Appendix B.7.3

Terrestrial Wildlife and Wildlife Habitat Supplemental Baseline Report

Crawford Nickle Project: Terrestrial Wildlife and Wildlife Habitat Supplemental Baseline Report

Final

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Prepared for:

Canada Nickle Company

Prepared by:

Stantec Consulting Ltd.

Limitations and Sign-off

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Acronyms and Abbreviations

2022 Agreement	Agreement for the Conservation of Caribou, Boreal Population in Ontario
AMIS	Abandoned Mines Information System
ARU	Autonomous Recording Unit
ATV	All-terrain vehicle
BCI	Bat Conservation International
CBD	Convention on Biological Diversity
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
DBH	Diameter at breast height
EA	Environmental assessment
ECCC	Environment Climate Change Canada
ELC	Ecological Land Classification
END	Endangered
ERA	Ecological Risk Assessment
ESA	*Endangered Species Act*, 2007
ESC	Erosion and Sediment Control
FRI	Forest Resources Inventory
FWCA	*Fish and Wildlife Conservation Act*, 1997
GHD	General Habitat Description
GIS	Geographical Information System
GPS	Global Positioning System
G-rank	Global sub-national rank

HSI	Habitat Suitability Index
IAA	*Impact Assessment Act,* 2019
KMGBF	Kunming-Montreal Global Biodiversity Framework
kV	kilovolt
LIO	Land Information Ontario
LSA	Local Study Area
MECP	Ministry of the Environment and Climate Change
MNR	Ministry of Natural Resources (formerly Ministry of Natural Resources and Forestry)
Mt	million tonnes
MTO	Ministry of Transportation Ontario
Nature Strategy	Canada's 2030 Nature Strategy: Halting and Reversing Biodiversity Loss in Canada
NHIC	Natural Heritage Information Centre
OBA	Ontario Butterfly Atlas
O.Reg	Ontario Regulation
ORAA	Ontario Reptile and Amphibian Atlas
PA	Project Area
ROM	Run of Mine
RSA	Regional Study Area
SAR	Species at Risk
SARA	*Species at Risk Act*
SARO	Species at Risk in Ontario
SC	Special Concern

SOCC	Species of Conservation Concern
S-rank	Provincial sub-national rank
SWH	Significant Wildlife Habitat
THR	Threatened
TIS Guidelines	Tailored Impact Statement Guidelines
TMF	Tailings Management Facility
tpd	tonnes per day
TWG	Technical Working Group
VC	Valued Component

1 Introduction

Canada Nickel Company (Canada Nickel) proposes to develop, operate, and progressively reclaim the Crawford Nickel Project ('the Project'), a new open pit nickel mine and processing facility approximately 42 kilometres (km) north of Timmins, Ontario along Highway 655. The Project is being assessed in accordance with the *Impact Assessment Act*, *2019*.

Stantec Consulting Ltd. (Stantec) has been retained by Canada Nickel to conduct an assessment of wildlife and wildlife habitat for the Project. This report supplements the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), which summarizes the baseline field studies completed between 2021 and 2023.

This Terrestrial Wildlife and Wildlife Habitat Supplemental Baseline Study has been completed to inform the Impact Statement. It has been prepared pursuant to the *Impact Assessment Act, 2019* and in consideration of the Tailored Impact Statement Guidelines: Crawford Nickel Project (Impact Assessment Agency of Canda 2023; TIS Guidelines; Appendix A.1 of the Impact Statement).

1.1 Project Location and Setting

The Project is located approximately 42 km north of the City of Timmins, Ontario, in the geographic townships of Crawford, Carnegie, Kidd, Lucas, Beck, Nesbitt, Wark, and Prosser. A small portion of the Project extent within the geographic townships of Kidd and Wark also lies within the municipal boundary of the City of Timmins.

1.2 Project Overview

The Project includes the development of an Open Pit, Stockpiles, two ore processing plants, and other mine-related infrastructure, as well as a new rail spur line and the realignment of Highway 655 and relocation of an existing 500 kilovolt (kV) transmission line. Ore will be extracted from a single Open Pit that will be divided into an East Zone and Main Zone. The projected maximum depth of the Open Pit is 690 m. The Project has a mineral reserve estimate of 1,715 million tonnes (Mt) and an expected Project life of 41 years.

Based on the current Project design, the maximum rate of ore extraction will be up to 240,000 tonnes per day (tpd) during Year 5 of operations and an average rate of 160,000 tpd over the life of mine. The two ore Processing Plants and associated service facilities will process run of mine ore delivered to primary crushers to produce nickel concentrate, iron concentrate, and tailings at a rate of approximately 60,000 tpd at the start of mine life, ramping up to a maximum of 120,000 tpd. In addition to nickel and iron, other metals such as cobalt, chromium, palladium and platinum are expected to be recovered from concentrate streams.

Based on the proposed processing rate and current information regarding the ore body, the current life of the proposed Project is expected to be approximately 41 years. Mining would be completed at a faster pace than milling, thus mining of ore would occur for about 30 years, then milling alone for the last 11 years.

Concentrate from the Processing Plants will be loaded onto rail cars and shipped via the new rail spur line for refinement offsite.

Further details regarding the Project components, activities, and phasing are provided in Chapter 3 of the Impact Statement (Project Description).

1.3 Study Objectives

This report provides a summary of baseline data collection methods and results for wildlife and wildlife habitat to inform the Impact Statement for the Project. Field study results and methodology are further discussed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).. Together, the Terrestrial Wildlife Habitat Supplemental Baseline Report and the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement) present the following:

- Description of baseline conditions that reflect current conditions within the LSA, including sources of data used, collection methods and how Indigenous knowledge was incorporated
- Description and mapping of general biodiversity of wildlife and wildlife habitat and SAR within the LSA
- Identification of key indicator species used for characterizing baseline conditions and general biodiversity
- Description of distribution and abundance, habitat, life history and threats and disturbances (existing and natural) for each of the key indicator species

2 Regulatory Setting

The following provides a summary of federal regulations, policies, and/or guidelines that apply directly or indirectly to the management of wildlife and wildlife habitat.

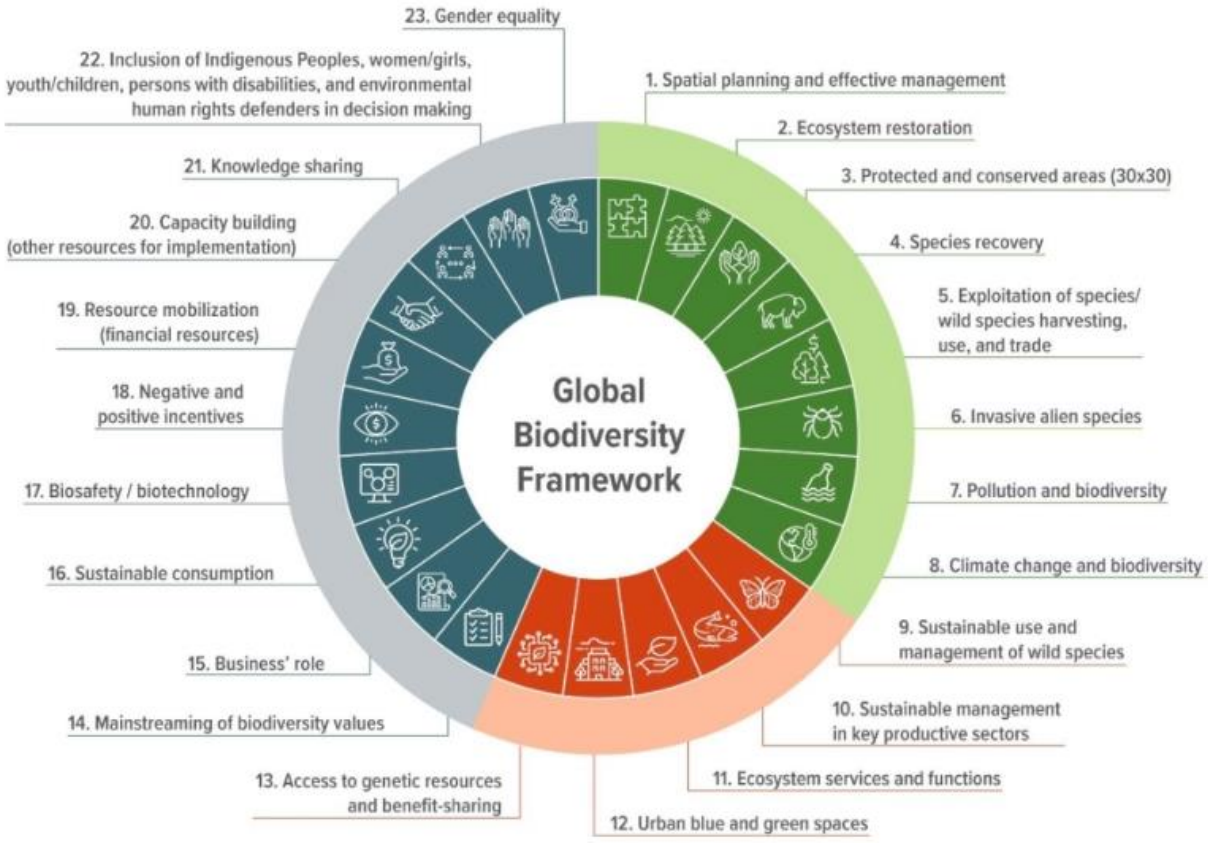
2.1 Federal Guidance

2.1.1 Convention of Biological Diversity

The Convention on Biological Diversity (CBD) is an international treaty signed in 1992 at the Earth Summit in Rio de Janeiro, Brazil. The CBD has three main goals: to conserve biological diversity, promote the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. The CBD sets a global framework for countries to collaborate in protecting ecosystems, species, and genetic diversity, recognizing the intrinsic value of biodiversity as well as its role in supporting human well-being and sustainable development. The treaty also emphasizes the importance of preserving traditional knowledge and practices of Indigenous and local communities. With ratification by 196 countries, including Canada, the CBD is a key international agreement addressing biodiversity loss and promoting sustainable development through national strategies and action plans such as the Kunming-Montreal Global Biodiversity Framework, Canadian Biodiversity Strategy and Canada's Biodiversity Outcomes Framework.

2.1.1.1 Kunming-Montreal Global Biodiversity Framework

The Kunming-Montreal Global Biodiversity Framework (KMGBF) is a global agreement adopted in 2022, that includes four goals for 2050 and 23 targets for 2030.The goals aim to achieve the CBD vision of living in harmony with nature by 2050, while the targets focus on sustainable development to halt and reverse biodiversity loss by 2030. An overview of the 23 targets are depicted in the image below.



Source: ECCC 2024

2.1.1.2 Canada's Biodiversity Strategies

Canada has developed a number of strategies in response to its commitment to the CBD. The Canadian Biodiversity Strategy was developed in 1995, outlining Canada's vision, goals and objectives for biodiversity conservation. The Canada's Biodiversity Outcomes Framework (Canadian Council of Resource Ministers 2006) and Canada's Biodiversity Outcomes Framework and 2020 Goals and Targets were developed as companion documents providing a more detailed and action-oriented approach to implementing the strategy, focusing on specific outcomes and indicators to measure progress. More recently, Canada's 2030 Nature Strategy: Halting and Reversing Biodiversity Loss in Canada (Nature Strategy; ECCC 2024) was developed and builds on past initiatives and commitments on implementing the KMGBF.

2.1.2 Species at Risk Act

The *Species at Risk Act* (SARA) provides a framework across Canada to prevent the extinction of wildlife species and to support actions for their recovery. Federal departments are responsible for preventing the disappearance of endangered or threatened species on their properties and to implement management plans to comply with the SARA.

General SARA prohibitions include section 32(1), which states that “no person shall kill, harm, harass, capture, or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species”, and section 33, which states that “no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.” In addition, critical habitat, defined as the habitat that is necessary for the survival or recovery of a listed wildlife species, may be defined and protected under section 58. Only those species currently listed in Schedule 1 of SARA (i.e., those listed as extirpated, endangered, or threatened) are protected by the prohibitions of sections 32 to 36 and 58 of SARA, and then only on federal lands, except for aquatic species and migratory birds which are protected throughout Canada. SARA-listed species designated as special concern are not protected by the prohibitions of sections 32 to 36 or 58 of SARA; however, these species are protected under section 79, which states that federal authorities must “identify adverse effects of the project on the listed wildlife species [including special concern species] and its critical habitat…and ensure that measures are taken to avoid or lessen adverse effects.” Furthermore, special concern species require that provincial or regional management plans, including conservation measures, be developed to protect the species.

Under SARA, a Recovery Strategy must be developed by Environment and Climate Change Canada (ECCC) for terrestrial species listed as threatened or endangered under Schedule 1 and a Management Plan must be developed for species listed as special concern under Schedule 1. The Recovery Strategy should include the identification of critical habitat and list examples of activities that are likely to result in its destruction.

2.1.2.1 Amended Recovery Strategy for the Woodland Caribou

The Amended Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population is a federal plan that outlines the recovery goals, objectives, and strategies for boreal caribou (ECCC 2020).

2.1.2.2 Agreement for the Conservation of Caribou, Boreal Population in Ontario

The governments of Canada and Ontario signed a five-year conservation agreement in April 2022 under sections 10 and 11 of SARA. The Agreement for the Conservation of Caribou, Boreal Population in Ontario (‘2022 Agreement’) outlines a framework for collaborative action, committing both governments to implementing evidence-based conservation measures. These measures aim to maintain and recover self-sustaining local populations.

2.2 Provincial Guidance

2.2.1 Endangered Species Act, 2007

The *Endangered Species Act, 2007* (ESA; Government of Ontario 2008) applies to species that are designated as extirpated, endangered or threatened and listed on the Species at Risk in Ontario (SARO) List (Ontario Regulation (O.Reg.) 230/08). Species and general habitat apply to all species, except those designated as special concern which are not afforded protection under the ESA. Species-specific habitat protection is also given to those species with regulated habitat, as identified in O.Reg. 832/21. The ESA also includes specific exemptions from the provisions of the ESA under certain conditions under O.Reg. 242/08 and O.Reg. 830/21. Exemptions and conditions vary by species, type of activity, the date the species was listed and the date the activity commenced.

2.2.2 Fish and Wildlife Conservation Act

The Ontario *Fish and Wildlife Conservation Act, 1997* (FWCA) provides protection to many birds, mammals, reptiles, amphibians, fish, and invertebrates. FWCA legislation prohibits hunting (killing, capturing, injuring, and harassing) and trapping of 'specially protected wildlife' as defined in Ontario Regulation (O.Reg.) 699/98 of the FWCA. The FWCA protects individuals and their habitat (e.g., nests, roosts).

2.2.3 Woodland Caribou Conservation Plan

The Woodland Caribou Conservation Plan (MNRF 2020) provides policy direction for the management and recovery of boreal caribou (forest-dwelling boreal population) in Ontario. This plan applies to areas of continuous and discontinuous boreal caribou distribution, including the Kesagami Caribou Range which overlaps the Project. This plan was considered along with the federal amended recovery strategy (ECCC 2020) and 2022 Agreement discussed in Sections 2.1.2.1 and 2.1.2.2, respectively.

3 Study Area

The spatial boundaries considered for the Project are discussed in the following Sections.

3.1 Project Area

The **Project Area (PA)** encompasses the Project footprint and is the anticipated area of physical disturbance associated with the construction, operations and decommissioning/closure of the Project. The PA covers an area of 11,785 hectares (ha) (118 square kilometres [km^2]) and includes the following key Project components: the relocated 500 kV transmission lines, future Highway 655 Right-of-Way, rail line, site roads, Ore Stockpiles (West and East), Open Pit (Main and East Zones), Ponds (for collection and storage), Tailings Management Facility (TMF), and Impoundment Facility. The extent of the PA is shown on the LSA and RSA maps on Figure A.1, Figure A.2, Figure A.3, and Figure A.4 of Appendix A of this report.

3.2 Local Study Area

The **Local Study Area (LSA)** includes the area in which Project-related effects (direct or indirect) are predicted or measured with a reasonable level of accuracy and confidence. The LSA for wildlife and wildlife habitat (excluding boreal caribou) is identical to the Vegetation, Riparian and Wetland Environments LSA (Figure A.1 of this report) because changes in vegetation, riparian and wetland environments may result in changes to wildlife and wildlife habitat. The LSA includes the PA and subwatersheds on the west side of the West Buskegau River main channel, several catchments within the Jocko Creek watershed, and headwater subwatersheds of the North Driftwood River. The LSA continues downstream on the West Buskegau River and North Driftwood River, away from the PA.

The LSA for boreal caribou is based on the limits of potential disturbance from the PA, recognizing that there are no recent records of boreal caribou within the southern limits of the Kesagami Caribou Range where the LSA is located. As a result, the LSA for boreal caribou is defined as the areas within the Kesagami Caribou Range that overlap the PA plus a 10 km buffer (Figure A.2 of this report).

3.3 Regional Study Area

The **Regional Study Area (RSA)** includes the area within which cumulative effects on wildlife and wildlife habitat are likely to occur, depending on the location of other past, present or reasonably foreseeable future projects or activities. The RSA for wildlife and wildlife habitat (excluding boreal caribou) encompasses the PA and the LSA and was primarily based on major road networks that would present substantive deterrents or impediments to movement, as well as species ranges (Figure A.3 of this report). The RSA for boreal caribou is defined as the entire Kesagami Caribou Range (Figure A.4 of this report).

4 Methodology

The following Sections outline the study approach to characterizing the overall biodiversity and baseline conditions within the LSA for wildlife and wildlife habitat, including Species of Conservation Concern (SOCC) and Species at Risk (SAR). The information is based on data from Project-specific reports and supplemented with data collected in 2024. Canada Nickel continues to undertake field work to further characterize baseline conditions. As information becomes available it will be used to support permitting, design and will inform the follow-up and monitoring programs.

4.1 Desktop Review and Data Sources

The desktop study included a compilation of data from publicly available information sources, it was further refined based on the results of field studies completed between 2021 and 2023. The information sources reviewed are provided below:

- **Land Information Ontario (LIO) Geospatial Data** – LIO data is maintained by MNR and provides key provincial geospatial data fort Ontario. Shapefiles obtained from the LIO open datasets were obtained and used to show the natural features within the LSA.
- **Natural Heritage Areas Make-a-Map Application (MNR 2024a)** – This is a web application that provides information on provincial parks, conservation reserves, and natural features (i.e., Areas of Natural and Scientific Interest [ANSI], wetlands, woodlands, natural heritage systems related to provincial policy plan areas (e.g., Niagara Escarpment, Oak Ridges Moraine and Greenbelt Plans). This web application also provides Natural Heritage Information Centre (NHIC) data, which includes information on plant communities, wildlife concentration areas, natural areas, SOCC, and SAR.
- **Ontario Reptile and Amphibian Atlas (ORAA 2023)** –The ORAA provides known ranges of reptiles and amphibian species in Ontario based on historic and current species occurrences. The information is displayed in 10 x 10 km^2 map squares.
- **Ontario Butterfly Atlas (OBA; Toronto Entomologists' Association, 2024)** – The OBA provides known ranges of butterfly species in Ontario based on historic and current species occurrences. The information is displayed in 10 x 10 km^2 map squares. The OBA map squares for those previously reviewed and undertaking a supplemental review are the same as those identified for the ORAA. A list of species recorded is provided in Appendix B of this report.
- **Atlas of the Mammals of Ontario (Dobbyn, 1994)** – The Atlas of the Mammals of Ontario was reviewed for species whose ranges overlap the LSA. A list of species recorded is provided in Appendix B of this report.
- **iNaturalist (2024)** – The NHIC and Herps of Ontario projects on iNaturalist were reviewed for records of herpetofauna, specifically SOCC and SAR. iNaturalist is a citizen scientist web application that provides up to date records of species. A list of species recorded is provided in Appendix B of this report.

- Other Information Sources
  - Bat Conservation International Bat Profiles (BCI; 2022)
  - SARA Public Registry
  - Critical Habitat for Species at Risk National Dataset – Canada (GOC 2023)
  - Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Assessments and Recovery Strategies
  - Committee on the Status of Species at Risk in Ontario (COSSARO) Evaluation Reports

4.2 Indigenous Knowledge and Wildlife of Importance

Wildlife of importance to each of the Indigenous nations with traditional territories and/or hunting areas in proximity to the Project are summarized in Table 4.1. The results are based on information made available by Indigenous nations through engagement, information gathering, and voluntary information sharing about species of importance to the Indigenous nations engaged on the Project. In some instances, only wildlife groups (and not species) were identified by Indigenous nations.

The list of wildlife of importance is preliminary, based on initial Indigenous engagement, and may be further refined, as needed, as part of ongoing engagement. It is recognized that all wildlife would have value and importance to Indigenous nations.

Table 4.1 Wildlife of Importance to Indigenous Nations

Species of Importance	Indigenous Nation					
	Apitipi Anicinapek Nation	Flying Post First Nation	Matachewan First Nation	Mattagami First Nation	Métis Nation of Ontario	Taykwa Tagamou Nation
Amphibians / Reptiles						
Salamanders					✓	
Reptiles (including Blanding's turtle)					✓	
Bats						
Bats					✓	
Ungulates						
Boreal caribou	✓	✓	✓	✓	✓	✓
Moose (including spirit moose)	✓	✓	✓	✓	✓	✓
White-tailed deer	✓	✓	✓	✓		✓
Furbearers						
Black bear	✓	✓	✓	✓		✓
Grey fox (red fox, fox)	✓	✓	✓	✓		✓
Gray wolf (wolf)	✓	✓	✓			✓
Wolverine	✓	✓	✓	✓		✓
Cougar	✓	✓	✓	✓		✓
Coyote	✓	✓	✓	✓		✓
Canada lynx	✓	✓	✓	✓		✓
Snowshoe hare (rabbit)	✓	✓	✓	✓		✓
Beaver	✓	✓	✓	✓		✓

Species of Importance	Indigenous Nation					
	Apitipi Anicinapek Nation	**Flying Post First Nation**	**Matachewan First Nation**	**Mattagami First Nation**	**Métis Nation of Ontario**	**Taykwa Tagamou Nation**
American mink	✓	✓	✓	✓		✓
American marten	✓	✓	✓			✓
Muskrat	✓	✓	✓	✓		✓
North American river otter (otter)	✓	✓	✓	✓		✓
Fisher	✓	✓	✓	✓		✓
Weasel	✓	✓	✓	✓		✓
Other						
Squirrel	✓	✓	✓	✓		✓
Large game					✓	
Pollinators					✓	
Species at risk	✓	✓	✓	✓	✓	✓

4.3 Wildlife Habitat Assessment

A desktop habitat assessment was completed using Geographical Information System (GIS). Vegetation communities within the LSA were delineated and described according to the Ontario Ecosite Classification system (Banton et al. 2009). Forest Resources Inventory (FRI) Versions 1 and 2 were used as a baseline for vegetation boundaries between wetlands, forests, and vegetation communities (LIO 2007; LIO 2021). FRI from the Abitibi River Forest, Romeo Malette Forest, and Gordon Cosen's Forest were used to update the baseline FRI data. Some manual adjustments to polygon boundaries and classification were made based on visual aspects of the polygon and surrounding habitats. Ontario Land Cover Classification v2 and the Ontario Wetland Evaluation System (obtained from Land Information Ontario; LIO) were used to categorize the RSA because FRI data were not available for the entire RSA. For this reason, land cover between the RSA and LSA is not comparable. Vegetation communities within the LSA are show on Figure A.5 of this report.

4.4 Field Surveys

Field studies completed for the Project are summarized in Table 4.2, below. Additional details can be found in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), which includes a description of the methodologies and surveys completed between 2021 and 2023. Supplementary field studies are ongoing and will be used to support permitting, design and inform the follow-up and monitoring programs. Maps in Appendix A of this report (Figure A.5, Figure A.6, Figure A.7, Figure A.8, Figure A.9, Figure A.10, Figure A.11, Figure A.12 and Figure A.13) were prepared to illustrate survey data onto the PA, LSA and RSA. These maps also show updated habitat mapping based on FRI data within the LSA.

Table 4.2 Summary of Field Studies Completed by WOOD and WSP Between 2021-2023

Survey Type	Date	Summary
Amphibian Call Survey	• June 12-18, 2021 • May 13-18, 2022 • June 1-3, 2022 • June 22-27, 2022	• 10 surveys • 23 surveys • 11 surveys • 17 surveys See Appendix B.7.4 of the Impact Statement, Figure 3-2
Turtle Basking	• May 13-17, 2022	• 17 survey stations
Blanding's Turtle Habitat Assessment - Aerial	• August 16-17, 2023	Habitat Suitability Index (HSI) mapping was completed to identify locations for ground-truthing. HSI identified suitable nesting, overwintering and functional habitat (mating, thermoregulation, foraging, and summer activity) and assigned a rank of high (nesting and overwintering habitat were within 240 m of each other), moderate (nesting and/or overwintering habitat were within 2 km of functional habitat) and low suitability (nesting and overwintering areas were isolated)

Survey Type	Date	Summary
		Aerial transects to confirm HSI mapping and site visits to three historical observation locations. See Appendix B.7.4 of the Impact Statement Figure 3-2 and Figure 3-7 for historical record locations and transect mapping, respectively.
Blanding's Turtle Habitat Assessment -Ground	• August 19-20, 2023	Field assessments of features identified during aerial surveys
eDNA	• June 7-8, 2023 & July 15-16, 2023	A total of 20 environmental samples collected at three general locations - Kidd Creek (n=5), West Buskegau River (n=5), and Prosser Lake (n=10). One negative control at each of the three locations See Appendix B.7.4 of the Impact Statement Figure 3-2
Bat Maternity Habitat (including SAR) - Candidate Roost Survey	• August 11-15, 2021 • June 6-7, 2022 • July 30, 2022 & August 2, 2022 • May 23-31, 2023	• 20 survey locations • 3 plots • 9 survey locations • 13 survey locations See Appendix B.7.4 of the Impact Statement Figure 3-5
Bat Maternity Habitat (including SAR) – Autonomous Recording Unit (ARU)	• June 12-18, 2021 • June 29-July 7, 2021 • June 6-8, 2022 • June 30 & July 1, 2022 • May 23-31, 2023	• 14 ARUs deployed • 4 ARUs deployed • 9 ARUs deployed • 9 ARUs deployed • 10 ARUs deployed See Appendix B.7.4 of the Impact Statement Figure 3-5
Bat Hibernacula (including SAR) - Habitat Assessment	• May 17-19, 2022	• 25 potential bat hibernacula habitat entrances were evaluated
Bat Hibernacula (including SAR) - ARU	• May 16-17, 2022 • July 30 & August 2, 2022 • July 7, 2023 • September 11, 2023	• 9 ARUs deployed • 9 ARUs deployed • 9 ARUs deployed • 9 ARUs deployed See Appendix B.7.4 of the Impact Statement Figure 3-5

Survey Type	Date	Summary
Moose / Furbearers / boreal caribou - Aerial Survey	• March 17 & 19, 2021 • March 21, 2022 • Concurrent with bird stick nest survey	• 23 flight lines in an east-west orientation spaced at 3 km intervals (approximately 2,432 km^2) • 29 flight lines in an east-west orientation spaced at 3 km intervals (approximately 3,440 km^2). Flight lines were approximately 45 km in length • The flight lines covered the PA, LSA and majority of the RSA identified for Wildlife and Wildlife Habitat which includes a portion of the boreal caribou RSA (defined as the entire Kesagami Caribou Range). See Appendix B.7.4 of the Impact Statement Figure 3-6

5 Baseline Conditions for Wildlife and Wildlife Habitat

The results of the background review and field studies were used to inform the assessment of wildlife and wildlife habitat that are found or likely to be found within the LSA. General biodiversity is reflected in the species and habitats discussed (and mapped) in the following Sections, with each wildlife group comprising the key indicator species that are carried forward to Chapter 19 of the Impact Statement (Assessment of Potential Effects on Wildlife and Wildlife Habitat).

The assessment of the Wildlife and Wildlife Habitat Valued Component (VC) considers how the Project may affect the structure and functioning of biotic and abiotic components within the ecosystem using scientific, community, and Indigenous knowledge. The following Sections include the baseline conditions based on the background review and studies completed between 2021 to 2023, as detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement). Supplemental background reviews were also completed to further understand baseline conditions within the RSA.

5.1 Designated Areas

Designated areas for wildlife are considered to be those defined by resource agencies, municipalities, the government and/or the public, through legislation, policies, or approved management plans, to have special or unique value. Such areas may have a variety of ecological, recreational, and/or aesthetic features and functions that are highly valued.

There were no designated areas within the PA or LSA; however, the following provincial parks and conservation reserves (regulated under the *Provincial Parks and Conservation Reserves Act, 2006*) are within the RSA (Figure A.3 of this report).

- Kettle Lakes Provincial Park (Recreational Class)
- Mahaffy Township Ground Moraine Conservation Reserve
- Geary Township Shoreline Bluff Conservation Reserve

5.2 Wildlife Habitat Assessment

5.2.1 Project Area and Local Study Area

As shown in Table 5.1, wetlands dominate both the PA and LSA, accounting for 74% (8,667 ha) and 72% (39,175 ha) of the area, respectively. Upland forests cover 24% (2,837 ha) of the PA and 27% (14,273 ha) of the LSA. Coniferous forests are the dominant upland forest type, covering 21% (2,521 ha) of the PA and 23% (12,386 ha) of the LSA. Open water occurs as scattered ponds, small lakes, and rivers and is relatively uncommon, accounting for 0.2% (26 ha) of the PA and 0.5% (288 ha) of the LSA. Active barren habitat accounts for 0.4 ha and 12 ha within the PA and LSA, respectively. Anthropogenic habitat includes linear infrastructure, concrete/pavement and commercial and residential developments, accounting for 2% (254 ha) of the PA and 1% (577 ha) of the LSA. Utility corridors account for the largest anthropogenic areas, covering 1% (167 ha) of the PA and 1% (360 ha) of the LSA.

Table 5.1 Summary of Habitat Categories within the Project Area and Local Study Area

Land Cover Class	PA		LSA	
	Area[1] (ha)	Area[2] (%)	Area (ha)	Area[2] (%)
Upland - Treed				
Coniferous Forest	2,521	21	12,386	23
Deciduous Forest	316	3	1,887	3
Total Upland - Treed	**2,837**	**24**	**14,273**	**26**
Wetland				
Open Bog	5	0	32	0.1
Treed Bog	2,353	20	7,860	14
Subtotal Bog	**2,358.0**	**20.0**	**7,892**	**14**
Open Fen	7	0.1	233	0.4
Treed Fen	781	7	4,465	8
Subtotal Fen	**788**	**7**	**4,698**	**8**
Marsh	752	6	1,295	2
Swamp	4,768	40	25,290	47
Total Wetland	**8,666**	**73**	**39,175**	**71**
Barren				
Active Mineral Barren	0.4	0.0	12	0.0
Water				
Lakes, Rivers, Ponds	26	0.2	288	0.5
Anthropogenic				
Commercial/Residential	13	0.1	20	0.0
Utilities	167	1	360	1
Pavement/Concrete	74	1	196	0.4
Total Anthropogenic	**254**	**2**	**577**	**1**
Grand Total	**11,783**	106	**54,324**	107

Notes:
1. Total is under 11,785 due to rounding.
2. Total exceeds 100% due to rounding.

5.2.2 Regional Study Area

As shown in Table 5.2, within the RSA, upland treed habitat covers 38% (169,993 ha); mixed forests and coniferous treed forests are the most common upland forest types. Wetlands are the largest ecosystem category in the RSA, covering 49% (217,459 ha) of the RSA. Swamps are the most common wetland class in the RSA (167,358 ha, 38%), followed by bogs (18,625 ha, 4%). Open water, such as lakes, rivers, and ponds, covers a relatively small area of the RSA (12,427.8 ha, 3%). The RSA is in a relatively undisturbed state; anthropogenic and sparsely vegetated areas cover 9% (38,681 ha) of the RSA. Cuts

(harvested areas) are the largest anthropogenic or sparsely vegetated areas, reflecting the history of logging in the RSA, followed closely by settlement and infrastructure areas.

Table 5.2 Summary of Land Cover in the Regional Study Area

Ecosystem Category	Land Cover Class	RSA	
		Area (ha)	Area[1] (%)
Upland - Treed	Coniferous Forest	49,883	11
	Deciduous Forest	10,485	2
	Mixed Forest	86,740	20
	Sparse Forest	22,885	5
Total Upland - Treed		**169,993**	**39**
Wetland	Unclassified Bog	15,218	3
	Open Bog	500	0.1
	Treed Bog	2,906	1
	Subtotal Bog	**18,624**	**4**
	Unclassified Fen	21,037	5
	Open Fen	71	0.0
	Treed Fen	870	0.2
	Subtotal Fen	**21,978**	**5**
	Unclassified Marsh	4,760	1
	Swamp	167,358	38
	Other Wetland	4,739	1
Total Wetland		**217,459**	**50**
Water	Water - Deep or Clear	12,428	3
Sparsely Vegetated or Anthropogenic	Bedrock	115	0.0
	Cropland	794	0.2
	Cuts	18,280	4
	Pasture	5,756	1
	Sand/Gravel/Mine Tailings	5,603	1
	Settlement, Infrastructure	8,133	2
Total Sparsely Vegetated or Anthropogenic		**38,681**	**9**
GRAND TOTAL		**438,561**	**101**

Note:
1. Total exceeds 100% due to rounding.

5.3 Threats and Disturbances

5.3.1 Natural Disturbances

The RSA experiences a range of natural disturbance regimes, including forest fires, floods and droughts, blowdown, disease and pests. These disturbances are driven by climate change, which can lead to shifts in ecosystem composition, structure and function, influencing biodiversity through changes in species abundance and distribution.

Forest fires are the dominant natural disturbance with frequencies ranging from 30 to 210 years, depending on forest composition and landscape (Van Sleeuwen 2006). More recently forest harvesting accounts for a large portion of forest disturbance with over 7.8% of the Ecoregion classified as cutover. With climate change, warmer temperatures and prolonged periods of drought are expected to increase the frequency, intensity and length of the fire season. While fire plays a crucial role in forest ecosystems by regenerating certain plant species and maintaining diverse habitats, it can also have a profound effect on wildlife and wildlife habitat.

Other natural disturbances in the RSA, such as flooding, droughts, blowdowns, diseases, and pests, occur to a lesser extent but are also anticipated to increase in frequency and intensity due to climate change. Seasonal floods and periods of droughts may become more frequent and severe with changing weather patterns. Stronger winds and more intense storms could lead to more common blowdowns. Changes in temperatures and other climatic factors can increase the spread of disease and pests, posing further risks to wildlife and wildlife habitat.

One major pest in the RSA is the spruce budworm (*Choristoneura fumiferana*), which is a defoliator primarily targeting host species such as white spruce, balsam fir, tamarack, black spruce and white pine. In 2020, the area of moderate to severe defoliation caused by the spruce budworm in the Timmins District expanded to 97,342 hectares, an increase from 60,175 hectares in 2019 (Ministry of Northern Development, Mines, Natural Resources and Forestry, 2021). Such outbreaks lead to substantial tree mortality, further altering forest composition and structure and affecting wildlife habitat.

A discussion of threats and disturbances affecting wildlife and wildlife habitat is provided for each of the key indicator species in Section 5.4.

5.3.2 Habitat Fragmentation, Human Access and Use

Forestry, fires and linear infrastructure (roads, transmission lines) are the main contributors to habitat fragmentation in the RSA. Roads and transmission lines, particularly Highway 655, can impede or alter movement of species and affect predator-prey dynamics. Linear disturbances can attract prey to food resources and increase predation pressure due to hunting efficiency. Increased human access due to roads and trails associated with forestry can promote hunting, trapping and recreational use in the RSA. This access can lead to direct mortality, increased human-wildlife conflicts, and disturbance to wildlife.

5.4 Key Indicator Species

5.4.1 Amphibians and Reptiles

In this Section, reptiles only include eastern gartersnake, with turtles discussed further under SOCC in Section 5.4.4.1 and SAR in Section 5.4.5.1.

5.4.1.1 Distribution and Abundance

As detailed in section 4.2.1 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), seven species of toads and frogs were detected during the 2021 and 2022 amphibian call surveys and incidental observations. This included: American toad (*Anaxyrus americanus*), boreal chorus frog (*Pseudacris maculata*), green frog (*Lithobates clamitans*), mink frog (*Lithobates septentrionalis*), northern leopard frog (*Lithobates pipiens*), spring peeper (*Pseudacris crucifer*), and wood frog (*Lithobates sylvaticus*). Spring peeper was the most common species recorded during all field studies (42 locations), followed by wood frog (25 locations), American toad (17 locations), mink frog (10 locations), and boreal chorus frog (7 locations) and northern leopard frog (3 locations). The least common species was green frog, which was only detected at two locations.

Two incidental records of salamanders were documented in the western portion of the PA at two separate locations on May 14, 2022. An unidentified salamander (believed to be an *Ambystomid*) was found in a pond at amphibian calling point CL-AM-15, located on the east side of Camp 40 Road, near the intersection of Lower Sturgeon Dam Road and Camp 40 Road. A blue-spotted salamander (*Ambystoma laterale*) was observed crossing Camp 40 Road at CL-OW-15. A map showing the locations of amphibian call surveys and salamander observations completed by WOOD (2021) and WSP (Appendix B.7.4 of the Impact Statement) is shown on Figure A.6 in this report.

There are few reptiles in Ontario whose ranges extend to northern Ontario. This Section focuses on eastern gartersnake (*Thamnophis sirtalis sirtalis*), a species whose range extends throughout the RSA (ORAA 2023). Targeted surveys for eastern gartersnake were not completed (Appendix B.7.4 of the Impact Statement)), although one individual was incidentally recorded in spring 2022 while assessing rocky slopes and rock barrens for bat hibernacula (Appendix B.7.4 of the Impact Statement). It is expected that more individuals and wider distribution of occurrences is present throughout the RSA.

5.4.1.2 Habitat

Amphibians occupy both terrestrial and aquatic habitats during various stages of their life history. A summary of habitat types within the RSA is provided in Table 5.3 and is based on FRI data mapped by Stantec; habitat within the LSA is provided on Figure A.6 of this report.

Terrestrial habitat is primarily used by adults for foraging and shelter during spring and summer and hibernacula in the winter. Aquatic habitat is used throughout the active period, particularly for breeding and during the early development stages before individuals emerge as adults. The majority of the LSA is characterized as wetland and woodland which are suitable to support amphibian and reptile habitat.

Eastern gartersnake is a generalist and can be found in a variety of habitats. Hibernaculum includes sites located below the frost line in burrows, rock crevices, and other natural locations, particularly in areas with broken and fissured rock as they provide access to subterranean sites. As detailed in section 5.2.2.1 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), indicator ecosites found in the LSA include: B012, B024, B128, B129, B134, B135, B136, B137, B139, and B164. There were no congregations of snakes observed during field surveys, although targeted studies were not completed.

Table 5.3 Summary of Amphibian and Reptile Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat • Amphibians – functional habitat (foraging, summer activity), movement, overwintering • Eastern Gartersnake – functional habitat	2,837	24	14,273	27	169,993	39
Wetland Habitat • Amphibians – functional habitat, breeding	8,667	74	39,175	72	217,459	50
Water Habitat • Amphibians - breeding	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Eastern Gartersnake -functional habitat, movement, overwintering	255	2	577	1	38,681	9
Total	**11,785**	**-**	**54,324**	**-**	**438,561**	**-**

5.4.1.3 Life History

5.4.1.3.1 Amphibians

In the spring, adults emerge from overwintering sites and migrate to breeding ponds/wetlands (fish-free) where they will lay eggs. The eggs will hatch into larvae and undergo metamorphosis where they will develop legs and lungs and emerge as adults capable of living on land or remaining semi-aquatic. In fall, adults will migrate to overwintering sites where they will remain until spring emergence. Toads and frogs will overwinter in mammal burrows, natural crevices, logs and leaf litter. This is similar for blue-spotted salamander, although they require access to subterranean substrate below the frost line.

The active period is generally March through November, although the timing may be later or shorter in northern Ontario. For example, the active period for boreal chorus frog only extends until mid-September, which may still vary based seasonal temperatures and location. Primary dispersal periods include spring emergence (generally late March through early May) and fall migration (generally mid-September through mid-October) to overwintering sites and spring and summer movement between breeding ponds/wetlands and upland habitats. Amphibian movement was discussed by WSP (Appendix B.7.4 of the Impact Statement) in terms of criteria under provincial guidance for identifying SWH, specifically for toads and frogs. Salamanders can migrate several hundred meters between overwintering and breeding sites (ORAA 2023).

5.4.1.3.2 Reptiles

The eastern gartersnake has an active period that generally spans from April to early November, though this period can be shorter or start later in northern regions due to cooler temperatures. Eastern gartersnakes may undertake migrations between summer feeding grounds and overwintering sites, which can be considerable distances. Their home range varies widely, from as small as 0.8 hectares to as large as 14 hectares, depending on habitat availability and resource distribution (Harding 1997). In the spring, typically around April, eastern gartersnakes move from their overwintering sites to their summer habitats. In the fall, around October to November, they migrate back to their hibernacula to prepare for overwintering.

This species commonly overwinters communally, often in large numbers, using hibernacula that provide protection from freezing temperatures. These hibernacula can include rock crevices, burrows, and other subterranean refuges that maintain stable conditions throughout the winter. Mating occurs in early spring, shortly after the snakes emerge from their overwintering sites. After mating, the snakes disperse to their summer habitats. Female eastern gartersnakes give birth to live young, with birthing typically occurring between late July and early October, depending on the specific location and environmental conditions.

5.4.1.4 Threats and Disturbance

Amphibians and reptiles may be impacted by habitat loss and fragmentation (e.g., forestry, linear infrastructure), fires, flooding, droughts and pests which can result in loss of individuals and changes in habitat through direct loss and alteration. While negative effects on habitat can be profound, disturbances such as flooding can create temporary wetlands beneficial for amphibians and reptiles. Forest harvesting can result in incidental take, road mortality and increased risk of predation.

5.4.2 Moose

5.4.2.1 Distribution and Abundance

Moose (*Alces* alces) is considered locally abundant and widespread throughout the RSA. Actual moose numbers will vary due to other factors such as disease, parasites (e.g., winter tick, brainworm), road/railway mortality, and predation by northern gray wolves, American black bears, and humans (e.g., hunters). As of 2023, MNRF estimated the population size to be 288 individuals in Wildlife Management Unit 30 (MNR 2024b) which overlaps the PA and LSA. Information from engagement within Indigenous nations identified the presence of spirit moose within the RSA. It is expected that there are relatively few individuals within the RSA. This species was not recorded during field studies.

As detailed in section 4.5.1.1 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), moose observations included 27 individual sightings during the 2021 (n=15) and 2022 (n=12) winter aerial surveys. Moose observations across both survey years comprised six bulls, 11 cows, and three unknown cow or calf. Observers were not able to reliably classify seven moose observations; as such, they were recorded as unknown age and sex. Further, a combined total of 57 separate sets of moose tracks were identified during aerial surveys across the two survey years (2021-2022), of which 24 track sets were believed to belong to more than one individual.

Moose sightings were documented throughout the LSA, with areas of relatively high density populations primarily in the RSA near the north, south and eastern boundaries. Areas of relatively high density were also noted in the PA near the southern boundary and within the north and south limits of the LSA. Overall, the LSA was characterized as having low to medium density moose populations. A map showing relative density for moose is provided in Figure A.7 of this report.and is based on data from WSP (Appendix B.7.4 of the Impact Statement). High relative density of moose and northern gray wolf is provided in Figure A.10 of this report.

Moose sightings and tracks were typically associated with clearcuts, regenerating forest, and riparian areas, particularly those dominated by aspen and abundant young hardwood saplings and shrubs that provide a browse forage source to moose; these habitats, in proximity to adjacent thermal and hiding cover, are preferred by moose in northern Ontario. Movement corridors between habitats are important during different life stages, particularly to access specialized habitats like moose late winter cover and aquatic feeding areas which are present in the LSA and identified as SWH (Appendix B.7.4 of the Impact Statement).

5.4.2.2 Habitat

Moose use a wide range of habitats based on the availability of browse, cover and specialized habitats. Their habitat preferences shift with the season and life history requirements. A summary of habitat types within the RSA is provided in Table 5.4 and is based on FRI data mapped by Stantec.

During the spring and summer, moose are often found near wetlands and young deciduous forests where they can access abundant aquatic plants and tender shrubs for feeding. Moose will move considerable distances to reach preferred aquatic feeding areas and mineral licks which supply important nutrients such as sodium and other minerals necessary for antler development and lactation. Mineral licks are found in upwelling groundwater and the soil around these seepage areas, typically occurring in areas of sedimentary and volcanic bedrock (MNRF 2015). In areas of granitic bedrock, the site is usually overlain with calcareous glacial till. A review of the provincial LIO wildlife values area dataset identified aquatic feeding areas throughout the RSA; no mineral licks were recorded although there is potential habitat throughout the RSA. The dataset also contains habitat ranks for aquatic feeding areas, listing them as nil, low, moderate, high, and very high. Only one small portion of aquatic feeding area (0.12 ha) extends into the southern limits of the PA along Highway 655 (Texas Golf Road) and is ranked very high. Aquatic feeding areas are present throughout the RSA.

In winter, moose select habitats that offer both food and shelter from harsh conditions. They are typically found in areas with dense coniferous forests, such as spruce, fir, or pine stands, which provide thermal cover to help them conserve energy and stay warm. These forests also offer protection from deep snow, allowing easier movement. Additionally, moose seek out areas with available browse, such as willow, aspen, or birch twigs, which are their primary food sources during the winter months when other vegetation is scarce. Late winter habitat is often used when snow depth restricts movement to other habitats. As detailed in section 5.2.2.1 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), late winter moose habitat is characterized by dense conifer stands >50 ha, cover with greater than 60% canopy closure, dominated by trees >6 m in height, and on gentle to moderately

rugged sites with deep soils (MNRF 2015). Upland sites are preferred, and these habitats are extensively used by moose during late spring and summer due to the shade provided (MNRF 2015). Moose late winter cover quality is ranked by MNR according to the Ranking Early and Late Winter Habitat guidelines under the Selected Wildlife and Habitat Features: Inventory Manual (MNR 1998) as low (1), moderate (2), high (3), or very high (4). Areas identified as ranking a 3 (high potential) or 4 (very high potential). High potential stands have excellent conifer cover and crown closure exceeding 75% and are usually large stands (>50 ha) and occur on gentle or moderately rugged sites. Very high potential stands are as defined for ranking 3 while also dominated by super-canopy trees (white pine, hemlock, white spruce); in the far north, jack pine and black spruce on deep soil sites are more likely to be associated with high potential late winter habitat. Almost all areas identified as very high potential are associated with deep soil sites and have abundant vegetation for browse.

A review of the provincial LIO wildlife values area dataset identified early winter habitat near the northeast limits of the RSA but not within the LSA. Late winter habitat in the LSA was ranked as high, while habitat within the RSA was identified as unranked or low to moderate. Within the PA, only one mapped area of late winter habitat is present in the northern limits; the next closest late winter habitat is approximately 3 km east of the PA (Figure A.8 of this report). The majority of late winter habitat within the RSA is located near the eastern limits with a few in the northern limits. Habitat mapping (Figure A.8 of this report) is based on the provincial wildlife values area dataset.

Table 5.4 Summary of Moose Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Functional Habitat						
Woodland Habitat	2,837	24	14,273	27	169,993	39
Wetland Habitat	8,667	74	39,175	72	217,459	50
Water Habitat	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren)	N/A	N/A	N/A	N/A	N/A	N/A
Total	**11,530**	**-**	**53,736**	**-**	**399,880**	**-**
Specialized Habitat						
Moose Aquatic Feeding (120 m buffer)	0.12	0.001	10.55	0.02	1,048	0.2
Moose Early Winter Cover	0	0	0	0	469	0.1
Moose Late Winter Cover (300 m buffer)	222	2	1,286	2	14,522	3
Total	**222**	**2**	**1,297**	**-**	**16,039**	**-**

5.4.2.3 Life History

The life history of moose involves various stages and behaviors throughout their lives, influenced by seasonal changes and environmental conditions. Mating season (rutting) occurs in the fall, usually from late September to October. After mating, females have a gestation period of about 230 days and will give birth to their calves in spring or summer, usually late May to early June.

5.4.2.4 Threats and Disturbance

Threats affecting moose populations include habitat loss and fragmentation (e.g., forestry, natural fires), disease, collisions with vehicles, hunting, and predator interactions. Habitat loss and fragmentation through forest harvesting and linear disturbances can displace and alter movement patterns and increase risk of predation through creation of linear disturbances. The existing Highway 655 can result in road mortality and human access can lead to increased hunting pressure and disturbance, potentially causing moose to avoid otherwise suitable habitat. Fire and blowdowns can create early successional habitats and browse (young, tender vegetation) that benefit moose; however, severe or extensive fires can also reduce available cover. Increased insect outbreaks and disease due to climate change may stress moose populations. The Project will include the realignment of Highway 655 and construction of a new rail spur which may contribute to mortality through collisions with vehicles/train and increase predation risk.

5.4.3 Furbearers

5.4.3.1 Distribution and Abundance

Furbearer abundance is regulated by factors other than habitat availability such as disease, predation (e.g., wolves), and trapping. A map showing the locations of furbearers documented in the RSA, where surveys overlapped, is provided in Figure A.9 of this report.and is based on data provided by WSP (Appendix B.7.4 of the Impact Statement). As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), several furbearers were recorded during surveys completed between 2021 and 2023. The majority of species were recorded incidentally, with the following seven species detected during aerial surveys:

- Snowshoe hare (*Lepus americanus*) evidence (i.e., tracks) was prevalent throughout the aerial surveys in high density and not individually recorded.
- Red fox (*Vulpes vulpes*) was recorded at 179 locations, followed by Canada lynx (*Lynx canadensis*) at 91 locations and American marten (*Martes americana*) at 70 locations. Records of these species were found throughout the RSA.
- North American river otter (*Lontra canadensis*) was recorded at 56 locations throughout the RSA and within the central-east limits of the PA. The greatest densities were documented at Kamiskotia Lake and along the Mattagami River.

- Beaver (*Castor canadensis*) was recorded at 28 locations, the majority of which are within the RSA and a few records within the central-east limits of the PA. Three lodges and two dams were also recorded in the southern portion of the RSA.
- Northern gray wolf (*Canis lupus occidentalis*) was recorded at 21 locations, the majority of which are located within the RSA, with the exception of one area near the Mattagami River that extends into the LSA and is identified as high density based on the 2021 surveys. Several areas within the 2022 aerial survey area exhibited sufficient evidence of northern gray wolf signs to be classified as medium-high to high relative density; these areas were located near the northwest, northeast, and southwest extents of the RSA (Figure A.10 of this report).

5.4.3.2 Habitat

Furbearer habitat encompasses a wide range of habitat, including forests, wetlands, water/riparian and open areas. A summary of habitat types within the RSA is provided in Table 5.5 and is based on FRI data mapped by Stantec. Forested areas with dense canopy cover and a mix of coniferous and deciduous trees offer critical cover and hunting grounds for species like the American marten, fisher (*Pekania pennanti*), American black bear (*Ursus americanus*), Canada lynx. Wetlands, including swamps, bogs, and riparian zones, provide important habitat for species such as beaver, muskrat (*Ondatra zibethicus*) and North American river otter, supporting their activities like dam-building and foraging. Open areas and edge habitats are utilized by species such as northern gray wolf, red fox and coyote (*Canis latrans*) for hunting and territorial marking.

Denning sites for furbearers such as American mink (*Neovison vison*), North American river otter, northern gray wolf, Canada lynx, American marten, fisher and American black bear are critical habitat requirements as they can be a limiting factor in sustaining populations. As detailed in section 5.2.2.3 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), targeted surveys for denning sites were not completed due to the difficulty in locating these features; none were confirmed during field studies.

American mink prefers shorelines dominated by coniferous or mixed forests with dens usually underground. American mink will often use old muskrat lodges or may den in root masses along shorelines of water bodies. North American river otter prefer undisturbed shorelines along water bodies that support productive fish populations with abundant shrubby vegetation and downed woody debris for denning. They often use old beaver lodges or log jams and crevices in rock piles. American marten and fisher share the same general habitat, requiring large tracts of coniferous or mixed forests of mature or older age classes. Denning sites are often in cavities in large trees or under large, downed woody debris.

Northern gray wolves prefer a more interior forest condition for locating their den sites. Wolves often select sandy sites sloped for excavation (esker areas should be examined as potentially key sites). Wolf dens are often located near wetlands. Wolf den locations are generally randomly situated within the pack territory with the outer 1 km periphery avoided; the larger the territory, the closer the den is to the center (Packard 2003; Mech and Boitani (eds.) 2003). Rendezvous sites are usually located in the general denning region. Pack foraging excursions may be up to 48 km from the den or pups. Several dens within each home range may be used for pup rearing, with natal dens usually located near water (Packard

2003). The peak of parturition occurs near the end of April through early May. Pups are highly associated with the den for their first eight weeks. Den proximity to human disturbance is dependent on whether they have experienced negative interactions with humans. Disturbance is unlikely to have an effect unless it is widespread and intensive (Fuller et al. 2003). Dens and rendezvous sites have been documented within 1 to 2 km of active roadways and as close as 400 m to paved roadways (Fritts et al. 2003).

Canada lynx den sites are most often associated with the presence of downed woody debris.

American black bear, particularly sub-adults, will often den in the base of hollow trees. Such trees are rare in this ecoregion and primarily consist of large diameter cedar or sometimes large white spruce. Black bear are particularly sensitive to noise disturbance within 200 m of overwintering (hibernation) dens, with effects as great as 1 km, and may abandon the den in response to disturbance, especially early in the denning period (Linnell et al. 2000). Hibernation dens are seldom reused in consecutive years. Therefore, the loss of a single denning site from human disturbance is not deleterious if alternative sites are available within the home range (Linnell et al. 2000).

Table 5.5 Summary of Furbearer Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat • Terrestrial species - functional habitat (American black bear, red fox, coyote, Canada lynx, cougar, northern gray wolf and snowshoe hare) • Semi-aquatic species - movement and foraging (American mink, North American river otter, beaver and muskrat)	2,837	24	14,273	27	169,993	39
Wetland Habitat • Terrestrial species – movement and foraging • Semi-aquatic species – functional habitat	8,667	74	39,175	72	217,459	50
Water Habitat • Terrestrial species – movement and foraging • Semi-aquatic species – functional habitat	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Terrestrial species – movement and foraging	255	2	577	1	38,681	9
Total	**11,785**	**-**	**54,324**	**-**	**438,561**	**-**

5.4.3.3 Life History

Furbearers have diverse life histories that are closely tied to their habitats and ecological roles. For instance, American mink breeds in late winter to early spring, with females giving birth to litters of 4 to 6 kits in dens lined with vegetation. These kits remain dependent on their mother until they are weaned in late summer. Similarly, the North American river otter also breeds in late winter, with births occurring in dens near water bodies. Pups stay in the den for 2 to 3 months before they begin to explore water, reflecting the otter's reliance on aquatic habitats.

The northern gray wolf breeds from February to March, with packs giving birth to 4 to 7 pups in dens. These pups are cared for by the entire pack, highlighting the social structure and cooperative nature of wolves. The Canada lynx breeds from February to April and gives birth to 2 to 4 kittens in dens, typically located in dense forest cover. Canada lynx are solitary and prefer areas with abundant snowshoe hares.

American marten breeds in late winter, with females giving birth to 3 to 4 kits in dens often found in tree cavities. Martens are arboreal and require mature forests for both foraging and shelter. Similarly, fishers breed from March to April and give birth to 1 to 4 kits in tree cavities or under logs. They are solitary and rely on dense forests for their habitat.

American black bears, which are more generalist in their habitat use, breed from June to July, with a delayed implantation resulting in births of 1 to 4 cubs in winter dens. Cubs stay with their mother for about 6 to 8 months before becoming independent. American black bears can adapt to various habitats, including forests, swamps, and mountainous regions.

5.4.3.4 Threats and Disturbance

Threats affecting furbearers include habitat loss and fragmentation (e.g., forestry, natural fires, blowdowns), disease, collisions with vehicles, hunting, and predator interactions. Forest harvesting can result in habitat loss and fragmentation which can displace individuals. The existing Highway 655 can impede movement and result in road mortality. Logging roads and recreational trails in the RSA can increase human access and trapping potential which poses a direct threat to individuals and can lead to changes in behaviour and habitat use. Furbearers depend on diverse forest habitats. Fire and forest harvesting can alter habitat availability, food sources and increase risk of predation due to access. Blowdowns can benefit furbearers that can utilize the downed trees for building materials or as hunting grounds. Beavers, for example, can benefit from post-fire environments due to increased regrowth of preferred food species.

5.4.4 Species of Conservation Concern

5.4.4.1 Midland Painted Turtle and Snapping Turtle

5.4.4.1.1 Species Significance

Midland painted turtle (*Chrysemys picta marginata*) is designated as special concern federally under SARA. Snapping turtle (*Chelydra serpentina*) is designated as special concern both provincially and federally, under the ESA and SARA. These species serve as important indicators of wetland health and are important to Indigenous culture and traditional practices.

5.4.4.1.2 Distribution and Abundance

The midland painted turtle has the largest range and most northerly geographic range of any freshwater turtle in North America. Northernmost atlas records occurred approximately 47 to 48 degrees north latitude (Wawa, Algoma District) in northwestern Ontario and at 47 to 49 degrees north latitude (Cobalt, Timiskaming District; Little Lake, Cochrane District) in northeastern Ontario (ORAA 2023).

The snapping turtle occurs from the southernmost areas of the province to north of Lake Superior. Northernmost atlas records occurred at 51 degrees north latitude (boreal caribou Provincial Park, Kenora District, in northwestern Ontario, 50 degrees north latitude (Longlac, Thunder Bay District in north-central Ontario, and 49 degrees north latitude (Timmins, Cochrane District) in northeastern Ontario (ORAA 2023). Midland painted turtle and snapping turtle were not recorded during field surveys, although suitable habitat is present throughout the RSA.

5.4.4.1.3 Habitat

Midland painted turtle inhabit waterbodies, such as ponds, marshes, lakes, and slow-moving creeks, with a soft bottom and provide abundant basking sites and aquatic vegetation. This species often basks on shorelines or on logs and rocks that protrude from the water. Overwintering occurs on the bottom of waterbodies (ORAA 2023). Snapping turtles prefer slow-moving waters with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges and slow streams and wetlands. Individuals can also exist in developed areas (e.g., golf course ponds, irrigation canals); however, it is unlikely that populations persist in such habitats. Snapping Turtles can occur in highly polluted waterways, but environmental contamination is known to limit reproductive success (COSEWIC 2008). A summary of habitat types within the RSA is provided in Table 5.6 and is based on FRI data mapped by Stantec.

Nesting sites are typically found in open sunny areas near water, with gravel or loose substrates that turtles can dig into for nest-making. Sand and gravel beaches adjacent to shallow weedy areas of lakes, rivers, or marshes are frequently used. Turtle wintering areas include permanent waterbodies, large wetlands, bogs, or fens with soft substrates, water deep enough not to freeze through to the bottom, and year-round standing or flowing water.

Table 5.6 Summary of Midland Painted Turtle and Snapping Turtle Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat • Movement	2,837	24	14,273	27	169,993	39
Wetland Habitat • Functional habitat (mating, thermoregulation, foraging and summer activity), overwintering	8,667	74	39,175	72	217,459	50
Water Habitat • Functional habitat (mating, thermoregulation, foraging and summer activity), overwintering	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Nesting (road shoulders)	255	0.5	577	1	38,681	9
Total	**11,785**	**-**	**54,324**	**-**	**438,561**	**-**

5.4.4.1.4 Life History

Painted turtles in northern populations can take 7 to 10 years (males) and 12 to 15 years (females) to reach sexual maturity. Nesting females lay clutches of 4 to 13 eggs, starting in late May to early July (ORAA 2023). They prefer to dig nests in loamy or sandy soil in sunny areas. Hatchlings may emerge in the fall but sometimes overwinter in the nest and emerge the following spring. They have a biological antifreeze that prevents their tissue from freezing in temperatures as low as -10ºC. Incubation temperatures in the nest determine the sex of the offspring (ORAA 2023).

Snapping turtles do not reach sexual maturity until 15 to 20 years old. Nesting females lay a single clutch of 25 to 45 eggs, starting in late May or June in open areas, usually containing loose, sandy soil (ORAA 2023). The nest site is often the side of a road, an embankment or a shoreline, but they will use almost any area they can excavate. Hatchlings emerge in late August to early October. Incubation temperatures of the nest determine the sex of the hatchlings as well (ORAA 2023).

Midland painted turtles and snapping turtles are typically active from April through September and sometimes move long distances overland from one waterbody to another or in search of nesting sites. Female snapping turtles can travel up to 16 km roundtrip by water and land to find a nesting site (ORAA 2023). Moving to nesting sites can involve extensive land travel through forests, fields, and other terrestrial habitats; nests are typically within 50 metres of water (ORAA 2023).

5.4.4.1.5 Threats and Disturbance

Midland painted turtle and snapping turtle may be impacted by habitat loss and fragmentation (e.g., forestry, linear infrastructure), fires, flooding, droughts and pests which can result in loss of individuals and changes in habitat through direct loss and alteration. Negative effects on habitat can be profound, while disturbances such as flooding can create temporary wetlands beneficial for turtles. Forest harvesting can result in incidental take, road mortality and increased risk of predation. Turtles have a late age of maturity and slow reproduction rate and therefore, a loss of a few adult turtles annually can result in substantial declines in a population.

5.4.4.2 Monarch

5.4.4.2.1 Species Significance

The monarch (*Danaus plexippus*) plays a role in the ecosystem as pollinators for various wildflowers and other plants, contributing to the biodiversity and health of natural habitats. The decline of monarch populations can have significant ecological impacts, potentially leading to disruptions in plant-pollinator networks. Conservation efforts aimed at protecting monarch butterflies would also benefit other pollinator species, such as the yellow-banded bumble bee, due to the shared need for healthy habitats and floral resources.

5.4.4.2.2 Distribution and Abundance

The monarch is widely distributed across Ontario, throughout the Deciduous and Great Lakes St Lawrence Forest and into southern areas of the Boreal Forest (COSSARO 2020). Population size and estimates are not available for Canada. Targeted surveys for this species was not completed for the Project and there were no incidental observations during field studies (Appendix B.7.4 of the Impact Statement). However, based on records obtained from iNaturalist, there are records of this species within the RSA, primarily within town centres.

5.4.4.2.3 Habitat

Monarch depends on available milkweed and flowering plants for breeding and nectaring habitat, typically located in meadows, open fields, roadsides, and urban gardens. Adult monarchs feed on the nectar of many flowers and rely exclusively on milkweed as a host plant for reproduction as this is the only species larvae feed on. Staging habitat is used for feeding and resting during spring and fall migration and primarily located along the Great Lakes (COSEWIC 2016a). This species overwinters in Mexico and the United States. A summary of habitat types within the RSA is provided in Table 5.7 and is based on FRI data mapped by Stantec.

Table 5.7 Summary of Monarch Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat	N/A	N/A	N/A	N/A	N/A	N/A
Wetland Habitat • Feeding	8,667	74	39,175	72	217,459	50
Water Habitat • Feeding	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Breeding and feeding	255	2	577	1	38,681	9
Total	**8,948**	**-**	**39,752**	**-**	**268,568**	**-**

5.4.4.2.4 Life History

The monarch has four distinct life stages: egg, larva (caterpillar), pupa (chrysalis) and adult. The egg stage lasts from three to eight days, the larva (caterpillar) stage lasting nine to 14 days, and the pupa (chrysalis) stage lasting nine to 15 days before becoming an adult (COSEWIC 2016a). In southern Canada, monarch can have two to three generations between June and September (ECCC 2016b). The summer adults live approximately 30 days. The late summer generation migrate to overwintering sites and live up to nine months without breeding or laying eggs until the following spring (ECCC 2016b).

5.4.4.2.5 Threats and Disturbance

Habitat degradation and pollution are the two main threats that are considered to have the greatest impact on the breeding population of monarchs (COSSARO 2020). Monarchs rely on milkweed plants found in open areas. Fire can create openings that allow milkweed to thrive, but widespread forest harvesting can reduce these habitat patches. In addition, mortality due to vehicular collisions, herbicides and pesticides is a risk along roadways where milkweed and other nectaring plants are found. Opportunities to enhance monarch habitat within the Project can be achieved by avoiding the use of pesticides and incorporating milkweed and other pollinator species into reclamation plans to support breeding and nectaring habitat.

5.4.4.3 Yellow-banded bumble bee

5.4.4.3.1 Species Significance

The yellow-banded bumble bee (*Bombus terricola)* is designated as special concern both provincially and federally. It was first assessed as special concern by COSSARO in 2015 and subsequently added to O.Reg. 230/08 under the ESA in 2016. Federally, it was assessed by COSEWIC in 2015 and listed under Schedule 1 of SARA in 2018.

The yellow-banded bumble bee plays a vital role in the ecosystem as a pollinator of many native flowering plants and crops. The decline of bumble bees can have far-reaching effects, potentially leading to plant extinctions due to the loss of pollination services. Efforts to conserve the yellow-banded bumble bee would also positively impact other pollinator species, such as monarch, by preserving the diverse and healthy habitats they all rely on.

5.4.4.3.2 Distribution and Abundance

The distribution of yellow-banded bumble bee extends from the Mixed Wood Plains of southern Ontario to the Hudson Plain in the north. The Project is located between these ecozones, in the Boreal Shield. There is little information on abundance data for yellow-banded bumble bee within northern Ontario due to inadequate survey effort (COSSARO 2016).

Changes in the distribution of the yellow-banded bumble bee have been documented across Canada's 15 ecozones, including the Boreal Plain, which spans Manitoba, Saskatchewan, and Alberta. In the Boreal Plain ecozone, there has been a notable decline in the bee's presence or density. The number of occupied grid cells dropped significantly, from 194 before 2003 to just 21 between 2004 and 2013 (COSEWIC 2015). Similarly, the area occupied by the species decreased from 776 km² to 84 km² over the same periods, reflecting only about 10.8% of its historical range (COSEWIC 2015).

Targeted surveys for this species were not completed for the Project and there were no incidental observations during field studies (Appendix B.7.4 of the Impact Statement). However, there are records of this species within the RSA,, including PA, based on data collected from the background review, specifically iNaturalist. This includes one record in the PA from 2019 along Lower Sturgeon Dam Road and nine records between 2019 to 2024 throughout the RSA (outside of the LSA), particularly along the southern limits, with a few along the east and west limits.

5.4.4.3.3 Habitat

Yellow-banded bumble bee is a habitat generalist. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. They forage on flowers for pollen and nectar from various plant genera and establish nests sites in abandoned rodent burrows or decomposing logs (COSSARO 2016). Yellow-banded bumble bee queens are known to overwinter underground in pre-existing cavities like abandoned rodent burrows and rotten logs and emerge in early spring to forage and search for suitable nest sites. Woodlands and open habitat (characterized in this Project as anthropogenic or active barren habitat) are present throughout the RSA and are considered higher value as they support nesting, overwintering and foraging habitat. A summary of habitat types within the RSA is provided in Table 5.8 and is based on FRI data mapped by Stantec.

Table 5.8 Summary of Yellow-banded Bumble Bee Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat • Nesting and overwintering	2,837	24	14,273	27	169,993	39
Wetland Habitat	N/A	N/A	N/A	N/A	N/A	N/A
Water Habitat • Foraging	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Foraging	255	2	577	1	38,681	9
Total	**3,118**	**-**	**14,850**	**-**	**221,102**	**-**

5.4.4.3.4 Biology

Yellow-banded bumble bees are eusocial insects, meaning they live in colonies and exhibit a division of labor among different forms: queens, workers, and males. These bees form annual colonies, with one generation produced per year. Mating occurs in the fall, after which the males die and only the queen overwinters (COSEWIC 2015). Yellow-banded bumble bees require constant floral resources like pollen and nectar for colony growth. The yellow-banded bumble bee's sex determination also makes them highly susceptible to extinction in small population sizes (ECCC 2023).

Similar to monarchs, bumble bees have four developmental stages: egg, larva, pupa, and adult. The queen is the sole reproductive female, while the worker bees are her unmated daughters, typically not reproducing themselves. The males, or drones, have the sole purpose of mating. There is some evidence that bumble bees are able to disperse relatively long distances. Males of a closely related old world species, buff-tailed bumble bee (*Bombus terrestris*), are estimated to fly between 2.6 and 9.9 km from the colony of origin (COSEWIC 2015).

The queen emerges in April or May to forage for pollen and nectar, searching for suitable nest sites. Once the queen lays the first eggs, female workers emerge and begin foraging for the colony, tending to the nest, feeding the brood and protecting the colony (COSEWIC 2015). Eggs hatch in approximately four days, and the larvae feed on pollen and nectar. After two weeks, they spin cocoons and pupate, developing for another two weeks before becoming adults. Queen bees typically live just over a year, worker bees have an average lifespan of 13 days, and males live only a few weeks at the end of the colony cycle (COSEWIC 2015). However, little is known about their specific mating and overwintering habitat requirements (COSSARO 2016).

As early emerging pollinators, yellow-banded bumble bees are likely crucial for the pollination of early-blooming wild plants, such as wild blueberry, and agricultural crops, like apples. This early emergence makes them particularly susceptible to shifts in the timing of flowering due to climate change, as well as to spring storms and other climate-related factors that could impact their access to food resources.

5.4.4.3.5 Threats and Disturbance

There are four main threats affecting yellow-banded bumble bee populations: pathogen transmission and spillover from managed bumble bee populations in greenhouses; pesticide exposure (use of insecticides, herbicides and fungicides in agriculture and silviculture); intensification of agriculture; and climate change (habitat shifting and alteration, and temperature extremes (ECCC 2023). Within the LSA, herbicide and pesticide use in forestry or if used for the Project can result in mortality of individuals. Additionally, climate change can lead to shifts in habitat ranges, habitat alterations, and changes in the phenology of species, potentially affecting the timing of species' active periods and the flowering of plants.

Other potential threats, including fire, transportation (roads and railways), and mining. Fire is generally beneficial to bumble bee populations as it promotes the growth of flowering plants, but fire suppression is viewed as detrimental over the long term. In terms of transportation and mining can have an effect on populations through collisions with vehicles and habitat loss (COSEWIC 2023). However, in terms of overall threats to yellow-banded bee populations, these effects are considered negligible since roadside right-of-ways can provide floral resources and mining can lead to an increase in edge habitat over the long term.

The yellow-banded bumble bee also faces limiting factors that impact its survival. This species depends on a continuous supply of floral resources (pollen and nectar) throughout the growing season to support colony growth. Further, this species has a unique sex determination system that makes it highly vulnerable to extinction when populations sizes are small (ECCC 2023).

Opportunities to enhance yellow-banded bumble bee habitat within the Project can be achieved by avoiding the use of pesticides and promoting the growth of foraging plants. Appendix A of the federal management plan provides a list of plant food sources that are beneficial for the yellow-banded bumble bee (ECCC 2023). By minimizing pesticide use, the Project can reduce harmful chemical exposure to bees, thereby supporting healthier populations. Additionally, encouraging the growth of native flowering plants will provide essential pollen and nectar resources throughout the growing season, helping to sustain and increase bee populations in the area. These measures can create a more favorable environment for the yellow-banded bumble bee and contribute to the conservation of this important pollinator species.

5.4.5 Species at Risk

5.4.5.1 Blanding’s Turtle

5.4.5.1.1 Species Significance

Blanding’s turtle (*Emydoidea blandingii*) is designated as threatened under the ESA and endangered under SARA for the Great Lakes / St. Lawrence population. As the Project is not on federal land, species and habitat protection generally only applies to the ESA. This species serves as an important indicator of wetland health and is important to Indigenous culture and traditional practices.

5.4.5.1.2 Distribution and Abundance

Blanding's turtle is at the northern limit of their range within the RSA. There are two historical records (i.e., greater than 20 years ago) from community members within the LSA (east of the PA) and one in the RSA (west the LSA). Suitable habitat is present throughout the RSA, although this species was not observed during field studies or through eDNA sampling (Appendix B.7.4 of the Impact Statement).

5.4.5.1.3 Habitat

Blanding's turtle is considered semi-aquatic. This species spends most if its time in aquatic habitat and will use upland terrestrial habitat during seasonal movement. Aquatic habitat is used for overwintering, mating, foraging, thermoregulation, summer inactivity, and movement (ECCC 2018). Aquatic habitat includes permanent or seasonal wetlands including marshes, swamps, bogs, shallow water, beaver regulated wetlands, vernal pools or watercourses and lakes. These areas should include the presence of static or slow-flowing water, emergent and/or submerged vegetation, basking sites and soft organic or sandy substrates. This species prefers eutrophic conditions (i.e., nutrient rich with low dissolved oxygen), with shallow waters between 0.50 m and 2 m deep) (ECCC 2018). Terrestrial habitat includes grasslands with less than 10% shrub or tree cover and shrublands with scattered forbs and grass-like plants. These areas include refuge areas and openings to support basking. Terrestrial habitat is also important, as these turtles will travel overland more than 2.5 km to nest and will nest up to 410 m from the nearest water source (Joyal et al. 2001). Terrestrial habitat is generally upland wooded areas, consisting of mixed deciduous or coniferous forest.

Nesting habitat includes open areas with full sunlight, minimal or sparse vegetation and well-drained soils. This includes beaches, meadows, shorelines, road shoulders, sand and gravel areas (MECP 2019). Female Blanding's turtles will preferentially choose nesting locations in relatively open areas, such as fields, or disturbed habitats such as roadways (Congdon et al. 2000).

Overwintering habitat includes permanent wetlands with 0.07 m to 0.50 m of free-standing water, soft substrate for burying, cold temperatures and thermally stable (MECP 2019). Areas with thick vegetation, water depths of 0.40 m or greater or open pools surrounded by vegetation have the highest likelihood of being used for overwintering. Studies have shown a preference for water temperatures just above freezing, ranging from 0ºC (Edge et al. 2009) and 0.48ºC to 0.77ºC (Markle and Fraser 2017), suggesting that temperature may be more important in site selection than dissolved oxygen given that this species is anoxia tolerant. Sites with ice cover present may restricts access to air, thus, selecting sites that are cold and thermally stable allows them to maintain a low metabolism to reduce energy costs or the risk of metabolic acidosis (Markle and Fraser 2017; Edge et al. 2009) which would occur if temperatures fell below the bodily fluid freezing point of -0.6ºC (Constanzo et al. 2016).

Habitat Suitability Index (HSI) mapping shows suitable nesting, overwintering and functional habitat within 10 km of the PA (Appendix B.7.4 of the Impact Statement). Where HSI modelling did not cover the full extent of the LSA, those areas were mapped using FRI vegetation data (Figure A.11 of this report).

Blanding's turtle habitat, as set out in the General Habitat Description (GHD) for Blanding's turtles (MECP 2021a) for the three historical observations in the RSA is summarized Table 5.9 based on data from WSP (Appendix B.7.4 of the Impact Statement) and described below:

- Category 1: Nest and/or Overwintering Sites and area within 30 m –To be conservative, the provided observation was assumed to be the centre of Category 1 habitat. This habitat is present within the LSA for two historical records and RSA for one historical record. Category 1 habitat was not found in the PA.
- Category 2: Wetland Complex (All suitable waterbodies within 500 m of each other) that extends up to 2 km from an occurrence, and the area within 30 m around those suitable waterbodies – Category 2 habitat extends into the PA for one of the three historical records. All three records indicate the presence of Category 2 habitat within the LSA, with one record showing that it is predominantly located in the RSA.
- Category 3: Area between 30 m and 250 m around suitable waterbodies identified in Category 2, within 2 km from an occurrence – Category 3 habitat was identified in the LSA for two of the historical records east of the PA, as well as in the RSA for the historical record west of the LSA.

Table 5.9 Summary of Blanding's Turtle Habitat in the Regional Study Area

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Blanding's Turtle Habitat, Category 1	0	0	1	0	0.28	0
Blanding's Turtle Habitat, Category 2 (wetland plus 2 km)	382	3	1,990	4	927	0.2
Blanding's Turtle Habitat, Category 3	1	0	191	0.4	190	0.04
Total	**383**	**-**	**2,182**	**-**	**1,117.28**	**-**

5.4.5.1.4 Life History

Blanding's turtle is a long-lived species which can live for over 75 years. Similar to other turtles, this species has delayed sexual maturation which can take up to 25 years. Reproductive output is low, with females producing one clutch of 3-19 eggs, averaging 10-15 eggs, every 1-3 years. Nesting occurs in early June, peaking around mid-month, with activity mostly between late afternoon and night. Females may spend several days on land before nesting (ECCC 2018).

5.4.5.1.5 Threats and Disturbance

Blanding's turtle may be impacted by habitat loss and fragmentation (e.g., forestry, linear infrastructure), fires, flooding, droughts and pests which can result in loss of individuals and changes in habitat through direct loss and alteration. Negative effects on habitat can be profound, while disturbances such as flooding can create temporary wetlands beneficial for amphibians and reptiles. Forest harvesting can result in incidental take, road mortality and increase risk of predation. Turtles have a late age of maturity and slow reproduction rate and therefore, a loss of a few adult turtles annually can result in substantial declines in a population.

The species' life-history strategy involves a trade-off between high adult survival and low reproductive output. This strategy makes them particularly vulnerable to increases in adult mortality rates, even if slight. Blanding's turtles are sensitive to disturbances such as road construction, habitat fragmentation, and wetland alterations, which can significantly impact their survival and reproduction. Their habitat needs and life-history characteristics highlight their sensitivity to environmental changes and the importance of protecting their habitats from disturbance.

Blanding's turtle is a disturbance-sensitive species with life history limitations (low recruitment rates, low annual survival of juveniles), resulting in sensitivity to even minor changes in mortality risk. Individuals are at risk along existing roads, and the risk is increased when these roads experience greater volumes of traffic and where new roads are created through suitable habitat, bisecting movement corridors. Draining, infilling, dredging, or other alterations of wetlands or suitable waterbodies can impact Blanding's turtle and their habitat, where present.

5.4.5.2 Boreal Caribou

5.4.5.2.1 Species Significance

Boreal caribou (*Rangifer tarandus* pop. 14) is designated as threatened both provincially and federally under the ESA and SARA, respectively. This species is an indicator of healthy boreal forest ecosystems and are important to Indigenous culture and traditional practices. As an 'umbrella' species, protecting boreal caribou habitat can extend to a wide range of other species that rely on the same ecosystem.

5.4.5.2.2 Distribution and Abundance

The southern limit of the Kesagami Caribou Range (ON8; ECCC 2020) begins within the central portion of the LSA with limited suitable habitat present. The Kesagami Caribou Range was last assessed provincially in 2010 (MNRF 2014) and was characterized at the time as 44% disturbed, with a minimum animal count of 178 boreal caribou and a declining population trend (low calf recruitment). At that time, no boreal caribou were observed south of Pierre Lake in the southern half of the Kesagami Caribou Range (MECP 2024), which is located 78 km northeast of the PA. In 2023, subsequent monitoring was completed with 167 individuals observed, belonging to 18 groups (MECP 2024). No boreal caribou were observed in the southern portion of the Kesagami Caribou Range, consistent with previous findings from the MNRF (2014) Integrated Range Assessment report.

There have been no records of boreal caribou in the southern portion of the Kesagami Caribou Range since the early 2000s (MNRF 2014), which includes LSA. Historically, the southern limits of the Kesagami Caribou Range have always had low occupancy with relatively [redacted] (MNRF 2014). The southern limits of the Kesagami Caribou Range were established based on the potential for connectivity, particularly [redacted] where forest stands are coming of age to support caribou re-occupation (MNRF 2014).

5.4.5.2.3 Habitat

At a broad landscape scale, boreal caribou require large, undisturbed areas of old or mature conifer upland forest and lowlands dominated by jack pine and/or black spruce. These areas allow boreal caribou to effectively separate themselves from higher densities of moose, white-tailed deer, northern gray wolf, and American black bear which tend to be associated with younger mixed or deciduous forest. At smaller scales, boreal caribou seasonally select specific habitat features and areas that support successful reproduction and calf rearing, provide summer and/or winter forage, and/or facilitate movement between discrete areas of use. boreal caribou require large un-fragmented habitats for security from predators to space apart from other ungulate species, to distribute themselves over the landscape at naturally low population density, and to avoid disturbance from human activities that may increase mortality risk (COSEWIC 2002; ECCC 2020). Lichen species preferred by boreal caribou are a consistent feature of winter and summer home ranges. Lichens tend to be most abundant in mature and old forests, consequently fire, logging, and mining and sensory disturbance from linear anthropogenic disturbances can displace Caribou for decades (COSEWIC 2002; ECCC 2020).

As detailed in Appendix C of this report, habitat within the LSA that overlaps the Kesagami Caribou Range has low habitat suitability as a consequence of current habitat characteristics (early successional vegetation and has incurred significant forestry disturbance) and presence of alternate prey (moose) which typically attracts a known predator of boreal caribou, wolves. In accordance with provincial guidance, boreal caribou habitat was characterized following the GHD (MECP 2021b), as well as a Resource Selection Probability Function (RSPF) approach to modelling Category 2 and Category 3 habitat. The 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement) includes the initial habitat assessment for boreal caribou, while the updated Category 2 and Category 3 mapping is discussed in Appendix C of this report (Updated General Habitat Description Category 2 and 3 Mapping for Kesagami Range memo). The updated habitat mapping for boreal caribou reflects the latest modelling using the RSPF (Appendix C) and is shown on Figure A.12 of this report

- Category 1: Nursery Areas, Winter Use Areas, Travel Corridors –This habitat was only identified in the RSA (beyond the LSA) [redacted] near the [redacted] portions of he Kesagami Caribou Range.
- Category 2: Seasonal Ranges – This habitat was only identified in the RSA (beyond the LSA), near the [redacted] of the Kesagami Caribou Range and [redacted]
- Category 3: Remaining Areas within the Range – This habitat was identified throughout the RSA, encompassing the entire LSA, and has the highest tolerance to alteration before the function is compromised. Habitat within the PA is approximately 6,020 ha, which accounts for 51% of the PA. The LSA for boreal caribou is 64,558 ha.

5.4.5.2.4 Life History

Boreal caribou exhibit a life history characterized by low reproductive rates, long life spans, and a strategy of avoiding predators. Boreal caribou have a seasonal mating period, known as the rut, which typically occurs in late September to early October. After mating, the gestation period lasts about 230 days, with

cows giving birth to a single calf in late spring or early summer, usually in May or June. Cows are protective of their calves, often seeking isolated areas to give birth, away from predators.

5.4.5.2.5 Threats and Disturbance

The habitat configuration within the LSA is conducive to increased numbers of alternate prey (moose) and associated predators (northern gray wolves) which reflect a local landscape with high mortality risk to boreal caribou and has substantial anthropogenic disturbance; therefore, it currently has low habitat suitability.

Boreal caribou are disturbance-sensitive with life history limitations (low reproductive output, low annual calf survival), resulting in sensitivity to minor changes in mortality risk. They naturally occur at low spatial density (typically 0.02 to 0.03 boreal caribou/km^2) but have large spatial home range requirements for well-connected old-growth boreal forest and lichen-rich peatlands. These large home ranges allow boreal caribou to spatially separate from predators and alternative prey and avoid disturbance (ECCC 2020).

5.4.5.3 Bats

5.4.5.3.1 Species Significance

Several bat species were recorded within RSA, including big brown bat (*Eptesicus fuscus*), little brown myotis (*Myotis lucifugus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*). Of these, only big brown bat is considered common, while the other species are considered a SAR based on current designations or upcoming changes. Northern myotis (*Myotis septentrionalis*) was not confirmed, although has a high potential of occurrence. As the Project is not on federal land, species and habitat protection for bats generally only applies to the ESA.

Little brown myotis and northern myotis are currently designated endangered both provincially and federally under the ESA and SARA, respectively. In 2023, eastern red bat, hoary bat, and silver-haired bat were assessed as endangered both provincially (COSSARO) and federally (COSEWIC). These species will be added to O.Reg. 230/08 and protected under the ESA, effective January 31, 2025. However, the federal status change is currently under consideration with consultation ongoing through 2024. At this time, it is unknown when or if the status change will occur federally under SARA. These species will only receive protection once the status changes take effect. Although these species are not currently considered a SAR, they will be discussed in this Section as the Project is not expected to commence prior to the upcoming provincial status change.

5.4.5.3.2 Distribution and Abundance

As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), surveys were completed within 10 km of the PA between 2021 to 2023 with bats recorded at all survey locations. This included: big brown bat, eastern red bat, hoary bat, little brown myotis and silver-haired bat. Of these, only big brown bat is considered common, while the other species are considered a SAR based on current designations or upcoming changes. The only bat species in Ontario not recorded was northern myotis and tricolored bat (*Perimyotis subflavus*; designated endangered both federally and

provincially) and eastern small-footed myotis (*Myotis leibii*; designated endangered provincially only). Although northern myotis was not confirmed (due to difficulty in distinguishing calls from acoustic data), there is potential that this species could be present.

Overall, there appears to be widespread distribution of bats throughout the LSA based on results from the acoustic surveys (Appendix B.7.4 of the Impact Statement). Abundance data is not available for acoustic data. The most frequently recorded species was the silver-haired bat, followed by the hoary bat. Little brown myotis were recorded at the following locations: CL-DET-G2-04, CL-DET-CBM-11, CL-DET-CBM-19, and CL-DET-CBM-12 (Appendix B.7.4 of the Impact Statement). A map showing the survey locations and habitat is provided on Figure A.13 of this report. Survey locations are from data obtained by WSP (Appendix B.7.4 of the Impact Statement) and habitat is based on FRI data mapped by Stantec. A summary of results from the maternity roost and hibernacula acoustic data is provided in section 4.4.2 and 4.4.4 of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).

5.4.5.3.3 Habitat

Bats utilize a variety of habitats throughout their life history. Woodlands are used for roosting, while wetlands and waterbodies are important for foraging. Caves, mines and areas with bedrock are typically used for overwintering, although some species (i.e., big brown bat) will hibernate in anthropogenic structures like buildings. A summary of habitat types within the RSA is provided in Table 5.10, with habitat mapping provided on Figure A.13 of this report. As mentioned earlier, habitat was mapped by Stantec using FRI data.

A summary of methods, results and habitat characteristics is provided in section 4.4.1 and 5.2.2.1 (maternity roost) and section 4.4.3 and 5.2.1 (hibernacula) of the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).

Table 5.10 Summary of Bat (including non-SAR) Habitat in the LSA

Feature	PA (11,785 ha)	Area (%)	LSA (54,324 ha)	Area (%)	RSA (438,561 ha)	Area (%)
Woodland Habitat • Roosting, foraging and movement	2,837	24	14,273	27	169,993	39
Wetland Habitat • Foraging and movement	8,667	74	39,175	72	217,459	50
Water Habitat • Foraging and movement	26	0.2	288	0.5	12,428	3
Open Habitat (Anthropogenic/Active Barren) • Foraging, movement, overwintering (caves, mines, rock outcrops, buildings)	255	2	577	1	38,681	9
Total	**11,785**	**-**	**54,324**	**-**	**438,561**	**-**

5.4.5.3.4 Life History

Bats have a complex life history characterized by unique reproductive strategies, growth, and social behaviors. Bats typically give birth to one or two pups in late spring or early summer, after a gestation period of about 40 to 60 days. Mating generally occurs in the fall, but fertilization is often delayed until after hibernation, so that pups are born when food is abundant. Of the eight bat species in Ontario, five are non-migratory and stay in Ontario year-round (little brown myotis, northern myotis, eastern small-footed myotis, tricolored bat, and big brown bat) and three migrate in the winter (silver-haired bat, hoary bat and eastern red bat).

In summer, bats roost in tree cavities, under bark, leaf clusters or in human structures like attics and barns. Social structures vary, with some species forming large colonies, while others are more solitary. The life span of Ontario bats can be relatively long, with some individuals living over 10 years. Ontario bats, such as the little brown bat and the big brown bat, undergo hibernation during the winter months to survive periods when insect prey is scarce. Hibernaculum includes caves, abandoned mines, or other sheltered locations with stable temperatures and humidity levels. Big brown bat primarily hibernates in man-made structures.

5.4.5.3.5 Threats and Disturbance

The primary threat to bats is white-nose syndrome, a fungal disease that disrupts hibernation and leads to high mortality rates among affected species. Other disturbances such as habitat loss and fragmentation due to forestry, fires and blowdowns can result in a loss of roosting and foraging areas. These same disturbances can benefit bats by creating additional roosting sites in fallen trees and increasing foraging opportunities. Climate change and pesticide use pose additional threats to bats by reducing insect populations, which are a primary food source for insectivorous bats. Climate change also presents further challenges, including the spread of white-nose syndrome, changes in insect availability and the creation of unsuitable conditions for hibernation that can affect foraging efficiency and overall survival.

6 Summary

This Terrestrial Willdife and Wildlife Habitat Supplemental Baeline Report provides a description of baseline conditions that reflect current conditions within the LSA, based on comprehensive data collection, analysis and field studies between 3031 to 2023. The key indicator species selected for evaluation are reflective of the general biodiversity of the area and are intended to inform the assessment of Project effects in the Assessment of Potential Effects on Wildlife and Wildlife Habitat in Chapter 19 of the Impact Statement.

The LSA is reflective of the boreal forest, characterized by a landscape dominated by wetlands and woodland communities. However, forestry activities and a history of fires have altered the habitat, leading to various stages of regeneration. Wildlife and wildlife habitat are typical of boreal ecosystems with widespread distribution of moose, furbearers and bats throughout the LSA.

Suitable habitat for amphibians and reptiles, including SOCC (midland painted turtle and snapping turtle) are present within the LSA; however, most of these species are at the northern limit of their range, making them less abundant and difficult to detect. As a result, many have not been recorded or observed in the area. Other SOCC such as monarch and yellow-banded bumble bee have the potential to occur in the LSA with relatively low abundance due to declining populations. Habitat for monarch is limited due to a lack of open habitat and meadow communities supporting milkweed populations. Suitable habitat for yellow-banded bumble bee is present in the LSA with only a few records in recent years based on the background review.

Historical records of Blanding's turtle in the RSA were identified during the background review. This includes three historical records in the RSA: two records in the LSA east of the PA and one record in the RSA west of the LSA. Category 2 and 3 habitat extends into the PA for one of the records along the east boundary and would be subject to the provisions of the ESA. Category 2 habitat has a moderate level of tolerance to alteration before their function is compromised. Category 3 habitat is considered important for movement corridors between wetlands and has the highest tolerance to alteration. Consultation with MECP is required to determine any permitting requirements.

The southern limit of the Kesagami Caribou Range begins within the central portion of the LSA and are subject to the provisions of the ESA in collaboration with SARA through the 2022 Agreement. The southern portion of the Kesagami Caribou Range [redacted] has historically had low occupancy and there have been no records of boreal caribou within the LSA since the early 2000s. The LSA is considered to have low habitat suitability based on current conditions such as early successional forests, disturbance and alternate prey (moose) and associated predators (northern gray wolf). A permit under the ESA is anticipated as the Project will require removal of habitat within the Kesagami Caribou Range.

SAR bats have been recorded throughout the LSA. Habitat loss will occur through the removal of potential roosting habitat. Hibernacula was not identified in the PA, although may be present in the LSA and RSA. Consultation with MECP is required to determine any permitting requirements for impacts to bat habitat in the PA.

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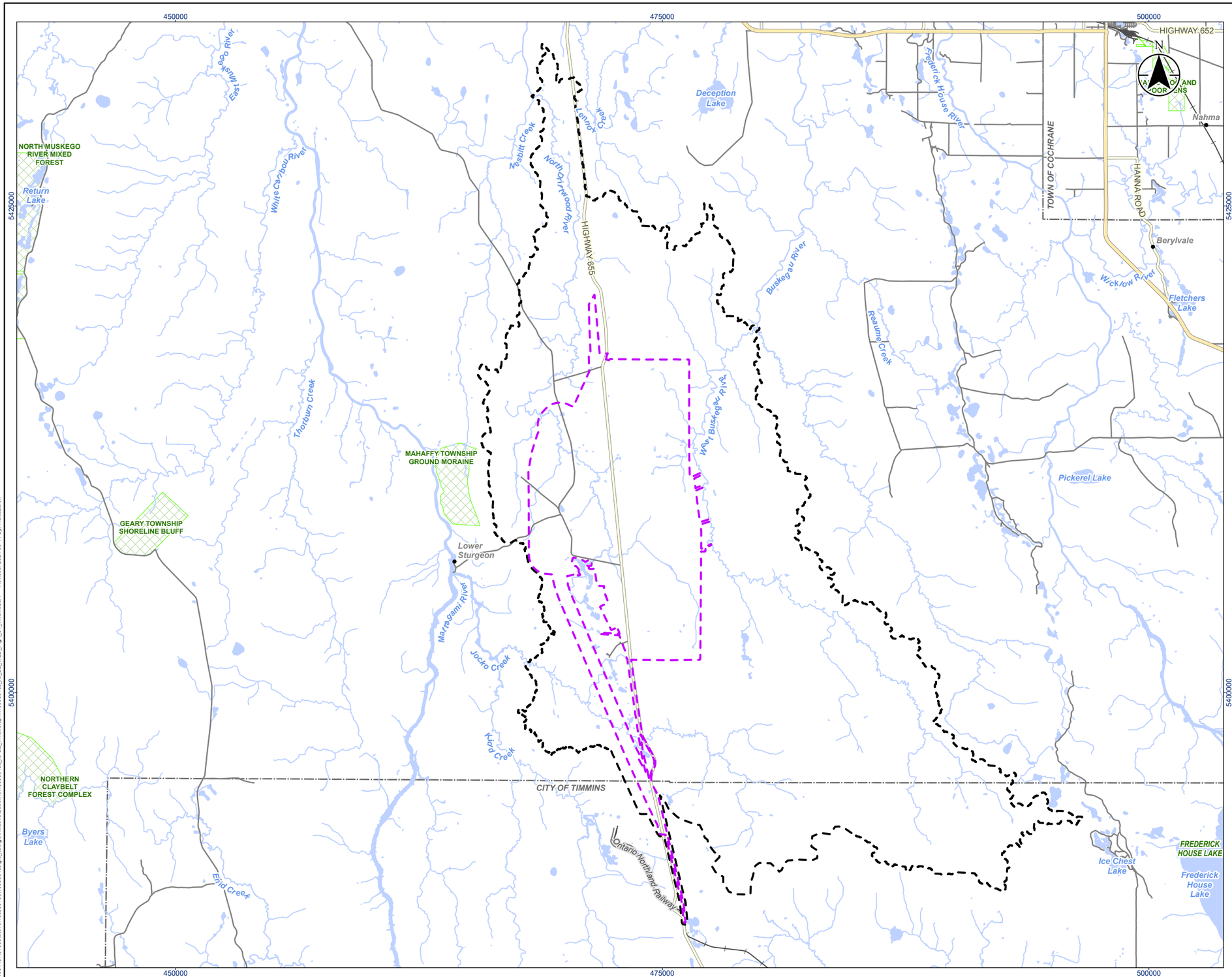
Appendices

Appendix A Figures



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

1:200,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.01

Title
Wildlife and Wildlife Habitat Local Study Area

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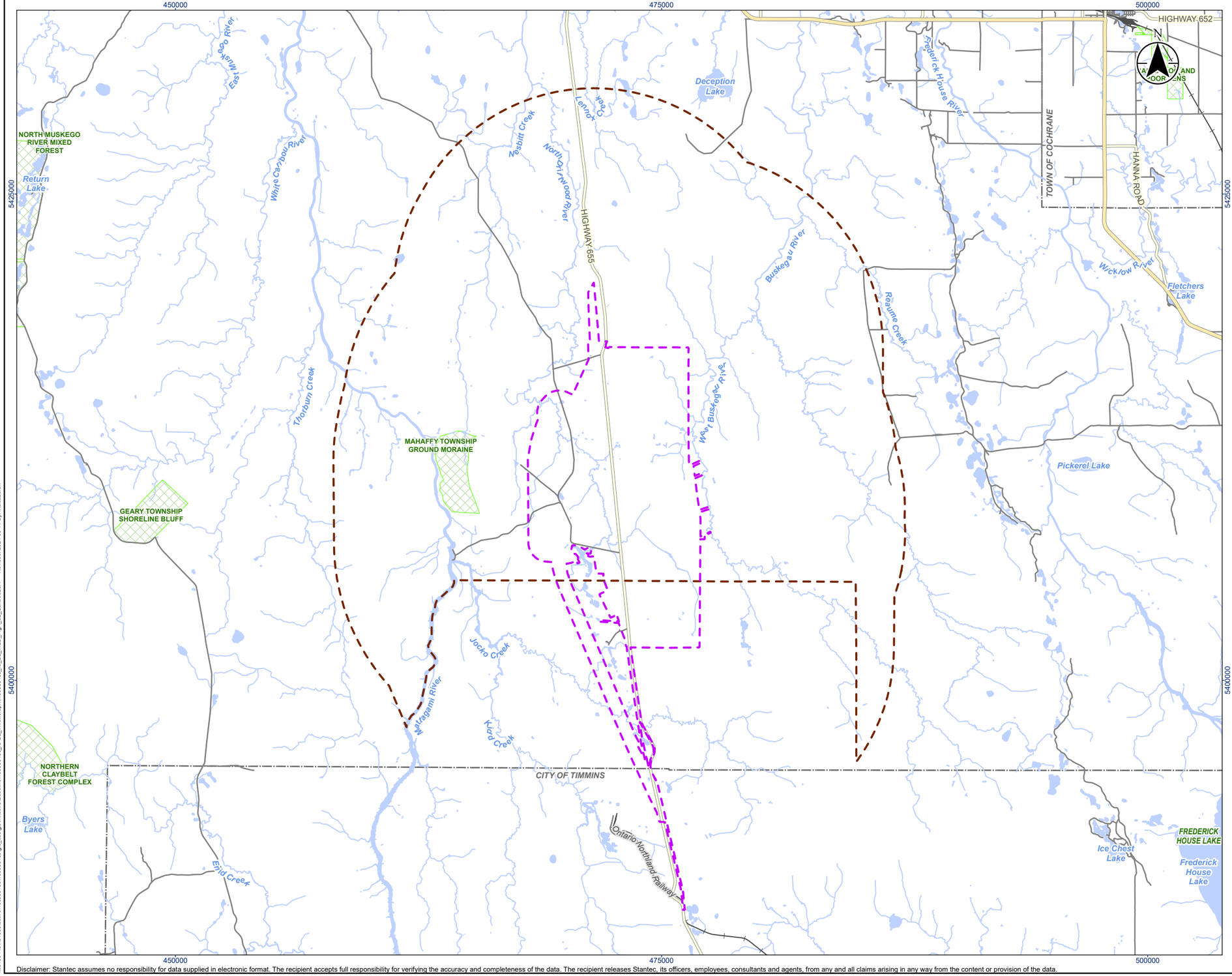

Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area,Wildlife - Caribou

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

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REVA
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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.02

Title
Boreal Caribou Local Study Area

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Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- First Nation Reserve
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- Provincial Park
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated

0 10 20 km

1:400,000 (At original document size of 11x17)

Notes

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Project Location
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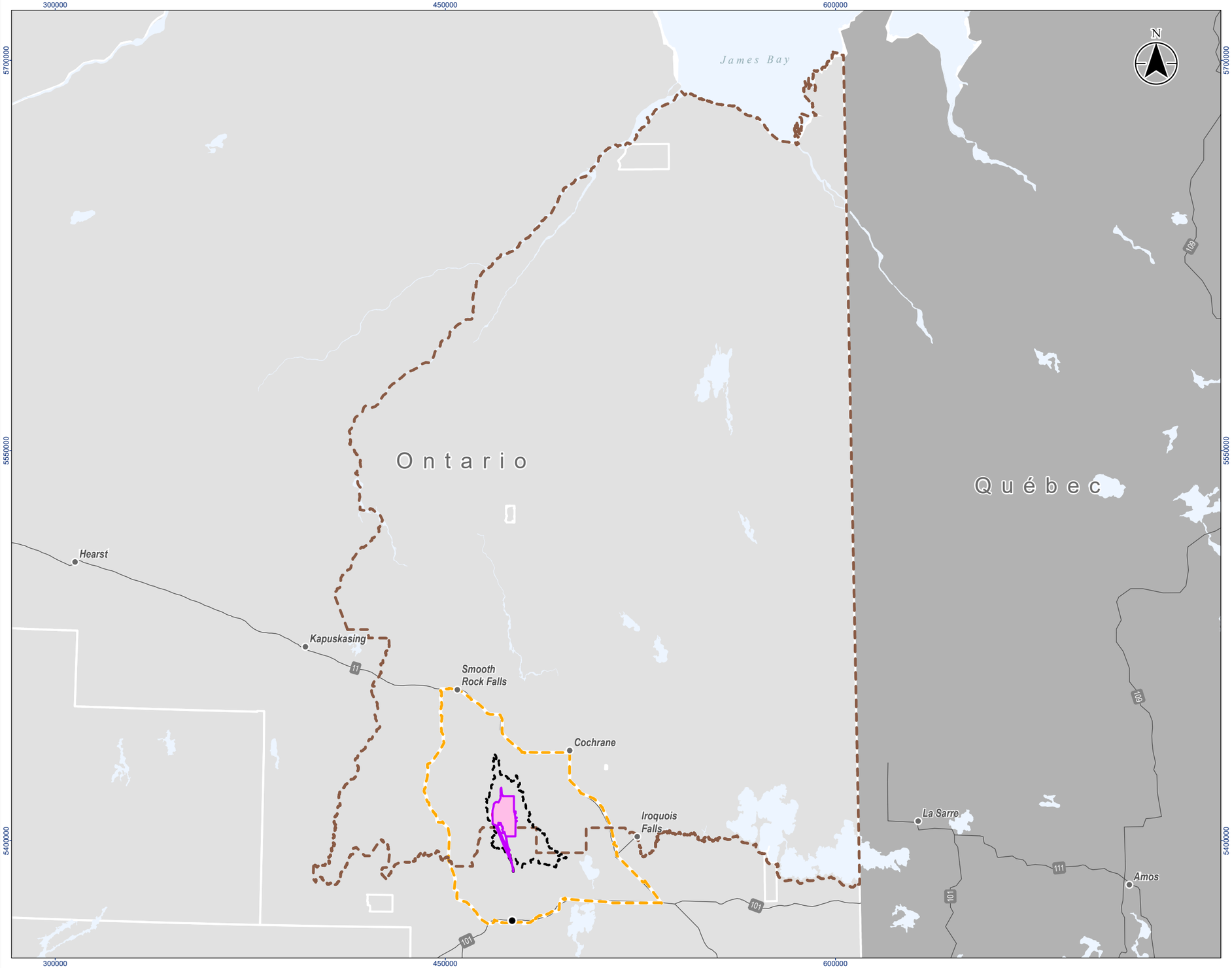
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.03

Title
Wildlife and Wildlife Habitat Regional Study Area

\\cd1004-f01101609\active\160930456\160930456\gis_cad\gis\mxds\ISBaseline\160930456_IS-BL_Wildlife.aprx\160930456_IS_BL_WLD_Fig4_03_WildlifeRSA Revised: 2024-09-11 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Regional Study Area - Caribou

Base Features

- Major Roads
- Waterbody
- ON
- Quebec

0 50 100 km

1:1,500,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

REVA
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.04

Title
Boreal Caribou Regional Study Area

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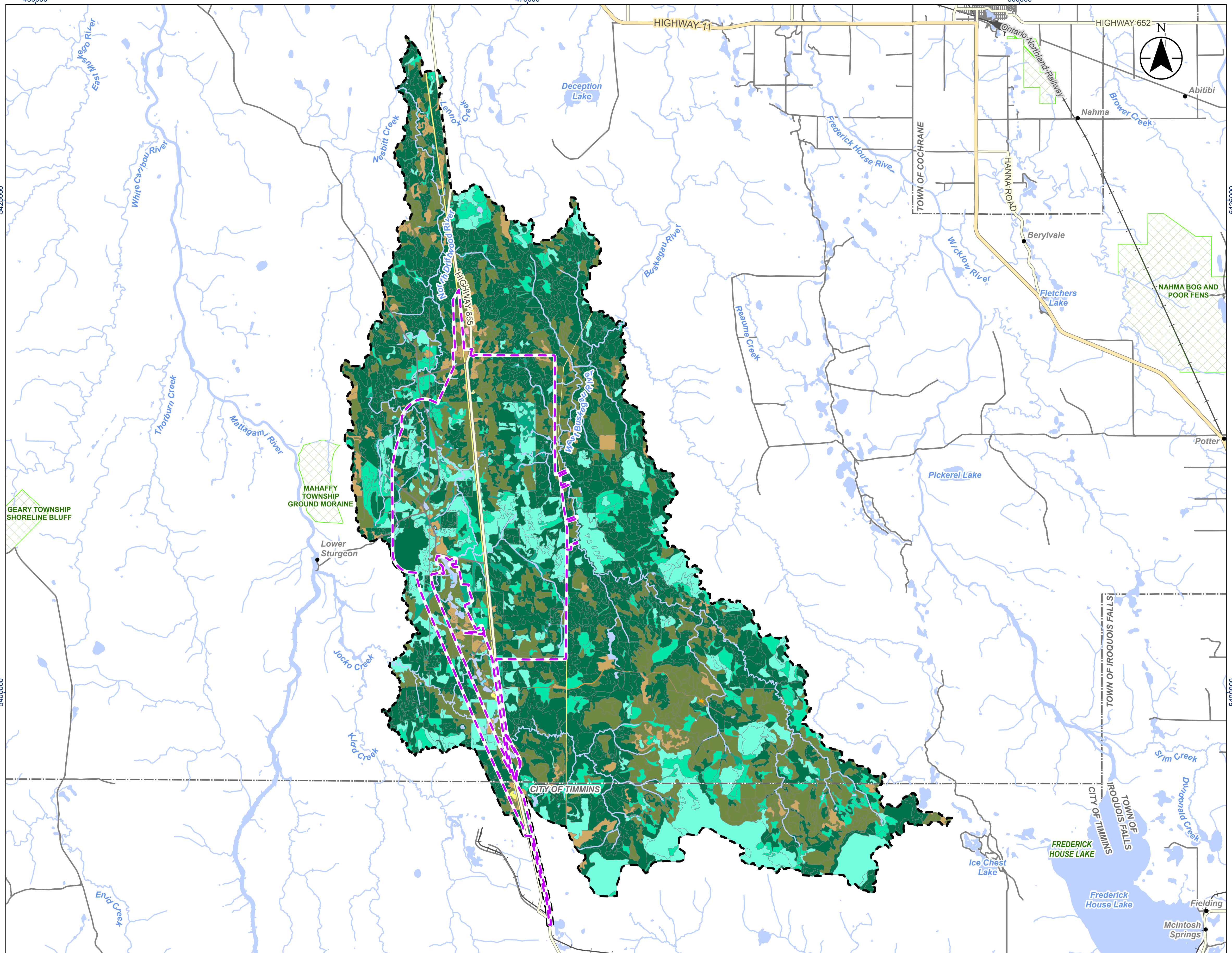

Stantec

CANADA NICKEL COMPANY

N

Legend

- Project Area
- Local Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

Forested Area

- Coniferous Forest/ Stand
- Deciduous Forest/ Stand

Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp

Water

- Water

Anthropogenic

- Anthropogenic
- Constructed

Rock

- Barren

0 5 10 km

1:200,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

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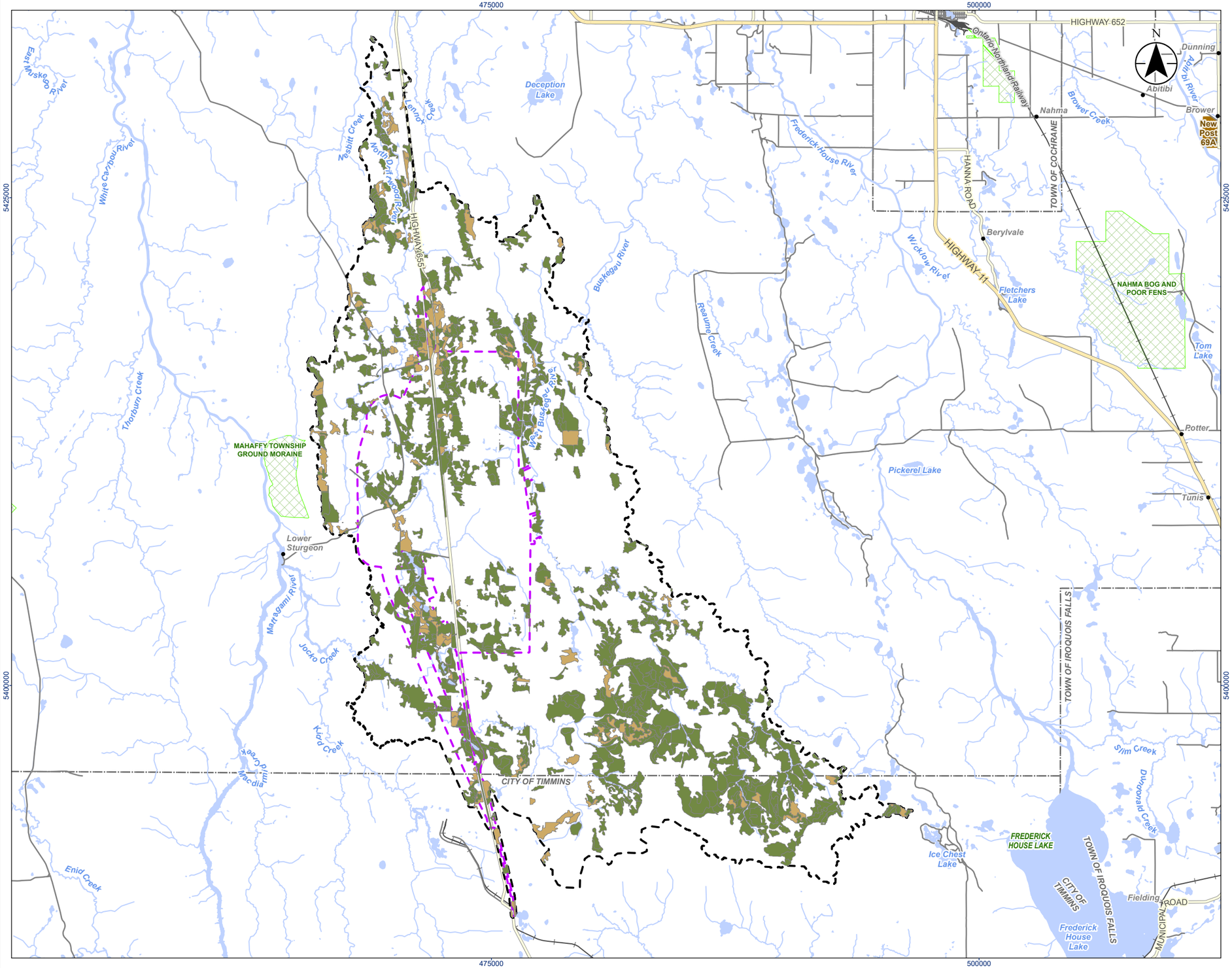
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.05.0

Title
Vegetation Communities in the Local Study Area

V:\01604-f01\01609\active\160930456\gis_cad\gis\mxds\ISBaseline\160930456_IS_BL_Wildlife.aprx\160930456_IS_BL_WLD_FigA_05_Veg_LSA Revised: 2024-09-11 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area

Forested Area

- Coniferous Forest/ Stand
- Deciduous Forest/ Stand

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- First Nation Reserve
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

1:200,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
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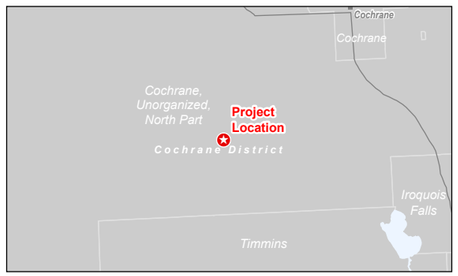


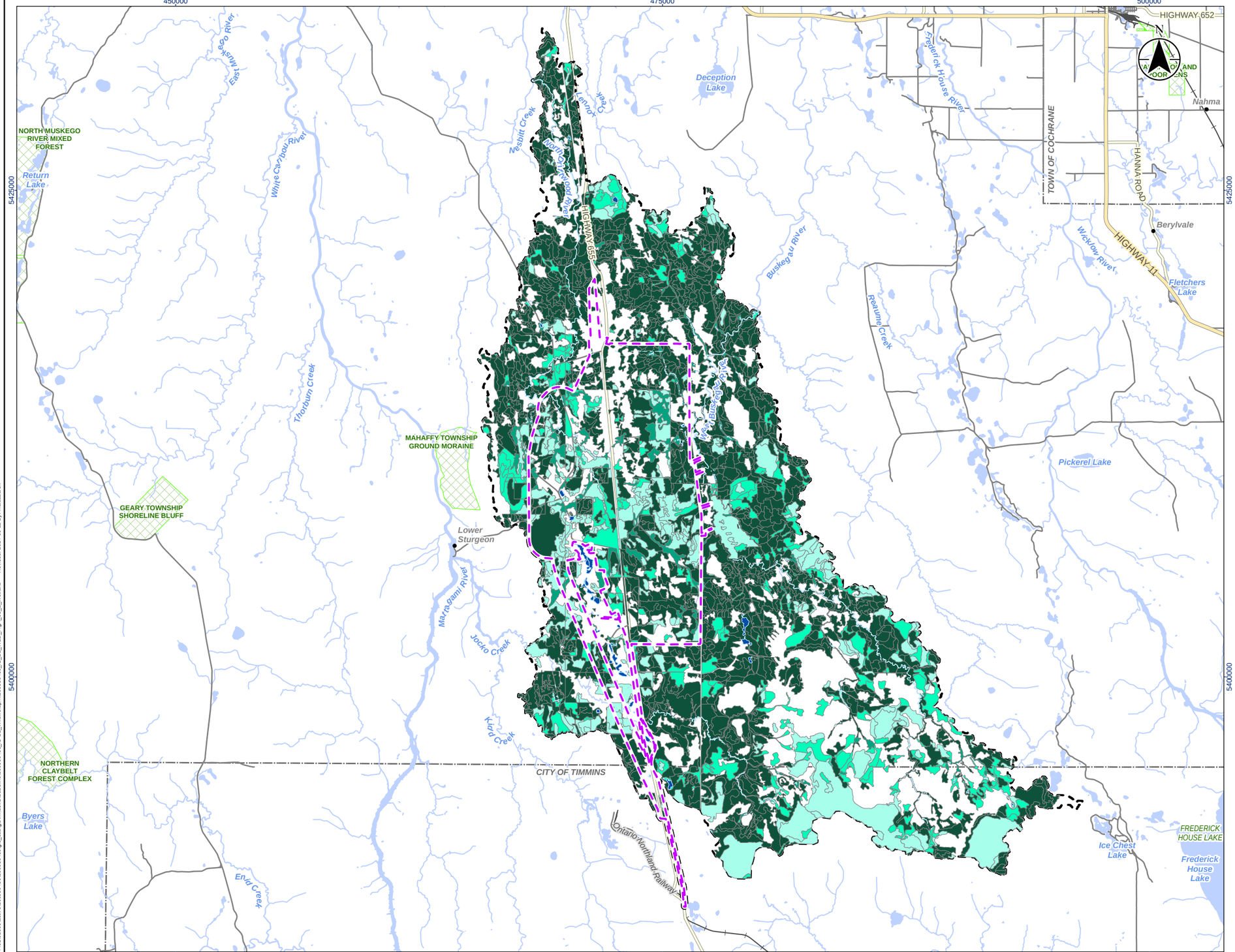
Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.05.1

Title
Upland Forest Communities in the Local Study Area



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area

Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp

Water

- Water

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

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Notes

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Project Location
Timmins, Ontario

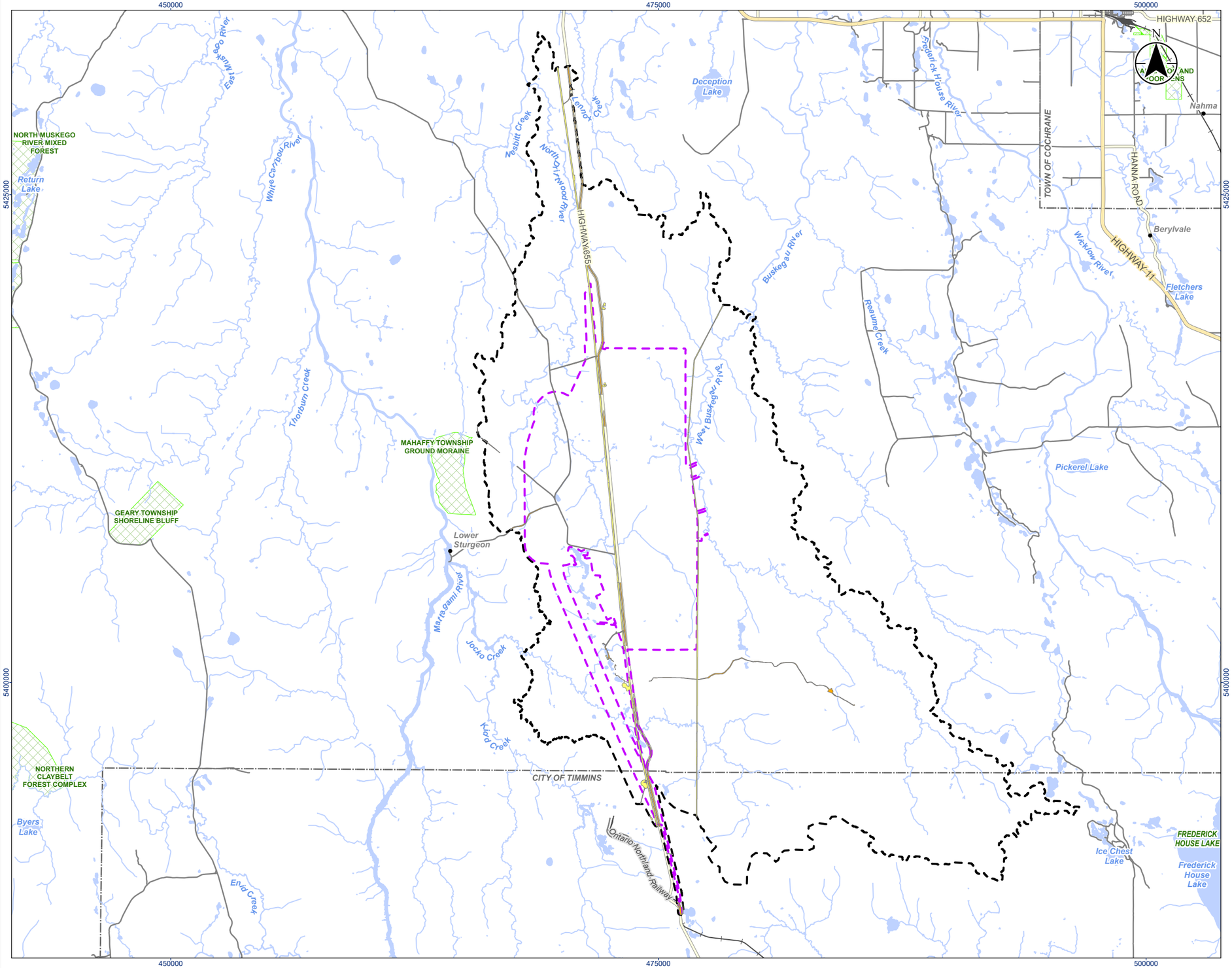
160930456 REVA
Prepared by malcazaren on 2024-09-11

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.05.2

Title
Wetland and Water Communities in the Local Study Area

\\cd1004-f01\01609\active\160930456\gis_cad\gis\mxds\ISBase\mxd\160930456_IS-BL_Wildlife.aprx\160930456_IS_BL_VILD_Fig4_06_2_Wetland Revised: 2024-09-11 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area

Anthropogenic

- Anthropogenic
- Constructed

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

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Notes

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Project Location
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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.05.3

Title
Anthropogenic Communities in the Local Study Area

\\cd1004-f01\01609\active\160930456\160930456\gis_cad\gis\mxds\SI\Baseline\160930456_IS-BL_Wildlife.aprx\160930456_IS_BL_YLD_FigA_05_3_Anthropogenic Revised: 2024-09-11 By: malcazaren

Map_ID	ID
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A-2	CL-AM-07
A-3	CL-AM-10
A-4	CL-AM-11
A-5	CL-AM-12
A-6	CL-AM-13
A-7	CL-AM-14
A-8	CL-AM-15
A-9	CL-AM-16
A-10	CL-AM-17
A-11	CL-AM-20
A-12	CL-AM-21
A-13	CL-AMPH-G2-03
A-14	CL-AMPH-G2-01
A-15	CL-AMPH-G2-02
A-16	CL-AMPH-G1-01
A-17	CL-AMPH-G1-02
A-18	CL-AMPH-G1-04
A-19	CL-AMPH-G2-04
A-20	CL-AMPH-G2-05
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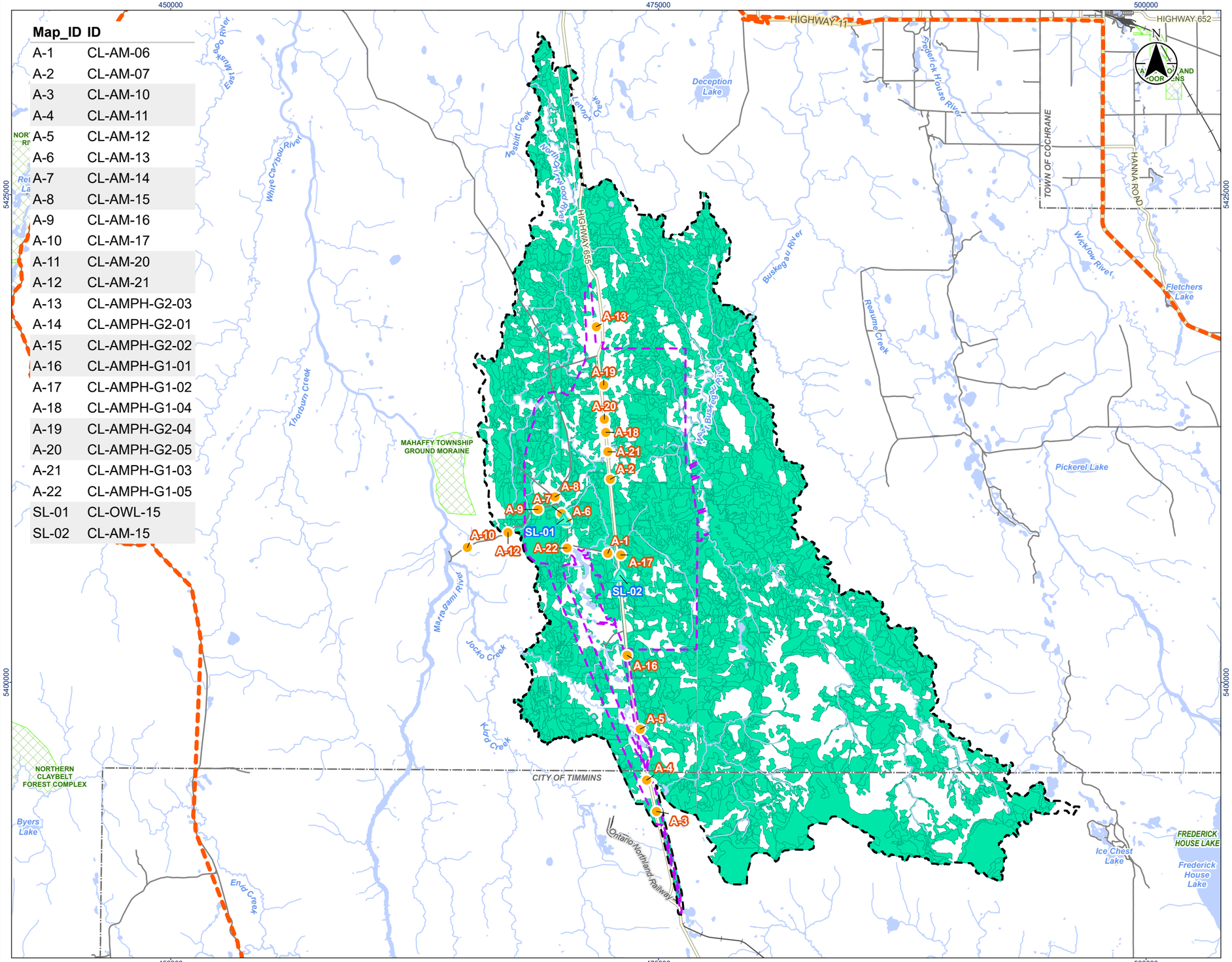
A-22	CL-AMPH-G1-05
SL-01	CL-OWL-15
SL-02	CL-AM-15



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Salamander Observation, 2023
- Amphibian Call Survey Location
- Suitable Amphibian and Turtle Habitat

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody

0 5 10 km

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Notes

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Project Location
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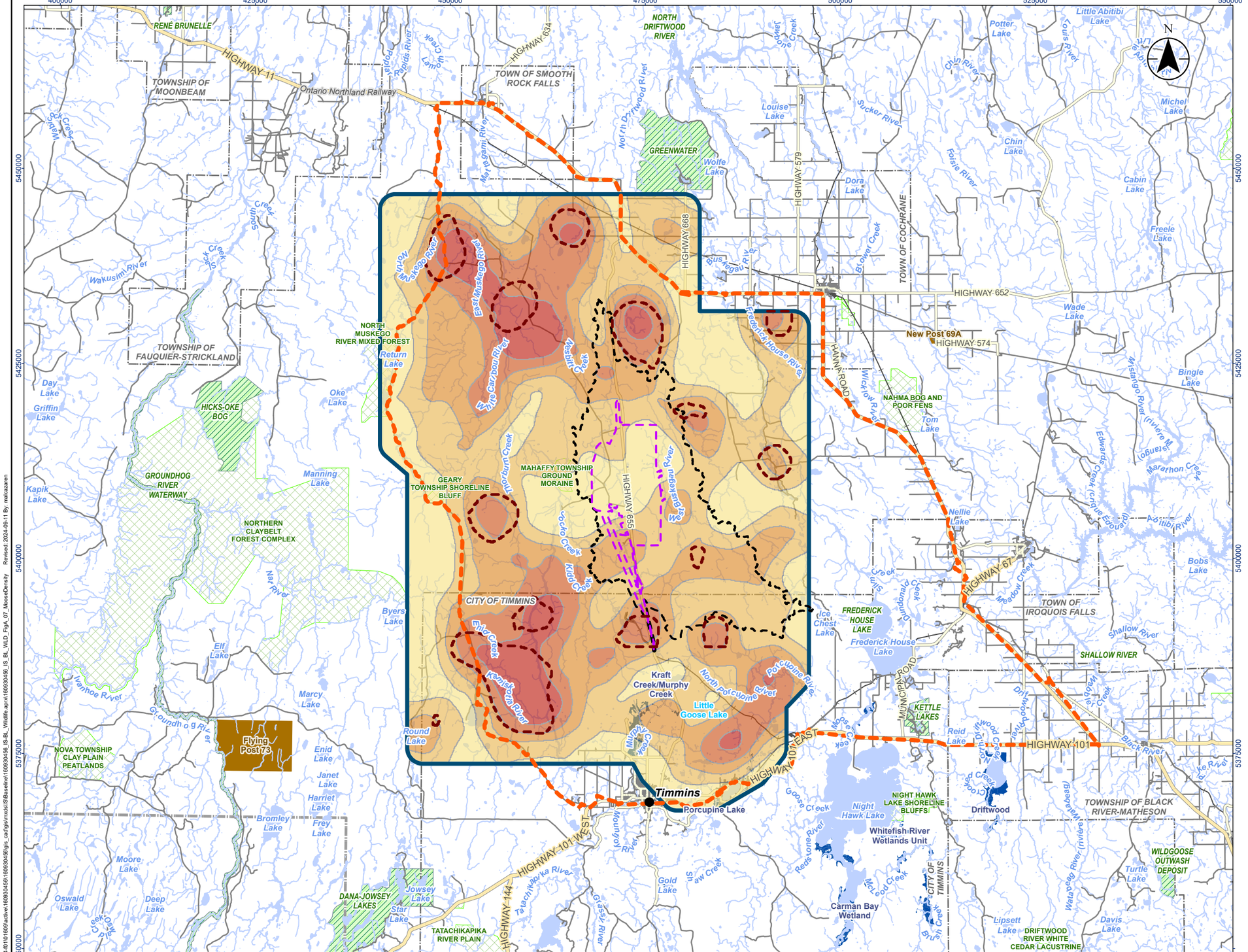
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.06

Title
Amphibian Surveys and Results

\\cal1004-f01\160930456\active\160930456\160930456_GIS\gis_cad\gis\mxd\ISBaseline\160930456_IS-BL_Wildlife.aprx\160930456_IS_BL_WLD_Fig06_AmphSurvey Revised: 2024-09-11 By: malcazaren



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CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Aerial Survey Study Area 2022
- Relatively High Moose Density Areas (2021)

Density

- High
- High Medium
- Medium
- Medium Low
- Low

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- First Nation Reserve
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated

0 5 10 km

1:500,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.07

Title
Relative Density for Moose

\\cd1004-f01\01609\active\160930456\gis_cad\gis\mxds\ISBaseline\160930456_IS-BL_Wildlife.aprx\160930456_IS_BL_VILD_FigA_07_MooseDensity Revised: 2024-09-11 By: malcazaren

Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Moose Aquatic Feeding Area (120m buffer)
- Moose Aquatic Feeding Area
- Moose Early Wintering Area (300 m buffer)
- Moose Early Wintering Area
- Moose Late Wintering Area (300 m buffer)
- Moose Late Wintering Area

Moose Winter Habitat Rating

- High
- Moderate
- Low
- Not Ranked

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- First Nation Reserve
- Provincial Park
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated

0 5 10 km

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Notes

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Project Location
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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.08

Title
Moose Habitat

\\cd1004-f01\01\160\active\160930456\160930456\gis_cad\gis\mxds\ISBase\mxd\160930456_IS-BL_Wildlife.aprx\160930456_IS-BL_WLD_FigA_08_MooseHabitat Revised: 2024-09-11 By: malcazaren

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CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Aerial Survey Study Area 2022

Wildlife Observations

- Beaver
- Canada Lynx
- American Marten
- North Amrican Otter
- Snowshoe Hare

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Conservation Reserve (Regulated)
- First Nation Reserve
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower Tier
- Provincial Park
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Waterbody

0 5 10 km

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Project Location
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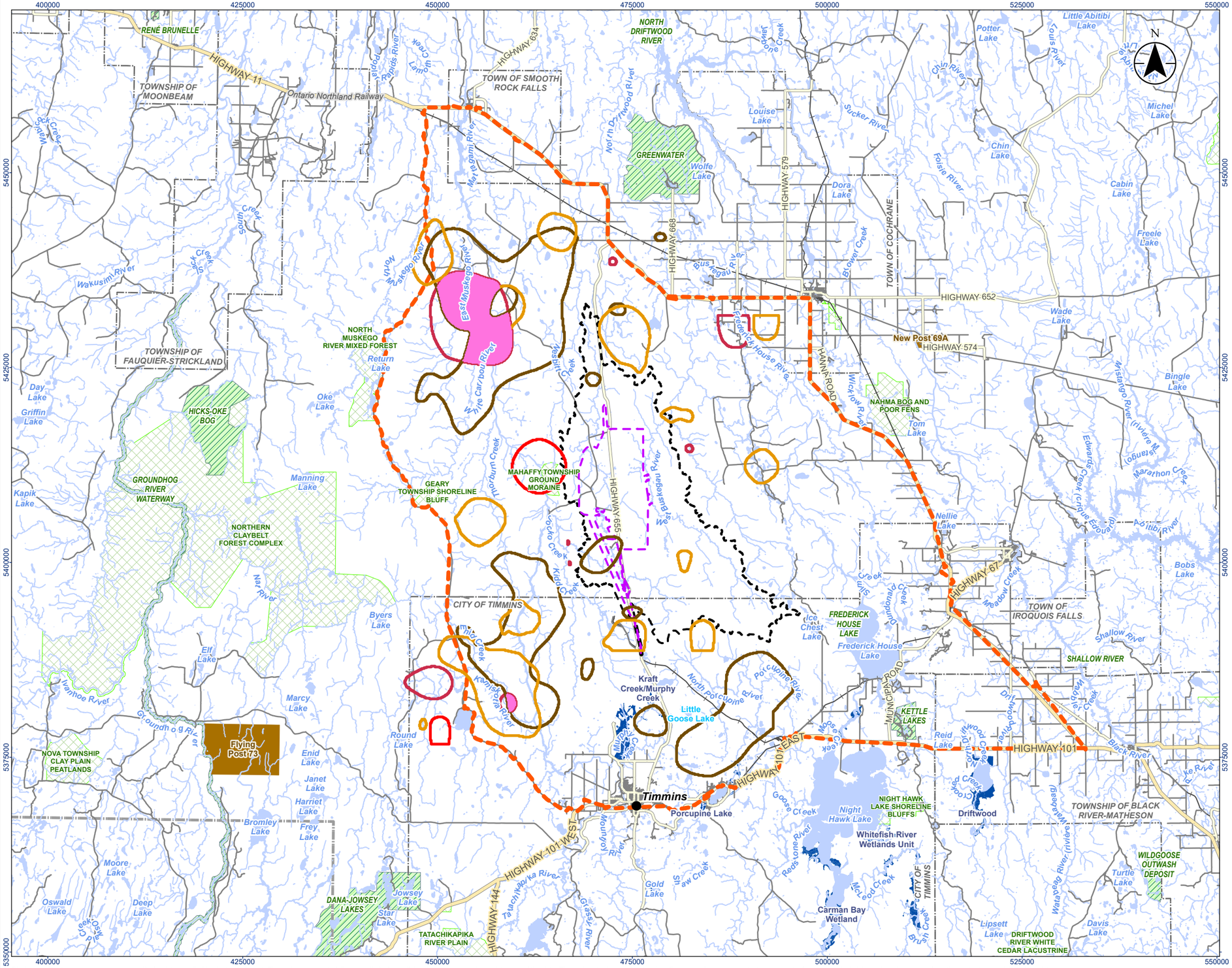
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.09

Title
Furbearer Surveys and Results

\\cd1004-f01\01609\active\160930456\160930456\gis_cad\gis\mxds\IS\Baseline\160930456_IS_BL_Wildlife.aprx\160930456_IS_BL_VILD_FigA_09_Furbearers Revised: 2024-09-11 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Relatively High Wolf Density, 2022
- Relatively High Wolf Density, 2021
- Relatively High Moose Density, 2022
- Relatively High Moose Density, 2021
- Areas of Relatively High Density overlap (2022)

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Waterbody
- Watercourse
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- First Nation Reserve
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Provincial Park
- Conservation Reserve (Regulated)

0 5 10 km

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Notes

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Project Location
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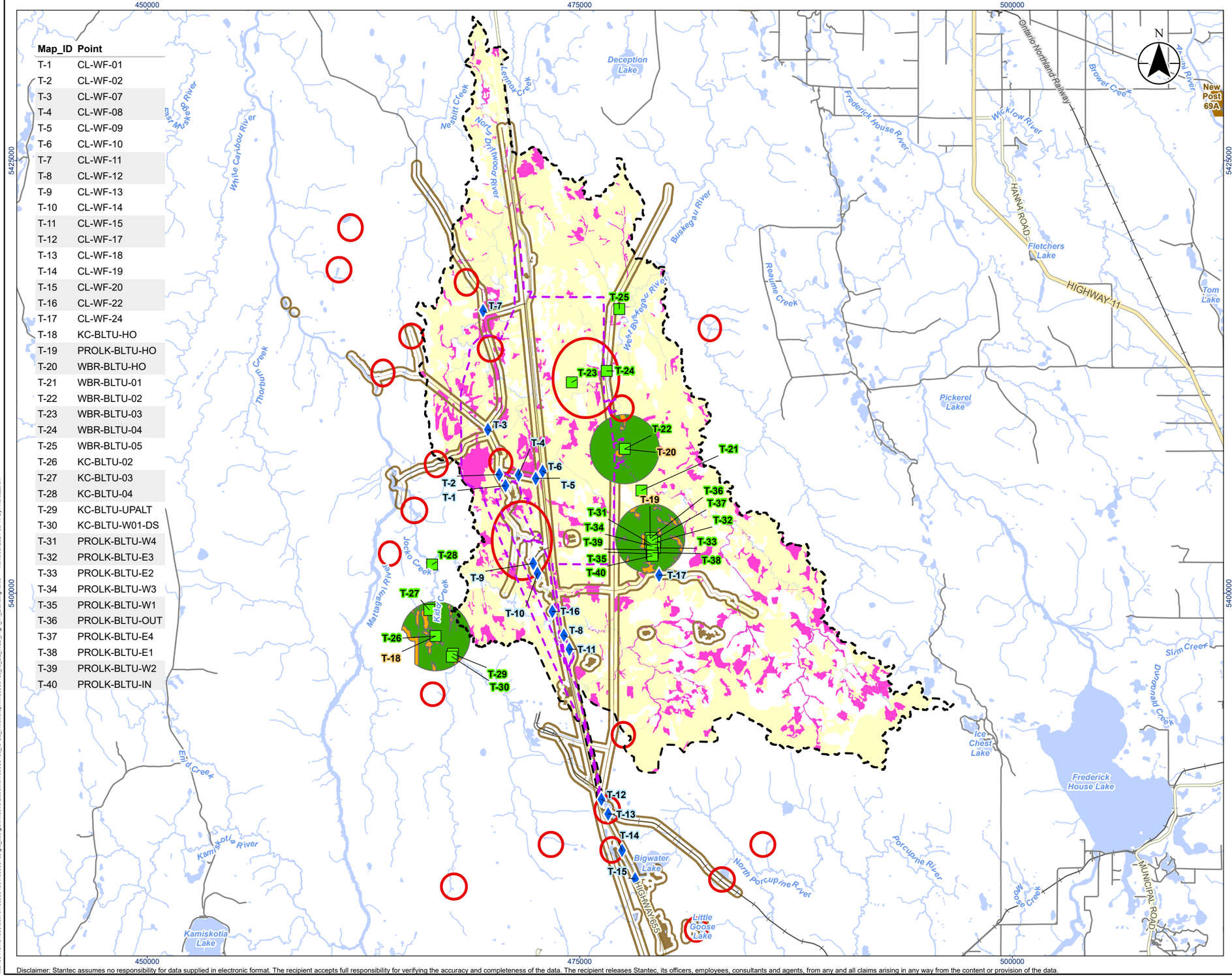
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.10

Title
High Relative Density of Moose and Wolf

Map_ID	Point
T-1	CL-WF-01
T-2	CL-WF-02
T-3	CL-WF-07
T-4	CL-WF-08
T-5	CL-WF-09
T-6	CL-WF-10
T-7	CL-WF-11
T-8	CL-WF-12
T-9	CL-WF-13
T-10	CL-WF-14
T-11	CL-WF-15
T-12	CL-WF-17
T-13	CL-WF-18
T-14	CL-WF-19
T-15	CL-WF-20
T-16	CL-WF-22
T-17	CL-WF-24
T-18	KC-BLTU-HO
T-19	PROLK-BLTU-HO
T-20	WBR-BLTU-HO
T-21	WBR-BLTU-01
T-22	WBR-BLTU-02
T-23	WBR-BLTU-03
T-24	WBR-BLTU-04
T-25	WBR-BLTU-05
T-26	KC-BLTU-02
T-27	KC-BLTU-03
T-28	KC-BLTU-04
T-29	KC-BLTU-UPALT
T-30	KC-BLTU-W01-DS
T-31	PROLK-BLTU-W4
T-32	PROLK-BLTU-E3
T-33	PROLK-BLTU-E2
T-34	PROLK-BLTU-W3
T-35	PROLK-BLTU-W1
T-36	PROLK-BLTU-OUT
T-37	PROLK-BLTU-E4
T-38	PROLK-BLTU-E1
T-39	PROLK-BLTU-W2
T-40	PROLK-BLTU-IN



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CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Turtle Basking Survey Location, 2023
- Blanding's Turtle Historical Observations
- Blanding's Turtle eDNA Sampling Locations, 2023

Habitat Suitability Index

- Blanding's Turtle Preferred Nesting Habitat
- Blanding's Turtle Preferred Nesting Habitat (240 m buffer)
- Blanding's Turtle Preferred Overwintering Habitat
- Blanding's Turtle Preferred Functional Habitat
- Blanding's Turtle Highly Suitable Habitat

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- First Nation Reserve
- Waterbody

General Habitat Description

- Category 3 Habitat
- Category 2 Habitat
- Category 1 Habitat

Legend Note:
Suitable Habitat for Blanding's Turtle also applies to Midland Painted Turtle and Snapping Turtle

0 5 10 km

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Notes

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Project Location
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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.11

Title
Turtle Surveys and Results

Figure A.12 Boreal Caribou Habitat Summary within the Kesagami Caribou Range

Confidential – Not for Distribution

Label on Map	Site_ID
BM-01	CL-BM-23-1
BM-02	CL-BM-23-3
BM-03	CL-BM-23-4
BM-04	CL-BM-23-5
BM-05	CL-BM-23-6
BM-06	CL-BM-23-7
BM-07	CL-BM-23-8
BM-08	CL-BM-23-9
BM-09	CL-BM-23-10
BM-10	CL-BM-23-12
BM-11	CL-BM-23-13
BM-12	CL-BM-23-14
BM-13	CL-BM-23-19
BM-14	CL-BMR-10
BM-15	CL-BMR-G2-01
BM-16	CL-BMR-21
BM-17	CL-DET-ET-G2-02
BM-18	CL-DET-G1-11
BM-19	CL-DET-G2-04
BM-20	CL-DET-24-CBM-16
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BM-25	CL-DET-38-CBM-18
BM-26	CL-BMR-1
BM-27	CL-BMR-2
BM-28	CL-BMR-3
BM-29	CL-BMR-4
BM-30	CL-BMR-5
BM-31	CL-BMR-6
BM-32	CL-BMR-7
BM-33	CL-BMR-8
BM-34	CL-BMR-9
BM-35	CL-BMR-10
BM-36	CL-BMR-11
BM-37	CL-BMR-12
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BM-39	CL-BMR-14
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BM-41	CL-BMR-16
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BM-46	CL-BMR-21
BM-47	CL-BMR-22
BM-48	CL-BMR-23
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BM-51	CL-BMR-26
BM-52	CL-BMR-27
BM-53	CL-BMR-28
BM-54	CL-BMR-29
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BM-71	CL-BMR-46
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BM-73	CL-BMR-48
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BM-76	CL-BMR-51
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BM-85	CL-BMR-60
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BM-90	CL-BMR-65
BM-91	CL-BMR-66
BM-92	CL-BMR-67
BM-93	CL-BMR-68
BM-94	CL-BMR-69

Label on Map	Site_ID
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BD-02	ARUBAT02
BD-03	ARUBAT04
BD-04	ARUBAT05
BD-05	ARUBAT06
BD-06	ARUBAT07
BD-07	ARUBAT08
BD-08	ARUBAT09
BD-09	ARUBAT10
BD-10	ARUBAT03
BD-11	CL-DET-EM-G2-01
BD-12	CL-DET-ET-G2-01
BD-13	CL-DET-ET-G2-02
BD-14	CL-DET-EXTRA-02
BD-15	CL-DET-EXTRA-02b
BD-16	CL-DET-EXTRA-03
BD-17	CL-DET-G1-03
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BD-22	CL-DET-G1-11
BD-23	CL-DET-G2-01
BD-24	CL-DET-G2-03
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BD-27	CL-DET-WT-G2-02b
BD-28	CL-DET-WT-G2-02
BD-29	CL-DET-CBM-11
BD-30	CL-DET-CBM-12
BD-31	CL-DET-CBM-13
BD-32	CL-DET-CBM-14
BD-33	CL-DET-CBM-16
BD-34	CL-DET-CBM-17
BD-35	CL-DET-CBM-18
BD-36	CL-DET-CBM-19
BD-37	CL-DET-CBM-2
BD-38	CL-DET-CBM-3
BD-39	CL-DET-CBM-5
BD-40	CL-DET-CBM-7
BD-41	CL-DET-CBM-8
BD-42	CL-DET-CBM-9
BD-43	CL-DET-EXTRA-01
BD-44	CL-DET-G1-04
BD-45	CL-DET-G2-01
BD-46	CL-DET-Rock Barren 6 control
BD-47	CL-DET-Rock Barren 6-10
BD-48	CL-DET-Rock Barren 6-12
BD-49	CL-DET-Rock Barren 6-3
BD-50	CL-DET-Rock Barren 6-5
BD-51	CL-DET-Rock Barren 6-8
BD-52	CL-DET-Rock Barren 6-9
BD-53	CL-DET-Rock Barren 8-3
BD-54	CL-DET-Rock Barren 8-3 control

Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area
- Bat Hibernacula Habitat
- Suitable Bat Habitat

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Watercourse
- Railway
- Conservation Reserve (Regulated)
- Municipal Boundary - Lower Tier
- Provincial Park
- Waterbody
- Bat Maternity Roost Survey Location
- Bat Detector Location
- Other Named Place

0 5 10 km

1:200,000 (At original document size of 11x17)

Notes

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Project Location
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Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.13

Title
Bat Surveys and Results

\\cd1004-f01\01609\active\160930456\160930456gis_cad\gis\mxds\SIBaseline\160930456_IS-BL_Wildlife.aprx\160930456_IS-BL_WLD_Fig4_13_BatHabitat Revised: 2024-09-11 By: malcazaren

Appendix B Species List

Table B.1 - Species confirmed or that have the potential to occur in the Study Area

Common Name	Scientific Name	Survey (Observation)	Confirmed (Y/N)	ESA, 2007 (SARO)	SARA (Schedule 1)	COSEWIC	G Rank (Global)	S Rank (Provincial)
Amphibians								
American Toad	*Anaxyrus americanus*	Amphibian Call Survey, Incidental	Y				G5	S5
Blue-spotted Salamander	*Ambystoma laterale*	Incidental	Y				G5	S4
Boreal Chorus Frog	*Pseudacris maculata*	Amphibian Call Survey, Incidental	Y				G5	S5
Eastern Red-backed Salamande	*Plethodon cinereus*	N/A	N				G5	S5
Green Frog	*Lithobates clamitans*	Amphibian Call Survey	Y				G5	S5
Mink Frog	*Lithobates septentrionalis*	Amphibian Call Survey, Incidental	Y				G5	S5
Northern Leopard Frog	*Lithobates pipiens*	Incidental	Y	NAR		NAR	G5	S5
Spring Peeper	*Pseudacris crucifer*	Amphibian Call Survey, Incidental	Y				G5	S5
Wood Frog	*Lithobates sylvaticus*	Amphibian Call Survey, Incidental	Y				G5	S5
Reptiles								
Blanding's Turtle	*Emydoidea blandingii*	Turtle Basking Survey, eDNA	N	THR	END	END	G4	S3
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	Incidental	N				G5T5	S5
Midland Painted Turtle	*Chrysemys picta marginata*	Turtle Basking Survey	N		SC	SC	G5T5	S4
Snapping Turtle	*Chelydra serpentina*	Turtle Basking Survey	N	SC	SC	SC	G5	S4
Mammals								
American Black Bear	*Ursus americanus*	Incidental (2021, 2022)	Y	NAR		NAR	G5	S5
American Marten	*Martes americana*	Aerial	Y				G5	S5
American Mink	*Neovison vison*	Incidental (2022)	Y				G5	S4
Beaver	*Castor canadensis*	Aerial, Incidental (2021, 2022)	Y				G5	S5
Big Brown Bat	*Eptesicus fuscus*	ARU	Y				G5	S4
Boreal Caribou	*Rangifer tarandus pop. 14*	N/A	N	THR	THR	THR	G5TNRQ	S4
Canada Lynx	*Lynx canadensis*	Aerial, Incidental (2022)	Y		NAR	NAR	G5	S5
Coyote	*Canis latrans*	N/A	N				G5	S5
Deer Mouse	*Peromyscus maniculatus*	N/A	N				G5	S5
Eastern Chipmunk	*Tamias striatus*	N/A	N				G5	S5
Eastern Cottontail	*Sylvilagus floridanus*	Aerial, Incidental (2022, 2023)	Y				G5	S5
Eastern Gray Squirrel	*Sciurus carolinensis*	N/A	N				G5	S5
Eastern Red Bat	*Lasiurus borealis*	ARU	Y	END (January 31, 2025)		END	G3G4	S4
Ermine	*Mustela erminea*	N/A	N				G5	S5
Fisher	*Pekania pennanti*	N/A	N				G5	S5
Cougar	*Puma concolor*	N/A	N	SC			G5	SU
Hoary Bat	*Lasiurus cinereus*	ARU	Y	END (January 31, 2025)		END	G3G4	S4
House Mouse	*Mus musculus*	N/A	N				G5	SNA
Little Brown Myotis	*Myotis lucifugus*	ARU	Y	END	END	END	G3	S3
Long-tailed Weasel	*Mustela frenata*	N/A	N				G5	S4
Meadow Vole	*Microtus pennsylvanicus*	Incidental (2021)	Y				G5	S5
Moose	*Alces americanus*	Aerial, Incidental (2021, 2022, 2023)	Y				G5	S5
Muskrat	*Ondatra zibethicus*	Incidental (2023)	Y				G5	S5
North American River Otter	*Lontra canadensis*	Aerial	Y				G5	S5
Northern Flying Squirrel	*Glaucomys sabrinus*	N/A	N				G5	S5
Northern Gray Wolf	*Canis lupus occidentalis*	Aerial, Incidental (2021, 2022)	Y	NAR		NAR	G5T4T5	S4
Northern Myotis	*Myotis septentrionalis*	N/A	N	END	END	END	G2G3	S3
Northern Short-tailed Shrew	*Blarina brevicauda*	N/A	N				G5	S5

Table B.1 - Species confirmed or that have the potential to occur in the Study Area

Common Name	Scientific Name	Survey (Observation)	Confirmed (Y/N)	ESA, 2007 (SARO)	SARA (Schedule 1)	COSEWIC	G Rank (Global)	S Rank (Provincial)
Norway Rat	*Rattus norvegicus*	N/A	N				G5	SNA
Porcupine	*Erethizon dorsatum*	N/A	N				G5	S5
Red Fox	*Vulpes vulpes*	Aerial, Incidental (2021, 2022, 2023)	Y				G5	S5
Red Squirrel	*Tamiasciurus hudsonicus*	Incidental (2021, 2022, 2023)	Y				G5	S5
Silver-haired Bat	*Lasionycteris noctivagans*	ARU	Y	END (January 31, 2025)		END	G3G4	S4
Smoky Shrew	*Sorex fumeus*	N/A	N				G5	S5
Snowshoe Hare	*Lepus americanus*	Aerial	Y				G5	S5
Star-nosed Mole	*Condylura cristata*	N/A	N				G5	S5
Striped Skunk	*Mephitis mephitis*	N/A	N				G5	S5
Tricolored Bat	*Perimyotis subflavus*	N/A	N	END	END	END	G3G4	S3?
Water Shrew	*Sorex palustris*	N/A	N				G5	S5
White-tailed Deer	*Odocoileus virginianus*	N/A	N				G5	S5
Woodchuck	*Marmota monax*	Incidental (2022)	Y				G5	S5
Woodland Jumping Mouse	*Napaeozapus insignis*	Incidental (2021)	Y				G5	S5
Insects								
Monarch	*Danaus plexippus*	N/A	N	SC	END	END	G4	S2N, S4B
Yellow-banded Bumble Bee	*Bombus terricola*	N/A	N	SC	SC	SC		S4

Definitions, Acronyms

Species of Conservation Concern (SoCC)

Species at Risk (SAR)

Global G-rank

G1: Critically Imperiled (at very high risk of extinction)
G2: Imperiled (at high risk of extinction)
G3: Vulnerable (at moderate risk of extinction)
G4: Apparently Secure (Uncommon but not rare)
G5: Secure (common, widespread and abundant)
G#G#: Range Rank (range of uncertainty about the status of a taxon or ecosystem type)
GU: Unrankable (currently unrankable due to lack of information)
GNR: Unranked (global rank not yet assessed)
GNA: Not Applicable (species is not a suitable target for conservation activities)
T: Denotes that the rank applies to a subspecies or variety

Provincial S-rank

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)
S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)
S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)
S4: Apparently Secure (uncommon, but not rare in the nation and/or province)
S5: Secure (common, widespread and abundant in the nation and/or province)
SNA: Not Applicable (species is not a suitable target for conservation activities)
SHB: Breeding is not confirmed in Ontario
S#S#: Range Rank (range of uncertainty about the status of the species or community)
S#?: Rank is Uncertain
S?: Not Ranked Yet
SU: Unrankable due to lack of information or substantially conflicting information about status

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
ESA: Endangered Species Act
SARA: Species at Risk Act
SARO: Species at Risk in Ontario

SARA or ESA designagtion

EXT - Extinct
END - Endangered
THR - Threatened
SC - Special Concern
NAR - Not at Risk

Appendix C Updated General Habitat Description Category 2 and 3 Mapping for Kesagami Range

TECHNICAL MEMORANDUM

DATE September 10th 2024 **Project No.** CA0034344.7056

TO Mathieu Boucher
Canada Nickel Company Inc.

CC Samantha Hughes

FROM Megan Hazell

RE: Updated General Habitat Description Category 2 and 3 Mapping for Kesagami Range

Under the General Habitat Description (GHD), Category 2 habitat represents seasonal ranges for Boreal Caribou, while Category 3 is the remaining habitat that may still be used but has lower value to Boreal Caribou (MNRF 2014/2017). The Ministry of Environment Conservation and Parks (MECP) has taken a Resource Selection Probability Function (RSPF) approach to mapping Category 2 habitat by mapping each of the 4 seasonal ranges and is briefly described in methods for State of the Woodland Caribou Resource reports (MNRF 2017). More detail is available in Hornseth and Rempel (2016) and Rempel and Hornseth (2017). This method maps potential habitat value on modelling associations of observed caribou use with land cover, linear features, and other environmental variables.

This memo summarizes the methods and data used to update the Category 2 and 3 GHD mapping for Kesagami Range.

METHODS

The Category 2 RSPF model was based on 7 classes from the Landsat based Provincial Forest Classification (PLC) plus esker lines, mapped forest fires, and anthropogenic linear features (Table 1, Table 2, Figure 1). Coefficient effect size and sign for the seasonal models are given in Figure 1. Calculations are conducted in the specialized GIS program, Landscape Scripting Language (LSL) (Kushneriuk and Rempel 2011), which allows for multiple scale modeling using spatial averaging of hexagons. For Caribou Category 2 maps, an intersection of 3-ha hexagons with landscape variables is conducted first, and then spatial averages generated at the 5,000-ha scale are used for the RSPF analysis. This scale was used because it resulted in the highest performance relative to all other scales that were assessed (Hornseth and Rempel 2016).

Table 1: Variables used in the Category 2 and 3 RSPF model.

Variable	Source	Calculation
Dense Deciduous	PLC	• Proportion within hexagon
Dense Mixed Forest	PLC	• Proportion within hexagon
Dense Conifer	PLC	• Proportion within hexagon
Sparse Treed	PLC	• Proportion within hexagon
Treed Peatland	PLC	• Proportion within hexagon
Open Peatland	PLC	• Proportion within hexagon
Water	PLC	• Proportion within hexagon
Natural Disturbance	Disturbance mapping	• Majority with hexagon
Eskers Lines	Topographic map	• Density
Linear features – roads, railways, transmission lines	Anthropogenic disturbance mapping	• Density

Table 2: A Summary List of the Land Cover Classes of the Second-Edition Provincial Land Cover Data Base

Code	Class	Description
1	Water - Deep or Clear	Deep or clear waterbodies.
2	Water - Shallow or Sedimented	Shallow waterbodies and waterbodies with a high concentration of suspended sediment.
3	Settlement/Infrastructure	Clearings for human settlement and economic activity; major transportation routes.
4	Sand/Gravel/Mine Tailings	Beach deposits, aggregate quarries and sand dunes; mines and mine tailings.
5	Bedrock	Exposed bedrock, lacking vegetation cover.
6	Mudflats	Unvegetated coastal areas of the Hudson Bay-James Bay Lowlands, partly submerged at high tide.
7	Cutovers	Forest clearcuts estimated to be less than 10 years of age.
8	Burns	Forest burns estimated to be less than 10 years of age.
9	Regenerating Depletion	Old burns supporting very sparse vegetation.
10	Sparse Forest	A patchy or sparse forest canopy composed of coniferous or deciduous species or a combination of the two.
11	Deciduous Forest	Largely continuous forest canopy composed primarily of deciduous species.
12	Mixed Forest	Largely continuous forest canopy composed of both deciduous and coniferous species. In more northerly areas, a greater component of coniferous species can be expected; in more southerly areas, a greater component of deciduous species can be expected.
13	Coniferous Forest	Largely continuous forest canopy composed primarily of coniferous species
15	Intertidal Marsh	Coastal marshes of the Hudson Bay-James Bay Lowlands lying between the coastal mudflats and the supertidal zone.

16	Supertidal Marsh	Coastal marshes of the Hudson Bay-James Bay Lowlands lying inland of both the coastal mudflats and intertidal marshes, and subject to only exceptionally high tides.
17	Inland Marsh	Lakeshore and inland marshes of Southern Ontario.
18	Deciduous Swamp	Hardwood swamps of Southern Ontario occurring along rivers and in old lakebeds and other low-lying areas.
19	Coniferous Swamp	Swamps with dense conifer tree or shrub cover occurring in Southern Ontario.
20	Open Fen	Fens generally lacking tree cover that may support some shrub cover and tamarack. Open fens include fens with an open water surface, graminoid fens, pattern fens, and shrub-rich fens.
21	Treed Fen	Fens supporting a sparse to dense cover of trees or shrubs.
22	Open Bog	Bogs generally lacking tree cover.
23	Treed Bog	Bogs supporting a sparse to dense cover of trees.
24	Tundra Heath	Low tundra vegetation growing on slightly raised beach deposits and strand lines along the Hudson Bay coast.
25	Pasture	Open grassland with sparse shrubs in rural land.
27	Cropland	Areas of row crops and fallow fields.
28	Other	transitional areas between classes, such as some wetland boundaries.
29	Cloud and Shadow	Areas of cloud or shadow on the satellite images.

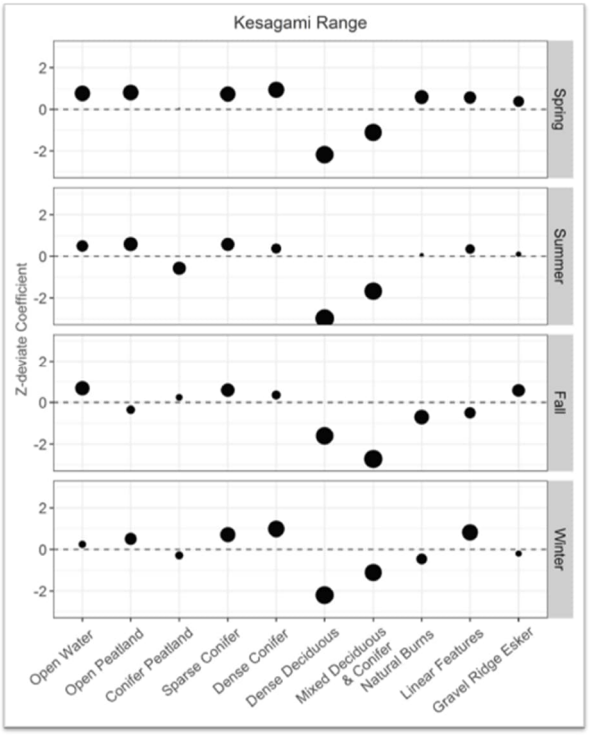

Figure 1. Comparison of standardized RSPF coefficients for the Kesagami Range

Forest harvest, aging and succession change forest cover over time. Wetlands and other variables remain stable. Of the original PLC model variables, deciduous forest, mixed forest and conifer forest in the PLC were updated in LSL by overlaying disturbance layers and reassigning existing PLC classes to the appropriate disturbance classes. The Kesagami Range intersects with 3 Forest Management Unit (FMUs; Abitibi River Forest, Gordon Cosens and Romeo Malette). A recent (2024) version of Forest Resource Inventory (FRI) data was obtained from the Provincial Impact Assessment Model (PIAMM) geodatabase. Two versions of the geodatabase were available, and one called caribou2024.gdb was appropriate for this work as it merged all the inventories within each Boreal Caribou range. PIAMM also included enhanced FRI (eFRI) inventories for Parks and more recent inventories in northern management units, as well as a separate burns attribute with date of fire. Although these data were relatively clean, additional pre-processing to deal with topological and attribute issues was required to make data suitable for the Category 2 and 3 mapping updates. An R script was written to process geometry and attributes.

Specifically, three groups of disturbance under current condition were processed in LSL to update the PLC 2000 map: harvest, burns, and infrastructure. The Kesagami Range is unique among the southern Boreal Caribou

ranges in that it overlays areas of rich soil (Clay Belt Eco-district), and this results in enhanced agricultural activity. These areas were mapped in the PLC as pasture and cropland classes (classes 25 and 27) and added to the anthropogenic (settlement) disturbance class. The harvest layer was derived from the merged PIAMM FRI coverage, and disturbance age calculated as current year (2024) – year of stand origin. The burn layer was from a combination of PIAMM polygons and LIO polygons (where FRI coverage was not available through PIAMM). Disturbance age was calculated as current year – burn year. A settlement layer was created from the LIO settlements layer and MNDM mines layer by creating a 1 km buffer around existing mines and settlements. This was overlayed on a Google earth image, and then manual on-screen digitizing conducted to define more exact boundaries of mines and settlements.

If a 3-ha hexagon intersected a burn or harvest disturbance <= 40 years or a settlement, and proportion was > 10% of the hexagon, then mature forest in the hexagon was reclassed to either PLC classes 7 (Burn), 8 (Harvest), or 3 (Settlement). In addition, construction of roads also removes mature forest. To model this the PLC landcover was updated in LSL to change any mature forest classes in the 3.1 ha hexagon cell (100 m radius) that intersected an anthropogenic linear feature to the Settlement class (which includes road disturbance). Linear features have an additional effect on caribou in that they facilitate movement and effectiveness of predators and are included directly as a variable in the RSPF model. Vector lines from LIO for roads, railways, and hydro-lines were imported into LSL, and density of these features calculated. Category 2 regional range habitat is based on the selective use of landscape features across all 4 seasons. The RSPF models habitat selection for each season, and a threshold value for the continuous probability of use is determined above which the habitat is considered high use, and therefore contributes to Category 2 habitat.

2.0 RESULTS

Table 3: Average Category 2 and 3 (percent area in Category 2), categorized probability of high use (percent area in seasonal high use categories), and overall average seasonal probability of use within Kesagami Range

Variable	Range	Season	Current/Baseline
Category 2 & 3	Kesagami	All Seasons	0.567
Prob of Use (high)	Kesagami	Spring	0.537
Prob of Use (high)	Kesagami	Summer	0.530
Prob of Use (high)	Kesagami	Fall	0.193
Prob of Use (high)	Kesagami	Winter	0.355
Prob of Use (overall)	Kesagami	Spring	0.170
Prob of Use (overall)	Kesagami	Summer	0.160
Prob of Use (overall)	Kesagami	Fall	0.111
Prob of Use (overall)	Kesagami	Winter	0.120

Figure 2: Updated Category 2 and 3 Mapping for Kesagami Range Relative to the Crawford Nickel Project Area

Confidential – Not for Distribution

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