturbances (Schaefer 2003; Vors and Boyce 2009).

The distribution of suitable caribou habitat in the wildlife LSA and RSA is influenced by existing anthropogenic disturbance (Figure 11-12, Section 11.4.4.1). Unsuitable developed land (with a 500 m buffer added) comprises approximately 52% of the wildlife LSA. There are suitable habitat patches in the wildlife RSA, but habitat connectivity in the existing environment is fragmented by the Trans-Labrador Highway, the Labrador Railway, and resource exploration activities.

Linear features can act as semi-permeable barriers to movement, reducing their movement to suitable habitat, and confining them to smaller home ranges where they may be more easily detected by predators (Beauchesne et al. 2014). The density of linear features within the wildlife LSA is estimated at 0.68 km/km^2 which includes permanent linear features (e.g., highway, local roads, railroad, utility lines) and non-permanent (trails; Table 11-19). In the wildlife RSA, linear density is estimated at 0.16 km/km^2 (Table 11-19). The density of linear features in the wildlife LSA and RSA is expected to be having a negligible influence on caribou mortality because the densities are less than 1 km/km^2 which is considered a threshold for facilitating predator movement in boreal habitats (DeMars and Boutin 2018). However, traffic along the Trans-Labrador Highway and the Québec North Shore and Labrador Railroad may be adversely influencing the local behaviour and movement of animals and reducing the connectivity between suitable caribou habitat in the wildlife RSA and the NL1 and QC6 caribou ranges in the existing environment (Schmelzer et al. 2004).

The existing anthropogenic disturbances and associated linear features in the wildlife LSA, and the permanent highway that bisects the wildlife RSA, has altered the distribution/connectivity of caribou habitat and is likely resulting in avoidance of the study areas in the existing environment[2].

Table 11-19: Linear Density in the Wildlife Study Areas

Disturbance Category[(a)]	Disturbance Type	Wildlife LSA		Wildlife RSA	
		Length (km)	Density (km/km^2)[(b)]	Length (km)	Density (km/km^2)[(b)]
Highway	Permanent	3.7	0.05	139.5	0.02
Local Road	Permanent	8.8	0.10	347.2	0.05
Railroad	Permanent	18.3	0.20	191.0	0.03
Utility Line	Permanent	0.9	0.01	133.5	0.02
Total	**Permanent**	**31.7**	**0.4**	**811.2**	**0.12**
Trail	Non-Permanent	23.3	0.3	321.2	0.05
Total Permanent + Non-permanent		**55.1**	**0.68**	**1,132.4**	**0.16**

Notes: Some numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Linear features sourced from CanVec (Natural Resources Canada 2023) and provincial publicly available datasets.
(b) Density based on wildlife LSA size of 80.7 km^2 and wildlife RSA size of 7,011.5 km^2.
LSA = local study area; RSA = regional study area.

[2] Caribou telemetry data have been requested from the Government of Newfoundland and Labrador and the Government of Québec but were not received in time to incorporate into the assessment of current habitat availability and use for the draft EIS.

11.4.4.3 Survival and Reproduction

Boreal caribou are listed as a Threatened species on Schedule 1 of the federal SARA (Government of Canada 2002), and provincially in both Labrador (Government of NL 2024a) and Québec (vulnerable) (Government of Québec 2025c). The two federally delineated boreal populations closest to the Project (Table 11-16) are the Lac Joseph range (NL1) and the Québec range (QC6).

There is estimated to be less than 4,000 boreal caribou across five local populations in Labrador (Government of NL 2024b). In the federal recovery strategy, the NL1 range was assessed as 14% disturbed, but the integrated risk assessment indicated the NL1 population was equally at risk of being not self sustaining or self sustaining (ECCC 2020). Despite being above the threshold of 65% undisturbed habitat necessary for a self-sustaining population, a progress report published in 2024 updated the population trend of NL1 between 2017 to 2022 as declining (ECCC 2024b).

The QC6 range continues to be recognized as one range in the federal recovery strategy; population trends were not available at the time of the recovery strategy update and the integrated risk assessment indicated the QC6 population was self-sustaining (ECCC 2020).

The provincial government updated the boreal range boundaries in 2020, using telemetry data to redefine the delineated ranges from 6 to 10 separate local population units (Government of Québec 2021) (ECCC 2024b). The provincially delineated Manicouagan range and Caniapiscau range overlap with the wildlife RSA (Table 11-16, Figure 11-10). The Manicouagan local population of boreal caribou use habitat between the Manicouagan and Moisie rivers, which act as a semi-permeable barrier to connectivity with adjacent populations (note that while they share the same name, the provincially delineated Manicouagan range [part of federal QC6] does not overlap with the QC5 range identified as Manicouagan in the federal Recovery Strategy) (ECCC 2024b). The range is affected by anthropogenic disturbance in the south (primarily forest harvest activities) and fires in the north; combined the range was assessed as 32.7% disturbed as of 2019 (Government of Québec 2021). This value was reduced to 29% disturbed in the 2024 federal Progress Report (ECCC 2024b). Despite being above the threshold of 65% undisturbed habitat necessary for a self-sustaining population (ECCC 2020), the Manicouagan population was reported to have a declining trend based on survival and recruitment rates in 2018 to 2019 (Government of Québec 2021; ECCC 2024b).

The Caniapiscau local population use habitat in the Côte-Nord and Nord-du-Québec administrative regions, where the northern boundary of the lichen-dominated black spruce forest meets the taiga and tundra ecosystems. This population has had limited surveys or long-term monitoring, but based on surveys conducted in 2018 and 2020, it was assessed as having an increasing population trend (Government of Québec 2021; ECCC 2024b).

Eastern migratory caribou have been assessed as Endangered by COSEWIC (2017a), and a recommendation has been made to add them to Schedule 1 of SARA (ECCC 2018). This recommendation is based primarily on the decline of the two subpopulations in Québec/Labrador (George River and Leaf River) (COSEWIC 2017a). The George River herd has demonstrated dramatic fluctuations in population estimates. A partial count in the 1950s estimated approximately 5,000 individuals in the herd; this was later updated using simulation modelling to a minimum of 60,000 individuals (COSEWIC 2014). The population increased to approximately 823,000 ± 102,000 individuals in 1993 (Couturier et al. 1996) and then declined to approximately 9,000 individuals in 2016 (COSEWIC 2014). The most recent population estimate survey in July 2024 estimate the population to be approximately 8,600 animals (Government of NL 2024b). The reduction in population size was associated with a range contraction of approximately 85% between the 1990s and 2010 (COSEWIC 2014). The current winter and summer ranges of this herd is located outside the Project study areas (Figure 11-10).

Threats to caribou populations in Labrador include habitat loss and alteration, sensory disturbance, hunting pressure (both legal and illegal), predation, and climate change (Schmelzer et al. 2004). Caribou survival and reproduction are related to the availability of suitable habitat that supports life history processes, including being able to space out to lower densities and detection by predators. Habitat conversion to early-seral forests as a result of anthropogenic and natural disturbances increases the preferred forage (e.g., young trees, shrubs) for moose; subsequently, an increase in prey abundance leads to increased densities of wolves (and other predators), which ultimately results in an increased rate of encounter between wolves and caribou and wolf hunting efficiency (James et al. 2004; Latham et al. 2011a,b; Whittington et al. 2011; ECCC 2020). Across the broader expanse of boreal caribou ranges in Labrador, the amount of anthropogenic disturbance is minimal (14% disturbed in NL1, 9% disturbed in NL2, 2% in NL3) (ECCC 2020), which indicates there is sufficient habitat for caribou to spatially separate and reduce the risk of predation. However, predation by wolves is considered a dominant limiting factor to caribou populations in Labrador, particularly during periods when the migratory George River caribou herd overlap with the sedentary boreal herds and wolves opportunistically predate on the large congregation of both caribou ecotypes (Schaefer et al. 1999; Schmelzer et al. 2004).

Sensory disturbance from anthropogenic developments can affect caribou survival and reproduction through physiological stress, though these effects are difficult to quantify (Dantzer et al. 2014). Effects vary depending on proximity to a development footprint and associated level of disturbance. Behavioural and physiological responses to sensory disturbance have included higher movement rates and more frequent movement, and increased heart rates (Murphy and Curatolo 1987; Bradshaw et al. 1997; Herrero et al. 2005). Caribou avoidance of sensory disturbance around anthropogenic disturbances is accounted for in range assessments by a 500 m buffer on all anthropogenic disturbances (ECCC 2020). A baseline field program conducted in 2024 found that existing noise levels in the area up to 5 km from the SSA (i.e., extending beyond the wildlife LSA) were slightly lower than those measured in 2011 and 2012 for the Alderon EIS. Noise levels in the existing environment were characterized as rural to remote, whereby noises were dominated by nature-based ambient sounds and to a lesser degree by anthropogenic sources (Chapter 6, Noise, Vibration, and Light). Illuminance levels met the zone light trespass limits except for where commercial land uses occurred (Chapter 6, Noise, Vibration, and Light). In the larger wildlife RSA, non-point sources of sensory disturbance also include recreational activities (e.g., snowmobiling) and military activities (i.e., low-level flying at training area that overlaps with the NL1 range) (Schmelzer et al. 2004). The current sensory disturbances associated with these activities may be resulting in temporary or long-term avoidance of suitable habitat, thus reducing caribou survival and reproduction.

Sport and subsistence hunting is currently considered the major source of mortality for the George River migratory caribou herd (COSEWIC 2017a). Sport hunting has been banned in Québec since 2012 and in Labrador since 2013 (COSEWIC 2017a). In 2013, the Province of Newfoundland and Labrador enacted a moratorium on all hunting of the George River subpopulation, inclusive of that by Indigenous Peoples (COSEWIC 2017a). Some Indigenous Peoples from eastern Québec and Labrador have voluntarily stopped hunting migratory caribou, while other Indigenous groups have continued to harvest an unknown number of caribou each year (COSEWIC 2017a).

Overharvest has contributed to the decline of boreal caribou in Labrador, particularly in years when the migratory George River caribou herd overlapped with the Lac Joseph boreal herd and there was increased harvest by hunters who did not distinguish between migratory and sedentary animals (Schmelzer et al. 2004). Since 2002, sport hunting of boreal caribou has been prohibited in Labrador under the NL ESA (Government of NL 2002); similarly, it has been banned in Québec since 2001 (Government of Québec 2025c). There is no mandatory or voluntary reporting for Indigenous harvest, so harvest estimates are difficult to determine. Some First Nations have voluntarily ceased hunting boreal caribou for cultural or subsistence purposes, while other communities continue to harvest (ECCC 2024b).

Climate change is a threat to caribou across their range in the boreal forest because of direct effects on habitat (e.g., increased frequency and severity of wildfires, deep snow, ice events, changes in food supply) and the interaction of climate change with other threats (e.g., change in habitat facilitating moose and deer expansion northward, increasing spread of disease) (ECCC 2020; Schmelzer et al. 2020; Johnson et al. 2020; Stewart et al. 2023). An increase in the frequency and intensity of wildfires could alter the distribution and composition of upland habitat patches or reduce the size of wetlands on the landscape, which could change where suitable caribou habitat occurs throughout the range and study areas. A changing climate is predicted to affect plant composition (i.e., amount of forage for caribou) and timing of insect emergence as well as abundance of insects (Morales-Castilla et al. 2021), which will subsequently effect body condition of caribou (Vors and Boyce 2009).[3]

11.4.5 Other Wildlife (Mammals and Herptiles)

Information Review

Engagement with Indigenous groups and the public revealed concerns about potential effects on wildlife and their habitats. The Innu Nation emphasized that environmental protection is of top importance (Chapter 22, Engagement).

A review of previous surveys and online databases revealed a total of 34 mammal species (including bats) and seven herptile species with potential to occur within the SSA, LSA, and/or RSA (Appendix 11A). Of these, five are listed as Endangered, Threatened, or Special Concern/Vulnerable under SARA and/or NL ESA; this includes American marten, little myotis (Section 11.4.3), northern myotis (Section 11.4.3), wolverine, and woodland caribou (Section 11.4.4).

Previous Environmental Impact Statement Surveys

Two aerial winter wildlife surveys were completed on 27 January 2012 and 27 March 27 2012. Aerial transects spaced at 2 km intervals were flown throughout the wildlife RSA for that EIS. Ten wildlife species or signs were detected during the two surveys, including snowshoe hare, moose, wolf, Canada lynx, red fox, American marten, ermine, river otter, porcupine, and red squirrel. The surveys noted possible coyote tracks as well (Alderon 2012). During waterfowl surveys conducted in 2011 (Section 11.4.2), black bear and beaver were also identified incidentally.

[3] Caribou telemetry data have been requested from the Government of Newfoundland and Labrador and the Government of Québec but were not received in time to incorporate into the assessment of population trends for the draft EIS.

An amphibian survey was conducted in July 2012 in the Wabush tailings area and two candidate protected areas outside the LSA. Wood frog and American toad were noted during these surveys. In addition, two northern two-lined salamanders were detected in the RSA in Walsh River; however, observers predicted that this species would not likely occur in the Project LSA because there is no similar, appropriate habitat (Alderon 2012).

Current Environmental Impact Statement Surveys

Four trail cameras were deployed within the Project area on September 20, 2023, to detect potential wildlife. The cameras were checked on January 30, 2024, but only cameras 1 and 4 could be accessed due to snow conditions; their batteries were changed and Secure Digital memory cards were downloaded. All cameras were retrieved on November 6, 2024, and were still functioning at the time of retrieval. Approximately 5,000 pictures were captured between the four trail cameras. Wildlife species were observed on cameras 1 and 4. Camera 1 recorded two moose (a young bull on September 24, 2023, and a calf on June 23, 2024), while Camera 4 captured a snowshoe hare (March 24, 2024), a spruce grouse (November 21, 2023), a fox sparrow (May 30, 2024), and three unidentified birds (August 17, September 4, and September 17, 2024).

There were no additional field surveys specifically targeting mammals or herptiles as part of this EIS; however, incidental observations of mammals and amphibians were recorded during bird and bat surveys (described in Section 11.4.2 and Section 11.4.3, respectively).

Valued Environmental Component Selection

The previously approved EIS included a "Birds, Other Wildlife and Their Habitats and Protected Areas" VEC (Section 20, Alderon 2012). This group included migratory and non-migratory birds, amphibians, small mammals, ungulates, and furbearers (Alderon 2012). Mitigation measures were described to limit the effects of the Project on wildlife, and taking those measures into account, the Canadian Environmental Assessment Agency concluded that the Project was unlikely to cause pronounced adverse effects on this group (birds, other wildlife and their habitat and protected areas) from change in habitat, distribution, and movements, or change in mortality risk and health (Alderon 2012; CEA Agency 2013).

The final EIS Guidelines from Newfoundland and Labrador's Department of Natural Resources explicitly requested the current EIS consider reptiles and amphibians, and species and areas important to Indigenous governments and organizations as potential key issues for the Project. In addition, Champion was directed to consider the existing environment and Project effects on flora and fauna, including SAR and relevant habitat, whereby "fauna" should include at a minimum, ungulates (caribou and moose) (Government of NL 2024c).

The other wildlife VEC in this EIS groups together large mammals, furbearers, and herptiles. These groups and the representative species within have been selected because of socioeconomic value, Indigenous Peoples value, and ecological roles. Large mammals are represented in this other wildlife VEC group by moose (*Alces alces*) and black bear (*Ursus americanus*). Moose is a representative species for other mammals that utilize habitats in different stages of ecological succession. Black bear was selected as a representative for predators who are generalist in both habitat selection and prey selection, with large home ranges. Other large mammals occurring in Labrador are summarized in Appendix 11A. Of these, two are SAR/SoCC, including wolverine (*Gulo gulo)*. Although wolverine is provincially listed as Endangered, it was not selected as a VEC because the last confirmed sightings in Labrador and areas in Québec bordering Labrador were in 1965 and 1978, respectively (Dagenais 1988; Moisan 1996; Fortin et al. 2005; COSEWIC 2014).

Furbearer refers to medium- and small-sized mammals that are harvested either Traditionally or commercially. These have been selected as part of the other wildlife VEC group because of socioeconomic value, Indigenous Peoples value, and ecological roles as predators, prey, and environmental architects. Furbearers are represented by American marten (*Martes americana*) and beaver (*Castor canadensis).* Other small mammals/furbearers occurring in Labrador are summarized in Appendix 11A. Of these, one is SAR/SoCC: American marten.

Herptiles consist of amphibians and reptiles. These taxa are part of the other wildlife VEC group because they act as indicators of environmental health, particularly aquatic environments and wetlands. They are also important prey species for birds, mammals, and fish. There are seven amphibian species in Labrador and no known reptiles (Appendix 11A). Currently, there are no SAR or SoCC herptiles listed in Labrador.

The following subsections describe the existing conditions of moose, black bear, American marten, beaver, two lined salamander, and wood frog in the wildlife LSA and vegetation RSA (Figure 11-20). Habitat availability is generally described by habitat associations, seasonal diets, influence of natural and anthropogenic disturbance, and habitat suitability. Habitat distribution is generally described by habitat arrangement and connectivity, home range size and dispersal, and influence of linear features. Survival and reproduction are described by population status, vital rates, and harvest, where applicable.

Table 11-20: Other Wildlife Species Valued Environmental Components

Species Name	Federal Listing under SARA Previous EIS (2012) Current EIS (2025)	Provincial Listing under NL ESA Previous EIS (2012) Current EIS (2025)	Habitat Preferences	Representative Species for other Wildlife in Study Areas	Rationale	Detected in Previous EIS (Alderon 2012)	Detected in Current EIS
Moose (*Alces alces*)	n/a	Secure	Early- to mid-succession deciduous and mixed forest stands, wetlands, riparian areas	Ungulates and small herbivores (e.g., snowshoe hare [*Lepus americanus*]) that use similar seral-stage habitats	Identified in EIS Guidelines; important to Indigenous groups and organizations	Yes	Yes
Black bear (*Ursus americanus)*	Not at risk	Secure	Vegetation-rich areas and forested areas (e.g., Balsam Fir/Black Spruce Forests, Kalmia-Black Spruce Woodland, Mixedwood Forest, Regenerating Forest, Alder and Riparian Thickets, and Wet Coniferous Forests)	Wide-ranging generalist carnivores (e.g., wolf [*Canis lupus*], wolverine, coyote [*Canis latrans*], red fox [*Vulpes vulpes*])	Representative of predator guild, which can have strong influence on dynamics and persistence of ungulates (moose, caribou) which are of importance to Indigenous groups and organizations.	Yes, incidentally	None reported
American marten (*Martes americana atrata*)	Threatened (Newfoundland population)	Vulnerable (Newfoundland population)	Late successional coniferous and mixed forest stands with diverse structure (e.g., standing dead and live trees, fallen dead trees, coarse woody debris)	Small mammals and furbearers (e.g., Canada lynx [*Lynx canadensis*], fisher, ermine, red fox)	Representative of furbearers, which have ecological, social, cultural and economic importance. Representative of species which occur in late-stage boreal forest.	Yes	None reported
Beaver (*Castor canadensis)*	n/a	n/a	Wetlands, forest habitat adjacent to water	Semi-aquatic species (e.g., muskrat, mink [*Mustela vison*], river otter)	Representative of semi-aquatic mammals that occur in habitat types that are highly susceptible to environmental degradation (wetlands, ponds, lakes and streams).	Yes, incidentally	None reported
Two-lined salamander	Not at Risk	Secure	Moist, wooded areas near streams, ponds, and marshes. Abundant leaf litter, fallen logs, and rocks	Northern dusky salamander, blue-spotted salamander	Reptiles and amphibians identified in EIS Guidelines	Yes	No
Wood frog	Not at Risk	Secure	Deciduous and mixed forests, vernal pools for breeding, and various wetlands and uplands. They are known to survive in extreme cold temperatures.	Mink frog, northern leopard frog, spring peeper	Reptiles and amphibians identified in EIS Guidelines	Yes	No

SARA = *Species at Risk Act*; EIS = Environmental Impact Statement; NL ESA = Newfoundland and Labrador *Endangered Species Act*.

11.4.5.1 Moose

11.4.5.1.1 Habitat Availability

Moose inhabit a mosaic of boreal and mixed forests below the arctic of Canada, preferring areas with deciduous aspen, shrubland, and wetlands interspersed with trees and shrubs or disturbed areas with early-successional vegetation (Franzmann 2000; Courtois et al. 2002; Osko et al. 2004; Nelson et al. 2008; Chubbs and Schaefer 1997; Jung et al. 2009). In boreal regions, including Labrador, deciduous trees and shrubs are crucial for moose, particularly during winter when forage is scarce (Stelfox 1993; Jung et al. 2009). Moose have been documented browsing on willow sp. (*Salix* spp.) and white birch (*Betula papyrifera*) in riparian areas and regenerating clear-cut stands during winter (Newbury et al. 2007; Jung et al. 2009). Moose habitat selection is related more to food availability than cover, but they will avoid deep snow areas in winter by seeking mature coniferous stands (Romito et al. 1999; Courtois et al. 2002; Jung et al. 2009; Stewart et al. 2010; SNC-Lavalin Environment 2012). The ideal availability of food may be when landscapes are composed of approximately 25% to 40% primary habitat (Romito et al. 1999; Higgelke et al. 2000), which includes alder thicket, riparian thicket, hardwood forest, coniferous, and mixed forests. These habitat types are found within the wildlife LSA (Appendix 11B).

Dense shrub growth in burned areas is highly suitable habitat for moose (Jung et al. 2009). Regenerating burned areas become functional habitat 6 to 10 years after disturbance, although the fire intensity and severity influence the number of years until moose start using these areas (Nelson et al. 2008; Street et al. 2015a,b). Shrubs are typically available for browsing six to 26 years post-fire. Between 1980 and 2025, 131 ha burned in the LSA, representing 1.7% of the LSA (Figure 11-11). A review of wildfire disturbance since 1980 determined that the most recent fire greater than 1,000 ha to affect the wildlife RSA occurred in 2024, covering an area of 19,059 ha. Approximately 61.6% of the wildfires since 1980 that occurred in the wildlife RSA are 6 to 26 years old (i.e., occurred between 1999 and 2019), which is when the most desirable regenerating vegetation for moose is expected to be most abundant. These regenerating areas were classified as highly suitable habitat for moose in the existing environment (Table 11-21, Appendix 11B).

Baseline field surveys completed in 2011 and 2012 identified moose in the wildlife RSA (Alderon 2012). They were observed in various habitats, including mature and young conifer forests, mature and young mixed forests, burnt habitats, and open/bare lands and bogs (SNC-Lavalin Environment 2012). The Lower Churchill Project Consultation Assessment Report highlights the presence of moose and other culturally important wildlife to the Naskapi Nation of Kawawachikamach in the wildlife LSA and wildlife RSA (Nalcor Energy 2010).

In the existing environment, the wildlife LSA contains an estimated 315 ha (4.1%) of high-suitability habitat, 3,092 ha (40.1%) of moderate-suitability habitat, and 3,203 ha (41.6%) of low-suitability habitat for moose (Table 11-21, Figure 11-13). Collectively, moderate- and high-suitability habitat represent 3,407 ha (44.2%) of the wildlife LSA and 20,270 ha (50.8%) of the vegetation RSA. High- and moderate-suitability moose habitat in the wildlife LSA is associated with regenerating habitats following a burn, thickets, riparian habitat, hardwood, coniferous and mixed forest ecosites (Appendix 11B).

Table 11-21: Moose Habitat Availability Under Existing Conditions in the Wildlife Local Study Area and Vegetation Regional Study Area

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	315	4.1	1,394	3.5
Moderate	3,092	40.1	18,876	47.3
Low	3,203	41.6	10,219	25.6
Poor	1,097	14.2	9,425	23.6
Total	7,707	100.0	39,914	100.0

(a) Moose habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.1.2 Habitat Distribution

Moose are highly mobile, with annual home ranges often spanning thousands of hectares, enabling access to habitat patches in varied landscapes (Murray et al. 2012; Street et al. 2015a,b). In regions with low primary productivity, their mobility increases (Mace et al. 1984; Risenhoover 1986; Doge et al. 2004; Hundertmark 2007). In northern Québec, moose home ranges for females are an average of 82 km², while males are an average of 28 km² (Dussault et al. 2005; Government of Québec 2025b). Those home ranges are assumed to be comparable to the home ranges of individuals in the wildlife RSA.

Typically, during spring, summer, and fall, moose use lowland to upland forests for browsing fresh shoots and leaves from deciduous shrubs, young deciduous trees, and wetland vegetation. During the fall and winter, moose typically prefer habitats where adequate browse is available and provide dense cover which acts as protection from wind and snowfall (Dussault et al. 2005). Movement patterns are more variable in areas with sizable disturbances or severe winters due to scattered resources and reduced connectivity. Although disturbances and severe winters occur in the wildlife RSA, high- to moderate-suitability habitat are well distributed and connected in the vegetation RSA (Figure 11-13). Seasonal movement patterns and variability in habitat selection are not specifically known for moose in the wildlife RSA.

Historically the wildlife RSA was shaped by wildfires, insect outbreaks, and disease, but the current forest composition and structure is now heavily influenced by fire suppression (Government of NL 2025g). This activity has affected forest age distribution and composition in the wildlife LSA and RSA (i.e., older forests that have not undergone recent wildfires).

The wildlife LSA is dominated by boreal coniferous species (e.g., spruce and jack pine), and mixedwood forests and wetlands, which were classified as moderate- and low-suitability habitats (Appendix 11B). High- and moderate-suitability habitats are distributed throughout the wildlife LSA under the existing environment conditions (Figure 11-13), with high suitability concentrated in the south and west sections. Low-suitability moose habitat in the wildlife LSA is associated with graminoid and shrub wetlands, alpine habitats, and recent or old fires, while poor-suitability habitat is linked to open water and active disturbances (i.e., highways). Highway 500 (Labrador) and Highway 389 (Québec) bisect the wildlife RSA southwest to northeast, and a railroad bisects the wildlife RSA west to east, potentially disrupting movement and connectivity (Figure 11-13). Overall, suitable moose habitat is widely distributed but mixed with low- and poor-suitability areas.

Narrow anthropogenic disturbances (e.g., trails, rights-of-way, cutlines) may serve as early-successional foraging habitats (Higgelke 1994; Serrouya and D'Eon 2002; Poole and Stuart-Smith 2003) and are unlikely to affect connectivity for moose under existing environment conditions. Moose are more abundant in disturbed habitats, which offer post-disturbance foraging opportunities, although human activity and road density negatively effect movement and habitat connectivity (Bowman et al. 2010; Beyer et al. 2013). Moose avoid roads with higher traffic, especially during fall and winter, which may relate to hunter activity or increased predator presence along linear features (Mytton and Keith 1981; Laurian et al. 2008; Bartzke et al. 2015; McLoughlin et al. 2011; Beyer et al. 2013; Rempel et al. 1997; Bowman et al. 2010). Some studies indicate moose avoidance of roads by 100 m to 3 km, with seasonal variations (Jiang et al. 2009; Laurian et al. 2012; McLoughlin et al. 2011; Beyer et al. 2013).

Linear feature (i.e., highway, local roads, railroad, utility lines, trails) density is estimated at 0.16 km/km² and 0.68 km/km² in the wildlife RSA and LSA, respectively. Highways, and resource roads, may effect moose more during high harvesting activity, while other linear features are less disruptive. Approximately 45.7% of the wildlife LSA consists of suitable moose habitats, with moderate- and high-suitability areas being more contiguous in the north of the LSA (Table 11-21, Figure 11-13).

11.4.5.1.3 Survival and Reproduction

Moose are not listed federally or provincially as a SAR (Government of Canada 2024b; Government of NL 2025a), nor under consideration by COSEWIC (2025). Moose are primarily threatened by altered predator–prey relationships (Dussault et al. 2005; Franzmann 2000), disease and parasites (Severud et al. 2022), collisions on linear features (Joyce and Mahoney 2001; Dorsey 2011) and hunting (Government of NL 2024d).

Moose are long-lived ungulates with relatively high adult survival rates (e.g., 74.6% to 89.9% [including harvest]) (Murray et al. 2012), with a life expectancy of 12 to 20 years in hunted populations (Arsenault 2000). Aerial surveys conducted in 2012 indicate moose populations in the wildlife RSA are declining from estimated population densities of 0.077 individuals/km² in 1995 to 0.014 individuals/km² in 2012 (Chubbs and Schaefer 1997; SNC-Lavalin Environment 2012). Estimated moose densities in the wildlife RSA in 2012 were comparable to estimated densities in central Labrador and adjacent areas of Québec (Chubbs and Schaefer 1997; Jung et al. 2009; Courtois and Lamontagne 1997). Moose have high pregnancy rates and regularly give birth to twins (Boer 1992). In areas of similar moose density as Labrador, (e.g., the Northwest Territories), twin births occur at a higher rate (Stenhouse et al. 1994). In Labrador, twin rates are low occurring in 0 to 11% of pregnancies in southeastern Labrador and 8% to 17% in south Labrador (Chubbs and Schaefer 1997; Jung et al. 2009). In 2000 and 2001, the estimated calf: cow ratio in south Labrador were high when compared to other northern areas (0.79 and 0.5, respectively) (Jung et al. 2009; Ferguson et al. 2000).

A high calf: cow ratio suggests a low rate of calf predation (Jung et al. 2009), which would contribute towards an ecologically effective population in the existing environment.

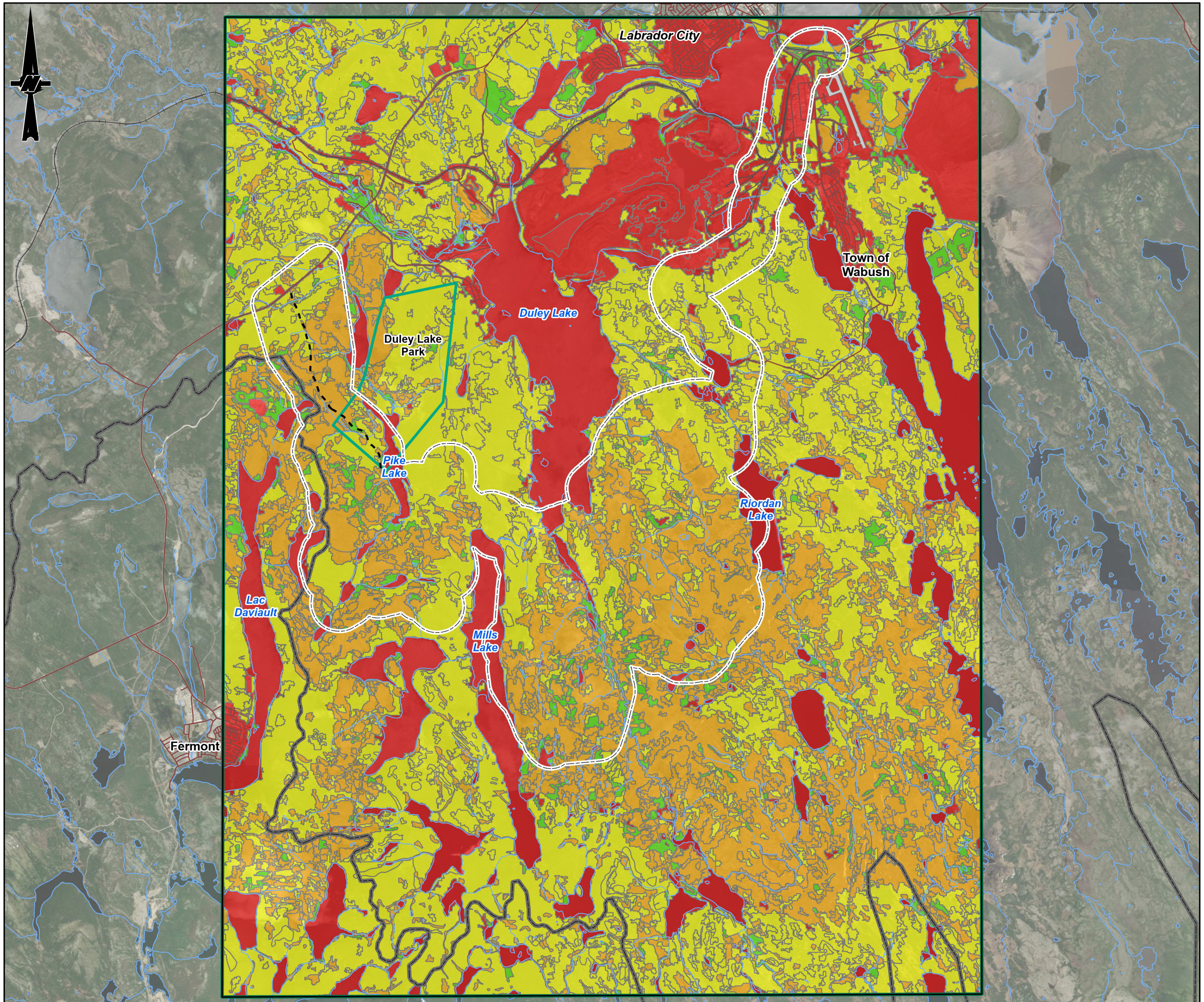
The primary predators of moose in Labrador are wolves, black bear, and occasionally lynx (Chubbs and Schaefer 1997; Jung et al. 2009). Calves are most at risk of predation, although adults can also become prey (Ballard and Van Ballenberghe 1997). Predation and snow conditions are interrelated factors that can affect moose survival and recruitment; deeper snow hinders moose movement, which increases risk of predation (Franzmann 2000). However, low wolf densities have been recorded in Labrador and wolves have rarely been recorded predating on moose in this region (Jung et al. 2009; SNC-Lavalin Environment 2012). The low density of moose populations is likely insufficient to support a high density of predators, and moose may not be the target prey species for predators in the area (Jung et al. 2009).

Diseases and parasites are a threat to moose survival and reproduction, particularly in areas with many other species of ungulates. White-tailed deer are hosts to parasites (e.g., winter tick [*Dermacentor albipictus*] and meningeal worm [*Parelaphostrongylus tenuis*]) which cause high mortality rates in moose (Ranta and Lankester 2017; Priadka et al. 2022; Severud et al. 2022). Deer do not occur in the wildlife RSA; however, diseases and parasites prevalent in more southern ranges of moose may still be transmitted to moose within the wildlife RSA depending on seasonal movement patterns of moose. This is likely a limited threat to moose in the existing environment.

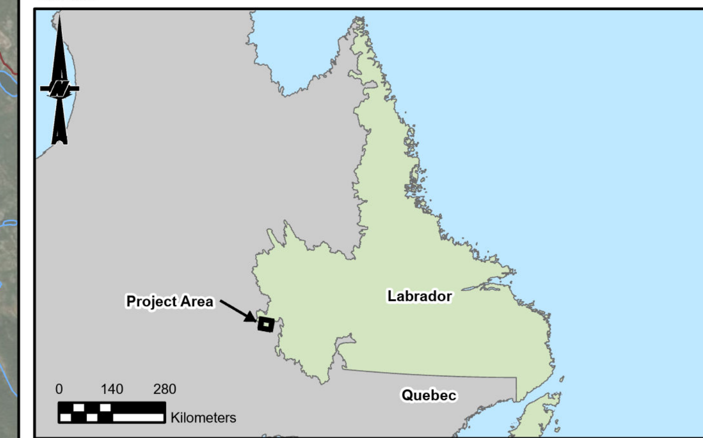
Moose are managed by the Government of Newfoundland and Labrador at the scale of Moose Management Area across the province. The SSA is in Moose Management Area 48: Wabush (Government of NL 2020). The Moose Management Area 48 is bounded to the east by the Québec, North Shore, and Labrador Railroad between Shabo and Ross Bay Junction and extends to the provincial boundary south of Lac Emerillon and is bounded to the south and west by the provincial boundaries. The northern boundary extends south of Lac Boujonnier up to the Québec, North Shore, and Labrador Railroad at Shabo. The number of moose licences issued is based on the moose population, where one licence allows the harvest of one individual of either sex (Government of NL 2024d). A total of five licences were awarded in the 2024–2025 hunting season (i.e., September 14, 2024, to March 9, 2025), which is the same as number of issued licences in previous years (Government of NL 2024d; Alderon 2012). Most of the RSA is located within the Labrador Moose Management Area 48 boundary. However, the RSA also extends into two Québec moose hunting zones, including zones 19 and 23 (Government of Québec 2024).

Other threats to the moose population in the wildlife RSA include vehicle and train collisions. Roadways often intersect prime moose habitat and are used by moose to travel between habitats. Moose are attracted to roadways because of the foraging opportunities on the adjacent regenerating vegetation, and many collisions occur even in areas with very low moose density (Government of NL 2025b; Joyce and Mahoney 2001). A major factor contributing to moose collisions is the relationship between habitat availability around roadways and moose behaviour (Joyce and Mahoney 2001). In summer, roadways can provide wind tunnels to relieve moose from insect harassment, and in winter, roadways provide a movement corridor (Government of NL 2025b). In Newfoundland and Labrador, 70% of moose–vehicle collisions occur between May and October (Government of NL 2025b). The frequency of moose–vehicle collisions is not known for the wildlife RSA, but it is assumed that collisions occur most regularly on the Trans-Labrador Highway because of increased vehicle speeds. In addition to collisions with vehicles, train collisions with moose can cause direct mortality or severe injuries that leads to mortality (Van der Grift 1999, Dorsey 2011, Hamr et al. 2019). Although research on train collisions involving wildlife in Labrador is scarce, factors that increase moose presence on railroads and collisions with trains include snow depths, moose distribution in winter ranges, and their proximity to railroads (Hamr et al. 2019). In Ontario, the collision rate between moose and trains ranged from 0.02 to 0.15 moose/km/year while mortality averaged 265 moose/year across 38 Wildlife Management Units (Hamr et al. 2019). In the wildlife LSA and vegetation RSA, the railroad runs parallel from Labrador City and Wabush to a primary road in the northeast. Approximately 18 km and 41 km of railroad occurs within the wildlife LSA and vegetation RSA, respectively. Approximately 0.9 km of railroad is adjacent to high- and moderate-moose habitat in the wildlife LSA, and 4.6 km is adjacent to high- and moderate-moose habitat in the vegetation RSA. In 2012, winter aerial surveys documented moose away from railroads, although in proximity to primary roads (SNC-Lavalin Environment 2012). Moose were located in the west and south areas of the wildlife RSA (SNC-Lavalin Environment 2012). The potential effects on wildlife from QNS&L rail operations in the Project's wildlife RSA in the existing environment have been considered and mitigated for in Rio Tinto IOC's Biodiversity Conservation Strategy. A letter from Rio Tinto IOC with a description of the Biodiversity Conservation Strategy is included in Appendix 2B of Chapter 2 of the EIS.

Hunting, predation, collisions with vehicles and trains, and disease are expected to affect the survival and reproduction of the moose population overlapping the wildlife RSA in the existing environment. Population trends have consistently indicated a low-density population of moose, and it is expected that the population in the existing environment is ecologically effective.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Moose Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

MOOSE HABITAT SUITABILITY IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

11.4.5.2 Black Bear

11.4.5.2.1 Habitat Availability

Black bears are a slow-growing and long-lived species estimated to live 25 to 30 years in the wild. They are habitat generalists and occupy a wide variety of habitat types throughout the year in response to shifting availability of forage and prey items (Laufenberg et al. 2018). An opportunistic omnivore, black bears primarily forage for plants and insects (Graber and White 1983; Greenleaf et al. 2009; Bastille-Rousseau et al. 2011) and will hunt or scavenge when possible (Allen et al. 2014). Black bears rely heavily on fruits (e.g., blueberry, cherry), graminoids and forbs (Greenleaf et al. 2009). They are also known to be important predators of neonate/young ungulates (Zager and Beecham 2006; Mumma et al. 2016) and consume hare on the Island of Newfoundland (Mumma et al. 2016). On the Island, over 30% of predated caribou calves are killed by black bears (Lewis and Mahoney 2014; Lewis et al. 2017). However, black bears likely hunt moose and caribou neonates opportunistically as research indicates they select habitats rich in vegetation rather than selecting habitat with a higher likelihood of encountering ungulates (Bastille-Rousseau et al. 2011).

Black bears have the capacity to adapt and be resilient to existing natural and human-related disturbances and associated variations in habitat availability. Black bears may also benefit from wildfire since berry production and moose densities increase in recently burned areas (Schwartz and Franzmann 1989, 1990; Fisher and Wilkinson 2005). The only fire in the LSA was in the southwestern area and occurred 29 years ago in 1996, making it older than the optimal age for increased berry production and moose density. As such, it was categorized as moderate suitability instead of high.

Anthropogenic disturbances represent 7% (2,830 ha) of the vegetation RSA (Table 10-4 in Chapter 10, Vegetation, Wetlands, and Protected Areas). Bears are highly sensitivity to disturbance during the winter months (i.e., hibernation; Section 11.4.5.2.3), but are able to persist in a diversity of habitats and in highly fragmented forested areas in close proximity to humans due to their ability to adjust their diet to the circumstances of their environment (Garshelis et al. 2016). McLoughlin et al. (2019) found that habitat use by black bears increased closer to linear features at the home range scale and that black bears generally selected linear features at all seasons and scales. Linear features were highly selected by bears in peatlands and other land covers in northeast British Columbia (DeMars and Boutin 2018). Avoidance effects from sensory disturbance may not be detected during much of the year because black bears can be drawn to attractants associated with anthropogenic disturbance. Although black bears sometimes avoid human activity and development (Vander Heyden and Meslow 1999; Reynolds-Hogland and Mitchell 2007; Simek et al. 2015), suitable habitats that occur adjacent to developments, including active mines, can be used. Results from a five-year remote camera study in the Alberta Oil Sands Region suggested that black bear detection rates were higher at distances farther away from active mines compared to areas closer to mines, but the trend was not statistically significant (Boutin et al. 2015). Black bear habitat selection was not influenced by sensory disturbance in North Carolina (Telesco and Van Manen 2006).

Black bear habitat suitability preference varies seasonally. The range of habitats used remains largely unchanged year-round, but black bears select for specific habitats during certain times of the year typically according to the availability of food. For example, berries are a primary food source of black bears in summer and fall; as such, black bears are more likely to be found in habitat types with higher proportions of berry-producing vegetation (e.g., where dominant canopy height and density are low) during those seasons (Hébert et al. 2008). Seasonal black bear habitat preferences were not accounted for in habitat suitability models presented in this report; rather, a conservative approach was taken to quantify available suitable habitat in the LSA and vegetation RSA based on a blended habitat model that focuses on the generalist nature of black bears (Table 11-22, Appendix 11B).

Vegetation-rich areas are important to black bear, as they contain a wide variety of forage species (Bastille-Rousseau et al. 2011). Areas with forest cover are also important to black bear for security, protection and bedding sites. Balsam Fir/Black Spruce Forests, Kalmia-Black Spruce Woodland, Mixedwood Forest, Regenerating Forest, Alder and Riparian Thickets, and Wet Coniferous Forests are ranked as high importance for black bear in the Project study areas (Table 11-22) as these habitat types include diverse forage as well as sufficient cover (Lyons et al. 2003; Brodeur et al. 2008b; Carter et al. 2010; Obbard et al. 2010). These habitat types include plentiful herbaceous plants (e.g., bunchberry [*Cornus canadensis*], cloudberry [*Rubus chamaemorus*], dewberry [*Rubus pubescens*]), shrubs (e.g., blueberry [*Vaccinium* spp.], fire cherry [*Prunus pensylvanicum*], raspberry [*Rubus idaeus*], currant [*Ribes* spp.], crowberry [*Empetrum* spp.], partridgeberry [*Vaccinium vitis-idaeus*]), forbs, graminoids, and horsetails (*Equisetum* spp.), which are consumed by black bears (Graber and White 1983; Greenleaf et al. 2009; Bastille-Rousseau et al. 2011). The trees and understory in these habitat types also provide adequate cover for black bear. There are approximately 520 ha (6.7%) of high-suitability habitat available to black bears in the LSA (Table 11-22, Figure 11-14).

Habitat types of moderate importance to black bear include Open Wetlands, Open Water and Anthropogenic habitats (Appendix 11B) (Carter et al. 2010; Latham et al. 2011c). While these habitats may provide some of the preferred forage species, they occur in lower quantities and lack the trees used as cover by black bear. Some anthropogenic habitats may provide plentiful forage (e.g., cleared areas adjacent to roadways) or easy access to human food (e.g., garbage cans and dump sites); however, these habitats can present higher risks due to their proximity to humans and traffic. There are 3,461.5 ha (44.9%) of moderate habitat available to black bears in the LSA.

In winter, black bears require secluded areas for denning and will use a wide variety of den structures such as existing caves or tree cavities, excavated underground chambers, exposed root masses of overturned trees, brush piles, and even above-ground nests/elevated dens (Garshelis et al. 2016). Denning requirements of black bears in the RSA are unknown but expected to be variable. Kolenosky (1987) found that 89% of black bear dens in eastern Ontario were excavations, of which 41% were under trees or stumps, 23% were under logs, and 36% were dug into the soil. The other 11% of the dens were in hollow logs and trees, in rock caves, or under piles of man-made debris. Neufeld (2018) observed that den sites of 14 black bears in the Boreal Shield of Saskatchewan were more than 100 m from water and at least 14 km from a road. Gantchoff et al. (2019) showed that, except for sows with cubs, black bears in the midwestern United States selected den locations farther from roads than what would be predicted by availability on the landscape. Investigated dens included southern-facing banks and under a tree, catching snow. The availability of den sites is rarely considered limiting for this species. Exceptions are areas that flood (White et al. 2001) or where bears prefer a specific den type (e.g., hollow tree), the abundance of which may be reduced through logging or other human activities (Davis et al. 2012). Fire may also decrease appropriate denning habitat because black bears prefer to den in areas with mature cover and avoid denning in regenerating habitats (Tietje and Ruff 1980). In the existing environment, regenerating habitat comprises 14.6% of the vegetation RSA while most of the remaining area is assumed to be mature habitat, thus denning features are not expected to be limited within the vegetation RSA.

Overall, suitable black bear habitat is abundant in the LSA and vegetation RSA (Table 11-22). Furthermore, suitable habitat is not limiting in the surrounding environment. Baseline field studies completed in 2011 and 2012 identified black bear sign in the wildlife RSA (Alderon 2012). Five black bear signs were observed (scat, trail, and/or tracks) incidentally during forest songbird surveys conducted on the property and again during waterfowl surveys conducted in 2011; however, locations and habitat types of individual observations were not recorded (Alderon 2012).

Table 11-22: Black Bear Habitat Availability Under Existing Conditions in the Wildlife Local Study Area and Vegetation Regional Study Area

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	519.8	6.7	2,386.2	6.0
Moderate	3,461.5	44.9	11,628.2	29.1
Low	2,961.6	38.4	19,303.9	48.4
Poor	764.4	9.9	6,595.2	16.5
Total	7,707.4	100.0	39,913.5	100.0

(a) Black bear habitat quality categories are described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.2.2 Habitat Distribution

High-suitability habitat is sparse in the wildlife LSA (Figure 11-14). Moderately suitable habitats are relatively evenly distributed throughout the LSA and the southern part of the vegetation RSA (Figure 11-14). High- and moderate-suitability habitat are more abundant in the southeast region of the vegetation RSA and sparse in the northern area nearest anthropogenic development, including Labrador City and Wabush. The prevalence and distribution of high- and moderate-suitability habitat suggests that black bears are able to move freely throughout the LSA and vegetation RSA; even in areas of moderate anthropogenic development (e.g., near the town of Wabush), there appears to be movement corridors of suitable habitat that would facilitate connectivity between the low and poor habitat (Figure 11-14).

Black bear home range size fluctuates in response to food availability (Koehler and Pierce 2003). As such, bear presence and occupancy within the LSA and vegetation RSA may be reduced during years of low food abundance. When food availability is low, individual home ranges increase since bears will travel greater distances (i.e., up to 200 km) to obtain adequate amounts of food (Pelchat and Ruff 1986; Garshelis et al. 2016). Mosnier et al. (2008) reported that females with cubs had considerably smaller home ranges than adult females without cubs. In northeastern Labrador, average annual home range size for adult male and female black bears were reported to range from 31 to 343 km^2 and 21 to 221 km^2, respectively (Chaulk 2001). These home ranges are larger than average home ranges observed in more productive forests, which suggests that relative density of black bears in the Boreal Shield is low (McLoughlin et al. 2019). Black bear males tend to disperse farther from natal home ranges than females since males travel longer distances to mate with females (Schwartz and Franzmann 1992); as such, they require suitable habitat across a broader expanse.

11.4.5.2.3 Survival and Reproduction

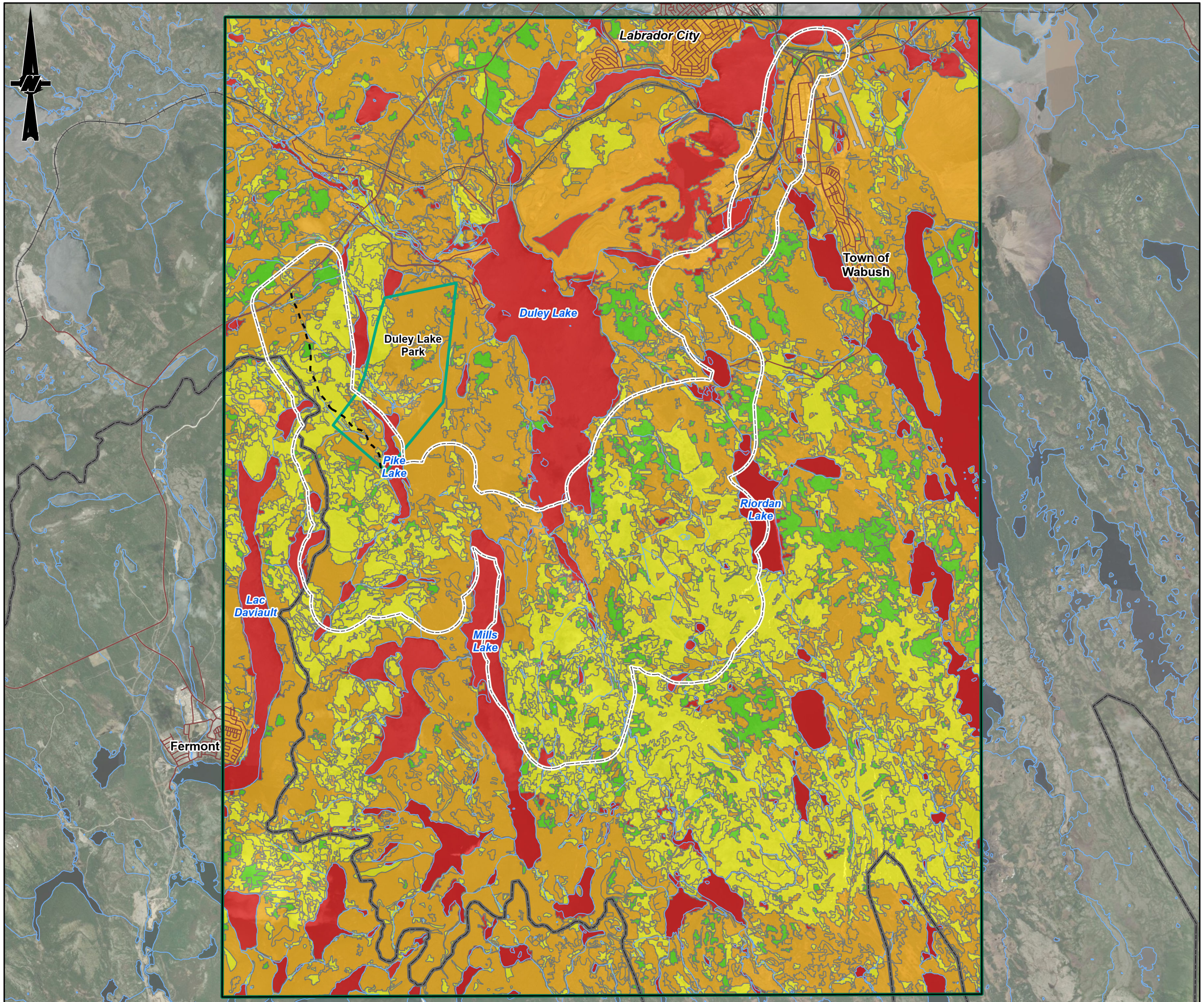
The black bear population in Newfoundland and Labrador is estimated to be between 6,000 to 10,000 bears (Government of NL 2025d) and are tracked through the annual harvest licence sales, although most recent data available online are from 2010 and only for insular Newfoundland (Government of NL 2011). Black bear is not a provincially tracked or federally listed species (Government of Canada 2024b; Government of NL 2025a) and is considered not at risk by COSEWIC (Government of Canada 2024b).

The main limiting factors or threats affecting black bear survival, abundance, and distribution are likely harvest pressure and anthropogenic development and activities, including vehicle collisions (Schwartz and Franzmann 1990; Tri et al. 2017). Black bears in Newfoundland and Labrador are harvested as a game species. In Labrador, the Black Bear Management Area 200 Labrador is a single area covering the entirety of the mainland province (Government of NL 2025a). It has two hunting seasons from April 1 to July 13 and August 10 to November 30 (Government of NL 2025d). Licensed hunters are permitted two bears per year, either two in a single season or one per season. Most recent data available from 2011 estimated the annual harvest of black bear on the island of Newfoundland was approximately 700 individuals. The annual harvest numbers and licence sales have continually increased since 1983, indicating confidence in the security of black bear populations on the island. Harvest records were not available for mainland Labrador (Government of NL 2011). Additionally, black bear hunting has been gaining in popularity in recent years (Alderon 2012).

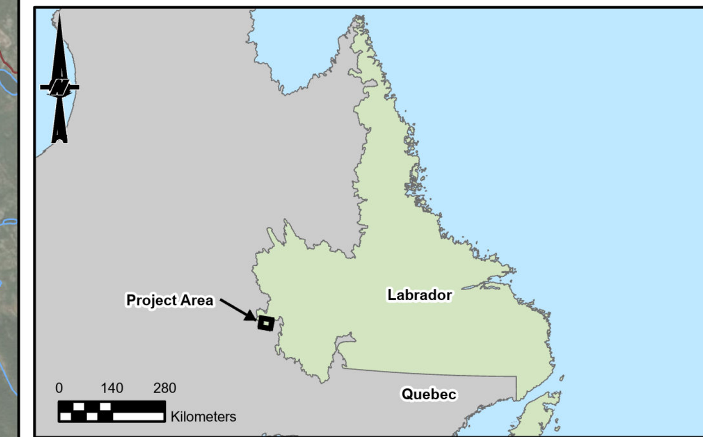
The LSA sits within a highly developed anthropogenic area aggregated around the Trans-Labrador Highway and consisting of Labrador City, several large open-pit mines, linear features (e.g., roads, trails), and a major rail corridor. It is likely that black bears currently inhabiting the region are generally adaptive and resilient to existing anthropogenic developments. However, bears are highly sensitive to sensory disturbance during winter hibernation and may abandon their dens if disturbance occurs within 1 km of their den site (Linnell et al. 2000). Black bears in North America seem to tolerate disturbance more than 1 km away from den sites (Linnell et al. 2000); however, activity less than 1 km away, and especially within 200 m of dens, caused variable responses (i.e., some dens were abandoned, while other bears tolerated close disturbance). In addition, Gantchoff et al. (2019) found that the effects of sensory disturbance on black bear habitat availability are expected to be highest during the winter when animals are denning and thus selecting habitat away from anthropogenic disturbance. Based on this literature review, under existing conditions, it was assumed that black bear are generally adapted and resilient to anthropogenic disturbance in the LSA and vegetation RSA during most of the year, but denning may be disturbed, and dens potentially abandoned as a result of anthropogenic activities in the winter.

Black bears are known to habituate to people and anthropogenic environments, and black bears habituated to human foods may lose their fear of humans (Greenleaf et al. 2009; Lewis et al. 2015). Habituation could result in increased encounters between humans and black bears and increased mortality for black bears if they are deemed to be a threat to humans. However, the prevalence of anthropogenic development in the study area suggests that black bears are tolerant of living near human development and furthermore, Herrero et al. (2011) reported no pattern of habituation as the cause of 54 fatal black bear attacks between 1960 and 2009. As such, the risk of increased habituation of black bears is negligible.

Other limiting factors for black bear in the region may include disease and infanticide. Several parasites are known to infect black bears (e.g., ticks, lice, tapeworms) but there is little research on how they affect black bear populations. While black bears have no predators in Newfoundland and Labrador, they can experience infanticide and cannibalism from other bears (LeCount 1987; Schwartz and Franzmann 1990).



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Black Bear Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

BLACK BEAR HABITAT SUITABILITY IN THE EXISTING ENVIRONMENT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-14

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.5.3 American Marten

11.4.5.3.1 Habitat Availability

The American marten is commonly associated with mature coniferous and mixed forests with high structural complexity, abundant coarse woody debris, and a well-developed understory (Buskirk and Ruggiero 1994; Clark et al. 1987; Lyon et al. 1994; Payer and Harrison 2000; Slauson et al. 2007; Thompson and Harestad 1994; Thompson et al. 2012). They can also inhabit second growth forests with sufficient structural complexity but avoid open habitats with low canopy cover such as bogs, meadows, and burns (Bowman and Robitaille 1997; Hearn et al. 2010; Mowat 2006; Thompson et al. 2008; Cheveau et al. 2013; Godbout and Ouellet 2008; Koehler and Hornocker 1977; Taylor and Abrey 1982). Structural complexity is crucial for martens as it provides optimal conditions for foraging, resting, and reproduction. They use hollow trees for rest sites and dens, which are often found in large tree cavities, snags, coarse woody debris, or rock crevices (Bull et al. 2005; Buskirk and Ruggiero 1994). American marten hunt small mammals around coarse woody debris, stumps, and rocks, which enhance their foraging efficiency as it provides marten with sensory cues to locate their prey (Andruskiw et al. 2008). In winter, these habitat features also serve as access points to subnivean resting sites and hunting areas (Buskirk and Ruggiero 1994; Andruskiw et al. 2008).

In eastern Canada's boreal forests, marten prefer late-seral mixedwood stands over 70 years old due to their complex structure, which reduces predation risk and offers more prey and denning sites (Cheveau et al. 2013; Potvin et al. 2000). Mixedwood stands dominated by trembling aspen (*Populus tremuloides*) produce extensive coarse woody debris, especially between 80 and 130 years old (Hély et al. 2000; Pedlar et al. 2002). In Labrador, marten prefer dense canopy stands and avoid open habitats due to higher predation risks and lower prey density (Smith and Schaefer 2002; Buskirk and Ruggiero 1994; Thompson and Colgan 1994). Historically, fire was the main disturbance in these forests, creating a mosaic of forest ages (Bergeron et al. 2001; Carleton 2001). Larger fires reduced marten habitat, while smaller, frequent fires improved it by creating suitable habitats (i.e., snags and coarse woody debris) for their prey (Brassard and Chen 2010; Pedlar et al. 2002). Fire suppression efforts since the 1960s have led to older forest stands, benefiting martens by accelerating the accumulation of coarse woody debris and snags (Government of NL 2010).

Baseline field surveys completed in 2011 and 2012 identified American marten in the wildlife RSA but did not specify habitat associations where martens were detected (Alderon 2012).

In the existing environment, the wildlife LSA contains an estimated 2,991 ha (38.8%) of high-suitability habitat, 141 ha (1.8%) of moderate-suitability habitat, and 3,478 ha (45.1%) of low-suitability habitat for American marten (Table 11-23; Figure 11-15). Collectively, moderate- and high-suitability habitat represent 3,132 ha (40.6%) of the wildlife LSA and 19,094 ha (47.8%) of the vegetation RSA. High- and moderate-suitability American marten habitat in the LSA and vegetation RSA is associated with coniferous, mixed-wood and deciduous forest ecosites.

Table 11-23: American Marten Habitat Availability Under Existing Conditions in the Wildlife Local Study Area and Vegetation Regional Study Area

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	2,991	38.8	18,534	46.4
Moderate	141	1.8	560	1.4
Low	3,478	45.1	11,394	28.6
Poor	1,097	14.3	9,425	23.6
Total	7,707	100.0	39,913	100.0

(a) American marten habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.3.2 Habitat Distribution

American marten home ranges vary depending on sex, location, prey availability, habitat conditions, and population density (Buskirk and McDonald 1989). In Labrador, home-range size of males are larger than females, averaging 45 km² compared to 28 km² for females (Smith and Schaefer 2002). Martens generally avoid open areas lacking overhead cover but may travel along edges or cross openings under 600 m wide (Buskirk and Powell 1994; Snyder and Bissonette 1987). They tend to respond more strongly to forest fragmentation than proximity to roads, potentially compensating by expanding home ranges in disturbed landscapes (Chapin et al. 1998; Buskirk and Ruggiero 1994; Thompson and Colgan 1994; Fuller and Harrison 2005).

Marten dispersal behaviour is not well understood, but they have been documented dispersing through habitat patches that are unsuitable for occupation (Wasserman et al. 2010) and are known to avoid large treeless areas over 5 km wide (Buskirk and Ruggiero 1994). Juveniles can travel up to 80 km to establish a range but typically disperse less than 20 km in boreal forests (Broquet et al. 2006; Johnson et al. 2009). Evidence suggests that marten genetic diversity and population structure are not particularly sensitive to habitat arrangement (Broquet et al. 2006; Koen et al. 2012). Martens have good dispersal abilities and only a few successful dispersers are required to maintain gene flow within a population (Broquet et al. 2006; Kyle and Strobeck 2003). The lack of strong genetic structure indicates that dispersal and large-scale disruptions in gene flow are not greatly impeded in areas of high disturbance (e.g., forest harvesting; Koen et al. 2012; Kyle and Strobeck 2003). Despite habitat changes, marten genetic diversity and population structure remain stable, indicating dispersal abilities are sufficient to maintain stable populations.

Suitable habitat for American marten is predicted to be abundant and widespread throughout the wildlife LSA and vegetation RSA under existing conditions (Table 11-24, Figure 11-15). Observations during previous field studies confirm American marten presence in the wildlife RSA (Alderon 2012). Habitat connectivity is not a limiting factor for this species given its ability to disperse long distances across various habitat types, and combined changes from natural and human-related disturbance under existing conditions appear within the resilience and adaptability limits of this species.

11.4.5.3.3 Survival and Reproduction

American marten (Newfoundland population; *Martes americana atrata*) is provincially listed as Vulnerable (Government of NL 2023) and federally listed as Threatened, although under consideration for a status change federally (Government of Canada 2024a,b). In 2022, the American marten (Newfoundland population) was reassessed and designated Special Concern by COSEWIC (Government of Canada 2024a,b). The Newfoundland population is geographically isolated and genetically and ecologically distinct from the American marten found across the boreal region of Canada, including in Labrador (Government of Canada 2024a,b). The Labrador and northern Québec population of American marten is part of the subspecies *Martes americana brumalis* that is not listed federally (Government of Canada 2015b; Government of Canada 2024a,b) or provincially (Government of NL 2010), nor under consideration by COSEWIC (2025). Their abundance in the RSA has presumably been influenced by multiple factors, including quality and quantity of available habitat, prey abundance, harvest, and connectivity.

Habitat loss and fragmentation are primary threats to martens (Stone 2010). Marten abundance declines when forest openings (from anthropogenic and natural sources) exceed 25% of the landscape, despite connectivity between forested patches and the presence of prey (Hargis et al. 1999). They avoid roads, and their abundance declines with increased road density (Robitaille and Aubry 2000; Nielsen et al. 2007). Habitat removal effects overhead cover and presence of coarse woody debris, affecting prey communities and increasing juvenile mortality (Buskirk and Ruggiero 1994; Hargis et al. 1999; Johnson et al. 2009). Martens are opportunistic feeders, primarily eating mice and voles, which also have population cycles (Powell et al. 2003). Prey shortages can suppress marten reproduction, affecting population growth (Thompson and Colgan 1987; Fryxell et al. 1999).

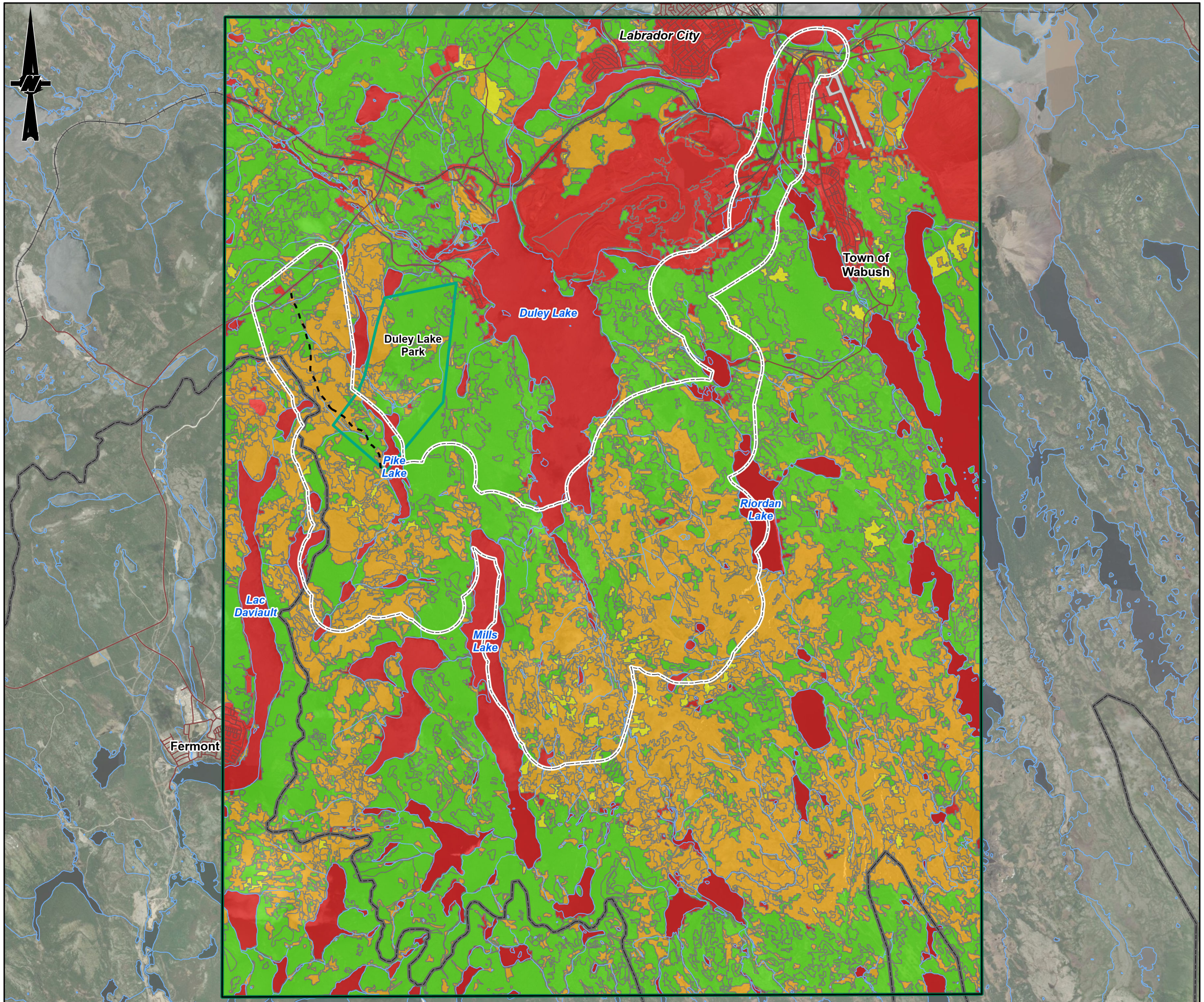
Comparatively, fire suppression in marten habitat has likely had a positive effect on the species. Fire suppression since the 1960s has increased late-successional closed canopy conditions, benefiting martens (Government of NL 2025g). Whether the benefits of fire suppression in the wildlife RSA have outpaced adverse effects associated with concurrent developed land is not known. Both habitat change and prey abundance influence marten populations. However, because of existing levels of anthropogenic disturbance in the wildlife LSA (e.g., infrastructure, commercial development, roadways and railroads) American marten population are likely to be limited by current disturbance under existing conditions.

American martens are economically important furbearers in Labrador, harvested for their fur (Landriault et al. 2012; Government of NL 2010. Martens are susceptible to overharvesting because of their large spatial requirements and relatively low reproductive rates compared to similar sized mammals but can rapidly grow populations given suitable habitat (Buskirk and Ruggiero 1994; Fryxell et al. 2008; Johnson et al. 2009). Despite this, martens have shown resiliency to harvest pressure due to their reproductive potential and dispersal capabilities (Fryxell et al. 1999; Fryxell et al. 2001; Powell et al. 2003; Banci and Proulx 1999).

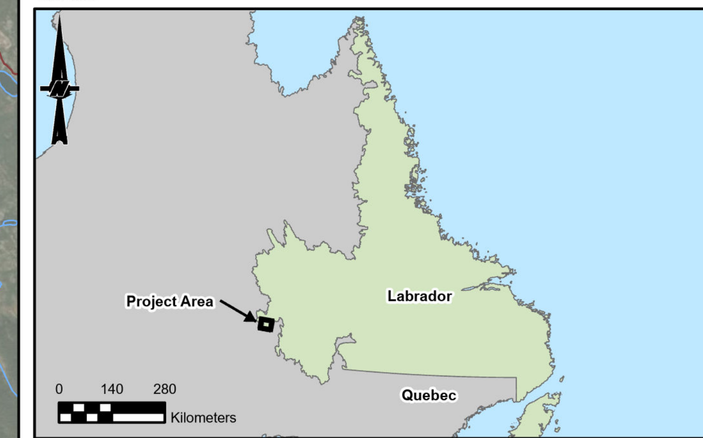
American marten are harvested by trapping in two fur zones (Government of NL 2025b). The LSA overlaps with the Labrador South Fur Zone, which extends up to 54 degrees/55 degrees latitude. Trapping in the 2024/2025 season occurred between November 1, 2024, and March 20, 2025 (Government of NL 2025d). Most of the wildlife RSA is located within the Labrador South Fur Zone boundary. The wildlife RSA also extends into two Québec fur-bearing animal management units (UGAF), including UGAF 60 and UGAF 96 (Government of Québec 2025a).

The boreal forests habitat for American marten may be affected by environmental stress and disturbances from changes in climatic extremes and seasonality (Price et al. 2013). Increase in temperature and changes in water availability are an imminent threat to the functions of boreal ecosystems, as they are particularly sensitive to climate-related changes and threatened by warming and drying (Price et al. 2013). Drier conditions may lead to changes in structural complexity that is crucial for the American marten. Climate change may also effect boreal forests from an increased occurrence of convective storms, lighting-caused fires, wind damage, flooding, hot and dry conditions may prevent successful establishment of conifer seedlings, pioneer species may outcompete conifers by their ability to regrow following drought and fire, and interval between fires may become too short (Price et al. 2013; Loehle 2003; Goldblum and Rigg 2005; Price et al. 2001). Many of these environmental stress and disturbances could effect available habitat for the American marten in the wildlife RSA as it is currently described in the existing conditions.

All these factors are expected to affect the survival and reproduction of the American marten population overlapping the wildlife RSA in the existing environment.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

American Marten Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
AMERICAN MARTEN HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-15

11.4.5.4 Beaver

11.4.5.4.1 Habitat Availability

The beaver is a semi-aquatic mammal that inhabits a variety of aquatic habitats such as lakes, ponds, and slow-flowing streams. The species is found across forested regions of Canada (Cassola 2016). Beavers build lodges out of mud, sticks, logs, and debris in areas that are near adequate food sources and building resources, and in a waterbody deep enough that the underwater lodge entrance will not freeze during winter (Boonstra 2013). Beavers are territorial animals, and the core area of a beaver's territory is likely to include lodge sites, escape cover, and preferred feeding areas (Havens et al. 2013).

Beavers are not considered sensitive to anthropogenic disturbance, as dams are often created at human-made structures where human activity is common (e.g., culverts under roads) (Boyles and Savitzky 2008). A study completed in northeastern British Columbia found no evidence that anthropogenic linear features decreased the likelihood of occurrence or distribution of beaver (Mumma et al. 2018). Anthropogenic disturbances represent 7% (2,830 ha) of the vegetation RSA in the existing environment (Table 10-4 in Chapter 10, Vegetation, Wetlands, and Protected Areas), are aggregated around the Trans-Labrador Highway throughout the study area and largely consist of several other open pit mines around Labrador City, linear features (e.g., roads, trails), and a major rail corridor. Beavers are expected to have the capacity to adapt and be resilient to existing human-related disturbances and associated variations in habitat availability in the wildlife LSA and RSA.

Optimal habitat for beavers in the existing conditions vegetation RSA consists of open water (less than 8 ha in surface area) and riparian areas adjacent to foraging areas of upland deciduous forest or thicket swamp. Under existing conditions, high- and moderate-suitability habitats total 361.9 ha (11.5%) in the LSA and 1,415.9 ha (7.65%) in the vegetation RSA (Table 11-24, Figure 11-16).

Low-suitability habitat represents 1,886.1 ha (60.1%) of existing conditions in the LSA and 9,849.3 ha (52.6%) of the existing conditions vegetation RSA, while poor habitat represents the remaining 891.2 ha (28.4%) of the LSA and 7,462.2 ha (39.85%) of the vegetation RSA. Most of the existing conditions in the SSA and vegetation RSA contain low- and poor-suitability habitat, which is related to the extent of conifer swamps and upland forest. Although beavers may consume young coniferous trees, their preferred food consists of deciduous trees and shrubs that grow adjacent to waterbodies (Jenkins and Busher 1979).

Table 11-24: Beaver Habitat Availability Under Existing Conditions in the Wildlife Local Study Area and Vegetation Regional Study Area

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	150.4	4.8	550.2	2.9
Moderate	211.5	6.7	865.7	4.6
Low	1,886.1	60.1	9,849.3	52.6
Poor	891.2	28.4	7,462.2	39.9
Total	3,139.2	100.0	18,727.4	100.0

(a) Beaver habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.4.2 Habitat Distribution

High- and moderate-suitability habitat (as described in Figure 11-24) is sparsely distributed throughout the LSA and vegetation RSA (Figure 11-16). Low-suitability habitat is much more common and connects areas of high and moderate suitability throughout the vegetation RSA, allowing beavers to move freely throughout the area. Most beaver habitats are in the southern portion of the vegetation RSA and located away from the concentrated anthropogenic development in the northeastern area (e.g., Labrador City).

Home range size for beavers can vary greatly depending on many factors, including age, sex, season, type of habitat and social organization of the family. A study showed that the mean home range for beavers in North America was 11.8 ± 5.6 ha, but when three outliers were included, the home range increased to 20.8 ± 26.5 ha (Touihri et al. 2018). The study also showed that a minimum of 0.8 km of stream length or 1 km^2 of lake must be available for beaver colonization to occur (Touihri et al. 2018). Average home range size measured for a non-harvested population of beavers in Illinois was 6 ha (Bloomquist et al. 2012). A population in the boreal region of Manitoba had an average summer home range of 10.3 ha and an average fall home range of 3 ha (Wheatley 1994). Based on this literature, it was assumed that beaver in the existing conditions LSA have an average annual home range size of 10 ha but could vary between 3 and 10 ha during the year. Because beaver home ranges may overlap, it is expected that the wildlife LSA could support numerous individuals in the existing environment.

Beavers will generally stay near their lodge sites but have been observed to forage up to 100 m from aquatic habitats (Boyle and Owens 2007). The beaver diet varies seasonally, and the type and abundance of food sources available in an area play an important role in determining beaver distribution (Leary 2012). Beavers have moderate to high mobility, and juveniles will disperse from their natal territories over varying distances. Beavers tend to disperse over longer distances when they have access to free-flowing water (McNew and Woolf 2005), suggesting the important role of surface water networks in enabling travel and maximizing beaver movement potential. For example, a study in Illinois found that on average, beavers dispersed over 6 km when they had access to free-flowing water, but dispersal averaged 1 km in landlocked colonies (McNew and Woolf 2005).

The prevalence of water features (i.e., waterbodies, watercourses, and wetlands) in the existing conditions LSA and vegetation RSA suggests that suitable beaver habitat is well connected at the local and regional scales.

11.4.5.4.3 Survival and Reproduction

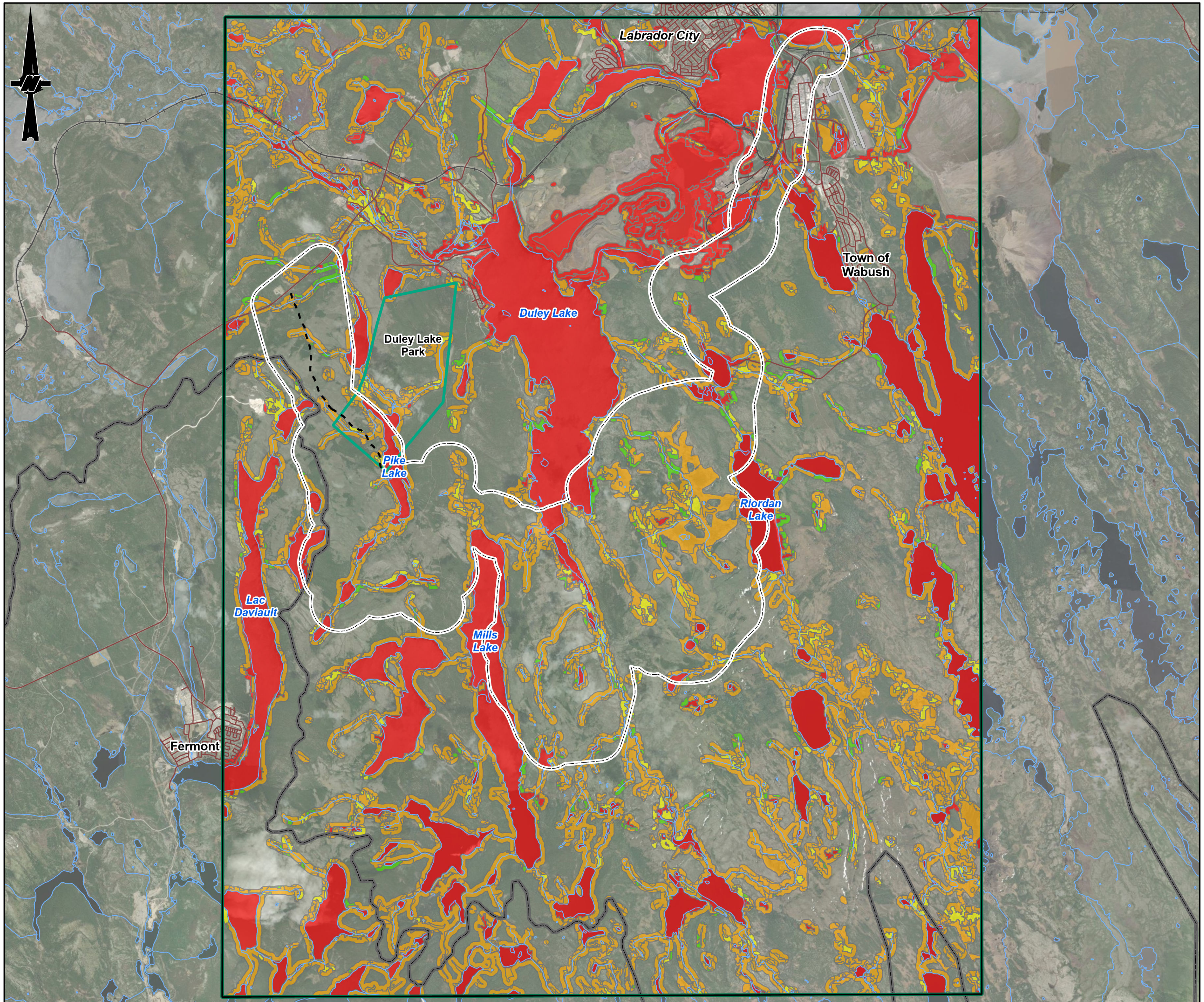
Historically, beavers were found in greater numbers and distribution than in the present due to their near extirpation from North America in the early 1900s because of over-harvesting during the fur trade (Havens et al. 2013). Current beaver populations in North America are estimated to range from 6 to 12 million, whereas the beaver population in North America prior to the arrival of Europeans is estimated to have been between 60 million and 400 million individuals (Havens et al. 2013).

Beaver is not a provincially tracked or federally listed species (Government of Canada 2024b; Government of NL 2025a), nor is it a species under consideration by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2024b). Although beaver is not federally or provincially listed/tracked, it has been highlighted as a culturally important species by Indigenous communities who have provided Indigenous Knowledge related to the Project (Alderon 2012). The annual harvest of beaver is tracked provincially by the number of pelts sold, which totalled 2,500 in 2010 and 2011 throughout Newfoundland and Labrador, the most recent time frame in which data were available (Government of NL 2011).

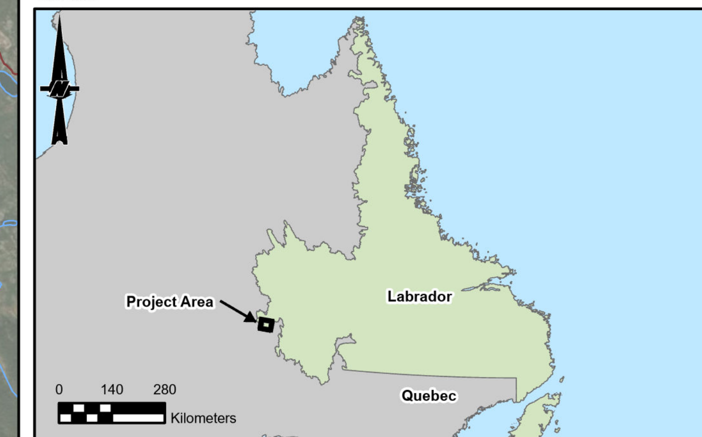
Beavers are monogamous and mate in the winter months of January and February, and kits are generally born in April through June (Hartman 1997; Boyle and Owens 2007). Beavers are strongly territorial animals that live in family groups generally consisting of an adult pair and offspring from one or more breeding seasons (Hartman 1997). Subordinate members of a colony will not become sexually active if a dominant beaver of the same sex is present in the colony (Hartman 1997). The age at first parturition (i.e., birth) varies from two to five years in a typical population, and beavers may respond to population manipulation (i.e., trapping) by becoming sexually mature and dispersing at an earlier age (Nordstrom 1972). Prior to the birth of the new young, the eldest young are forced out of their parental colony to create their own lodge and dam (Boonstra 2013).

The main limiting factors or threats to beaver survival, abundance, and distribution include harvest pressure and the availability of suitable habitat. Anthropogenic disturbance is not expected to exert a large amount of pressure on beaver populations because of their association with developed areas (e.g., culverts). Furthermore, many beaver populations across North America have recolonized most areas of their historical range (Havens et al. 2013).

Beaver remains an important trapping resource to the Innu of Uashat mak Mani-Utenam, although to a lesser degree than in the past (Alderon 2012). The Saguenay Beaver Reserve (Sept-Îles Division) was officially established in 1954 through collaboration between the federal and Québec governments to protect beaver populations in the area. The Saguenay Beaver Reserve was established by the Government of Québec without regard to the Province and Newfoundland and Labrador's provincial border and, according to available information, approximately 40 trapping areas of the Saguenay Beaver Reserve lie within Labrador (Alderon 2012). The Project will specifically be carried out in whole or in part in Lots 244 and 245 of the Saguenay Beaver Reserve, which are the subject of claimed interests by certain Traditional families of Uashat mak Mani-Utenam. These two Lots are physically located entirely within Labrador and do not extend across the provincial border into Québec. As a result, the Québec legislation purporting to create reserves and to regulate trapping in those portions of the Saguenay Beaver Reserve located in western Labrador, including Lot 244 and Lot 245, has no extra-territorial application or legal effect on trapping activities carried out in Labrador. Up until the late 1960s, the Government of Newfoundland and Labrador issued permits to Québec residents allowing them to carry on their trapping activities in this area; when the federal government subsequently recognized the Montagnais Band of Matimekush-Lake John, this practice was discontinued.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Beaver Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
BEAVER HABITAT SUITABILITY IN THE EXISTING ENVIRONMENT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-16

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.4.5.5 Two-Lined Salamander

11.4.5.5.1 Habitat Availability

The two-lined Salamander is typically found in moist, wooded areas near streams, ponds, and marshes. They prefer environments with abundant cover such as leaf litter, fallen logs, and rocks, which provide shelter and protection from predation. The two-lined salamanders are often associated with clean, cool water sources, which are essential for their breeding and larval development. They can also be found in terrestrial habitats, particularly during the non-breeding season, where they seek out moist microhabitats to prevent desiccation (e.g., rocks, woody debris; Canadian Herpetological Society 2025).

In the existing environment, the two-lined salamander habitat availability in the wildlife LSA and vegetation RSA shows varying levels of suitability (Table 11-25). High-suitability habitat covers 1.31% of the wildlife LSA (100.61 ha) and 0.86% of the vegetation RSA (341.92 ha). Moderate suitability is the most prevalent, covering 46.26% of the wildlife LSA (100.61 ha) and 0.86% of the vegetation RSA (341.92 ha). Moderate suitability is the most prevalent, covering 46.26% of the wildlife LSA (3,565.34 ha) and 57.14% of the vegetation RSA (22,806.66 ha). Low-suitability habitats account for 36.10% of the wildlife LSA (2,782.39 ha) and 22.03% of the vegetation RSA (8,793.94 ha). Poor suitability is found in 16.34% of the wildlife LSA (1,259.00 ha) and 19.97% of the vegetation RSA (7,971.02 ha).

Table 11-25: Two-lined Salamander Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	100.61	1.31	341.92	0.86
Moderate	3,565.34	46.26	22,806.66	57.14
Low	2,782.39	36.10	8,793.94	22.03
Poor	1,259.00	16.34	7,971.02	19.97
Total	7,707.35	100.00	39,913.54	100.00

(a) Two-lined salamander habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.5.2 Habitat Distribution

The two-lined salamander is distributed throughout northeastern North America. Their range extends from central and southern Québec, New Brunswick, and northeastern Ontario, down through the northeastern United States. They are commonly found in temperate forests, temperate shrublands, and freshwater marshes. This species has a relatively large geographic distribution compared to other members of the genus *Eurycea*, and they are adaptable to various habitats within this range. Two-lined salamanders were detected in the previous EIS (Alderon 2012).

Within the wildlife LSA and vegetation RSA, high-quality habitat suitability is limited to the ELC type Tamarack/black spruce-feathermoss (water track), which constitutes only 1.31% and 0.86% of these areas, respectively. Moderate- to high-quality habitat within the wildlife LSA accounts for only 16% of the total available high- to moderate-quality habitat, suggesting the LSA is not unique in its habitat availability in comparison to the larger regional area; however, the overall availability of suitable habitat remains limited. High-quality habitats are predominantly located in the northern and central regions, though they are scattered. Moderate-quality habitats are more dispersed and can be found in both the northern and southern parts of the site.

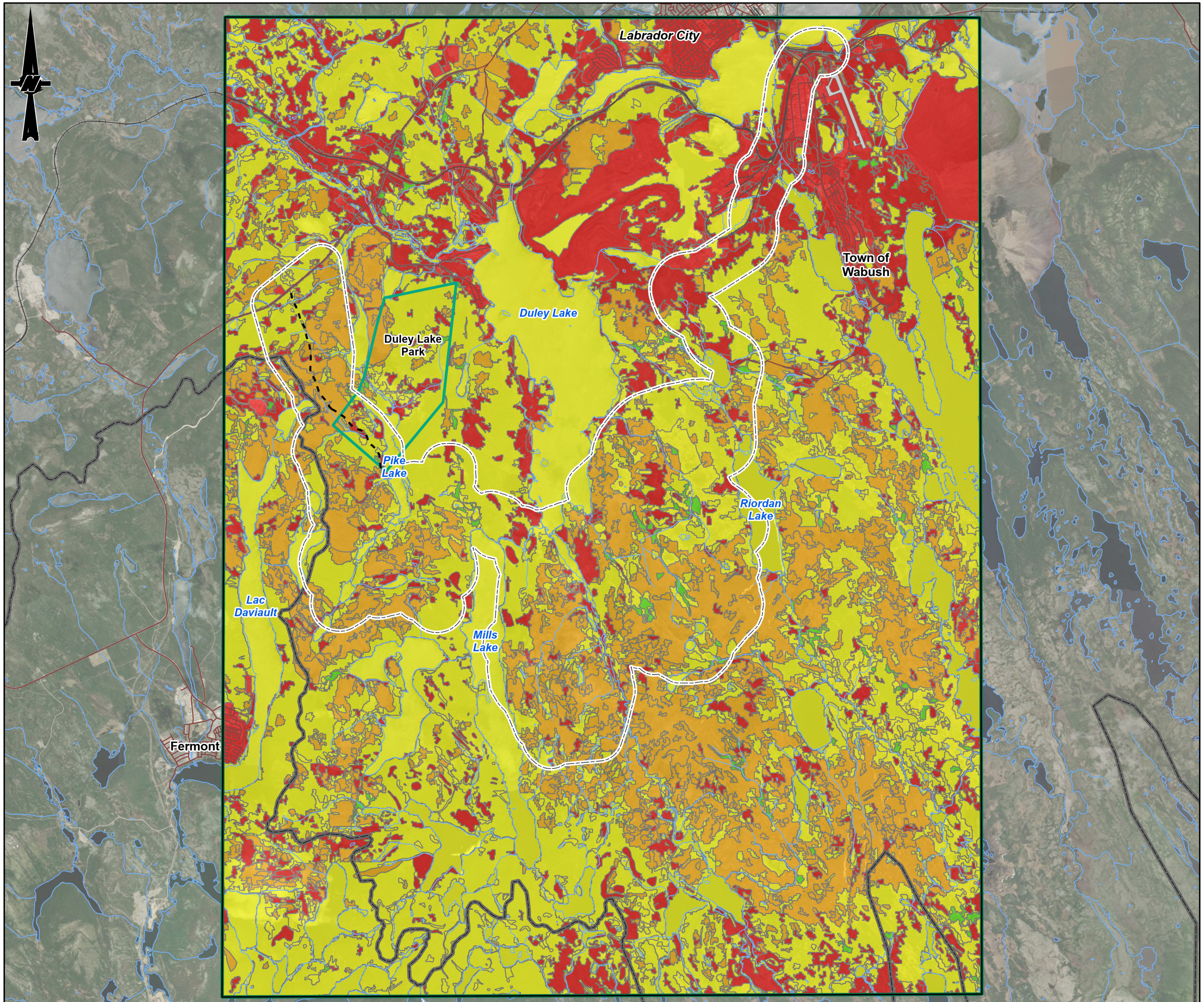
The distribution of suitable two-lined salamander habitat in the wildlife LSA and RSA is also influenced by existing anthropogenic disturbance (Figure 11-17, Section 11.4.4.1). Unsuitable developed land (with a 500 m buffer added) is composed of approximately 52% of the wildlife LSA. There are suitable habitat patches in the wildlife RSA, but habitat connectivity in the existing environment is fragmented by the Trans-Labrador Highway, the Labrador Railway, and resource exploration activities.

Linear features can act as semi-permeable barriers to amphibian movement (Section 11.5.2.2). The density of linear features within the wildlife LSA is estimated at 0.68 km/km^2 which includes permanent linear features (e.g., highway, local roads, railroad, utility lines) and non-permanent (trails; Table 11-19). In the wildlife RSA, linear density is estimated at 0.16 km/km^2 (Table 11-19). which is considered a threshold for facilitating predator movement in boreal habitats (DeMars and Boutin 2018).

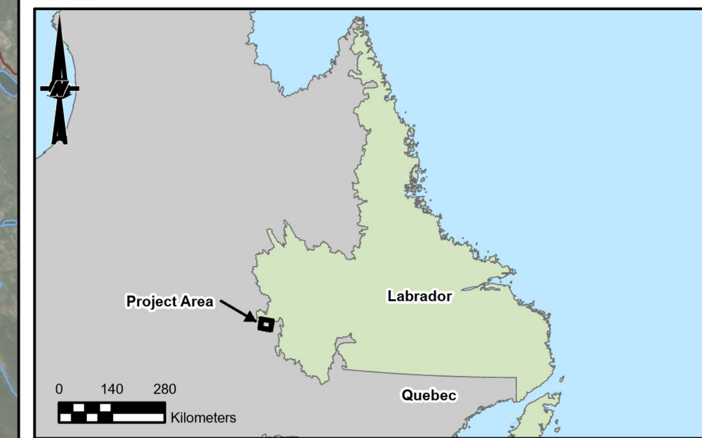
11.4.5.5.3 Survival and Reproduction

Two-lined Salamanders reach sexual maturity within one year after metamorphosis. Their breeding season typically lasts from October through May, with females laying eggs in April or May, with females laying eggs in April or May. Breeding takes place within small, fast flowing streams within woodland habitats where larvae remain until they reach maturity. Eggs are laid in water, often attached to submerged vegetation or under rocks, where they are protected from predators. The larvae develop in aquatic environments and undergo metamorphosis before transitioning to a more terrestrial life cycle. Hibernation takes place underground in forested habitats near their breeding streams (Canadian Herpetological Society 2025). Survival rates can be influenced by environmental factors such as drought, which can reduce habitat availability and increase mortality.

Existing habitat fragmentation and density of linear features in the wildlife LSA and RSA may be having an effect on two-lined salamander survival and reproductive success by restricting movement between summer breeding habitat and overwintering habitat.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Two-lined Salamander Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
TWO-LINED SALAMANDER HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-17

11.4.5.6 Wood Frog

11.4.5.6.1 Habitat Availability

Wood frogs live in shady forests with moist soils, and in wetlands like swamps, and are most commonly associated with deciduous and boreal forests. In their most northern range, where forests are mostly absent, they inhabit shrub and sedge-dominated habitats. They rely on shallow wetlands inside or near forests, mostly vernal pools, which limits the presence of predatory fish. Wood frogs hibernate in upland forest habitat inside shallow depressions or burrows underneath leaf litter.

In the existing environment within the wildlife LSA and the vegetation RSA there is varying levels of habitat suitability for the wood frog (Table 11-26). High suitability covers 1.31% of the wildlife LSA (100.61 ha) and 0.86% of the vegetation RSA (341.92 ha). Moderate suitability is found in 42.21% of the wildlife LSA (3,253.02 ha) and 26.25% of the vegetation RSA (10,479.06 ha). Low-suitability habitat account for 46.26% of the wildlife LSA (3,565.34 ha) and 57.14% of the vegetation RSA (22,806.66 ha).

Table 11-26: Wood Frog Habitat Availability in Wildlife Local Study Area and Vegetation Regional Study Area Under Existing Conditions

Habitat Suitability[a]	Wildlife LSA		Vegetation RSA[b]	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)
High	100.61	1.31	341.92	0.86
Moderate	3,253.02	42.21	10,479.06	26.25
Low	3,565.34	46.26	22,806.66	57.14
Poor	788.37	10.23	6,285.90	15.75
Total	7,707.35	100.00	39,913.54	100.00

(a) Wood frog habitat suitability is described in Appendix 11B.
(b) The spatial extent of the vegetation RSA is smaller than the wildlife RSA; ELC is not available to the full extent of wildlife RSA.
LSA = local study area; RSA = regional study area; ELC = Ecological Landscape Classification.

11.4.5.6.2 Habitat Distribution

The wood frog is found in every province and territory in Canada. In Labrador, its range extends from the eastern Québec border to western Labrador. Locally, wood frog distribution varies seasonally as they are dependent on fishless water bodies for breeding, moist riparian areas in the summer, and moist riparian areas or uplands for overwintering. A wood frog may travel over hundreds of metres between their breeding, summer, and hibernation habitats, but typically remain near their breeding areas (e.g., 25 m documented by Taylor and Paszkowski 2018).

High-suitability habitat for the wood frog is limited within the wildlife LSA; it is limited to the tamarack/black-spruce-feathermoss (water track) ELC type, which is mostly found in small amounts scattered around the TMF. The total combined amount of high-suitability habitat within the wildlife LSA makes up only 1.31% of the entire LSA. Taking into account the wood frogs moderate-suitability habitat and the available habitat increases to 42.21% within the LSA, this accounts for the various wetland ELC types found within the LSA (e.g., riparian marsh [fen], patterned shrub fen, graminoid fen). The available high-suitability habitat makes up even less of the total available habitat within the vegetation RSA.

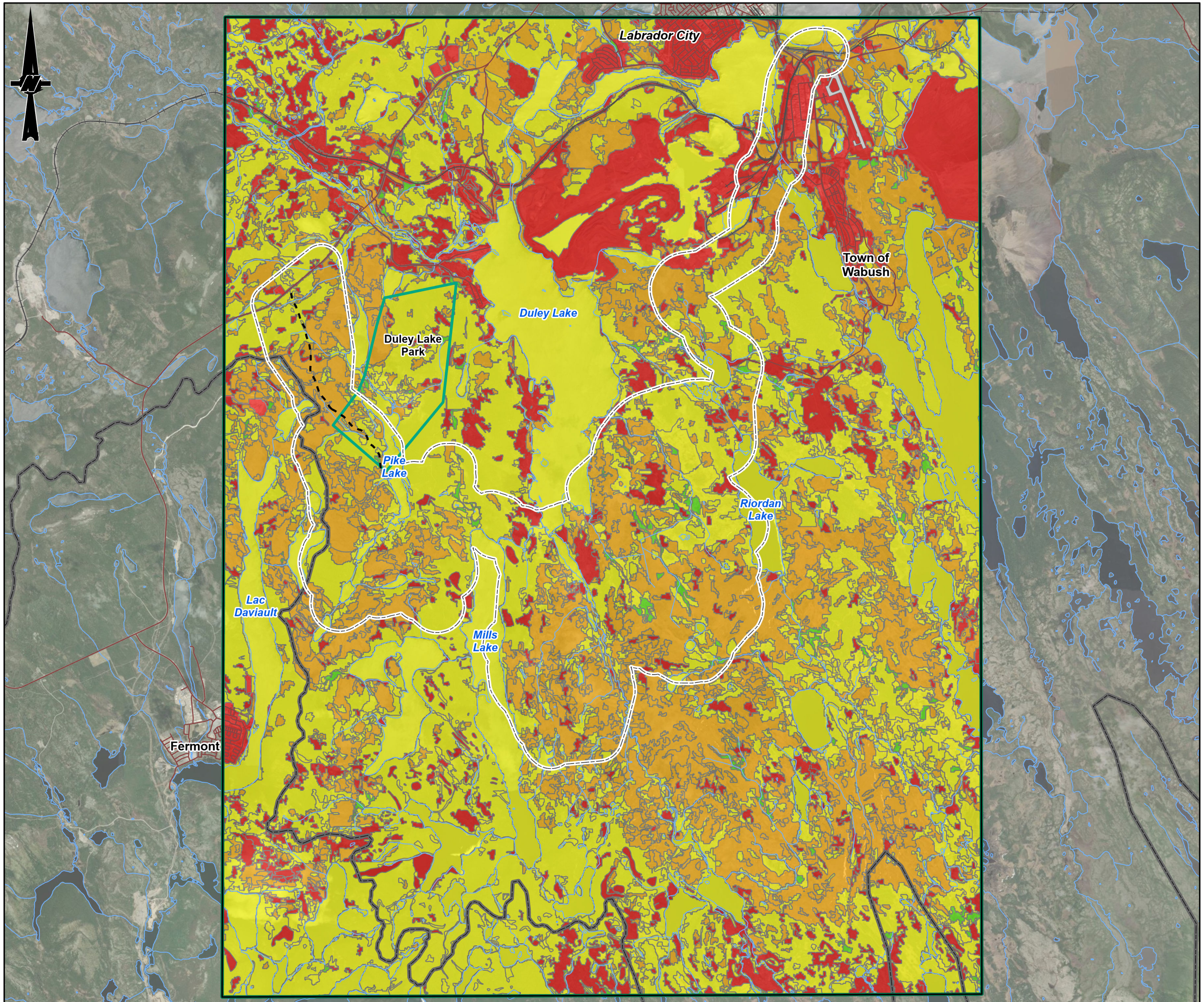
The distribution of suitable wood frog habitat in the wildlife LSA and RSA is also influenced by existing anthropogenic disturbance (Figure 11-18, Section 11.4.4.1). Unsuitable developed land (with a 500 m buffer added) comprises approximately 57% of the wildlife LSA. There are suitable habitat patches in the wildlife RSA, but habitat connectivity in the existing environment is fragmented by the Trans-Labrador Highway, the Labrador Railway, and resource exploration activities.

Linear features can act as semi-permeable barriers to amphibian movement (Section 11.5). The density of linear features within the wildlife LSA is estimated at 0.68 km/km^2, which includes permanent linear features (e.g., highway, local roads, railroad, utility lines) and non-permanent (trails; Table 11-19). In the wildlife RSA, linear density is estimated at 0.16 km/km^2 (Table 11-19), which is considered a threshold for facilitating predator movement in boreal habitats (DeMars and Boutin 2018).

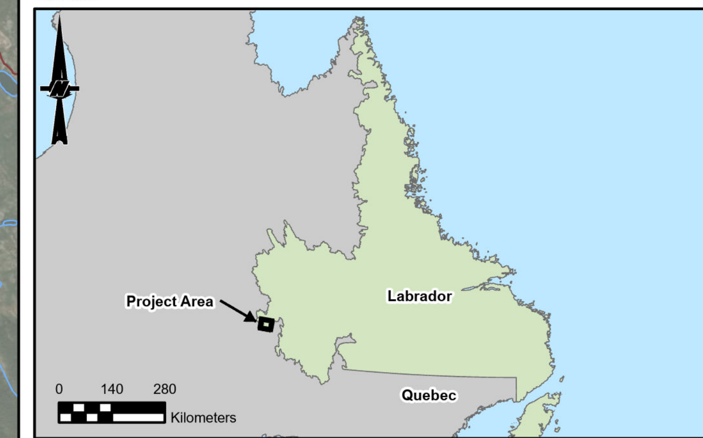
11.4.5.6.3 Survival and Reproduction

The wood frog exhibits freeze tolerance, allowing survival at sub-zero temperatures by producing cryoprotectants. This adaptation enables early-spring activity. Breeding takes place in shallow, ephemeral wetlands within forested areas. The shallow, ephemeral wetlands reduce predation. Reproduction involves males calling to attract females, who lay up to 3,000 eggs in ephemeral pools. Eggs hatch within 1 to 3 weeks, and larvae undergo metamorphosis in 7 to 18 weeks, influenced by factors such as food availability and temperature. Male wood frogs reach maturity at 2 to 4 years, females at 3 to 6 years. The maximum lifespan is 8 years for males and 10 years for females (Larson et al. 2014).

Existing habitat fragmentation and density of linear features in the wildlife LSA and RSA may be having an effect on wood frog survival and reproductive success by restricting movement between summer breeding habitat and overwintering habitat.



KEY MAP



SCALE 1:20,000,000

Legend

- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Wood Frog Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

WOOD FROG HABITAT DISTRIBUTION IN THE EXISTING ENVIRONMENT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
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11.5 Effects Assessment

11.5.1 Methods

11.5.1.1 Effect Pathway Screening

Considerable effort has been made to limit potential Project interactions with the environment during the design phase. Nevertheless, interactions between the Project and wildlife and their habitat are anticipated. These interactions and the corresponding potential changes to measurable parameters were identified by an effect pathway screening that was then used to inform the residual Project and cumulative effect analyses for the wildlife VECs. The first part of the analysis was to identify the potential effects pathways for each phase of the Project. Each pathway was initially assumed to have an interaction that would result in potential effects on wildlife VECs.

Potential pathways from Project activities to wildlife VECs were identified using the following:

- review of the Project description (Chapter 2) and scoping of potential effects by the EIS team for the Project
- input from engagement (Chapter 22)
- scientific knowledge
- review of EISs for similar mining projects, including the previous Kami EIS (Alderon 2012)
- previous experience with mining projects

consideration of key issues (Section 11.3.1)

Potential adverse effects of the Project were then identified, and practicable mitigation was applied to avoid, minimize, and/or rehabilitate effects on wildlife VECs. Avoidance and minimization measures are widely recognized as the most important for biodiversity conservation (BBOP 2025). Avoidance designs and actions integrated into the Project were developed iteratively by the Project's EIS team. Mitigations to avoid, minimize, and restore will be implemented during the Project life cycle; they are included in Table 11-28 for each VEC and pathway. Mitigations in Table 11-28 represent those typically expected for wildlife VECs. A number of these have already been addressed at the design stage of the Project, as design optimizations (see Chapter 2 and Chapter 4). The effectiveness of mitigation measures proposed for each effect pathway was assessed to determine whether the mitigation would address the potential Project effect such that the pathway was eliminated, would result in a negligible adverse effect on wildlife, or if residual adverse effects on wildlife from the Project remained.

This effect pathway screening was a preliminary assessment that was intended to focus the effects analysis on effect pathways that required a more quantitative or comprehensive assessment of effects on VECs. Using scientific knowledge, feedback from engagement, logic, experience with similar developments, and an understanding of the known effectiveness of mitigation (i.e., level of certainty that the proposed mitigation would work), each effect pathway was categorized as one of the following:

- **No effect pathway**—For target species in the Project area, the effect pathway could be removed (i.e., the effect would be avoided) by avoidance measures and/or additional mitigation so that the Project would result in no measurable environmental change relative to existing conditions or guideline values (e.g., vegetation, wetlands, soil, water, noise, vibrations, light), and would have no residual effect on wildlife. The effect pathway could be also removed if the target species is unlikely to occur in the Project area.
- **Negligible effect pathway**—With the application of mitigation, the effect pathway could result in a measurable but minor environmental change relative to existing conditions or guideline values, but the change is sufficiently small that it would have a negligible residual effect on wildlife VECs (e.g., a decrease in high-quality habitat that is negligible compared to habitat availability in the RSA). Therefore, further detailed assessment of the residual effect is not warranted as the effect pathway would not be expected to result in a substantive residual Project or cumulative effect on wildlife.

Residual effect pathway—Even with the application of mitigation, the effects pathway is still likely to result in a measurable environmental change relative to existing conditions or guideline values that could cause a greater-than-negligible adverse or positive effect on wildlife and warrants additional assessment.

Project interactions determined as no effect pathway or negligible effect pathways were not carried forward for further assessment (Section 11.5.2). Residual effect pathways that could result in changes to the environment with one or more associated measurable parameter and have the potential to cause a greater than negligible effect on wildlife VECs were carried forward to the residual Project effects analysis (Section 11.5.3) and residual cumulative effects analysis (Section 11.5.4). Pathways and results of the effects assessments from the current EIS and previous EIS are compared in Appendix 11C.

11.5.1.2 Residual Project Effect Analysis

The residual effects analysis measures and describes the effects of the Project on wildlife relative to existing conditions. The residual effects analysis was conducted using the temporal snapshot identified for the assessment (Section 11.3.3). Residual effects are described for each of the measurement indicators for the residual effect pathways identified. During Construction, activities such as land clearing, dewatering, and increase in traffic are likely to have both short- and long-term effects on wildlife and wildlife habitat. During Operations, activities such as open pit mining, operation of mining equipment, water and sewage management, site traffic, and railway operations, are likely to have effects on wildlife and wildlife habitat for the duration of the Operations phase. During Closure, activities such as accelerated pit flooding, restoration and revegetation, and site traffic are likely to have both short- and long-term effects on wildlife and wildlife habitat.

The residual effects analysis used a reasoned narrative to describe anticipated changes to each measurable parameter caused by the Project. This narrative description of anticipated effects is the foundation for the residual effects classification. Residual effects are summarized or classified in tabular form using effects criteria, which is intended to provide structure and comparability across VECs assessed for the Project. The residual effects classification uses nature, magnitude, geographic extent, duration, timing, frequency, reversibility, and probability of occurrence as criteria. The approach to classify each residual effect criterion is provided in Table 11-27. Following classification of residual Project effects, the analysis also evaluates the significance of residual Project effects using threshold criteria or standards beyond which a residual effect is considered significant. The definition of a significant effect for wildlife is provided in Section 11.5.1.4.

Table 11-27: Definitions Applied to Effects Criteria Classifications for the Assessment of Wildlife and Wildlife Habitat

Criterion	Rating	Definition
Nature	Positive	Change in measurable parameter results in net improvement or benefit to the wildlife VECs
	Neutral	Change in measurable parameter results in no change to the wildlife VECs
	Adverse	Change in measurable parameter results in net degradation or loss to the wildlife VECs
Magnitude	Change in habitat availability, distribution; change in survival and reproduction	**Change in Habitat Availability and Distribution** **Negligible –** no measurable change in habitat for wildlife **Low**–Project changes less than 5% of high- and moderate-value habitat in the vegetation RSA for representative species **Moderate**–Project changes 5% to 25% of high- and moderate-value habitat in the vegetation RSA for representative species **High**–Project changes more than 25% of high- and moderate-value habitat in the vegetation RSA for representative species **Change in Mortality Risk and Reproductive Success** **Low**–A substantial change in the abundance of representative species in the LSA is not anticipated, although temporary local shifts in distribution in the LSA could occur. **Moderate**–A substantial change in the abundance and/or distribution of target species in the LSA might occur, although a measurable change in the abundance of target species in the RSA is not anticipated. **High**–A substantial change in the abundance and/or distribution of target species in the RSA could occur.
Geographic extent	Site Study Area	Residual effects (if any) confined to the SSA
	Local	Residual effects (if any) extend outside the SSA but within the LSA
	Regional	Residual effects (if any) extend beyond the LSA but is confined to the RSA
	Beyond regional	Residual effects (if any) extend beyond the RSA
Duration	The period of time required until the measurable parameter or the VEC returns to its existing (baseline) condition, or the residual effect can no longer be measured or otherwise perceived	**Short term**–Residual effect restricted to construction or decommissioning, rehabilitation and closure phases **Medium term**–Residual effect extends through the Operations phase (26 years) **Long term**–Residual effect extends beyond the Operations phase (>26years) **Permanent**–Recovery to baseline conditions unlikely
Timing	Qualitative narrative or numeric quantification of potential seasonal timing of measurable parameter	**Year-round**–Change in measurable parameter is expected to effect target species that occur in area year-round **Breeding season (spring and summer)**–Change in measurable parameter is expected to effect target species that occur in the area only during the breeding season **Migration (spring and fall)**–Change in measurable parameter is expected to effect target species that occur in the area when stopping-over during migration

Criterion	Rating	Definition
Frequency	Occasional	Change in measurable parameter is expected to occur rarely (e.g., once or a few times)
	Periodic	Change in measurable parameter is expected to occur consistently at regular intervals or associated with temporal events (e.g., during hot, dry climatic conditions)
	Continuous	Change in measurable parameter is expected to occur all the time
Reversibility	Reversible	Change in measurable parameter is reversible after activity completion and rehabilitation/compensation
	Irreversible	Change in measurable parameter is predicted to influence the component indefinitely
Probability of occurrence	Unlikely	Change in measurable parameter is not expected to occur, but not impossible
	Possible	Change in measurable parameter may occur, but is not likely
	Probable	Change in measurable parameter is likely to occur, but is uncertain
	Certain	Change in measurable parameter will occur
Ecological and socioeconomic context	Qualitative narrative or numeric quantification	Change in measurable parameter is described by the perception of an effect that considers sensitivity and resilience of VECs (ecological context), and the cultural and social importance placed on certain VECs and the unique values, customs or aspirations of local communities or Indigenous groups

VECs = Valued Environmental Components; RSA = regional study area; LSA = local study area; SSA = site study area.

11.5.1.3 Residual Cumulative Effect Analysis

The cumulative effects assessment builds on the results of the residual Projects effects assessment and considers the incremental changes that were predicted to have a likely residual adverse effect on wildlife. This would include the effects of past and current projects or past climate-related changes (i.e., forest fires), which contribute to existing conditions upon which residual Project effects are assessed. For the EIS, the description of the existing environment characterizes the environment already affected by past and current projects and activities; therefore, the cumulative effects assessment focused on analyzing the effects of other RFDs in combination with the Project residual effects. Although positive residual effects are characterized in the residual Project effects analysis, they are not carried forward to the cumulative effects analysis, as the Project benefits from other past, present, and RFDs or activities are unlikely to be known or publicly disclosed (e.g., Benefit Agreements with Indigenous groups or local community stakeholders).

The cumulative effects assessment followed a three-step process:

- Identify RFDs and potential cumulative effects that overlap in time and space with Project residual effects.
- Identify and describe any additional mitigation measures, if applicable.

Characterize residual cumulative effects, using the same criteria defined for the residual Project effects analysis (Section 11.5.1.2).

Chapter 4, Effects Assessment Methodology, provides a list of known RFDs and physical activities with potential residual effects that could overlap spatially and temporally with the Project's residual environmental effects. This list was considered in the identification of RFDs for the assessment of cumulative effects on wildlife. Following the identification of applicable RFDs, residual Project effects on wildlife were evaluated for temporal and spatial overlap with the effects of RFDs to identify potential cumulative effects. The evaluation was completed qualitatively based on publicly available information (e.g., Project Registrations or EIS reports) describing the environmental effects of RFDs. If effects from these RFDs overlapped spatially or temporally with the residual Project effects on wildlife, then potential cumulative effects were identified. If no spatial or temporal overlap existed for the residual Project effects and RFDs identified in Chapter 4, Effects Assessment Methodology, then a cumulative effects assessment was not required.

Based on the assessment of potential cumulative effects, an assessment was made regarding whether additional mitigation measures, beyond those proposed for the Project, were required to address potential cumulative effects. Where applicable, additional mitigation measures were identified.

Residual cumulative effects were characterized using the same criteria assessed for residual Project effects (Section 11.5.1.2). The same measurable parameters were used to assess the cumulative effect of other RFDs on wildlife and wildlife habitat. Where applicable, additional mitigation measures were described.

Following classification of residual cumulative effects, the analysis also evaluated the significance of residual Project effects using threshold criteria or standards beyond which a residual environmental effect was considered significant. The definition of a significant effect for wildlife is provided in Section 11.5.1.4.

11.5.1.4 Significance Determination

Significance determination is binary, such that adverse Project and cumulative effects were either deemed significant or not significant for each VEC. Although the positive residual effects associated with the Project are reported in the EIS, these residual effects were not assessed for significance.

Residual effects are measurable at the population level and are likely to decrease resilience and increase the risk to the maintenance of a self sustaining and ecologically effective VEC population. Loss of habitat that causes permanent adverse changes to survival or reproduction at the population level would likely be significant. A significant effect may also result from habitat loss and fragmentation that reduces migratory or seasonal range movements to the point that it disrupts (breaks) population connectivity.

Specifically, a significant adverse residual effect on wildlife and wildlife habitat is defined as one that results in:

- permanent loss of suitable habitat (high and moderate) within the LSA and RSA, after mitigation and compensation are implemented in such a way as to cause a detectable decline in the distribution or abundance of VECs
- permanent degradation or alteration of suitable habitat (high and moderate) within the LSA and RSA, physically, chemically, or biologically, in quality or extent, after mitigation and compensation are implemented in such a way as to cause a detectable decline in the distribution or abundance of VECs
- permanent sensory disturbance in such a way as to cause a detectable decline in the distribution or abundance of a VEC

non-compliance with species recovery strategies and management under SARA, NL ESA, COSEWIC, and/or MBCA

An environmental effect that does not meet the above criteria is rated as not significant.

The following sections present the results of each of the assessment steps described in the methods section above.

11.5.2 Effect Pathway Screening

The effect pathway screening predicts potential effects pathways that are then evaluated considering proposed mitigation to predict whether the effect pathway had the potential to cause residual adverse or positive effects. Environmental design features, mitigation and enhancement measures in Table 11-28 represent those typically expected for wildlife VECs, as well as those previously presented for the Alderon EIS (2012). In addition, efforts have been made by Champion to reduce the footprint effect of the Project through optimizations described in Chapter 2 and Chapter 4; these are represented as avoidance and minimization measures in Table 11-28. Champion included in Chapter 2 design features, mitigations, and enhancement measures to address the Ministerial release of 2014 conditions and included optimizations to the Project. The effectiveness of mitigation measures proposed for each effect pathway was assessed to determine whether the mitigation would address the potential Project effect such that the effect pathway was eliminated or would result in a negligible adverse effect on a VEC. As described in Section 11.5.1.1, each effect pathway was categorized as one of the following:

- **no effect pathway** (i.e., avoidance measures and/or mitigation results in no residual effect on wildlife)
- **negligible effect pathway** (i.e., mitigation results in negligible effect on wildlife)

residual effect pathway (i.e., effect that is greater than negligible and carried forward for further assessment)

The effects pathway screening across the lifetime of the Project is broadly summarized in Table 11-28. The subsections that follow provide detailed rationale used to assign potential effects on the no effect pathway and negligible effect pathway categories and list residual effect pathways. Each Project component/activity identified as a residual effect pathway was carried forward for detailed assessment in Section 11.5.3.

Table 11-28: Potential Effects Pathways for Wildlife and Wildlife Habitat

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment, and discharge of contact water — Water intake for fresh water and process water — Sewage collection, treatment, and surface discharge — Progressive reclamation — Railcar loading and transportation — Worker accommodation, mine services area, and office operation **Closure** — Accelerated pit flooding — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Habitat loss**: Direct removal or alteration of soil, vegetation, wetlands, and freshwater habitat can cause loss of wildlife habitat and affect wildlife abundance and distribution.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Avoid sensitive species and their habitats to the extent possible. — To the extent practicable, use existing road infrastructure, including the existing access roads and watercourse crossings. — Implement construction phasing to minimize open cleared areas at any one time. — Minimize disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent possible. — Maintain natural buffers around wetlands and riparian zones, to the extent possible — Comply with provincial and federal legislation, permits, approvals, and guidelines. — Conduct invasive species management. — Conduct progressive reclamation with an emphasis on the use of native local species, provided they are effective in preventing dust lift and erosion. — Implement the Environmental Effects Monitoring Plan (**Annex 5E**), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species. — Implement an Erosion and Sediment Control Plan (Annex 5F). — Rehabilitate temporary access routes that are no longer needed. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	Residual effect pathway (all VECs unless otherwise stated) Negligible effect pathway – harlequin duck – unlikely to be present
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities — Power generation — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site	**Habitat alteration**: Alteration of final terrain, soil, and aquatic conditions, including groundwater and/or plant species composition, could change the types of ecosystems that can be reclaimed on the landscape and adversely affect wildlife habitat availability and distribution, and survival and reproduction.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Avoid sensitive species and their habitats to the extent possible. — From April to September (mandatory), avoid removing structures that may function as a bat maternity roost habitat. A 200 m buffer must be maintained around an active bat maternity roost. — Use existing road infrastructure, including the existing access roads and watercourse crossings. — Locate borrow pits more than 100 m away from high-water mark of waterbodies, where possible. — Implement construction phasing to minimize open cleared areas at any one time. — Minimize disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent possible. — Maintain natural buffers around wetlands and riparian zones. — Allow wildlife to pass through construction sites without harassment. — Maintain hydrology at stream crossings through approved methods to install culverts.	Residual effect pathway

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Operations and Maintenance — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment, and discharge of contact water — Water intake for fresh water and process water — Sewage collection, treatment, and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation **Closure** — Accelerated pit flooding — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site		— Use dewatering wells strategically to minimize effect and monitor groundwater levels and wetland hydrology during construction and restore water level post-construction. If affected wetlands provide sensitive habitat (i.e., habitat utilized by a critically imperilled/imperilled SoCC), use mitigative measures to maintain wetland hydrology (e.g., pumping and discharging of water into wetlands). — Monitor groundwater levels and wetland hydrology. — Comply with provincial and federal legislation, permits, approvals, and guidelines. — Rehabilitate temporary access routes that are no longer needed. — Implement the Environmental Effects Monitoring Plan (Annex 5E), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species. — Implement an Erosion and Sediment Control Plan (**Annex 5F**). — Mulch, coarse woody debris, or matting will be used on newly constructed stockpiles or recently replaced soils (while this is intended for sediment and erosion control, it will also serve to limit attraction of common nighthawks to exposed soil). — Implement strict chemical handling and spill prevention procedures to protect amphibian habitats from contamination, including monitoring and remediation as needed. — Avoid use of herbicides and pesticides to the extent possible. — Conduct progressive reclamation with an emphasis on the use of native local species, provided they are effective in preventing dust lift and erosion. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process. — The Rehabilitation and Closure Plan will consider progressive reclamation with an emphasis on the use of native local species, provided they are effective in preventing dust lift and erosion.	
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities — Power generation — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management	**Sensory disturbance**: Sensory disturbance (e.g., presence of people, traffic, lights, dust, smells, noise) can alter wildlife movement and behaviour and adversely affect wildlife habitat availability and wildlife abundance and distribution.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Use existing road infrastructure, including the existing access roads and watercourse crossings. — Implement construction phasing to minimize extent of sensory disturbance at any one time. — Maintain natural buffers around wetlands and riparian zones. — Restrict clearing activities to the period outside of the breeding bird season to the extent possible. If clearing and/or construction must occur during this period, the nest search protocols outlined in the Environmental Protection Plan will be implemented (Annex 5D). If a nest of a migratory bird is discovered, the nest and surrounding vegetation will be left undisturbed until nesting is complete. Construction in the immediate area will be minimized until nesting is complete. — Restrict clearing and other activities within 800 m of an active raptor nest, and within 200 m of an inactive nest. — Flag boundaries of sensitive areas before commencing any work in the area. — Select travel routes that avoid noise effects on sensitive sites or habitat to the extent possible. — Implement the Environmental Effects Monitoring Plan (**Annex 5E**), which includes measures for monitoring noise and vibration. — Implement mitigations measures to manage noise, vibration and light as described in Chapter 6, Noise, Vibration, and Light.	Residual effect pathway No effect – woodland caribou; species is unlikely to occur in the Project area No effect – harlequin duck; species is unlikely to occur in the Project area

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
— Handling, storage and discharge of non-contact water — Handling, storage, treatment, and discharge of contact water — Water intake for fresh water and process water — Sewage collection, treatment and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation **Closure** — Accelerated pit flooding — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site			
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities — Power generation — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment and discharge of contact water — Water intake for fresh water and process water — Sewage collection, treatment and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation	**Linear barriers**: Site roads, access roads, and railways could decrease habitat connectivity and adversely affect wildlife habitat distribution.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Avoid sensitive species and their habitats to the extent possible. — Use existing road infrastructure, including the existing access road and watercourse crossing, to the extent possible. — Reduce road widths to minimize effect on wildlife movement. — Rehabilitate temporary access routes that are no longer needed. — Use standard methods and mitigation for culvert/bridge installations to maintain habitat connectivity for watercourses. — Maintain gaps in access road berms and snowbanks at regular intervals to facilitate wildlife crossings at drainages, wildlife trails, or connected habitat patches so that wildlife movements across the access roads are not blocked, as determined in the field. — Maintain low snowbanks to allow passage of wildlife around access roads and railway corridor, where feasible. — Incorporate design elements into the access road and railway that allow wildlife to pass around, over, or under (e.g., install culverts and underpasses at road crossings for amphibians and small mammals).	No effect – harlequin duck; species is unlikely to occur in the Project area Negligible effect pathway – all other VECs

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Closure — Accelerated pit flooding — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site			
Construction — Site preparation, including vegetation clearing and earthworks — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Site traffic, including transportation of personnel and materials to and from site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Increased Edge Habitat:** Vegetation clearing would result in an increase in edge habitat, which could cause a rise in nest predation for forest birds.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Avoid sensitive species and their habitats to the extent possible. — Use existing road infrastructure, including the existing access road and watercourse crossing, to the extent possible. — Reduce road widths to minimize effect on wildlife movement. — Rehabilitate temporary access routes that are no longer needed. — Implement construction phasing to minimize open cleared areas at any one time.	Negligible effect pathway

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site	**Injury and mortality from clearing**: Vegetation removal and soil alterations during site preparation and construction may result in injury or mortality to individual animals with low mobility (e.g., denning black bears or marten, herptiles), destruction of nests, eggs, and individuals of migratory birds (i.e., incidental take).	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Avoid sensitive species and their habitats (including wetlands, shorelines and waterbodies) to the extent possible. — Flag boundaries of sensitive areas before commencing any work in the area. — Use existing road infrastructure, including the existing access road and watercourse crossing, to the extent possible. — Restrict clearing activities to the period outside of the breeding bird season to the extent possible. If clearing and/or construction must occur during this period, the nest search protocols outlined in the Environmental Protection Plan will be implemented (**Annex 5D**). If a nest of a migratory bird is discovered, the nest and surrounding vegetation will be left undisturbed until nesting is complete. Construction in the immediate area will be minimized until nesting is complete. — Restrict clearing and other activities within 800 m of an active raptor nest, and within 200 m of an inactive nest. — From April to September (mandatory), avoid removing structures that may function as a bat maternity roost. A 200 m buffer must be maintained around an active bat maternity roost. — Conduct surveys of cabins for potential bat colonies prior to construction; if bats are found, handle according to regulator guidelines. — Avoid activities in wetlands and water features in the winter where salamanders may overwinter. — Conduct surveys for bear den presence/absence and wildlife tree surveys prior to clearing activities. — Implement the Environmental Effects Monitoring Plan (Annex 5E), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species.	Residual effect pathway – amphibians No effect – harlequin duck; species is unlikely to occur in the Project area No effect – woodland caribou; species is unlikely to occur in the Project area Negligible for other wildlife VECs
Construction — Site preparation, including vegetation clearing and earthworks — Road development, including culverts and bridge installation — Construction of facilities and infrastructure **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Progressive reclamation **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure	**Increased predator access**: Increased access for predators (e.g., wolf and black bear) and prey may increase predation risk and decrease survival and reproduction for moose and caribou.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Use existing road infrastructure, including the existing access road and watercourse crossing, to the extent possible. — Rehabilitate temporary access routes that are no longer needed. — Supplement refuge habitat for prey species, where possible, by planting native species. — Implement a Project-specific Environmental Protection Plan, which includes processes for prohibition of feeding wildlife, and other measures for deterring wildlife from site.	Negligible effect pathway No effect – woodland caribou; species is unlikely to occur in the Project area No effect – harlequin duck; species is unlikely to occur in the Project area
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site — Employment and procurement **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Operation and management of the TMF	**Increased public access**: Changes in public access to hunting/trapping areas and increased density of people (i.e., Project staff and contractors) in the area may alter ungulate and carnivore survival and reproduction as well as affect abundance.	— The SSA contains a buffer around the Project infrastructure. Efforts will be made to minimize the area of disturbance within the SSA to the extent possible. — Use existing road infrastructure, including the existing access road and watercourse crossing, to the extent possible. — Implement a Project-specific Environmental Protection Plan, which includes processes for prohibition of hunting or harassment of wildlife by employees on the Project site. — Allow wildlife to pass through construction sites without harassment. — Rehabilitate temporary access routes that are no longer needed.	Negligible effect pathway No effect – woodland caribou; species is unlikely to occur in the Project area No effect – harlequin duck; species is unlikely to occur in the Project area

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
— Sewage collection, treatment and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation — Employment and procurement **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site — Employment and procurement			
Construction — Site preparation, including vegetation clearing and earthworks — Road development, including culverts and bridge installation — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site **Operations and Maintenance** — Operating mobile mining equipment — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Vehicle collisions**: Collisions with vehicles, buildings, equipment on site, and vehicles travelling to and from site may cause injury or mortality to individual animals.	— Establish and enforce appropriate speed limits and road signage to minimize environmental disturbance and accidents. — Yield the right of way to wildlife when operating equipment and vehicles. — Rehabilitate temporary access routes that are no longer needed. — Identify wildlife crossings and mark them with signage. — Maintain low snowbanks to allow passage of wildlife around access roads and railway corridor, where feasible. — Incorporate design elements where feasible into the access road and railway that allow wildlife to pass around, over, or under. — Implement a Project-specific Environmental Protection Plan, which includes processes for mandatory encounter and incident reporting.	Negligible effect pathway No effect – woodland caribou; species is unlikely to occur in the Project area No effect – harlequin duck; species is unlikely to occur in the Project area

Construction
— Site preparation, including vegetation clearing and earthworks
— Handling and storage of overburden
— Road development, including culverts and bridge installation
— Construction of facilities and infrastructure
— Construction of TMF starter dam
— Handling and storage of mine rock
— Construction of water management infrastructure
— Dewatering activities
— Power generation
— Operating mobile mining equipment
— Site traffic, including transportation of personnel and materials to and from site
	Wildlife attractants: Attraction of wildlife to the Project site (e.g., food waste, sewage, petroleum-based products, dust suppressants, explosive powder, site run-off ponds) may increase human-wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction.	— Implement a Project-specific Environmental Protection Plan and Waste Management Plan, which includes processes for prohibition of feeding wildlife, and other measures for deterring wildlife from site, where needed, for human and wildlife protection. These measures include:
		  – Collect domestic (e.g., food) and industrial (e.g., used oil and lubricants) waste and temporarily store in wildlife-proof containers.
		  – Dispose of waste/garbage properly to limit access by wildlife – ideally incinerated or transported off site for recycling, or disposed of at a licensed disposal facility, as appropriate.
		  – Do not bury waste/garbage in the pit during progressive remediation activities.
		  – Use mulch, coarse woody debris, or matting on newly constructed stockpiles or recently replaced soils to limit attraction of common nighthawks to exposed soil.
		  – Limit lighting to levels required for safe operation to minimize attraction of bats and common nighthawks to lights.
		  – Fence lined water management ponds to deter entrance–or they should be fitted with wildlife egress matting or ramps to help animals exit the ponds.
		— Implement the Environmental Effects Monitoring Program (**Annex 5E**), which includes measures for monitoring avifauna, SAR/SoCC, and invasive species.
			Negligible effect pathway
			
			No effect – woodland caribou; species is unlikely to occur in the Project area
			
			No effect – harlequin duck; species is unlikely to occur in the Project area

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Operations and Maintenance — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Processing iron ore concentrate — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment and discharge of contact water — Water intake for fresh water and process water — Sewage collection, treatment and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site			
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Construction of water management infrastructure — Dewatering activities — Power generation — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from site **Operations and Maintenance** — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Sewage collection, treatment and surface discharge — Progressive reclamation — Railcar loading and transportation — Site traffic, including transportation of personnel and materials to and from site — Worker accommodation, mine services area, and office operation	**Introduction and spread of invasive plants**: Introduction and spread of noxious, exotic, and/or invasive plant species can affect wildlife habitat availability and distribution.	— Use mechanical vegetation clearing, and limit use of herbicides and pesticides to the extent possible. — Maximize the use of native plant species for revegetation, soil stabilization, and erosion control. — Inspect construction equipment prior to arriving at the site and clean, if required. Use the maintenance shop to support cleaning, once constructed, and as required. — Monitor restoration landscapes and adjacent vegetated areas and wetlands for the presence of invasive species and implement removal techniques, as appropriate. Include the presence of invasive species as a target of wetland environmental effects monitoring. — Implement the Environmental Effects Monitoring Program (**Annex 5E**), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species.	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area No effect – woodland caribou; species is unlikely to occur in the Project area

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Closure — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site			
Construction — Site preparation, including vegetation clearing and earthworks — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Power generation — Worker accommodation, mine services area, and office operation — Site traffic, transportation of personnel and materials to and from the site **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Deposition of suspended solids in emissions:** The deposition of suspended solids in criteria air contaminant emissions (e.g., potential acid inputs) can alter water quality and soil quality, which may change soil quality and vegetation, ultimately effecting the health, survival, and reproduction of wildlife.	— Use and maintain emissions control devices on motorized equipment. — Maintain and monitor mobile mining equipment and vehicles and operate the equipment within parameters for engine exhaust system design. — Seek to reduce fuel combustion requirements of infrastructure and equipment during detailed design, to the extent feasible. — Limit idling of equipment and vehicles to the extent practicable — Use the best available pollution control technology at material transfer points — Minimize haul route distances, thereby reducing fuel consumption and fugitive emissions from equipment. — Application of water and/or suppressants should be applied to site roads and access roads, as necessary. — Establishing and enforcing speed limits on site and access roads will reduce dust production. — Limit vehicle speed on unpaved site roads to reduce fugitive dust during Construction and Operations. — Minimize haul route distances, thereby reducing fuel consumption and fugitive emissions from equipment. — To limit total suspended particulate emissions, a reduced speed limit for heavy equipment involved in material movement and earthworks on site will be enforced. This speed limit does not apply to site road traffic or the haul route from the headworks to the waste rock piles. — All crushed iron ore stockpiles would be covered with dust collection technology to minimize fugitive dust and silica from crushed ore stockpiles. — Use dust suppressants that minimize environmental risk and are government approved. — Apply water sprays to stockpiles or areas that have visible dust, as necessary. — Minimize areas of vegetation clearing and soil disturbance to reduce the generation of fugitive dust. — Implement a Project-specific Environmental Protection Plan that includes mitigation to reduce emissions during all Project phases. — Implement the Environmental Effects Monitoring Program (Annex 5E), which includes measures for monitoring air quality, surface water quality, wetlands, noise, avifauna, SAR/SoCC, and invasive species.	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Handling and storage of overburden, mine rock, and ore — Operation and management of the TMF — Handling, storage, and discharge of non-contact water — Handling, storage, treatment, and discharge of contact water — Progressive reclamation	**Sedimentation**: Sediment released during instream Construction and from ground disturbance may alter wildlife habitat availability and distribution in local waterbodies and watercourses.	— Minimize areas of vegetation clearing and soil disturbance. — Limit the steepness and length of slopes of disturbed areas and stockpiled soils, when feasible — Avoid placing soil stockpiles on slopes, near waterbodies (maintain a 150 m buffer from waterbodies), and near natural drainage features, unless required for temporary storage — Locate borrow pits more than 100 m away from high-water mark of waterbodies, where possible. — Complete water diversions using industry-standard best management practices. — Discharge water to waterbodies and watercourses in a manner that does not cause erosion or other damage to adjacent areas. — Schedule work in sensitive areas to avoid periods (e.g., spring freshet) that may result in high flow volumes and/or increased erosion and sedimentation, to the extent practical — Avoid or limit instream construction to when watercourses are not flowing, or are frozen to the bottom, where possible. — Routinely inspect and maintain containment and conveyance structures (i.e., roadside ditches and culverts) to limit the risk of road wash-out or sediment release to the environment. — Implement progressive reclamation and revegetation of disturbed areas no longer required, where practicable — Reclaim and revegetate areas where non-permanent Project facilities have been decommissioned	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Closure — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site		— Develop and implement an Erosion and Sediment Control Plan (Annex 5F) — Implement a Project-specific Environmental Protection Plan (Annex 5D) — Develop and Implement Environmental Effects Monitoring Program (Annex 5E) that includes monitoring surface water and sediment quality — Implement a Project-specific Waste Management Plan (Annex 5J) and site water management procedures — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	
Construction — Site preparation, including vegetation clearing and earthworks — Road development, including culverts and bridge installation — Handling and storage of mine rock — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Handling, storage, and discharge of non-contact water — Handling, storage, treatment, and discharge of contact water — Worker accommodation, mine services area, and office operation **Closure** — Removal of infrastructure; restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Altered site drainage**: Altered site drainage, run-off, and discharge from facilities during construction and operations may cause changes to water levels and flows and channel/bank stability and affect soils and vegetation, ultimately affecting wildlife habitat availability and distribution.	— Adequate water storage capacity has been designed to provide a controlled release rate during both routine and non-routine operation scenarios. — Minimize areas of vegetation clearing and soil disturbance — Alignment of site roads will be designed to minimize stream crossings and avoid sensitive habitat as feasible. — Limit the steepness and length of slopes of disturbed areas and stockpiled soils, when feasible. — Avoid placing soil stockpiles on slopes, near water bodies (i.e., maintaining a 150 m buffer from waterbodies), and near natural drainage features, when feasible. — Work in sensitive areas will be scheduled to avoid periods (e.g., spring freshet) that may result in high flow volumes and/or increased erosion and sedimentation. — Water withdraw in accordance with provincial standards and licence/permit conditions and industry best standards. — Implement progressive reclamation and revegetation of disturbed areas no longer required, where practicable — Adhere to additional mitigations to reduce effects of altered site drainage that are outlined in Chapter 8, Surface Water. — Develop and implement a Project-specific Environmental Protection Plan — Develop and implement the Environmental Effects Monitoring Program (Annex 5E) that includes surface water and sediment quality monitoring to confirm the effectiveness of mitigation measures as well as to maintain compliance with regulatory permits / approvals — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	No effect – harlequin duck; species is unlikely to occur in the Project area Negligible effect pathway for all other wildlife VECs

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Operating mobile mining equipment — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Operating mobile mining equipment — Handling and storage of overburden, mine rock, and ore — Processing iron ore concentrate — Site traffic, including transportation of personnel and materials to and from the site **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Air emission effects via inhalation or ingestion**: Fugitive dust emissions and associated constituents (e.g., metals, radionuclides) may cause changes in air, soil, and water quality, which can adversely affect wildlife health, survival, and reproduction through inhalation and ingestion of soil/water and food sources.	— Cover crushed iron ore stockpiles with dust collection technology to minimize fugitive dust and silica from crushed ore stockpiles — Implement progressive re-grading and reclamation of the overburden stockpile (starting during Operations, where applicable), and the mine rock stockpile and TMF (starting during Closure) — Optimize haul routes to reduce fuel consumption and emissions — Apply water and / or dust suppressants to site roads, including the access road, as necessary — Apply water sprays to stockpiles or areas that have visible dust, as necessary — Limit vehicle speed on unpaved roads to reduce fugitive dust — Maintain mobile mining equipment and vehicles and operate the equipment within parameters for engine exhaust system design — Limit idling of vehicles and equipment to the extent practicable — Develop and implement a Project-specific Environmental Protection Plan (Annex 5D) that includes mitigation to reduce fugitive dust emissions during all Project phases — Implement the Environmental Effects Monitoring Plan (Annex 5E), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species.	Residual effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area
Construction — Site preparation, including vegetation clearing and earthworks — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Dewatering activities — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment and discharge of contact water — Sewage collection, treatment and surface discharge — Worker accommodation, mine services area, and office operation	**Treated effluent discharge:** Release of treated effluent may cause changes to surface water and sediment quality and adversely affect wildlife health, survival, and reproduction through contact and ingestion of water and food sources.	— Design, construct and operate water management facilities and infrastructure in accordance with applicable permits, approvals, and best industry practices to minimize effect on surface water in receiving waterbodies. — Adhere to additional mitigations to reduce effects of discharge of treated effluent that are outlined in Chapter 8, Surface Water. — Implement an Environmental Effects Monitoring Program (5E) that includes monitoring treated effluent and surface water quality and sediment quality, and applying adaptive management as necessary. — Implement a Project-specific Environmental Protection Plan (Annex 5D). — Implement a Project-specific Waste Management Plan (Annex 5H) and site contact water management procedures. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area No effect – woodland caribou; species is unlikely to occur in the Project area Residual effect – amphibians, aerial insectivores (bank swallows, common nighthawks, hoary bat, northern myotis)

Project Components/Activities	Effects Pathway	Environmental Design Features, Mitigation, or Enhancement Measures	Effect Pathway Screening
Closure — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site			
Construction — Handling and storage of mine rock **Operations and Maintenance** — Operation and management of the TMF — Handling and storage of overburden, mine rock, and ore **Closure** — Accelerated put flooding — Handling and storage of mine rock — Removal of infrastructure, restoration and revegetation of facilities and infrastructure	**Surface water quality from run-off and seepage**: Seepage from the overburden stockpile, mine rock stockpile, and tailing management facility during Construction, Operations, Closure, and the Post-closure period may affect groundwater and surface water quality in receiving waterbodies and watercourses, as well as farther downstream, and adversely affect wildlife health, survival, and reproduction through ingestion of water and food sources.	– Design, construct and operate water management infrastructure and facilities (including waterbody crossings) in accordance with applicable permits, approvals, and best industry practices to minimize effect on surface water in receiving waterbodies — Provide adequate contact water storage capacity to manage runoff and seepage from Project infrastructure and disturbed areas — Minimize areas of vegetation clearing and soil disturbance — Limit steepness and length of slopes of disturbed areas and stockpiled soils, where feasible — Avoid placing soil stockpiles near waterbodies and near natural drainage features, unless required for temporary storage — To the extent practical, work in sensitive areas (i.e., erosive soils, wetland features, and fish habitats) will be scheduled to avoid periods that may result in high flow volumes and/or increase erosion and sedimentation (e.g., spring freshet) — Implement progressive reclamation and revegetation of disturbed areas no longer required, where practicable — Reclaim and revegetate areas where non-permanent Project facilities have been decommissioned — Adhere to additional mitigations to reduce effects of site run-off and seepage that are outlined in Chapter 8, Surface Water. — Implement the Environmental Effects Monitoring Program (**Annex 5E**), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species. — A Rehabilitation and Closure Plan is being developed in collaboration with government and Indigenous communities. This will be submitted as part of the permitting process.	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area
Construction — Handling and storage of overburden — Road development, including culverts and bridge installation — Construction of facilities and infrastructure — Construction of TMF starter dam — Handling and storage of mine rock — Construction of water management infrastructure — Site traffic, including transportation of personnel and materials to and from the site **Operations and Maintenance** — Open pit mining, including blasting and crushing ore and mine rock — Handling and storage of overburden, mine rock, and ore — Pit dewatering and site water management — Handling, storage and discharge of non-contact water — Handling, storage, treatment and discharge of contact water — Sewage collection, treatment and surface discharge — Worker accommodation, mine services area, and office operation **Closure** — Removal of infrastructure, restoration and revegetation of facilities and infrastructure — Site traffic, transportation of personnel and materials to and from the site	**Spill contamination:** spills of chemical or hazardous material stored or spilled on the Project site or along access roads can affect soils, water, vegetation, and wetlands, as well as wildlife survival and reproduction.	— Adhere to federal and provincial regulations and guidelines regarding hazardous substance transportation, collection and storage, use and handling, and disposal and treatment — Develop and implement a Project-specific Environmental Protection Plan — Implement the Environmental Effects Monitoring Plan (Annex 5E), which includes measures for monitoring surface water quality, wetland, noise, avifauna, SAR/SoCC, and invasive species.	Negligible effect pathway No effect – harlequin duck; species is unlikely to occur in the Project area

SoCC = Species of Conservation Concern; TMF = tailings management facility; SSA = site study area; SAR = Species at Risk; EM = Environmental Monitor; EML = Environmental Management Lead; VEC = Valued Environmental Component; DFO = Fisheries and Oceans Canada; TSP = total suspended particulate; PAG = potentially acid generating; NPAG = non-potentially acid generating.

11.5.2.1 No Effect Pathways

Project interactions that were predicted to result in no effect pathway (Table 11-28) were specific to harlequin duck or woodland caribou, because those species are not predicted to occur in the Project study area.

11.5.2.2 Negligible Effect Pathways

Project environmental design features to mitigate potential effects on air, noise, vibrations, light, surface water, vegetation, and wetlands were designed to minimize the Project's effects on these receptors, which are also important receptors for wildlife and wildlife habitat. Implementing an Environmental Protection Plan, which includes plans for dust management, sediment and erosion control, air quality, noise management, and lighting, will help reduce potential adverse Project effects on wildlife and wildlife habitat. An Environmental Effects Monitoring Program will also help reduce adverse Project effects on wildlife and wildlife habitat and inform adaptive management actions, if necessary.

After mitigation measures were considered, the pathways screening analysis determined that the Project could have negligible adverse effects on wildlife and wildlife habitat through the following pathways, which are not carried forward in the assessment, unless otherwise specified for a particular species:

- **Habitat loss** is negligible for harlequin duck.
- **Increased edge habitat** is negligible for all VECs.
- **Linear barriers** is negligible for all VECs.
- **Injury and mortality from clearing** is negligible for all VECs except amphibians (herptiles).
- **Increased predator access** is negligible for all VECs.
- **Increased public access** is negligible for all VECs.
- **Vehicle collisions** is negligible for all VECs except amphibians (herptiles).
- **Wildlife attractants** is negligible for all VECs.
- Introduction and spread of invasive plants is negligible for all VECs.
- Deposition of suspended solids in emissions is negligible for all VECs.
- **Sedimentation** is negligible for all VECs.
- **Altered site drainage** is negligible for all VECs except amphibians and harlequin duck.

Treated effluent discharge is negligible for all VECs except for woodland caribou, amphibians, and avifauna (except grouse spp.).

For a comparison of negligible effect pathways in the previous EIS and current EIS, refer to Key Findings and Conclusions.

11.5.2.2.1 Linear Barriers (Construction, Operations and Management, and Closure)

- Site roads, access roads, and railways could decrease habitat connectivity and adversely affect animal distribution.

This negligible effect pathway applies to all wildlife VECs except two-lined salamander and wood frog, for which the pathway is residual (Section 11.5.2.3).

Fragmentation of wildlife habitat can result from linear corridor developments such as cleared rights of way through contiguous habitats, which can decrease species densities (Andrews 1990; Beauchesne et al. 2014; Crooks et al. 2017). Barrier effects or alterations in species movement patterns could also result from linear corridors intersecting habitats (Carthew et al. 2009; Dunne and Quinn 2009). Linear features in the SSA will be primarily associated with existing features to minimize potential effects.

Linear barriers are not expected to affect bird or bat VECs, which can fly over such features. For example, roads and railroads are expected to have a low effect on bank swallows (ECCC 2022a). Bats may use narrow linear features for commuting. Project access roads would not be expected to act as physical barriers to the movement of large mammals. Smaller mammals would also be anticipated to travel across roads and trails designed for the Project provided that natural roadside habitat is maintained. Implementation of crossing structures, such as culverts, underpasses, and overpassed would further reduce potential Project effects.

Berms and snowbanks may also act as barriers. To mitigate this, gaps would be maintained in road berms and snowbanks to facilitate wildlife crossing at drainages, wildlife trails, or connected habitat patches so that wildlife movements across roads are not blocked, as determined in the field. Along the access road, low snowbanks would be maintained with breaks in snowbanks placed at regular intervals to allow passage of wildlife, where feasible. Snow clearing along the access road would incorporate road pull-outs at regular intervals to provide refuge for wildlife moving along the road corridor. Use of crossing structures, such as culverts for smaller animals, overpasses, and underpasses could also maintain connectivity.

Access roads may act as a considerable movement barrier for two-lined salamander and wood frog (NCASI 2008); a study on amphibians showed that railroad mortality was highest among adult common toads and suggested that railroad tracks may be challenging for the species to cross (Budzik and Budzik 2014). The density of linear features within the wildlife LSA is estimated at 0.68 km/km^2 which includes permanent linear features (e.g., highway, local roads, railroad, utility lines) and non-permanent features (trails; Table 11-19). The addition of 14 km of access roads associated with the Project is not expected to increase the linear density such that it would result in a measurable change in the wildlife populations.

Overall, with the implementation of mitigation measures (Table 11-28), linear barriers are expected to result in a minor reduction in habitat connectivity and wildlife movement. The changes would be localized to the Project SSA and are predicted to have a negligible residual effect on wildlife VECs. The pathway was not carried forward in the assessment. However, this will be a residual effect for two-lined salamanders and wood frogs due to their limited mobility (Section 11.5.2.3).

11.5.2.2.2 Increased Edge Habitat (Construction, Operations and Management, and Closure)

- Vegetation clearing would result in an increase in edge habitat, which could increase nest predation for forest birds.

This negligible effect pathway applies to all VECs.

Vegetation clearing would result in an increase in habitat fragmentation and edge habitat, which could adversely affect wildlife and their habitat (Laurance et al. 2007). For example, forest birds and their nests are more exposed to potential predators at forest edges (NCASI 2008). Biophysical conditions, such as temperature, wind speed, and soil conditions, are also altered at edges and may affect microclimates for wildlife. Given these effects will be highly localized, they are unlikely to effect mobile species. They may, however, have effects on amphibians as they are less mobile and rely on very localized microclimates (NCASI 2008). In some instances, increased edge habitat may be beneficial. Many bats, including hoary bats, commute and forage along edge habitat (Patriquin and Barclay 2003; NCASI 2008).

Edge effects in the SSA will be primarily associated with linear features that will align with existing features; therefore, existing flora and fauna communities near these features are likely tolerant of edge effects. Additionally, some studies suggest species in boreal forests, like those found in the Project area, are adapted to edge effects since these forests experience regular disturbance (NCASI 2008). Therefore, increased edge habitat is expected to have a negligible effect on wildlife and their habitat, and this pathway is not carried forward.

11.5.2.2.3 Injury and Mortality from Clearing (Construction, Operations and Management)

- Vegetation removal and soil alterations during site preparation and construction may result in injury or mortality to individual animals with low mobility (e.g., denning black bears or marten, herptiles), destruction of nests, eggs, and individuals of migratory birds (i.e., incidental take).

This negligible effect pathway applies to all wildlife VECs except two-lined salamander and wood frog, for which the pathway is residual (Section 11.5.2.3).

The MBCA prohibits the destruction of migratory bird nests (e.g., songbirds [excluding corvids] and waterfowl) during the breeding season. In addition, SARA prohibits the damage or destruction of the residence (e.g., nest) and of species listed under Schedule 1 of SARA as Special Concern, Endangered, Threatened, or Extirpated and critical habitat of migratory birds (Threatened and Endangered). Bird nests, eggs, and/or birds could be destroyed during land clearing, site preparation, and construction of facilities and infrastructure. To the extent possible, clearing and grubbing of vegetation would be completed outside of the breeding/nesting season (i.e., early May to mid-August annually [Nesting Zone D6]), which would mitigate injury or mortality for nesting birds. If vegetation removal is required during the nesting period, then non-intrusive nesting surveys (i.e., to search for active nests and to document breeding bird behaviour such as pairing, singing, alarm calling, carrying food, and distraction displays) would be completed by qualified biologists prior to clearing activities. If nests are discovered, the qualified biologist would consult with regulators, as required, to apply appropriate buffers to avoid disturbance. Application of timing restrictions for nesting birds also provides mitigation to reduce effects on bat maternity roosting habitat (i.e., bats roost in forested areas during summer months). Minimizing disturbance during bird nesting would also minimize disturbance to calving ungulates. Harm to American marten natal (i.e., birthing) and maternal dens that occur in the wildlife LSA would be reduced by avoiding clearing mature forest and wildlife trees (i.e., dead or decaying trees, standing, or fallen) from March 11 to July 31 (Ellis 1999; EC 2013; Strickland and Douglas 1987), which mostly overlaps the migratory bird breeding/nesting season.

Bank swallows and common nighthawks may also be at risk of direct injury and mortality during project operations. Bank swallows are well known to nest in exposed stockpiles resulting from mining and quarrying, putting adults at risk of injury and nests/eggs at risk of mortality (COSEWIC 2013a). However, these effects were assessed as not a major threat to bank swallow populations (ECCC 2022a).

The ability of VECs to avoid or move away from construction activities can be constrained during certain life-history periods or stages, such as during nesting, denning, and hibernation periods. Animals in dens may be at higher risk of injury or mortality if these dens occur within the anticipated Project SSA and are not detected by pre-construction surveys. The survival of young black bears could decrease if anthropogenic disturbance leads to relocation of den sites (Argue et al. 2008). Denning dates in Voisey's Bay, Labrador ranged between 148-222 days with entry occurring in October to November and emergence between mid-April to May (Chaulk et al. 2005). As a result, denning periods for black bear in the wildlife LSA are expected to be October to May. Direct removal of habitat during these periods of the life history of VECs can increase the risk of injury or mortality to adults and their young. Little is known of the denning requirements of black bears in the LSA; however, Neufeld (2018) observed that for 14 black bears denning in the Saskatchewan Boreal Shield, sites selected by bears showed avoidance of water within 100 m of dens and average denning of at least 14 km from a road. Black bears in Bruce Peninsula, Ontario, also denned further from settlement and developed roads than expected (Coady et al. 2024). The proposed Project footprint is in a highly disturbed area, and it is predicted that the LSA would likely represent unsuitable denning habitat for black bears. However, if vegetation removal is required during the black bear denning/hibernation periods (i.e., fall to winter) or marten denning periods (i.e., March to July) (Ellis 1999; EC 2013; Strickland and Douglas 1987; COSEWIC 2007a), then bear den presence/absence surveys and wildlife tree surveys would be completed by qualified biologists prior to clearing activities. If dens are discovered, then the Government of Newfoundland and Labrador would be consulted to determine appropriate mitigation.

The implementation of mitigation is anticipated to avoid and reduce Project changes to the survival and reproduction of black bears, marten, and beavers that may be denning, migratory birds that may be nesting, or bats roosting in the LSA. Any adverse interactions between the Project and wildlife are expected to be infrequent and have a minor influence on the regional population relative to existing conditions and are predicted to result in negligible residual effects on VECs. As such, the pathway was assessed as negligible for these VECs and not carried forward in the assessment.

Because amphibians like two-lined salamanders and wood frogs are not highly mobile and present year-round, they are at a higher risk of effects from clearing activities compared to other VECs (NCASI 2008). This pathway is expected to have an effect and is carried forward for herptiles (see Section 11.5.2.3) Restricting clearing activities to seasonal windows is unlikely to be an effective mitigation for amphibians as they overwinter in the Project area. Therefore, amphibians are likely to experience adverse effects of Project clearing despite mitigation efforts. This pathway is carried forward for amphibians.

11.5.2.2.4 Increased Predator Access (Construction, Operations and Maintenance)

- Increased access for predators (e.g., wolf and black bear) and prey may increase predation risk and decrease survival and reproduction for moose and caribou.

This negligible effect pathway applies to all VECs.

Increases in linear features and edge effects may increase access for humans and predators (Horejsi 1979; Bergerud et al. 1984; Brody and Pelton 1989; Jalkotzy et al. 1997; Stuart-Smith et al. 1997; Rettie et al. 1998; James and Stuart-Smith 2000; Tigner et al. 2014; Dickie et al. 2016), which can result in an increase in mortality for wildlife species. The Project is not predicted to increase access for predators because access to the area already exists, from both the Trans-Labrador Highway and access trails which lead to private cabins on Duley Lake, Mills Lake and Riordan Lake. Any improvements to roads are expected to result in no measurable change to existing access for predators.

Overall, the Project is anticipated to result in no measurable change in access for predators in the wildlife LSA and RSA relative to existing conditions. The increase in the level of human activity in the wildlife LSA associated with the Project is expected to deter most predators, and prey, from using the Project site. As such, the pathway was not carried forward in the assessment.

11.5.2.2.5 Increased Public Access (Construction, Operations, and Maintenance)

- Changes in public access to hunting/trapping areas and increased density of people (i.e., Project staff and contractors) in the area may alter ungulate and carnivore survival and reproduction and affect abundance.

This negligible effect pathway applies to all VECs.

Linear features often increase the ease of movement by predators and humans into previously inaccessible areas (Horejsi 1979; Bergerud et al. 1984; Brody and Pelton 1989; Jalkotzy et al. 1997; Stuart-Smith et al. 1997; Rettie et al. 1998; James and Stuart-Smith 2000; Tigner et al. 2014; Dickie et al. 2016), which can result in an increase in mortality for wildlife species. The Project is not predicted to increase access for humans and predators because access to the area already exists, from both the Trans-Labrador Highway and access trails which lead to private cabins on Duley Lake, Mills Lake and Riordan Lake. Any improvements to roads are expected to result in no measurable change to existing access for hunting/trapping. The proposed road upgrades are intended to enable the safe and efficient transport of heavy materials, equipment, and fuel, which would not increase the current use of the road for light and all-terrain vehicles and snowmachines. Further, mitigations described in Table 11-28 (e.g., gated Project site entrance, no hunting by employees in areas within the Project footprint) are expected to limit hunting and trapping in the LSA.

An increase in people in the area is not expected to result in a proportional increase in harvest of ungulates or trapping of furbearers, because government-regulated hunting and trapping limits would be maintained. Nonetheless, increased access into the region from improved roads and increased knowledge of the region due to the influx of workers and contractors could result in poaching. This would be minimized through Champion's wildlife policies and employee and contractor training programs.

Overall, the Project is anticipated to result in no measurable change in access for predators, prey, and hunters in the wildlife LSA and RSA relative to existing conditions. The increase in the level of human activity in the wildlife LSA associated with the Project is expected to deter most predators, and prey, from using the Project site. The increase in the number of people in the area during the Project lifespan could result in a minor increase in illegal harvesting of animals, but the amount is predicted to have a negligible residual effect on the abundance of wildlife VECs. As such, these two pathways were not carried forward in the assessment.

11.5.2.2.6 Vehicle Collisions (Construction, Operations and Maintenance, and Closure)

- Collisions with vehicles, equipment, buildings, and aircraft on site, and vehicles travelling to and from site may cause injury or mortality to individual animals.

This negligible effect pathway applies to all VECs, except amphibians.

During the lifespan of the Project, the increase in Project-related traffic may increase the number of wildlife–vehicle collisions relative to existing conditions. Vehicle mortality affects all wildlife species (Kelsall and Simpson 1987; Jalkotzy et al. 1997). The frequencies of road mortalities are often related to specific locations, traffic volume, and speed (Oxley et al. 1974; Jalkotzy et al. 1997). Previous estimates projected an additional 13 truck trips per day during construction, but information regarding increased civilian and employee traffic are not available (Alderon 2012). This is expected to have a larger effect on large mammals and amphibians. Although bird species whose habitat is bisected with roads are vulnerable to road mortalities to some extent, it is anticipated that vehicle-related mortality would be low for birds. Generally, few wildlife species are expected to be present in proximity to roads due to previous displacement.

Amphibians, including two-lined salamanders and wood frog, would be most at risk to collision with vehicles between late June and early September when adults and emerging young-of-the-year (i.e., metamorphs) are expected to leave breeding habitat and complete migratory or dispersal movements into terrestrial habitats (Fahrig et al. 1995; Mazerolle et al. 2005). Migrating or dispersing amphibians are typically slow moving and will remain immobile instead of fleeing when approached by vehicles, making them particularly vulnerable to vehicle collision (Mazerolle et al. 2005).

As part of the Project Environmental Protection Plan, an education program would be implemented that details to staff, contractors, and visitors how to take all reasonable precautions to avoid wildlife collisions. In addition, implementation of mitigation measures including staff, contractor, and visitor orientations, giving wildlife the right of way, identification of wildlife crossings, leaving gaps in road berms and snowbanks, mandatory encounter and incident reporting, and speed limit adjustments (Table 11-28) are expected to result in a minor increase in injury or mortality to individual animals from vehicle–wildlife collisions relative to existing conditions. The change is predicted to have a negligible residual effect on populations of wildlife VECs, except amphibians. Therefore, the pathway was not carried forward in the assessment. This pathway was carried forward for amphibians because they are less mobile and therefore planned mitigations will not be as effective.

11.5.2.2.7 Wildlife Attractants (Construction, Operations and Maintenance, and Closure)

- Attraction of wildlife to the Project site (e.g., food waste, sewage, petroleum-based products, dust suppressants, explosive powder, site run-off ponds, lights) may increase human–wildlife interactions and change predator–prey relationships, which can affect animal survival and reproduction.

This negligible effect pathway applies to all VECs.

Food smells and other aromatic compounds such as petroleum-based chemicals, grey water, and sewage can attract carnivores to human developments (Beckmann and Lackey 2008; Peirce and Van Daele 2006). Corvids and raptors may also be attracted to infrastructure and anthropogenic food sources (Marzluff and Neatherlin 2006). Attraction of carnivores and predatory birds (e.g., ravens and gulls) to the Project site can increase predation pressure on prey species (Marzluff and Neatherlin 2006). Attraction of carnivores to developments can also result in negative human-animal interactions and increase the risk of loss of individual animals (e.g., relocation or destruction) from the population.

Berms/banks along roads may attract nesting bank swallows, placing them at risk of vehicle collisions (ECCC 2022a). Berms should be reduced, to the extent possible, and sloped, to reduce the likelihood of attracting nesting swallows (ECCC 2022a). Similarly, exposed surfaces on road shoulders and railways may attract nesting common nighthawks, also placing them at a higher risk of vehicle collisions (ECCC 2016).

Lights may also act as attractants for wildlife, such as foraging bats and common nighthawks. Nocturnal insects often aggregate around artificial light sources, thereby attracting nocturnal insectivores like bats (source) and common nighthawks (COSEWIC 2007b). While this may provide a rich patch of food for these species, it also places them at a higher risk of adverse human–wildlife interactions as they may collide with vehicles. Additionally, artificial lights interfere with survival and reproduction of insect prey, which would then reduce prey availability for nocturnal aerial insectivores (ECCC 2016). To mitigate these risks, lighting levels should be limited to the extent possible while supporting safe operation (ideally less than 6 lux), exterior lights should be shielded from above, lighting should be focused on work areas, full cut-off horizontal fixtures should be used to the extent possible, motion sensors should be used for security lighting, and lights should be reduced or shut off during peak migration periods to the extent possible.

The Environmental Protection Plan (Annex 5D) and Waste Management Plan (Annex 5H) would be implemented to limit the attraction of wildlife to the Project site and the associated changes in predator-prey relationships and human–wildlife interactions. Food wastes and oil products would be collected and temporarily stored in wildlife-proof containers. Wastes would be incinerated or transported off site for recycling or disposed at a licensed disposal facility as appropriate. Lined water management ponds would be fenced to deter entrance or fitted with wildlife egress matting or ramps to help animals exit the ponds. Environmental design features and management plans could limit attractants to the Project and result in a minor increase in wildlife mortality risk from predation or adverse human–wildlife interactions relative to existing conditions. Therefore, this pathway is predicted to have a negligible residual effect on wildlife VECs and was not carried forward in the assessment.

11.5.2.2.8 Introduction and Spread of Invasive Plants (Construction, Operations and Maintenance, and Closure)

- Introduction and spread of noxious, exotic, and/or invasive plant species can affect wildlife habitat availability and distribution.

This negligible effect pathway applies to all VECs.

The spread of invasive species is a potential threat to species diversity as they can outcompete native vegetation, including SAR and SoCC. This, in turn, could effect availability and distribution of important food sources for wildlife. Invasive plant species may be spread during construction if they are used on exposed soils for erosion and sediment control. Invasive plant species may also be spread during operations through the movement of materials across the site. Invasive plant species may be spread during closure if they are used for revegetation during reclamation. However, if appropriate mitigation measures are implemented, namely prioritizing the use of native vegetation, this effect on wildlife and wildlife habitat is expected to be negligible. This pathway is not carried forward in the assessment. Refer to Chapter 10, Vegetation, Wetlands, and Protected Areas, for more discussion regarding invasive plant species, their potential effects, and mitigation.

11.5.2.2.9 Deposition of Suspended Solids from Emissions (Construction, Operations and Maintenance, and Closure)

- The deposition of suspended solids in criteria air contaminant emissions (e.g., potential acid inputs) can alter water quality and soil quality, which may change soil quality and vegetation, ultimately affecting the health, survival, and reproduction of wildlife. Additionally, fugitive dust containing metals and radionuclides may alter water quality and effect wildlife habitat quantity, quality, and distribution.

This negligible effect pathway applies to all VECs.

Deposition can occur of suspended solids from emissions into water features and terrestrial areas from emissions associated with Project activities (such as site preparation; road development; construction and removal of infrastructure and facilities; handling and storage of mine rock and overburden; site traffic; open pit mining; power generation; and worker accommodation, office, and mine service area operations). Unlike fugitive dust emission, which experiences natural mitigation during the winter months, emissions from the above sources can be generated year-round; thus, they require more robust mitigation measures to limit their effect on wildlife and wildlife habitat. Air contaminants of concern can accumulate within the snowpack surrounding the Project site during the winter, as they are not dispersed by run-off. The spring melt may carry an increased load of emission contaminants of concern to regional water features.

Project design and mitigation measures will minimize the generation and deposition of suspended solids from Project emissions. The most pronounced effect is expected from this pathway through the snow accumulation and subsequent melt, which could mobilize emission contaminants of concern that may have accumulated on it. This could potentially result in minor, localized changes in surface water and sediment quality, leading to temporary, minor effects on wildlife and wildlife habitats. However, any effects are expected to dissipate quickly, given the large amount of water released during snowmelt, resulting in negligible residual effects on wildlife and wildlife habitat. Therefore, this pathway was not carried forward in the assessment.

11.5.2.2.10 Sedimentation (Construction, Operations and Maintenance, and Closure)

This negligible effect pathway applies to all VECs.

Activities such as site preparation, handling and storage of overburden and mine rock, road development, the construction of infrastructure and facilities, construction, operation, and management of the TMF starter dam, site traffic, handlings, storage, treatment, and discharge of non-contact and contact water, progressive reclamation, and the removal of infrastructure are likely to result in sedimentation in water features within the LSA. If sedimentation is not mitigated, wildlife and wildlife habitat can be largely affected. Sedimentation can degrade the quality of watercourse sediment, smother invertebrate and amphibian eggs, alter the flow of streams, reduce water quality and alter amphibian behaviour.

Sedimentation is expected to occur during Construction, Operations and Maintenance, and Closure. The following mitigation measures are expected to minimize effects and protect fish and fish habitat:

- Implement a Project-specific Environmental Protection Plan.
- Implement a Project-specific Waste Management Plan (Annex 5J) and site water management procedures.
- Develop and implement an Environmental Effects Monitoring Program (Annex 5E) that includes monitoring surface water and sediment quality.
- Conduct water diversion using industry-standard best management practices.
- Discharge water to waterbodies and watercourses in a manner that does not cause erosion or damage to adjacent areas.
- Develop and implement an Erosion and Sediment Control Plan (Annex 5F).
- Routinely inspect and maintain containment and conveyance structures (i.e., roadside ditches and culverts) to limit the risk of road washouts or sediment release into the environment.
- Minimize areas of vegetation clearing and soil disturbance.

- Avoid placing soil stockpiles on slopes, near waterbodies (maintain a 150 m buffer from waterbodies), and near natural drainage features, unless required for temporary storage.
- Limit the steepness and length of slopes of disturbed areas and stockpiled soils, when feasible
- Avoid or limit instream construction to when watercourses are not flowing, or are frozen to the bottom, where possible.
- Schedule work in sensitivie areas to avoid periods (e.g., spring freshet) that may result in high flow volumes and/or increased erosion and sedimentation, to the extent practical.
- Where practicable and applicable, implement progressive reclamation and revegetation of disturbed areas no longer required.
- Reclaim and revegetate areas where non-permanent Project facilities have been decomissioned.

Develop a Rehabilitation and Closure Plan, under the Institutional Control Program, in collaboration with the government and Indigenous communities to decommission and transfer the site back to the Province.

Mitigation measures for preventing sedimentation are widely practiced, well established, and known to be effective. As a result, the effects of sedimentation are expected to be negligible; therefore, this effect pathway is not carried forward for further assessment. The effect of sedimentation on wildlife and their habitats can be measured through fish habitat surveys (substrate surveys). Any effects are unlikely to occur, but if they are observed, they are expected to be infrequent and restricted to the LSA.

11.5.2.2.11 Altered Site Drainage (Construction, and Operations and Maintenance)

- Altered site drainage, run-off, and discharge from facilities during construction and operations may cause changes to water levels and flows and channel/bank stability and affect soils and vegetation, ultimately affecting wildlife habitat availability and distribution.

This pathway is negligible for all wildlife VECs.

Activities that may alter site drainage are the following: site preparation; road development; handling and storage of mine rock, overburden, and ore; site traffic, including the transportation of personnel and material; open pit mining; handling, storage, treatment, and discharge of contact and non-contact water; and worker accommodation, mine service area, and office operations. See Chapter 8, Surface Water, Section 8.5.2, for details of the watershed alterations in the SSA.

Additionally, residual changes from site drainage during Closure may cause changes in water level, flows, watercourse channels, and bank stability. Water balance modelling indicated the predicted changes in flow rates from Pike Lake to Walsh River and onto Duley (Long) Lake were found to be insignificant and are considered negligible (Lorax 2024).

Project designs and mitigations will minimize the effect of altered site drainage, run-off, and discharge from facilities and infrastructure on wildlife and wildlife habitat during all three project phases. With these mitigations, effects on wildlife and wildlife habitat are expected to be negligible. Additionally, the effects that removing the water features in the Project footprint will have on site drainage will be offset under the St. Lewis River Connectivity project and are considered negligible. Therefore, this pathway has not been carried forward in the assessment for most VECs.

However, despite the robust system of mitigations and Project controls, changes in drainage can result in measurable changes to surface water quantity and quality, as well as sediment quality, in turn affecting amphibians and amphibian habitat. Therefore, this pathway is carried forward for two-lined salamander and wood frog.

11.5.2.2.12 Treated Effluent Discharge (Construction, Operations and Maintenance, and Closure)

- Release of treated effluent may cause changes to surface water and sediment quality and adversely affect wildlife health, survival, and reproduction through contact and ingestion of water and food sources.

This negligible effect pathway applies to all VECs.

Project activities—including site preparation; handling and storage of overburden and mine rock, road development, construction and removal of infrastructure and facilities; dewatering; open pit mining; handling, storage, and discharge of contact and non-contact water; sewage collection, treatment, and discharge; and worker accommodation, office and mine service area operations—can cause adverse effects on the water quality of the receiving water features. However, effluent discharges must be monitored for compliance with federal and provincial criteria. Discharge will adhere to the Section 36 MDMER requirements.

Mitigation measures and Project designs are expected to minimize the effect of effluent release on wildlife and wildlife habitat. The water quality of all expected discharges was modelled using a site-wide water balance and water quality model (Lorax 2024). Discharge effluent fell below the federal *Metal and Diamond Mining Effluent Regulations* discharge limits during all phases and flows.

Additionally, predicted selenium and cobalt concentrations were below their respective Site-specific Water Quality Objectives (SSWQO; Chapter 8, Surface Water). However, several exceedances remain of the Canadian Council of Ministers of the Environment (CCME) guidelines for Total Cobalt and Total Selenium (**Chapter 9, Fish and Fish Habitat**). As presented in Chapter 9, site-specific water quality objectives for total cobalt and total selenium were developed to provide a site-specific guideline for effects to fish and fish habitat. The SSWQOs for cobalt are not exceeded, but there is long term exceedance of total selenium in Pike Lake following the Operations phase. Due to the the long-term increase of the SSWQO for total selenium in Pike Lake, the effects of effluent release will have a predicted residual effect on fish health (Chapter 9, Fish and Fish Habitat). Therefore, it is assumed effluent discharge could also have an effect on waterfowl that consume fish, amphibian larval stages and overwintering adults, and aerial insectivores that consume water-borne insects (ECCC 2022). As outlined in Chapter 8, Surface Water, "Even with the effective implementation of mitigation and enhancement measures outlined in Chapter 8, Surface Water, and summarized in Table 8-21, measurable changes (i.e., residual effects) to surface water quantity (increase in flows and / or water levels at receiving waterbodies) and surface water quality (increase to the concentrations of chemical constituents in receiving waterbodies) are expected to occur as a result of treated effluent/water discharges. Therefore, the pathway is carried forward in the assessment."

As such, this effect pathway has been carried forward to assessment for aerial insectivore and amphibian VECs. For remaining wildlife VECs, this effect pathway is expected to be negligible and not carried forward.

11.5.2.2.13 Surface Water Quality from Run-off and Seepage (Construction, Operations and Maintenance, and Closure)

Seepage from the overburden stockpile, mine rock stockpile, and tailing management facility during Construction, Operations, Closure, and the Post-closure period may affect groundwater and surface water quality in receiving waterbodies and watercourses, as well as farther downstream, and adversely affect wildlife health, survival, and reproduction through ingestion of water and food sources.

Seepage from the overburden stockpile, TMF, and mine rock stockpile is expected to move through the overburden and shallow bedrock, eventually discharging into sediment and nearby water features. Refer to Section 8.5.2 in Chapter 8, Surface Water, for a comprehensive description of the expected movement and mitigation measures that will limit seepage. As the seepage from the facilities is expected to pose a low environmental risk to sediment and surface water, this translates to a low environmental risk to wildlife and wildlife habitat. The main sedimentation pond will control the tailing facility's run-off and intercepted groundwater seepage during both Operations and Post-closure.

The construction of facilities and infrastructure will increase impervious surfaces leading to run-off onto vegetation and into wetlands. However, these effects are expected to be negligible with the implementation of appropriate mitigation and are expected to pose minimal risk to wildlife. Refer to Section 10.5.2 in Chapter 10, Vegetation, Wetlands, and Protected Areas, for a discussion of expected effects and mitigation measures that will limit effects of Project activities on vegetation and wetlands via run-off and seepage.

With appropriate mitigation measures, this pathway is considered negligible and is not carried forward in the assessment.

11.5.2.2.14 Spill Contamination (Construction, Operations and Maintenance, and Closure)

Spills of chemical or hazardous material stored or spilled on the Project site or along access roads can affect soils, water, vegetation, and wetlands, as well as wildlife survival and reproduction.

The assessment of the effects pathway for site traffic, including transportation of personnel and materials to and from the site, identifies dust generation and accidental spills of blasting materials, fuel, or oil as potential effects on surface water, wetlands, and vegetation. The rationale for categorizing the spill contamination as a negligible effect pathway is based on the potential effects on surface water being limited by implementation of standard spill prevention and dust management (Chapter 8, Surface Water). This effect pathway was also categorized as having no residual effect on vegetation and wetlands with appropriate mitigation measures (Chapter 10, Vegetation, Wetlands, and Protected Areas).

Standard spill prevention measures include proper storage of hazardous materials, ensuring they are securely contained and located away from potential spill sources. Regular inspections of storage areas and equipment are conducted to identify signs of wear or potential leaks. By adhering to these protocols, the risk of spills contaminating water, wetlands, vegetation and subsequently wildlife habitat is significantly minimized. Therefore, this pathway was not carried forward in the assessment.

11.5.2.3 Residual Effect Pathways

Project environmental design features to mitigate potential effects on air, noise, vibrations, light, surface water, vegetation, and wetlands were designed to minimize the Project's effects on these receptors which are also important receptors for wildlife and wildlife habitat. Implementing an Environmental Protection Plan, including measures for dust management, sediment and erosion control, air quality, noise management, and surface water protection, will help reduce adverse Project effects on wildlife and wildlife habitat. An Environmental Effects Monitoring Program will also help reduce adverse Project effects on wildlife and wildlife habitat.

After mitigation measures were considered, the pathways screening analysis determined that the Project could adversely affect wildlife and wildlife habitat through the following residual effect pathways, which were advanced for further assessment of residual effects (Section 11.5.3):

- habitat loss (Construction, Operations and Maintenance): all VECs
- habitat alteration (Construction, Operations and Maintenance): all VECs
- sensory disturbance (Construction, Operations and Maintenance): all VECs
- injury and mortality from clearing (Construction): two-lined salamander and wood frog
- vehicle collisions (Construction, Operations and Maintenance, Closure): two-lined salamander and wood frog
- air emission effects via inhalation or ingestion (Construction, Operations and Maintenance, Closure)

treated effluent discharge (Operations)

For a comparison of residual effect pathways in the previous EIS and current EIS, refer to Section 11.9.

11.5.3 Residual Project Effect Analysis

This section provides results of the residual Project effects analysis for wildlife for the residual effects pathways identified in Section 11.5.2. Methods for completing the residual project effects analysis for wildlife is presented in Section 11.5.1.

11.5.3.1 Habitat Loss (Construction, Operations and Maintenance, and Closure)

- Direct removal or alteration of soil, vegetation, wetlands, and freshwater habitat can cause loss of wildlife habitat and affect wildlife abundance and distribution.

This residual effect pathway applies to all wildlife VECs.

Table 11-29 shows the area of suitable habitat type within the proposed Project footprint as represented by the SSA in the current assessment. The purpose of this summary was to understand if suitable habitat is disproportionately available in the LSA and if there was a large effect by the SSA relative to suitable habitat that may have a small representation in the RSA. The LSA (ha) is total loss of suitable habitat (high and moderate habitat) within the wildlife LSA. The "percentage of Suitable Habitat in SSA relative to the Veg RSA before Construction" is the proportion of the suitable habitat in the vegetation RSA represented by the amount of suitable habitat in the SSA. The "percentage of Veg RSA Impacted" is the proportion of suitable habitat in the RSA that is directly affected by the SSA. This also served to compare previous EIS and current EIS predicted effects.

The amount of suitable habitat lost presented in Table 11-29 and described in Section 11.5.3.3 is likely an overestimate because of the use of the SSA (4,323 ha) to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA but not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Table 11-29: Summary of Suitable Habitat (High/Moderate[a]) Losses in the Local Study Area and Vegetation Regional Study Area as a Result of the Project Site Study Area

VEC	Area of Suitable Habitat Lost in Wildlife LSA (ha)	Percentage of Suitable Habitat in SSA relative to Vegetation RSA before Construction	Percentage of Suitable Habitat Lost in Vegetation RSA [b]	Percentage of Suitable ELC Affected[c]
Terrestrial mammals				
American marten	-1,634.00	16.40	-8.6	-3.30
Beaver	-361.9	14.5	-17.4	n/a
Black bear	-2,798.68	28.41	-20.0	n/a
Moose	-1,818.66	16.81	-9.0	-4.20
Amphibians				
Two-lined salamander	-1,825.67	15.84	-7.9	n/a
Wood frog	-2,177.55	30.99	-20.1	-5.7
Bats				
Hoary bat	-3,965.74	19.67	-11.6	n/a
Northern myotis	-2,761.13	20.72	-12.5	n/a
Migratory birds				
Bank swallow	-1,972.02	21.64	-13.2	n/a
Boreal chickadee, Tennessee warbler, Lincoln's sparrow, common goldeneye	n/a	n/a	n/a	-1.1 – 9.3
SAR: olive-sided flycatcher, gray-cheeked thrush, rusty blackbird, Barrow's goldeneye	n/a	n/a	n/a	-1.1 – 6.3
Raptors				
Peregrine falcon	-2,298.07	20.40	-12.6	n/a
Osprey/northern harrier	n/a	n/a	n/a	-1.2 – 8.8

VEC	Area of Suitable Habitat Lost in Wildlife LSA (ha)	Percentage of Suitable Habitat in SSA relative to Vegetation RSA before Construction	Percentage of Suitable Habitat Lost in Vegetation RSA [(b)]	Percentage of Suitable ELC Affected[(c)]
Crepuscular/nocturnal birds				
Common nighthawk	-2,596.62	20.69	-11.7	-3.6
Short-eared owl	-1,890.85	29.90	-22.3	-7.1
Upland gamebird				
Spruce grouse	-1,611.15	16.38	-8.5	-5.00
Waterfowl/waterbirds				
Common loon/Canada goose/greater yellowlegs	n/a	n/a	n/a	-0.3-8.2
Harlequin duck[(d)]	0	0	n/a	n/a

(a) Equivalent to primary and secondary in Alderon (2012).
(b) Data for this column taken from Champion 2025.
(c) Data for this column taken from Alderon 2012.
(d) There was no suitable habitat in the LSA or RSA.
VEC = Valued Environmental Component; LSA = local study area; RSA = regional study area; SSA = site study area; ELC = Ecological Landscape Classification; n/a = not applicable; SAR = Species at Risk; – = Endangered, Threatened, or Vulnerable under SARA or NL ESA.

Generally, high and moderately suitable habitat (hereafter referred to as suitable habitat) found within the wildlife LSA makes up 20% or less of the total available suitable habitat within the vegetation RSA. The relative amount of suitable habitat in the LSA was slightly higher for black bear, wood frog, and short-eared owl (approximately 30%). Except for common nighthawk, Project activities are expected to result in the conversion of all suitable habitat within the SSA to poor habitat. For the common nighthawk, developed land resulting from Project activities was considered moderately suitable habitat rather than poor habitat. Overall, the availability of suitable habitat in the LSA is not disproportionately high compared to the RSA. Loss of habitat as a result of Project activities is not expected to have a measurable effect on wildlife, because sufficient suitable habitat exists outside the SSA.

For all VECs, predicted loss of suitable habitat in the current EIS is higher than predicted losses in the previous EIS. This may be due, in part, to the use of slightly different ELC types in the two assessments (Chapter 10, Vegetation, Wetlands, and Protected Areas). It may also be due to differences in characterization of habitat suitability, as these were informed by professional expertise and qualitative in both cases, rather than quantitative. Additionally, differences may be due to improved accuracy of the recent ELC modelling (from the 2012 levels of around 50%) up to approximately 90% accuracy. Also, the two effect areas are different, as the 2014 Project Development Area was only 2,377.50 ha whereas the more conservative SSA in the current assessment is 4,323.06 ha.

Looking at the percent effects overall provides a general indication that moderate amounts of suitable habitat will be reduced in the RSA and there will remain relatively large areas of suitable habitat for most VECs in the region following Kami Mining Project development. Across all VECs, the loss of suitable habitat in the SSA translates to a loss of 7.9% to 22.3% of total suitable habitat within the vegetation RSA. Changes in habitat availability for each VEC are detailed below.

It should be noted that some habitat losses are associated with the Pike Lake South Management Unit for which special mitigation is also required through stewardship agreements (see Section 10.5.3.4 of Chapter 10, Vegetation, Wetlands, and Protected Areas). It should also be noted that the predicted areas of effect are conservative to allow for potential minor changes to the Project footprint and are likely to be much smaller.

11.5.3.2 Habitat Loss by Species

Bank Swallow

The Project is predicted to reduce the availability of suitable bank swallow habitat. There is no known available high-quality habitat in the LSA or RSA as there is no nesting habitat close enough to suitable foraging habitat. A loss of 1,972 ha of moderate-quality habitat is predicted with the addition of the Project. This represents a decrease of 61% of moderate-quality habitat in the wildlife LSA, and a decrease of 13.2% of moderate-quality habitat in the vegetation RSA, relative to the existing environment (Table 11-30, Figure 11-19). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA (4,323 ha) to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA but not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Bank swallows typically forage within 500 m of nesting sites, and they often nest colonially (ECCC 2022a). Given there is no apparent suitable nesting habitat within the LSA, loss of suitable nesting habitat as a result of the Project is unlikely. However, if nesting bank swallows are present within the SSA, effects would be highly localized. Project activities, such as creation of stockpiles or roadside berms, may provide additional nesting habitat for bank swallows in the SSA (COSEWIC 2013a).

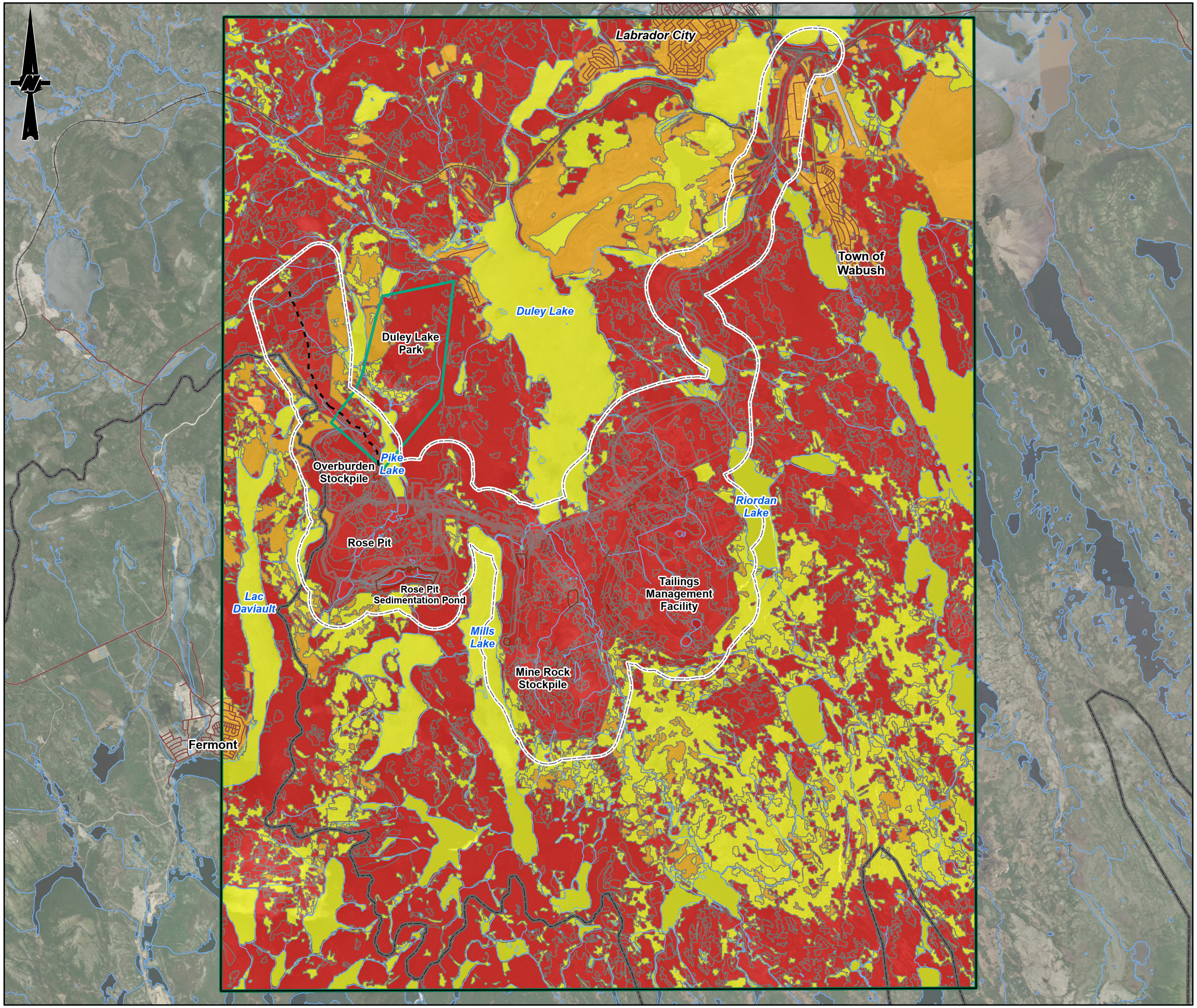
The calculated losses of available bank swallow foraging habitat in the vegetation RSA are expected to be well within the resilience and adaptive capacity limits of bank swallows as their distribution is largely dependent on nesting habitat rather than suitable foraging habitat. Additionally, moderate-quality habitat available in the LSA only represents 22% of moderate-quality habitat within the vegetation RSA. Therefore, the prevalence of foraging habitat in the existing conditions LSA and vegetation RSA suggests that suitable bank swallow habitat will remain well connected at the local and regional scales which will allow bank swallows to move freely throughout the region (Figure 11-19). Because of the prevalence of anthropogenic development existing currently in the LSA and vegetation RSA, bank swallows currently occupying these areas are predicted to have the capacity to adapt and be resilient to additional disturbances. Additionally, bank swallows are long-distance migrants with strong dispersal and movement capabilities and the changes. Therefore, changes in habitat availability and configuration from the Project are not expected to create barriers to movement relative to existing conditions.

The effects of habitat loss on bank swallow populations in the region from the Project are therefore likely to be negligible.

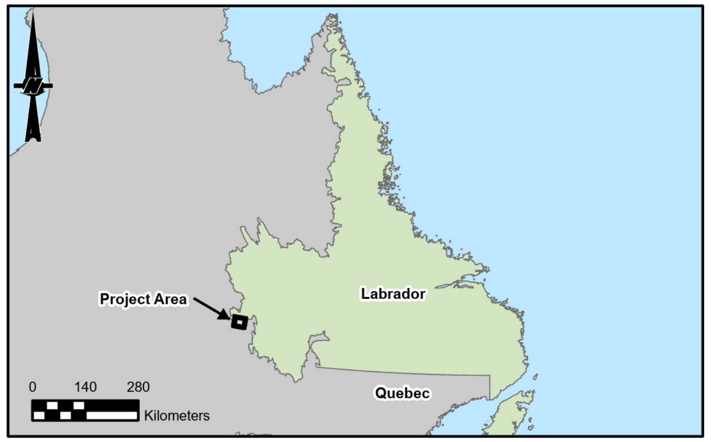
Table 11-30: Changes to Bank Swallow Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,235.71	1,263.68	-1,972	-60.95	14,952.15	12,980.13	-1,972	-13.19
Poor and low	4,471.64	6,443.66	1,972	44.10	24,961.39	26,933.41	1,972.02	7.90

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil and low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA
- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Bank Swallow Habitat Suitability
- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION
- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
BANK SWALLOW HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-19

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

Common Nighthawk

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) common nighthawk habitat. A loss of 2,597 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 56.7% of suitable habitat in the wildlife LSA, and a decrease of 11.7% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-31, Figure 11-20). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA but not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Typical common nighthawk foraging home range size is 86 ha (NS Department of Lands and Forestry 2021) and nesting territories are on average 28.3 ha (COSEWIC 2007b). Suitable nesting habitat in the LSA is limited to about 136 ha (high-quality habitat, Table 11-8). This suggest the potential loss of nesting habitat for about 5 breeding pairs, but potentially more individuals could be affected as common nighthawks may nest within 25-75 m of each other in isolated patches of suitable habitat (NS Department of Lands and Forestry 2021). However, common nighthawks also nest in anthropogenic open habitats and Project activities may result in new nesting habitat in stockpiles, exposed ground, new roads, and new railways (NS Department of Lands and Forestry 2021).

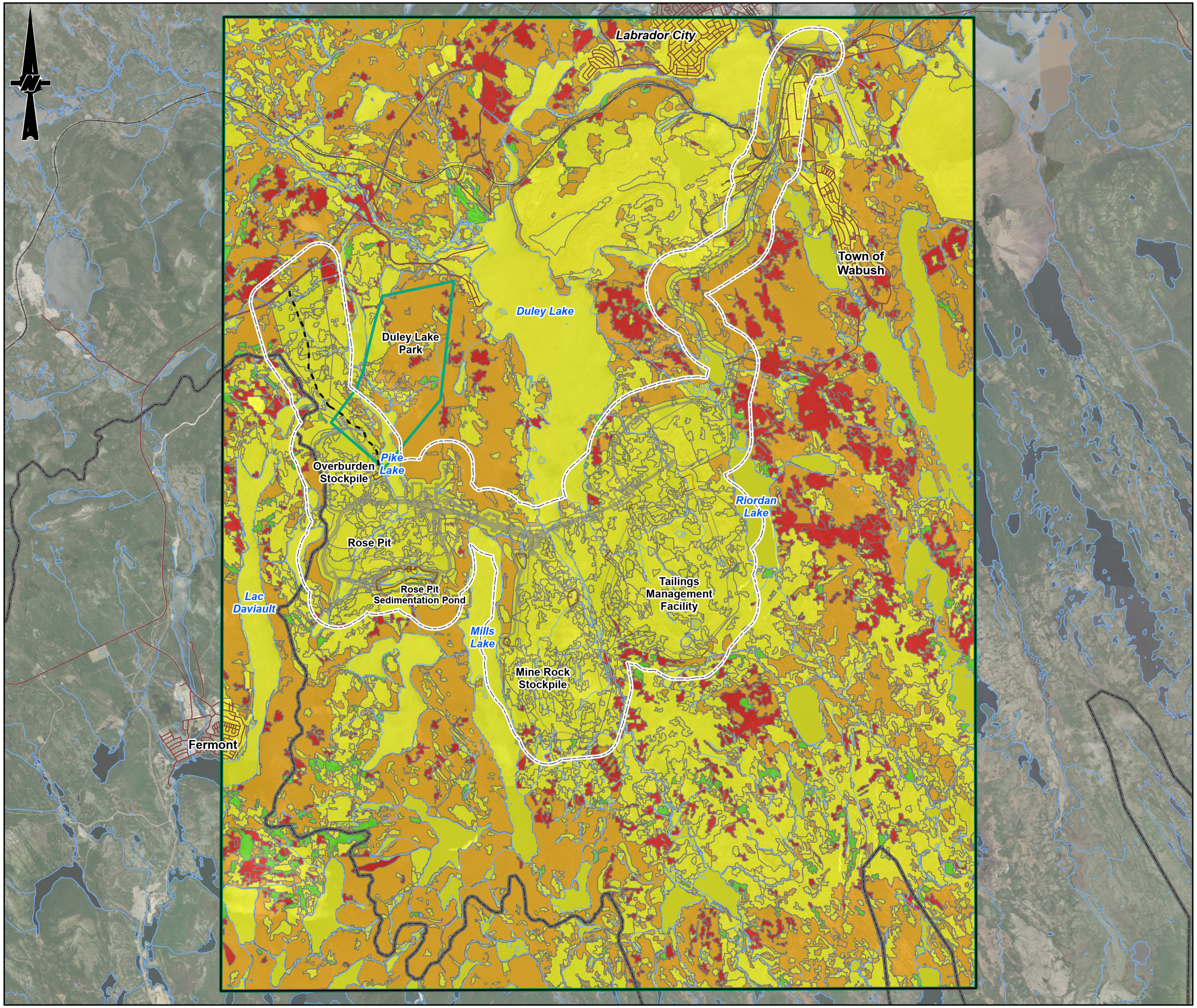
The calculated losses of suitable common nighthawk habitat in the vegetation RSA are expected to be well within the resilience and adaptive capacity limits of common nighthawks. The prevalence of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable common nighthawk habitat will remain well connected at the local and regional scales which will allow common nighthawks to move freely throughout the region (Figure 11-21). Because of the prevalence of anthropogenic development existing currently in the LSA and vegetation RSA, common nighthawks currently occupying these areas are predicted to have the capacity to adapt and be resilient to additional disturbances (Table 11-31). Additionally, common nighthawks are long-distance migrants with strong dispersal and movement capabilities. Therefore, changes in habitat availability and configuration from the Project are not expected to create barriers to movement relative to existing conditions.

The effects of the habitat loss on common nighthawk populations in the region are therefore likely to be negligible.

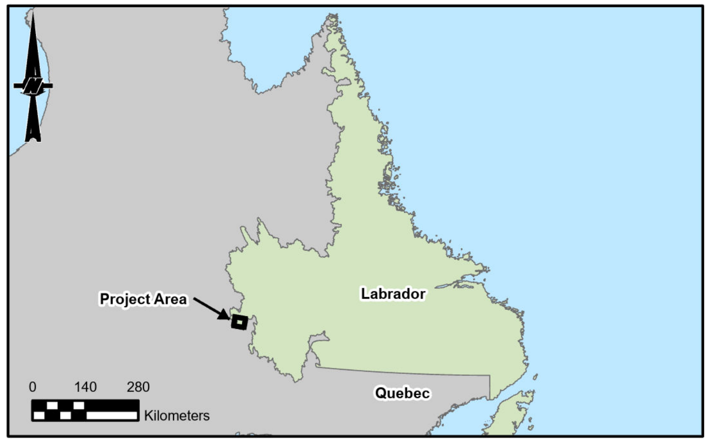
Table 11-31: Changes to Common Nighthawk Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	4,576.8	1,980.2	-2,596.6	-56.73	22,116.8	19,520.17	-2,596.6	-11.74
Poor and low	3,130.6	5,727.2	2,596.6	82.94	17,796.8	20,393.37	2,596.6	14.59

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Common Nighthawk Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

COMMON NIGHTHAWK HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-20

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

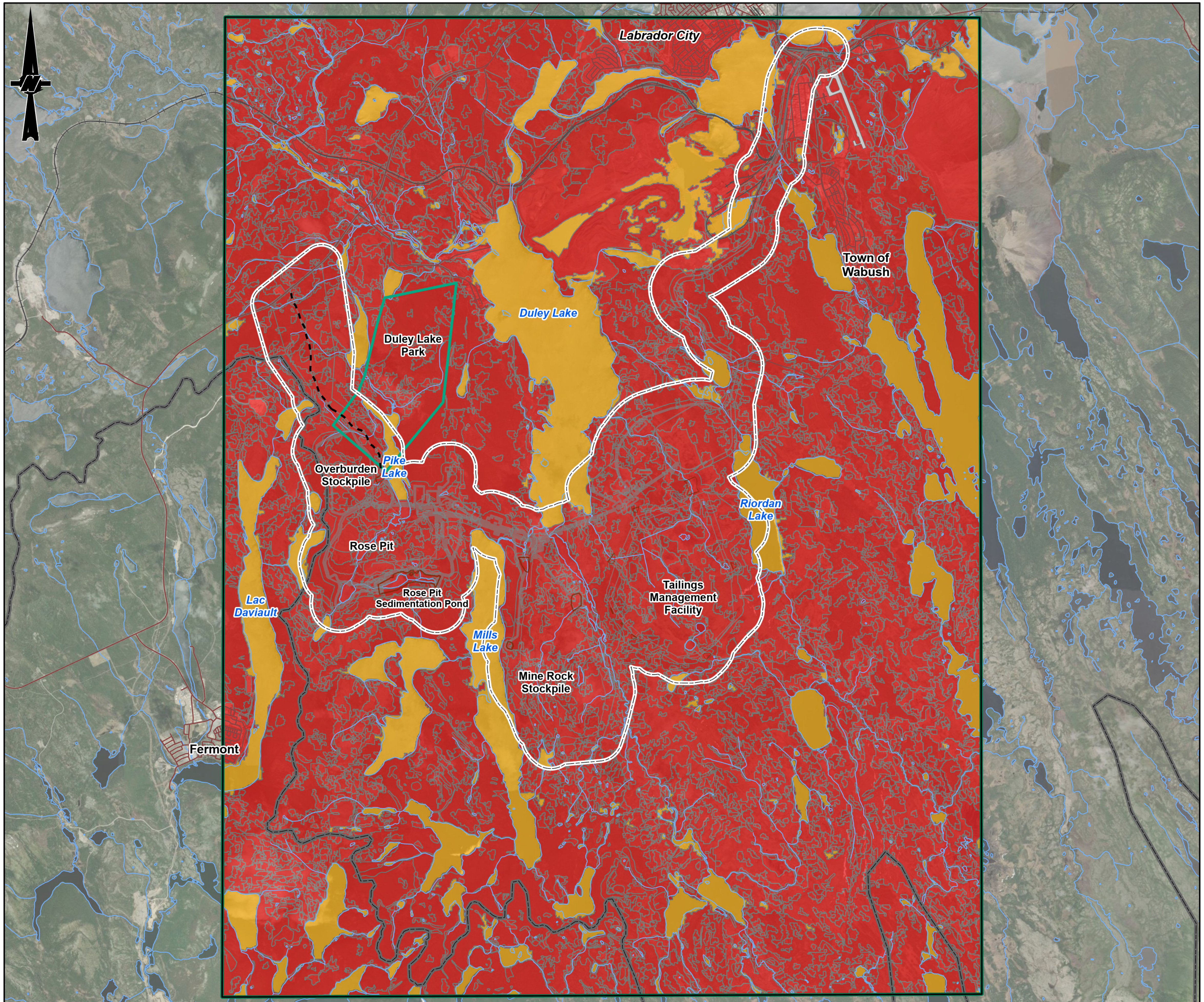
Harlequin Duck

It is unlikely harlequin ducks breed in the wildlife LSA or vegetation RSA as suitable habitat is not present (except for potentially the Wabush River) (Figure 11-32). Additionally, the last record of an observed individual is from 2012. Therefore, Project activities are not expected to effect harlequin ducks.

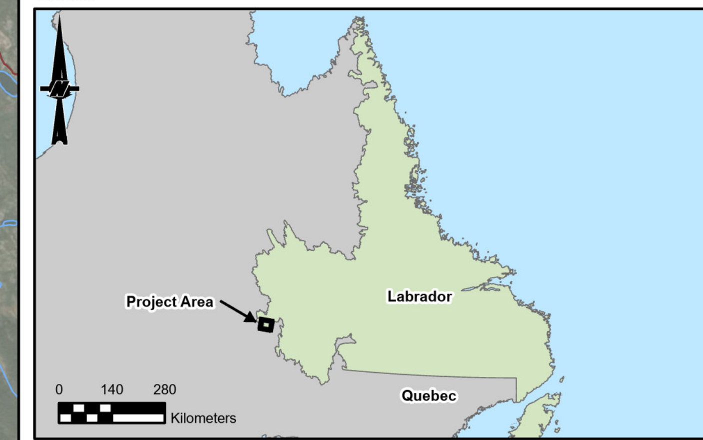
Table 11-32: Changes to Harlequin Duck Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poor and low	7,707.35	7,707.35	0.00	0.00	39,913.54	39,913.54	0.00	0.00

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Harlequin Duck Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
HARLEQUIN DUCK HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-21

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Peregrine Falcon

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) peregrine falcon habitat. A loss of 2,298 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 62% of suitable habitat in the wildlife LSA, and a decrease of 12.6% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-33, Figure 11-22). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

The *anatum* subspecies' typical foraging range is 5 km^2, but its home range can extend from 100 to 500 km^2 (COSEWIC 2017b). This suggests only a single breeding pair of peregrine falcons could potentially be effected by habitat loss in the LSA.

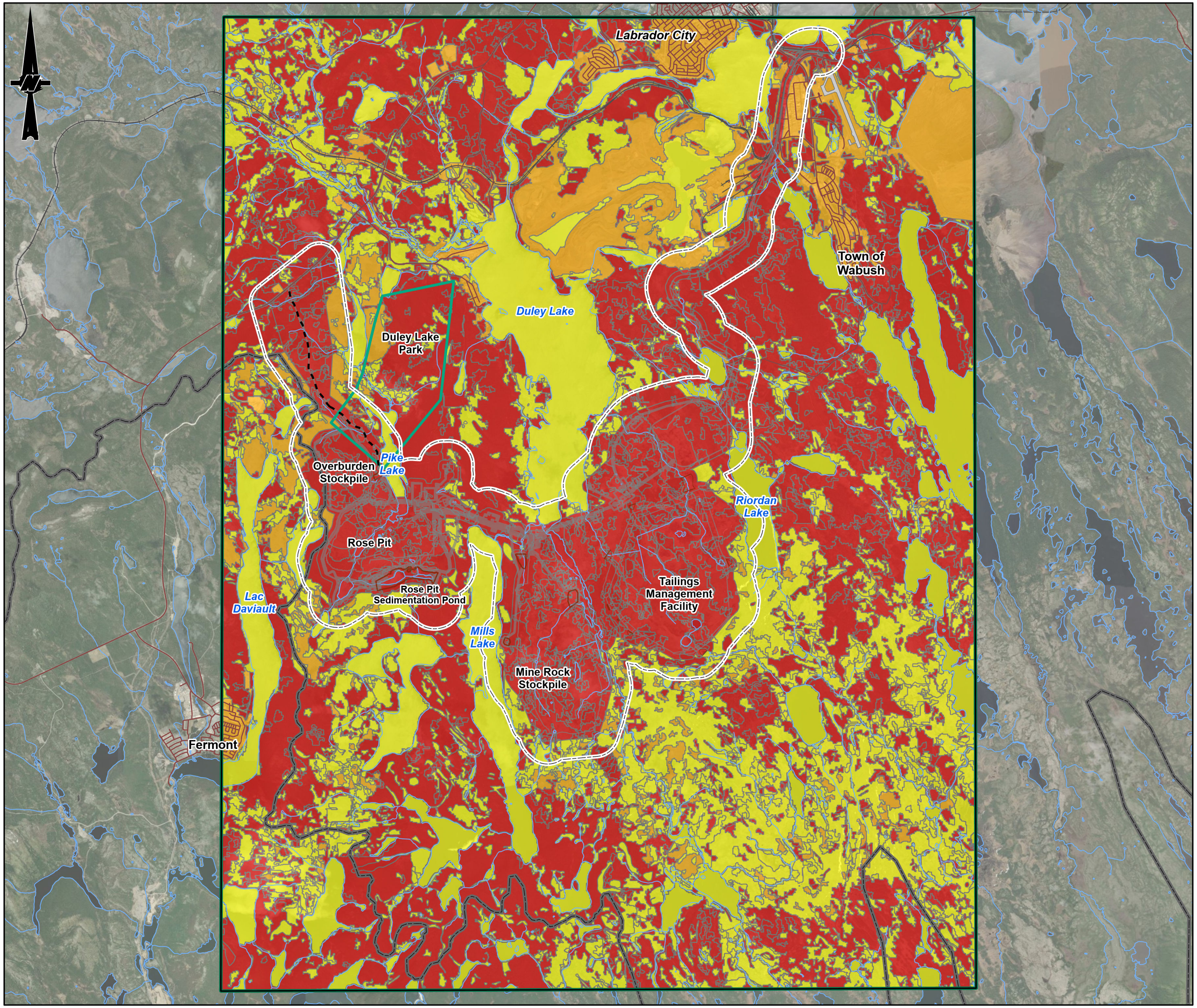
The calculated losses of suitable peregrine falcon habitat in the vegetation RSA are expected to be well within the resilience and adaptive capacity limits of peregrine falcons. The prevalence of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable peregrine falcon habitat will remain well connected at the local and regional scales which will allow peregrine falcons to move freely throughout the region (Figure 11-22). Because of the prevalence of anthropogenic development existing currently in the LSA and vegetation RSA, peregrine falcons currently occupying these areas are predicted to have the capacity to adapt and be resilient to additional disturbances. In fact, peregrine falcons are known to occupy disturbed landscapes (Gahbauer et al. 2015). Additionally, peregrine nighthawks are long-distance migrants with strong dispersal and movement capabilities. Therefore, changes in habitat availability and configuration from the Project are not expected to create barriers to movement relative to existing conditions.

The effects of the habitat loss on peregrine falcon populations in the region are, therefore, likely to be negligible.

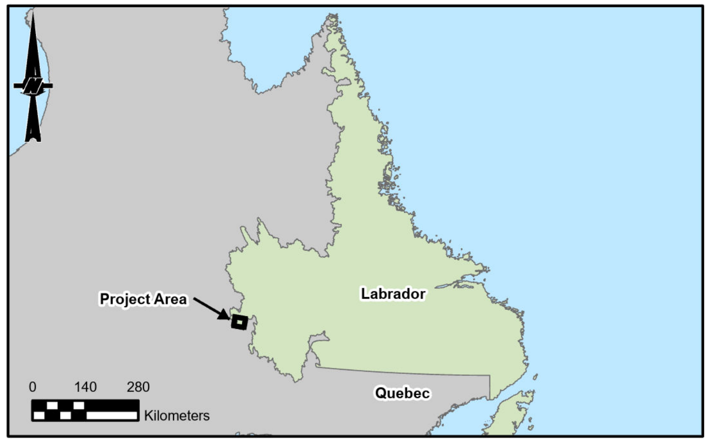
Table 11-33: Changes to Peregrine Falcon Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,707.76	1,409.69	-2,298.07	-61.98	18,173.89	15,875.82	-298.07	-12.64
Poor and low	3,999.58	6,297.65	2,298.07	57.46	21,739.65	24,037.72	2,298.07	10.57

Notes: Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA	BASEMAP INFORMATION
Proposed Project Infrastructure	Road
Proposed Sediment Pond	Railway
Wildlife Local Study Area (LSA)	Watercourse
Vegetation RSA	Duley Lake Park
Potential Access Road	

Peregrine Falcon Habitat Suitability

- High
- Moderate
- Low
- Poor

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
PEREGRINE FALCON HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-22

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Short-Eared Owl

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) short-eared owl habitat. A loss of 641 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 74.7% of suitable habitat in the wildlife LSA, and a decrease of 22.3% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-34, Figure 11-23). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate effected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Short-eared owl typical home range is 71 to 121 ha (0.62 km radius). This suggests loss of suitable habitat could effect between five and nine breeding pairs of short-eared owls in the LSA.

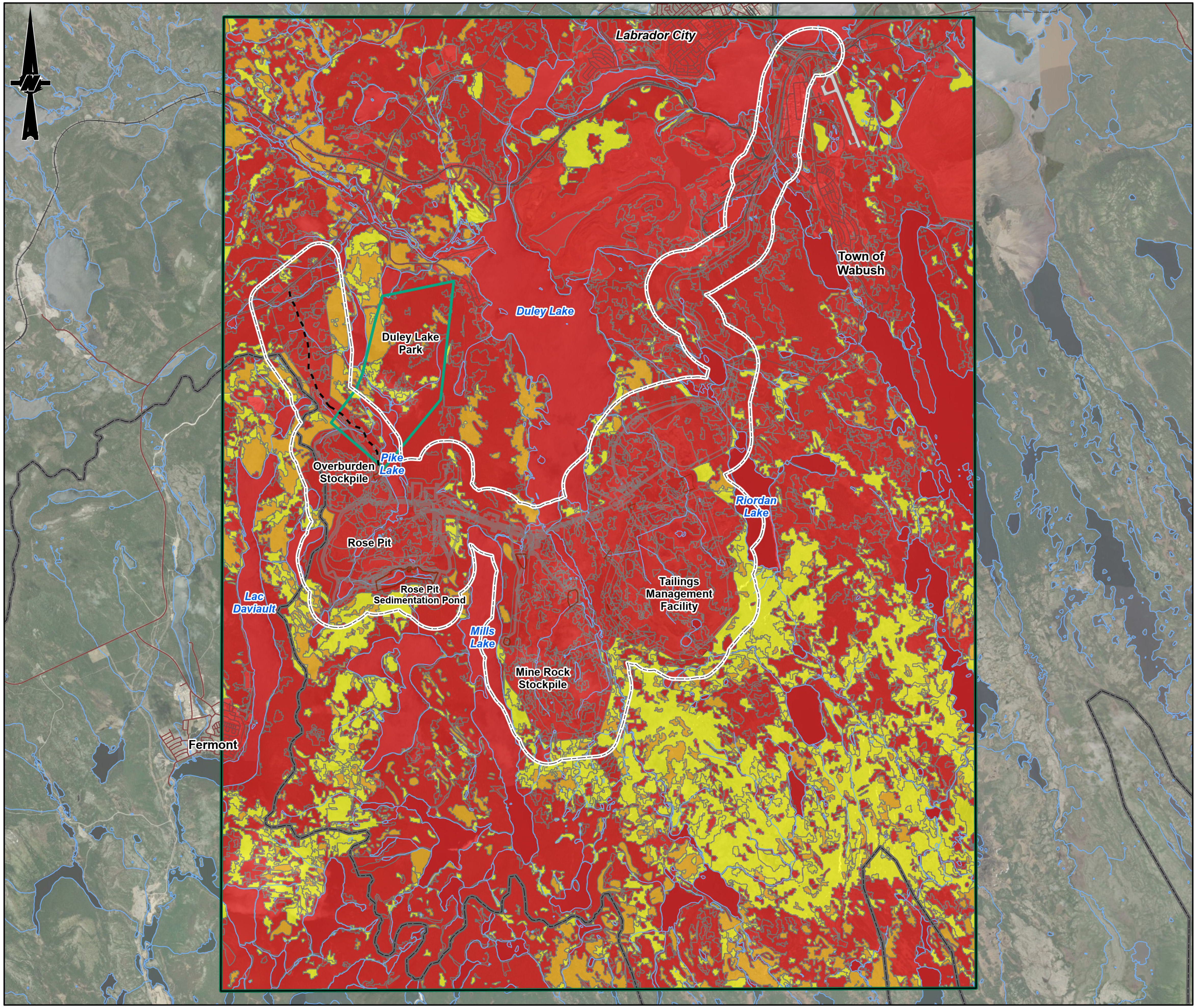
The wildlife LSA provides 30% of the moderately suitable habitat available across the larger vegetation RSA, suggesting that the LSA may play a role in supporting the habitat needs of the short-eared owl within the region. However, there is still no high-suitability habitat in either the LSA or RSA. However, the calculated losses of suitable short-eared owl habitat in the vegetation RSA are expected to be well within the resilience and adaptive capacity limits of short-eared owls. The availability of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable short-eared owl habitat will remain well connected at the local and regional scales which will allow short-eared owls to move freely throughout the region (Figure 11-23). Additionally, short-eared owls are long-distance migrants with strong dispersal and movement capabilities. Therefore, changes in habitat availability and configuration from the Project are not expected to create barriers to movement relative to existing conditions.

The effects of the habitat loss on short-eared owl populations in the region are, therefore, likely to be low.

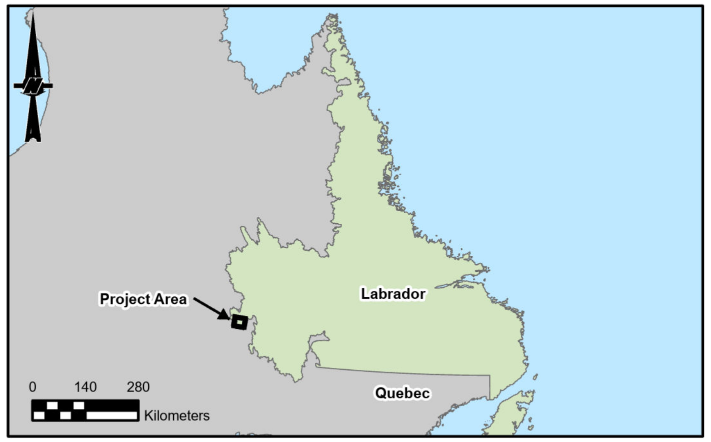
Table 11-34: Changes to Short-eared Owl Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	2,531.04	640.19	-1,890.85	-74.71	8,466.24	6,575.39	-1,890.85	-22.33
Poor and low	5,176.31	7,067.16	1,890.85	36.53	31,447.30	33,338.14	1,890.85	6.01

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Short-eared Owl Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

SHORT-EARED OWL HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-23

Spruce Grouse

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) spruce grouse habitat. A loss of 1,481 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 52.1% of suitable habitat in the wildlife LSA, and a decrease of 8.5% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-35, Figure 11-24). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Spruce grouse typical home range is, on average, 10 ha during the breeding season and 100 ha in the winter (Doyon et al. 2000). This suggests loss of suitable habitat could effect 148 breeding pairs of spruce grouse or 15 individuals in the winter in the LSA.

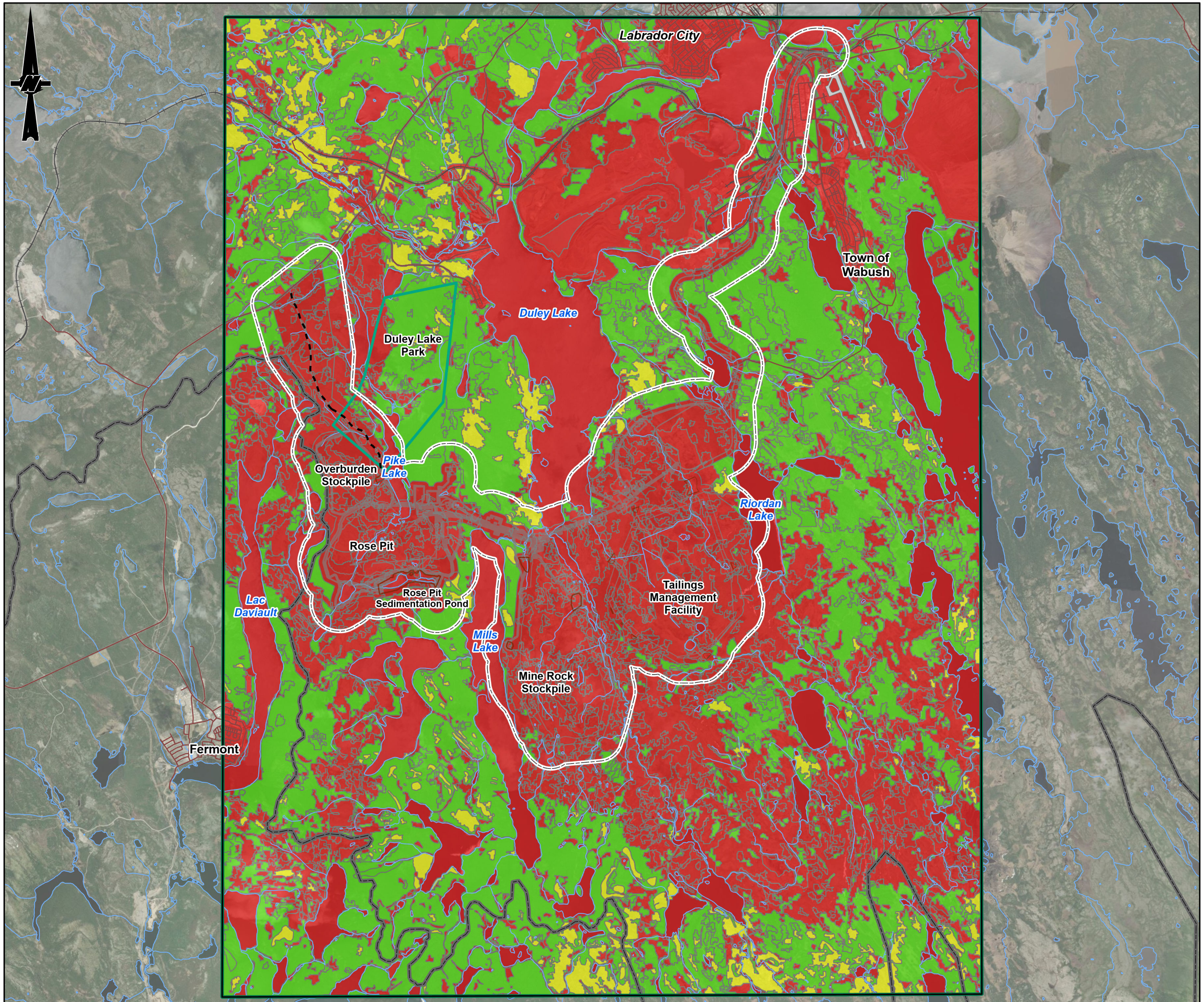
The wildlife LSA provides 16% of the suitable habitat available across the larger vegetation RSA, suggesting that the LSA plays only a minor role in supporting the habitat needs of spruce grouse within the region. The availability of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable spruce grouse habitat will remain well connected at the local and regional scales which will allow spruce grouse to move freely throughout the region (Figure 11-24). Additionally, spruce grouse is generally abundant. Although population estimates are not available for Labrador, Canada-wide population is estimated at 9.5 million and has been increasing over time (Birds Canada 2024). The daily bag limit for spruce grouse is 25 individuals, up to a total possession limit of 50 per season (Government of NL 2024e). This suggests spruce grouse populations are not expected to be vulnerable to the minimal habitat loss created by the Project.

The effects of the habitat loss on spruce grouse populations in the region are, therefore, likely to be negligible.

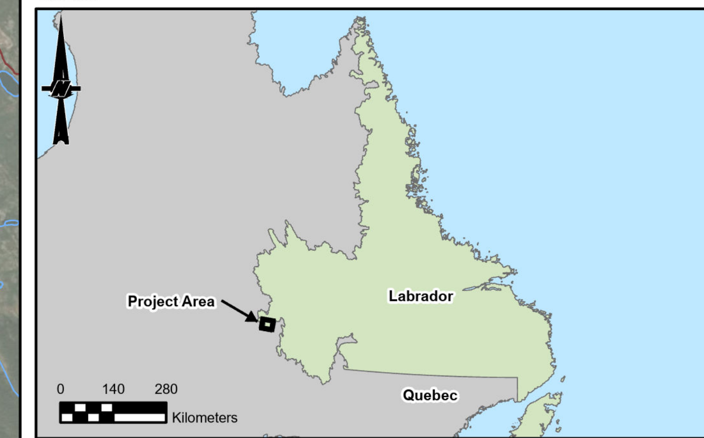
Table 11-35: Changes to Spruce Grouse Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,091.91	1,480.76	-1,611.15	-52.11	18,875.66	17,264.51	-1,611.15	-8.54
Poor and low	4,615.43	6,226.58	1,611.15	34.91	21,037.88	22,649.03	1,611.15	7.66

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Spruce Grouse Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

SPRUCE GROUSE HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-24

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Northern Myotis

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) northern myotis habitat. A loss of 2,761 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 60.29% of suitable habitat in the wildlife LSA, and a decrease of 12.49% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-36, Figure 11-25). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Estimated home range size of female northern myotis in the wildlife LSA was assumed to be 65 and 30 ha for lactating females, based on estimated home range sizes in Québec (Henry et al. 2002; Owen et al. 2003; COSEWIC 2013c). Using the smaller home range size of 30 ha, the estimated loss of 2,761 ha of moderate- to high-suitability habitat in the wildlife LSA is likely to affect 92 home range of females at a minimum.

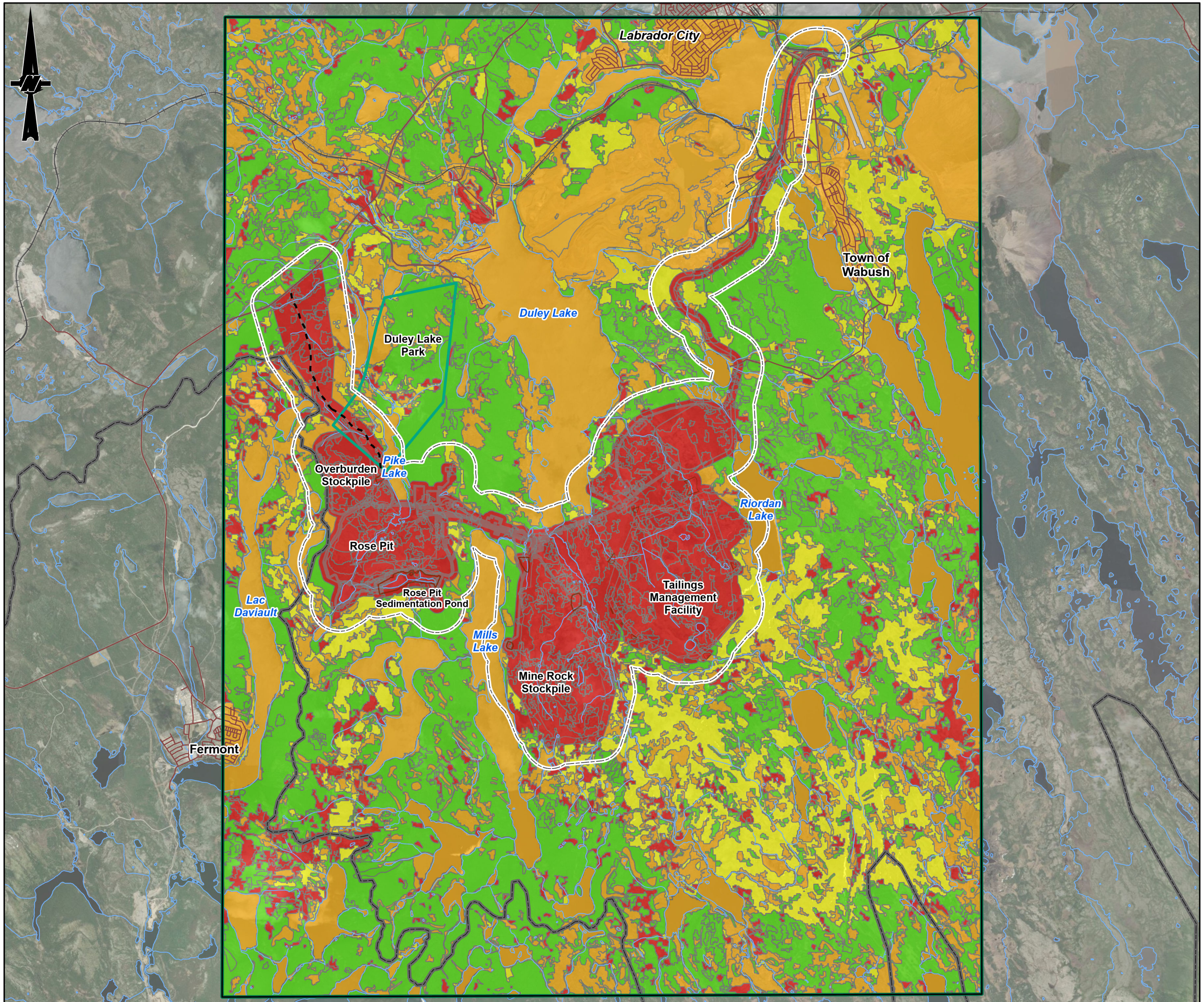
The wildlife LSA provides 21% of the suitable habitat available across the larger vegetation RSA, suggesting that the LSA plays only a minimal role in supporting the habitat needs of northern myotis within the region. The availability of suitable habitat in the existing conditions LSA and vegetation RSA (Table 11-36) suggests that suitable northern myotis habitat will remain well connected at the local and regional scales which will allow this species to move freely throughout the region (Figure 11-25). Additionally, northern myotis survival and reproduction are more strongly effected by changes to roost availability compared to foraging habitat.

The effects of the habitat loss on northern myotis populations in the region are likely to be negligible.

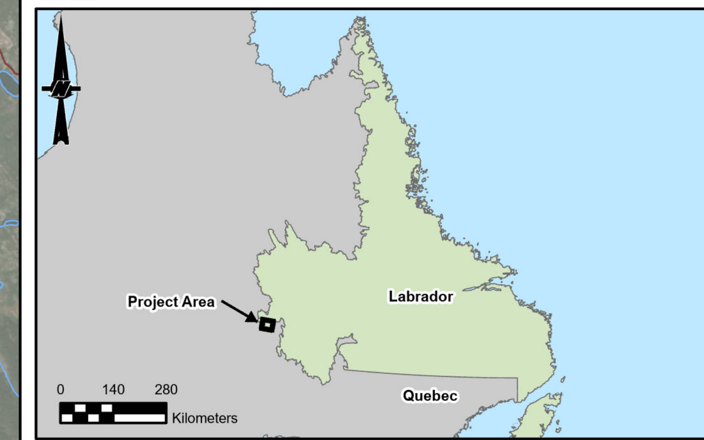
Table 11-36: Changes to Northern Myotis Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	4,580.00	1,818.87	-2,761.13	-60.29	22,100.67	19,339.54	-2,761.13	-12.49
Poor and low	3,127.34	5,888.48	2,761.13	88.29	17,812.87	20,574.00	2,761.13	15.50

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Northern Myotis Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

NORTHERN MYOTIS HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-25

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Hoary Bat

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) hoary bat habitat. A loss of 3,966 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 58.88% of suitable habitat in the wildlife LSA, and a decrease of 11.58% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-37, Figure 11-26). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

Estimated summer home range size of hoary bat in the wildlife LSA was assumed to be 0.5 ha (COSEWIC 2023; Veilleux et al. 2009). In Manitoba and Saskatchewan, hoary bats rarely switched roosts using the same roost for multiple weeks (Willis and Brigham 2005). The estimated loss of 3,966 ha of moderate- to high-suitability habitat in the wildlife LSA is likely to affect 7,932 home ranges at a minimum.

The wildlife LSA provides 19.7% of the suitable habitat available across the larger vegetation RSA, suggesting that the LSA plays only a minimal role in supporting the habitat needs of spruce grouse within the region. The availability of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable hoary bat habitat will remain well connected at the local and regional scales which will allow hoary bat to move freely throughout the region (Figure 11-26). Additionally, hoary bat survival and reproduction are more strongly effected by changes to roost availability compared to foraging habitat.

The effects of the habitat loss on hoary bat populations in the region are likely to be negligible.

Table 11-37: Changes to Hoary Bat Habitat Availability in the Residual Effects Assessment

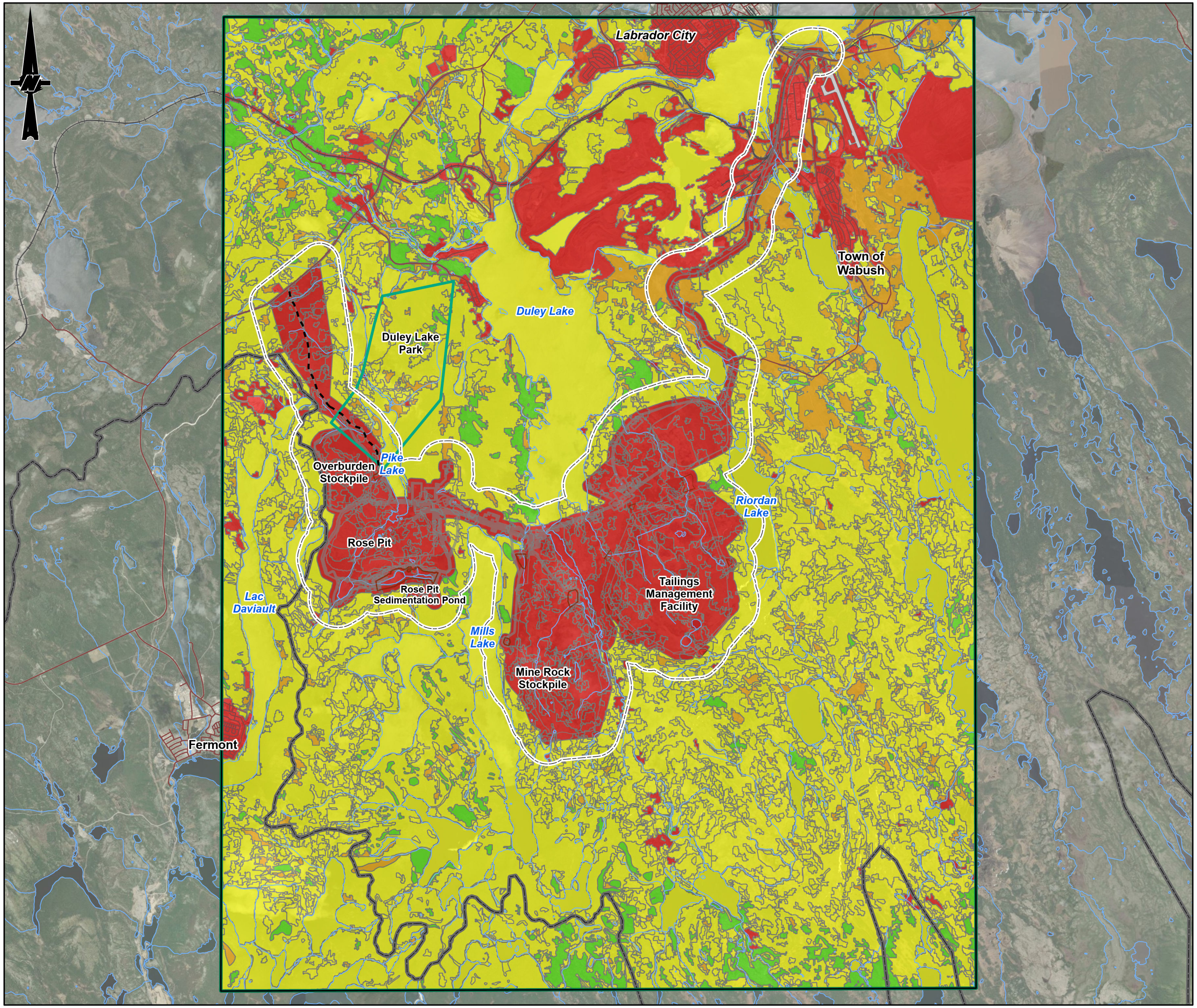
Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	6,735.84	2,770.10	-3,965.74	-58.88	34,246.53	30,280.79	-3,965.74	-11.58
Poor and low	971.51	4,937.25	3,965.74	408.20	5,667.01	9,632.75	3,965.74	69.98

Notes:

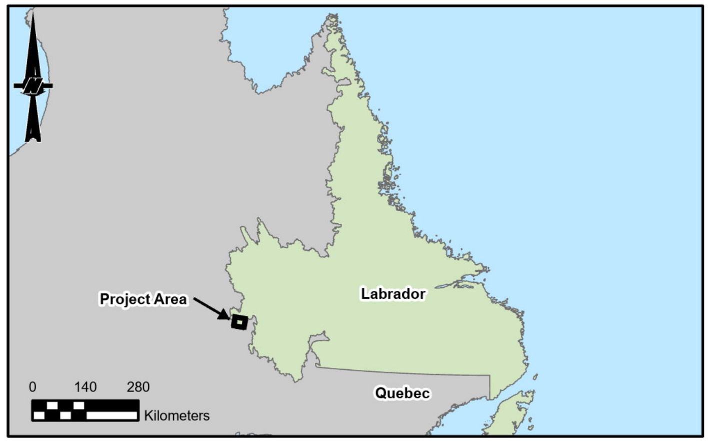
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.

(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.

- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Hoary Bat Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
HOARY BAT HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-26

25mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Moose

The Project is predicted to reduce the availability of suitable moose habitat. A loss of 1,819 ha of moderate- and high-suitability habitat is predicted with the addition of the Project. This represents a decrease of 53.4% of moderate- to high-suitability habitat in the wildlife LSA, and a decrease of 9% of moderate- to high-suitability habitat in the vegetation RSA relative to the existing environment (Table 11-38, Figure 11-27). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

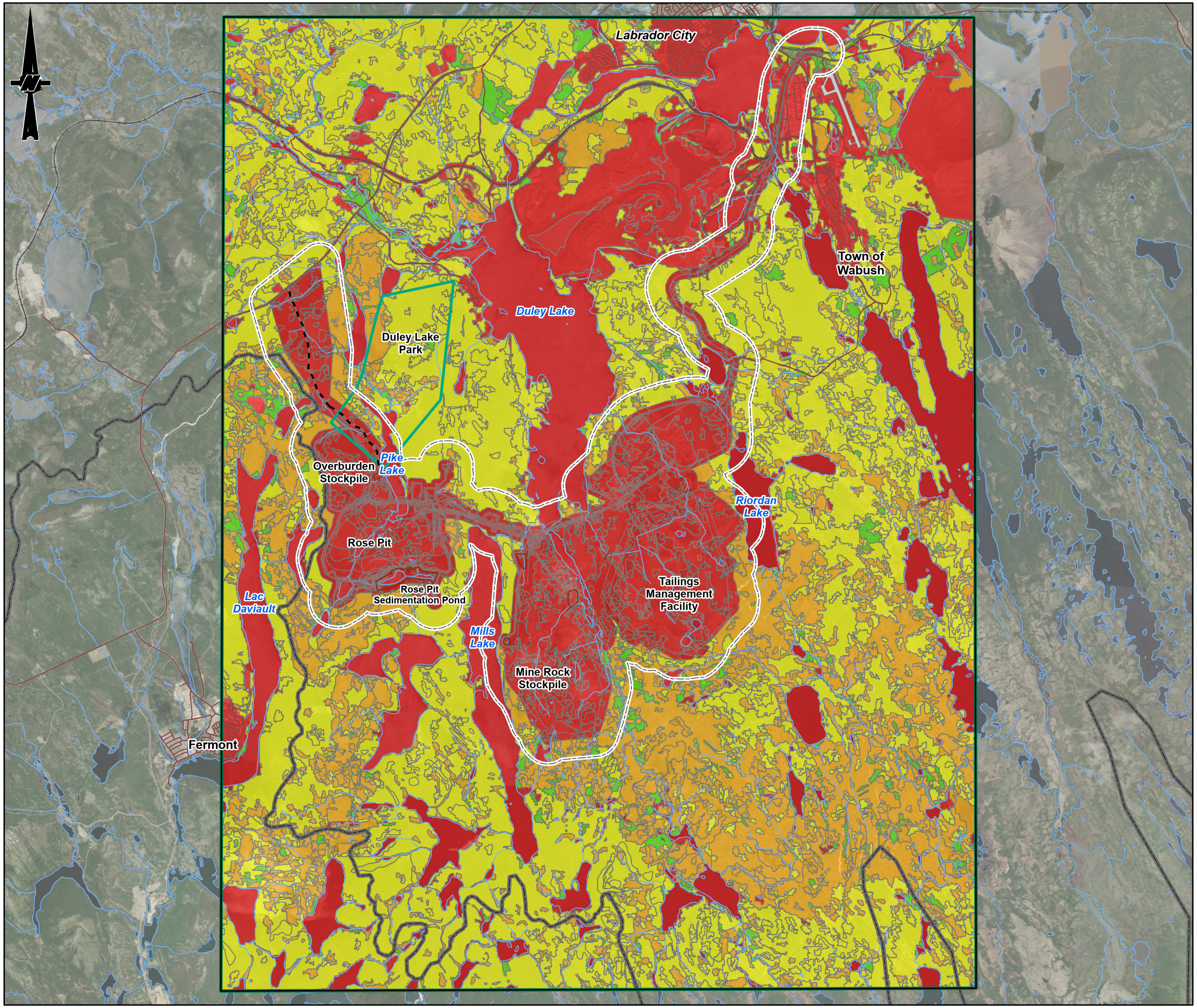
Based on estimated home range sizes in northern Québec, home range size of moose in the wildlife LSA was assumed to be 28 km^2 for adult male moose and 82 km^2 for adult female moose (Dussault et al. 2005; Government of Québec 2025b). Using the smaller home range size of 28 km^2 (2,800 ha), the estimated loss of 1,819 ha of moderate- to high-suitability habitat in the wildlife LSA is likely to affect one home range at a minimum.

Boutin et al. (2015) found that radio-tracked moose would maintain home ranges in proximity to mine sites but would avoid the physical mine footprints and their associated infrastructure. Moose are not limited by habitat availability in the wildlife RSA, and the calculated losses of available moose habitat are expected to be within the resilience and adaptive capacity limits of moose.

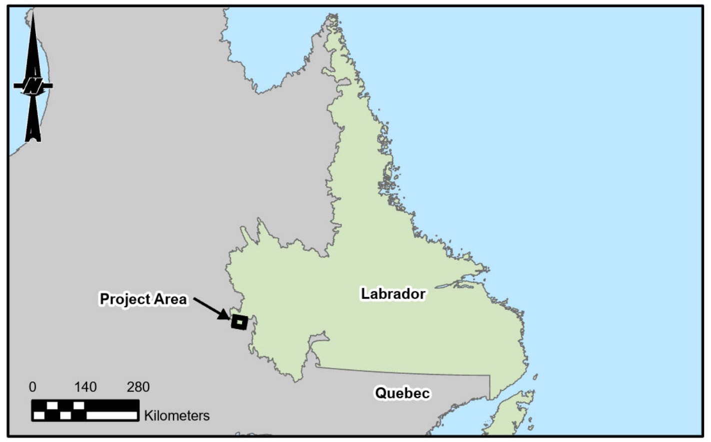
Table 11-38: Changes to Moose Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,407	1,588	-1,819	-53.4	20,269	18,451	-1,819	-9.0
Poor and low	4,300	6,119	1,819	42.3	19,644	21,463	1,819	9.3

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA	BASEMAP INFORMATION
Proposed Project Infrastructure	Road
Proposed Sediment Pond	Railway
Vegetation RSA	Watercourse
Wildlife Local Study Area (LSA)	Duley Lake Park
Potential Access Road	Labrador/Quebec Boundary

Moose Habitat Suitability

- High
- Moderate
- Low
- Poor

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
MOOSE HABITAT SUITABILITY IN THE WILDLIFE LSA AND THE VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT
Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-27

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B
25mm

Black Bear

The Project is predicted to reduce the availability of suitable black bear habitat. A loss of 2,798.7 ha of moderate- to high-suitability habitat is predicted with the addition of the Project. This represents a decrease of 70.3% of moderate- to high-suitability habitat in the wildlife LSA, and a decrease of 20% of moderate- to high-suitability habitat in the vegetation RSA relative to the existing environment (Table 11-39, Figure 11-28). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

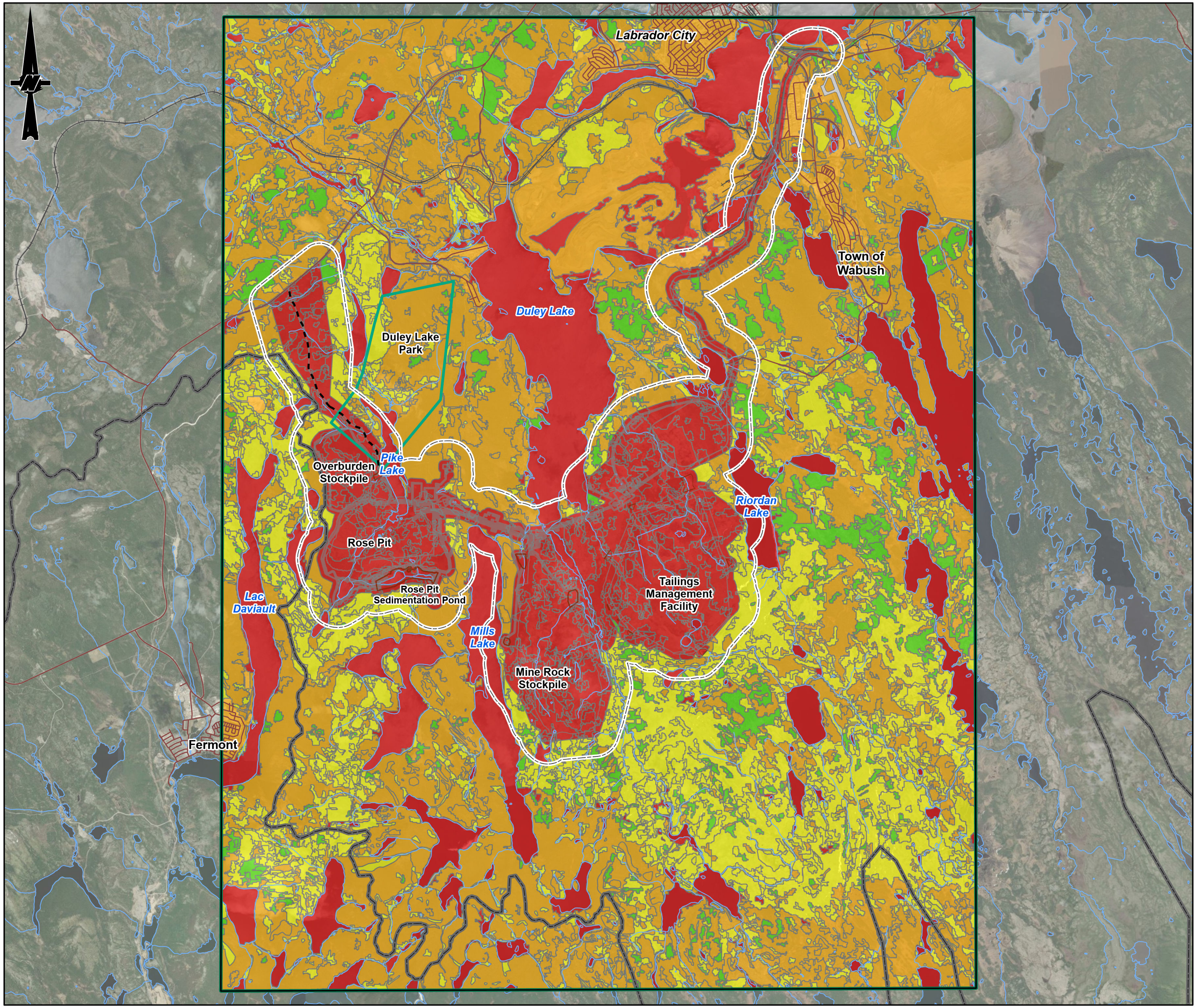
Based on estimated home range sizes in northeastern Labrador, home range size of black bears in the wildlife LSA was assumed to be 31 km^2 for adult male bears and 21 km^2 for adult female bears (Chaulk 2001; Chaulk et al. 2005; Government of NL 2025d). Using the smaller home range size of 21 km^2 (2,100 ha), the estimated loss of 2,798.7 ha of moderate- to high-suitability habitat in the wildlife LSA is likely to affect two home ranges at a minimum.

Black bears are considered more resilient to anthropogenic effects on habitat availability than other carnivores due to their relatively high reproductive rates and early age at first reproduction (Hebblewhite et al. 2003). Black bears are not limited by habitat availability in the wildlife RSA, and the calculated losses of available black bear habitat are expected to be within the resilience and adaptive capacity limits of black bears.

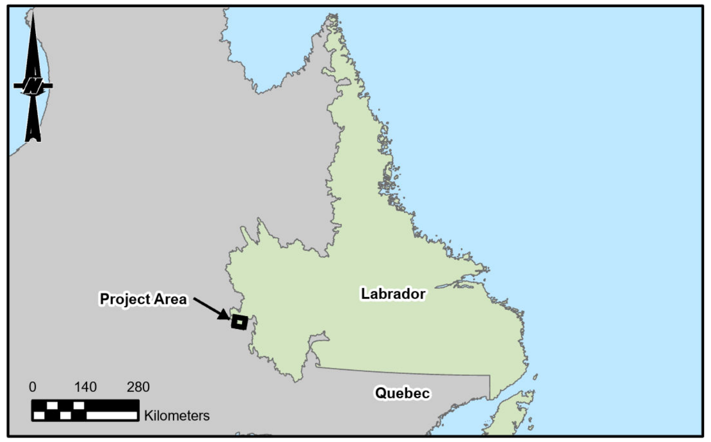
Table 11-39: Changes to Black Bear Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,981.3	1,182.6	-2,798.7	-70.3	14,014.4	11,215.7	-2,798.7	-20.0
Poor and low	3,726.1	6,524.7	2,798.7	75.1	25,899.2	28,697.8	2,798.7	10.8

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Black Bear Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

BLACK BEAR HABITAT SUITABILITY IN THE WILDLIFE LSA AND THE VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-28

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

American Marten

The Project is predicted to reduce the availability of suitable American marten habitat. A loss of 1,634 ha of moderate- to high-suitability habitat is predicted with the addition of the Project. This represents a decrease of 52.2% of moderate- to high-suitability habitat in the wildlife LSA, and a decrease of 8.6% of moderate- to high-suitability habitat in the vegetation RSA relative to the existing environment (Table 11-40, Figure 11-29). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

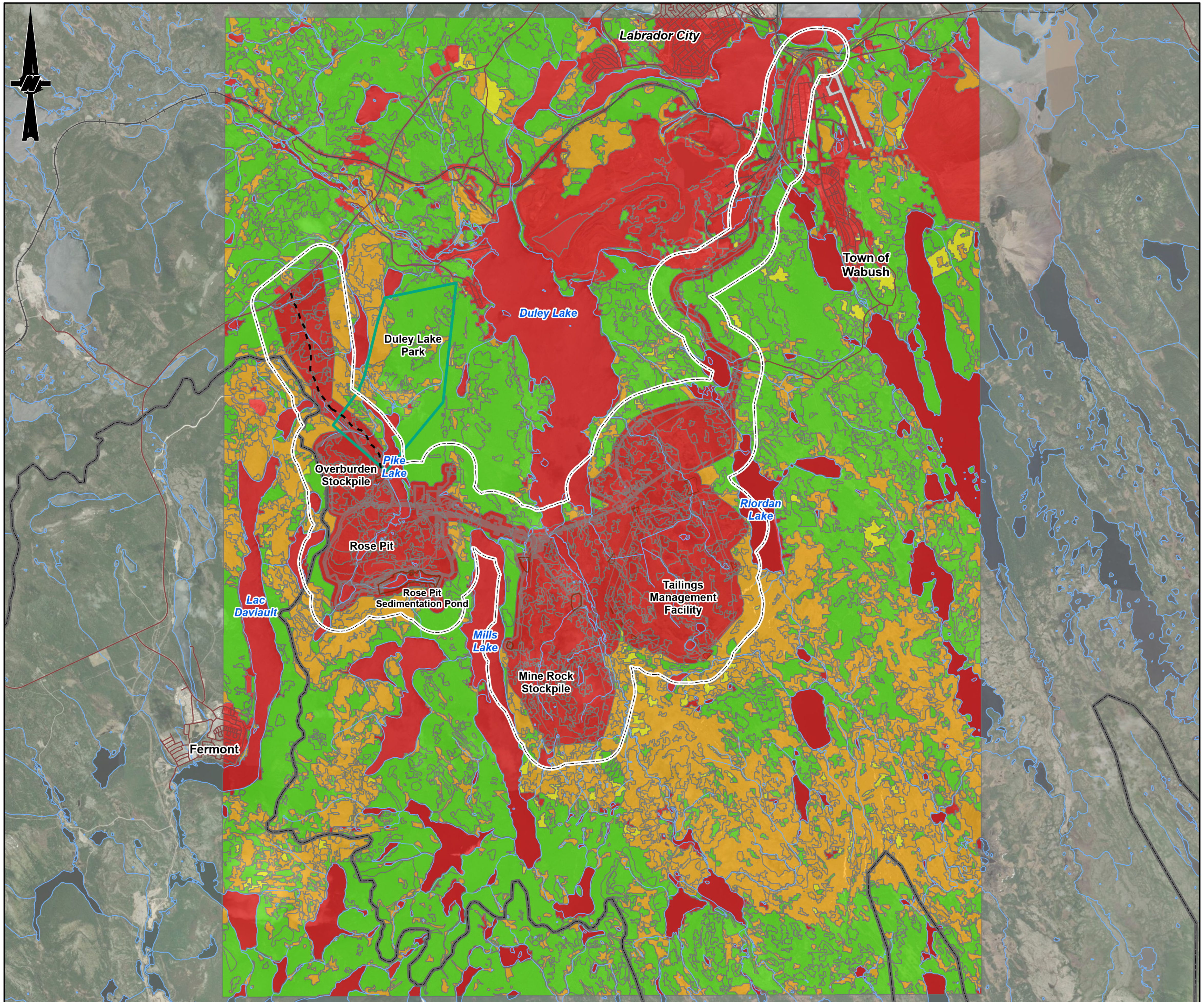
Based on estimated home range sizes in Labrador, home range size of American marten in the wildlife LSA was assumed to be 45 km^2 for adult male martens and 28 km^2 for adult female bears (Smith and Schaefer 2002). Using the smaller home range size of 28 km^2 (2,800 ha), the estimated loss of 1,634 ha of moderate- to high-suitability habitat in the wildlife LSA is likely to affect one home range at a minimum.

American marten may expand home ranges to compensate for forest fragmentation in disturbed landscapes (Chapin et al. 1998; Buskirk and Ruggiero 1994, Thompson and Colgan 1994, Fuller and Harrison 2005). Marten have good dispersal abilities; they can travel up to 80 km to establish a range and they may disperse through habitat patches that are unsuitable for occupation (Broquet et al. 2006, Johnson et al. 2009, Wasserman et al. 2010). American martens are not limited by habitat availability in the wildlife RSA, and the calculated losses of available marten habitat are expected to be within the resilience and adaptive capacity limits of this species.

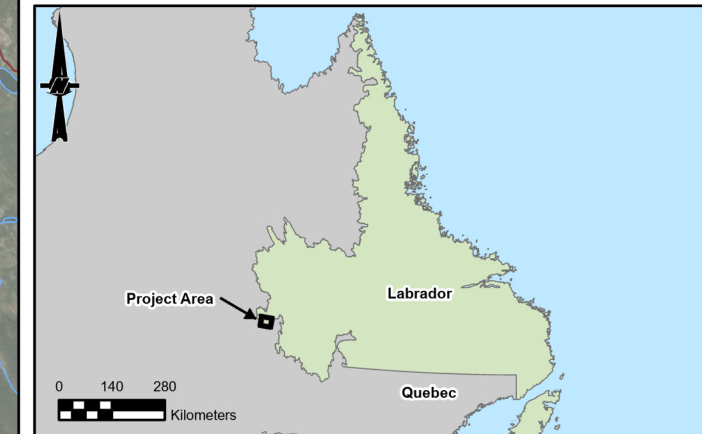
Table 11-40: Changes to American Marten Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[a]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[a]	Percent Change (%)
Moderate and high	3,132	1,498	-1,634	-52.2	19,094	17,460	-1,634	-8.6
Poor and low	4,576	6,210	1,634	35.7	20,820	22,454	1,634	7.8

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA
- Proposed Project Infrastructure
- Proposed Sediment Pond
- Wildlife Local Study Area (LSA)
- Potential Access Road

American Marten Habitat Suitability
- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION
- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
AMERICAN MARTEN HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-29

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Beaver

The Project is predicted to reduce the availability of suitable beaver habitat. A loss of 246.2 ha of moderate- to high-suitability habitat is predicted with the addition of the Project. This represents a decrease of 68% of moderate- to high-suitability habitat in the wildlife LSA, and a decrease of 17.4% of moderate- to high-suitability habitat in the vegetation RSA, relative to the existing environment (Table 11-41, Figure 11-30). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

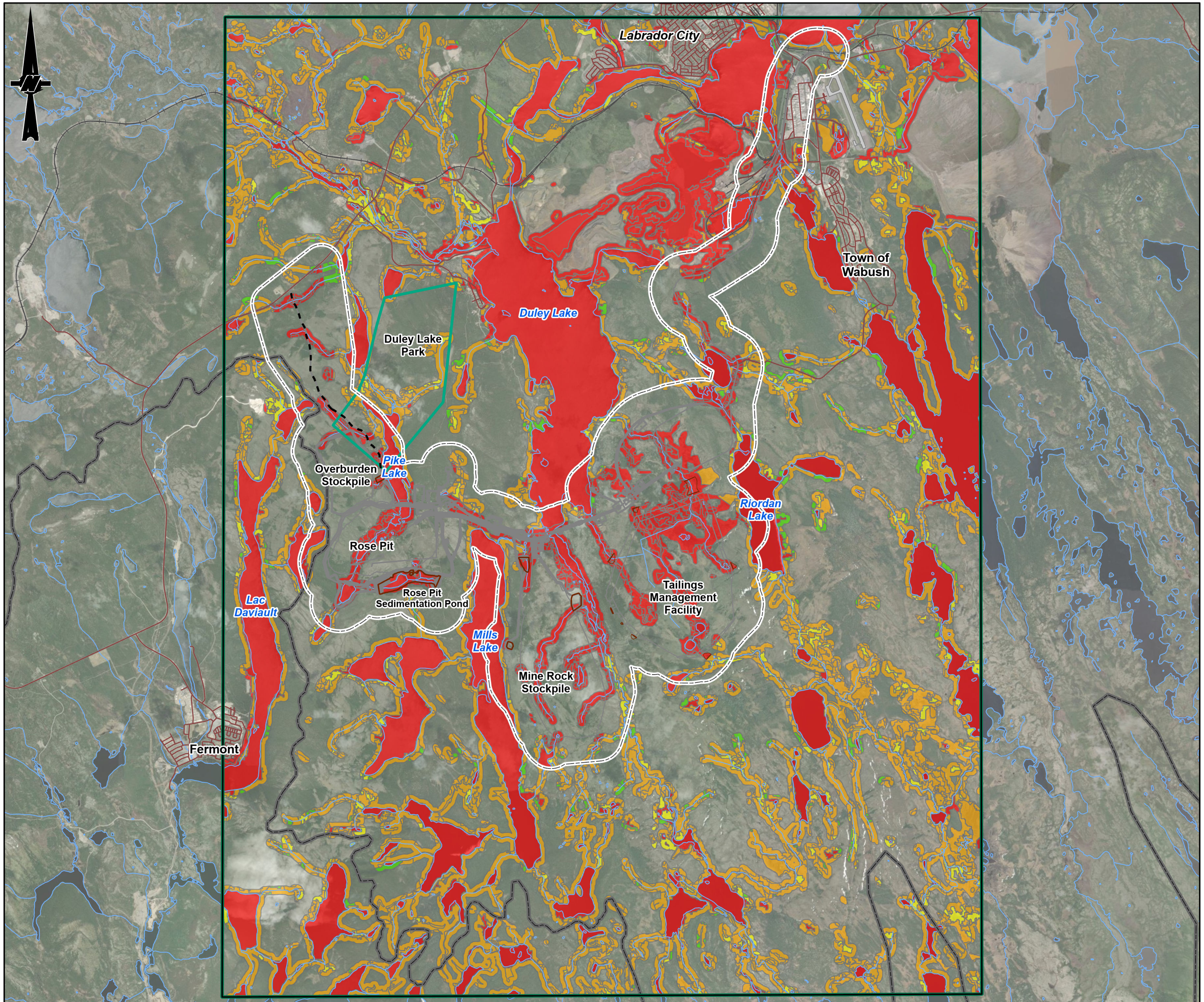
Estimated home range sizes for beavers in the LSA and vegetation RSA were assumed to vary between 3 and 10 ha during the year (Wheatley 1994). Using an average home range size of 6.5 ha (the average of 3 and 10), the estimated loss of 246.2 ha of moderate- to high-suitability habitat in the LSA is likely to affect 37 home ranges at a minimum.

The calculated losses of available beaver habitat in the vegetation RSA are expected to be well within the resilience and adaptive capacity limits of beavers. Additionally, the prevalence of water features (i.e., waterbodies, watercourses, and wetlands) in the existing conditions wildlife LSA, vegetation RSA, and wildlife RSA suggests that suitable beaver habitat will remain well connected at the local and regional scales which will allow beavers to move freely throughout the region and provide opportunities to avoid anthropogenic development (Figure 11-30). Because of the prevalence of anthropogenic development existing currently in the LSA and vegetation RSA, beavers are predicted to have the capacity to adapt and be resilient to additional disturbances and the effects on beaver populations in the region from the Project are likely to be negligible.

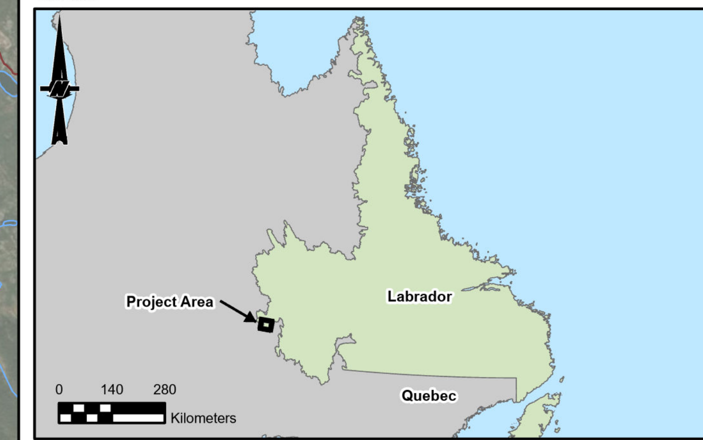
Table 11-41: Changes to Beaver Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	361.9	115.7	-246.2	-68.0	1,415.9	1,169.7	-246.2	-17.4
Poor and low	2,777.3	3,023.5	246.2	8.9	17,311.5	17,557.7	246.2	1.4

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA	BASEMAP INFORMATION
Proposed Project Infrastructure	Road
Proposed Sediment Pond	Railway
Vegetation RSA	Watercourse
Wildlife Local Study Area (LSA)	Duley Lake Park
Potential Access Road	Labrador/Quebec Boundary

Beaver Habitat Suitability

- High
- Moderate
- Low
- Poor

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
BEAVER HABITAT SUITABILITY IN THE WILDLIFE LSA AND THE VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

Kami

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-30

Two-lined Salamander

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) two-lined salamander habitat. A loss of 1,826 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 49.8% of suitable habitat in the wildlife LSA, and a decrease of 7.9% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-42, Figure 11-31). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

There is no recent available information regarding typical home range size or population density of two-lined salamander. Therefore, it is not possible to estimate number of individuals that may be effected by loss of habitat at this time.

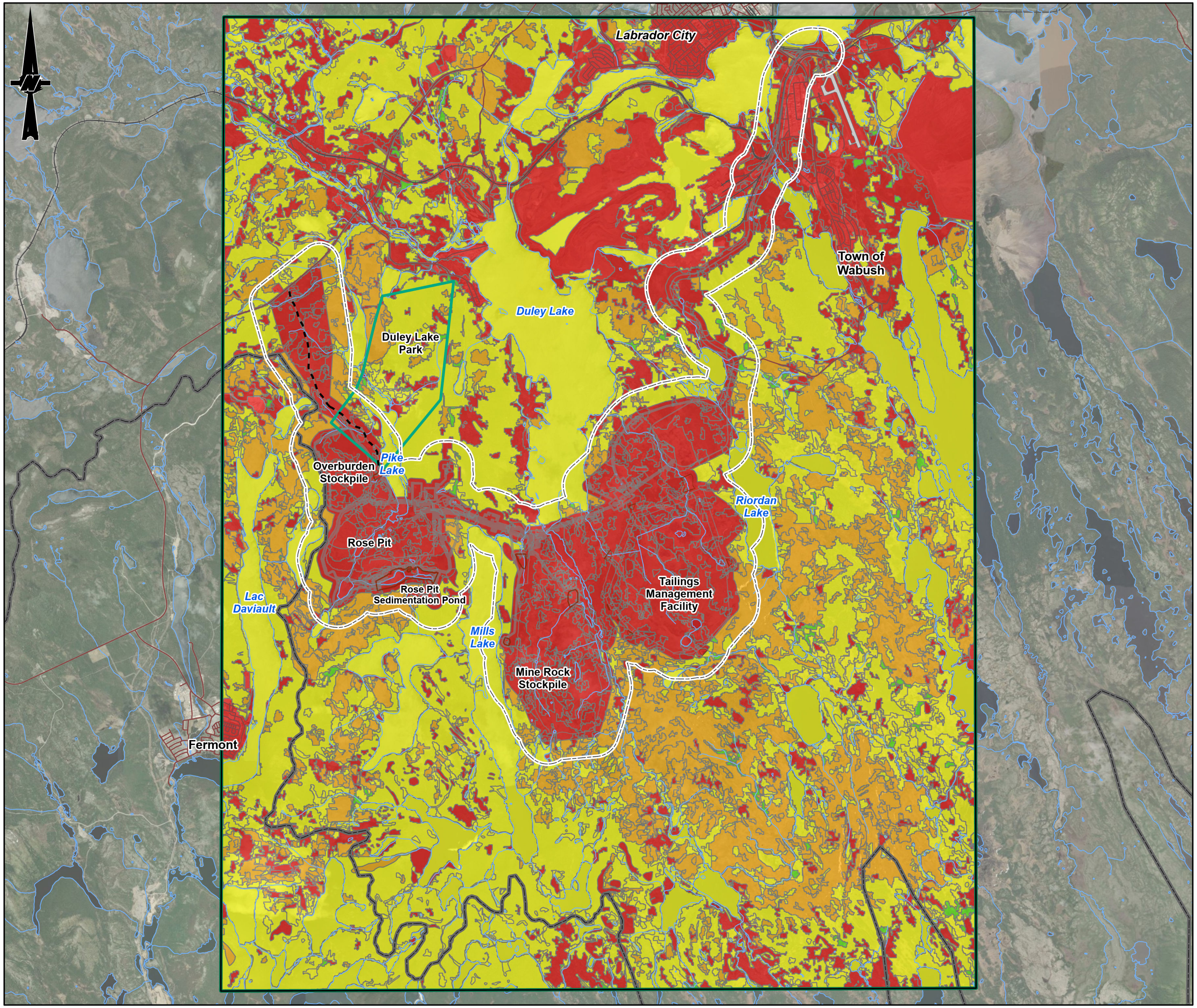
The wildlife LSA provides 16% of the suitable two-lined salamander habitat available across the larger vegetation RSA, suggesting that the LSA plays only a minor role in supporting the habitat needs of two-lined salamander within the region. The availability of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable two-lined salamander habitat will remain well connected at the local and regional scales which will allow two-lined salamander to move freely throughout the region (Figure 11-31).

The effects of the habitat loss on two-lined salamander populations in the region are, therefore, likely to be low.

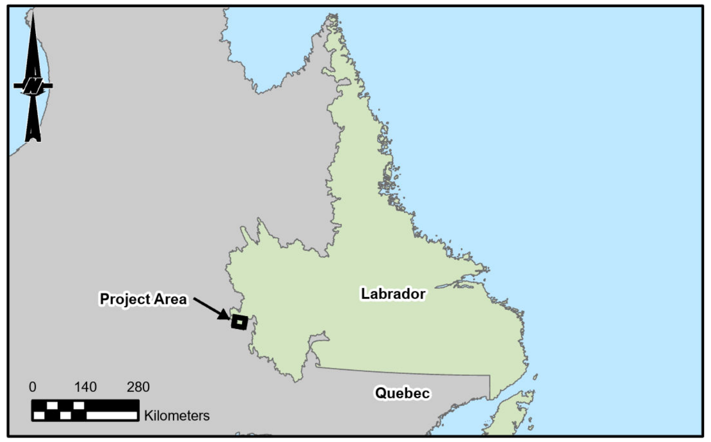
Table 11-42: Changes to Two-lined Salamander Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,665.95	1,840.28	-1,825.67	-49.80	23,148.58	21,322.91	-1,825.67	-7.89
Poor and low	4,041.39	5,867.06	1,825.67	45.17	16,764.96	18,590.63	1,825.67	10.89

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Two-lined Salamander Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000
1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N
4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
TWO-LINED SALAMANDER HABITAT SUITABILITY IN THE WILDLIFE LSA AND VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-31

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Wood Frog

The Project is predicted to reduce the availability of suitable (high- and moderate-quality) wood frog habitat. A loss of 2,177 ha of suitable habitat is predicted with the addition of the Project. This represents a decrease of 64.9% of suitable habitat in the wildlife LSA, and a decrease of 20.1% of suitable habitat in the vegetation RSA, relative to the existing environment (Table 11-43, Figure 11-32). The amount of suitable habitat lost is likely an overestimate because of the use of the SSA, to calculate affected area. This represents the maximum possible affected area and is a conservative approach to estimating habitat loss. The values presented here are a conservative estimate as they are based on fully affecting the total surface of the SSA, but it is expected that not all these lands will be required for the Project infrastructure. In contract, the previous EIS proposed a Project footprint with a total area of 2,377 ha, which is greater than the current footprint of 1,972 ha.

There is no recent available information regarding typical home range size or population density of two-lined salamander. Therefore, it is not possible to estimate number of individuals that may be effected by loss of habitat at this time.

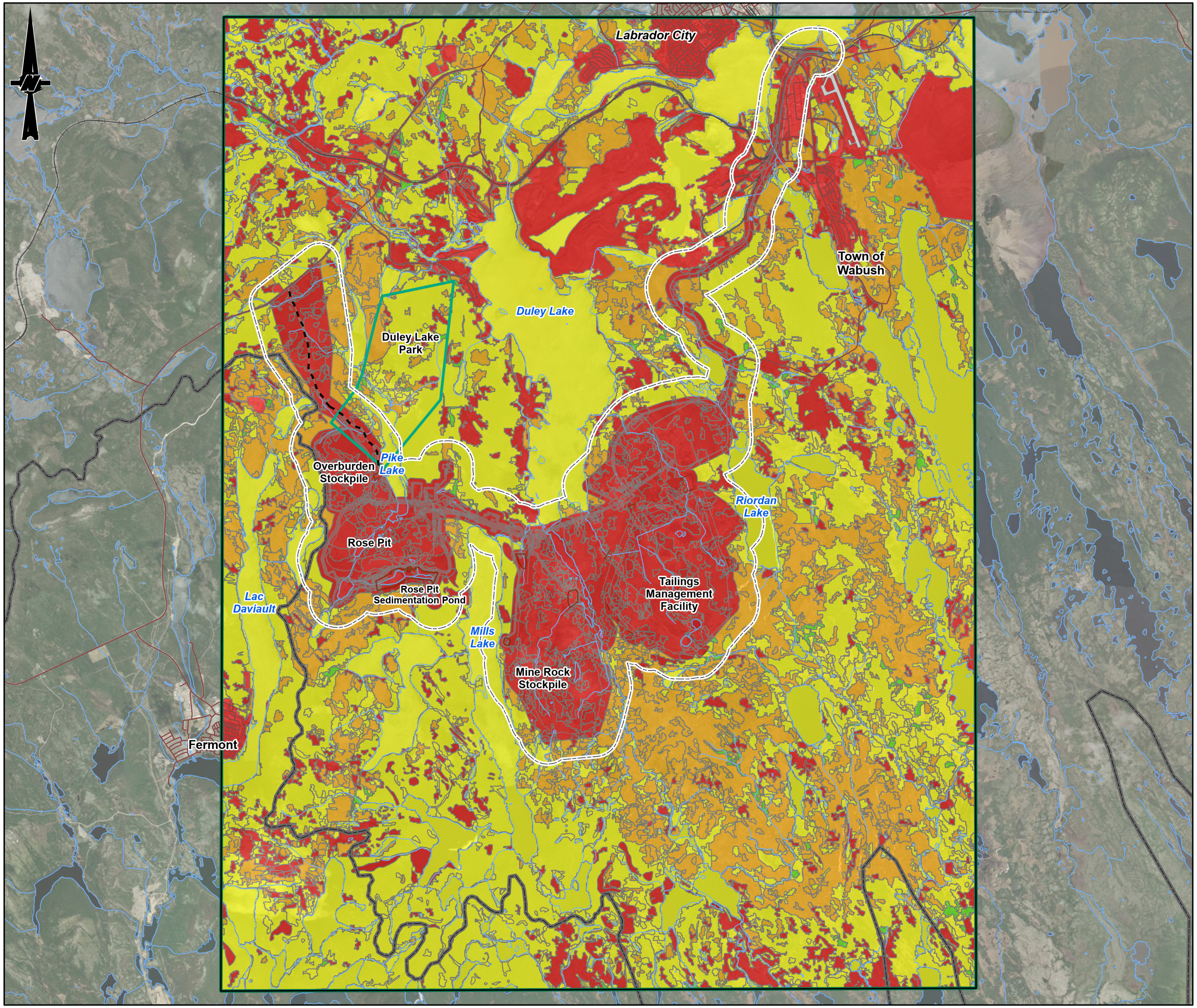
The wildlife LSA provides 31% of the suitable habitat available across the larger vegetation RSA, suggesting that the LSA plays only a moderate role in supporting the habitat needs of wood frog within the region. The availability of suitable habitat in the existing conditions LSA and vegetation RSA suggests that suitable wood frog habitat will remain connected at the local and regional scales which will wood frog to move freely throughout the region (Figure 11-32).

The effects of the habitat loss on wood frog populations in the region are, therefore, likely to be low..

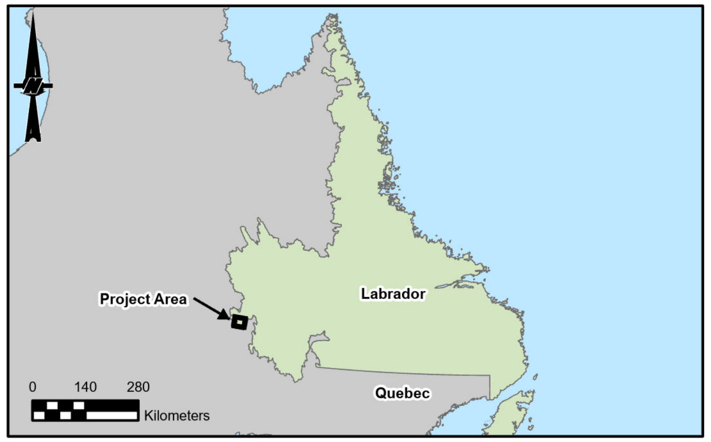
Table 11-43: Changes to Wood Frog Habitat Availability in the Residual Effects Assessment

Habitat Suitability	Wildlife Effects Assessment Wildlife LSA				Wildlife Effects Assessment Vegetation RSA			
	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)	Existing Conditions Characterization (ha)	Residual Effects (ha)	Change in Area (ha)[(a)]	Percent Change (%)
Moderate and high	3,353.63	1,176.08	-2,177.55	-64.93	10,820.98	8,643.43	-2,177.55	-20.12
Poor and low	4,353.72	6,531.26	2,177.55	50.02	29,092.56	31,270.11	2,177.55	7.48

Notes:
Numbers are rounded for presentation purposes. Therefore, it may appear that the totals do not equal the sum of the individual values.
(a) Changes in habitat area result from a conversion of moderate and high suitability to nil to low suitability.
- = negative; LSA = local study area; RSA = regional study area.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Vegetation RSA
- Wildlife Local Study Area (LSA)
- Potential Access Road

Wood Frog Habitat Suitability

- High
- Moderate
- Low
- Poor

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Duley Lake Park
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:90,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
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4. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
WOOD FROG HABITAT SUITABILITY IN THE WILDLIFE LSA AND THE VEGETATION RSA WITH THE ADDITION OF THE PROJECT

CONSULTANT

YYYY-MM-DD	2025-06-27
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0005	0	11-32

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.5.3.2.1 Loss of Potential Future Habitat for Woodland Caribou

Caribou do not currently occupy the wildlife LSA; however, the historical ranges of boreal caribou and George River migratory caribou did overlap with the wildlife LSA, and the existing environment of the vegetation RSA supports biophysical attributes necessary to support self-sustaining populations of caribou (Section 11.4.4.1). As such, there is potential that caribou could occur in the region again in the future. The loss and alteration of potential future habitat is characterized below. No other pathways were assessed as having potential residual effects on caribou populations during the life of the Project.

There is no direct habitat loss in any of the caribou ranges in proximity to the Project, because there is no spatial overlap between the Project SSA or wildlife LSA (500 m buffer around the SSA) and boreal caribou ranges or the current extent of the George River migratory herd (Table 11-16 in Section 11.4.4).

Caribou avoid anthropogenic disturbance, and the Project is expected to affect caribou habitat availability in the wildlife LSA and RSA by causing an incremental increase in the amount of disturbance. The SSA is 4,323 ha and a conservative assumption was made that all the vegetation in the SSA would be cleared with the application of the Project. Given that assumption, the amount of developed land in the vegetation RSA (the extent of ELC mapping) is expected to increase from 2,830 ha (7% of the vegetation RSA) to 7,153 ha (18% of the vegetation RSA) with the application of the Project.

Relative to the existing environment, where 52% of the wildlife LSA and 14.5% of the wildlife RSA were calculated to be anthropogenically disturbed (disturbance plus a 500 m buffer), the addition of the Project SSA and the 500 m buffer would increase the percent disturbed to 100% of the wildlife LSA and 15.7% of the wildlife RSA (with the 500 m buffer applied). There would be no change in the percent disturbed in the provincial and federal boreal caribou ranges with the addition of the Project because the Project SSA plus a 500 m buffer does not overlap with any boreal caribou ranges.

In the existing environment, approximately 41.3% (16,470 ha) of the vegetation RSA are habitat types that typically support caribou critical habitat biophysical attributes described in the federal recovery strategy (black spruce-labrador tea-feathermoss, black spruce-lichen, black spruce/tamarack-sphagnum woodland, tamarack/black-spruce-feathermoss; Table 10-14 in Chapter 10, Vegetation, Wetlands, and Protected Areas). The addition of the Project's SSA (footprint plus a 100 m buffer) into the vegetation RSA would result in a direct loss of 1,303 ha of those four highly suitable habitat types in the vegetation RSA (Table 10-14 in Chapter 10, Vegetation, Wetlands and Protected Areas). This represents a decrease of 3.3% of those suitable habitat types in the vegetation RSA as a result of the Project SSA. The four highly suitable habitat types would continue to make up 38% (15,167 ha) of the vegetation RSA after the application of the Project SSA. Approximately 545 ha (1.4%) of the vegetation RSA overlaps with QC6 boreal caribou range, and does not overlap with any other current delineations of caribou range boundaries (Section 11.4.4); as such, this is considered a direct loss of habitat that could support biophysical attributes for caribou in the future (should caribou occur in the region), rather than direct loss of currently occupied suitable habitat.

The distribution of suitable caribou habitat types would remain largely unchanged as a result of the addition of the Project in the vegetation RSA and wildlife RSA. The proposed Project is in a portion of the wildlife RSA that is already characterized by an existing aggregation of human development features including mines, towns, and roads (Figure 11-12). Given the constraints on connectivity within the LSA and RSA in the existing environment, the Project is predicted to cause minor changes in arrangement and connectivity of available undisturbed caribou habitat relative to the existing environment.

Direct loss of potential future caribou habitat would be contained within the SSA, and indirect loss would occur within a 500 m buffer of the SSA (i.e., the wildlife LSA) where sensory disturbance and perceived predation risk reduce the functionality of the habitat. Mitigation to avoid and minimize habitat loss for caribou are outlined in Table 11-27. The Project design has been optimized to minimize the footprint size and use existing infrastructure (i.e., access roads, watercourse crossings) to the extent possible. The area of vegetation clearing would be minimized during Construction to limit direct habitat loss. Reclaimed areas and some of the existing natural and anthropogenic disturbances in the LSA would, if not re-disturbed by human activity, grow into mature forest. The effect from direct loss of potential future habitat is certain and expected to be continuous from Construction until beyond Closure when effects are reversed or determined to be permanent.

11.5.3.2.2 Mitigation Measures

Mitigation measures outlined in Table 11-28 will be implemented to avoid, minimize and, where feasible, restore the effects from habitat loss on wildlife habitat availability and distribution, and survival and reproduction in the wildlife LSA and RSA.

During final design and Construction, efforts will be made to minimize the Project footprint to the extent possible; however, it is anticipated that a large area of wetland ELC will be affected. To mitigate these effects, a stewardship agreement is in place to compensate for the wetland losses. For terrestrial ELCs, there will be an opportunity to restore regional ELC types during Closure and Post-closure site rehabilitation. Detailed mitigation and monitoring activities are also described in the Project-specific Environmental Protection Plan. The effectiveness of mitigation measures will be evaluated during Construction and Operations, and mitigation measures will be modified or enhanced as necessary through adaptive management.

Following mitigation, habitat loss is still predicted to occur. This pathway is carried forward to the residual effects characterization in Section 11.5.3.2.

11.5.3.3 Habitat Alteration (Construction, Operations and Management, and Closure)

- Alteration of final terrain, soil, and water conditions, and/or plant species composition, could change the types of ecosystems that can be reclaimed on the landscape and adversely affect wildlife habitat availability and distribution, and survival and reproduction.

This residual effect pathway applies to all wildlife VECs.

High and moderately suitable habitat in the SSA will be converted to low- and poor-quality habitat for all VECs, except common nighthawk in which case land is converted to moderately suitable. This is reflected in Table 11-30 to Table 11-43 and Figure 11-19 to Figure 11-32. Additionally, qualitative changes will occur to vegetation through dust accumulation, wetland quality through changes to groundwater, and water quality through altered site drainage and treated effluent discharge. Each of these is discussed in more detail below.

<u>Vegetation</u>

Dust generated by project activities is expected to affect vegetation. This was partly assessed by the air quality and greenhouse gases discipline in Section 5.5.2 as well as Section 10.5.3.1 in Chapter 10, Vegetation, Wetlands, and Protected Areas. A significant residual Project effect is predicted in the Operations phase for total particulate matter (TPM) and particulate matter with a mass median diameter less than 10 micrometres (PM_{10}) as exceedances of regulatory guidelines (for human health risk) ranging from 120 to 3,687 micrograms per cubic metre ($\mu g/m^3$) in 24 hours. The maximum range of dust exceedances is about 4 km from the site, but very high concentrations, greater than about 500 to 1000 $\mu g/m^3$ are restricted to ranges within about 100 to 300 m. As an example, a typical unpaved road may generate around 400 to 500 $\mu g/m^3$ in a 24-hour period under busy traffic conditions (Farmer 1993), which can cause relatively minor effects on local vegetation. The potential effect of higher TPM (dust) on local vegetation may be locally substantial, including mortality of sensitive plant species and changes in species diversity through replacement with tolerant plant species. Such effects are most severe immediately adjacent to the source and are reduced at a logarithmic rate with distance from the site boundary (Farmer 1993; Turner et al. 2013; Cichosz and Pająk 2024). The interaction between dust and vegetation species is complex and distance of significant effects can vary but in general, where the local vegetation community is dense forest, the effects are limited to 20 to 100 m, as a dense vegetation screen is effective at capturing fugitive dust. However, where vegetation is low growing, dust effects have been observed at distances of several hundred metres (Farmer 1993; Turner et al. 2013). Experience shows that dust concentration is less important than the sensitivity of exposed plant species in predicting negative effects (Cichosz and Pająk 2024). One common outcome of open cast mining-related dust is the transformation of local vegetation communities by the elimination of sensitive species followed by recruitment of dust tolerant species (Farmer 1993; Cichosz and Pająk 2024) which can sometimes cause an increase in species diversity. In worst case scenarios, a belt of severely effected vegetation (stunted or dead) can develop, up to 20 m wide at some sites (Farmer 1993; Cichosz and Pająk 2024).

These potential changes in plant communities could result in changes in preferred habitat for nesting birds; changes in invertebrate communities and changes in available prey species for insectivorous birds like bank swallows (ECCC 2022a) and common nighthawks (ECCC 2016), bats, and amphibians; and changes in preferred browse species for herbivores. However, these potential effects are expected to be primarily restricted to the LSA and relatively small proportions of any ELC type (less than 5%) within the RSA (Chapter 10, Vegetation, Wetlands, and Protected Areas). Effected vegetation communities will recover after operations cease and the site is restored.

Loss of natural habitat supporting insect populations has been assessed as a medium threat to bank swallow populations (ECCC 2022a) and would likely also be a threat to common nighthawks, bats, and amphibians. However, except for amphibians, each of these VECs is highly mobile, and the effected area will be limited for all VECs. The overall effect on wildlife will be negligible.

Wetlands

The currently proposed Project includes considerably more complicated manipulation of local lake levels than the previous Alderon project description. These include draining, damming, and multiple water withdrawals lasting months or years, initially to prepare the site for mining development, then to keep the pit dry during Operations and finally to accelerate the pit refilling during Closure. Changes in local groundwater levels have the potential to affect wetlands adjacent to the site and the lakes where associated riparian wetlands are dependent on natural lake levels for annual hydrogeological balance. Potential changes to drainage patterns and groundwater levels and quality have been assessed and residual effects are not anticipated to be significant (Chapter 7, Groundwater).

Changes in depth to water table of tens of centimetres in wetlands can change the type of vegetation that grows there. These changes could be subtle and take months or years to develop. These effects could effect the functions provided within a wetland and in extreme cases could "dry out" portions of a wetlands. This will effect wildlife dependent on wetlands for breeding and foraging. The likelihood for this effect to occur and the potential severity are uncertain. Since the local water table is expected to return to normal Post-closure, such effects would be temporary. Monitoring of visible hydrological indicators in selected wetlands in the LSA will be incorporated into the wetland environmental effects monitoring program as part of the Environmental Effects Monitoring Program.

Water Quality

The Project effects on surface water are assessed in Chapter 8, Surface Water. It concluded that most residual effects will be negligible, including dust and air emissions, treated effluent, total suspended solids, waste rock stockpile seepage, and blast residue. The potentially significant residual effects on surface water are unmanaged effluent releases and water removal.

Although effluent will be treated, modelling suggests some levels will remain above acceptable limits (Chapter 8, Surface Water). Effluent discharge in waterbodies can affect larval stages of aquatic-borne insects that will be consumed by aerial insectivores, including bank swallows, common nighthawks, and bats, as well as by amphibians. As such, aquatic habitat quality will be affected.

Sediment samples have been taken at 23 locations (see Chapter 8, Surface Water, for more details), and the results are comparable to the CCME's *Sediment Quality Guidelines for the Protection of Aquatic Life Freshwater and Marine Interim Sediment Quality Guidelines (ISQG)/Probable Effect Level (PEL)* (CCME 1999). Therefore, the potential effects on hibernating amphibians are expected to be negligible. Sediment samples will be replicated at the same sites throughout the Project's lifespan to build a long-term database on the effect of Project activities on sediment quality throughout the LSA.

Changes in water quantity and quality will also effect wetland habitat within and immediately adjacent to the Project footprint. Effects could arise from discharges of effected site water from the mine areas or changes in the annual surface water flow into receiving wetland areas. Potential effects could include changes in wetland vegetation types and functions, or, in extreme cases, the loss of wetland area from infilling or drying out. The likelihood for this effect to occur and the potential severity are uncertain, but standard mitigation is well understood with known effectiveness. Monitoring of visible hydrological indicators in selected wetlands in the LSA will be incorporated in the wetland environmental effects monitoring program as part of the Environmental Effects Monitoring Program. Failure of erosion and sedimentation prevention measures (if applicable) will be reported.

Overall, the cumulative changes in water quality are not expected to effect wildlife habitat; however, the effects in Pike Lake may be measurable in the years following the flooding of Rose Pit (Chapter 8, Surface Water). Water quality levels are modelled to return to or slightly above baseline in some areas and scenarios without exceeding the CCME guidelines. However, the selenium levels in Pike Lake are predicted to be irreversible according to the models; therefore, this measurable parameter is considered significant regarding the effects of effluent release.

Summary

Overall, the anticipated alteration of suitable habitat within the LSA and vegetation RSA is unlikely to influence wildlife abundance, distribution, survival, and reproduction (probability of effect is not expected but possible). Suitable habitat would remain abundant and well connected and distributed across the RSA relative to the existing environment. Because habitat availability is not limiting in the wildlife RSA, most wildlife would be expected to shift or alter their home ranges to exclude areas of high disturbance or use these areas less frequently when human activity levels are higher.

11.5.3.3.1 Mitigation Measures

Potential alteration of habitat quality and distribution can be mitigated with appropriate measures, when possible (refer to Table 11-28 and Chapter 6, Noise, Vibration, and Light), such as minimize Project footprint, avoid sensitive habitats, minimize disturbance within adjacent wetlands, and maintain hydrology at stream crossings. However, habitat alteration is still predicted to occur following the implementation of mitigation. This pathway is carried forward to the residual effects characterization in Section 11.5.3.2.

11.5.3.4 Sensory Disturbance (Construction, Operations and Management, and Closure)

- Sensory disturbance (e.g., presence of people, traffic, lights, dust, smells, noise) can alter wildlife movement and behaviour and adversely affect wildlife habitat availability and wildlife abundance and distribution.

This residual effect pathway applies to all wildlife VECs.

Changes in noise, vibrations, and light are expected to interact with wildlife throughout the lifetime of the Project until closure. Sensory disturbance can cause wildlife to move away from these sources of disturbance, thereby affecting wildlife movement and distribution (e.g., Benítez-López et al. 2010; Shannon et al. 2016). Noise from blasting, traffic, and processing can directly effect communication in a variety of wildlife (e.g., mate attraction, parent-offspring, alarm signals) (Barber et al. 2010), as well as navigation and foraging by bats, which rely on echolocation (Vosbigian et al. 2024). Noise and vibrations may also effect roosting and hibernating bats (West Virginia Department of Environmental Protection 2006). Light pollution from site lighting can disrupt circadian rhythms and orientation of migratory species. The potential effects of sensory disturbance can vary with weather, intensity, duration, and position source, as well as ambient background noise and light conditions (Poot et al. 2008; Jones and Francis 2003; Montevecchi 2006). However, Project interactions are expected to be localized to the LSA and will no longer have an effect Post-closure. Also, suitable roosting habitat is limited in the LSA and no known hibernacula occur in or near the LSA or RSA and, therefore, potential effects on roosting and hibernating bats are expected to be negligible.

Sound levels above about 90 dBA are likely to be aversive to mammals, resulting in potential retreat from the sound source, freeze response, or a strong startle response (Manci et al. 1988). Lower levels of noise may result in unobserved internal reactions such as increased heart rate that are energetically costly (Herrero et al. 2005). According to noise modelling results for the Project (Chapter 6), cumulative noise contributions resulting from background and Project construction will exceed 40 dBA at certain receptor points, exceeding Health Canada's change in percentage hectares criteria and Québec's noise guideline criteria. During Operations, noise contributions are not expected to exceed 40 dBA and will be at or below the Health Canada percentage hectares and Québec's noise guideline criteria. Therefore, noise from the Project during Operations is not expected to result in strong avoidance, and noise is not expected to affect energetics of mammals in the LSA or RSA compared to that occurring during existing conditions.

The Project could affect black bear survival through sensory disturbance potentially leading to further losses of suitable habitat or abandonment of denning sites. Although adaptable, bears are particularly sensitive to disturbance during the denning period and hibernation. Therefore, sensory disturbance may affect reproductive success and survival of some individuals near the Project as a result of denning site abandonment, early emergence from hibernation, or avoidance of areas near the Project. The implementation of pre-clearance den surveys if and when clearing is required during denning periods is anticipated to avoid and minimize Project-related changes to black bear denning in the LSA.

The Project could affect beaver survival through sensory disturbance potentially leading to further losses of suitable habitat or abandonment of lodge sites. The loss of suitable habitat may affect reproductive success if individuals are displaced into lower quality habitat. Sensory disturbance may affect reproductive success and survival of some individuals near the Project as a result of lodge site abandonment or avoidance of areas near the Project.

11.5.3.4.1 Mitigation Measures

Potential sensory disturbance can be mitigated with appropriate measures (refer to Table 11-28 and Chapter 6, Noise, Vibration, and Light), such as avoiding or limiting activities during sensitive periods, when feasible. However, following the implementation of mitigation, sensory disturbance is still predicted to occur. This pathway is carried forward to the residual effects characterization in Section 11.5.3.2.

11.5.3.5 Injury and Mortality from Clearing (Construction)

- Vegetation removal and soil alterations during site preparation and construction may result in injury or mortality to individual animals with low mobility (e.g., denning black bears or marten, herptiles), destruction of nests, eggs, and individuals of migratory birds (i.e., incidental take).

This residual effect pathway applies to two-lined salamander and wood frog. For all other wildlife VECs, this pathway is negligible.

The implementation of mitigation is anticipated to avoid and minimize Project-related changes to the survival and reproduction of black bears, marten, and beavers that may be denning, migratory birds that may be nesting, or bats roosting in the LSA. Any adverse interactions between the Project and wildlife are expected to be infrequent and have a minor influence on the regional population relative to existing conditions and are predicted to result in negligible residual effects on VECs. As such, the pathway was assessed as negligible for these VECs and not carried forward in the assessment (Section 11.5.2.2). Project-related changes to the survival and reproduction of amphibians are expected to be moderate due to their limited mobility and carried forward.

11.5.3.6 Vehicle Collisions (Construction, Operations and Maintenance, Closure)

- Collisions with vehicles, equipment, buildings, and aircraft on site, and vehicles travelling to and from site may cause injury or mortality to individual animals.

This residual effect pathway applies to two-lined salamanders and wood frog.

The implementation of mitigation is anticipated to minimize Project-related changes to the survival and reproduction of amphibians. Any adverse interactions between the Project and wildlife are expected to be infrequent and have a minor influence on the regional population relative to existing conditions and are predicted to result in negligible residual effects on VECs. As such, the pathway was not carried forward.

11.5.3.7 Air Emissions Effects via Inhalation or Ingestion (Construction, Operations and Closure)

- Fugitive dust emissions and associated constituents (e.g., metals, radionuclides) may cause changes in air, soil, and water quality, which can adversely affect wildlife health, survival, and reproduction through inhalation and ingestion of soil/water and food sources.

This residual effect pathway applies to all wildlife VECs, except for harlequin duck and woodland caribou which are unlikely to occur in the Project area.

Fugitive dust emissions were a concern highlighted by Indigenous communities and nearby towns (Chapter 22, Engagement). Activities such as site preparation, handling and storage of overburden and mine rock, road development, construction and removal of facilities and infrastructure, operation of mobile mining equipment, site traffic, open pit mining, and iron ore processing are likely to produce fugitive dust. This dust can be directly deposited onto vegetation and into water features and/or vegetation in riparian areas, potentially adversely affecting plant species, surface water, and sediment quality, which could effect wildlife habitat. This dust is expected to be mobilized primarily in the summer, as snow and ice provide a natural mitigation to the spread of fugitive dust.

This was partly assessed by the air quality and greenhouse gases discipline in Section 5.5.2 as well as Section 10.5.3.1 in Chapter 10, Vegetation, Wetlands, and Protected Areas. A significant residual Project effect is predicted in the Operations phase for TPM and PM_{10} as exceedances of regulatory guidelines (for human health risk) ranging from 120 to 3,687 $\mu g/m^3$ in 24 hours. The maximum range of dust exceedances is about 4 km from the site, but very high concentrations, greater than about 500 to 1000 $\mu g/m^3$ are restricted to ranges within about 100 to 300 m.

Herbivores may consume dust-covered plants. The effects of dust on water quality are predicted to be negligible; therefore, effects on wildlife that may consume water will also be negligible. Loss of natural habitat supporting insect populations has been assessed as a medium threat to bank swallow populations (ECCC 2022a) and would likely also be a threat to common nighthawks, bats, and amphibians. However, except for amphibians, each of these VECs is highly mobile, and the effected area will be limited for all VECs. The overall effect on wildlife will be negligible. This pathway is therefore not carried forward.

11.5.3.7.1 Mitigation Measures

The dust management measures will be included in the Project-specific Environmental Protection Plan (Annex 5D, Environmental Protection Plan Annotated Table of Contents) and Project design are anticipated to limit the spread of fugitive dust generated by Project activities, particularly in the summer months. Road watering during summer months has been found to suppress dust emission generation by approximately 80% and maintain its efficacy for four to six hours after watering (Golder 2012). After implementation of mitigation measures, the most significant effects on surrounding vegetation and wetlands are expected to be restricted to within 100 m of dust sources and limited to a small fraction (less than 5%) of available habitat (Chapter 10, Vegetation, Wetlands, and Protected Areas). Therefore, potential effects on wildlife through inhalation and consumption will be restricted to the SSA. Mitigation measures are also expected to limit fugitive dust generation. Because effects are highly localized and temporary, a negligible effect on wildlife via inhalation and consumption is expected; as a result, this pathway has not been carried forward in the assessment. Standard mitigation for dust and air quality effects are detailed in **Chapter 5, Air Quality and Climate** (Section 5.5.2.1, Table 5-14).

Following mitigation, alteration of air emissions is still predicted to occur. This pathway is carried forward to the residual effects characterization in Section 11.5.3.2.

11.5.3.8 Treated Effluent Discharge (Construction, Operations and Closure)

Although effluent will be treated, and predicted water quality throughout all Project phases were below SSWQO values, modelling predicts selenium and cobalt values will remain above acceptable CCME limits (Chapter 8, Surface Water). Chemicals in effluent discharges released in waterbodies can affect larval stages of aquatic-borne insects that will be consumed by aerial insectivores, including bank swallows, common nighthawks, and bats, as well as by amphibians. As such, aquatic habitat quality will be effected. Although the effects of effluents on bank swallows are unknown, evidence from tree swallows suggests that contaminants found in insect prey are also found in swallows (ECCC 2022a). This suggests the potential for accumulation in other aerial insectivores. Additionally, chemicals can affect larval stages of amphibians and be absorbed through the skin of adult amphibians.

11.5.3.8.1 Mitigation Measures

Following the implementation of mitigation, effluent discharge is not predicted to have an effect on all VECs.

11.5.3.9 Residual Effects Characterization

Residual effects were classified after the implementation of mitigation (Table 11-28), and summarized according to nature, magnitude, geographic extent, duration, timing, reversibility, frequency, and probability of the effect occurring following the methods described in Section 11.5.1. The residual effects characterization for the wildlife VEC groups are summarized in Table 11-44 to Table 11-48.

Most suitable habitat for wildlife will be lost in the SSA, representing 8.5% to 22.3% of suitable habitat in the vegetation RSA. In most cases, the remaining area is large enough to support the existing ecological functions that these habitats represent at a slightly reduced level. For terrestrial habitats, the residual effect is temporary during the Project life cycle, except for habitat covered by permanent features and wetlands in which case the residual effect is permanent and irreversible. Some suitable habitats are wetlands, and some are located within protected areas which are subject to required mitigation as described in Sections 10.5.3.3 and 10.5.3.4.

It is likely that high dust concentrations predicted during Operations will have observable effects on vegetation communities immediately adjacent to the mine site, up to 100 m (i.e., in the LSA). Effects may include reduced growth or mortality in sensitive plant species leading to changes in local species diversity or reduced density. Effects are expected to be limited to the LSA and relatively small proportions of any habitat type (less than 5%) within the vegetation RSA. The implementation of dust suppression measures (e.g., adding water to road surfaces during dry-dusty conditions) will minimize any effects of dusts. Any effected vegetation communities will recover after operations cease and the site is restored.

Table 11-44: Characterization of Residual Effects on Species at Risk Birds and Migratory Birds' Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Habitat Loss and Alteration; Sensory Disturbance	Nature	Adverse
	Magnitude	Moderate: 8% to 22% habitat loss and alteration Low: sensory disturbance
	Geographic extent	Local: habitat loss and alteration Local: sensory disturbance
	Duration	Permanent: habitat loss and alteration for habitat covered by permanent features and wetland habitat Long term: habitat loss and alteration for habitat covered by non-permanent features (at least five years after the end of Closure to establish breeding bird habitat) Long term for sensory disturbance (at least five years after the end of Closure to see recruitment)
	Timing	Seasonal: summer breeding Year-round: spruce grouse habitat
	Reversibility	Reversible: reclaimed habitat and sensory disturbance Irreversible: habitat covered by permanent features and wetlands
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	Bank swallow, common nighthawk, harlequin duck, peregrine falcon, short-eared owl are all listed federally and provincially. Spruce grouse is not listed but is an important gamebird species. Several species are also of cultural importance to Indigenous groups. Therefore, the Project is expected to have ecological and socioeconomic effects. However, these effects are expected to be restricted primarily to the LSA and be negligible.

LSA = local study area.

Table 11-45: Characterization of Residual Effects on Bats Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Habitat Loss and Alteration; Sensory Disturbance	Nature	Adverse
	Magnitude	Moderate: 12% habitat loss and alteration Low: sensory disturbance
	Geographic extent	Local: habitat loss and alteration Local: sensory disturbance
	Duration	Permanent: habitat loss and alteration for habitat covered by permanent features and wetland habitat Long term: habitat loss and alteration for habitat covered by non-permanent features (at least 60 to 80 years after the end of Closure to establish mature ecosystems) Long term for sensory disturbance (at least five years after the end of Closure to see recruitment)
	Timing	Seasonal – summer breeding and foraging habitat
	Reversibility	Reversible (reclaimed habitat and sensory disturbance) Irreversible (habitat covered by permanent features and wetlands)
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	Northern myotis are listed federally and provincially; hoary bats are listed provincially and under review for listing federally. As primary consumers of nocturnal insects, they provide important ecosystem service in the form of pest control, including agricultural and silvicultural pests. Bats are not typically of cultural importance for Indigenous groups in Canada. Therefore, Project effects on bats are not likely to have social effects, but they could have economic effects. However, effects are expected to be limited and negligible.

Table 11-46: Characterization of Residual Effects on Woodland Caribou Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Habitat Loss and Alteration of Potential Future Habitat	Nature	Adverse
	Magnitude	Low
	Geographic extent	Local for effects on habitat availability, survival and reproduction Regional for effects on caribou distribution (movement and connectivity)
	Duration	Permanent for habitat covered by permanent features and wetland habitat Long term for habitat covered by non-permanent features (at least 40 years after the end of Closure to establish caribou habitat)
	Timing	Year-round
	Reversibility	Reversible (reclaimed habitat and indirect loss from sensory disturbance) Irreversible (habitat covered by permanent features and wetlands)
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	Boreal caribou are a threatened species both federally and provincially. Federal and provincial range assessments indicate the boreal caribou populations in the ranges that overlap with the Project's wildlife RSA (NL1, QC6, Manicouagan, and Caniapiscau) have sufficient undisturbed habitat (i.e., >65%) to support self-sustaining populations. However, federal assessments indicate that NL1 and Manicouagan location populations have declining population trends. QC6 and Caniapiscau populations are assessed as being self-sustaining. None of the boreal caribou ranges overlap with the Project SSA or wildlife LSA. Eastern migratory caribou have been assessed as Endangered by COSEWIC but have not been added to Schedule 1 of SARA. The historical range of the George River herd overlapped with the Project's wildlife RSA. This population have undergone dramatic fluctuations and reductions in population size, and the range has retracted to 85% of its historical extent. The George River herd do not currently use habitat within the Project study areas.

RSA = regional study area; SSA = site study area; LSA = local study area; > = greater than; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; SARA = *Species at Risk Act*.

Table 11-47: Characterization of Residual Effects on Terrestrial Mammals Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Habitat Loss and Alteration; Sensory Disturbance	Nature	Adverse
	Magnitude	Moderate: 9% to 20% habitat loss and alteration Low: sensory disturbance
	Geographic extent	Regional: habitat loss and alteration Local: sensory disturbance
	Duration	Permanent: habitat loss and alteration for habitat covered by permanent features and wetland habitat Long term: habitat loss and alteration for habitat covered by non-permanent features (at least five years after the end of Closure to establish moose and bear habitat, at least 40 years after the end of Closure to establish mature habitat for marten and beaver) Long term for sensory disturbance (at least five years after the end of Closure)
	Timing	Year-round
	Reversibility	Reversible: reclaimed habitat and sensory disturbance Irreversible: habitat covered by permanent features and wetlands
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	Ungulates and furbearers are hunted, trapped, and of cultural importance to Indigenous groups. The populations in the wildlife RSA are not considered to be habitat-limited in the existing environment. Changes in habitat availability, habitat distribution, and survival and reproduction from planned developments are unlikely to affect the ability of moose, black bear, American marten and beaver populations to remain self-sustaining and ecologically effective.

RSA = regional study area.

Table 11-48: Characterization of Residual Effects for Amphibians Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Habitat Loss and Alteration; Sensory Disturbance	Nature	Adverse
	Magnitude	Moderate: 8% to 20% habitat loss and alteration Low: Sensory disturbance
	Geographic extent	SSA: habitat loss and alteration LSA: sensory disturbance
	Duration	Permanent: habitat loss and alteration for habitat covered by permanent features and wetland habitat Long term: habitat loss and alteration for habitat covered by non-permanent features (at least five years after the end of Closure to establish breeding bird habitat) Long term for sensory disturbance (at least five years after the end of Closure to see recruitment)
	Timing	Year-round: habitat loss and alteration; sensory disturbance
	Reversibility	Reversible: reclaimed habitat and sensory disturbance Irreversible: habitat covered by permanent features and wetlands
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	Two-lined salamander and wood frog are important prey species to some birds and mammals. They are key indicators of environmental health, particularly aquatic environments. Therefore, habitat loss and alteration, together with sensory disturbance, could effect abundance, distribution, survival, and reproduction of already sensitive species. Some species are also of cultural importance to Indigenous groups so that the Project may have socioeconomic effects. However, effects are expected to be restricted to the SSA and negligible.

Residual Effect	Criterion	Rating/Effect Size
Injury and Mortality from Clearing	Nature	Adverse
	Magnitude	Moderate: moderate change in abundance in LSA is expected
	Geographic extent	SSA
	Duration	Long term: duration of the Project until Closure
	Timing	Year-round
	Reversibility	Reversible upon Closure
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	As above
Air Emissions	Nature	Adverse
	Magnitude	Low: substantial change in abundance in LSA is not expected
	Geographic extent	LSA
	Duration	Long term: duration of the Project until Closure
	Timing	Year-round
	Reversibility	Reversible upon Closure
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	As above
Treated Effluent Discharge	Nature	Adverse
	Magnitude	Low: substantial change in abundance in LSA is not expected
	Geographic extent	SSA
	Duration	Long term: duration of the Project until Closure
	Timing	Year-round
	Reversibility	Reversible upon Closure
	Frequency	Continuous
	Probability of occurrence	Certain
	Ecological and socioeconomic context	As above

SSA = site study area; LSA = local study area.

11.5.3.10 Significance Determination

Following the summary of residual effects, significance of residual effects for the Project was determined according to the methods described in Section 11.5.1. Effective implementation of mitigation measures and progressive reclamation and revegetation is expected to reduce the magnitude and duration of residual effects on wildlife species and their habitat. Additionally, habitat loss and alteration will be largely offset by a commitment to the Strawberry Lake Stewardship Agreement; therefore, it is considered that the overall effects on habitat loss and alteration will be **not significant**.

Species at Risk Birds and Migratory Birds

The construction and operation of the Project is expected to result in the loss of nesting and foraging habitats for avifauna species. However, with the implementation measures such as clearing outside of breeding bird season, the residual effects are anticipated to be low in magnitude, localized, and residual. Therefore, the significance of the residual effects on avifauna is determined to be **not significant**.

Bats

The construction and operation of the Project is expected to result in loss of bat habitat via loss of roosting sites and foraging areas for various bat species. Mitigation measures, including the preservation of bat hibernacula, if found, and key roosting areas, will be implemented. Additionally, efforts will be made to minimize light pollution when possible. Given these measures, and the fact that bats are highly mobile, the residual effects on bats are anticipated to be low to moderate in magnitude, localized, and largely reversible. The residual effects on bat populations are, therefore, expected to be minor and **not significant**.

Woodland Caribou

The Project occurs in an area that was historically occupied by caribou, but the ranges of both the eastern migratory and boreal caribou have receded and no longer overlap with the Project's SSA or wildlife LSA. As such, there is no direct (SSA) or indirect (500 m buffer around SSA) loss of currently occupied caribou habitat as a result of the construction and operation of the Project. Suitable habitat that supports biophysical attributes for caribou life processes is present in the vegetation RSA and wildlife RSA, indicating the potential for future occurrence of caribou. However, the existing anthropogenic disturbance and barriers to movement would likely deter caribou from selecting habitat in the wildlife LSA, particularly because there is sufficient undisturbed habitat in adjacent ranges to support self-sustaining populations. Mitigation measures, including limiting the Project footprint, using existing roads, minimizing light and noise pollution, and Post-closure remediation, will reduce the amount of loss and alteration of potential future habitat. As a result, the residual effects are anticipated to be low in magnitude and unlikely to have a demographic effect on adjacent caribou populations, and **not significant**.

Other Wildlife

The Project will contribute to habitat loss and increased disturbance for various wildlife species, including terrestrial mammals and amphibians. Specific effects include the loss of breeding and foraging habitats, increased road mortality, and potential barriers to movement. Mitigation measures, such as the creation of wildlife corridors, Post-closure remediation, and the implementation of a wildlife monitoring program will be put into place. Efforts will also be made to minimize light and noise pollution, where possible, and to maintain vegetation buffers. As a result, the residual effects on other wildlife are anticipated to be low to moderate in magnitude, localized, and largely reversible, and **not significant**.

11.5.4 Residual Cumulative Effects Analysis

11.5.4.1 Reasonably Foreseeable Developments

Following the assessment of Project effects discussed in the sections above, a qualitative assessment of potential cumulative effects was conducted for other projects and activities (i.e., reasonably foreseeable developments [RFDs]) (Table 11-49) that have the potential to interact with the Project's residual effects. Six projects were identified that had the potential to contribute to the cumulative effects, including five mines and one road improvement project. These projects range from 13 to 60 km from the Kami Mine Project. The assessment conclusion is that potential cumulative effects with identified RFDs are unlikely to result in greater than negligible contributions to the Project's residual effects.

All RFDs have physical footprints within the RSA for wildlife and wildlife habitat, which encompasses a 40 km buffer around the SSA to account for home ranges of mobile wildlife VEC. Due to their relatively low mobility, the amphibian RSA is confined to the vegetation RSA. None of the RFDs have physical footprints within the RSA for amphibians and amphibian habitat. Therefore, cumulative residual effects are not applicable to amphibians.

The Scully Mine Tailings Impoundment Area Expansion Project is expected to alter a large section of habitat in a series of small lakes that flow north into Flora Lake. This expansion will likely lead to habitat destruction and disturbance to wildlife, particularly amphibians, which are sensitive to changes in water quality, and avifauna like waterfowl, which can be affected by substances in the water. All effluent discharges will meet the federal *Metal and Diamond Mining Effluent Regulations* guidelines, and annual sub-lethal toxicity testing occurs for the Flora Lake final discharge point. The Environmental Assessment Registration for this project concluded that it is not expected to cause any changes to water quality at the Flora Lake final discharge point that would negatively affect receiving waterbodies. While this project footprint is outside Kami Mine's LSA, the flow from Flora Lake ends in Wabush Lake, within the Project's RSA. The effects of this project have been assessed as negligible.

The Rio Tinto IOC Western Hillside Tailings Pipeline Project will create a new tailing impoundment area within the Kami Mine's RSA. The new Tailings Management Plan for the Wabush Lake tailings facility, which includes optimizing available space and utilizing the Western Hillside, has potential to effect wildlife habitats within the Kami Mine's RSA. The development of access roads and pipeline alignments can contribute to habitat fragmentation and disrupt wildlife movement patterns, particularly affecting larger mammals such as ungulates. Transmission lines can pose collision and risk to avifauna, particularly during migration. The modified strategy for tailings deposition into Wabush Lake can effect aquatic habitats potentially affecting waterfowl and amphibians, by introducing substances that affect water quality. However, all effluent discharges will meet the federal (*Metal and Diamond Mining Effluent Regulations* and CCME guidelines) and provincial Certificate of Approval criteria. The Environmental Assessment registration for this project concludes that the Rio Tinto IOC Western Hillside Tailings Pipeline Project's operation is not anticipated to have significant adverse effects on the natural environment. Therefore, incremental contributions of this project's effects on overall cumulative effects have been assessed as negligible.

The Rio Tinto IOC Smallwood North Extension Project's expansion to the boundaries of the existing Smallwood Pit will encompass approximately 160 ha within Rio Tinto IOC's existing mining leases. The proposed project includes extending the Smallwood North Pit to the north, developing a new waste dump, constructing new power lines, installing new pit dewatering wells, and developing surface water handling systems. These activities can potentially effect local wildlife habitats. Habitat fragmentation and increased human access due to the development of access roads and pipeline alignments may disrupt wildlife movement patterns, particularly affecting larger mammals such as ungulates. The construction of new power lines poses collision and electrocution risks to avifauna, especially migratory birds, and can create barriers to wildlife movement. The installation of new pit dewatering wells and surface water handling systems can lead to localized habitat destruction and disturbance, affecting shelter and food availability for wildlife. However, project controls and mitigation measures are expected to minimize these effects. Therefore, the incremental contributions of this project's effects on Project overall effects have been assessed as negligible.

The 370 ha extension to the Humphrey South Pit iron ore deposit, including development into the White Lake area, will support existing operations in Labrador City. The Project involves extending the Humphrey South Pit to the east and south, developing a waste dump south of White Lake, extending the Carol waste dump, constructing power lines, installing dewatering wells, and developing surface water-handling systems. These activities can potentially effect local wildlife habitats. Habitat fragmentation and increased human access due to the development of access roads and pipeline alignments may disrupt wildlife movement patterns, particularly affecting larger mammals such as caribou and deer. The construction of new power lines poses collision and electrocution risks to avifauna, especially migratory birds, and can create barriers to wildlife movement. The installation of dewatering wells and surface water-handling systems can lead to localized habitat destruction and disturbance, affecting shelter and food availability for wildlife. However, project controls and mitigation measures are expected to minimize these effects. Therefore, the incremental contribution of this Project's effects on overall cumulative effects have been assessed as negligible. The Bloom Lake Iron Mine project is aiming to increase the tailings and waste rock storage capacity to support an annual production of 7.5 Mt of concentrate from 2019 to 2021 and 16 Mt of concentration from 2022 to 2040, with an estimated operating life of 21 years. This expansion will occur within the wildlife RSA, potentially effecting local wildlife habitats. The increased storage capacity and associated infrastructure development can lead to habitat fragmentation and disturbance, particularly affecting larger mammals such as ungulates. Additionally, the construction and operation activities may introduce or increase noise and light pollution, potentially disrupting the behaviour and physiology of nocturnal species like bats. Avifauna, especially migratory birds, may face increased risks of collision due to new infrastructure such as power lines. Amphibians could be affected by changes in water quality and habitat conditions. However, project controls and mitigation measures are expected to minimize these effects. Therefore, the incremental contributions of this project's effects on overall cumulative effects have been assessed as negligible.

The Route 389 improvement project between Fire Lake and Fermont aims to increase the flow and safety of the road, improve the link with Newfoundland and Labrador, and facilitate access to natural resources. The Project involves building 55.8 km of new right-of-way road and improving existing road, for a total length of 69.5 km. Although there is no physical overlap with the wildlife RSA, the linear nature of the project could potentially interact with the Kami Project and vice versa, leading to further habitat fragmentation and creating barriers for amphibians. However, due to their relatively low mobility, the amphibian RSA is confined to the vegetation RSA and will not be effected by this RFD.

No potential interaction with surface water or groundwater within the RSA was identified. Similarly, no reasonably foreseeable effects from introduction of invasive species were identified for the RFDs within the RSA. Only dust from RFDs may migrate into the RSA airshed and become a potential source of cumulative effects that may also contribute to habitat alteration by affecting vegetation quality and communities. The potential cumulative effects of dust (TPM and PM_{10}) were assessed as part of the Air Quality and Greenhouse Gases discipline in Section 5.5.2.3 of Chapter 5, Air Quality and Climate. The assessment conclusion is that potential cumulative effects with identified RFDs, specifically the Scully Lake Tailings Impoundment Project, are unlikely to contribute to predictions of COCs from the Project, and a significant cumulative effect was not predicted.

Section 6.4 (Cumulative Effects) of the EIS Guidelines notes that "historically, the George River Caribou Herd has used the study area thus migratory caribou shall be given special consideration for analysis of cumulative effects and how the precautionary principle was applied in the EIS" (p. 57, Government of NL 2024c). The historical range of the George River herd overlapped with the Project's wildlife RSA (Table 11-10). This population have undergone dramatic fluctuations and reductions in population size, and the range has retracted to 85% of its historical extent. The George River herd do not currently use habitat within the Project study areas.

As presented in Section 11.5.3.2.1, caribou do not currently occupy the wildlife LSA; there is minimal available suitable habitat as a result of existing anthropogenic disturbances (the LSA is more than 50% disturbed; Table 11-18). However, the historical ranges of boreal caribou and George River migratory caribou did overlap with the wildlife LSA, and the existing environment of the vegetation RSA supports biophysical attributes necessary to support self-sustaining populations of caribou. Given that, there is potential for future occupancy of the vegetation RSA and wildlife RSA by the George River migratory caribou if suitable habitat remains available.

A precautionary approach was applied in the assessment by considering potential effects to hypothetical future occupancy and habitat use by George River caribou of the Project study areas.

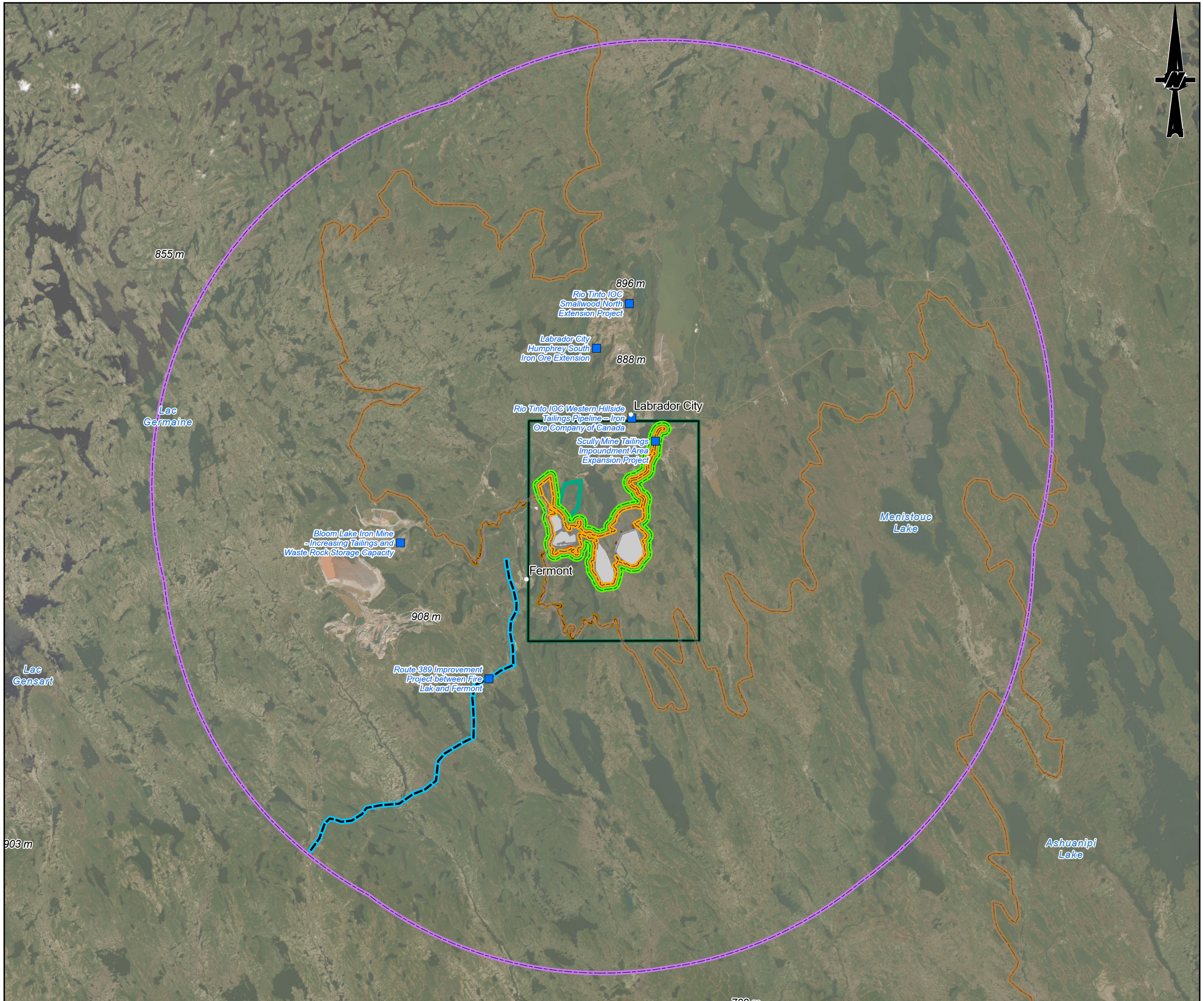
Change in potential future habitat for caribou was considered qualitatively in the cumulative effects assessment because physical footprints of other RFDs were not available. All six RFDs in the wildlife RSA are expansions or improvements of existing projects (Table 11-49, Table 11-33); as such, it is likely that there is minimal to no suitable caribou habitat in the existing environment adjacent to those projects where the expansions will occur, because caribou avoid anthropogenic disturbances (ECCC 2020). The five mine expansion Projects were predicted to result in very little, if any, direct and indirect loss of suitable habitat. The Route 389 improvement project is along an existing road; this Project may result in direct and indirect habitat loss but is predicted to cause only minor changes in connectivity relative to the existing environment. It is expected that the distribution of suitable caribou habitat types would remain largely unchanged as a result of the addition of the Project and RFDs. Any potential changes to connectivity or increased mortality as a result of the QNS&L rail operations in the wildlife RSA has been previously considered and mitigated for in the Rio Tinto IOC Biodiversity Conservation Strategy (Appendix 2B).

Table 11-49: Other Projects and Activities Considered in the Cumulative Effects Assessment

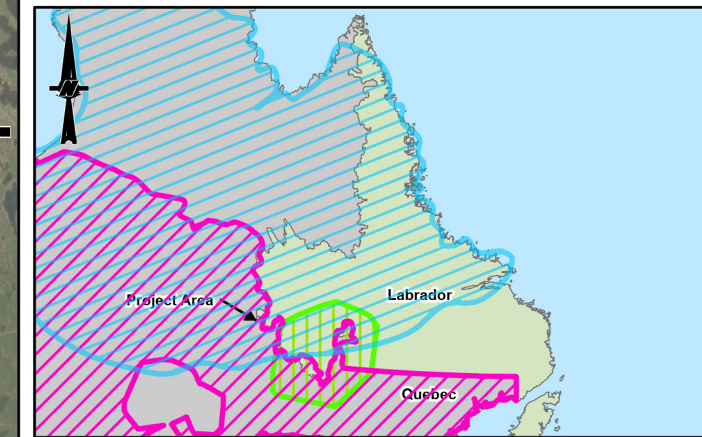
Project Name or Physical Activity	Description of Project Effects	Approximate Direct Distance to Kami Project Site	Status/Timing	Interaction with Residual Effects on Wildlife from Kami Project
Scully Mine Tailings Impoundment Area Expansion Project	Tacora Resources Inc. proposes expanding the tailings impoundment area of the Scully Mine, an iron ore mine located in Wabush, Newfoundland and Labrador. As proposed, the Scully Mine Tailings Impoundment Area Expansion Project would expand the existing tailings impoundment area by up to 1,411 ha, allowing for the full use of the mine's ore reserves and for operations to continue until 2047. The existing tailings impoundment area is expected to reach full capacity around 2025.	13 km	The minister announced that the project was approved under the provincial Environmental Assessment on March 31, 2022. Anticipated start in 2025 and expand operations by 22 years	The Scully Mine Tailings Impoundment Area Expansion Project will temporally overlap with Project activities. Contributes to habitat loss and alteration in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**
Rio Tinto IOC Western Hillside Tailings Pipeline – Iron Ore Company of Canada	A new Tailings Management Plan that would include optimizing the available space of the existing Wabush Lake tailings storage facility and utilizing the Western Hillside. The project would consist of developing an access road and pipeline alignment, transmission lines, pumps and pumphouses, and a modified strategy for tailings deposition into Wabush Lake.	15 km	The Minister announced that the project was released from an Environmental Assessment on May 17, 2024 Construction anticipated to start in 2024 and continue into 2033, operation from 2033 to 2038.	The Rio Tinto IOC Western Hillside Tailings Pipeline Project will overlap temporally with Project activities. Contributes to habitat loss and alteration, and mortality in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**

Project Name or Physical Activity	Description of Project Effects	Approximate Direct Distance to Kami Project Site	Status/Timing	Interaction with Residual Effects on Wildlife from Kami Project
Rio Tinto IOC Smallwood North Extension Project	Expansion to the boundaries of the existing Smallwood Pit to support ongoing operations in Labrador City. The proposed extension of Smallwood Pit is located within Rio Tinto IOC's existing mining leases and encompasses approximately 160 ha. The proposed project includes extending the Smallwood North Pit to the north, development of a new waste dump, construction of new power lines, construction of new pit dewatering wells and the development of surface water handling systems.	25 km	The Minister announced that the project was released from an Environmental Assessment on July 21, 2021 Construction to start in summer 2024 into 2030	The Rio Tinto IOC Smallwood North Extension Project will overlap temporally with Project activities. Contributes to habitat loss and alteration in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**
Labrador City Humphrey South Iron Ore Extension	A 370-ha extension to the Humphrey South Pit iron ore deposit that will include development into the White Lake area to support its existing operations in Labrador City. The project consists of an extension of the Humphrey South Pit to the east and south, development of a waste dump south of White Lake, extension of the Carol waste dump, power lines, dewatering wells, and surface water-handling systems.	20 km	Condition of release from Environmental Assessment met on December 11, 2024 Construction to start in 2024 and operations anticipated by 2026	The Labrador City Humphrey South Iron Ore Extension Project will overlap temporally with Project activities. Contributes to habitat loss and alteration in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**
Bloom Lake Iron Mine - Increasing Tailings and Waste Rock Storage Capacity	Increasing Tailings and Waste Rock Storage Capacity for Bloom Lake Iron Mine. The project's objective is to increase the capacity of the accumulation areas to allow annual production of 7.5 Mt of concentrate/year from 2019 to 2021 and 16 Mt of concentrate/year from 2022 to 2040, i.e., for an estimated operating life of 21 years.	17 km	*Fisheries Act* Authorization provided in 2024 2023 to 2040	The Bloom Lake Iron Mine Expansion Project will overlap temporally with Project activities. Contributes to habitat loss and alteration in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**
Route 389 Improvement Project between Fire Lake and Fermont	Improving Route 389 between Fire Lake and Fermont (kilometres 478 to 564) to increase the flow and safety of the road and, in addition, improve the link with Newfoundland and Labrador and facilitate access to natural resources. The work includes building 55.8 km of new right-of-way road and improving existing road, for a total length of 69.5 km.	6 to 93 km	Environmental Assessment approved in 2019 Construction began 2023, to continue to 2028	The Route 389 Improvement Project will overlap temporally with Project activities. Contributes to habitat loss and alteration in the wildlife RSA during Construction, Operations, and Closure. **Considered to be a negligible cumulative effect.**

RSA = regional study area; IOC = Iron Ore Company of Canada; Mt = million tonnes.



KEY MAP



SCALE 1:20,000,000

LEGEND

- LABRADOR/QUEBEC BOUNDARY
- PROPOSED PROJECT INFRASTRUCTURE
- PROPOSED SEDIMENT POND
- VEGETATION REGIONAL STUDY AREA (RSA)
- WILDLIFE REGIONAL STUDY AREA (RSA)
- WILDLIFE LOCAL STUDY AREA (LSA)
- SITE STUDY AREA
- PROPOSED ROAD 389 BETWEEN FERMONT AND FIRE LAKE
- REASONABLY FORESEEABLE DEVELOPMENTS

0 3.75 7.5 15
1:400,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
1. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TERRAIN REFERENCE: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
OTHER PROJECT AND ACTIVITIES CONSIDERED IN THE CUMULATIVE EFFECTS ASSESSMENT FOR WILDLIFE

CONSULTANT

Kami

YYYY-MM-DD	2025-07-02
DESIGNED	----
PREPARED	GM
REVIEWED	MB
APPROVED	KP

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0025	0	11-33

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

11.5.4.2 Potential Cumulative Effects

11.5.4.2.1 Habitat Loss and Alteration

The cumulative effects assessment for wildlife habitat loss considers the combined effects of multiple projects within the region (i.e., RFDs). This includes fragmentation and degradation of habitats due to land development, resource extraction, and infrastructure projects. These activities collectively contribute to a reduction in the availability and quality of habitats, which can adversely affect wildlife populations by limiting their access to essential resources such as food, shelter, and breeding sites. The assessment also evaluates potential for increased human–wildlife conflicts and the long-term sustainability of wildlife populations in the affected areas.

Wildlife in Labrador West are influenced by a range of pressures that can alter their distribution, abundance, and overall health. These pressures include industrial and urban development (such as mining and forestry), hunting, emissions, pesticide use, and other forms of pollution. For the Kami Mine Project, key cumulative effects pathways include vegetation removal, and construction activities. These factors may contribute to cumulative habitat loss and increased mortality risk. This section outlines the cumulative effects pathways associated with the Project and other developments listed in Table 11-48, discusses potential mitigation measures to reduce these effects, and evaluates the cumulative effects in the context of residual effects from other projects.

RFDs that are predicted to contribute to cumulative effects on wildlife include the Scully Mine Tailings Impoundment Area Expansion Project, IOC Western Hillside Tailings Pipeline – Iron Ore Company of Canada, IOC Smallwood North Extension Project, Labrador City Humphrey South Iron Ore Extension, Bloom Lake Iron Mine - Increasing Tailings and Waste Rock Storage Capacity, and the Route 389 Improvement Project between Fire Lake and Fermont (Table 11-48). These projects potentially have similar effects pathways as those arising from the Project, including habitat loss and alteration.

The primary cumulative environmental effect pathway for habitat loss within the cumulative effects assessment is through vegetation removal and alteration of wetlands, resulting in direct loss of habitat. The contribution of adverse incremental Project residual effects to cumulative effects on loss of habitat will be low (Section 11.5.3.2).

The IOC Western Hillside Tailings Pipeline, IOC Smallwood North Extension Project and the Labrador City Humphrey South Iron Ore Extension projects have all been released from submitting an Environmental Assessment; therefore, habitat loss estimates are not available.

The Route 389 Improvement Project will result in a loss of habitat for wildlife via the removal and clearing of vegetation during the construction phase of the road improvement. However, it was determined that the habitat loss is not likely to adversely affect the maintenance of wildlife populations and would not be detrimental to the recovery of SAR due to the species' ability to find replacement habitats nearby.

Habitat for wildlife is widespread within the RSA. Past and ongoing projects (commercial mining, forestry, highway improvements) have affected individual occurrences of wildlife, which are reflected in the existing conditions. It is unlikely that incremental Project residual effects, in combination with effects from other projects and activities, would result in a reduction in wildlife habitat that would threaten the persistence or viability of wildlife species. This prediction assumes that the other projects within the wildlife RSA will employ various mitigation measures and regulations, including legal requirements to protect migratory birds (e.g., clearing outside of the breeding bird season).

11.5.4.3 Mitigation Measures

Based on the assessment of potential cumulative effects, an assessment was made regarding whether additional mitigation measures, beyond those proposed for the Project, were required to address potential cumulative effects on wildlife under Champion's care and control. These include:

- Develop and implement an Environmental Effects Monitoring Program to identify and further mitigate any adverse effects on wildlife and their habitats.

Address erosion and sediment control issues before discharge to prevent habitat degradation.

11.5.4.4 Residual Cumulative Effects Characterization

No measurable cumulative effects from RFDs are anticipated and the cumulative effect characterization is identical to the Project-related residual effects (Table 11-50). Only negligible effects on wildlife and wildlife habitat are expected from the Scully Mine Tailings Impoundment Area Expansion Project and the Rio Tinto IOC Western Hillside Tailings Pipeline Project. Tailings effluent will be deposited into Wabush Lake and Flora Lake. However, the effect of wildlife habitat or wildlife in these areas, including amphibians and avian species like waterfowl and aerial insectivores, is expected to be minimal.

Amphibians, which rely on aquatic habitats for breeding and development, may experience some habitat alteration due to changes in water quality and sedimentation. Mitigation measures, including the establishment of buffer zones and monitoring of water quality, will be implemented to minimize these effects.

Avian species, particularly waterfowl and aerial insectivores, may be affected by changes in habitat availability and food resources. Waterfowl, which depend on wetlands and open water bodies, may experience habitat loss of degradation. Aerial insectivores, which rely on insect populations near water bodies, may be effected by changes in water quality and vegetation cover. Mitigation measures, such as closure restoration, will be put into place to support these species.

Table 11-50: Characterization of Residual Cumulative Effects on Wildlife and Wildlife Habitat Measurable Parameters

Residual Effect	Criterion	Rating/Effect Size
Change in Measurable Habitat Loss and Alteration	Nature	Adverse
	Magnitude	Negligible
	Geographic Extent	Regional
	Duration	Long-term
	Timing	Year-round
	Reversibility	Reversible at project closure
	Frequency	Continuous for life cycle of projects
	Probability of occurrence	Certain
	Ecological and Socioeconomic context	Synergistic effects of habitat loss and alteration related to the Project together with other RFDs in the RSA will affect all wildlife VECs, except for amphibians. In the case of amphibians, the RSA is restricted to the vegetation RSA. Therefore, synergistic effects only pertain to RFDs within the vegetation RSA, which includes the Scully Mine Tailings. As outlined above, many VECs are listed federally or provincially, or both. As such these cumulative effects could effect abundance, distribution, survival, and reproductive success of already sensitive species. Additionally, several VECs are important game species and of cultural importance to Indigenous groups. As such, cumulative effects could have socioeconomic effects. Overall, these effects are expected to be negligible.

RFD = reasonably foreseeable development; RSA = regional study area; VEC = Valued Environmental Component.

11.5.4.5 Significance Determination

Based on the significance definitions in Section 11.5.1.4, potential cumulative effects on wildlife and wildlife habitat are not significant, as many of the Project activities of other RFDs fall outside of the RSA of the Project, and those that do are implementing mitigation measures, and **not significant**.

11.5.4.6 Climate Change

In addition to human activities, climate change and related effects (e.g., extreme weather, increased frequency and intensity of extreme weather events, wildfires, and insect infestations) may contribute cumulatively to further contribute to habitat loss and alteration, as well as survival and reproduction. Current climate change projections under a high greenhouse gas emissions model (Shared Socioeconomic Pathway 5-8.5) predict summer temperatures to rise by +1.9°C and winter temperatures to rise by +6.0°C by 2060 in Happy Valley-Goose Bay (roughly 530 km east of the Project area) (Neilsen 2023). A Climate Projections Study (Finnis and Daraio 2018) projects similar changes by mid-century in Wabush where daily mean temperatures are predicted to rise by +2.8°C in the summer and as much as 5.8°C in the winter (Finnis and Daraio 2018). These increases would result in noticeable changes in precipitation, rising ambient temperatures, shorter winters, and permafrost thaw (Neilsen 2023). These climate changes will in turn affect habitat distribution and potentially disrupt predator-prey dynamics and ecosystem function (Bush and Lemmen 2019).

Changes to climate could also result in an increase in frequency and intensity of extreme weather events. Labrador is subject to severe weather events like heavy rainfall, blizzards, and hurricanes, all of which could result in habitat loss and alteration. The northwestern Atlantic Ocean, the Labrador Sea, and the Gulf of St. Lawrence are some of the stormiest areas in North America (Savard et al. 2016). Climate projections suggest that substantial changes in wind speed are unlikely to be effected by climate change but there is likely to be a northward shift in storm tracks that will affect storm frequency and intensity in the East Coast region (Loder et al. 2013). Storms, like hurricanes, can result in substantial habitat loss and alteration. Storms moving up the eastern seaboard or across the continent effect precipitation events in Labrador (Lemmen and Warren 2016). Thus, more frequent and intense storms, together with increased precipitation due to ocean warming, is expected to increase the risk of floods (US EPA 2022). Flooding events can affect terrestrial and aquatic habitats important to wildlife.

Climate change mediated increases in temperature also affect insect populations. Because insect development and physiology are strongly tied to temperature, rising temperatures will result in insect range expansions, and increased over-winter survival, reproductive success, and a risk of invasive species (Skendžić et al. 2021). This could increase the risk of outbreaks of common boreal forest pest species, such as the eastern hemlock looper, *Lambdina fiscellaria fiscellaria*, (Government of Canada 2010) or spruce budworm, *Choristoneura fumiferana* (Fewster et al. 2022), which in turn would lead to habitat loss and alteration for wildlife species. The eastern hemlock looper, a subspecies found in Atlantic Canada, feeds primarily on balsam fir and eastern hemlock. When these tree species become scarce, the looper will readily feed on many other coniferous species as well as deciduous species (Skinner 2025). Spruce budworm also feed primarily on balsam fir, as well as white spruce, but will feed on other conifers when food is scarce. Depending on the intensity of defoliation, this could lead to more frequent and more intense wildfires (Fewster et al. 2022).

Changes to climate could also result in an increase in frequency and intensity of wildfires. Labrador is prone to wildfires. For instance, 131 ha burned in the wildlife LSA between 1980 and 2025. Approximately 61.6% of the wildfires since 1980 that occurred in the wildlife RSA are 6 to 26 years old (i.e., occurred between 1999 and 2019), while the most recent fire to affect the wildlife RSA occurred in 2024, covering an area of 19,059 ha. An increase in the frequency and intensity of wildfires could alter the distribution and composition of upland habitat patches or reduce the size of wetlands on the landscape, which could change where suitable habitat occurs throughout the wildlife RSA. Additionally, forest age structure is predicted to change at the landscape scale as a result of an increase in the frequency and intensity of fire associated with climate change (Thompson et al. 1998; Nituch and Bowman 2013).

Climate change may alter the processes that influence the availability of different quality wildlife habitats, and effects would likely occur beyond the wildlife RSA. Because of the uncertainty in direction and magnitude, it was conservatively assumed that climate change would have an adverse cumulative effect on wildlife habitat distribution.

11.6 Prediction Confidence and Uncertainty

A key element of a comprehensive EA is the prediction of future conditions of the environment as a result of the Project from previous and existing projects and activities and RFDs. Given that environments change naturally and continually through time and across space, assessments of effects and predictions about future conditions embody some degree of uncertainty (IAAC 2018).

The purpose of the Prediction Confidence and Uncertainty section is to identify the key sources of uncertainty and qualitatively describe how uncertainty was addressed for wildlife and wildlife habitat to increase the level of confidence that effects would not be larger than predicted, including the potential need for monitoring and adaptive management that can reduce uncertainty over time (Section 4.9 of Chapter 4, Effects Assessment Methodology).

Confidence in effects analyses can be related to many elements for wildlife and wildlife habitat, including the following:

- uncertainties associated with the exact location, physical footprint, activity level, and the timing and rate of future developments
- adequacy of the baseline data for providing an understanding of the existing conditions
- the nature, magnitude, and spatial extent of future fluctuations in ecological, cultural, and socioeconomic variables, independent of effects from the Project and other developments (e.g., climate change, fire, flood)
- assumptions, conditions, and constraints of quantitative model inputs for other biophysical VECs (e.g., vegetation, wetlands, and protected areas; noise, vibrations, and light)
- understanding of Project-related effects on complex social-ecological systems that contain interactions across different scales of time and space (e.g., how and why the Project would influence wildlife and Indigenous Land and resource use)
- knowledge and experience with the type of effect in the system

knowledge of the effectiveness of proposed Project environmental design features or mitigation for avoiding or minimizing effects

As stated previously, a conservative SSA was proposed, which adds a 100 m buffer to the latest design Project elements, to address the possibility that minor design changes may yet occur during final design or construction. Assuming design changes (if any) are small, this will result in a conservative effect assessment which may slightly overestimate effect severity due to the addition of the buffer. Similarly, a conservative wildlife LSA was proposed which adds a 500 m buffer to encompass the maximum extent of even the lowest intensity effect of anticipated Project effects (e.g., air, noise, vibrations, and light). Additionally, a conservative wildlife RSA was proposed, which adds a 40 km buffer to account for highly mobile species and their potential to interact with other RFDs.

Baseline data collected during surveys, while robust, may not capture the full extent of species presence and distribution due to spatiotemporal variation. Baseline mapping of habitat (vegetation communities and wetlands) is reliant mostly on remote sensing and modelling, with a limited field verification program. The accuracy of the recent modelling improved substantially (from the 2012 levels of around 50%) up to around 90% accuracy. Field verification of selected wetlands in the LSA indicate that accuracy of wetland modelled boundaries may be somewhat less than 90%. However, such levels are considered sufficient to represent regional trends with acceptable accuracy. A conservative approach was used in modelling predicted effects for other biophysical VECs, such as noise, light, and air, as outlined in those disciplines' respective chapters.

Conservative boundaries, together with robust baseline collection and conservative modelling approaches, enable the predictions of habitat loss and alteration to be made with a high level of confidence. A good understanding of species life histories and habitat needs also increased the level of confidence around predicted effects on wildlife survival and reproduction, and wildlife habitat.

Drawing on species-specific best management practices and standard mitigation based on established design features with known effectiveness in similar contexts provides a high level of confidence in the proposed mitigation measures. In addition to examining effects within conservative spatial boundaries, the characterization of residual Project effects incorporates several conservative assumptions to increase the confidence that the assessment will not underestimate the effects of the Project. For instance, separate effects assessments were examined for each of the 15 VECs to account for potential species differences. For each VEC, effects assessments were examined for 18 separate pathways to account for potential variation in nature, magnitude, and extent of Project activities at all stages throughout the Project lifespan. With respect to predicting cumulative effects assessment, there is high confidence in the temporal and spatial boundaries and potential effects of RFDs, because they have been approved or released from EA and have a high likelihood of proceeding with accepted mitigation measures.

11.7 Monitoring, Follow-Up, and Adaptive Management

This section presents a summary of the identified monitoring and follow-up required to confirm effects predictions and address uncertainty identified in Section 11.5.4.6.

Specifically, follow-up and monitoring programs will be used to:

- evaluate the effectiveness of reclamation and other mitigation actions, and modify or enhance as necessary through monitoring and developing updated mitigation measures (if needed)
- identify unanticipated negative effects, including possible accidents and malfunctions

contribute to the overall continual improvement of the Project

Relevant environmental effects monitoring programs are:

- surface water
- groundwater
- wetlands
- wildlife and habitat monitoring
  - Avifauna Mitigation and Monitoring Plan
  - SAR and SoCC
  - invasive species monitoring

Relevant Environmental Management Plans are:

- Environmental Protection Plan
- Erosion and Sediment Control Plan

Waste Management Plan

An overview of each of the above plans is provided in **Chapter 20, Environmental Management, Monitoring, and Follow-Up**. Below is a summary of environmental effects monitoring programs specific to wildlife.

The Environmental Effects Monitoring Plan will include detailed requirements for the assessment and management of birds and bird habitat. If clearing is required to take place during the breeding bird season, an Environmental Monitor or Environmental Monitor Lead will conduct nest sweeps a maximum of 72 hours prior to the clearing that will be taking place. If a nest is discovered, the nest will be given a suitable buffer and be monitored to confirm activities do not disturb the nest/nesting birds. If a nesting bird shows signs of disturbance due to construction activities, the Environmental Management Lead or Environmental Monitor will temporarily halt work until it is safe to resume. Indicators of disturbance include cessation of nest-building, adults flushing from the nest, or failure of adults to return. Nest monitoring will cease if the nest fails (e.g., eggs do not hatch within the expected period), is predated, or is destroyed by natural events such as high winds.

Setback distances and monitoring protocols will vary depending on the species and nest status. All monitoring data will be recorded in the Environmental Management System to identify trends, such as nesting hotspots. If such trends are observed, the Environmental Management Lead or Environmental Monitor will work with the contractor to develop and implement a site-wide buffer zone, where feasible.

The Environmental Effects Monitoring Program will also include wildlife and habitat monitoring, as well as SAR and SoCC monitoring, which will include both targeted and general observations. Targeted monitoring will focus on specific species, such as birds and bats, during key seasonal windows, such as the breeding season. General wildlife monitoring will involve incidental observations throughout the construction phase. All wildlife sightings will be recorded and tracked to identify potential patterns or trends in observations that may indicate concentrations of individuals or patches of critical habitat. Any observations of SAR and SoCC will be reported to the Wildlife Division. During the Operations phase, wildlife and habitat monitoring activities may continue, depending on regulatory requirements. The Environmental Effects Monitoring Program will be updated prior to operations to reflect any changes required by regulatory authorities. A wildlife effects monitoring program will be developed to identify and implement adaptive management for any measured adverse incremental Project effects on wildlife and their habitats.

11.8 Predicted Future Conditions Should the Project Not Proceed

Current climate change projections under a high greenhouse gas emissions model (Shared Socioeconomic Pathway 5-8.5) predict summer temperatures to rise by +1.9°C and winter temperatures to rise by +3.0°C by 2060 in Happy Valley-Goose Bay (roughly 530 km east of the Project area) (Neilsen 2023). These increases would result in noticeable changes in precipitation, rising ambient temperatures, shorter winters, and permafrost thaw (Neilsen 2023). These climate changes will in turn affect habitat distribution and potentially disrupt predator-prey dynamics and ecosystem function (Bush and Lemmen 2019). However, both the federal and provincial governments have pledged to cut greenhouse gas emissions by 2030 and achieve net-zero emissions by 2050. The federal goal is to lower greenhouse gas emissions by 30% from 2005 levels by 2030 and to establish a low-carbon economy by 2050 (ECCC 2022b). If the Project does not move forward, the current trend of decreasing greenhouse gas emissions at the federal and provincial levels would persist due to government efforts to meet their targets and help mitigate climate change. As highlighted in Chapter 5, Air Quality and Climate, if the Project does not proceed, the predicted future condition of the environment for wildlife and wildlife habitat is relatively insensitive to climate change over the proposed Project time scale of approximately 40 years.

The next likely substantial change in the Project area absent the proposed Kami Mine Project would be the implementation of a different mining project by other stakeholders. The global mining economy is the main driver of mining development pressure and is relatively difficult to predict, but long-term trends over 40 years are likely to include future periods of strong mining interest in the demonstrated ore deposits at the site. Should no mining take place within the next 40 years, based on historical events, it seems unlikely that any other major development would occur, and the current conditions would persist relatively unchanged, subject to timber harvesting, and recreational activities. Small incremental expansion of existing developed areas would be expected to be less than 5%.

11.9 Key Findings and Conclusions

A review was conducted of the previous EIS (Alderon 2012), community engagement, literature, and EIS Guidelines provided by the Government of Newfoundland and Labrador. This review informed which VECs to consider as part of the effects assessment of Project interactions with wildlife and wildlife habitat. This also informed which pathways to consider as potential Project interactions. Based on this review, 15 VECs were identified, including representative species of the following: SAR and migratory birds, bats, woodland caribou, large mammals, furbearers, upland gamebirds, and amphibians.

Several of these VECs were not explicitly considered in the previous EIS, but they were included in this EIS because (1) they were identified as a concern during the engagement process; (2) their conservation status has changed; and/or (3) they were specifically highlighted in the EIS Guidelines.

The effects assessment considered 16 pathways, drawing from other biophysical VECs, including air, noise, and light; surface water; groundwater; and vegetation and wetlands. Based on a review of species biology, extent of projected effects of Project activities, and mitigation measures, the effects assessment concluded the following:

No Effects

Project interactions that were predicted to result in no effect pathway were specific to harlequin duck or woodland caribou, because those species are not predicted to occur in the Project study area.

Negligible Effects

- habitat Loss – harlequin duck
- increased edge habitat – all VECs
- linear barriers – all VECs
- injury and mortality from clearing – all VECs except amphibians (herptiles)
- increased predator access– all VECs
- increased public access – all VECs
- vehicle collisions – all VECs, except amphibians (herptiles)
- wildlife attractants – all VECs
- introduction and spread of invasive plants – all VECs
- deposition of suspended solids in emissions – all VECs
- sedimentation – all VECs
- altered site drainage – all VECs
- treated effluent discharge – all VECs, except for woodland caribou, amphibians, avifauna (except grouse spp.)

Residual Effects

- habitat loss (Construction, Operations and Maintenance): all VECs – not significant
- habitat alteration (Construction, Operations and Maintenance): all VECs – not significant
- sensory disturbance (Construction, Operations and Maintenance): all VECs – not significant
- injury and mortality from clearing (Construction): two-lined salamander and wood frog – not significant
- Vehicle collisions (Construction, Operations and Maintenance, Closure): two-lined salamander and wood frog – not significant
- air emission effects via inhalation or ingestion (Construction, Operations and Maintenance, Closure) – two-lined salamander and wood frog – not significant
- treated effluent discharge (Operations) – two-lined salamander and wood frog – not significant

Residual Cumulative Effects

Although the above residual effects were assessed as not significant, they have the potential to interact cumulatively with effects from other projects in the area (i.e., RFDs). This potential was assessed within a 40 km buffer of the Project footprint. Six projects were identified that had the potential to contribute to the cumulative effects, including five mines and one road improvement project. These projects range from 13 to 60 km from the Kami Mine Project. The assessment conclusion is that potential cumulative effects with identified RFDs are unlikely to result in greater than negligible contributions to the Project's effects assessment.

Conclusions

The Kami Mine Project is predicted to have a negligible effect on wildlife and wildlife habitat, with implementation of effective mitigation, monitoring, and management.

Although specific VECs differed between the previous EIS and the current EIS, both considered species from the same guilds (i.e., SAR and migratory birds, large mammals, amphibians) and the conclusions are similar. Major exceptions include bats, which were not listed at the time of the previous EIS. The current EIS concludes the Project will have a negligible effect on bats and bat habitat. Woodland caribou also were not considered in the previous EIS, as they have not been reported in the area. However, consultation highlighted effects on caribou as a key issue. The current EIS concluded that Project activities will have a negligible effect on future caribou habitat, if caribou were to return to the area.

To further address baseline data requirements of the EIS Guidelines, Champion will be conducting additional surveys in 2025.

Appendix 11A: Wildlife Species List

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Birds					
Alder flycatcher	***Empidonax alnorum***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Common (breeder)**	**Forest**
American bittern	***Botaurus lentiginosus***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
American black duck	***Anas rubripes***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
American coot	***Fulica americana***	**REPORTED**	**EBIRD 2025**	**Rare (breeder)**	**Freshwater wetlands and riparian areas**
American crow	***Corvus brachyrhynchos***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**General**
American golden plover	*Pluvialis dominica*	REPORTED	EBIRD 2025	Common (migratory)	Upland barrens/shoreline
American goldfinch	***Spinus tristis***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Rare (breeding)**	**Open woodlands**
American kestrel	*Falco sparverius*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens
American pipit	*Anthus rubescens*	REPORTED	EBIRD 2025	Common (migrant)	Open meadows
American robin	***Turdus migratorius***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**General**
American three-toed woodpecker	***Picoides dorsalis***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Coniferous forest**
American tree sparrow	*Spizella arborea*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens/forest
American wigeon	*Mareca americana*	REPORTED	EBIRD 2025	Rare (breeder)	Wetlands and grasslands
Arctic tern	*Sterna paradisaea*	REPORTED	EBIRD 2025	Uncommon (breeder)	Shorelines
Aythya sp.	*Aythya* sp.	REPORTED	EBIRD 2025	N/A	N/A
Bald eagle	***Haliaeetus leucocephalus***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**General**
Bank swallow	*Riparia riparia*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Barn swallow	*Hirundo rustica*	REPORTED	EBIRD 2025	Uncommon (breeder)	Open areas/ structures/ cliffs
Barrow's goldeneye	*Bucephala islandica*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Belted kingfisher	***Megaceryle alcyon***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Black scoter	***Melanitta americana***	**REPORTED**	**ACCDC 2025, EBIRD 2025**	**Uncommon (migrant)**	**Wetlands**
Black tern	*Chlidonias niger*	REPORTED	EBIRD 2025	Rare (migrant)	Wetlands/ shorelines
Black vulture	*Coragyps atratus*	REPORTED	EBIRD 2025	Rare (all seasons)	General
Black-and-white Warbler	*Mniotilta varia*	REPORTED	EBIRD 2025	Rare (breeding)	Forest
Black-backed woodpecker	***Picoides arcticus***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Coniferous forest**

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Black-belied plover	*Pluvialis squatarola*	REPORTED	EBIRD 2025	Common (migrant)	Wetlands/ coastal areas
Black-capped chickadee	***Poecile atricapillus***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Forest**
Blackpoll warbler	***Dendroica striata***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Common (breeder)**	**Forest**
Blue jay	*Cyanocitta cristata*	REPORTED	EBIRD 2025	Common (breeder)	Forest/towns
Blue-headed vireo	***Vireo solitaries***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Mixed forest**
Bohemian waxwing	*Bombycilla garrulus*	REPORTED	EBIRD 2025	Rare (winter)	General
Boreal chickadee	***Poecile hudsonicus***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Boreal owl	*Aegolius funereus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Brant	*Branta bernicla*	REPORTED	EBIRD 2025	Rare (migration)	Freshwater lakes
Brown creeper	*Certhia americana*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Brown-headed cowbird	*Molothrus ater*	REPORTED	EBIRD 2025	Rare (breeder)	Open country
Bufflehead	*Bucephala albeola*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Cackling goose	*Branta hutchinsii*	REPORTED	EBIRD 2025	Rare (migrant)	Tundra/Lakes
Canada Goose	***Branta canadensis***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Canada Jay	***Perisoreus canadensis***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Coniferous forest**
Cedar waxwing	***Bombycilla cedrorum***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Common goldeneye	***Bucephala clangula***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Common grackle	*Quiscalus quiscula*	REPORTED	EBIRD 2025	Uncommon (breeder)	Towns
Common loon	***Gavia immer***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Wetlands**
Common merganser	***Mergus merganser***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Common nighthawk	***Chordeiles minor***	**CONFIRMED**	**AMEC 2014, EBIRD 2025**	**Uncommon (breeder)**	**Open forest**
Common raven	***Corvus corax***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**General**
Common redpoll	***Acanthis flammea***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Barrens/forest**
Common tern	***Sterna hirundo***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Aquatic habitats**
Common/ red breasted merganser	*Mergus merganser/serrato*	REPORTED	EBIRD 2025	Common (breeder)	Lakes
Dark-eyed junco	***Junco hyemalis***	**REPORTED**	**EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Forest**

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
European starling	*Sturnus vulgaris*	REPORTED	EBIRD 2025	Common (breeder)	Towns
Fox sparrow	***Passerella liliaca***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Forest**
Golden eagle	*Aquila chrysaetos*	REPORTED	EBIRD 2025	Uncommon (migrant)	Forest/barrens
Golden-crowned kinglet	***Regulus satrapa***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Forest**
Gray-cheeked thrush	*Catharus minimus*	REPORTED	EBIRD 2025, QBBA 2014	Uncommon (breeder)	Forest
Great black-backed gull	*Larus marinus*	REPORTED	EBIRD 2025	Common (breeder)	General
Great horned owl	*Bubo virginianus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Greater scaup	*Aythya marila*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Greater yellowlegs	***Tringa melanoleuca***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Green-winged teal	***Anas crecca***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Wetlands**
Gyrfalcon	*Falco rusticolus*	REPORTED	EBIRD 2025	Uncommon (wintering)	Arctic barrens
Hairy woodpecker	*Picoides villosus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Harlequin duck	*Histrionicus histrionicus*	REPORTED	EBIRD 2025	Uncommon (migrant)	Wetlands
Hermit thrush	***Catharus guttatus***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Herring gull	***Larus argentatus***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**General**
Hoary redpoll	***Acanthis hornemanni***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Barrens/forest**
Horned lark	*Eremophila alpestris*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens
Killdeer	*Charadrius vociferus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Open ground
Lapland longspur	***Calcarius lapponicus***	**REPORTED**	**EBIRD 2025**	**Common (migrant)**	**General habitat during migration**
Least flycatcher	***Empidonax minimus***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Least sandpiper	*Calidris minutilla*	REPORTED	EBIRD 2025	Uncommon (breeder)	Upland barrens/shoreline
Lesser scaup	*Aythya affinis*	REPORTED	EBIRD 2025	Rare (migration)	Wetlands/lakes
Lesser yellowlegs	*Tringa flavipes*	REPORTED	EBIRD 2025	Rare (migration)	Wetlands/Open boreal forest
Lincoln's sparrow	***Melospiza lincolnii***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Barrens**
Long-tailed duck	*Clangula hyemalis*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Magnolia warbler	***Dendroica magnolia***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Mallard	***Anas platyrhynchos***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Uncommon (breeder)**	**Wetlands**
Merlin	***Falco columbarius***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest/barrens**
Mourning dove	*Zenaida macroura*	REPORTED	EBIRD 2025	Rare (year-round)	Any semi-open area
Nashville warbler	*Oreothlypis ruficapilla*	REPORTED	EBIRD 2025	Rare (year-round)	Forest
Northern flicker	***Colaptes auratus***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Northern goshawk	***Accipiter gentilis***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Northern harrier	*Circus cyaneus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Open, vegetated habitat
Northern hawk owl	*Surnia ulula*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens/forest
Northern Pintail	*Anas acuta*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Northern shrike	*Lanius borealis*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Northern waterthrush	***Seirus noveboracensis***	**REPORTED**	**EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Forest**
Olive-sided flycatcher	***Contopus cooperii***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Orange-crowned warbler	***Vermivora celata***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Osprey	***Pandion haliaetus***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Riparian forest**
Peregrine falcon	*Falco peregrinus anatum*	REPORTED	EBIRD 2025, QBBA 2014	Uncommon migrant	Forest/barrens
Philadelphia vireo	***Vireo philadelphicus***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Mixed forest**
Pine grosbeak	***Pinicola enucleator***	**REPORTED**	**EBIRD 2025, NLBBA 2025**	**Common (breeder)**	**Forest**
Pine siskin	***Spinus pinus***	**REPORTED**	**EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Barrens/forest**
Purple finch	***Carpodacus purpureus***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Coniferous forest**
Red crossbill	*Loxia curvirostra*	REPORTED	EBIRD 2025	Uncommon (breeder)	Coniferous forest
Red knot	*Calidris canutus*	REPORTED	ACCDC 2025	Uncommon (migrant)	Shoreline habitats
Red-breasted merganser	***Mergus serrator***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Red-breasted nuthatch	***Sitta canadensis***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Red-eyed vireo	*Vireo olivaceus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Mixed forest
Red-tailed hawk	*Buteo jamaicensis*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Red-winged blackbird	*Agelaius phoeniceus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Wetlands
Ring-billed gull	*Larus delawarensis*	REPORTED	EBIRD 2025	Common (breeder)	General
Ring-necked duck	***Aythya collaris***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Wetlands**
Rough-legged hawk	*Buteo lagopus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Barrens
Ruby-crowned kinglet	***Regulus calendula***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Forest**
Ruffed grouse	*Bonas umbellus*	REPORTED	EBIRD 2025	Common (breeder)	Forest
Rusty blackbird	***Euphagus carolinus***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Uncommon (breeder)**	**Wetlands**
Savannah sparrow	***Passerculus sandwichensis***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Post-fire habitat/barrens**
Semipalmated plover	*Charadrius semipalmatus*	REPORTED	EBIRD 2025	Common in migration	Shoreline habitat
Semipalmated sandpiper	*Calidris pusilla*	REPORTED	EBIRD 2025	Uncommon breeder	Shoreline habitat
Sharp-shinned hawk	*Accipiter striatus*	REPORTED	EBIRD 2025	Uncommon (breeder)	Forest
Shorebird sp.	*Charadriiformes sp.*	REPORTED	EBIRD 2025	N/A	N/A
Short-eared owl	***Asio flammeus***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Barrens**
Snow bunting	***Plectrophenax nivalis***	**REPORTED**	**EBIRD 2025**	**Common (migrant)**	**General habitat during migration**
Snow goose	*Answer caerulescens*	REPORTED	EBIRD 2025	Uncommon (migrant)	Wetlands
Snowy owl	*Bubo scandiacus*	REPORTED	EBIRD 2025	Uncommon (wintering)	Tundra/open country
Solitary sandpiper	*Tringa solitaria*	REPORTED	EBIRD 2025	Common (breeder)	Wetlands
Song sparrow	***Melospiza melodia***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Spotted sandpiper	***Actitis macularius***	**REPORTED**	**EBIRD 2025**	**Common (breeder)**	**Shoreline habitat**
Spruce grouse	***Canachites canadensis***	**REPORTED**	**EBIRD 2025**	**Uncommon (breeder)**	**Forest**
Surf scoter	***Melanitta perspicillata***	**REPORTED**	**EBIRD 2025, QBBA 2014**	**Uncommon (breeder)**	**Wetlands**
Swainson's thrush	***Catharus ustulatus***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014**	**Common (breeder)**	**Forest**
Swamp sparrow	***Melospiza georgina***	**CONFIRMED**	**Alderon 2012, EBIRD 2025**	**Common (breeder)**	**Wetlands/forest**
Tennessee warbler	***Vermivora peregrine***	**CONFIRMED**	**Alderon 2012, EBIRD 2025, QBBA 2014, NLBBA 2025**	**Common (breeder)**	**Forest**

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Tree swallow	*Tachycineta bicolor*	CONFIRMED	Alderon 2012, EBIRD 2025	Common (breeder)	Wetlands/near open water
White-crowned sparrow	*Zonotrichia leucophrys*	CONFIRMED	Alderon 2012, EBIRD 2025, NLBBA 2025	Uncommon (breeder)	Forest
White-throated sparrow	*Zonotrichia albicollis*	CONFIRMED	Alderon 2012, EBIRD 2025, NLBBA 2025, QBBA 2014	Common (breeder)	Forest
White-winged crossbill	*Loxia leucoptera*	CONFIRMED	Alderon 2012, EBIRD 2025, NLBBA 2025	Common (breeder)	Coniferous forest
Willow ptarmigan	*Lagopus lagopus*	REPORTED	EBIRD 2025	Common (breeder)	Barrens; riparian thicket
Wilson's snipe	*Gallinago delicata*	REPORTED	EBIRD 2025	Common (breeder)	Wetlands
Wilson's warbler	*Wilsonia pusilla*	CONFIRMED	Alderon 2012, EBIRD 2025, QBBA 2014	Common (breeder)	Forest
Winter wren	*Troglodytes troglodytes*	CONFIRMED	Alderon 2012, EBIRD 2025, QBBA 2014	Uncommon (breeder)	Forest
Yellow warbler	*Dendroica petechia*	CONFIRMED	Alderon 2012, EBIRD 2025, NLBBA 2025	Common (breeder)	Forest
Yellow-bellied flycatcher	*Empidonax flavivetris*	CONFIRMED	Alderon 2012, EBIRD 2025, QBBA 2014	Common (breeder)	Forest (wet)
Yellow-rumped warbler	*Dendroica coronate*	CONFIRMED	Alderon 2012, EBIRD 2025, QBBA 2014, NLBBA 2025	Common (breeder)	Forest
Bats					
Eastern red bat	*Lasiurus borealis*	CONFIRMED	WSP 2024, WSP 2025	Uncommon (breeder)	Forest edge, open habitat, wetlands
Hoary bat	*Lasiurus cinereus*	CONFIRMED	WSP 2024, WSP 2025	Uncommon (migrant)	Open, wetlands
Little brown myotis	*Myotis lucifugus*	CONFIRMED	WSP 2024, WSP 2025	Common (breeder)	Forest edges, forest open patches, wetlands, ponds, developed land
Northern myotis	*Myotis septentrionalis*	CONFIRMED	WSP 2024, WSP 2025	Uncommon (breeder)	Forest, forest Edges, wetlands
Silver-haired bat	*Lasionycteris noctivagans*	CONFIRMED	WSP 2024, WSP 2025	Uncommon (breeder)	Forest edge, wetlands
Terrestrial Mammals[3]					
Arctic fox	*Alopex lagopus*	REPORTED	Government of Newfoundland and Labrador 2000	Common	Arctic tundra
Arctic hare	*Lepus arcticus*	REPORTED	Government of Newfoundland and Labrador 2000	Common	Arctic tundra
American ermine	*Mustela erminea*	CONFIRMED	Alderon 2012, AMEC 2012	Common	Forest, woodland, field
American marten	*Martes americana*	CONFIRMED	Alderon 2012, AMEC 2012, JWEL 2001	Common	Forest with coarse woody debris
American mink	*Neogale vison*	CONFIRMED	AMEC 2012, Minaskuat 2008a	Common	Wetland, water
Beaver	*Castor canadensis*	CONFIRMED	Alderon 2012	Common	Wetland, water

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Black bear	***Ursus americanus***	**CONFIRMED**	**Alderon 2012**	**Common**	**Broad range habitats, developed land**
Canada lynx	***Lynx canadensis***	**CONFIRMED**	**Alderon 2012, Labrador Iron Mines Ltd. 2009**	**Common**	**Boreal forest**
Eastern coyote	***Canis latrans***	**CONFIRMED**	**Alderon 2012, AMEC 2012**	**Uncommon**	**Forest, field, wetland, developed land**
Fisher	*Pekania pennanti*	REPORTED	Government of Newfoundland and Labrador 2000	Uncommon	Boreal forest
Gray wolf	***Canis lupus***	**CONFIRMED**	**Alderon 2012, AMEC 2012**	**Common**	**Forest, wetland, shrubland, field**
Moose	***Alces alces***	**CONFIRMED**	**Alderon 2012**	**Common**	**Boreal and deciduous forest, shrubland, wetland**
Muskrat	*Ondatra zibethicus*	CONFIRMED	Labrador Iron Mines Ltd. 2009	Common	Wetland, water
North American river otter	***Lontra canadensis***	**CONFIRMED**	**Alderon 2012, JWEL 2001, Minaskuat 2008a**	**Common**	**Wetland, water**
Porcupine	***Erethizon dorsatum***	**CONFIRMED**	**Alderon 2012, AMEC 2012, Minaskuat 2008b**	**Common**	**Forest**
Red fox	***Vulpes vulpes***	**CONFIRMED**	**Alderon 2012, AMEC 2012, JWEL 2001**	**Common**	**Broad range habitats, developed land**
Snowshoe hare	***Lepus americanus***	**CONFIRMED**	**Alderon 2012, AMEC 2012**	**Common**	**Boreal forest, wetland**
Wolverine	*Gulo gulo*	REPORTED	Government of Newfoundland and Labrador 2000	Historically common; currently rare	Broad range habitats in northern landscapes
Woodland caribou	*Rangifer tarandus*	REPORTED	Government of Newfoundland and Labrador 2000	Historically common; currently uncommon	Large contiguous tracts of undisturbed mature to old forest in peatland complexes
Amphibians					
American toad	***Anaxyrus americanus***	**CONFIRMED**	**Alderon 2012**	**Common**	**Broad range of habitats, ponds and pools for breeding**
Blue-spotted salamander	*Ambystoma laterale*	REPORTED	Government of Newfoundland and Labrador 2005	Common	Deciduous forest, wetland, vernal pools for breeding
Mink frog	*Lithobates septentrionalis*	REPORTED	Government of Newfoundland and Labrador 2005	Common	Edge of water and wetland habitats
Northern leopard frog	*Lithobates pipiens*	REPORTED	Government of Newfoundland and Labrador 2005	Uncommon	Wetland, slow-moving streams
Northern two-lined salamander	*Eurycea bislineata*	CONFIRMED	Alderon 2012	Common	Forest, woodland, wetland

Table A.1: Wildlife Species that Occur or Potentially Occur Within the Local Study Area and Regional Study Area

Species Common Name	Scientific Name	Occurrence[1]	Data Source	Relative Abundance[2]	Habitat
Spring peeper	*Pseudacris crucifer*	REPORTED	Government of Newfoundland and Labrador 2005	Uncommon	Forest, wetland
Wood frog	***Lithobates sylvaticus***	**CONFIRMED**	**Alderon 2012**	**Common**	**Damp lowlands, woodlands, vernal pools, peat bogs**

Note: N/A = Not applicable

1 – CONFIRMED = observed during targeted surveys and incidental observations within the wildlife LSA and RSA; REPORTED = reported in databases only. Species occurrences shown in **bold** are confirmed to occur in the immediate or close proximity to the SSA. Targeted surveys for terrestrial mammals were limited to winter aerial surveys, observations of this taxa were primarily incidental and may not accurately represent mammal occurrence within the LSA and RSA.

2 – Relative abundance (i.e., common, uncommon, rare) was assessed based on the combination of species status (i.e., NL *ESA*) in Labrador and occurrence databases: Avibase Newfoundland and Labrador (Birds Canada Avibase 2024), 2000 General Status of Newfoundland and Labrador's Terrestrial Mammals (Government of Newfoundland and Labrador 2000), 2005 Amphibian General Status Assessments (Government of Newfoundland and Labrador 2005).

3 – Common small mammals (e.g., *Microtus, Napaeozapus, Sorex, Tamiasciurus, Glaucomys*) are not listed in the table but assumed to also occur in the RSA given their distribution in the ecozones.

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Appendix 11B: Wildlife Habitat Suitability

Table B1: Wildlife Habitat Suitability Models

Ecological Land Classification[1]	Amphibians		Bats		Birds						Mammals			
	Two-lined salamander	Wood frog	Northern myotis	Hoary bat	Bank swallow	Common nighthawk	Harlequin duck	Peregrine falcon	Short-eared owl	Spruce grouse	American marten	Moose	Black bear	Beaver[3]
Alder Thickett	Poor	Low	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Low	High	Moderate	Moderate
Alpine Heath	Poor	Poor	Poor	Moderate	Poor	High	Poor	Moderate	Moderate	Poor	Low	Low	Moderate	Poor
Black Spruce/ Tamarack-Sphagnum Woodland	Poor	Low	Moderate	Low	Poor	Low	Poor	Poor	Poor	High	High	Moderate	Low	Low
Black Spruce-Labrador Tea - Feathermoss	Moderate	Moderate	High	Moderate	Poor	Low	Poor	Poor	Poor	High	High	Moderate	Low	Low
Black Spruce-Lichen	Poor	Poor	Low	High	Poor	Moderate	Poor	Moderate	Low	Moderate	High	Moderate	Low	Low
Developed Land	Poor	Poor	Low	Poor	Low	Moderate	Poor	Low	Poor	Poor	Poor	Poor	Low	Poor
Graminoid Fen	Moderate	Moderate	Poor	Moderate	Moderate	Moderate	Poor	Moderate	Moderate	Poor	Low	Low	Moderate	Low
Hardwood Burn/ Regeneration[2]	Low	Low	Low	Moderate	Low	Moderate	Poor	Low	Low	Poor	Low	Low	Moderate	Low
Hardwood Forest	Low	Low	High	Moderate	Poor	Poor	Poor	Poor	Poor	Poor	Moderate	High	High	High
Jack Pine	Low	Poor	High	Low	Poor	Poor	Poor	Poor	Poor	High	High	Moderate	Moderate	High
Mixedwood Forest	Low	Low	High	Moderate	Poor	Poor	Poor	Poor	Poor	High	High	Moderate	High	High
Non-Patterened Shrub Fen	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Poor	Moderate	Moderate	Poor	Low	Low	Moderate	Low
Patterned Shrub Fen	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Poor	Moderate	Moderate	Poor	Low	Low	Moderate	Low
Riparian Marsh (Fen)	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Poor	Moderate	Poor	Poor	Low	Low	Moderate	Low
Riparian Thickett	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Poor	Moderate	Poor	Poor	Low	High	Moderate	Low
Softwood Burn/ Regeneration[2]	Low	Low	Moderate	Moderate	Moderate	Moderate	Poor	Moderate	Moderate	Poor	Low	Low	Moderate	Low
Tamarack/ Black-Spruce-Feathermoss (Water Track)	High	High	High	Moderate	Poor	Low	Poor	Moderate	Poor	High	Low	Moderate	Low	Moderate
Water	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Low	Moderate	Poor	Poor	Poor	Poor	Poor	High

Note: High - meets life history needs (breeding, feeding, overwintering); Moderate - provides at least one of life history habitat needs; Low - may use infrequently (e.g. may pass through, stopover); Poor - unlikely to use habitat.

1 - Stand age was not available to assess suitability of habitats. It was assumed limited logging operations occur in the wildlife RSA and therefore all forested ecosites identified in the ELC are mature/old.

2 - Most recent fire within the wildlife LSA occured in 1996, approximately 30 years ago. A regeneration age of 30 years is assumed.

3 - Suitability rating only applies to habitat within 100m of open water or wetland ecosites; Habitats >100m from open water or wetland ecosites were rated as poor. Reversibly, suitability rating of open water only applies within 100 m of shoreline, otherwise rated as poor.

Appendix 11C: Comparison of Alderon and Kami Pathways

Table C.1: Comparison of Project Effects Pathways for Wildlife in the previous EIS (Alderon 2012) and current EIS

Effect Pathway for Wildlife*	Previous EIS (Alderon 2012)		Current EIS (Kami 2025)	
	Included?**	Assessment of effects on 'Birds, Other Wildlife and Habitat, and Protected areas' VEC, and 'Species at Risk and Species of Conservation Concern' VEC**	Included?	Assessment of effects on 'Wildlife and Wildlife Habitat' VEC***
Habitat Loss	Y	Interaction occurs for both VECs: change in habitat, change in distribution and movement, change in mortality risk, change in health, change in protected areas. **Not significant**	Y	Residual effect: habitat availability, distribution, survival and reproduction. **Not significant**.
Habitat Alteration	Y	Interaction occurs for both VECs: change in habitat, change in distribution and movement, change in mortality risk, change in health, change in protected areas. **Not significant**	Y	Residual effect: habitat availability, distribution, survival and reproduction. **Not significant**.
Sensory Disturbance	Y	Interaction occurs for both VECs: change in distribution and movement, change in mortality risk, change in health. **Not significant**	Y	Residual for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area): habitat availability, distribution, survival and reproduction. **Not significant.**
Linear Barriers	Y	Interaction occurs for Birds, Other Wildlife and Habitat, and Protected areas: change in habitat, change in distribution and movement. **Not significant**	Y	Negligible, except No effect for Harlequin Duck (not present in the Project area).
Increased Edge Habitat	Y	Interaction occurs for Birds, Other Wildlife and Habitat, and Protected areas: change in habitat, change in distribution and movement, change in mortality risk. **Not significant**	Y	Negligible
Injury and Mortality from Clearing	Y	Interaction occurs for both VECs: change in mortality risk. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area), and Residual for Amphibians: survival and reproduction. **Not significant.**
Increased Predator Access	Y	Interaction occurs for both VECs: change in mortality risk. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area).
Increased public access	Y	Interaction occurs for both VECs: change in mortality risk. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area).
Vehicle collisions	Y	Interaction occurs for both VECs: change in mortality risk. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Widlife attractants	Y	Minor interactions for Birds, Other Wildlife and Habitat, and Protected areas. **Not significant.**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Introduction and spread of invasive plants	N	N/A	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Deposition of suspended solids in emissions	Y	Interaction occurs for Species at Risk and Species of Conservation Concern: change in mortality risk. **Not significant**.	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Sedimentation	Y	Interaction occurs for Birds, Other Wildlife and Habitat, and Protected areas: change in distribution and movement. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Altered site drainage	N	N/A	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area).
Air emission effects via inhalation or ingestion	Y	Interactions occurs for both VECs: change in mortality risk. **Not significant**	Y	Residual for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area). **Not significant.**
Treated effluent discharge	Y	Minor interactions for Birds, Other Wildlife and Habitat, and Protected areas. **Not significant.**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area); Residual for Bank Swallow, Common Nighthawk, Hoary Bat, Northern Myotis, Amphibians: survival and reproduction. **Not significant**.
Surface water quality from runoff and seepage	Y	Interaction occurs for Birds, Other Wildlife and Habitat, and Protected areas: change in mortality risk, change in health. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)
Spill contamination	Y	Interaction occurs for both VECs: change in habitat, change in distribution and movement, change in mortality risk, change in health, change in protected areas. **Not significant**	Y	Negligible for all VECs, except No effect for Woodland Caribou and Harlequin Duck (not present in the Project area)

* Pathways presented in this list are from current EIS (Kami 2025). The Project-Environment Interactions presented in the previous EIS (Alderon 2012) used different terminology and approach (assessed each project activity seperately; compared to assessing project pathways which incorporate mulitple activities). Assumptions and professional opinions have been made to relate previous EIS
** Compiled from information in Table 19.2, Table 19.3, Section 19.6, Table 20.6, Table 20.7 in Alderon EIS Volume 1, Part 2.
*** No effect for all pathways for Harlequin Duck because this species is not present in the LSA or RSA.

Kami

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Mining
Project