TABLE OF CONTENTS
SECTION 6

LIST OF TABLES

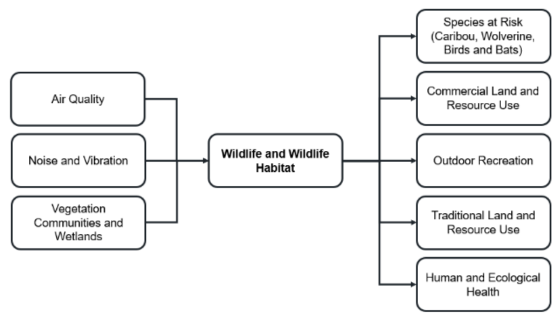
LIST OF FIGURES

6.12 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat has been selected as a VC due to the potential interactions with Project activities. The wildlife species included in this VC are considered to have ecological, aesthetic, recreational, economic and/or cultural importance. For the purposes of this VC, "wildlife" refers to birds, mammals, reptiles, and amphibians but excludes bats as well as threatened and endangered Species at Risk (SAR), which have been identified and assessed as separate VCs (Section 6.13 to Section 6.16). Fish and aquatic species are considered in Section 6.10.

In the absence of mitigation, the assessment of potential changes on wildlife is directly linked to other VCs and are informed by the following sections:

- **Air Quality** (Section 6.2): The assessment of the potential effects on air quality includes changes in dust deposition during construction and operation of the Project that may have indirect effects on habitat for wildlife.
- **Noise and Vibration (Section 6.3):** The assessment of potential effects from noise and vibration includes changes in sound levels during construction and operation of the Project that may have indirect effects on habitat for wildlife due to sensory disturbance.



- **Vegetation Communities and Wetlands (Section 6.11):** The assessment of potential effects on vegetation communities and wetlands includes changes in abundance and function of vegetation communities during construction and operation of the Project that may affect habitat used by wildlife.

In addition, the assessment of potential changes on wildlife is also directly linked to other VCs, and informs the analysis of the following sections:

- **Commercial Land and Resource Use** (Section 6.17): The assessment of potential effects on commercial land and resources is informed by changes in habitat for wildlife during construction of the Project that may affect wildlife resources used by local users for trapping and outfitters.
- **Traditional Land and Resource Use** (Section 6.21): The assessment of potential effects on Traditional Land and Resource Use is informed by changes in habitat for wildlife during construction of the Project that may affect traditionally harvested wildlife species used by Indigenous people.
- **Human and Ecological Health** (Section 6.24): The assessment of potential effects on human and ecological health is informed by changes in the function of habitat for wildlife from dust deposition during construction and operation of the Project that may affect potential contaminants that could be ingested by wildlife directly or indirectly as prey.

The assessment of the potential changes on wildlife from the Project are compared to relevant provincial and federal criteria (Section 6.12.1.1) and existing conditions (Section 6.12.2). The terrestrial resources technical support documentation is included in Appendix P, which includes the Baseline Terrestrial Report (Appendix P-1).

6.12.1 Assessment Approach

The approach to the assessment of potential effects on wildlife includes a description of the relevant regulatory and policy setting, a description of the input obtained through consultation specific to this VC, the identification of criteria along with the associated rationale, a description of the spatial and temporal boundaries used for this VC, and a description of the attributes used to determine the significance of any residual adverse effects. The assessment of potential effects is supported by a description of the existing conditions for the VC (Section 6.12.2) the identification and description of applicable pathways of potential effects on the VC (Section 6.12.3) and a description of applicable mitigation measures for the VC (Section 6.12.4). An outline of the analytical method conducted for the assessment and the key assumptions and/or conservative approach is found in Section 6.12.5.1. With the application of mitigation measures to the potential effects on the VC, the residual effects are then characterized in Section 6.12.6 and the significance of the residual effects is determined in Section 6.12.7.

6.12.1.1 Regulatory and Policy Setting

The effects assessment for wildlife has been prepared in accordance with the requirements of the federal Environmental Impact Statement (EIS) Guidelines (Appendix B-1) and the provincially approved Amended Terms of Reference (ToR; Appendix B-3). Concordance tables, indicating where EIS Guidelines and ToR requirements have been addressed, are provided in Appendix B-2 and B-5, respectively. Government policies, objectives, standards, or guidelines most relevant to the VC are summarized below.

Federal *Species at Risk Act*

The *Species at Risk Act* (SARA; S.C. 2002, c. 29) was passed into law in 2002 and was last amended on June 17, 2024. The SARA aims to prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species and to manage species to prevent further risk to their status. SARA provides legal protection to species at risk (SAR) listed in Schedule 1 if they have a designation of Extirpated, Endangered, or Threatened with respect to harming the species or its residence. The SARA applies to federal lands (e.g., First Nations reserve lands) and outside of federal lands to migratory birds (i.e., those species listed under Article I of the Migratory Birds Convention Act, 1994 [S.C. 1994, c. 22]) that also fall under Schedule 1 of the SARA; this does not include the species' critical habitat but it does include residences of migratory birds that have residence descriptions; and aquatic species that fall under Schedule 1 of the SARA.

The majority of the Project is not located within federal lands. However, the application of SARA relative to wildlife has been considered for the portion of the transmission line that crosses Slate Falls Nation. SAR with Extirpated, Endangered, or Threatened federal designations require recovery strategies or conservation action plans that identify their critical habitat for mandatory prohibition from damage or destruction. Species listed as Special Concern in Schedule 1 are not legally protected under SARA but require a management plan. Species listed in Schedule 2 or 3 of SARA are not legally protected under SARA. Still, they require status assessment through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to determine conservation status and priority for recovery and action planning. Notably, SARA prohibitions can be applied if provincial legislation or voluntary measures do not adequately protect federally listed species and their residence. Generally, compliance with provincial legislation in Ontario satisfies the SARA requirements.

To meet the requirements of Section 79 of SARA, the potential adverse effects to the listed species or its critical habitat are to be identified, and mitigation measures consistent with any applicable recovery strategy and action plans must be described during the environmental assessment. The proponent must identify the project's adverse effects on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and monitor them. Environment and Climate Change Canada (ECCC), formerly Environment Canada, must be notified of impacts to listed species or its critical habitat.

As the Project is subject to a federal EA, wildlife identified under SARA and their critical habitat are considered. In addition to identifying the Project's adverse effects on all species listed in Schedule 1, the COSEWIC recommendations should be considered. A SAR assessment was completed in the 2024 Terrestrial Resources Baseline Report (Appendix P-1), and the following Schedule 1 species were confirmed to occur in the Regional Study Area (RSA):

- Barn Swallow (Threatened on Schedule 1 and under consideration for status change to Special Concern by COSEWIC) does not have a recovery strategy and, therefore, no critical habitat definition but is considered under residence description in Section 6.16.
- The Canada Warbler's (Threatened on Schedule 1 and under consideration for status change to Special Concern by COSEWIC) recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016a).
- The Common Nighthawk's (Special Concern on Schedule 1) recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016b).
- The Eastern Whip-poor-will's (Threatened on Schedule 1 and under consideration for status change to Special Concern by COSEWIC) recovery strategy partially identifies critical habitat (ECCC 2018). This species is considered in Section 6.16.
- The Eastern Wood-pewee (Special Concern on Schedule 1) is a special concern species; therefore, a recovery strategy is not required.
- The Evening Grosbeak (Special Concern on Schedule 1) is a special concern species; therefore, a recovery strategy is not required.
- The Olive-sided Flycatcher's (Special Concern on Schedule 1) recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016c).
- Rusty Blackbird (Special Concern on Schedule 1) is a special concern species; therefore, a recovery strategy is not required.
- Yellow Rail (Special Concern on Schedule 1) is a special concern species; therefore, a recovery strategy is not required.

Federal *Migratory Birds Convention Act*

The *Migratory Birds Convention Act* (MBCA; S.C. *1994*, c. 22) was passed in 1917, and the last amendment was on December 12, 2017, and is enforced by ECCC. The MBCA prohibits harming and/or killing most species of birds and/or destroying or collecting their eggs or nests. Protected species, listed under Article I of the MBCA, are native or naturally occurring in Canada and are known to occur regularly in Canada. Most birds found in the baseline investigation area receive protection under the MBCA, and nearly all the remaining species receive similar protection under the provincial *Fish and Wildlife Conservation Act, 1997* (FWCA; S.O. 1997, c.41; see Section 6.12).

Under the MBCA, together with the *Migratory Birds Regulations* (C.R.C., c. 1035) which were last amended on July 30, 2022, provide protection to migratory bird nests during the period considered to have a high conservation value (i.e., generally during the nesting period). The "incidental take" of migratory birds and the disturbance, destruction, or taking of the nest of a migratory bird is prohibited. ECCC and the Canadian Wildlife Service have compiled nesting calendars that show the variation in nesting intensity by habitat type and nesting zone within broad geographical areas distributed across Canada (ECCC 2021), which can greatly reduce the risk of encountering a nest. Some species whose nests are reused or subsequently used by other species continue to have year-round nest protection unless they are abandoned. Bird species not regulated under the MBCA include the Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird, and European Starling.

The MBCA and Migratory Birds Regulations bind all members of the public and all levels of government.

Barn Swallow, Eastern Whip-poor-will, and Lesser Yellowlegs are presented in Article 1. Short-eared Owl is not listed on Article 1 of the MBCA. Some species are not protected under the MBCA but are listed under the ESA (e.g., Rusty Blackbird and Short-eared Owl). If Barn Swallow, Eastern Whip-poor-will, or Lesser Yellowlegs individuals or nests are encountered during Project activities, the Project must comply with the prohibitions of the MBCA and Migratory Birds Regulations, including avoiding the destruction of the nest (i.e., stop work) and following appropriate timing windows for best management practices for vegetation removals. The Project site occurs in nesting zone C5, which has a regional nesting period of late April to late August.

Provincial *Endangered Species Act*

Species at Risk are discussed in their own Sections: Boreal Caribou Section 6.13, Wolverine Section 6.14, SAR Bats Section 6.15, and SAR Birds Section 6.16.

Provincial *Fish and Wildlife Conservation Act*

The *Fish and Wildlife Conservation Act* (FWCA; S.O. 1997, c.41) was passed into law in 1997 and was last amended on June 8, 2024, and is administered by the Ministry of Natural Resources (MNR). The FWCA applies to "fish and wildlife," whereby fish are defined as having the same meaning as in the *Fisheries Act*, and wildlife is defined as "an animal that belongs to a species that is wild by nature and includes game wildlife and specially protected wildlife."

Schedules 6 to 11 under the FWCA O. Reg. 669/98: Wildlife Schedules identify "specially protected wildlife" and are protected from being killed, trapped, or hunted. If wildlife requires collection or relocation at any point in the Project (i.e., through trapping / collection and relocation), a permit or approval under the FWCA may be required. Additionally, under the FWCA Part II, Section 7(1), Nests and eggs, "A person shall not destroy, take or possess the nest or eggs of a bird that belongs to a species that is wild by nature." If a provision of the FWCA and a provision of the MBCA or ESA conflict, the provision that gives the most protection prevails.

Permits under the FWCA are contractor-specific, whereby the individual undertaking the work to rescue and relocate or collect wildlife will be the responsible party required to obtain the necessary permits and approvals. Additionally, if a den of a North American Beaver, Canada Lynx, American Marten, North American River Otter, Gray Wolf, or other furbearer is found, a professional trapper must be hired to remove the animals (see the FWCA Schedule for a complete list). Likewise, a professional trapper must be hired to remove North American Beaver dams.

If the nest or eggs of species listed under the schedules for game birds, specially protected raptors, or specially protected birds, authorization for removal is required. Species specific to the Project that are not protected under the MBCA but are protected under the FWCA include (see FWCA Schedule for a complete list of protected birds) Ruffed Grouse, Spruce Grouse, Bald Eagle, Boreal Owl, Canada Jay, Common Raven, and Rusty Blackbird.

6.12.1.2 Influence of Consultation with Indigenous Communities, Government, and the Public

Consultation has been ongoing for several years, prior to and throughout the environmental assessment process, and will continue with Indigenous communities, government agencies, and the public through the life of the Project. Section 2 provides more detail on the consultation process. The Record of Consultation (Appendix D) includes detailed comments received and responses provided during the development of the final EIS/EA.

Feedback received through consultation has been addressed through direct responses (in writing and follow up meetings) and incorporated in the final EIS/EA, as appropriate. The key comments that influenced the assessment for wildlife between the draft and final EIS/EA is provided below:

General Comments

The Impact Assessment Agency of Canada (IAAC), the Ministry of the Environment, Conservation and Parks (MECP), MNR, Mishkeegogamang Ojibway Nation (MON), the Ministry of Citzenship and Multiculturism and the Northwestern Ontario Métis Community (NWOMC) have provided comments for Section 6.12 Wildlife and Wildlife Habitat. Additional details were requested on the study method, including further information on the spatial and temporal boundaries, inclusion of additional baseline studies and background data (e.g., incorporation of available updated land cover classification) to support the environmental assessment. Comments were received on elaborating on the assessment of potential effects to local wildlife and their habitats, focusing on the effects of linear disturbances on prey and predators, potential accidents affecting shorebirds, waterbirds and waterfowl, and the effect of airstrip construction and operation. The feedback emphasized enhancing mitigation strategies, especially in areas of potential habitat loss or wildlife mortality, with a focus on reducing noise, minimizing corridor fragmentation, and addressing wildlife use changes. Comments were also received which sought justification, rationale, and clarity on the characterization and significance of residual effects as well as the confidence level associated with predictions.

Incorporation of Traditional Knowledge and Traditional Land Use Information

Cat Lake First Nation (CLFN), Lac Seul First Nation (LSFN), Slate Falls Nation (SFN), Wabauskang First Nation (WFN), MON and NWOMC has shared valuable insights from their Traditional Knowledge and Land Use Study (TKLUS), highlighting the importance of specific species to their community. This includes documentation of plant and animal species (abundance, distribution, and diversity) and their habitats found or likely to be found in the baseline investigation area, with a focus on species at risk (SAR) or with special status that are of social, economic, cultural, or scientific significance, as well as invasive alien species and species used for traditional purposes by Indigenous groups. This information has been included in the Baseline Terrestrial Report (Appendix P-1) and described in Section 6.12.2.6. Further, the information is used in Section 6.21 (Traditional Land and Resource Use) to assess the effects of the Project on the experience of traditional wildlife harvesting. In addition, the assessment of the potential effects on Indigenous people (Section 6.26) is informed by the results of the biophysical and human environment effects assessment as well as feedback received during engagement

Assessment Methodology

IAAC requested clarification on how spatial boundaries address both potential direct and indirect effects for each valued component. Section 6.1 describes the local and regional study areas in the assessment of effects on valued components. The local study area for each valued component is based on the geographic extent of the potential direct and indirect Project effects. The regional study area is based on the maximum geographic extent or zone of influence in which the potential effects are assessed and used to provide regional context to the valued component. These study areas are further refined in the effects assessment for each valued component. For example, the basis for the regional study area for wildlife and SAR birds has been revised in the final EIS/EA and includes consideration for watersheds, eco-districts, Bird Conservation Regions, traditional knowledge (when available), and guidance from ECCC pertaining to development of ecologically defined study areas.

MNR requested further clarification on the suitability of the study area for the assessment of effects at the regional scale to evaluate cumulative effects on wildlife and their habitat. There are two wildlife LSAs as described in Spatial and Temporal Boundaries 6.12.1.3 one for Large Mammals and one for all other wildlife categories. LSAs include consideration of direct overprinting of habitat, as well as indirect effects associated with sensory disturbance. Based on recommendations from ECCC to consider watersheds and patterns in land cover, the RSA has been redefined and includes consideration for the use of ecologically defined boundaries.

Effects Assessment

IAAC requested further analysis for the displacement of nesting bird habitat to demonstrate there is enough equivalent habitat for birds to be displaced to, and that the vegetation being removed is not unique to the Project footprint. An analysis of habitat available within the revised regional study area relative to each habitat type that has been affected has been updated in Section 6.11 (Vegetation Community and Wetlands) and Section 6.12 and shows a less than 1% change in vegetation communities within the RSA.

IAAC requested an assessment of potential effects on wildlife and SAR birds from spills, accidents and other malfunctions, and where appropriate, mitigation measures such as a spill response plan for species that may be affected. Further, IAAC requested additional on the significance of any residual effects on wildlife and SAR birds. To address the comment, Section 9 includes an assessment of the potential effects on wildlife and SAR birds as a result of a potential spill, accident or malfunction from Project activities. Specifically, Section 9.12 considers vehicular accidents that could release materials, Section 9.13 considers the potential spill of cyanide, and Section 9.14 considers the potential release of products from containment and dispensing facilities. Key measures to mitigate the potential effects of a spill on the environment, including SAR birds, are outlined in Section 9. Mitigation measures specific to wildlife include:

- Chemicals such as liquid, gas and solid reagents required for processing and other purposes will be adequately stored and handled, in accordance with industry standard and applicable safety data sheets.
- Chemical reagents that pose a potential risk to the environment will be stored and used within contained areas if practicable, with sealed floors and sumps or drains reporting to facilities that will provide retrieval of the spilled materials.
- Only trained personnel will handle chemicals and reagents, and a program for regular inspections of tanks and operational procedures will be put in place.
- Emergency and spill response procedures will be established and are expected to include the following: medical response, notification, containment of spill, removal of spill, treatment of affected environment, monitoring of environment and learning from the accident.

LSFN, CLFN and NWOMC requested consideration for the potential effect on wildlife and wildlife habitat due to the operation of the mine access road, airstrip and other transportation activities and the subsequent effect on hunting and other land-based activities. The effects of the construction and operation of the airstrip on air quality, noise and wildlife has been assessed and added in Section 6.2 (Air Quality), Section 6.3 (Noise and Vibration) and Section 6.12 (Wildlife and Wildlife Habitat). The change in sound levels from the operation of helicopters has been included in Section 6.3 (Noise and Vibration) and the results carried into the assessment of wildlife and wildlife habitat (Section 6.12), including the application of mitigation measures. The changes in wildlife and wildlife habitat have been carried into the assessment of traditional land and resource use (Section 6.21).

LSFN, CLFN, SFN, and NWOMC requested consideration for the potential effect that fragmentation of wildlife habitat may have on wildlife movement and the subsequent effect this may have on the interruption of harvest by NWOMC citizens. Wildlife responses to the construction and operation phases may result in a change of species abundance and resource condition due to habitat fragmentation which may affect traditional wildlife harvesting. However, with the implementation of the mitigation measures for wildlife (Section 6.12.4), the potential effects on wildlife resource condition will be limited. These measures include:

- The development of a compact mine site;
- Avoidance of clearing and construction activities during sensitive periods;
- Prohibiting hunting and trapping by non-Indigenous employees and contractors within the Project Development Area while working on site; and
- Enforcing speed limits along Project-controlled roads within high quality wildlife habitat.

Mitigation Measures

IAAC requested clarification for the timing windows that will be used for vegetation removal to mitigate potential effects on migratory birds and bats. The timing windows for migratory birds identified in the final EIS/EA are consistent with the MBCA. As outlined in Section 6.12.4, vegetation removal will only be permitted between September 15 to January 14 in any given year. The implementation of timing windows will reduce the risk of mortality for migratory birds (bats, Boreal Caribou, and Wolverine) during vegetation removal, and this has been clarified in Section 6.12.4 and Table 6.12-7.

IAAC requested clarification on the mitigation measures proposed for Moose and how these measures may result in effects to Boreal Caribou. The draft EIS/EA stated that habitat changes caused by disturbance is expected to increase browse availability and amount of early succession deciduous and mixed wood forest covers and may offset residual effects of the Project on moose. However, in the final EIS/EA locally enhance of moose browse was not presented as a mitigation strategy. As described in Section 6.13, mature coniferous and refuge forest types preferred by Boreal Caribou is a restoration goal. A local increase of moose browsing activity (particularly with respect to the incremental increase of new linear development) is not anticipated to result in a detectable change in apparent competition effects unless the disturbance resulted in a functional or numeric response by moose and wolves. For context, forestry activities and forest fires would have a much more substantial local effect than the limited disturbance by the Project. The mitigation measures proposed for moose as well as consideration of how these measures may affect Boreal Caribou have been clarified in Section 6.12.4 and Section 6.13.4, respectively.

6.12.1.3 Spatial and Temporal Boundaries

The Project Development Area (PDA) is defined as the footprint of the Project, including the mine site, mine site access road, and the transmission line corridor, as well as a buffer to allow for flexibility for design optimizations during Project permitting. The buffer includes approximately 250 metres (m) around the mine site area. The buffer is included within the 40 m wide corridor for the transmission line and within in the 30 m wide corridor for the mine access road. Where the mine access road and transmission line are aligned together, the buffer is included within a 60 m wide corridor.

The spatial boundaries used for the assessment of wildlife and wildlife habitat are shown Figure 6.12-1 and Figure 6.12-2 and defined as follows:

- **Local Study Area (LSA):** There are two wildlife LSAs; one for Large Mammals and one for all other wildlife categories. Given the larger ranges of Moose, Black Bear, and Wolf, the Large Mammal LSA is a 10 km buffer around the mine site area and the centreline of the mine access road of the PDA. The other wildlife LSA for smaller species is a 2 km buffer around the mine site area and the centreline of the mine access road of the PDA. For both LSAs, the LSA extends along the transmission line route and includes a 1 km buffer from the centreline. The LSAs includes consideration of direct overprinting of vegetation communities and indirect effects associated with sensory disturbance. The LSAs are the approximate extent to which potential effects on wildlife are anticipated:
    - The groundwater drawdown (Figure 6.12-54);
    - The extent of the modelled air emissions (Figure 6.12-55); and
    - The extent of the modelled noise emissions (Figure 6.12-56).
- **Regional Study Area (RSA):** Based on ECCC's recommendations and to consider patterns in land cover where assemblages of vegetation and wetlands occur relative to distinct environmental conditions, the RSA was determined based on consideration for watersheds, eco-districts, Bird Conservation Regions (BCR), traditional knowledge (when available), and any other guidance made available by ECCC pertaining to the development of ecologically defined study areas. The Large Mammal RSA is defined by the Churchill Range boundaries for Boreal Caribou. Boreal Caribou, Moose and Wolf drive the distribution and abundance of each other on the landscape and will be measured at the same scale.

The temporal boundaries for the assessment of wildlife are defined as:

- **Construction Phase:** Years -3 to -1, representing the construction period for the Project;
- **Operation Phase:** Years 1 to 10, with the first year potentially representing a partial year as the Project transitions from construction into operations. Mining of the ore from the open pit will end in Year 10, at which time the pit will begin refilling with water; and
- **Decommissioning and Closure Phase:**
    - Active Closure: Years 11 to 15, when final decommissioning and the majority of active reclamation activities are carried out; and
    - Post-Closure: Years 16+, corresponding to the post-closure monitoring period when the filled open pit basin will be reconnected to Springpole Lake.

Effects on each VC are assessed for each Project phase (i.e., construction, operation and closure).

6.12.1.4 Criteria and Indicators

In undertaking the assessment of effects on wildlife, the following criteria were used:

- Change in relative abundance of habitat;
- Change in the function, connectivity, and quality of habitat; and
- Change in risk of mortality.
- Change in Bird Density is evaluated for the species that density could be modelled for.

The specific criteria, measurable indicators and the rationale for the selection of criteria are described in Table 6.12-1.

6.12.1.5 Description of Residual Effect Attributes

Residual effects are characterized in terms of the following attributes:

- Magnitude;
- Geographic extent;
- Duration;
- Frequency;
- Reversibility; and
- Timing.

These attributes along with the rankings are further described in Table 6.12-2.

In addition, the residual effects for wildlife are characterized according to the ecological and/or social context within which the VC is found. This is a qualitative measure of the sensitivity and/or resilience of the VC to potential change. The following ranking is applicable:

- **Level I:** The VC may or may not be sensitive but is capable of supporting the predicted change with typical mitigation measures.
- **Level II:** The VC is sensitive and requires special measures to support the predicted change.
- **Level III:** The VC is sensitive and unable to support the predicted change even with special measures.

As noted in Section 6.1, a residual effect is defined as significant if both of the following criteria are satisfied:

- A Level II or III rating is attained for all of the attributes involving magnitude, extent, duration, frequency, timing and reversibility; and
- A Level II or III rating is attained for ecological and/or social context.

Conversely, if a Level I rating is achieved for any of the attributes involving magnitude, extent, duration, frequency, timing or reversibility; or, if a Level I rating is achieved for the ecological and/or social context, then the residual effect is considered to be not significant.

In the event there is a significant adverse effect, the likelihood of occurrence is further described.

6.12.2 Existing Conditions

A summary of the existing conditions is presented below to support an understanding of the effects assessment. The 2023 Terrestrial Resources Baseline includes baseline data on wildlife and their habitat and is provided in Appendix P. Road networks associated with logging and the Slate Falls community are present in the southwestern and southeastern parts of the RSA. The E1C and Watay TL corridors run east to west across the study area. In general, most of the study area in the north shows little evidence of human disturbance. Wildlife species are grouped into the following assemblages, based on the rationale provided in Table 6.12-3:

- Furbearers;
- Large mammals;
- Herptiles (amphibians and reptiles);

- Migratory and non-migratory birds:
  - Forest birds;
  - Raptors;
  - Shorebirds;
  - Waterfowl; and
  - Bog / fen, wetland birds.
- Species of conservation concern; and
- Culturally important species, based on Traditional Knowledge.

Sections 6.13, 6.14 and 6.15 discuss SAR mammals, including Boreal Caribou, Wolverine and SAR bats, respectively.

Indigenous communities have shared valuable insights from their TKLUS, highlighting the importance of specific species to their communities for sustenance and lifestyle. As described in Section 6.12.2.6, these species include moose, deer, Boreal Caribou, black bear, hare, fox, lynx, wolf, muskrat, beaver, otter, martin, mink and fisher, skunk, weasel, wolverine, migratory waterfowl (duck and goose) and grouse species.

The results of the 2021 and 2022 terrestrial baseline studies are summarized below (information on bats is presented in Section 6.15). Additionally, for each assemblage, at least one representative species was selected as a proxy-valued component (proxy species) based on habitat association and expected abundance or behaviour (e.g., diurnal or nocturnal). The proxy species were selected as focal species that would be representative of the broader assemblage and, regarding birds, would occur in sufficient numbers within the RSA to support habitat model validation. See Table 6.12-3 for the rationale for the selection of proxy species.

Studies completed for the Project from 2021 to 2023 were completed using the available Forest Resource Inventory (FRI) data. In September 2023, updated 2021 FRI was provided by the MNR. The new FRI increases coverage and updates the ecosites as well as disturbances. The new 2021 FRI has been used to update the 2023 baseline and updated EIS/EA data. From the 2021 FRI data, 64 boreal ecosites are mapped (Section 6.11). Boreal ecosites are grouped into Terrestrial, Wetland and Anthropogenic. Terrestrial and Anthropogenic ecosites are considered Upland Vegetation Communities, while the Wetland ecosites are considered Wetland Communities. The PDA has an area of 2,026.3 hectare (ha; mine site area is 1,527.9 ha, the mine access road area is 183.7 ha and the transmission line area is 314.7 ha). Where possible, the availability and distribution of proxy species habitat within the RSAs were mapped using existing habitat models on a GIS platform. For species without validated habitat models, WSP created habitat suitability maps based on available land cover data and the species' habitat preferences (Section 6.12.2, Table 6.12-4, and Appendix P-3).

Habitat Suitability Modelling

Habitat suitability (HS) models, which quantify the discernible habitat preferences of wildlife, have been widely used to anticipate the potential effects of habitat alteration (Marzluff et al. 2002). These models combine GIS analysis software, available data and expert knowledge to generate site-specific estimates of habitat suitability for a given species.

For the Project, HS models were used to provide spatially explicit depictions of habitat quality and quantity in the PDA, LSA and RSA. Moderate and high suitability habitats were assumed to support reproduction and survival of species. "Suitable habitat" amounts reported in the PDA, LSA or RSA for species are specifically referring to these moderate to high suitability habitats. Habitats deemed with low or nil suitability may still be inhabited by species or provide connectivity to higher quality habitats; however, they were presumed not to support species reproduction. For the Project, HS models were used as a tool for predicting how wildlife may respond to a changing landscape and facilitate the characterization of residual effects for species evaluated for the Project.

Two types of HS models were used for the Project: Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species (Boreal Avian Modelling Project 2020); and, ecological land classification (ELC) Habitat Suitability Models, as shown in Table 6.12-2.

Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species

The BAM Project by the Alberta Biodiversity Monitoring Institute (ABMI) has produced Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species. These maps depict model-predicted species distribution and provide information about relative habitat suitability based on current climate and landcover (Stralberg 2012). The suitability ranking (SR) of any mapped grid cell is the sum of the probabilities of that grid cell and all other grid cells with equal or lower probability, multiplied by 100 to give a percentage (Stralberg 2012). As such, higher value pixels represent higher habitat suitability for a given species (Stralberg 2012). Using BAM, figures were produced for the Project to provide a visual representation of the predicted distribution and relative habitat suitability for various bird species across the RSA. For interpretation purposes model scores were categorized (or binned) into distinct habitat classes. These classes were defined based on the SR values. The "High" class included SR values ranging from 67 percent (%) to 100%, the "Moderate" class encompassed SR values from 33% to 67%, the "Low" class contained SR values greater than 0% and up to 33%, and the "nil" class was designated for SR values of 0%.

Ecological Land Classification Habitat Suitability Models

The ELC Habitat Suitability Models were developed to map and quantify the availability of various suitable habitats within the PDA, LSA, and RSA for each wildlife VC. These models primarily utilized ELC landcovers derived from Forest Resource Inventory data, in conjunction with hydrology and disturbance layers.

To predict the suitability of a specific landcover type (for instance, vegetation/ELC units, anthropogenic or fire disturbance) for each species, WSP employed a combination of baseline data, scientific literature, Indigenous Knowledge and local knowledge as well as expert opinion from experienced WSP wildlife biologists.

In this assessment, each landcover type and its associated ELC units were evaluated using a binary habitat suitability scale. This scale classified habitats as either nil to low or moderate to high in suitability. However, only habitats with moderate to high suitability were included in the mapping process. It is worth noting that several of these models are grounded in the approaches and methods previously developed and applied in earlier EAs for northern Ontario, such as the Marten Falls Community Access Road (MFCAR) Project.

6.12.2.1 Furbearers

Several species (North American Beaver, Canada Lynx, Muskrat, Red Fox, American Red Squirrel, Snowshoe Hare, and Mustelids [Least Weasel, American Mink, American Marten, American Fisher, North American River Otter]) were documented by visual confirmation or other signs, such as tracks, during surveys, or from historical trapping records. Wolverine is considered as a separate VC, and Wolf and American Black Bear are considered under Large Mammals. Three proxy species were selected for habitat mapping to assess potential effects on furbearers: American Fisher (Figure 6.12-5), Canada Lynx (Figure 6.12-6), and North American Beaver (Figure 6.12-7). American Fisher was selected as a proxy for the Mustelids as they are omnivores that prefer mature forests and are sensitive to forest disturbances, making them an indicator of forest health. Canada Lynx was selected as a proxy as they are closely tied to Snowshoe Hare populations, and hares are important to local communities (Kunicky 2021). Canada Lynx is also a mid-sized boreal forest carnivore. North American Beaver is a semi-aquatic herbivore selected as a proxy as they thrive in stable water environments. Together, these three proxy species inform the habitat needed for furbearers to carry out the life processes necessary to survive and reproduce.

The American Fisher has a moderate amount of suitable habitat with an area of 779 ha (44.94%) in the PDA, and a lower proportion of habitat available in the LSA and RSA 4,326 ha (18.62%) and 64,416 ha (12.40%), respectively. The Canada Lynx has a high amount of suitable habitat with an area of 1,499 ha (86.47%) in the PDA, 21,578 ha (92.90%) in the LSA, and 39,2317 ha (75.52%) in the RSA. The Beaver was also mapped to have a high amount of suitable habitat within the Study Area, with an area of 2,022 ha (99.76%) in the PDA, 21,885 ha (71.12%) in the LSA, and 477,528 ha (76.00%) in the RSA.

6.12.2.2 Large Mammals

Boreal Caribou is considered as a separate VC and addressed in Section 6.13. Large mammals documented in the RSA include Moose, Wolf, and American Black Bear.

The traditional land use information discusses Moose hunting and consumption from the study area, specifically southwest of the Project (i.e., Red Lake) and 91 total locations for Moose harvest. Moose is also a highly valued food source for Indigenous communities. Moose and Wolf were recorded during the 2021 to 2024 surveys. Black Bear is also considered under the Large Mammal section. While not commonly observed during surveys, evidence is documented.

No evidence of deer was documented during surveys. Extensive logging in the early 20th century resulted in second-growth forests that allowed deer to increase and spread north (Dobbyn 1994). White-tailed Deer started to occur in areas such as Red Lake and Sioux Lookout in 1970 (Dobbyn 1994) and can still be found in these municipalities (iNaturalist community 2023). While range mapping does not currently have White-tailed Deer occurring as far north as the Project, it is possible that continued range expansion could occur, and deer will be in the RSA in the future. White-tailed Deer are not currently considered in the effects assessment.

Two proxy species were selected for habitat mapping to assess potential effects on large mammals: Moose (Figure 6.12-8) and Wolf (Figure 6.12-9). Moose are selected as a proxy as they are a generalist herbivore and a culturally important game species. Wolf was selected as a proxy species as they are considered habitat generalists that move with prey availability. The baseline condition for Moose in Late Winter and Wolf habitat includes 1704 ha (98.31%) in the PDA, 63,268 ha (98.06%) in the LSA, and 1,596,129 ha (95.78%) in the RSA. For Moose foraging habitat, the baseline condition comprises 45.8 ha (2.64%) in the PDA, 4,210 ha (6.52%) in the LSA, and 109,660 ha (6.58%) in the RSA.

Traditional knowledge and land use information identified 91 locations for Moose hunting and consumption within the RSA, specifically southwest of the mine site, near Red Lake. Moose and Wolf were recorded during the winter aerial surveys. During the 2021, 2022, and 2023 aerial surveys, between 32 and 46 Moose have been observed. The ability to sex Moose was limited due to the thick conifer cover. Moose wintering areas were associated with early successional habitats near heavier cover that was created by forestry activities and forest fires, but did not overlap with Boreal Caribou. Wolves were generally recorded in areas with Moose, rather than Boreal Caribou. In 2021, one pack of Wolves (5 animals) was recorded 30 km southeast of the proposed mine site area. Although Black Bear is included under the large mammal assemblage, they were not commonly observed during field investigations. Spatial observations from aerial surveys of Moose and Wolf were used to construct kernel density estimators (KDE) in ArcMap or R, which are estimates of the probability of use on the landscape and can be used to identify core wintering areas. KDE analysis results were used to support the development of habitat maps for Moose and Wolf in the RSA (Figure 6.12-8 and Figure 6.12-9) for the assessment of potential effects.

6.12.2.3 Herptiles

Spring Peeper, American Toad, and Wood Frog were abundant during surveys in a wide variety of habitats, while Northern Leopard Frog was present locally in low numbers. Historically, Gray Treefrog and Blue-spotted Salamander have also been reported (DST 2013). Common Gartersnake was observed frequently during surveys. Common Gartersnake includes two lineages: Eastern Gartersnake and Red-sided Gartersnake. Occurrences of both lineages are documented around Slate Falls (Rowell 2012). Determining the extent of Red-sided Gartersnake is problematic due to wide variation that exists in colouration and pattern of both lineages (Rowell 2012). No other snake species are expected to occur in the RSA. No turtles were observed during field investigations. To assess potential habitat effects on herptiles, Wood Frog was selected as a proxy species (Figure 6.12-10). The Wood Frog was selected as a proxy species as it is largely terrestrial in adult life but remains close to the water and is reliant on vernal pools for breeding; these habitat types encompass key habitats of other herptiles. Wood Frog habitat was mapped for the Project using an HS model that was developed by WSP (Figure xx; Appendix P-3.6). It was found that 1737 ha of suitable habitat exists in the PDA (85.73% of PDA), 24,176 ha in the LSA (78.56% of LSA), and 366,069 ha in the RSA (58.26% of RSA).

6.12.2.4 Migratory and Non-migratory Birds

DST (2013) and NWES (2020) completed surveys for migratory and non-migratory birds. These included marsh bird, waterfowl surveys, and owl surveys around the PDA, with no target marsh bird species found in 2012, 2018, or 2019. Waterfowl were observed at various locations in 2012, 2017, and 2019, with Common Merganser, Mallard, Canada Goose, Common Goldeneye, and Hooded Merganser being the most abundant. Owl surveys recorded Boreal Owl and Northern Saw-whet Owl in 2012, and Barred Owls were noted in 2012 and 2018.

Further surveys were conducted starting in 2021, documenting migratory and non-migratory birds through in-person observations, autonomous recording units (ARU), and winter surveys (e.g., at existing camps and via helicopter).

Across 2021 and 2022, 103 species of birds were detected during breeding bird point counts. In 2021, 228 point-count stations were surveyed. In 2022, 164 point-count stations were surveyed, of which 77 were re-sampled point-count stations from 2021. The re-sampled stations were in areas that were not burned in the fire that occurred in June and July of 2021. Multi-year migratory bird point count surveys have been undertaken to obtain density estimates of individual breeding bird species across the local and regional study areas and seasons per provincial and federal avian protocols. Bird densities modelled from point count survey data accounting for species-specific detection probability followed methods by Sólymos et al. 2013 (Appendix P-3). Density could be modelled for 45 species detected during breeding bird point count surveys. Final density models for most species showed relatively good generalizability and stability in their predictive performance, with most showing low variability in the Root Mean Square Error (RMSE; a measure of prediction error) and relatively high concordance between the expected RMSE and observed RMSE.

Average density across the surveyed point count locations ranged from 0 to 1 birds per hectare (birds/ha). Four species had unreasonably large standard errors (more than 50 birds/ha), so they were excluded from the density plots. Most bird species (34 species) had average densities below 0.1 birds/ha. The three bird species with the highest average densities were the White-throated Sparrow, Nashville Warbler, and Ruby-crowned Kinglet, which had average densities of 0.54, 0.74, and 0.99 birds/ha, respectively.

In point counts, in 2021, the top three most abundant and frequently observed species in the RSA are representative of the avifauna and habitats found in the RSA (boreal coniferous forest and wetland) were Ruby-crowned Kinglet, Nashville Warbler, and White-throated Sparrow. Ruby-crowned Kinglet and Nashville Warbler were particularly ubiquitous, each being found at 86% of all point count locations. Similarly, in point counts in 2022, the top three abundant and frequently observed species in the RSA were the Ruby-crowned Kinglet, Nashville Warbler, and White-throated Sparrow. Again, similarly, the Ruby-crowned Kinglet was particularly ubiquitous, being found at 87% of all point count locations. Nashville Warbler was documented at 70% of all point count locations.

Equal densities for each species were expected across the RSA if habitat is homogeneously distributed on the landscape. While most (31 out of 45 species, or 68.9%) had densities that tended to be higher within the currently defined LSA boundary for birds, this difference was only significant for three species: Boreal Chickadee, Chipping Sparrow, and Sandhill Crane. Only one species, Greater Yellowlegs, had a significantly higher modelled density outside compared to within the LSA.

The covariate “Year” was included in the final density model of 22 species. For 19 of these, density was significantly lower in 2022 compared to 2021. While it is impossible to state a certain cause of this decrease, a possible explanation could be the high number of forest fires in 2021.

As noted, wildlife species were sorted into assemblages, based on the rationale provided in Table 6.12-3. Furthermore, migratory and non-migratory birds were grouped into separate subgroups based on the ECCC Annex (2021). These subgroups were forest birds, raptors, shorebirds, waterfowl, and bog/fen, and wetland birds. Special Concern and culturally important species are discussed in Section 6.12.2.5 and Section 6.12.2.6, respectively. While all data collected during baseline surveys and bird modelling were completed at the species level, these groups are used for overall summaries and a subset of species to serve as proxies was selected to help synthesize the results of the density modelling. Proxy species inform if habitat loss and alteration would result in a change in the habitat required to carry out the life processes necessary to survive and reproduce. A description of how these recommended subgroups are used in relation to habitat mapping for effects assessments is as follows:

- Forest birds: Songbird, woodpecker and grouse species that use upland coniferous, deciduous, and mixed forest habitat types for breeding. Proxy species for HS modelling are Dark-eyed Junco for coniferous (Figure 6.12-11), Red-eyed Vireo for Deciduous (Figure 6.12-12), and Ovenbird for deciduous/mixed (Figure 6.12-13). Note that mixed and deciduous forests in the RSA are discussed together in the baseline and Section 6.11. Deciduous and coniferous trees must be in equal portions at 50% coverage. Communities may be mixed with, but most mixed forests in the RSA with a significant portion of deciduous trees will be classified as Deciduous Forest under the Boreal ELC. Relative Habitat Suitability model for the RSA was based on the BAM Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species (Stralberg 2012). For the Dark-eyed Junco, limited suitable habitat was available in the PDA (286 ha or 16.51%), increasing to moderate amounts of habitat in the LSA (13,649 ha or 58.76%) and RSA (199,508 ha or 39.15%). The Red-eyed Vireo, which prefers deciduous habitats, has 1,553 ha available in the PDA (high amount at 89.59%), 6,308 ha in the LSA (27.16%) and 203,352 ha (39.15%) in the RSA. Lastly, the Ovenbird, which inhabits deciduous/mixed forests, has no available habitat in the PDA, 1.03 ha in the LSA (less than 1%), and 144,893 ha in the RSA (27.89%).

- Raptors: They are divided into nocturnal and diurnal as well as species which form stick nests and cavity nesting species. Proxy species for HS modelling are Great-horned Owl for nocturnal stick nesters (Figure 6.12-14) and Boreal Owl for nocturnal cavity nesters (Figure 6.12-15). Osprey are used as diurnal stick nesters (Figure 6.12-16), and American Kestrel is used as diurnal cavity nesters (Figure 6.12-17). Raptor habitat was mapped for the Project using HS models developed by WSP. Osprey habitat leveraged a model developed for MFCAR at Ogoki Post, ON. For the Great-horned Owl, moderate to high habitat availability is 1,290 ha (74.43%) in the PDA, 10,952 ha (47.15%) in the LSA, and 152,439 ha (29.34%) in the RSA. The Boreal Owl has 1,404 ha (80.99%) of habitat in the PDA, 14,839 ha (63.88%) in the LSA, and 245,985 ha (47.35%) in the RSA. The Osprey has moderate to high availability of habitat in the Study Area, 1,381 ha (79.66%) in the PDA, 15,312 ha (65.92%) in the LSA, and 322,990 ha (62.18) in the RSA. Lastly, the American Kestrel has 1,415 ha in the PDA, 18,719 ha in the LSA and 428,377 ha in the RSA.
- Shorebirds: Greater Yellowlegs (Figure 6.12-18) and Wilson's Snipe (Figure 6.12-19) are the proxy species for HS modelling. Suitable habitat for Greater Yellowlegs in the PDA covered a moderate area of the study areas, including 943 ha (54.41%), 12,081 ha (52.01%) in the LSA, and 253,440 ha (48.79%) in the RSA. The Wilson's Snipe had lower availability of moderate to high suitability in the study areas, with an area of 369 ha (21.28%) in the PDA, 7,583 ha (32.65%) in the LSA, and 170,231 ha (32.77%) in the RSA. Overall suitable shorebird habitat is moderately abundant and covers approximately 30% to 55% of each study area.
- Waterfowl: The proxy species for HS modelling is Mallard (Figure 6.12-20. The study areas are highly suitable for the Mallard with suitable habitat covering an area of 1,384 ha (79.87%) in the PDA, 20,238 ha (87.13%) in the LSA, and 442,942 ha (85.27%) in the RSA.
- Bog / fen and wetland birds: Proxy species for HS modelling are Common Yellowthroat (Figure 6.12-21), Palm Warbler (Figure 6.12-22), and Northern Waterthrush (Figure 6.12-23). The Common Yellowthroat has no suitable habitat in the PDA or LSA, and a low amount in the RSA with an area of 51,869 ha (9.98%). The Northern Waterthrush has a low amount of suitable habitat in each study area (less than 1% to 28%). Similarly, the Palm Warbler has a low amount of suitable habitat in the PDA and LSA, with an area of 153 ha (8.80%) and 7,486 ha (32.23%), respectively. It has a moderate amount of suitable habitat in the RSA with an area of 252,265 ha (48.56%).

Further, eight of these proxy species could be included in the density modelling. In general, the subgroup for forest and bog/fen species were generally representative of the species' habitat preferences (as described in the section showing Bird Modelling Results).

In 2021, 31 ARUs were deployed, and this was doubled to 64 ARUs in 2022. This provided a total of 3,410 ARU days. In 2021, ARUs gathered 778,259 bird detections. In 2022, with the deployment of an additional ARUs, the number of detections significantly increased to 4,482,168. The design included stratification across habitat types as well as randomly selected locations for all bird survey stations (including

ARU) within each target Far North Landcover class (the available vegetation community information at the time). Randomization was done using ARCMap 10.2. In some instances, the first locations randomly selected were not accessible by helicopter and as such, another random location was then selected.

Bird Modelling Methods

Covariates

Several temporal, climatic and habitat covariates were used to model density. Temporal covariates included the time since sunrise that the survey was conducted, the survey day and the survey day squared. Sunrise time was obtained from the nrc.canada.ca sunrise calculator. Weather covariates included humidity (%), amount of precipitation (millimetres [mm]), windspeed (kilometres per hour [km/h]) and average temperature (degrees Celsius [°C]). Weather for each point count survey was calculated as the average weather measured by three Environment Canada weather stations nearest to the Project (Ear Falls AUT, Pickle Lake A, Red Lake A) during the hour in which the survey was conducted. Several steps were followed to obtain the final habitat variables used in the density analysis. First, the Far North Landcover layer obtained through the Ontario GeoHub (https://geohub.lio.gov.on.ca) was used to obtain the proportion occupied by each land class at two spatial scales:

1) Within a 150 m radius circle around each point (local scale); and
2) Within a 5 km radius circle around each point (landscape scale).

These scale sizes are comparable to those used by Mahon et al. (2016) on data from the BAM Project. The resulting habitat variables were simplified by summing the proportions of similar land classes to form five main habitat categories for each spatial scale: 1) Coniferous Forest; 2) Deciduous/Mixed Forest; 3) Wetlands; 4) Sparse Treed Habitat; and 5) Treed Habitat. Each habitat category was composed of the following land classes:

1. Coniferous Forest: Coniferous Treed;
2. Deciduous/Mixed Forest: Deciduous Treed, Mixed Treed;
3. Wetlands: Open Bog, Open Fen, Coniferous Swamp, Freshwater Marsh, Thicket Swamp, Treed Bog, Treed Fen;
4. Sparse Treed: Sparse Treed; and
5. Treed: Coniferous Treed, Deciduous Treed, Mixed Treed, Treed Bog, Treed Fen, Coniferous Swamp.

The Sparse Treed habitat category was excluded in all subsequent analyses, as it made up only 2% of the total habitat coverage.

Additional habitat covariates included the proportions of riparian habitat, mature forest, and disturbed habitat at both spatial scales, as well as the distance from the survey point to the nearest water source. The proportion of riparian habitat at the two spatial scales was calculated as the proportion of area occupied by a 100 m buffer around "Clear Open Water" Far North Landcover features. To improve the distribution for this covariate, a 200 m radius was used to define the local scale instead of 150 m. The proportion of mature forest (forests >60 years old) at each spatial scale was obtained from the FRI forest age attribute. Disturbed habitat included roads and other areas with human activity as well as areas impacted by harvest activities and forest fires. Disturbed habitat was compiled by merging the Ontario Roads Network layer, the MNRF Roads layer, FRI Harvest and Fire polygons occurring after the year 2000, and all Far North Landcover disturbance features (including Community/Infrastructure). Distance to Water was calculated as the shortest distance from a point to a "Clear Open Water" Far North Landcover feature.

Principal Components Analysis (PCA; Figure 6.12-28) and a Pearson correlation matrix were used to refine the list of habitat covariates included in analyses. The first three axes of the ordination cumulatively accounted for 65.4% of the variance in the data. Although habitat was quantified at more than one spatial scale to account for the scale dependency in habitat selection of many species (Mayor et al. 2009, McGarigal et al. 2016), landscape scale covariates all had similar loadings to their local-scale counterparts. Consequently, only the local scale variables were retained for modelling bird densities. While Mahon et al. (2016) used canonical correspondence analysis in avian community modelling to inform variable selection and facilitate model building, this approach could not be used, as it requires all values to be above zero, which was not the case for the current data. None of the remaining variables had correlations above |r| = 0.6. All numeric variables were scaled for analyses and, using the cut-off from Van Wilgenburg et al. (2017), only species with greater than 15 detections were retained for density modelling.

QPAD Offsets

Following the QPAD approach to modelling avian densities described in Sólymos et al. (2013) and Sólymos (2019), offsets were generated and included in the density models to account for the probability of detecting each species. Detection probability varies as a function of singing rate (phihat) and the distance from the observer at which the animal can be detected (detection radius; tauhat). The offset was calculated as $Offset = \log{(A \times P \times Q)}$ where:

- $A\ (detection\ area) = \pi \times tauhat^2$
- $P\ (singing\ probability) = 1 - \mathrm{e}^{-\text{maximum survey time}\times\text{phihat}}$
- $Q\ (perception\ probability) = 1$

Q was set to "1" since the offset was calculated for an untruncated maximum detection distance (effective detection radius, EDR) in which all calling birds would be detected under perfect conditions (Sólymos 2019).

Phihat and tauhat were respectively obtained from the coefficients of removal and density models conducted on the avian observation data by conditional maximum likelihood estimation ("cmulti" function of the R package "detect"). Removal sampling was performed using three time intervals during which an individual bird would have been detected for the first time during the survey: 0 to 3 minutes, 3 to 5 minutes and 5 to 10 minutes. Covariates included in the removal models were time since sunrise, the survey day, the survey day squared, humidity, precipitation, windspeed, and temperature. Distance sampling was achieved using three intervals for distance from the observer: 0 to -50 m, 50 to 100 m and >100 m. Covariates tested in the distance models included the same weather covariates from removal models, the final habitat covariates described in the previous section and the identity of the principal observer conducting the survey.

Density Models

Generalized linear models (GLMM) were used to estimate density as a function of year, habitat, and whether the observation was made inside or outside the LSA (hereafter referred to as the Treatment). Model selection followed a hierarchical process where an initial comparison of null models with either a "poisson" or "negative binomial" distribution was used to identify the distribution family to carry forward in all subsequent models. Secondly, the importance of Year was tested by comparing models with and without Year. If including Year provided a better model fit to the data, it was carried forward in all subsequent models. Finally, a series of eight models were compared to test the effect of habitat on density. Except for one model that contained no habitat variables, all other models contained two to three habitat variables. Combinations of habitat variables were selected based on typical or expected habitat preferences for potentially occurring species. An information-theoretic approach was used to select the top model by AIC (Burnham and Anderson 2002). To evaluate the goodness-of-fit (GOF) of the best-fitting models, tests for normality of residuals, zero inflation, and presence of outliers were conducted with R package "DHARMa" (Hartig 2022). Model fit was evaluated based on adjusted p-values (at $\alpha = 0.01$) and on the size of model coefficient standard errors. When a species model did not meet the GOF criteria, the modelling process was repeated for that species using log-transformed covariates for covariates that had skewed distributions. If the final model for a given species still did not pass the GOF tests, it was labelled as having a "questionable" fit. All models contained the survey route (series of consecutive point counts; "Route") and the individual point count location ID ("Point") as random intercepts.

Model Validation

All models were validated by k-fold validation, where model performance was measured using the root mean square error (RMSE; a measure of prediction error). This method was used due to its computational efficiency and accuracy compared to "Leave-One-Out" cross-validation (James et al. 2021). Data were split into a training set (80% of the data) and a testing set (20% of the data). Cross-validation with a fold of k=5 was applied to the training set to obtain an average RMSE (referred to here as the expected RMSE). The expected RMSE and its standard deviation was plotted against the RMSE calculated from the testing set (observed RMSE; Figure 6.12-29). Concordance between the expected and observed RMSE and a low standard deviation of the expected RMSE indicate a more stable and generalizable model (i.e., not overfit).

Density Estimation

The average density for each species predicted by the models across both years and treatments at average levels of the habitat covariates was plotted (Figure 6.12-30). Confidence intervals were obtained through hierarchical bootstrapping (Sólymos et al. 2013) which weighted resampling by the number of observations obtained from each sampling route (i.e., the random factor in the density models). The data were iteratively re-sampled, and a new QPAD detection probability offset was modelled and calculated. Final models were refitted to the subsampled data with the new offsets, and new estimates / predictions were obtained based on the refit model. Recalculating the offset at each iteration allowed for the propagation of the detection probability error in the final confidence estimates (Sólymos et al. 2013). The process was repeated 1000 times for each species, and 95% confidence intervals were obtained from the 0.025 and 0.975 quantiles of the model prediction / estimates.

Power Analysis by Simulation

Simulations were conducted to evaluate how the power to detect a change from baseline in the density within the LSA in a hypothetical new year of sampling varied according to sample size and types of habitat sampled (Figure 6.12-41; Figure 6.12-42; Figure 6.12-43; Figure 6.12-44; and, Figure 6.12-45). Power was calculated at effect sizes ranging from -0.5 (50% reduction in density) to 0.5 (50% increase in density). Power was also calculated for four levels of sampling in the new hypothetical year: 5, 10, 15 and 25 routes, each of which was composed of five point-count locations. Each sampling level represented the following:

1) The number of routes revisited from previous routes within the LSA.
2) The number of revisited routes outside the LSA.
3) The number of simulated new routes within the LSA.

4) The number of simulated new routes outside the LSA. For example, sampling at level "5" represented an approximate sampling effort of 20 routes (100 points) in a hypothetical new year (five routes from 2021 to 2022 inside the LSA, five routes from 2021 to 2022 outside the LSA, five routes for a new year inside the LSA and five routes for a new year outside the LSA).

If the number of available points to revisit was insufficient to meet the targeted sampling level, the maximum number of old points was used. Although old points were sampled without replacement, new points were generated by resampling from the dataset with replacement to meet the targeted sampling levels.

Two rounds of surveys were simulated beginning on May 25, and each round lasted a maximum of 18 days. The length of each survey was set to 10 minutes. TSSR was allowed to vary between 0 and 500 seconds, and each simulated route was randomly attributed a series of TSSR values (one for each point) from a list of possible survey times dictated by the sampling scheme. Although a survey time of 10 minutes per point count leaves no time for commuting between surveys, ensuring flexibility in the survey start date and time was necessary to simulate the higher sampling efforts. Weather for a given simulated point and for a given simulated survey time and round was resampled from the original data filtered for the targeted survey time and round. Power was also evaluated for three levels of habitat where the simulated survey effort in a given level placed greater focus on one of three habitat groupings. Groupings were derived by using a k-means cluster analysis to cluster the habitat data underlying the model into three groups. Each cluster represented a distinct habitat group driving the density of the given species. Simulations were conducted by resampling the original data within each habitat cluster according to the following scheme:

1) 60% from Cluster 1, 20% from Cluster 2 and 20% from Cluster 3;
2) 20% from Cluster 1, 60% from Cluster 2 and 20% from Cluster 3; and
3) 20% from Cluster 1, 20% from Cluster 2 and 60 % from Cluster 3.

The original data and simulated data were then combined for modelling. To include the detection probability uncertainty in each simulation, a new set of QPAD models was randomly selected from a set of 500 QPAD models generated during the bootstrapping step used to estimate confidence intervals for density. New QPAD offsets were calculated from the QPAD models for the new dataset. The original model with the added interaction between Treatment and Year was run with the new dataset, and p-values for the effect of interest were extracted to estimate power. Confidence intervals were calculated for the predicted density inside and outside the LSA at the reference levels of the predictor variables averaged across all years. Power and confidence intervals at each simulated level of effect size, sample size, and habitat were plotted (Figure 6.12-46; Figure 6.12-47; Figure 6.12-48; Figure 6.12-49; Figure 6.12-50).

Avian Acoustic ARU Analysis

The avian acoustic activity was modelled from ARU surveys to supplement results from human point count density modelling. While absolute density is not thought to be estimable from single-microphone ARU data (Dawson and Efford 2009; Van Wilgenburg et al. 2017), singing activity can serve as a measure of current relative abundance and area use and can be employed to measure downstream Project impacts.

Species Classification

Data from ARUs was analyzed by first using an automated classifier to detect avian vocalizations within the recordings and classifying them to species. The BirdNET automated classifier was leveraged for this task and was accessed and implemented through the National Park Service NSNSD "R" package, NSNSDAcoustics, following their suggested workflow (Kahl et al. 2021); https://github.com/

nationalparkservice/NSNSDAcoustics). The model used was BirdNET_GLOBAL_3K_V2.2_Model_ FP32.tflite. The location of the Project (coordinates Latitude 48.170294 and Longitude -79.766916) was specified, allowing BirdNET to generate a list of possible species for the RIA from which to base the classification decisions. BirdNET was set to decide which internal species list to use based on each specific survey week. The sensitivity of the classifier was set to 0.5. The overlap was set to 0, meaning that BirdNET did not classify the same call more than once. The minimum species occurrence frequency threshold was set to 0.01, which made the classifier more inclusive for bird species at the edge of their range. Automated classification provides the ability to efficiently and objectively analyze all recordings made at the Project to obtain high-resolution activity trends (Knight et al. 2017). The ability of the classifier to detect a vocal signal (also termed "recall") can vary by species due to differences in species singing rate, signal strength, and environmental clutter, which can influence relative activity patterns inferred from ARU data (Van Wilgenburg et al. 2017; Yip 2020). Nevertheless, this potential drawback is outweighed by this method's significant time savings and consistency. Compared to human point count surveys, ARU surveys provide the ability to collect more data over longer time frames in remote areas (Knight et al. 2017). This will result in more species meeting modelling requirements and allowing potential downstream Project impacts to be assessed for more species.

Data Vetting and Filtering

Before filtering the data for analyses, all files auto-classified to a SAR species were manually vetted except for SAR species with over 10,000 detections, including Common Nighthawk, Olive-sided Flycatcher, and Chimney Swift. Data were then filtered for analyses, which involved selecting only files with a BirdNET species classification confidence of 30%. After filtering, all files from species identified as a Significant Wildlife Habitat indicator species or as a Federal Priority species (excluding species at risk) were manually vetted. Ten recordings from each site were selected for manual verification for all remaining species (including Common Nighthawk, Olive-sided Flycatcher, and Chimney Swift). This strategy helped to ensure that all species were provided with an equal verification effort such that less abundant species were not under-verified while setting a reasonable effort limit on more abundant species. In total, 44,278 files were manually vetted. Only species with a BirdNET classification success rate ≥90% (determined through manual vetting) were retained for subsequent analyses. Although this rigorous filtering process excluded species from the modelling exercise, it guaranteed higher confidence in the precision of the modelled species trends. Subsequent filtering also involved only including data from complete two-hour recording bouts and removing evening / night survey data for diurnal species, and morning data for nocturnal species. Species classified as "nocturnal" included all potentially occurring nightjar and owl species, as well as other species that commonly vocalize at night or dusk, including the Common Loon, American Bittern, Virginia Rail, Sora, Pied-billed Grebe, and Yellow Rail.

ARU Vocal Activity Models

Generalized linear models were used to model bird singing activity as a function of spatial, temporal and climatic covariates. Spatial covariates aimed to correct for any spatial autocorrelation in the data and included the survey location UTM easting and northing. Temporal covariates included survey week (from Julian day), $week^2$, and year. The relationship between singing rate and the number of days to the nearest full moon was also tested for nocturnal species. The weather and habitat covariates used were the same ones used for modelling bird density from human point count data.

Model building followed a hierarchical procedure made up of six model selection steps. In each step, a suite of models was compared to test the importance of a specific parameter or variable type. Step one identified the distribution that best fit the data by comparing two null models with either a "poisson" or "negative binomial" distribution. The best-fitting distribution was carried forward in all subsequent models. Step 2 tested the effect of adding a zero-inflation component. If zero-inflation provided a better fit to the data, it was carried forward in subsequent modelling steps. The effect of weather was tested in step 3 by comparing ten models with different combinations of weather covariates. Step 4 tested the importance of temporal variables by comparing six models for diurnal species (no full moon variable included) and 12 models for nocturnal species (including the variable "days to the nearest full moon"). Location was tested in step 5 (four models), and habitat in step 6 (eight models). For all models, "Point" was included as a random factor. Finally, the parameters from the best models in each step were combined into a single final model. Model fit for the final model was measured and assessed following the same approach and criteria that was used to evaluate the human point count density models. Similarly, k-fold cross-validation (k = 5) was also used to measure the predictive performance and stability of the models (Figure 6.12-51).

The average number of detections/hr predicted by the best model for each species at average levels of the numeric predictor covariates (averaged across year and treatment) is provided in Figure 6.12-52. Confidence intervals were estimated from standard errors of the predicted values. Additionally, to visualize the temporal pattern of avian vocal activity for each species within the Project, the mean number of detections/hr within the LSA predicted by the best model for each species at average levels of the numeric predictors was estimated for each survey date. Predicted means were averaged across each week. Rarer species (for which the sum of the weekly averages was <5) were excluded from the plot. Finally, all values were scaled to the maximum weekly predicted mean and plotted against week (Figure 6.12-53).

Bird Modelling Results

__Density Estimation__

Density could be modelled for 45 species detected during breeding bird point count surveys. Of these, 18 had questionable model fits. Despite this, final density models for most species showed relatively good generalizability and stability in their predictive performance. Most showed low variability in the RMSE and relatively high concordance between the expected RMSE and observed RMSE. Most models show consistency in their responses when given new data, which suggests they have relatively low bias. Models for six species performed relatively poorly: Orange-crowned Warbler, Brown Creeper, Bonaparte's Gull, Philadelphia Vireo, Cape May Warbler, and Black-backed Woodpecker.

Mean predicted density (birds/ha) at the average surveyed habitat condition for the 45 bird species for which density could be modelled is provided in Figure 6.12-30. Average density across the surveyed point count locations ranged from 0-1 birds/ha. Four species had unreasonably large standard errors (>50 birds/ha), so they were excluded from the density plots. Most bird species (34 species) had average densities below 0.1 birds/ha. The three bird species with the highest average densities were the White-throated sparrow, Nashville Warbler, and Ruby-crowned Kinglet, having average densities of 0.54, 0.74, and 0.99 birds/ha, respectively.

Equal densities for each species were expected across the RSA if the habitat was homogeneously distributed on the landscape. While most (31/45 or 68.9%) had densities that tended to be higher within the currently defined LSA boundary for birds, this difference was only significant for three species: Boreal Chickadee, Chipping sparrow, and Sandhill Crane. Only one species, Greater Yellowlegs, had a significantly higher modelled density outside compared to within the LSA.

The covariate "Year" was included in the final density model of 22 species. For 19 of these, density was significantly lower in 2022 compared to 2021. While it is impossible to know the cause of this decline, a possible explanation could be the high number of forest fires in 2021.

A subset of species was selected to serve as proxy-valued components (VCs) to help synthesize the results of the density modelling. The following species were selected as VCs:

- Forest species: Dark-eyed Junco, Ovenbird, and Red-eyed Vireo;
- Wetland species: Common Yellowthroat, Palm Warbler, and Northern Waterthrush;
- Shorebirds: Wilson's Snipe, Mallard, Greater Yellowlegs;
- Nocturnal Raptors: Great-horned Owl, Boreal Owl;
- Diurnal Raptors: Osprey, American Kestrel;
- Special Concern species: Olive-sided Flycatcher, Common Nighthawk; and
- Culturally important species: Bald Eagle and Grouse.

Of these VCs, eight could be included in the density modelling. All forest VCs were included in the density modelling, and the final models were generally representative of the species' habitat preferences. Dark-eyed Junco was significantly more abundant near wetlands and negatively associated with deciduous/mixed forests, consistent with the species' known preference for coniferous forests and edge / open habitats. Ovenbird was significantly more abundant in deciduous / mixed forests, which aligns perfectly with the species' known habitat preferences. Red-eyed Vireo showed a negative association with treed habitat. While this species is known to prefer deciduous forests, the negative association with treed habitats may be a reflection of the low abundance of deciduous habitats and relatively ubiquitous coniferous forests across the RSA. Bog / fen and wetland VCs included in the density modelling were Common Yellowthroat and Palm Warbler. Consistent with their known habitat preferences, final models for both VCs showed statistically significant negative associations with forested habitats. Of the shorebird VCs, density was modelled for Greater Yellowlegs. As expected, abundance of this species was greatest in wetland and riparian habitats. Finally, density could be modelled for one species at risk, Olive-sided Flycatcher. While this species' habitat preferences range from old-growth coniferous / mixed forests to young / intermediate-stage forests resulting from wildfire or timber harvesting, density models revealed a greater preference within the RSA for the latter habitat type. Density models could not be developed for the remaining VCs.

Power Analysis by Simulation

Efforts were made to determine whether the current point count data would be sufficient to assess future Project impacts and to determine the level of additional sampling required to detect such impacts and improve the accuracy of the density estimates. To this end, power analyses were conducted by simulation to detect a change in density from baseline within the LSA for a hypothetical new year for a range of changes in density, sample sizes, and habitat types. Although hypothetical Project-driven impacts to density were investigated up to a 50% decrease in the LSA, a decrease of 25% can be considered large. Even for this conservative effect size, power did not reach 80% for any of the species included in the power analyses, irrespective of sample size or habitats sampled. In general, the power to detect a 25% decrease in density from baseline increased with each addition to the sampling effort. The gains in power from increasing the sample size were mainly observed at larger effect sizes (~≤-25%). Despite this, the highest simulated sampling effort of 25 resampled routes and 25 new routes per treatment (total of 500 simulated points) was still insufficient to reach the desired 80% power level in any of the examined species.

While increasing the sample size did not appreciably improve the analytical power, it improved the accuracy of the density estimates for nine of the ten species examined. Confidence intervals of density estimates decreased with each additional increase in sample size for Nashville Warbler, White-throated Sparrow, Dark_eyed Junco, Ovenbird, Red-eyed Vireo, Common Yellowthroat, Palm Warbler, Greater Yellowlegs, and Olive-sided Flycatcher. Focusing sampling efforts in specific habitats improved confidence of density estimates for four species. Smaller confidence intervals were observed for the following species:

1) Ovenbird, with lower sampling effort in coniferous forest;
2) Red-eyed Vireo, with a lower sampling effort in wetlands;
3) Common Yellowthroat, with a lower sampling effort in forested habitats; and
4) Greater Yellowlegs, with a greater sampling effort in riparian habitat.

The confidence benefits to density of focusing sampling effort in specific habitats were mainly observed at smaller sample sizes.

Avian Acoustic ARU Analysis

Manual vetting of a subset of the BirdNET ARU classifications confirmed the presence of 125 species. After removing the 43 species with fewer than 10 BirdNET detections, classification accuracy for the remaining species measured from manual vetting averaged 58.6%. The accuracy of the automated classification was over 80% for 69 species and over 90% for 53 species. Among the species confirmed by ARU surveys, 87 matched those confirmed through point count surveys and 38 were new species not detected during point count surveys.

After data filtering, acoustic activity models could be generated for 52 species, of which 29 had questionable model fits. Most models had relatively good generalizability, with few having very large variability in their expected RMSE values. Despite this, compared to the point count density models, a larger proportion of ARU acoustic activity models showed greater variability in their predictive ability. This may have stemmed from the fact that the models could not correct for the detection probability of each species, a function of the species calling rate and survey conditions. Despite this, the current analytical method still provides a sound way of modelling baseline conditions and, eventually, Project impacts based on the relative activity of each species.

Figure 6.12-30 provides the mean predicted acoustic activity (birds/ha) at the average surveyed habitat condition for the 53 bird species modelled. The average activity across the surveyed points during the survey period ranged from 0.0013 to 85 detections/hr.

6.12.2.5 Special Concern Species

Species found in, or that could be found in, the RSA listed as Threatened or Endangered under the ESA are presented in separate sections (Boreal Caribou are discussed in Section 6.13, Wolverine in Section 6.14, bats [SAR and non-SAR] in Section 6.15 and SAR birds [Eastern Whip-poor-will, Lesser Yellowlegs and Short-eared Owl] in Section 6.16). Species listed as Special Concern are treated under different regulatory standards (than Threatened and Endangered species) and, therefore, are included in this section.

Special Concern wildlife documented as confirmed or having high potential of occurrence in the SAR screening (Appendix P) are Barn Swallow, Canada Warbler, Common Nighthawk, Eastern Wood-pewee, Evening Grosbeak, Olive-sided Flycatcher, Peregrine Falcon, Rusty Blackbird and Yellow Rail. No Special Concern mammals, herptiles or insects had a high probability of occurring.

HS mapping has been completed for Common Nighthawk (Figure 6.12-24), Olive-sided Flycatcher (Figure 6.12-25), and a variety of other proxy bird species. The use of these proxy species in models has informed the relative habitat abundance and potential impact of the development of the PDA on species that share similar habitat requirements. Below are summarized species identity, distribution, abundance and estimates of breeding status, where possible, for each SAR bird in the bulleted list.

Barn Swallow

Barn Swallow was downlisted to Special Concern on the Species at Risk in Ontario List (Ontario Regulation [O. Reg.] 230/08) after COSEWIC and the Committee on the Status of Species at Risk in Ontario reassessed this species in 2021. However, while listed as Special Concern under the ESA, it is listed as Threatened under SARA and has a Residence Description. Like most birds documented in the RSA, Barn Swallow is also offered protections under the MBCA (Section 6.12.1.1 Federal Legislative Requirements). Birds listed under the MBCA and SARA and with a Residence Description have residences protected on private and public lands. Therefore, Barn Swallow nests are considered in Section 6.16. Barn Swallow habitat is still discussed below.

Barn Swallow nests in Ontario are commonly situated inside or outside buildings, under bridges and wharves, and in road culverts. Barn Swallows forage over a wide range of open and semi-open habitats, including natural and anthropogenic areas. Foraging is concentrated in areas with high availability of flying insects close to the ground or water surface. Insect-rich habitats vary seasonally and even daily. As Barn Swallow nests are a confirmed habitat type and unique to the species, additional mapping was not completed.

One pair of Barn Swallows was observed nesting on a building at the existing Springpole exploration camp in 2021 (main shop / garage), and nesting is likely to continue at this location as breeding is thought to be successful (Figure 6.12-3). Two individuals were also observed in 2018 (Appendix P-1). Low distribution and abundance are expected for Bird Conservation Region #8. The 2021 BCR#8 objective is recovery. Barn Swallow may only occur in other anthropogenic places, such as Slate Falls Nation Reserve.

Canada Warbler

Canada Warbler in Ontario was listed as Special Concern (ESA) in 2009. COSEWIC assessed this species as Threatened in 2008; however, in November 2020, it reassessed it as Special Concern. The Minister has not yet received the COSEWIC assessment (Minister of the Environment 2022). Canada Warbler is still Threatened on Schedule 1. Canada Warbler is listed under Article I of the MBCA. The federal recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016a).

The Canada Warbler is most abundant in wet, mixed deciduous-coniferous forests with a well-developed shrub layer. It can often be found near standing water or streams and is also found in stands regenerating after natural disturbances, such as forest fires or anthropogenic disturbances, such as logging.

Canada Warbler is not widely distributed or abundant; it was documented on 16 ARUs and during two-point count surveys. The Northern Waterthrush Wetland proxy subgroup is used to determine residual effects on habitat as both species like wet forests with cover that border water. The 2021 BCR#8 objective is recovery.

Common Nighthawk

Common Nighthawk in Ontario was listed as a Special Concern under the ESA in 2009 and, in 2023, under SARA. It is listed under Article I of the *MBCA*. The federal recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016b).

A wide range of substrates are used for nesting, and primary microsite characteristics include more open ground cover with low or no vegetation, adequate camouflage from predators, and nearby shade. Suitable roost sites are most likely important for individual survival. Almost any site can be used for roosting, including tree limbs, the ground, fenceposts, or rooftops that have shade to prevent overheating, camouflage from predators, and unobstructed flight paths.

Open areas are used during migration, but detailed habitat needs during this stage are poorly known. Nighthawks can be seen in flocks of a few and up to thousands of individuals during fall migration but undertake individual spring migrations, suggesting that specific areas or habitat characteristics are optimal for flight efficiency and/or for foraging during migration.

Habitats of Species of Conservation Concern SWH is confirmed for Common Nighthawk, and the 2021 BRC#8 objective is recovery. The Common Nighthawk is relatively abundant, and its habitat is not limited. Common Nighthawk was recorded in areas of existing linear infrastructure on 74 ARUs. Based on HS modelling, the Common Nighthawk has a high amount of suitable habitat in the PDA with an area of 1,404 ha (80.99%) and LSA with an area of 19,904 ha (85.69%). However, it has a moderate amount of such habitat in the RSA with an area of 292,663 ha (56.34%).

Eastern Wood-pewee

The Eastern Wood-pewee in Ontario was listed as Special Concern under the ESA in 2014 and is listed as Special Concern under SARA. Eastern Wood-pewee is listed under Article I of the MBCA.

The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation.

Eastern Wood-pewee is not widely distributed or abundant in the RSA and was only captured on three ARUs during surveys. The Olive-sided Flycatcher Special Concern proxy subgroup is used to determine residual effects on habitat as both species are flycatchers, can occupy mixed forests and prefer openings and edges.

Evening Grosbeak

The Evening Grosbeak in Ontario was listed as Special Concern under the ESA in 2018 and is listed as Special Concern under SARA. Evening Grosbeak is listed under Article I of the MBCA.

Evening Grosbreak lives in open, mature mixed-wood forests dominated by fir species, White Spruce and/or Trembling Aspen during the breeding season. Its abundance is strongly linked to the cycle of its primary prey, the Spruce Budworm.

Evening Grosbeak is not widely distributed or abundant in the RSA and was captured on six ARUs during surveys, one incidental at the accommodations complex, and in three element occurrences. The Dark-eyed Junco Coniferous Forest proxy subgroup is used to determine residual effects on habitat as both species prefer fir and spruce forests and are ground nesters and foragers.

Olive-sided Flycatcher

Olive-sided Flycatcher in Ontario was listed as a Special Concern under the ESA in 2009 and SARA in 2023. Olive-sided Flycatcher is listed under Article I of the MBCA. The federal recovery strategy states that available information is not adequate to identify critical habitat (Environment Canada 2016c).

Olive-sided Flycatcher breeds primarily in boreal forests, within open coniferous or mixed-coniferous forests that are often located near water or wetlands with the presence of tall snags or trees from which the species sallies for prey and advertises its territory. The highest densities of Olive-sided Flycatcher are often in mature conifer stands within patchy landscapes influenced by natural disturbance (e.g., recent burns, and harvested areas) that create open habitats for foraging. The species may have evolved as a post-fire-dependent species. Mature forest with openings containing snags or live trees provide suitable habitat from which individuals perch and forage for aerial insects, as well as forest edges associated with wetlands, burns, blowdowns, or clear-cuts where remnant trees and snags remain. Based on HS modelling, the Olive-sided Flycatcher has a low amount of suitable habitat in the PDA, LSA and RSA with areas of 6.02 ha (0.35%), 1,233 ha (5.31%), and 131,297 ha (25.28%), respectively.

Habitats of Species of Conservation Concern SWH is confirmed for Olive-sided Flycatcher. Olive-sided Flycatcher is a common bird during surveys, being observed at 71-point count locations during breeding bird surveys and 28 ARUs (Figure 6.12-25). This species could successfully breed in all areas it was heard calling. The 2021 BCR#8 objective is recovery.

Peregrine Falcon

The Peregrine Falcon in Ontario was downlisted to Special Concern under the ESA in 2020. The Peregrine *Falcon anatum* subspecies (Ontario subspecies) is not on Schedule 1 under SARA. The FWCA provides for the protection of Peregrine Falcon nests and eggs. Peregrine Falcons nest on tall, steep cliff ledges close to large bodies of water or in urban areas near buildings where there is a year-round supply of pigeons and starlings. Recorded on four ARUs and in the RSA the suitable nesting habitat would be the cliff along Springpole Lake.

Rusty Blackbird

Rusty Blackbird in Ontario was listed as Special Concern (ESA) in 2018. COSEWIC assessed this species as Special Concern in 2006 and 2017. No changes have been made to the status of this species (COSEWIC 2017). Rusty Blackbird is Special Concern on Schedule 1. The FWCA provides for the protection of Rusty Blackbird nests and eggs (S. 7(1)).

The breeding range of the Rusty Blackbird in Canada is almost entirely within the boreal forest. The breeding habitat there is characterized by coniferous-dominated forests adjacent to wetlands, such as slow-moving streams, peat bogs, sedge meadows, marshes, swamps and beaver ponds. On migration, the Rusty Blackbird is primarily associated with wooded wetlands. It occurs primarily in lowland forested wetlands, cultivated fields and pecan groves in winter.

The species was observed at two locations (Figure 6.12-3), both many kilometres from any proposed development of the Project. One location is west of the Project, and the other is on the east side of the RSA, east of Fry Lake. It was also observed incidentally at the accommodations complex and on nine ARUs. The 2021 BCR#8 objective is recovery.

Habitats of Species of Conservation Concern SWH is confirmed for Rusty Blackbird. Rusty Blackbird is most associated with coniferous-dominated forests adjacent to wetlands. For the purposes of this SWH delineation, in the two locations where Rusty Blackbird was documented, Coniferous Treed vegetation types bordering all wetland types are considered possible habitats.

The Palm Warbler Wetland proxy subgroup is used to determine residual effects on habitat. Both species prefer the boreal forest for breeding in bogs and wet forests with scattered trees. They are also ground nesters and foragers.

Yellow Rail

Yellow Rail is listed as Special Concern under the ESA and SARA. It was already assessed as Special Concern when the ESA took effect and is listed under Article I of the MBCA.

Yellow Rails live in marshes and shallow wetlands with reeds and sedges, where they nest on the ground. The marshy areas they use have an overlying dry mat of dead vegetation that they use to make roofs for their nests.

Yellow Rail is not widely distributed or abundant in the RSA and was only captured on two ARUs during surveys. The Wilson's Snipe Shorebird proxy VC is used to determine residual effects on habitat as both species prefer marshy settings with sedges and rushes. Both species feed on aquatic invertebrates by probing and they nest on the ground in dense vegetation.

6.12.2.6 Traditional Knowledge

As part of the Project, all eight Indigenous communities were contacted to participate in the EA process, and to provide Traditional Knowledge and Traditional Land Use (TK/TLU) information. To date, six Indigenous communities, CLFN, LSFN, MON, SFN, WFN and NWOMC, have provided Traditional Knowledge and Traditional Land Use information. Specific TK/TLU information relevant to wildlife is summarized below:

CLFN members have reported that their traditional lands intersect with portions of the RSA, which is accessed for wildlife harvesting of such species as moose, Boreal Caribou, beaver, marten, muskrat, otter, lynx, rabbit, goose, duck, and partridge. Some CLFN members sell furs in addition to consuming the meat and using muskrat fur as a medicine. The presence of jack pine in these areas indicates suitable habitat for rabbits, which enhances trapping success and supports these traditional practices.

LSFN access the RSA to hunt a variety of species, including moose, deer, muskrat, duck, caribou, partridge, rabbit, and even squirrels. Some LSFN hunters have successfully targeted moose in the Springpole Lake area. It was noted that muskeg areas and shorelines within the RSA provide especially productive habitats for both ungulates and fur-bearing species, supporting a wide range of wildlife. LSFN members continue to hunt and trap various species across their territory, including areas north towards Slate Falls, Ear Falls, and within the RSA. Moose are reported to be sighted more frequently in areas further north, around Cat Lake.

SFN traditionally harvests wildlife such as bear, beaver, caribou, duck, goose, grouse, moose, and partridge, while trapping activities target species such as beaver, fisher, fox, lynx, marten, mink, muskrat, otter, rabbit, skunk, squirrel, weasel, and wolverine. Ducks and other birds are primarily hunted during the spring and fall, aligning with their migratory patterns. Caribou, although less frequently hunted, hold special importance as they are reserved for the Elders during important community events. Boreal Caribou have been observed to migrate further northward due to the effects of forestry and climate change on their habitats. It was also an observed that there is a decline in wolverine trapping, attributed to the species' decreasing population. Interestingly, there have been increased sightings of wolverines in clear-cut areas, particularly near transmission line corridors, suggesting a shift in their habitat use. Forest fires have altered animal migration patterns and resulted in changes in traditional hunting and trapping practices. It was noted that existing transmission line corridors have facilitated an increase in wolf populations, as these corridors provide wolves with easier access to their prey.

MON reported harvesting wildlife such as moose, Boreal Caribou, deer, and geese.

WFN reported harvesting wildlife such as moose, deer, mink, muskrat, rabbit, otter, beaver, fox, bobcat, weasel, squirrel, wolf, marten, and partridge. It was noted that the Bald Eagle is a species that has cultural significance.

NWOMC reported harvesting a variety of wildlife species such as bear, deer, moose, wolf, rabbit, sharptailed grouse, spruce grouse, partridge (ruffed grouse), and waterfowl (ducks and geese). Participants in the study noted the large number of cow moose in the RSA, as they consider it to be prime habitat for the animals.

Traditional Knowledge and traditional land use information provided by Indigenous communities to date has been considered in the identification of valued components and the assessment of potential effects.

Based on the information provided through traditional knowledge, the following species are identified as culturally important species:

Bald Eagle

The Bald Eagle (*Haliaeetus leucocephalus*) is culturally important to First Nations. Communities revere the species for its symbolism and spiritual significance. Bald Eagle in Ontario was downlisted to Special Concern from Endangered (ESA) in 2009. As such, when the report was compiled in 2021, Bald Eagle was included as a Special Concern species. As of March 2022, the Committee on the Status of Species at Risk in Ontario has classified the Bald Eagle as Not at Risk. Federally, COSEWIC determined the species was Not at Risk in 1984. The FWCA provides protection for Bald Eagle nests and eggs.

Mature forest with scattered super canopy trees and adjacent large productive waterbodies. They typically nest within 2 km of water with suitable foraging opportunities and are often adjacent to large waterbodies, more often near lakes than large rivers, and often on peninsulas or islands. Nest trees are regularly blown down and the nests destroyed, highlighting the value of larger, firmer trees for longer-term nest retention. Bald Eagles will often rebuild nests in the same vicinity and reoccupy the same site if other nest trees are available but may not breed for a year after losing a nest tree. Based on Habitat Suitability (HS) modelling, the Bald Eagle has a high amount of suitable habitat in the PDA with an area of 1,306 ha (75.32%). However, it has a moderate amount of such habitat in the LSA and RSA, with areas of 11,465 ha (49.36%) and 217,894 ha (41.95%), respectively.

Several nests were documented during aerial surveys, predominantly in the northern half of the aerial survey extent (Figure 6.12-4), north of forestry activities and burn areas. Habitat for Bald Eagles does not appear to be limited. Bald Eagles have been confirmed breeding in the past, and it is likely that many pairs breed successfully each year. The 2021 BCR#8 objective is recovery.

Active Bald Eagle nests confirm Bald Eagle Nesting Habitat and Habitats of Species of Conservation Concern SWH. The active / main nest and a 400 to 800 m radius around the nest is considered the SWH. The area of the habitat from 400 to 800 m is dependent on sightlines from the nest to the development and inclusion of perching and foraging habitat. For the purposes of this assessment, it is assumed that the 800 m radius covers habitat form and function.

Grouse

The TKLUS has identified grouse (both the Spruce Grouse and the Ruffed Grouse) as a traditional source of food for many communities. In Ontario, the grouse are found in a variety of habitats. The Spruce Grouse is typically found in coniferous forests, while the Ruffed Grouse prefers mixed forests. Both species make use of early successional habitats, which are characterized by rapid growth and development following a disturbance in the ecosystem. HS modelling has considered the specific habitat preferences of these two grouse species. The PDA for grouse habitat covers an area of 1,723 hectares (ha), which is 99.38% of the total. The LSA spans 22,471 ha, accounting for 96.74% of the total, while the RSA extends over a larger area of 502,126 ha, constituting 96.66% of the total. Habitat for grouse does not appear to be limited within the Study Area.

6.12.2.7 Significant Wildlife Habitat

In addition to considering the effects on proxy species and HS modelling for bird species, SWH was also considered in the effects assessment. Wildlife habitat is considered "significant" if it is deemed ecologically important in terms of feature, function, representation, or amount, and contributes to the quality and diversity of an identifiable geographic area or Natural Heritage System (MMAH 2020). Within Ecoregion 3S, no specific SWH criteria schedule has been developed; however, a draft schedule for Ecoregion 3W has been developed, is available, and uses ELC for the Boreal Forest. The SWH criteria schedule for Ecoregion 3W (OMNRF 2017) is used to determine the presence of SWH. The SWH screening evaluated which indicator wildlife species were confirmed present, based on field surveys and background review, and which indicator ecosites were present in the FRI provided September 2023 (Appendix P-1). A SWH type was determined Not Present if either vegetation communities and/or indicator species are not documented in the RSA through field surveys and background review, or indicator species and ecosites are present, but field surveys were completed, and the defining criteria were not met. A SWH type was determined as Candidate if the site has the potential to be a specific SWH type based on the presence of certain vegetation communities and indicator species, but further field surveys or observations are needed to confirm whether the defining criteria for that SWH type are met. Lastly, SWH types are confirmed if indicator species, indicator ecosites, and defining criteria are met or documented through ministry mapping (i.e., the Natural Heritage Information Centre [NHIC]).

SWH has been evaluated for the baseline investigation area, and 17 habitats have been evaluated as candidate and 11 as confirmed (SWH types can be both candidate and confirmed; Figure 6.12-4; Appendix P-1 for details on SWH). SWH can occur as seasonal concentration areas, rare vegetation communities, specialized habitats, habitats for species of conservation concern, and wildlife movement corridors (MNRF 2014). All evaluations of SWH were conducted within the defined boundaries of the RSA.

Seasonal concentration areas are those where wildlife species occur annually in aggregations at certain times of the year. Such areas are sometimes highly concentrated with members of a given species or several species within relatively small areas. Confirmed habitats include:

- **Waterfowl Stopover and Staging Areas (aquatic):** Watercourse WF13 (including a 100 m radius) has been confirmed as an aquatic seasonal construction area for waterfowl stopover and staging area. The site was the first to be ice-free in the season. This site was confirmed based on field investigations, as from May 4 to May 7, 2022, approximately 1,511 individual indicator species were observed at WF13. The highest count was recorded on May 7, 2022, with 215 Common Goldeneye, 110 Mallard, 107 Green-winged Teal, 102 Bufflehead, 88 Ring-necked Duck, and 20 Common Loon. Indicator ecosites around this watercourse further support its significance as a waterfowl habitat. No confirmed Waterfowl Stopover and Staging Areas (aquatic) SWH was identified in the PDA or LSA. Approximately 68.93 ha of this SWH was mapped within the RSA.
- **Colonially Nesting Bird Breeding Habitat (tree / shrub):** The Natural Heritage Information Centre (NHIC) data confirmed this seasonal concentration area as Mixed Wader Nesting Colony. While this SWH does not intersect with the PDA or LSA, it is present within the larger RSA, covering an area of

99.99 ha. Additionally, field surveys determined that suitable breeding habitat is common throughout the Study Area and discovered a small breeding colony of Bonaparte's Gull nests consisting of 2 or more nests and 12 or more birds west of Bamaji Lake in 2021. The site did not meet the defining criteria of five or more nests of Bonaparte's Gull. No other Confirmed Colonially Nesting sites were found.

- **Colonially Nesting Bird Breeding Habitat (ground):** This seasonal concentration area was confirmed in the NHIC data as Colonial Waterbird Nesting Area. In the PDA 40.48 ha occurs, which represents 2.33%. The LSA has an area of 2,024.35 ha, representing for 8.72%, and the RSA has 34,600 ha, representing 6.66%. Field surveys determined that suitable breeding habitat is common throughout the RSA, and fieldwork in 2022 consisted of surveys in May to determine where ice-off occurred first and waterfowl numbers. Given the low numbers, surveys were again completed in June with more ice-off to determine if there was a change in use. Some indicator species were observed in low numbers on waterbodies throughout the Project area but not in the quantity required.
- **Bat Maternity Colonies:** Field surveys determined that suitable habitat is common throughout the RSA. The most frequently recorded species within the Project were by far the Silver-Haired Bat, followed by the Hoary Bat. The indicator ecosites for this SWH type differ from the SAR bats' requirements. Therefore, the Bat Maternity Colony habitat will be presented differently in Section 6.15 Bats. The area of SWH includes the entire woodland or a forest stand ELC ecosite or an Eco element containing the maternity colonies. As determined during field surveys, suitable cavities for bats are locally common in many mixed and deciduous forests in the RSA, and therefore, all indicator ecosites outlined in the SWH type are considered SWH if present. The Bat Maternity Colonies SWH occupy an area of 1,389 ha in the PDA, making up 80.12% of the total. In the LSA, they spread across 16,563 ha, which is 71.31% of the total. Within the RSA, these colonies span 278,713 ha, accounting for 53.65% of the total area.
- **Bat Hibernaculum:** Based on field investigations, four features could not be eliminated from the identified potential bat hibernacula list: Cliff 1, M3, M5, and M6. As such, these four features are considered confirmed bat hibernacula SWH. Cliff 1 is the cliff along the north shore of Springpole Lake. The remaining features (M3, M5, and M6) are within 600m of each other and are located approximately 9 km northwest of the PDA. No Bat Hibernaculum SWH occurs in the PDA. Cliff 1 occurs in the LSA and covers 55.53 ha (<1% of the LSA). In total, the RSA includes 84.35 ha for the Bat Hibernaculum. Additional details are provided in Section 6.15.

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for survival and cannot readily move to or find alternative habitats. In the FRI provided September 2023, few indicator ecosites were present. Confirmed habitats include:

- **Regionally Rare Plant Species:** Eleven species of plants are classified as rare in Ontario (ranked S1, S2 or S3) Black Ash, Northern Marsh Violet, Floating Marsh Marigold, Alpine Woodsia, Nahanni Oak Fern, Small Yellow Pond-lily and Lakecress. Also, four species of moss (non-vascular plants) are classified as rare: Smooth-margin Nitrogen Moss (S2), Red Dung Moss (S2), Yellow Dung Moss (S1) and Cruet Dung Moss (S3). SWH was mapped as the NHIC EOs (Alpine Woodsia, Nahanni Oak Fern, Smooth-margin Nitrogen Moss and Red Dung Moss) and/or the finest scale ELC encompassing the population of rare plants.

Specialized habitat for wildlife is a community or diversity-based category. Therefore, the more wildlife species a habitat contains, the more significant the habitat becomes to the planning area. Confirmed habitats include:

- **Wild Rice Stand:** Wild Rice is a species used traditionally by communities. In addition, wetlands containing large stands of wild rice are important rearing and migratory stopover locations for waterfowl. In 2022, Wild Rice was documented by WSP on the edge of a lake within Ecosite B152 (Open Water Marsh Organic) at site 254 (51.019502, -92.008591 or 15U 569536 5652461), located within the RSA, on August 26, 2022. Wild Rice was one of the dominant species, with an estimated aerial coverage of 5%. No instances of Wild Rice Stand SWH were identified within the PDA or LSA. However, the entirety of the lake at site 254 has been mapped as SWH, encompassing an area of 9.65 ha.
- **Bald Eagle and Osprey Nesting Habitat:** Bald Eagles and Ospreys are present during surveys. Forty Osprey nest sites were identified in the provincial data. Aerial surveys were completed to confirm known nest locations (and those reported previously). Additional nests were added as found. More than 20 Raptor nests, including those for Bald Eagle and Osprey, were confirmed in the Study Area. The PDA for the Bald Eagle and Osprey Nesting Habitat SWH covers an area of 284 ha, 16.37% of the total. The LSA spans 988 ha, accounting for 4.25% of the total, while the RSA extends over a larger area of 7,028 ha (1.35%).
- **Aquatic Feeding Habitat:** Thirty-one locations occur in the RSA, according to NHIC, in the southern extension. Field surveys determined that suitable habitat is common throughout the Study Area and more abundant in the south. Fieldwork in 2022 confirmed Moose Aquatic Feeding Habitat and sites classed high and very high are considered Confirmed for this SWH type. While no Aquatic Feeding Habitat SWH was found in the PDA, it does exist in the LSA, covering an area of 7.15 ha, 0.03% of the total. Conversely, the RSA contains a significant portion of this habitat, spanning an area of 227,209 ha, constituting 43.74% of the total.
- **Marsh Bird Breeding Habitat:** Field surveys determined that suitable habitat is common throughout the Study Area. Field Investigations documented three instances of breeding Trumpeter Swan in suitable habitat/indicator ecosites. These records are considered Confirmed for this SWH type. The PDA for Marsh Bird Breeding Habitat covers an area of 51.98 ha, 3.00% of the total. The LSA spans 1,979 ha, accounting for 8.52% of the total, while the RSA extends over 53,322 ha, constituting 10.26% of the total.
- **Habitats of Species of Conservation Concern** include wildlife species listed as Special Concern under the ESA 2007, provincially tracked or provincially rare (S1, S2, S3, SH). Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened Species. All nine Special Concern species were birds. No provincially tracked species were documented. However, 11 provincially rare flora species (Section 6.11) and two provincially rare insect species were documented.
- Special Concern and rare wildlife species:
    - Birds: Barn Swallow, Canada Warbler, Common Nighthawk, Eastern Wood-pewee, Evening Grosbeak, Olive-sided Flycatcher, Peregrine Falcon, Rusty Blackbird, Yellow Rail;
    - Plants: Alpine Woodsia, Black Ash, Cruet Dung Moss, Floating Marsh Marigold, Lakecress, Nahanni Oak Fern, Northern Marsh Violet, Red Dung Moss, Small Yellow Pond-lily, Smooth-margin Nitrogen Moss, Yellow Dung Moss (see above: Regionally Rare Plant Species); and
    - Insects: Old World Swallowtail, Subarctic Darner.

The habitat for rare wildlife species is presented in Figure 6.12-3. SWH for this category is the area of the habitat to the finest ELC scale that protects the habitat form and function. Seasonal concentration areas

SWH and Specialized habitat SWH are presented in Figure 6.12-4. Existing models with similar habitat requirements were leveraged for special concern species that were not included as proxies. This approach allowed for the extrapolation of habitat suitability for all special concern species documented.

The last SWH type is animal movement corridors, which are elongated areas used by wildlife to move from one habitat to another. One type of movement corridor is Cervid Movement Corridor. Cervid Movement Corridors are determined when Aquatic Feeding Areas and Mineral Lick Habitats are confirmed. As Mineral Lick habitat is not confirmed, this habitat type is not mapped.

6.12.3 Identification of Potential Effects Pathways

The initial step in the assessment process is to identify interactions between the Project and wildlife that can result in pathways to potential effects. These potential effects may be direct, indirect and/or positive effects, where applicable. Table 6.12-5 includes the potential interactions of the Project with wildlife, prior to the application of the mitigation measures. The professional judgment of technical experts experienced with mining projects in Ontario and Canada as well as input from Indigenous communities, government agencies and the public informed the identification of those interactions that are likely to result in a pathway to a potential effect due to a measurable change on wildlife. These pathways to potential effects are further described below for each phase of the Project, along with the rationale for those interactions excluded from further assessment. Section 6.12.4 and Table 6.12-6 provide a description of the mitigation measures applied to during all phases of the Project. The residual effects, after the application of the mitigation measures, are then described and further evaluated in Section 6.12.4, using the criteria and indicators identified in Section 6.12.1.4.

Construction Phase

The construction phase of the Project is expected to be developed over a three-year period and will include preparation of the site and the construction of mine infrastructure. The following interactions with the Project result in pathways to potential effects on wildlife as described below. After mitigation is applied to each pathway, as described in Table 6.12-6, the residual effects are assessed using the criteria identified for each pathway:

- Site preparation activities and construction of the PDA, including clearing, grubbing, and bulk earthworks, will result in the direct loss of habitat and are assessed for potential effects as a change in the relative abundance of habitat by assuming the area of the PDA will be removed.
    - These activities result in pathways to potential effects on wildlife due to:
        - The removal of vegetation which may directly affect habitat;
        - The regrading and alterations in catchment areas may change the contribution of surface water and indirectly affect habitat;
        - The use of equipment may cause sensory disturbances and air emissions (including dust) which may indirectly affect habitat; and
        - The use of equipment may increase potential collisions with wildlife and may change the risk of mortality.
    - The assessment of potential effects includes the change in habitat; the changes in the function, connectivity and quality of habitat; and the change in the risk of mortality from these pathways.
- The construction of the mine access road and airstrip, including the development and operation of potential aggregate resource areas, interacts with wildlife. These activities result in pathways to potential

effects due to the removal of vegetation, which may directly affect habitat; the use of equipment may change sensory disturbances and air emissions, which may indirectly affect habitat; and, may increase potential collisions leading to changes in the risk of mortality. The assessment of potential effects includes the change in habitat; the changes in the function, connectivity, and quality of habitat; and the change in the risk of mortality from these pathways.

- The development of temporary construction camp and staging areas, the fish habitat development area, the onsite haul and access roads, the buildings and onsite infrastructure, the construction of the dikes, the construction of the starter embankments for the CDF, the development of the surficial soil stockpile and ore stockpiles interacts with wildlife. These activities result in pathways to potential effects due to the use of equipment may change sensory disturbances and air emissions, which may indirectly affect the habitat, and the use of equipment may increase potential collisions and may change the risk of mortality. The assessment of potential effects includes the changes in the function, connectivity, and quality of habitat, and the change in the risk of mortality from these pathways.
- The controlled dewatering of the open pit basin interacts with wildlife. This activity results in a pathway to a potential effect due to the change in groundwater levels that may indirectly affect habitat. The assessment of potential effects includes the changes in the function, connectivity, and quality of habitat from this pathway.
- The development of the central water storage pond and other water management and treatment facilities interacts with wildlife. These activities result in pathways to potential effects due to the change in catchment areas and surface water regimes levels, which may indirectly affect habitat; the use of equipment may change sensory disturbances and air emissions, which may indirectly affect habitat; and may increase potential collisions with wildlife leading to change in the risk of mortality. The assessment of potential effects includes the changes in the function, connectivity and quality of habitat as well as the change in the risk of mortality from these pathways.
- The commissioning of the process plant, the stripping of lake bed sediments and overburden in the open pit and the initiation of pit development interacts with wildlife. These activities result in pathways to potential effects due to the change in sensory disturbances from the process plant and equipment, which may indirectly affect the habitat and may increase potential collisions with wildlife, leading to a change in the risk of mortality. The assessment of potential effects includes the changes in the function, connectivity and quality of habitat, as well as the change in the risk of mortality from these pathways.

There is no plausible interaction between employment and expenditure activities and wildlife during any Project phase.

Operation Phase

The operation phase is anticipated over a 10-year period, but the majority of potential effects on wildlife will occur during the construction phase resulting from a change in habitat. The following interactions with the Project result in pathways to potential effects on wildlife as described below. After mitigation is applied to each pathway, as described in Table 6.12-6, the residual effects are assessed using the criteria identified for each pathway:

- The operation of the open pit mine interacts with wildlife. This activity results in pathways to a potential effect due to ongoing groundwater management, which may continue to indirectly affect the habitat. The use of equipment and blasting may change sensory disturbances and air emissions (including dust), which may indirectly affect habitat. The assessment of potential effects includes the changes in the function, connectivity, and quality of habitat from these pathways.

- Operation of the process plant, open pit, co-disposal facility and ore stockpiles will result in indirect alteration due to sensory disturbance from light, noise, and dust and is assessed for potential effects of change in the function, connectivity, and quality of wildlife and wildlife habitat from this pathway.
- The operation and maintenance of mine site infrastructure, including the mine access road, the transmission line and the airstrip interacts with wildlife. These activities result in pathways to potential effects on wildlife due to the management of vegetation which may indirectly affect habitat; the use of equipment, the operation of Project vehicles and haul trucks, and the operation of aircraft may change sensory disturbances, which may indirectly affect habitat and create a semi-permeable movement barrier; and the use of equipment may increase potential collisions with wildlife and may change the risk of mortality. The assessment of potential effects on wildlife includes the changes in the function, connectivity and quality of habitat as well as the change in the risk of mortality from these pathways.
- Operation of the accommodations complex interacts with wildlife. These activities result in pathways to potential effects on wildlife due to attraction of nuisance wildlife due to domestic waste. The assessment of potential effects on wildlife includes the changes in the risk of mortality from this pathway.
- Operation of the water management and treatment facilities interacts with wildlife. This activity results in a pathway to potential effects on wildlife as the changes to hydrology could indirectly affect habitat for wildlife. The assessment of potential effects on wildlife includes the changes in the function, connectivity and quality of habitat from this pathway.

Progressive reclamation activities during operations are unlikely to interact with wildlife and wildlife habitat as these will be limited during the operation phase.

The interaction between wildlife and potential spills are not a planned activity that would occur within the normal operating conditions. However, the risk of an unplanned spill is fully assessed in Section 9 and includes consideration of the design and operational safeguards to avoid a spill, an assessment of the potential risks to the environment as a result of an unplanned spill, and the contingency and emergency measures that would be put into place in the event that a spill occurs.

There may be ongoing helicopter use during operation to support accessing remote areas on a sporadic basis. Given the infrequent occurrence under limited conditions, it has not been considered as having a potential effect on wildlife.

Decommissioning and Closure Phase

Activities occurring during this active closure phase, which is expected to occur over a five-year period, are similar to those that occur during the construction phase and use similar mining equipment, but generally on a smaller scale. The following interactions with the Project result in pathways to potential effects on wildlife as described below. After mitigation is applied to each pathway, as described in Table 6.12-6, the residual effects are assessed using the criteria identified for each pathway:

- Final reclamation activities will include revegetating disturbed areas to provide stable slopes and reduce the potential for erosion. These activities would support the re-establishment of vegetation communities in the PDA; however, this could lead to changes in vegetation species from the baseline condition or they could lead to sensory disturbances for wildlife. Reclamation will likely result in early successional communities in the first years. The community might not replicate the adjacent communities for several decades.

Dewatering of the open pit will have ceased during Year 10 of operations, and groundwater levels in the PDA will return to near baseline conditions once mining and ore processing activities cease and the open pit basin is filled. During decommissioning and closure, the removal of assets, demolition of remaining materials, disposal of demolition-related wastes offsite, and filling of the open pit basin are not expected to interact with wildlife beyond the operations and sensory disturbance noted above. Beyond closure, the activities will be primarily monitoring and are not expected to effect wildlife. Although changes may be mostly from the construction and operation phase, they might not be fully apparent until later.

6.12.4 Mitigation Measures

The following measures are to be implemented to avoid or minimize the effects of the Project on wildlife:

- Develop of a compact mine site to limit the areal extent of disturbance.
- Co-locate the transmission line, airstrip and mine access road within a shared infrastructure corridor, where feasible.
- Maintain existing hydroperiod conditions, outside the zone of influence for dewatering, by directing water from dewatering activities away from terrestrial habitats, where possible.
- Follow appropriate timing windows for vegetation removals; in combination with timing windows for Boreal Caribou (6.13), Wolverine (6.14), bats (Section 6.15), and SAR birds (6.16), vegetation removals should only occur between September 15 to January 14. Note that construction activity should never occur during the critical breeding period for Bald Eagle, defined as March 5 to August 31 in northwest Ontario.
- During construction, operation and closure, where practicable, avoid sensitive wildlife habitat by implementing buffers (Table 6.12-7) around sensitive habitats. The implementation of buffers will be sufficient to mitigate acoustic effects on birds (Rodgers and Schwikert 2002).
- Permits for specially protected species under the FWCA may be required to remove dens, nests, and lodges.
- During construction, operation and closure, prohibit hunting and trapping within the gated controlled access portion of the PDA by Project personnel while working or residing on-site, during construction, operation and closure phases.
- During construction, operation and closure phases, domestic solid waste products and similar materials will be properly secured, stored and disposed of at an offsite licensed facility, particularly anything that is an attractant for scavenging wildlife. Domestic solid waste products will be transported to a landfill off site, mitigating the habitat sink effect of increased predator densities that can be created due to access to landfill sites.
- Undertake progressive revegetation in the mine site area, where practicable, during operation of the Project.
- During construction, minimize the disturbance by using existing trails and roads for travel, where practicable.
- During construction of the mine access road and transmission line:

  - Minimize the area cleared with heavy machinery for the construction of the mine access road, as practicable, recognizing the need for clear sightlines for safety; and
  - Minimize the removal of woody vegetation along the transmission line by limiting removal to hazard trees and only clearing for safe access and infrastructure needs.
- During the operation phase of the mine access road and transmission line:
  - Enforce reduced speed limits along Project-controlled roads within high-quality wildlife habitats, particularly along segments with known or recurrent wildlife crossings;
  - Project-related vehicles travelling on the mine access road must come to a stop if wildlife is encountered and provide them with the right-of-way to cross the road; and
  - Minimize vegetation management along the transmission line corridor to that necessary for safe operation.
- During construction, operation and closure, wildlife awareness training will be provided to Project employees.
- During construction, operation and closure, log (and report as needed) observed wildlife, sign / tracks and wildlife–vehicle collisions and alter mitigation measures as appropriate.
- During closure, consider the incorporation of wildlife habitat features into the overall closure plan.
- Discouraging wildlife from inhabiting contact water ponds (including the CDF and CWSP ponds).
- Implement the mitigation measures for air quality (Section 6.2) during all phases of the Project, such as:
  - During construction, operation and active closure, a dust management plan will be implemented to identify potential sources of fugitive dusts, outline mitigation measures that will be employed to control dust generation and detail the inspection and record keeping required to demonstrate that fugitive dusts are being effectively managed.
  - Routine maintenance of all pollution control equipment, diesel-fired engines (vehicle, equipment and standby power generation)
  - The process plant emission sources will be enclosed where possible and be designed to allow good atmospheric dispersion, and dust control equipment such as dust collectors and water sprays will be used together with best practices, where necessary, to reduce emissions.
  - Dust emissions from roads and mineral stockpiles will be controlled through the application of water spray and supplemented by dust suppressants if required.
  - Site roads will be maintained in good condition, with regular inspections and timely maintenance completed to minimize the silt loading on the roads.
  - Vehicle speeds will be limited.
- Implement the mitigation measures for noise and vibration (Section 6.3) during all phases of the Project, such as:
  - Building dimensions, layout and orientation will be designed to shield noise sources, where possible;

- Acoustical enclosures will be used in the process plant to limit overall noise emissions from key noise sources, such as the ball mills;
- Generator intakes and exhausts in the process plant will use silencers;
- Motorized equipment will be selected or designed with mufflers / silencers to limit noise emissions;
- Reversing alarms will be dimmable with white noise and/or strobe lights;
- The use of engine brakes will be prohibited;
- Vehicles and equipment will be operated in such a way that impulsive noise is minimized, where possible;
- Regular inspections will take place to confirm that equipment and machinery used on site is operated in good working condition through regular maintenance; and
- For helicopter use during transmission line construction, minimum flight altitudes will be maintained unless the helicopters are engaged in construction tasks, landing or departure.

- During construction, operation and closure phases, implement mitigation measures for lighting to minimize sensory disturbance (Appendix J), including:
  - To prevent a direct line-of-sight from light, maintain light sources below natural barriers such as tree lines or artificial barriers such as berms; and
  - Minimize light spill and glare using shielding on stationary light sources and direct lighting downwards where practicable.
- Implement the mitigation measures surface water systems (Section 6.6) during all phases of the Project, such as:
  - During construction, operation and active closure, an erosion and sediment control plan will be implemented to manage runoff water in disturbed areas.
  - During construction, operation and active closure, an integrated water management system will be operated to collect and control contact water from the stockpiles, CDF and plant site areas. Collected contact water that is not used in ore processing will be treated at the ETP and discharged to the southeast arm of Springpole Lake in accordance with permitting requirements.
  - During construction, operation and active closure, contact water collection ditches will be constructed and operated around the perimeter of key infrastructure, including the CDF and stockpiles, to collect overland flow and seepage and direct it to the integrated water management system.
  - Locating the CDF on favourable geologic conditions at the Project site to support long-term stability and effective seepage management.
- Implement the mitigation measures for potential effects on vegetation communities and wetlands relevant to bat (Section 6.11.4) including:
  - During construction and operation, minimize the clearing of vegetation within the mine access road and transmission line corridor to that needed for the construction and safe operation.

- o During construction and operation, minimize the removal of woody vegetation within the transmission line corridor to maintain natural cover to adjacent areas. The removal of woody vegetation will be limited to hazard trees and clearing to provide safe construction access and infrastructure needs.
- o During construction, operation and active closure phases, implement mitigation measures for wetlands.
- o During operation and closure phases, undertake progressive and final rehabilitation of mine development in accordance with the filed Closure Plan, and implement a revegetation plan that preferentially uses local vegetation sources, incorporates plant species of interest to Indigenous communities, and wildlife habitat features.

The application of mitigation measures to specific pathways and phases is illustrated in Table 6.12-6. The mitigation measures described in this section are expected to be effective for their intended purposes, given their effective implementation at similar projects.

Monitoring programs will be implemented to verify the accuracy of the predicted effects and assess the effectiveness of the implemented mitigation measures. In response to monitoring data, these programs may be further optimized. Extensive monitoring programs are in place for the Project, with several years of data collection completed. Monitoring for the Project going forward is further described in Section 12 and will be further refined during the permitting phase to incorporate conditions of approvals and permits. Consultation on the monitoring programs is expected to continue through all phases of the Project.

6.12.5 Analytical Method

To quantify the direct effects of removing habitat from the PDA, it was conservatively assumed that all vegetation would be removed. Habitat mapping was overlaid with the PDA in geographic information system (GIS) tools, and the removal areas were calculated. The description for HS mapping and bird density modelling methods, is provided in Section 6.12.2.

Areas adjacent to the PDA within the LSA may experience indirect effects, such as edge effects, changes in light and changes in environmental conditions due to dust, noise, and limited groundwater changes. Artificial lighting will be required during the construction, operation, and closure phases of the Project, and an assessment of the effect of light from the Project was conducted (Appendix J). Changes in air quality parameters such as dust were modelled for the Project as described in Section 6.2 and uses the scenario with a silt content of 5.8% and control efficiency of 85%, as a conservative approach. The potential changes in air quality above background levels around the mine site area are considered in the quantification of indirect effects on habitat, but not along the mine access road or transmission line, given the short duration of those construction activities (Figure 6.12-55). Changes in the acoustic environment during the operation of the mine site area (Year 4) were modelled, as described in the noise modelling report (Appendix H-3), and the indirect effects on habitat were quantified for noise levels above 40 A-weighted decibels (dBA; Figure 6.12-56. The controlled dewatering of the open pit basin will result in a groundwater drawdown cone (Appendix L-2) that emanates radially from the open pit toward the nearest boundary conditions (i.e., Springpole Lake and Birch Lake), as shown in Figure 6.12-54. Like the direct effects, air, groundwater drawdown, and noise effects (indirect effects) can be conservatively accounted for by overlaying HS mapping and calculating the potentially affected area.

The potential change in the risk of mortality to species was undertaken in a qualitative manner, considering experience with other mine operations, literature and Project-specific factors. Habitat bisected by the PDA is predicted to experience fragmentation. Habitat fragmentation is quantified not as a direct loss with removal calculations but as a qualitative effect in the change of function, connectivity, and quality.

6.12.5.1 Assumptions and the Use of the Conservative Approach

For the purposes of this effects assessment, the following assumptions have been made:

- The PDA contains buffers to allow for flexibility for design optimizations during Project permitting. The buffer includes approximately 250 m around the mine site area, a 40 m wide corridor for the transmission line, and the 30 m wide corridor for the mine access road. Where the mine access road and transmission line are aligned together, the buffer is included within a 60 m wide corridor.
- The 2021 FRI ecosite mapping was used for the purposes of this effects assessment to support the analyses presented in this assessment. As noted in Section 6.15.5, it has been conservatively assumed that all vegetation communities support wildlife within the PDA will be removed during construction and as a result, all wildlife habitat within the PDA will be removed. However, in reality, vegetation communities will be maintained in specific areas to provide a buffer along waterbodies and mine site infrastructure where necessary.
- As noted, it is conservatively assumed that all vegetation communities / habitats in the PDA will be removed. However, the assessment of potential indirect effects (e.g., sensory disturbance, groundwater drawdown), does not account for the removal of the PDA (i.e., the area directly impacted by the PDA) and is not subtracted from the indirect impact calculations. This implies that much of the reported habitat impacted (% change) due to indirect effects, has already been impacted by the existing mine footprint. This assumption further applies a conservative approach.
- Progressive rehabilitation will occur at select locations during construction and operation when disturbance activities have been completed. Nevertheless, to be conservative, the assessment of the effects assumes that final rehabilitation activities will be completed during the active closure phase.
- The noise threshold to evaluate the effects of sensory disturbance is assumed to be greatest within the 40 dBA contour around the mine site area. Literature indicates that wildlife responses begin at noise levels of approximately 40 dBA, documented impacts occurring below 50 dBA (Shannon et al. 2016). As a result, a 40 dBA continuous noise threshold is used as a disturbance benchmark, which correspond to the noise of a suburban area at night.
- The assessment of mortality risk focuses on the construction and operations phases, as a conservative scenario, as the risk of mortality would be expected to be less during the decommissioning and closure phase once the footprint has been restored. It is assumed that the implementation of sensitive timing windows would effectively reduce the risk of mortality during the removal of vegetation.

Lastly, in the absence of thresholds, a conservative approach was used to evaluate the residual effects' size or degree relative to baseline conditions (i.e., magnitude). It was considered that Project-related changes (i.e., the residual effect) have a moderate potential to adversely affect wildlife and their habitat if a change of greater than 1% was found in the RSA. A comparison to the RSA is supported by the ECCC Annex, which states, "If displacement of nesting birds will occur, baseline data should provide evidence that there is enough equivalent habitat for birds to be displaced to, and that the vegetation being removed is not unique to the project footprint." It was considered that Project-related changes (i.e., the residual effect) have a moderate potential to adversely affect habitat if a change of greater than 1% was found in the RSA. If a change greater than 5% was found in the RSA, it was considered to have a high potential to adversely affect habitat. As criteria have multiple species, when varying levels of magnitude were determined, the highest magnitude was selected to account for cumulative impacts.

6.12.6 Characterization of Potential Residual Effects

Pathways to potential effects from the Project are identified (Section 6.12.3), and practicable mitigation was applied (Section 6.12.4) to minimize effects on wildlife and wildlife habitat. The assessment of potential effects on wildlife and wildlife habitat use is focused on direct habitat losses, indirect habitat alterations, the risk of mortality during the Project, and the change in bird density, as discussed below.

Pathways that could be removed (i.e., the effect is avoided) by mitigation would have not contribute to a residual effect on wildlife and wildlife habitat. Some pathways could result in a measurable change, but this change would be sufficiently small so as to have a negligible residual effect on wildlife and wildlife habitat. If pathways were deemed as having no residual effect or a negligible residual effect, a significance determination was not completed. Pathways that could result in changes to the environment with one or more associated indicators and have the potential to cause a greater than negligible residual effect on wildlife and wildlife habitat were assessed for significance (Section 6.12.7).

The following list summarizes the pathways having limited or no contribution to a residual effect on wildlife and wildlife habitat.

- Project interactions with groundwater were analyzed to determine potential effects associated with the Project for the construction, operation, and closure phases (Section 6.5). The residual effects of the Project on groundwater after the application of mitigation were characterized using quantitative predictive modelling (Section 6.5). Groundwater flow is expected to return to near-baseline conditions in the closure phase; no residual effects on wildlife or their habitats are expected to occur during closure.
- Surface water interactions are assessed in Sections 6.6 to 6.9. Negligible flow reductions are predicted for inland waterbodies within and outside the PDA during operations and are fully reversible at closure. Therefore, no residual effects on wildlife and their habitats are expected to occur in any Project phase.
- Mine construction and operations are anticipated to occur during night and day, and additional artificial lighting will be required. Some species may be more sensitive to lighting than others. For example, Common Nighthawk hunt at dusk using their eyesight; bright lighting may cause them to avoid habitat adjacent to the mine site. However, with the implementation of mitigation measures for lighting through all phases, the potential effect will be mitigated and not extend beyond the PDA (Appendix J). During closure, light disturbances that indirectly change habitat will be discontinued. Therefore, no residual effects on wildlife are expected to occur in any Project phase.
- Reclamation success will be monitored and evaluated to help ensure the suitability of the measures applied and provide opportunities for an adaptive management process for any site-specific issues such as invasive and non-native species, erosion or unsuccessful revegetation. Through these programs, no residual effects on wildlife and their habitats are expected to occur.
- During the closure phase, sensory disturbances that indirectly change habitat will be discontinued, resulting in no residual indirect effects on the habitat of wildlife due to noise / sensory disturbances.

6.12.6.1 Change in Relative Abundance of Habitat

The direct change in the relative abundance of wildlife habitat will occur in the PDA during the construction phase. It has been conservatively assumed that all terrestrial and wetland vegetation communities in the PDA (2,026 ha) will be removed during construction. However, the actual footprint of the Project is 1,365 ha, with 670 ha representing the terrestrial habitat overprinted by the mine site. The loss of wildlife habitat in the PDA will be greatest during the construction phase, with some rehabilitation occurring during the operations and closure phases. Table 6.12-8 summarizes the change in wildlife habitat for proxy species with respect to the baseline state and the removal of the PDA at the LSA and RSA scales.

With the implementation of the mitigation measures described in Table 6.12-6, there will be a residual effect due to the loss of habitat during construction.

Furbearers (proxy species Fisher, Canada Lynx, and Beaver): The habitats of Fisher and Lynx include coniferous, deciduous, mixed treed, and wetland (swamp, fen, and bog) communities. The habitats of Beaver include open water and marsh land cover.

- Fisher: Overall, the removal of communities in the PDA represents an 18.01% loss in the LSA and a 1.21% loss in the RSA of terrestrial communities (Table 6.12-8).
- Canada Lynx: Overall, the removal of communities in the PDA represents a 6.95% loss in the LSA and a 0.38% loss in the RSA of terrestrial communities (Table 6.12-8).
- Beaver: Overall, the removal of communities in the PDA represents a 9.24% loss in the LSA and a 0.42% loss in the RSA of terrestrial communities (Table 6.12-8).

The direct effects on furbearer habitat are direct and localized to the PDA, as the habitats are common throughout the LSA and RSA. In the RSA, the Lynx and Beaver species experienced less than a 1% direct loss of habitat, indicating that sufficient suitable habitat remains available elsewhere. There is a 1.21% habitat loss in the RSA for Fisher, but there is suitable habitat available in the RSA.

Large Mammals (proxy species Moose and Wolf): Habitat for Wolf is linked to habitat for Moose, especially in the winter. Habitat includes community types of coniferous, deciduous, mixed treed, sparse treed, and wetland (swamp, fen and bog). The relative change in available wildlife habitat from direct habitat loss for large mammals is:

- Moose Late Winter and Wolf Habitat: Loss of 2.69% in the LSA and 0.11% in the RSA (Table 6.12-8); and
- Moose Foraging Habitat: Loss of 1.09% in the LSA and 0.04% in the RSA (Table 6.12-8).

The effects on large mammal habitats are direct and localized to the PDA, and the habitats are common throughout the LSA and RSA. Moose may be attracted to the infrastructure corridors to exploit habitat for browsing and Wolves were generally recorded in areas with Moose during surveys. Forage availability from linear disturbances may be locally enhanced for Moose, and residual effects on habitat may be minimized further. The creation of linear corridors can benefit Wolves as they use them to gain access to prey. While Wolves may use the corridors for travel and increase the risk of predation on Moose, affecting local predator-prey dynamics, this effect is anticipated to be negligible.

Herptiles (proxy species Wood Frog): An estimated loss of 1,737 ha for potential habitat is predicted. Overall, the removal of communities in the PDA represents a 7.19% loss in the LSA and a 0.47% loss in the RSA. This indicates that the impact on the Wood Frog is localized to the PDA and suitable habitat exists elsewhere (Table 6.12-8).

Migratory and Non-migratory Birds (proxy species based on grouping): As discussed in existing conditions (Section 6.12.2.4), several groupings were selected, and different proxy species based on habitat types were chosen for discussion. All habitat types present were considered within the proxy species. Results are provided in Table 6.12-8 and summarized below:

- **Coniferous forest birds (proxy: Dark-eyed Junco)** had a 2.10% loss in the LSA and a 0.14% loss in the RSA.

- **Deciduous forest birds (proxy: Red-eyed Vireo)** had a 24.62% loss in the LSA and a 0.76% loss in the RSA.
- **Deciduous/mixed forest birds (proxy: Ovenbird)** had no change in both the LSA and RSA.
- **Nocturnal stick nester raptors (proxy: Great-horned Owl)** had a 11.78% loss in the LSA and an 0.85% loss in the RSA.
- **Nocturnal cavity nester raptors (proxy: Boreal Owl)** had a 9.46% loss in the LSA and a 0.57% loss in the RSA.
- **Diurnal stick nester raptors (proxy: Osprey)** had a 9.02% loss in the LSA and a 4.74% loss in the RSA. Osprey habitat is also considered under Bald Eagle and Osprey Nesting Habitat SWH under Section 6.12.2.7).
- **Diurnal cavity nester raptors (proxy: American Kestrel)** had a 7.56% loss in the LSA and a 0.33% loss in the RSA.
- **Shorebirds (proxy: Greater Yellowlegs and Wilson's Snipe)** had less than a 10% decrease in the LSA and a <1% decrease in the RSA.
- **Waterfowl (proxy: Mallard)** had a 6.84% loss in the LSA and a 0.31% loss in the RSA.
- **Bog/fen wetland birds (proxy: Common Yellowthroat, Palm Warbler and Northern Waterthrush)** ranged between 0 and 2% change in the LSA and <1% decrease in the RSA.

The effects on habitat are direct and localized to the PDA. The PDA is composed mostly of upland (approximately 80%) coniferous treed (approximately 61%) habitat (Section 6.11); as such, it does not provide abundant habitat for deciduous forest birds and wetland-dependent birds. For some species, the PDA contains high proportions of habitat, including coniferous forest birds and species which rely on treed habitat adjacent to waterbodies, i.e., most raptors (proxy species: Great-horned Owl, 74.43%; Osprey, 79.66%; American Kestrel, 81.64%) and waterfowl (proxy: Mallard, 79.87%). The LSA follows the same pattern as it is highly coniferous. In the RSA, while still largely coniferous, more deciduous habitats are found in areas of forestry and disturbance.

All proxy species, except Osprey, have less than a 1% change in the RSA, indicating that the impact of habitat loss is localized to the PDA and suitable habitat exists elsewhere. The diurnal stick nester raptor proxy, Osprey, has a 4.74% loss in the RSA but there is suitable habitat available in the RSA. The Osprey habitat mapping mirrors the results of the SWH mapping (Section 6.12.2.7).

Special Concern Species: Findings from proxy species habitat mapping were extrapolated to understand the potential effects on the special concern species in the RSA. Changes in relative abundance in habitat are anticipated to have a low potential to adversely affect special concern species or the habitat, as detailed below:

- **Barn Swallow:** Habitat mapping for Barn Swallow was not developed as it was recently downlisted from Threatened and had a general habitat description. Barn Swallow also has a residence description, and therefore, the nest is also considered in Section 6.16 SAR Birds. During construction, the removal of the main shop / garage will remove the nesting habitat (Category 1 and 2 habitat). Further, vegetation clearing and draining of the lake may remove the foraging habitat for this species (Category 3). During construction, the open water habitat used for foraging will be removed within the mine site portion of the PDA due to the Project. The clearing within the PDA will remove 284 ha of open water cover type, which may be used by Barn Swallow for foraging if other nests exist elsewhere, which represents 0.05% in the RSA. Barn Swallow will likely forage in new areas during operations, given the number of waterbodies within the LSA. Given their tendency to colonize anthropogenic structures, there will likely be no residual effect on direct habitat loss for Barn Swallow, as they may nest on new buildings. Barn Swallow is not carried through to residual effects (Section6.12.7).

- **Canada Warbler:** The Northern Waterthrush Wetland proxy subgroup is used to determine residual effects on habitat. The removal of communities in the PDA represents a <1% loss in both the LSA and RSA.
- **Common Nighthawk:** This species' habitat was mapped. The removal of communities in the PDA represents a 7.05% loss in the LSA and a 0.48% loss in the RSA.
- **Eastern Wood-pewee:** The Olive-sided Flycatcher proxy subgroup is used to determine residual effects on habitat for this species. The removal of communities in the PDA represents a 0.49% loss in the LSA, with a less than 0.01% change in the RSA.
- **Evening Grosbeak:** The Coniferous Forest proxy VC (Dark-eyed Junco) is used to determine residual effects on habitat for this species. Removing vegetation communities in the PDA shows a 2.10% loss in the LSA and a 0.14% loss in the RSA.
- **Olive-sided Flycatcher:** habitat was mapped for this species. The removal of communities in the PDA represents a 0.49% loss in the LSA, with a less than 0.01% change in the RSA.
- **Rusty Blackbird:** The Palm Warbler Wetland proxy VC is used to determine residual effects on habitat for this species. Removing vegetation communities in the PDA represents a 2.04% loss in the LSA and a 0.06% loss in the RSA.
- **Yellow Rail:** The Wilson's Snipe Shorebird proxy VC is used to determine residual effects on habitat for this species. The removal of vegetation communities in the PDA results in a 4.87% loss in the LSA and a 0.22% loss in the RSA.

The effects on habitat are direct and localized to the PDA. Each proxy species experienced less than a 1% direct loss of habitat in the RSA, indicating that suitable habitat remains available elsewhere. Common Nighthawk had high proportions of habitat in the PDA (80.99%). However, suitable habitat was also abundant throughout the LSA and RSA, and less than 1% direct loss of habitat is expected in the RSA.

Culturally Important Species (proxy: Bald Eagle and Grouse species): Habitat loss is not generally seen as a major threat for Bald Eagles, and generally, habitat does not appear to be limiting for Bald Eagles (Armstrong 2014). Within the RSA, Bald Eagle habitat is not limited (dozens of nests scattered throughout the RSA), and the construction of the Project will not result in a large reduction of available habitat. The removal of communities in PDA represents an 11.39% loss in the LSA and a 0.60% loss in the RSA. Bald Eagle habitat is also considered under Bald Eagle and Osprey Nesting Habitat SWH below. During construction and operation, a buffer will be maintained between nests and the Project, based on SWH distance of 800 m. Permits to remove Bald Eagle nests under FWCA may be required.

Grouse species and their habitat are abundant with almost 100% habitat coverage in the PDA and approximately 97% coverage in the LSA and RSA. The change in relative habitat coverage as a result of the PDA development is estimated at 0.34%.

Suitable habitat is abundant throughout the LSA and RSA for both species, and less than 1% direct loss of habitat is expected in the RSA.

6.12.6.2 Change in the Function, Connectivity and Quality of Habitat

This criterion aims to analyze the indirect effects of the Project on habitat (including SWH) as a result of indirect effects (i.e., not direct habitat removal). Indirect effects on wildlife habitat will occur during all phases, but the greatest effects will occur during the operations phase. Changes in the function, connectivity, and quality of habitat will assess the percent of habitat indirectly altered by air, groundwater drawdown, and noise exceedances. Landscape fragmentation, an indirect effect of the Project, can disrupt habitat function, connectivity, and quality, thereby altering habitat suitability and community dynamics. Landscape fragmentation has been qualitatively considered for the Project. The above indirect changes in habitat may result in altered habitat suitability and/or altered community dynamics. Mitigation to reduce residual effects is recommended, specifically, those measures aimed at reducing sensory disturbance and developing buffer distances. Recommended mitigation measures to address potential effects are provided above in Section 6.12.4. Adaptive management and monitoring for effects will be used to assess the effectiveness of mitigation measures.

With the implementation of the mitigation measures listed in Table 6.12-6, there will be a residual effect on some species from the indirect loss of habitat due to noise.

Groundwater Drawdown

The alteration of the groundwater and surface water regime in adjacent wildlife habitats could affect local suitability and use and reduce habitat effectiveness from fragmentation and change in habitat configuration. Controlled dewatering and water management activities within the open pit basin could affect habitat suitability and configuration by changing the abundance and composition of wetland vegetation supporting nests or the characteristics of the habitat (e.g., from open-water habitat to a thicket). The groundwater drawdown (Figure 6.12-54) is primarily restricted to the PDA, and therefore, the development of the Project during construction will have already directly removed the majority of the habitat. Still, in keeping with the conservative assumptions, the groundwater drawdown is evaluated with the habitat mapping for wildlife and wildlife habitat (Table 6.12-9). No change in the RSA habitat for wetland proxy species was found, and less than a 1% change for all other proxy species in the RSA habitat after drawdown was found.

These minor changes and the fact that all most all of the groundwater drawdown area will be directly removed, there will be no change to wildlife habitats due to changes in groundwater during operations. During the closure phase, the Project area will be rehabilitated, resulting in a return to near-baseline conditions for groundwater flow once dewatering activities cease. As a result, there will be no contribution to residual effects on the function, connectivity, and quality of wildlife habitat due to the groundwater pathway; this indirect effect is not carried forward to residual effects.

Air Quality Changes

Indirect habitat loss or alteration at the LSA scale may result from activity within the PDA from dust deposition. Dust from operations has the potential to deposit particulate matter, which may negatively impact forest canopies and, thus, habitat (e.g., for nesting birds). The air quality contour for dust was used to estimate worst-case indirect effects based on the air quality isopleth for dust that conservatively assumed a higher silt content (5.8%) and lower control efficiency (85%).

The air quality contour is largely focused on the PDA where the direct loss of habitat has already occurred and on open water (i.e., limited high-value terrestrial habitat). Still, in keeping with the conservative assumptions, the air quality contour is evaluated with the habitat mapping for wildlife and wildlife habitat (Table 6.12-9). The indirect effects of air quality are not expected to impact large mammals, herptiles, raptors, shorebirds, waterfowl, bog/fen wetland birds, special concern species or culturally important species. Project-related changes constitute less than 1% of the habitat within the RSA for these species, implying a low probability of negative effects on suitable habitat and habitat functions. With the implementation of mitigation measures such as the dust management plan, the application of water sprays on roads and limiting speed limits, the pathway to a potential effect due to dust will be effectively mitigated (Section 6.2). Additionally, as the development of the Project during construction will have already directly removed the large portion of terrestrial habitat there will be minimal contribution to residual effects on the function, connectivity and quality of habitat from this pathway (refer to Figure 6.12-55; Table 6.12-9); this indirect effect is not carried forward to residual effects.

Noise Exceedances

Sensory disturbance is the main driver of impaired habitat function. Non-lethal human disturbance can impact behaviour and reproductive success. Prey species have evolved anti-predator responses to threatening stimuli, such as loud noises and rapidly approaching objects, and therefore perceive human-caused noise and movement as a form of predation risk (Frid and Dill 2002); intermittent and unpredictable noise is often perceived as a threat (Francis and Barber 2013). In contrast, chronic and frequent noise interferes with animals' abilities to detect important sounds. Acoustical masking from increased noise can interfere with bird communication, particularly at lower frequencies and during the breeding period, which can reduce habitat function and result in locally reduced species richness, diversity and/or abundance (Rheindt 2003; Wood and Yezerinac 2006). Background noise levels in forested habitats in the proximity of the PDA during baseline conditions were consistent with a Class 3 Area (rural area dominated by natural sounds), as noted in Section 6.3. Noise levels were assessed to be 30 to 48 dBA during the leaf-on period (June 2021) and 20 to 36 dBA during the leaf-off period (April 2021). Changes in sound levels during the worst-case scenario (Year 4 of the operation phase) were modelled using the 40 dBA threshold to determine the extent of potential effects on wildlife (Figure 6.12-56).

A substantial portion of the area around the mine site consists of open waterbodies, which are not typically targeted by wildlife aside from the shorelines and travel. The area along the transmission line will be affected only for brief periods during construction and typically during winter when wildlife activity is low. The area along the mine access road will be affected only sporadically when used by Project vehicles and equipment. During the closure phase, sensory disturbances will be discontinued, thereby reducing the potential for effects on wildlife.

The changes in noise impacts may result in avoidance / displacement behaviours. Thus, mitigation to reduce residual effects is recommended, specifically those measures aimed at reducing sensory disturbance. Implementing buffers will be sufficient to mitigate acoustic effects on birds (Rodgers and Schwikert 2002) nesting directly adjacent to the PDA. Recommended mitigation measures to address potential effects are provided above in Section 6.12.4.

Modelled noise impacts encompass the mine site area and the mine access road from the mine site area to the end of Wenasaga Road, at the eastern end of the southeast arm of Springpole Lake. The PDA numbers for the mine site area is 1,527.9 ha and the portion of the mine access road is 183.7 ha. These terrestrial ecosites will be directly lost due to vegetation removal during the construction of the Project. Although not all areas within this portion of the PDA are habitats, this loss is qualitatively considered below.

As a result, with the implementation of noise mitigation, sensory disturbances due to the change in sound levels will likely only result in a low residual effect on the function, connectivity, and quality of wildlife habitat in the RSA; this indirect effect is carried forward to residual effects.

Furbearers (proxy species fisher, lynx, and beaver): The following subgroups are expected to experience moderate operational impacts due to noise exceedances:

- **Fisher**: 1.60% habitat decrease in the RSA (Table 6.12-9). Polygons of habitat occur in the mine site area and along the MAR portion which will already be removed during construction;
- **Canada Lynx**: 0.57% habitat decrease in the RSA (Table 6.12-9). Habitat is ubiquitous in the RSA and occurs in the mine site area and along the mine access road portion which will already be removed during construction; and
- **Beaver:** 1.10% habitat decrease in the RSA (Table 6.12-9). Habitat is ubiquitous in the RSA and occurs in the mine site area and along the mine access road portion which will already be removed during construction.

The effects of noise on furbearer habitat are evaluated with the HS mapping; less than a 5% change in the RSA was found. This impact is reduced further considering habitat would already be removed during construction. Overall, habitat functions are maintained elsewhere in the RSA.

Large Mammals (proxy species Moose and Wolf): Large mammals are expected to have a low potential for impact, with Project-related changes affecting less than 1% of habitat in the RSA for both species (Table 6.12-9). Species, including Moose and Wolf, may become less abundant in the LSA, proximate to the construction and operation at the mine site. It is anticipated there will be habituation to ambient noise from mining activities, but short-term negative responses to brief sources of sounds (e.g., blasting) may occur. Based on HS modelling, suitable habitats for these species are widespread. Therefore, wildlife and wildlife habitat functions are likely maintained elsewhere in the RSA, and the residual effects will be minimized or avoided.

Herptiles (proxy species Wood Frog): There may be residual effects on amphibians due to acoustical interference that may affect anuran chorus behaviour directly by modulating call rates of the chorus participants or indirectly by suppressing calling behaviour (Sun and Narins 2005). Habitat is ubiquitous in the RSA and occurs in the mine site area and along the mine access road portion which will be removed during construction. Overall, operational impact associated with noise thresholds represents a moderate 1.42% loss in the RSA (Table 6.12-9) but habitat functions are maintained elsewhere in the RSA.

Migratory and Non-migratory Birds (proxy species based on VC grouping): Acoustical masking from increased noise can interfere with bird communication, particularly at lower frequencies and during the breeding period, which can reduce habitat function and result in locally reduced species richness, diversity and/or abundance (Rheindt 2003, Wood and Yezerinac 2006). As a result, bird species richness is expected to decrease when ambient noise increases above baseline (Stone 2000). Bird assemblages would be most sensitive during the breeding / nesting period although they can increase the amplitude of vocalizations in response to increased ambient noise levels. Regardless, sensory disturbances can result in the disturbance of nesting birds and reduce the ecological function of the nesting habitat, thereby affecting breeding success. The alteration of bird habitat from sensory disturbance along the mine access road and the transmission line is expected to be low due to low traffic densities and construction timing. Raptors are not anticipated to be disturbed by noise from passing trucks provided they are greater than 400 m from nest sites (Grub et al 1998). The sound threshold for interference with sensitive bird species is 50 to 60 dBA as one-hour averages (Dooling and Popper 2007).

Anticipated impacts from noise exceedances are expected to be minimal, resulting in less than a 1% change in the RSA for deciduous forest birds (proxy: Red-eyed Vireo), nocturnal stick nester raptors (proxy: Great-horned Owl), nocturnal cavity nester raptors (proxy: Boreal Owl), diurnal stick nester raptors (proxy: Osprey), diurnal cavity nester raptors (proxy: American Kestrel), shorebirds (proxies: Wilson's Snipe and Greater Yellowlegs), waterfowl (proxy: Mallard) and Bog and open coniferous wetland birds (proxy: Palm Warbler). Conversely, Coniferous Forest birds (proxy: Dark-eyed Junco) are expected to experience moderate operational impacts due to noise exceedances with a 2.60% habitat decrease in the RSA. This impact is reduced further considering habitat would already be removed during construction. Overall, habitat functions are maintained elsewhere in the RSA. Therefore, there is a moderate potential to adversely affect these species and those with similar life processes and habitat requirements.

Special Concern Species: During construction and operations, sound generated by Project activities may negatively impact how birds interact with the environment and other birds. The effect of sound masking can decrease breeding success by impairing the perception of behavioural triggers, particularly near the mine site portion of the PDA. Common Nighthawk depends on auditory cues for intraspecific interactions and during foraging at night. During construction and operation, Project activities that produce sound levels could decrease the reproductive success of this species. Sound disturbance along the transmission line corridor will be limited to the construction phase. Project activities above a threshold range of 50 dBA will likely have an influence on most birds. However, noise effects associated with the Project operation assessed through predictive acoustic modelling are below this threshold. Given their tendency to colonize anthropogenic structures, species such as Barn Swallow are unlikely to be impacted by increased ambient sound levels. It is anticipated that increased sound will have little effect on Barn Swallows. During the closure phase, sensory disturbances that indirectly change habitat will be discontinued.

The effects of noise on special concern species habitat (some via proxy species, Section 6.12.2.5) are evaluated with the habitat mapping, and less than a 1% change in the RSA was found (Table 6.12-9). Overall, habitat functions are maintained elsewhere in the RSA; therefore, there is a low potential to adversely affect these species and those with similar life processes and habitat requirements.

Culturally Important Species (proxy species Bald Eagle and grouse): These species may have residual effects due to acoustical interference. Overall, operational impact associated with noise thresholds represents a low loss in the RSA (Table 6.12-9) and habitat functions are maintained elsewhere in the RSA.

- Bald Eagle: There is a habitat decrease of 0.95% in the RSA. (Table 6.12-9). Bald Eagle sensitivity to sensory disturbance may depend partly upon the nesting cycle (MNRF 2014). Birds disturbed early (i.e., return to nest site, incubation and the first week after hatch) may desert the nest, but those disturbed after incubation is well advanced tend to finish nesting. Habitat is abundant in the RSA and occurs in the mine site area and along the mine access road portion which will already be removed during construction.
- Grouse: There is a habitat decrease of 0.47% in RSA (Table 6.12-9). Habitat is ubiquitous in the RSA and occurs in the mine site area and along the mine access road portion which will already be removed during construction.

Significant Wildlife Habitat

Beyond species responses to and the change in species' habitat from the direct (Section 6.12.6.1) and indirect changes (Section 6.12.6.2), landscape fragmentation can reduce the probability that some wildlife species can persist on a landscape (Environment Canada 2012), particularly species that are sensitive to disturbance and/or require large tracts of interior forest habitat, grassland, or wetland habitat to persist (i.e., SWH types). With the development of non-vegetated areas adjacent to some habitat, it is predicted that fragmentation will occur along the edges of the PDA, including the mine site area, mine access road, and transmission line, where it does not follow an existing route. This will result in changes in the microclimate that create conditions for the regrowth of early successional species and other species adapted to disturbance conditions (including invasive and non-native species). The above indirect changes in habitat may result in avoidance / displacement behaviours, altered movement / barrier effects, altered predation risk, altered habitat suitability, and/or altered community dynamics for all subgroups. For example, the creation of linear corridors can act as a semi-permeable movement barrier for some species and movement corridors for others. Species such as wolves and foxes can benefit from the creation of linear corridors as they use them to gain access to prey, which can affect local predator–prey dynamics. The addition of a new linear corridor in the RSA may result in altered movement / barrier effects, altered predation risk, altered habitat suitability, and/or altered community dynamics. The effects on some habitats (e.g., furbearers and Moose) are negligible and may even increase habitat (or access to) in the LSA and RSA.

The change in the quality of habitat assesses if the form and function of confirmed SWH after direct (Table 6.12-10) and indirect (Table 6.12-11) impacts is maintained. Impacts to confirmed SWH types in the RSA are as follows:

- **Waterfowl Stopover and Staging Areas (Aquatic):** No habitat was identified or mapped in the PDA or the LSA, so there's no change in the RSA's cover type or function. In addition, no changes in the quality are anticipated due to air quality, groundwater drawdown, or noise ZOIs. There is no change in the form and function of this habitat; this SWH type is not carried forward to residual effects.
- **Colonially Nesting Bird Breeding Habitat (Tree / Shrub):** No habitat was identified or mapped in the PDA or the LSA, so there's no change in the RSA's cover type or function. In addition, no changes in the quality are anticipated due to air quality, groundwater drawdown, or noise ZOIs. There is no change in the form and function of this habitat; this SWH type is not carried forward to residual effects.
- **Colonially Nesting Bird Breeding Habitat (Ground):** A loss of 40.48 ha for potential habitat is estimated along the transmission line at Slate Falls Nation. There's a -2.0% change in the LSA and a -0.12% change in the RSA. No changes in the quality are anticipated due to air quality, groundwater drawdown or noise effects. As the timing of the construction of the transmission line will occur at a period when the habitat is not used for ground nesting (winter) there is no change in the form and function of this habitat; this SWH type is not carried forward to residual effects.
- **Bat Maternity Colonies:** A loss of 1,388.92 ha for potential habitat is estimated. Overall, there's a -8.39% change in the LSA and a -0.50% change in the RSA. In addition, the Bat Maternity Colonies SWH are expected to experience a low level of indirect effects. Pit dewatering, air quality and noise effects are anticipated to result in <1% change in the RSA. SAR bats and their maternity colony habitat definitions under the ESA are discussed in Section 6.15; less than a 1% change was documented as well.

  SWH guidance suggests that when complete avoidance is not possible and the SWH is large, minimizing the amount of habitat affected may be a satisfactory mitigation option (OMNRF 2014). Likewise, removing habitat outside of sensitive timing windows will also help mitigate the impacts on the SWH. Mitigation measures are proposed in Section 6.12.4 and with them, there is no change in the form and function of this habitat in the RSA. This SWH type is not carried forward to residual effects.
- **Bat Hibernaculum:** No habitat was identified in the PDA. Therefore, the removal of communities in the PDA represents a 0.00% loss in the RSA. However, Cliff 1 is within the LSA. The SAR bat Section 6.15 evaluated residual effects based on compliance with the ESA and agency guidelines. No residual effects are expected for the candidate hibernaculum Cliff 1 as this feature and its associated foraging habitat (200 m buffer around the cliff) will not be removed. The 200 m protection buffer aligns with the SWH

guidance. There is no change in the form and function of this habitat in the RSA. This SWH type is not carried forward to residual effects.

- **Regionally Rare Plant Species:** A loss of 29 ha of habitat is expected in the PDA, accounting for a moderate 1.22% loss in the RSA. A low probability of changes in the quality of available SWH in the RSA is anticipated due to air quality or groundwater drawdown (<1% of the RSA). There is no change in the form and function of this habitat in the RSA. This SWH type is not carried forward to residual effects.
- **Wild Rice Stand:** No habitat was identified or mapped in the PDA or the LSA, therefore, there's no change in the cover type in both the LSA and RSA. No changes in the quality of confirmed SWH are anticipated due to air quality, groundwater drawdown or noise ZOIs. There is no change in the form and function of this habitat in the RSA; this SWH type is not carried forward to residual effects.
- **Bald Eagle and Osprey Nesting Habitat:** This SWH type considers nest locations only—not habitat mapping. There are three known Bald Eagle nests and one Osprey nest that overlap with the PDA. It is unknown if these are main nests or secondary nests, and occupancy is also not known. There are numerous other nests and habitat in the RSA. Additionally, SWH guidance suggests buffer zones around nests to protect from disturbances. Buffers have been included in the SWH-type calculations. A loss of 283.74 ha for potential habitat is estimated. Overall, there's a 3.03% loss in the LSA (representing a -28.74% change in the LSA) and a 1.30% loss in the RSA (or a 4.04% change in the RSA). The approximately 4% direct loss in the RSA is similar to the change in relative abundance of habitat observed for Osprey.

  The indirect effects around the mine site area overlap with Bald Eagle and Osprey nests and may cause less than a 1% change in the RSA. Buffers and removing habitat outside of sensitive timing windows will help mitigate the impacts on this SWH type. Mitigation measures are proposed in Section 6.12.4. Permits to remove active nests are required under FWCA. Additionally, nests can be removed from SWH criteria if it is documented that the nest and other associated nests have been unoccupied within the past 3 consecutive years by Osprey or Bald Eagle.

  As there is a commitment to avoid sensitive timing windows, it is possible to maintain the form and function of this habitat in the RSA. This SWH type is not carried forward to residual effects.
- **Aquatic Feeding Habitat:** No habitat was identified or mapped in the PDA or the LSA, therefore, there's no change in the cover type in both the LSA and RSA. No changes in the quality of confirmed SWH are anticipated due to air quality, groundwater drawdown or noise ZOIs. There is no change in the form and function of this habitat in the RSA; this SWH type is not carried forward to residual effects.
- **Marsh Bird Breeding Habitat:** A loss of 51.98 ha for potential habitat is estimated, with an overall decrease of 2.63% in the LSA and a 0.10% decrease in the RSA coverage. Air quality, groundwater drawdown, and noise effects have a negligible effect on the RSA coverage. There is no change in the form and function of this habitat in the RSA; this SWH type is not carried forward to residual effects.

Overall, following appropriate guidance documents and applying effective mitigation strategies, direct and indirect impacts will not result in a change in the form and function of SWH in the RSA and, therefore, SWH is not carried forward to residual effects.

6.12.6.3 Change in the Risk of Mortality

Ground disturbance and vegetation clearing can result in physical disturbance of key habitat features (e.g., nests, dens, roosts) and vehicle and equipment movement can result in accidental mortality (i.e., wildlife-vehicle collisions), which is elevated during sensitive timing windows. There are legislative requirements to warrant following appropriate timing windows and Best Management Practices for vegetation removals (e.g., the MBCA, FWCA) to avoid destruction of individuals and habitat. To reduce the risk of mortality, vegetation clearing will be undertaken outside of the active season for most wildlife (clearing only between September 15 to January 14; Section 6.12.4). Mortality outside of the PDA is not expected to occur (i.e., vegetation removals are direct and localized to the PDA). Further, before the construction phase, aerial surveys to confirm stick nest locations in the PDA will be completed to avoid mortality impacts or obtain appropriate permits for impacts. If new active nests are identified prior to construction, the appropriate buffers will be implemented, authorizations will be obtained, and mitigation will be implemented to replace them. As a result, there will be no residual direct effects on direct mortality for stick nesters. Similarly, the removal of the Barn Swallow while not occupied will prevent mortality (and be in compliance with SARA and MBCA).

However, during all phases, collisions with vehicles and anthropogenic structures represent one of the largest human causes of mortality for songbirds. Common Nighthawks are known to roost on gravel roads within their preferred habitat. Foraging individuals or displaying males may also collide with vehicles. Aerial foraging and road-roosting behaviour make this species susceptible to collision risk. Similarly, many species are aerial insectivores and frequently pursue prey items, which increases the risk of collisions with vehicles. On the other hand, other species, such as Canada Warbler, are area-sensitive species and thus have an affinity for large tracts of habitat. As a result, Canada Warbler has a low risk of mortality due to collisions with vehicles along roads. Mortality via collisions will be mitigated with strict and enforced speed limits and wildlife awareness training for Project employees. Anecdotally, increases in wildlife-vehicle collisions are not typically observed on mine sites.

The increased access along infrastructure corridors could result in increased mortality risk from hunting (e.g., Moose and furbearers) or increased predation risk to species near infrastructure disturbance edges and roads (Forman and Alexander 1998), however hunting and trapping will be prohibited within the gated, controlled access portion of the PDA by Project personnel while working or residing on-site. Additionally, predation risk around the mine can increase during construction and operations as Wolves and Bears are attracted to food waste in the landfill; this will be mitigated with the proper management of domestic waste, and the Project does not include a landfill for domestic waste, that would otherwise provide a local habitat sink effect that can occur due to higher predator densities.

Loss of habitat in the PDA (including water drawdown) may increase mortality for amphibian and reptile populations. Generally, these species with lower mobility at the RSA scale may face greater challenges relocating from the PDA to alternative suitable habitats. Amphibians are particularly vulnerable to changes in their aquatic habitats due to their complex life cycles that involve both aquatic and terrestrial stages. The drawdown of waterbodies can disrupt these life cycles, particularly the breeding and larval development stages. Amphibians have strong site fidelity (return to the same breeding sites year after year) and losing a breeding site could result in the localized displacement of these species from the mine site area.

With respect to intermittent incidental wildlife exposure to the water management system such as ponds, it is expected that mammals and birds would tend to avoid the immediate areas of disturbance during construction and operations due to sensory disturbances. Some wildlife, such as waterfowl, may be intermittently and temporarily attracted to collection ponds, sumps, and ditches and the CWSP. Deterrents such as cannons, bangers, or sonic guns could be implemented to discourage wildlife entry into water management pond areas. Bird deterrents (e.g., cannons, bangers) may be used around the ponds prior to nesting periods (zone C5: late April to late August) and during the northern and southern migration periods to deter bird nesting activity. Monitoring would occur regularly to evaluate the effectiveness of deterrents, and adaptive management would be applied as necessary. As a result, there is limited reasonable potential for wildlife and birds to be affected by the water management system during normal operations.

With the implementation of mitigation measures as described in Table 6.12-6, the effects on changes to the risk of mortality will minimized. These measures include enforcing reduced speed limits, employee training in wildlife awareness, constructing a compact footprint, avoiding sensitive wildlife habitats and sensitive periods, prohibiting hunting and trapping within the gated controlled access portion of the PDA by Project personnel while working or residing on-site, and ensuring all waste products are properly secured, stored and disposed of. Employee tracking of wildlife observations will provide ongoing monitoring feedback to adaptively manage and minimize this effect.

6.12.6.4 Change in Bird Density

Density modelling provides an assessment of the change in bird density and the results demonstrate that bird proxy species accurately represent the selected habitat, but density surfaces could not be developed for all proxy species. Ten species for which density surfaces were developed (Appendix P-3) are considered. The loss of bird habitat was considered above in Sections 6.12.6.1 and 6.12.6.2.

All ten species have less than a 1% direct change in the RSA from the removal of the PDA (Table 6.12-12). Groundwater disturbance and air quality impacts have minimal effects on density (Table 6.12-13). Like Section 6.12.6.2, the development of the Project will have already accounted for much of these operational losses. Combined with mitigation measures, there will be negligible additional contribution to residual effects on bird density due to the groundwater and air quality pathway.

The area along the transmission line will be affected only for brief periods during construction and typically during winter when wildlife activity is low. The area along the mine access road will be affected only sporadically when used by Project vehicles and equipment. During the closure phase, sensory disturbances will be discontinued, thereby reducing the potential for effects on wildlife. The sensory disturbance from the change in sound levels may also affect bird density. Modelled noise impacts encompass the mine site area and the mine access road from the mine site area to the end of Wenasaga Road, at the eastern end of the southeast arm of Springpole Lake. The PDA numbers for the mine site area is 1,527.9 ha and the portion of the mine access road is 183.7 ha. These terrestrial ecosites will be directly lost due to vegetation removal during the construction of the Project. Although not all areas within this portion of the PDA are habitats or where modelled density occurs, this loss is qualitatively considered. While density will be directly lost due to habitat removal during the construction of the Project, there will also be a reduction in density around the Project due to sensory disturbances such as noise. Five species show between 1 and 2% density lost during operation from indirect sensory disturbance due to noise. As a result, with the implementation of noise mitigation, sensory disturbances due to the change in sound levels will likely only result in a low effect on the bird density in the RSA.

- Common Yellowthroat (bog / fen wetland bird proxy) had a density in the PDA of 41.43 individuals. The loss of the PDA decreased density by 3.93% in the LSA and 0.20% in the RSA. Groundwater drawdown and air quality impacts have less than a 1% decrease in the RSA which is largely accounted for in the PDA. Noise impacts resulted in a 1.38% decrease in the RSA.
- Dark-eyed Junco (coniferous forest bird proxy) had a density in the PDA of 1,865.79 individuals. The loss of the PDA decreased density by 5.59% in the LSA and 0.25% in the RSA. Groundwater drawdown, air quality impacts, and noise impacts have less than a 1% decrease in the RSA.

- Greater Yellowlegs (shorebird proxy) had a density in the PDA of 10.54 individuals. The loss of the PDA decreased density by 5.16% in the LSA and 0.21% in the RSA. Groundwater drawdown, air quality impacts, and noise impacts have less than a 1% decrease in the RSA.
- Nashville Warbler had a density in the PDA of 2,787.84 individuals. The loss of the PDA decreased density by 6.14% in the LSA and 0.29% in the RSA. Groundwater drawdown, air quality impacts, and noise impacts have less than a 1% decrease in the RSA.
- Olive-sided Flycatcher (special concern species proxy) had a density in the PDA of 16.87 individuals. The loss of the PDA decreased density by 5.01% in the LSA and 0.21% in the RSA. Groundwater drawdown, air quality impacts, and noise impacts have less than a 1% decrease in the RSA.
- Ovenbird (deciduous / mixed forest birds proxy) had a density in the PDA of 23.66 individuals. The loss of the PDA decreased density by 10.30% in the LSA and 0.58% in the RSA. Groundwater drawdown and air quality impacts have less than a 1% decrease in the RSA, while noise impacts resulted in a 1.54% decrease in the RSA.
- Palm Warbler had a density in the PDA of 594.92 individuals. The loss of the PDA decreased density by 3.96% in the LSA and 0.19% in the RSA. Groundwater drawdown and air quality impacts have less than a 1% decrease in the RSA, while noise impacts resulted in a 1.27% decrease in the RSA.
- Ruby-crowned Kinglet had a density in the PDA of 3,329.17 individuals. The loss of the PDA decreased density by 6.10% in the LSA and 0.29% in the RSA. Groundwater drawdown, air quality, and noise impacts have less than a 1% decrease in the RSA.
- Red-eyed Vireo (deciduous forest bird proxy) had a density in the PDA of 109.24 individuals. The loss of the PDA decreased density by 5.57% in the LSA and 0.29% in the RSA. Groundwater drawdown and air quality impacts have less than a 1% decrease in the RSA, while noise impacts resulted in a 1.46% decrease in the RSA.
- White-throated Sparrow had a density in the PDA of 1,870.68 individuals. The loss of the PDA decreased density by 5.82% in the LSA and 0.29% in the RSA. Groundwater drawdown and air quality impacts have less than a 1% decrease in the RSA, while noise impacts resulted in a 1.15% decrease in the RSA.

6.12.7 Significance of Residual Effects

The Wildlife VC is capable of supporting the predicted residual effects with typical measures, and therefore the ecological and social context is considered low (Level I).

6.12.7.1 Change in Relative Abundance of Habitat

With the implementation of mitigation measure for direct changes in wildlife habitat as described in Table 6.12-6, there will be a residual effect on the relative abundance of wildlife habitat for several species of wildlife. There will be a loss of less than 1% of the habitat in the RSA for most wildlife species, including culturally important species (Bald Eagle and grouse), with the exception of Fisher (1.21% direct change in habitat) and Osprey (less than 5% change in habitat). As a result, the magnitude of the residual effects due to the decrease in the relative abundance of habitat is moderate (Level II), as there is a low to moderate potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce, and wildlife habitat functions are likely maintained elsewhere in the RSA, as habitat are common throughout the LSA and RSA. The duration of the residual effect is high (Level III), as rehabilitation will continue until post-closure when the habitat is fully rehabilitated. However, the geographic extent of the residual effect is low (Level I), as it is constrained within the PDA, and is expected to be partially reversible (Level II) as site conditions within the PDA will be altered until post-closure although some areas of the PDA will not be revegetated (i.e., the co-disposal facility). In addition, the frequency of the residual effect is low (Level I) as it occurs once during construction. The timing of the residual effect is low (Level I), with the implementation of timing windows during clearing to mitigate effects on wildlife. As a result, the adverse residual effect on wildlife due to a change in the relative abundance of wildlife habitat is predicted to be not significant.

6.12.7.2 Change in the Function, Connectivity, and Quality of Habitat

With the implementation of mitigation measure for air, noise, and groundwater as described in Table 6.12-6, the indirect changes on the function, connectivity and quality of wildlife habitat will be a minor (less than 1%) residual effect for 20 of the 24 proxy species of wildlife. However, the residual effect is predicted to be between 1 and 2% of the RSA for Fisher, beaver and Wood frog, and between 2 and 3% of the RSA for Red-eyed Vireo. As a result, the magnitude of the residual effects due to the indirect habitat alteration is moderate (Level II), as there is a low potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce. Habitat functions are likely maintained elsewhere in the RSA. The duration of the residual effect is moderate (Level II), as the effects will occur during the construction and operation phases of the Project. However, the geographic extent of the residual effect is low (Level I), as it is constrained to within the LSA, and is expected to be reversible (Level I) as Project activities cease after closure. However, the residual effects are predicted to occur intermittently throughout operations (Level II) and occasionally during sensitive timing windows. As a result, the adverse residual effect on wildlife due to a change in the function, connectivity and quality of wildlife habitat is predicted to be not significant.

6.12.7.3 Change in the Risk of Mortality

With the implementation of mitigation measures such as timing windows during construction, strictly enforcing speed limits and properly managing domestic waste, there may a minor residual effect due to the change in the risk of mortality for some wildlife species, The removal of habitat may reduce the abundance and/or distribution of some wildlife groups (e.g., herptiles), and anthropogenic disturbances may change the risk of mortality. However, the magnitude of the residual effects due to a risk in mortality is low (Level I), as there is a low potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce. The geographic extent of the residual effect will be confined to the PDA and will be low (Level I). The duration of the residual effect due to a change in the risk of mortality is moderate (Level II), as the effects will occur during the construction and operation phases of the Project. The residual effect of this change is predicted to occur infrequently throughout construction and operations and frequency is low (Level I). However, the residual effect will be reversible as Project activities cease after closure (Level I). Although the timing of the residual effect can be mitigated with timing windows, there may still be a change in the risk of mortality during sensitive periods during operations and therefore the timing attribute is moderate (Level II). As a result, the adverse residual effect on wildlife due to a change in the risk of mortality is predicted to be not significant.

6.12.8 Confidence Prediction

The confidence level in the prediction is considered moderate to high based on the quality and quantity of baseline information, updated FRI data, and the GIS mapping techniques. Baseline data incorporated representative surveys from across the PDA, LSA, and RSA. The updated FRI data were used to undertake habitat mapping and GIS analysis. The accuracy and precision of model predictions are limited by sources used, such as FRI data layers. It is recognized that reducing the complexity of natural ecosystems and animal behaviour results in uncertain predictions. The value of a habitat type assigned to a VC may under or over-represent individuals' actual use of habitat. Habitat maps are static views between VCs and the environment and do not forecast changes over time with forest succession and natural disturbances such as future fire events, which limits their predictive power. For example, undisturbed early seral habitats assigned low suitability at present for some wildlife VCs would increase in quality through natural succession while mature or late seral habitats would degrade in quality. Such natural changes in forest succession would alter the availability of different suitable habitats in the RSA through the lifespan of the Project.

The assessment of changes in the function, connectivity, and quality of habitat and density relied on the results of predictive modelling undertaken for groundwater, noise, air, and lighting. Further, assessing potential effects included using realistic but conservative assumptions. The identified mitigation measures are industry standards successfully implemented at other mining projects and are informed by species-specific information, where available.

6.12.9 References

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Table 6.12-1: Wildlife Criteria, Indicators and Rationale

Criteria	Indicators	Rationale
Change in relative abundance of habitat	Area and relative abundance of habitat, in ha (Habitat mapping as described)	The area and relative abundance of habitat can provide a measure of the availability of resources (e.g., food, shelter). A decrease in the area or relative abundance of habitat can affect wildlife abundance and habitat availability.
Change in the function, connectivity and quality of habitat	Area indirectly altered, in ha (Habitat mapping in the LSA will be used to determine the indirect effects on wildlife habitat) Change in form and function of Confirmed Significant Wildlife Habitat	Changes in the function, connectivity, and quality of habitat can affect movement and dispersal, access to resources, and survival. Landscape fragmentation (function of connectivity) can reduce the probability that some wildlife species can persist on a landscape.
Change in the risk of mortality	Qualitative risk of mortality Vegetation removal outside of sensitive timing windows	It helps assess the risk of increased mortality due to factors such as ground disturbance and vegetation clearing. Ground disturbance and vegetation clearing can result in physical disturbance of key habitat features (e.g., nests, dens), and vehicle and equipment movement can result in accidental mortality (e.g., wildlife–vehicle collisions). A qualitative assessment can help identify potential risks and develop mitigation measures.
Change in bird density	Density models for select species from avian point count survey data and the percent change in individuals	It helps quantify the density of species in relation to the areas of expected direct impact (PDA), indirect impact (LSA), and areas without expected impacts (RSA).

Table 6.12-2: Significance Determination Attributes and Rankings for Wildlife

Attribute	Description	Category
Magnitude[(1)]	A qualitative or quantitative measure to describe the size or degree of the residual effects relative to baseline conditions *Significant Wildlife Habitat is evaluated based on retention of form and function. *Bird Density is evaluated in the same way as habitat	**Level I:** Project-related changes (i.e., the residual effect) have a low potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce. Wildlife and wildlife habitat functions are likely maintained elsewhere in the RSA. **Project-related changes are less than 1% of habitat in the RSA.** **Significant Wildlife Habitat form and function are retained.** **Level II:** Project-related changes (i.e., the residual effect) have a moderate potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce (e.g., some temporary changes in behaviour but not expected to have long-term impacts on the population or change the status of local populations or the availability of unique habitats). Wildlife and wildlife habitat functions are likely maintained elsewhere in the RSA. **Project-related changes are between 1% and 5% of habitat in the RSA.** **Level III:** Project-related changes (i.e., the residual effect) have a high potential to adversely affect wildlife and/or the habitat required for wildlife to carry out the life processes necessary to survive and reproduce. Wildlife and wildlife habitat functions are not maintained elsewhere in the RSA. **Project-related changes are greater than 5% of habitat in the RSA.** **Significant wildlife habitat form and function are not retained.**
Geographic extent	The spatial extent over which the residual effect will take place	**Level I:** Effect is restricted to within the LSA. **Level II:** Effect extends beyond the LSA. **Level III:** Effect extends beyond the RSA.
Duration	The time period over which the residual effect will or is expected to occur	**Level I:** Effect occurs over the short term: less than or equal to 3 years. **Level II:** Effect occurs over the medium term: more than 3 years but less than 20 years. **Level III:** Effect occurs over the long term: greater than 20 years.
Frequency	The rate of occurrence of the residual effect	**Level I:** Effect occurs once, infrequently or not at all. **Level II:** Effect occurs intermittently or with a certain degree of regularity. **Level III:** Effect occurs frequently or continuously.
Reversibility	The extent to which the residual effect can be reversed	**Level I:** Effect is fully reversible. **Level II:** Effect is partially reversible or potentially reversible with difficulty. **Level III:** Effect is not reversible.

Table 6.12-2: Significance Determination Attributes and Rankings for Wildlife

Attribute	Description	Category
Timing	A measure of whether the residual effect occurs during a sensitive period of the year	**Level I:** Effects do not occur during a sensitive period, or related effects are fully mitigated. **Level II:** Effects occur during a sensitive period, and related effects are partially mitigated. **Level III:** Effects occur during a sensitive period, or related effects cannot be fully mitigated.

Note(s):

1. A conservative general environmental practitioner approach was used to provide a percent change for magnitude.

Table 6.12-3: Assemblages of Wildlife Species

ASSEMBLAGE	PROXY SPECIES	RATIONALE FOR SELECTION
Furbearers	Fisher	• Omnivore with old-growth conifer forest association (Ray 2000) • Indicator of forest health - population sensitivity to landscape-scale habitat disturbance (forest clearing / fragmentation); local scale preference for intact forest and mature lowland coniferous dominated cover types
	Lynx	• Mid-sized carnivore with specialized food preference for snowshoe hare which selects young deciduous dominant cover with an abundant shrub understory (Ray 2000) • Sensitive to increased mortality from habitat change
	Beaver	• Important subsistence and cultural species • Keystone herbivore with disproportionate impacts on deciduous dominant riparian habitats, sheltered bays / inlets on waterbodies / wetlands with permanent, stable water of sufficient depth • Specialized semi-aquatic mammal requiring deciduous-dominant cover types adjacent to suitable aquatic habitat (Wang et al. 2019)
Large mammals	Moose	• Important subsistence and cultural species • Keystone species favouring early and mid-succession habitats; represent sensitive riparian habitats • Important for traditional and recreational hunting • Large cervid - component of apparent competition (Caribou-moose-wolf) - Primary prey species for large carnivores (MNRF 2015)
	Wolf	• Important subsistence and cultural species • Sentinel species indicating ecosystem condition (dependent on ecosystem productivity because of large spatial requirements linked to prey distribution) • Keystone carnivore species with a disproportionate impact on the ecosystem relative to their abundance • Apex predator of ungulates - component of apparent competition (Caribou-moose-wolf) • Preference for heavily forested areas (Dobbyn 1994)
Herptiles	Wood Frog	• Ecological indicator of a healthy environment • Susceptible to environmental pollutants and disturbance of wetlands and suitable adjacent uplands (Seneviratne et al. 2015)
Forest birds	Coniferous Forest – Dark-eyed Junco	• Coniferous forest association • Intensively studied, species routinely used in ecological research, in reference to resource use, habitat partitioning, community structure and to evaluate methods and predictions Nolan et al. 2020)
	Deciduous Forest - Red-eyed Vireo	• Deciduous forest association • Absent from sites where understory shrubs are sparse or lacking, more abundant in forest interior than near edge (Cimprich et al. 2020)

Table 6.12-3: Assemblages of Wildlife Species

ASSEMBLAGE	PROXY SPECIES	RATIONALE FOR SELECTION
	Mixed Forest - Ovenbird	• Mixed closed-canopy forest association • Preference for large area of contiguous, interior forest habitat • Structural vegetation of Ovenbird territories has been intensively studied (Porneluzi et al. 2020)
Raptors	Nocturnal stick nester - Great-horned Owl	• Preference for fragmented forested habitats (landscapes with 36% - 65% forest cover) • Crepuscular and nocturnal • Relies on abandoned stick nests of diurnal birds of prey (Artuso et al. 2022)
	Diurnal stick nester - Osprey	• Neotropical migrant • Diurnal stick nester with high nest site fidelity to platform • Nests in proximity to lakes and watercourses • Piscivorous (Bierregaard et al. 2016) • Disturbance-sensitive during the nesting period (Rodgers and Schwikert 2002)
	Nocturnal cavity nester - Boreal Owl	• Resident • Associated with structurally diverse, mature, and old-growth forests • Dependent on woodpecker cavities for nesting (Kaufman 1996)
	Diurnal cavity nester - American Kestrel	• Secondary cavity nester, using woodpecker-excavated or natural cavities in large trees • Inhabits open areas covered by short ground vegetation characterized by good foraging quality (Smallwood and Bird 2020)
Shorebirds	Greater Yellowlegs	• Breeds throughout boreal zone, in muskeg, wet bogs with small, wooded islands, and coniferous forests with abundant clearings • Breeding area generally have many small ponds or lakes • Ground nester at base of short (1 to 2 m) coniferous trees or hummocks (Mueller 2020a)
	Wilson's Snipe	• Breeds in sedge bogs, fens, swamps, and pond and river edges • Feeds on land and in shallow water, but usually in or near cover (Mueller 2020b)
Waterfowl (including ducks and geese)	Mallard	• Important subsistence and cultural species • An integral component of wetland ecosystems supporting biodiversity (e.g., wetland to wetland transfer of insect larvae, fish / amphibian eggs, aquatic plant propagules) • Dependent on healthy wetland habitat throughout their life cycle (Ducks Unlimited Canada 2020)
Bog / Fen, wetland birds	Common Yellowthroat	• Associated with wet areas with dense growth of low vegetation (Guzy and Ritchison 2020)
	Palm Warbler	• Associated with bogs, open coniferous forest, and partly open habitat with scattered trees and heavy undergrowth, usually near water (Wilson Jr. 2020)
	Northern Waterthrush	• Nests in spruce bogs, swamps, wet woodlands and along alder-and willow-bordered rivers and lakes • Sensitive to landscape scale habitat factors (Whitaker and Eaton 2020)

Table 6.12-3: Assemblages of Wildlife Species

ASSEMBLAGE	PROXY SPECIES	RATIONALE FOR SELECTION
Special Concern Species	Common Nighthawk	• Crepuscular Species of Special Concern • Aerial forager • Breeding habitat includes a huge variety of open habitats such as clearings, grasslands, open forests, crop fields and urban areas (COSEWIC 2018a)
	Olive-sided Flycatcher	• Species of Special Concern • Associated with open forest habitat containing tall trees or snags for perching that are often located near water or wetlands. Open areas include forest openings, forest edges, burned forest or open to semi-open mature forest stands. Generally, forest habitat is either coniferous or mixed coniferous (COSEWIC 2018b)
Culturally Important Species	Bald Eagle	• Important cultural species • Require large, stout-limbed, open-crowned trees to support their large bulky nests of sticks and provide perch and roost sites. Supercanopy trees are typically used because they are easily accessed • Forested areas, near water, are generally used for nesting (Armstrong 2014) • Nest in areas with low levels of human disturbance but have high levels of fidelity (Armstrong 2014)
	Grouse (including Spruce Grouse and Ruffed Grouse)	• Important subsistence and cultural species • Resident bird species • Spruce Grouse are reliant on fire disturbance to maintain complex open boreal forest habitats • Ruffed Grouse associated with deciduous and mixed forests, with scattered clearings and dense undergrowth (Kaufman 1996) • Potential umbrella species for northern grassland and shrub-grassland ecosystems
Bats (Section 6.15)		• Bat SARs are short-distance migrants • Insect specialists • Colonial with specialized habitat requirements for colonies and roosts • Northern Long-eared Myotis - Represents upland spruce and mixedwood old-growth forest • Little Brown Myotis - widest ranging of the bat species - an indicator of habitat changes to old-growth hardwood dominant stands because of disturbance sensitivity (ECCC 2018)
Lesser Yellowlegs (Section 6.16)		• Threatened species under Ontario's *Endangered Species Act* • Inhabits marshes, shorelines, ponds and boreal woods, forages in shallow water • Primarily eats insects, crustaceans and small fish • The shorebird, with 80% of its breeding range in Canada's boreal region, has had significant long and short-term declines due to the loss of wetland and intertidal habitats used during migration and winter

Table 6.12-3: Assemblages of Wildlife Species

ASSEMBLAGE	PROXY SPECIES	RATIONALE FOR SELECTION
Eastern Whip-poor-will (Section 6.16)		• Threatened species under Ontario's *Endangered Species Act* • Crepuscular aerial insectivore • Found in areas with a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests • Lays eggs directly on forest floor
Short-eared Owl		• Threatened species under Ontario's *Endangered Species Act* • Uses open areas such as grasslands, marshes, and tundra • Ground nester • Active at dawn and dusk • Short-eared Owls, once prevalent in North America's prairies, grasslands, marshes, and tundra, have seen a decline in populations across their range over the past century
Boreal Caribou (Section 6.14)		• Spiritual and cultural significance • Boreal obligate - requires a large expanse of intact mature / old-growth lichen-rich habitats • Umbrella species - an indicator of ecosystem health • Disturbance- and predation-sensitive species at risk • Spiritual and cultural significance • Medium sized cervid - Component of apparent competition (Caribou-moose-wolf; Environment Canada 2012)
Wolverine (Section 6.15)		• Large spatial requirement (low density and large home ranges) • Low reproductive rate makes them sensitive to disturbance of natal / maternal dens (potential abandonment; COSEWIC 2003)

Table 6.12-4: Wildlife Resource Selection Models

VC	PROXY SPECIES	TYPE OF MODEL[1]	DEVELOPED BY	HS MODEL (APPENDIX REFERENCE)
Furbearers	Fisher	ELC	WSP 2024	P-3.1
	Canada Lynx	ELC	WSP 2024	P-3.2
	Beaver	ELC	WSP 2024	P-3.3
Large mammals	Moose - Late Winter	ELC	WSP 2024	P-3.4
	Moose - Foraging	ELC	WSP 2024	P-3.4
	Wolf	ELC	WSP 2024	P-3.5
Herptiles	Wood Frog	ELC	WSP 2024	P-3.6
Forest birds	Dark-eyed Junco	BAM	ABMI 2012	-
	Red-eyed Vireo	BAM	ABMI 2012	-
	Ovenbird	BAM	ABMI 2012	-
Raptors	Great-horned Owl	ELC	WSP 2024	P-3.7
	Boreal Owl	ELC	WSP 2024	P-3.8
	Osprey	ELC	WSP-Golder	-
	American Kestrel	ELC	WSP 2024	P-3.9
Shorebirds	Greater Yellowlegs	ELC	WSP 2024	P-3.10
	Wilson's Snipe	ELC	WSP 2024	P-3.11
Waterfowl	Mallard	ELC	WSP-Golder	-
Bog / Fen, wetland birds	Common Yellowthroat	BAM	ABMI 2012	-
	Palm Warbler	BAM	ABMI 2012	-
	Northern Waterthrush	BAM	ABMI 2012	-
Special concern species	Common Nighthawk	ELC	WSP 2024	P-3.12
	Olive-sided Flycatcher	BAM	ABMI 2012	-
Culturally important species[2]	Bald Eagle	ELC	WSP-Golder	-
	Grouse	ELC	WSP 2024	P-3.13

Notes:
1. ELC = Ecological Land Classification Habitat Suitability Models, BAM = Boreal Avian Modelling Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species
2. The category of Culturally Important Species, which includes the Bald Eagle and Grouse, is not exhaustive of all Species of Significance as per Insights from Traditional Knowledge. Other species of significance have been incorporated under different VC categories. For instance, the Moose is included under Large Mammals, the Beaver under Furbearers and the Mallard under Waterfowl. This categorization aims to capture a broader range of species not previously captured under other VCs.

Table 6.12-5: Potential Interactions of Project Components with Wildlife and Wildlife Habitat

PROJECT COMPONENT / ACTIVITY	WILDLIFE AND WILDLIFE HABITAT
Construction Phase	
Site preparation activities in the mine site area, including clearing, grubbing and bulk earthworks	Yes
Construction of the mine site access road and airstrip, including the development and operation of the aggregate resource areas	Yes
Development of temporary construction camp and staging	Yes
Construction of the fish habitat development area	Yes
Construction of the transmission line to the Project site	Yes
Construction of the onsite haul and access roads	Yes
Construction of dikes in north basin of Springpole Lake	Yes
Construction of buildings and onsite infrastructure	Yes
Construction of the central water storage pond	Yes
Controlled dewatering of open pit basin	Yes
Construction of the starter embankments for the co-disposal facility	Yes
Stripping of lake bed sediment and overburden at the open pit	Yes
Development of the surficial soil stockpile	Yes
Initiation of pit development in rock	Yes
Initiation of stockpiling of ore	Yes
Establishment and operation of water management and treatment facilities	Yes
Commissioning of the process plant	Yes
Employment and Expenditures	-
Operation Phase	
Operation of the process plant	Yes
Operation of open pit mine	Yes
Management of overburden, mine rock, tailings and ore in designated facilities	Yes
Operation of water management and treatment facilities	Yes
Accommodations complex operations	Yes
Operation and maintenance of mine site infrastructure, including the fuel farm	Yes
Progressive reclamation activities	Yes
Employment and Expenditures	-
Decommissioning and Closure Phase	
Removal of assets that can be salvaged	-
Demolition and recycling and/or disposal of remaining materials	-
Removal and disposal of demolition-related wastes in approved facilities	-
Reclamation of impacted areas, such as by regrading, placement of cover and revegetation	Yes
Filling the open pit with water	-
Monitoring and maintenance	-
Employment and expenditures	-

Note(s):
- = The interaction is not expected, or the potential effect is not anticipated to be adverse, and no further assessment is warranted.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in relative abundance of habitat	•	•	–	Develop of a compact mine site to limit the areal extent of disturbance.
	•	–	–	Co-locate the transmission line, airstrip and mine access road within a shared infrastructure corridor, where feasible.
	•	•	–	Follow appropriate timing windows for vegetation removals; in combination with timing windows for Boreal Caribou (6.13), Wolverine (6.14), bats (Section 6.15), and SAR birds (6.16), vegetation removals should only occur between September 15 to January 14. Note that construction activity should never occur during the critical breeding period for Bald Eagle, defined as March 5 to August 31 in northwest Ontario.
	•	•	–	Permits for specially protected species under the FWCA may be required to remove dens, nests, and lodges.
	–	–	•	Undertake progressive revegetation in the mine site area, where practicable, during operation of the Project.
	•	–	–	During construction, minimize the disturbance by using existing trails and roads for travel, where practicable.
	•	•	•	Implement the mitigation measures for potential effects on vegetation communities and wetlands relevant to bat (Section 6.11.4) including: • During construction and operation, minimize the clearing of vegetation within the mine access road and transmission line corridor to that needed for the construction and safe operation; • During construction and operation, minimize the removal of woody vegetation within the transmission line corridor to maintain natural cover to adjacent areas. The removal of woody vegetation will be limited to hazard trees and clearing to provide safe construction access and infrastructure needs; • During construction, operation and active closure phases, implement mitigation measures for wetlands; • During operation and closure phases, undertake progressive and final rehabilitation of mine development in accordance with the filed Closure Plan, and implement a revegetation plan that preferentially uses local vegetation sources, incorporates plant species of interest to Indigenous communities, and wildlife habitat features.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in the function, connectivity, and quality of habitat	•	–	–	Co-locate the transmission line, airstrip and mine access road within a shared infrastructure corridor, where feasible;
	•	•	–	Maintain existing hydroperiod conditions, outside the zone of influence for dewatering, by directing water from dewatering activities away from terrestrial habitats, where possible;
	•	•	–	Follow appropriate timing windows for vegetation removals; in combination with timing windows for Boreal Caribou (6.13), Wolverine (6.14), bats (Section 6.15), and SAR birds (6.16), vegetation removals should only occur between September 15 to January 14. Note that construction activity should never occur during the critical breeding period for Bald Eagle, defined as March 5 to August 31 in northwest Ontario.
	•	•	•	During construction, operation and closure, where practicable, avoid sensitive wildlife habitat by implementing buffers (Table 6.12-7) around sensitive habitats. The implementation of buffers will be sufficient to mitigate acoustic effects on birds (Rodgers and Schwikert 2002).
		•	•	Undertake progressive revegetation in the mine site area, where practicable, during operation of the Project.
	•	•	–	During construction, minimize the disturbance by using existing trails and roads for travel, where practicable.
	•	–	–	During construction of the mine access road and transmission line: • Minimize the area cleared with heavy machinery for the construction of the mine access road, as practicable, recognizing the need for clear sightlines for safety; and • Minimize the removal of woody vegetation along the transmission line by limiting removal to hazard trees and only clearing for safe access and infrastructure need.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in the function, connectivity, and quality of habitat (Continued)	•	•	•	Implement the mitigation measures for air quality relevant to wildlife (Section 6.2.4) including: • During construction, operation and active closure, a dust management plan will be implemented to identify potential sources of fugitive dusts, outline mitigation measures that will be employed to control dust generation and detail the inspection and record keeping required to demonstrate that fugitive dusts are being effectively managed. • Routine maintenance of all pollution control equipment, diesel-fired engines (vehicle, equipment and standby power generation) • The process plant emission sources will be enclosed where possible and be designed to allow good atmospheric dispersion, and dust control equipment such as dust collectors and water sprays will be used together with best practices, where necessary, to reduce emissions. • Dust emissions from roads and mineral stockpiles will be controlled through the application of water spray and supplemented by dust suppressants if required. • Site roads will be maintained in good condition, with regular inspections and timely maintenance completed to minimize the silt loading on the roads. • Vehicle speeds will be limited.
	•	•	•	Implement the mitigation measures for noise and vibration relevant to wildlife (Section 6.3.4) including: • Building dimensions, layout and orientation will be designed to shield noise sources, where possible. • Acoustical enclosures will be used in the process plant to limit overall noise emissions from key noise sources, such as the ball mills. • Generator intakes and exhausts in the process plant will use silencers. • Motorized equipment will be selected or designed with mufflers / silencers to limit noise emissions. • Reversing alarms will be dimmable with white noise and/or strobe lights, • The use of engine brakes will be prohibited. • Vehicles and equipment will be operated in such a way that impulsive noise is minimized, where possible. • Regular inspections will take place to confirm that equipment and machinery used on site is operated in good working condition through regular maintenance. • For helicopter use during transmission line construction, minimum flight altitudes will be maintained unless the helicopters are engaged in construction tasks, landing or departure.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in the function, connectivity, and quality of habitat (Continued)	•	•	•	During construction, operation and closure phases, implement mitigation measures for lighting to minimize sensory disturbance (Appendix J), including: • To prevent a direct line-of-sight from light, maintain light sources below natural barriers such as tree lines or artificial barriers such as berms; and, • Minimize light spill and glare using shielding on stationary light sources and direct lighting downwards where practicable.
	•	•	•	Implement the mitigation measures surface water systems relevant to wildlife (Section 6.6) including: • During construction, operation and active closure, an integrated water management system will be operated to collect and control contact water from the stockpiles, CDF and plant site areas. Collected contact water that is not used in ore processing will be treated at the ETP and discharged to the southeast arm of Springpole Lake in accordance with permitting requirements. • During construction, operation and active closure, contact water collection ditches will be constructed and operated around the perimeter of key infrastructure, including the CDF and stockpiles, to collect overland flow and seepage and direct it to the integrated water management system. • Locating the CDF on favourable geologic conditions at the Project site to support long-term stability and effective seepage management. • Discouraging wildlife from inhabiting contact water ponds (including the CDF and CWSP ponds).
	•	•	•	Implement the mitigation measures for potential effects on vegetation communities and wetlands relevant to wildlife (Section 6.11.4) including: • During construction and operation, minimize the clearing of vegetation within the mine access road and transmission line corridor to that needed for the construction and safe operation; • During construction and operation, minimize the removal of woody vegetation within the transmission line corridor to maintain natural cover to adjacent areas. The removal of woody vegetation will be limited to hazard trees and clearing to provide safe construction access and infrastructure needs; and, • During operation and closure phases, undertake progressive and final rehabilitation of mine development in accordance with the filed Closure Plan, and implement a revegetation plan that preferentially uses local vegetation sources, incorporates plant species of interest to Indigenous communities, and wildlife habitat features.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in the risk of mortality	•	•	–	Develop of a compact mine site to limit the areal extent of disturbance.
	•	•	–	Co-locate the transmission line, airstrip and mine access road within a shared infrastructure corridor, where feasible;
	•	•	–	Follow appropriate timing windows for vegetation removals; in combination with timing windows for Boreal Caribou (6.13), Wolverine (6.14), bats (Section 6.15), and SAR birds (6.16), vegetation removals should only occur between September 15 to January 14. Note that construction activity should never occur during the critical breeding period for Bald Eagle, defined as March 5 to August 31 in northwest Ontario.
	•	•	•	During construction, operation and closure, where practicable, avoid sensitive wildlife habitat by implementing buffers (Table 6.12-7) around sensitive habitats. The implementation of buffers will be sufficient to mitigate acoustic effects on birds (Rodgers and Schwikert 2002).
	•	•	–	Permits for specially protected species under the FWCA may be required to remove dens, nests, and lodges.
	•	•	•	During construction, operation and closure, prohibit hunting and trapping within the gated controlled access portion of the PDA by Project personnel while working or residing on-site, during construction, operation and closure phases.
	•	•	•	During construction, operation and closure phases, domestic solid waste products and similar materials will be properly secured, stored and disposed of at an offsite licensed facility, particularly anything that is an attractant for scavenging wildlife. Domestic solid waste products will be transported to a landfill off site, mitigating the habitat sink effect of increased predator densities that can be created due to access to landfill sites.
	•	•	–	During the operation phase of the mine access road and transmission line: • Enforce reduced speed limits along Project-controlled roads within high-quality wildlife habitats, particularly along segments with known or recurrent wildlife crossings; • Project-related vehicles travelling on the mine access road must come to a stop if wildlife is encountered and provide them with the right-of-way to cross the road; and • Minimize vegetation management along the transmission line corridor to that necessary for safe operation.
	•	•	•	During construction, operation and closure, wildlife awareness training will be provided to Project employees.

Table 6.12-6: Proposed Mitigation Measures for Potential Wildlife and Wildlife Habitat Effects

Pathways to Potential Effects / Criteria	Phase			Proposed Mitigation Measure
	Con.	Op.	Cl.	
Change in the risk of mortality (Continued)	•	•	•	During construction, operation and closure, log (and report as needed) observed wildlife, sign / tracks and wildlife–vehicle collisions and alter mitigation measures as appropriate.
	•	•	•	Implement measures outlined in a spill prevention and contingency plan to be developed prior to construction.

Table 6.12-7: Buffer Distances and Sensitive Periods

Significant Wildlife Habitat Type	Sensitive Habitat Feature	Buffer Distance	Sensitive Period	Confirmed or Candidate SWH
Waterfowl stopover and staging areas: aquatic	Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration.	SWH includes the combined area of the ELC ecosites and a 100 m to 300 m radius area. During spring and fall, a buffer of 1,500 m from the staging area.	Fall or spring migration period	Candidate
Colonial nesting breeding bird habitat: bank and cliff	Banks and Cliffs	SWH includes the nest plus 50 m.	April to August	Candidate
Colonially nesting bird breeding habitat: tree / shrub	Live or dead standing trees in wetlands, lakeshores, islands, and peninsulas.	Between 100 to 300 m, species dependent.	April to August	Confirmed(1) and candidate
Colonially nesting bird breeding habitat: ground	Islands or peninsulas (natural or artificial) associated with open water or in marshy areas, lakes or large rivers.	Between 100 to 350 m, species dependent.	April to August	Confirmed(2) and candidate
Eagle and osprey concentration area(3)	Sites that have been used for several years and/or associated with large river systems and lake confluences.	SWH includes feeding areas, winter / nocturnal roosting sites and trees regularly used for perching.	Spring, fall or winter	Candidate
Bat maternity colonies	Maternity colonies located in mature deciduous(4) or mixed forest stands.(5) • Female bats prefer snags.(6) • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows, with at least 21 snags per ha in older forest areas preferred.	The area of habitat includes the entire woodland or a forest stand.	April to October	Confirmed
Amphibian breeding habitat	Wetlands and pools (including vernal pools) that are greater than 500 m^2 (approximately 25 m diameter) supporting high species diversity are significant.	SWH is the ELC ecosite(s) and shoreline.	Spring to fall	Candidate
Snake hibernaculum	Talus, rock barren, crevice and caves are typically habitats, but may be found in any forested ecosite.	Feature in which the hibernacula is located plus a 30 m radius.	Early spring and early fall	Candidate

Table 6.12-7: Buffer Distances and Sensitive Periods

Significant Wildlife Habitat Type	Sensitive Habitat Feature	Buffer Distance	Sensitive Period	Confirmed or Candidate SWH
Rock barren	Rock barrens have limited plant growth and species diversification.	Associated ecosite with a radius of 120 m.	Year-round	Candidate
Waterfowl nesting area	Upland areas from wetlands.	Approximately 120 m, but species dependent and greater than 250 m during nesting.	April to July	Candidate
Bald Eagle and Osprey nesting habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, and islands.	Osprey: Active nest plus 300 m radius Bald Eagle: Active nest plus 400 to 800 m radius	Year-round	Confirmed
Woodland Raptor nesting habitat	All natural or conifer plantation woodland / forest stands.	Great Gray Owl and Northern Goshawk: Nest plus 400 m radius, and/or 28 ha of suitable habitat surrounding the nest. Barred Owl: Nest plus 200 m radius. Broad-winged Hawk, Coopers Hawk, Great Horned Owl, Barred Owl, Red-tailed Hawk, Long-eared Owl: Nest plus 100 m radius. Great Horned Owl, Northern Hawk Owl, Common Raven, Merlin and Sharp-shinned Hawk: Nest plus 50 m radius. American Kestrel, Boreal Owl, Northern Saw-whet Owl: Nest plus 25 m radius.	Year-round	Candidate
Aquatic feeding habitat	Wetlands and isolated embayments in rivers or lakes which provide an abundance of submerged aquatic vegetation such as pondweeds, water milfoil and yellow water lily are preferred sites. Adjacent stands of lowland conifer or mixed woods will provide cover and shade.	The area of the habitat includes the ELC ecosite area and adjacent stands (120 m) of mixed or conifer forest, particularly those that provide thermal cover and/or travel corridors to other habitat features are considered significant.	Year-round	Confirmed
Seeps and springs	Any forested area within the headwaters of a stream or river system.	The area of an ELC forest ecosite.	Year-round	Candidate

Table 6.12-7: Buffer Distances and Sensitive Periods

Significant Wildlife Habitat Type	Sensitive Habitat Feature	Buffer Distance	Sensitive Period	Confirmed or Candidate SWH
Mineral licks	This habitat component is found in upwelling groundwater and the soil around these seepage areas. It typically occurs in areas of sedimentary and volcanic bedrock. In areas of granitic bedrock, the site is usually overlain with calcareous glacial till.	The area of the habitat is the wetland, seep or spring containing the mineral lick with associated activity and 120 to 1,000 m of undisturbed contiguous forest.	Year-round	Candidate
Mammal denning site(7)	Wolves: Dens in sandy sites, sloped for excavation, in proximity to wetlands and interior forests.	Wolves: Den plus 200 m radius.	April 15 to July 15	Candidate
	Fox: Dens in sandy sites.	Den plus 150 m radius	May 1 to July 15	
	Lynx: Dens associated with downed wood debris.	Den plus 250 m radius.	April 1 to July 15	
	Black Bears: Dens in the base of hollow trees (large Cedar or White Spruce)	Den plus 100 m.	October 15 to April 30	
	Mink: Dens in root masses or old muskrat lodges along shorelines dominated by coniferous / mixed forest. Otter: Dens in old beaver lodges, log jams or crevices in rock piles near undisturbed shorelines and abundant shrubby vegetation and downed woody debris. Marten and Fisher: Dens is cavities of large trees or under downed woody debris, near large tracts of mature or older age class coniferous / mixed forest.	Other mammals: Den plus 100 m.		
Marsh bird breeding habitat	Nesting occurs in wetlands. All wetland habitat is to be considered if there is shallow water with emergent aquatic vegetation present.	Area of the ELC ecosite is the SWH.	April to August	Confirmed

Table 6.12-7: Buffer Distances and Sensitive Periods

Significant Wildlife Habitat Type	Sensitive Habitat Feature	Buffer Distance	Sensitive Period	Confirmed or Candidate SWH
Special Concern and rare wildlife species	When an element occurrence is identified within a 1 or 10 km grid for a special concern or provincially rare species; linking candidate habitat on the site needs to be completed to ELC ecosites.	The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH.	Species dependent	Candidate
Cervid movement corridors	Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines or ridges).	The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH.	May to July	Candidate
Amphibian movement corridors	Movement corridors between breeding habitat and summer habitat.	The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH.	April to July	Candidate

Notes:

(1) NHIC provided information on Mixed Wader Nesting Colony.
(2) NHIC provided information on Colonial Waterbird Nesting Area.
(3) Habitat of annual importance to migrating and/or wintering eagles and ospreys.
(4) Dominant trees greater than 80 years old.
(5) With greater than 10 large diameter (greater than 25 cm diameter at breast height) trees per ha.
(6) In early stages of decay, Class 1 or 2 or Class 1 to 4 can be living or with bark mostly intact.
(7) The FWCA prohibits interference and intentional damage or destruction of a furbearing species.

Table 6.12-8: PDA Removal on Valued Component and Proxy Species Habitats (HS)

VC	Proxy Species	Baseline Condition (Area, in ha)[1] PDA	%	LSA	%	RSA	%	Condition during Mine Operations (Area, in ha)[2] LSA	%	RSA	%	Change in Cover Type[3] LSA	RSA
Furbearers[4],[5]	Fisher	779.08	44.94%	4325.61	18.62%	64416.13	12.40%	3,546.54	15.27%	63,637.05	12.25%	-18.01%	-1.21%
	Canada Lynx	1499.02	86.47%	21578.20	92.90%	392317.38	75.52%	20,079.17	86.44%	390,818.36	75.23%	-6.95%	-0.38%
	Beaver	2021.57	99.76%	21884.84	71.12%	477527.75	76.00%	19,863.27	64.55%	475,506.19	75.7%	-9.24%	-0.42%
Large mammals[6]	Moose -late Winter	1704.24	98.31%	63267.81	98.06%	1596128.97	95.78%	61,563.58	95.42%	1,594,424.73	95.68%	-2.69%	-0.11%
	Moose - foraging	45.82	2.64%	4209.92	6.52%	109659.98	6.58%	4,164.11	6.45%	109,614.16	6.58%	-1.09%	-0.04%
	Wolf	1704.24	98.31%	63267.81	98.06%	1596128.97	95.78%	61,563.58	95.42%	1,594,424.73	95.68%	-2.69%	-0.11%
Herptiles[5]	Wood Frog	1737.11	85.73%	24175.86	78.56%	366069.24	58.26%	22,438.75	72.92%	364,332.13	58.0%	-7.19%	-0.47%
Forest birds[4]	Dark-eyed Junco	286.29	16.51%	13649.07	58.76%	199508.31	38.41%	13,362.79	57.53%	199,222.02	38.35%	-2.10%	-0.14%
	Red-eyed Vireo	1553.03	89.59%	6308.75	27.16%	203352.71	39.15%	4,755.71	20.47%	201,799.68	38.85%	-24.62%	-0.76%
	Ovenbird	0.00	0.00%	1.03	0.00%	144893.03	27.89%	1.03	0.00%	144,893.03	27.89%	0.00%	0.0%
Raptors[4]	Great-horned Owl	1290.22	74.43%	10951.63	47.15%	152438.59	29.34%	9,661.41	41.59%	151,148.37	29.10%	-11.78%	-0.85%
	Boreal Owl	1403.98	80.99%	14839.16	63.88%	245985.22	47.35%	13,435.18	57.84%	244,581.25	47.08%	-9.46%	-0.57%
	Osprey	1380.87	79.66%	15312.17	65.92%	322990.16	62.18%	13,931.30	59.98%	307,677.99	59.23%	-9.02%	-4.74%
	American Kestrel	1415.20	81.64%	18718.93	80.59%	428377.24	82.46%	17,303.73	74.49%	426,962.04	82.19%	-7.56%	-0.33%
Shorebirds[4]	Greater Yellowlegs	943.17	54.41%	12080.56	52.01%	253440.06	48.79%	11,137.39	47.95%	252,496.89	48.61%	-7.81%	-0.37%
	Wilson's Snipe	368.95	21.28%	7583.08	32.65%	170231.38	32.77%	7,214.12	31.06%	169,862.43	32.70%	-4.87%	-0.22%
Waterfowl[4]	Mallard	1384.54	79.87%	20237.84	87.13%	442942.46	85.27%	18,853.31	81.17%	441,557.92	85.00%	-6.84%	-0.31%
Bog/Fen, wetland birds[4]	Common Yellowthroat	0.00	0.00%	0.00	0.00%	51869.18	9.98%	0.00	0.00%	51,869.18	9.98%	0.00%	0.00%
	Palm Warbler	152.51	8.80%	7486.17	32.23%	252264.84	48.56%	7,333.67	31.57%	252,112.33	48.53%	-2.04%	-0.06%
	Northern Waterthrush	8.05	0.46%	1065.96	4.59%	145483.78	28.01%	1,057.91	4.55%	145,475.73	28.00%	-0.76%	-0.01%
Special Concern species[4]	Common Nighthawk	1404.06	80.99%	19904.08	85.69%	292662.64	56.34%	18,500.02	79.64%	291,258.59	56.07%	-7.05%	-0.48%
	Olive-sided Flycatcher	6.02	0.35%	1233.29	5.31%	131297.64	25.28%	1,227.27	5.28%	131,291.61	25.27%	-0.49%	<0.01%
Culturally important species[4]	Bald Eagle	1305.72	75.32%	11465.00	49.36%	217893.73	41.95%	10,159.29	43.74%	216,588.01	41.69%	-11.39%	-0.60%
	Grouse	1722.73	99.38%	22470.52	96.74%	502125.54	96.66%	20,747.79	89.32%	500,402.81	96.33%	-7.67%	-0.34%
Total Area Available		**1,733.56**	-	**23,228.22**	-	**519,473.30**	-	**23,228.22**	-	**519,473.30**	-	-	-

Notes:
(1) Refers to the condition prior to mine development.
(2) Refers to the conditions after the mine has been developed for operations (i.e., the removal of the PDA footprint in GIS analysis).
(3) Change in Cover Type is calculated as = ([Condition during Mine Operations – Baseline Condition]/Baseline Condition).
(4) For this species, the Wildlife and Wildlife Habitat Study Area was used. Percentages are based on FRI ecosite coverage of each Study Areas (1,733.56 in the PDA, 23,228.22 ha in the LSA and 519,473.30 ha in the RSA).
(5) For Beaver and Wood Frog, the Wildlife and Wildlife Habitat Study Area was used (HS mapping included OHN waterbody data and FRI ecosites). Percentages are based on total area available in each Study Areas (2,026.33 ha in the PDA, 30,773.41 ha in the LSA and 628,311.38 ha in the RSA).
(6) For this species, the Large Mammal Study Area was used. Percentages are based on FRI ecosite coverage of each Study Areas (1,733.56 in the PDA, 64,520.22 ha in the LSA and 1,666,462.59 ha in the RSA).

Table 6.12-9: Groundwater, Air Quality, Noise Impact Areas on Valued Component and Proxy Species Habitats (HS)

VC	Proxy Species	Operational Impact (Area, in ha) Change in Cover Type(1),(2)														
		Pit Dewatering Drawdown					Air Quality Effects					Noise Threshold Effects				
		Pit Dewatering Drawdown Area	LSA after Drawdown	RSA after Drawdown	LSA % Change	RSA % Change	Air Quality Effects	LSA after Air Effects	RSA after Air Effects	LSA % Change	RSA % Change	Noise Effects(3)	LSA after Noise Effects	RSA After Noise Effects	LSA % Change	RSA % Change
Furbearers	Fisher	332.19	3,993.42	64,083.94	-7.68%	-0.52%	852.98	3,472.64	63,563.15	-19.72%	-1.32%	1,030.59	3,295.02	63,385.54	-23.83%	-1.60%
	Canada Lynx	457.50	21,120.70	391,859.89	-2.12%	-0.12%	1,304.96	20,273.23	391,012.42	-6.05%	-0.33%	2,222.74	19,355.46	390,094.64	-10.30%	-0.57%
	Beaver	930.04	20,954.80	476,597.72	-4.25%	-0.19%	4,346.67	17,538.17	473,181.08	-19.86%	-0.91%	5,229.29	16,655.55	472,298.46	-23.89%	-1.10%
Large mammals	Moose - late winter	574.71	62,693.11	1,595,554.26	-0.91%	-0.04%	1,785.51	61,482.31	1,594,343.46	-2.82%	-0.11%	2,470.47	60,797.34	1,593,658.49	-3.90%	-0.15%
	Moose - foraging	6.94	4,202.98	109,653.04	-0.16%	-0.01%	31.89	4,178.03	109,628.09	-0.76%	-0.03%	49.45	4,160.48	109,610.53	-1.17%	-0.05%
	Wolf	574.71	62,693.11	1,595,554.26	-0.91%	-0.04%	1,785.51	61,482.31	1,594,343.46	-2.82%	-0.11%	2,470.47	60,797.34	1,593,658.49	-3.90%	-0.15%
Herptiles	Wood Frog	717.95	23,457.91	365,351.29	-2.97%	-0.20%	2,863.60	21,312.26	363,205.64	-11.84%	-0.78%	5,207.28	18,968.58	360,861.96	-21.54%	-1.42%
Forest birds	Dark-eyed Junco (proxy for Evening Grosbeak)	0.00	13,649.07	199,508.31	0.00%	0.00%	0.01	13,649.07	199,508.31	<0.1%	<0.1%	103.83	13,545.25	199,404.48	-0.76%	-0.05%
	Red-eyed Vireo	799.32	5,509.42	202,553.39	-12.67%	-0.39%	3,033.06	3,275.69	200,319.65	-48.08%	-1.49%	5,281.05	1,027.70	198,071.66	-83.71%	-2.60%
	Ovenbird	0.00	1.03	144,893.03	0.00%	0.00%	0.00	1.03	144,893.03	0.00%	0.00%	14.10	0.00	144,878.93	-100.00%	-0.01%
Raptors	Great-horned Owl	500.93	10,450.70	151,937.66	-4.57%	-0.33%	1,282.70	9,668.93	151,155.89	-11.71%	-0.84%	1,152.53	9,799.10	151,286.06	-10.52%	-0.76%
	Boreal Owl	523.73	14,315.43	245,461.50	-3.53%	-0.21%	1,363.52	13,475.64	244,621.71	-9.19%	-0.55%	2211.55	0.00	243,773.68	-100.00%	-0.90%
	Osprey	498.65	14,813.52	322,491.50	-3.26%	-0.15%	1,224.82	14,087.35	321,765.34	-8.00%	-0.38%	2,086.07	13,226.10	320,904.08	-13.62%	-0.65%
	American Kestrel	1,219.43	17,499.50	427,157.82	-6.51%	-0.28%	2,983.85	15,735.08	425,393.39	-15.94%	-0.70%	982.54	17,736.39	427,394.70	-5.25%	-0.23%
Shorebirds	Greater Yellowlegs	340.43	11,740.14	253,099.64	-2.82%	-0.13%	951.70	11,128.86	252,488.36	-7.88%	-0.38%	1,297.97	10,782.60	252,142.09	-10.74%	-0.51%
	Wilson's Snipe (proxy for Yellow Rail)	97.80	7,485.28	170,133.58	-1.29%	-0.06%	347.90	7,235.18	169,883.48	-4.59%	-0.20%	510.65	7,072.43	169,720.73	-6.73%	-0.30%
Waterfowl	Mallard	435.97	19,801.87	442,506.48	-2.15%	-0.10%	1,209.79	19,028.05	441,732.67	-5.98%	-0.27%	2,021.54	18,216.30	440,920.92	-9.99%	-0.46%
Bog/Fen, wetland birds	Common Yellowthroat	0.00	0.00	51,869.18	0.00%	0.00%	0.00	0.00	51,869.18	0.00%	0.00%	0.00	0.00	51,869.18	0.00%	0.00%
	Palm Warbler (proxy for Rusty Blackbird)	0.00	7,486.17	252,264.84	0.00%	0.00%	0.00	7,486.17	252,264.84	0.00%	0.00%	89.73	7,396.44	252,175.11	-1.20%	-0.04%
	Northern Waterthrush (proxy forCanada Warbler)	0.00	1,065.96	145,483.78	0.00%	0.00%	0.00	1,065.96	145,483.78	0.00%	0.00%	129.60	936.35	145,354.17	-12.16%	-0.09%
Special Concern species	Common Nighthawk	772.00	19,132.08	291,890.65	-3.88%	-0.26%	2,054.69	17,849.39	290,607.96	-10.32%	-0.70%	2,211.55	17,692.53	290,451.10	-11.11%	-0.76%
	Olive-sided Flycatcher (proxy for Eastern Wood-peewee)	0.00	1,233.29	131,297.64	0.00%	0.00%	0.01	1,233.28	131,297.63	<0.1%	<0.1%	1.06	1,232.23	131,296.57	-0.09%	0.00%
Culturally important species	Bald Eagle	498.65	10,966.35	217,395.08	-4.35%	-0.23%	1,224.82	10,240.19	216,668.91	-10.68%	-0.56%	2,074.79	9,390.21	215,818.94	-18.10%	-0.95%
	Grouse	574.71	21,895.81	521,076.53	-2.56%	-0.11%	1,785.51	20,685.01	519,865.73	-7.95%	-0.34%	2,470.47	20,000.05	519,180.77	-10.99%	-0.47%

Notes:
(1). Refers to the conditions during mine has operations (i.e., the removal of the ZOI footprint in GIS analysis).
(2). Change in Cover Type is calculated as = ([Condition during Mine Operations – Baseline Condition]/Baseline Condition).
(3). Modelled noise impacts encompass the mine site area (MSA) and the mine access road (MAR) from the MSA to the end of Wenasaga Road. The PDA numbers for the MSA are 1,527.9 ha and the portion of the MAR is 183.7 ha. These terrestrial ecosites will be directly lost due to vegetation removal during the construction of the Project. Although not all area within this portion of the PDA is habitat, this loss is qualitatively considered.

Table 6.12-10: PDA Removal on Valued Component Significant Wildlife Habitat

SWH TYPE	Swh Type (Area, In Ha)[1]						Condition During Mine Operations (Area, In Ha)[2]				Change In Cover Type[3]	
	PDA	%	LSA	%	RSA	%	LSA	%	RSA	%	LSA	RSA
Waterfowl stopover and staging	0.00	0.00%	0.00	0.00%	68.93	0.01%	0.0	0.00%	68.93	0.01%	0.00%	0.00%
Colonially nesting bird breeding habitat: tree / shrub	0.00	0.00%	0.00	0.00%	99.99	0.02%	0	0.00%	100	0.02%	0.00%	0.00%
Colonially nesting bird breeding habitat: ground	40.48	2.33%	2024.35	8.72%	34600.00	6.66%	1,984	8.54%	34,560	6.65%	-2.00%	-0.12%
Bat maternity colonies	1388.92	80.12%	16563.20	71.31%	278713.06	53.65%	15,174	65.33%	277,324	53.39%	-8.39%	-0.50%
Bat hibernaculum	0.00	0.00%	55.53	0.24%	84.35	0.02%	55.5	0.24%	84.35	0.02%	0.00%	0.00%
Regionally rare plant species	29.00	1.67%	372.14	1.60%	2379.38	0.46%	343.1	1.48%	2,350.38	0.45%	-7.79%	-1.22%
Wild rice stand	0.00	0.00%	0.00	0.00%	9.65	<0.01%	0.0	0.00%	9.65	0.00%	0.00%	0.00%
Bald Eagle and Osprey nesting habitat	283.74	16.37%	987.37	4.25%	7027.58	1.35%	704	3.03%	6,744	1.30%	-28.74%	-4.04%
Aquatic feeding habitat	0.00	0.00%	7.15	0.03%	227209.20	43.74%	7	0.03%	227,209	43.74%	0.00%	0.00%
Marsh bird breeding habitat	51.98	3.00%	1979.11	8.52%	53321.60	10.26%	1,927	8.30%	53,270	10.25%	-2.63%	-0.10%

Notes:

(1) Refers to the condition prior to mine development.
(2) Refers to the conditions after the mine has been developed for operations (i.e., the removal of the PDA footprint in GIS analysis).
(3) Change in Cover Type is calculated as = ([Condition during Mine Operations – Baseline Condition]/Baseline Condition).
(4) The Wildlife and Wildlife Habitat Study Area was used. Percentages are based on FRI ecosite coverage of each Study Areas (1,733.56 in the PDA, 23,228.22 ha in the LSA and 519,473.30 ha in the RSA).

Table 6.12-11: Groundwater, Air Quality, Noise Impact Areas on Valued Component Significant Wildlife Habitat

SWH TYPE	Operational Impact (Area, In Ha) Change In Cover Type(1),(2)														
	Pit Dewatering Drawdown					Air Quality Effects					Noise Effects				
	Pit Dewatering Drawdown Area	LSA After Drawdown	RSA After Drawdown	LSA % Change	RSA % Change	Air Quality Effects	LSA After Air Effects	RSA After Air Effects	LSA % Change	RSA % Change	Noise Effects	LSA After Noise Effects	RSA After Noise Effects	LSA % Change	RSA % Change
Waterfowl stopover and staging	68.93	0.00	0.00	0.00	0.00	0.00	0.00	68.93	0.00	0.00	0.00	0.00	68.93	0.00	0.00
Colonially Nesting Bird Breeding Habitat: Tree / Shrub	0.00	0.00	99.99	0.00	0.00	0.00	0.00	99.99	0.00	0.00	0.00	0.00	99.99	0.00	0.00
Colonially Nesting Bird Breeding Habitat: Ground	0.00	2,024.35	34,600.00	0.00	0.00	0.00	2,024.35	34,600.00	0.00	0.00	0.00	2,024.35	34,600.00	0.00	0.00
Bat Maternity Colonies	453.54	16,109.66	278,259.52	-0.03	0.00	1,236.20	15,327.00	277,476.85	-0.07	0.00	2,115.44	14,447.76	276,597.62	-0.13	-0.01
Bat Hibernaculum	0.00	55.53	84.35	0.00	0.00	0.00	55.53	84.35	0.00	0.00	0.00	55.53	84.35	0.00	0.00
Wild Rice Stand	9.65	0.00	0.00	0.00	0.00	0.00	0.00	9.65	0.00	0.00	0.00	0.00	9.65	0.00	0.00
Regional Rare Plant Species	15.33	356.82	2,364.05	-0.04	-0.01	19.34	352.80	2,360.04	-0.05	-0.01	N/A	N/A	N/A	N/A	N/A
Bald Eagle and Osprey Nesting Habitat	172.34	815.03	6,855.25	-0.17	-0.02	336.50	650.86	6,691.08	-0.34	-0.05	478.43	508.93	6,549.15	-0.48	-0.07
Aquatic Feeding Habitat	0.00	7.15	227,209.20	0.00	0.00	0.00	7.15	227,209.20	0.00	0.00	0.00	7.15	227,209.20	0.00	0.00
Marsh Bird Breeding Habitat	6.94	1,972.17	53,314.66	0.00	0.00	27.27	1,951.84	53,294.34	-0.01	0.00	51.32	1,927.79	53,270.29	-0.03	0.00

Notes:
1. Refers to the conditions after the mine has been developed for operations (i.e., the removal of the ZOI footprint in GIS analysis).
2. Change in Cover Type is calculated as = ([Condition during Mine Operations – Baseline Condition]/Baseline Condition).

Table 6.12-12: PDA Removal on Bird Density

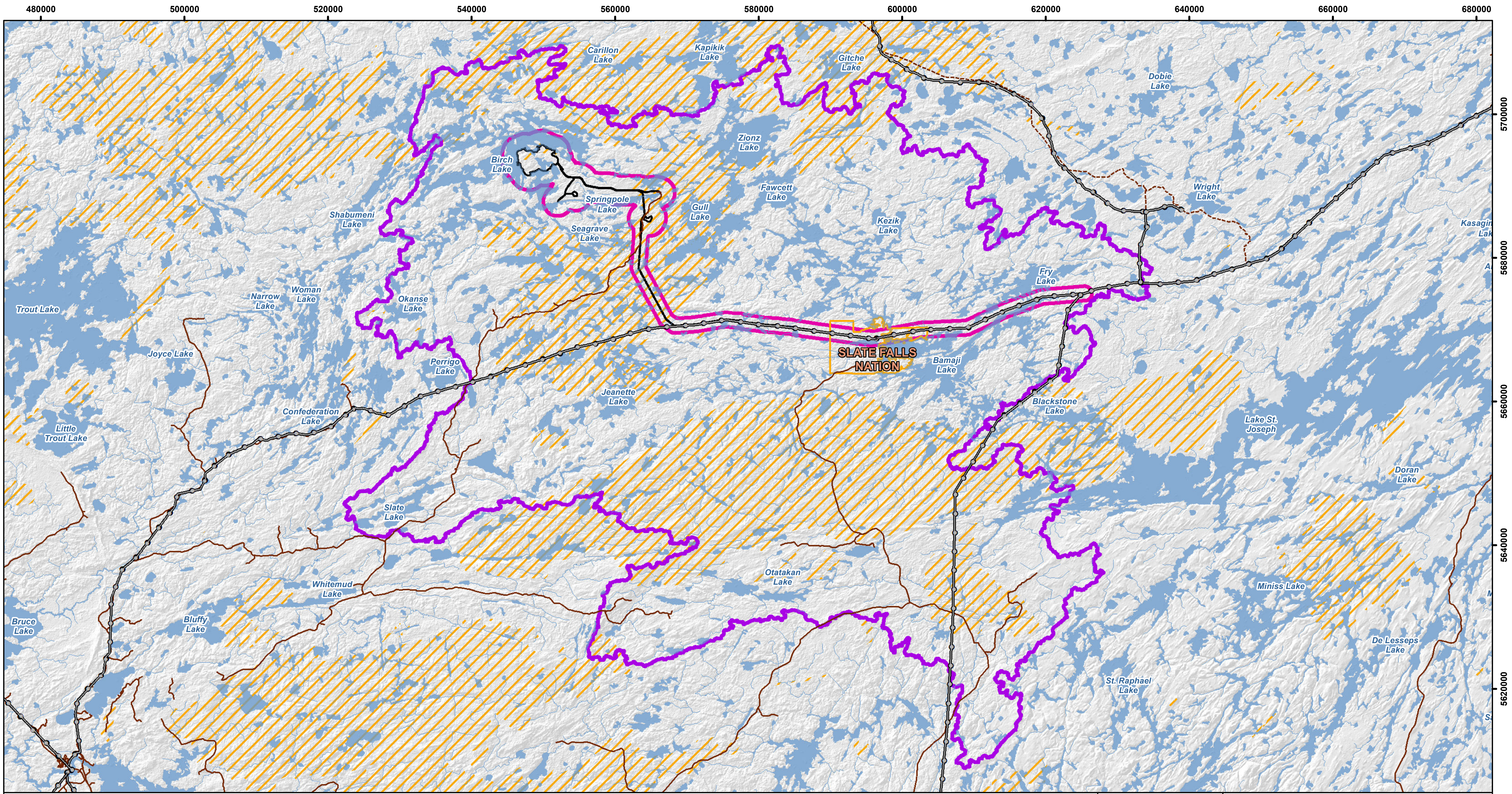
Species	Species Density (number of individuals) [1]			Species Density during Mine Operation (number of individuals) [2]		Change in Density	
	PDA	LSA	RSA	LSA	RSA	LSA	RSA
Common Yellowthroat	41.43	1,052.96	21,220.13	1,011.53	21,178.70	-3.93%	-0.20%
Dark-eyed Junco	1,895.79	33,899.02	746,156.65	32,003.22	744,260.86	-5.59%	-0.25%
Greater Yellowlegs	10.54	204.34	5,023.75	193.80	5,013.21	-5.16%	-0.21%
Nashville Warbler	2,787.84	45,393.79	977,184.72	42,605.96	974,396.88	-6.14%	-0.29%
Olive-sided Flycatcher	16.87	336.82	7,979.11	319.95	7,962.24	-5.01%	-0.21%
Ovenbird	23.66	229.67	4,097.53	206.02	4,073.87	-10.30%	-0.58%
Palm Warbler	594.92	15,025.83	318,479.10	14,430.91	317,884.18	-3.96%	-0.19%
Ruby-crowned Kinglet	3,329.17	54,540.01	1,159,558.08	51,210.84	1,156,228.91	-6.10%	-0.29%
Red-eyed Vireo	109.24	1,959.75	37,413.84	1,850.51	37,304.60	-5.57%	-0.29%
White-throated Sparrow	1,870.68	32,125.43	654,396.31	30,254.74	652,525.63	-5.82%	-0.29%

Notes:
(1) Refers to the condition prior to mine development.
(2) Refers to the conditions after the mine has been developed for operations (i.e., the removal of the PDA footprint in GIS analysis).
(3) Change in Density is calculated as = ([Species Density during Mine Operation – Species Density]/ Species Density).

Table 6.12-13: Groundwater, Air Quality, Noise Impact Areas on on Bird Density

Species	Operational Impact Change in Density[(1),(2)]														
	Pit Dewatering Drawdown Area	LSA after Drawdown	RSA after Drawdown	LSA % Change	RSA % Change	Air Quality Effects	LSA after Air Effects	RSA after Air Effects	LSA % Change	RSA % Change	Noise Effects	LSA after Noise Effects	RSA After Noise Effects	LSA % Change	RSA % Change
Common Yellowthroat	17.80	1,035.17	21,202.34	-1.69%	**-0.08%**	135.24	917.72	21,084.89	-12.84%	**-0.64%**	292.35	760.61	20,927.78	-27.76%	**-1.38%**
Dark-eyed Junco	633.13	33,265.88	745,523.52	-1.87%	**-0.08%**	2,837.52	31,061.50	743,319.13	-8.37%	**-0.38%**	5703.17	28,195.85	740,453.48	-16.82%	**-0.76%**
Greater Yellowlegs	3.18	201.15	5,020.57	-1.56%	**-0.06%**	12.02	192.32	5,011.73	-5.88%	**-0.24%**	22.26	182.08	5,001.49	-10.89%	**-0.44%**
Nashville Warbler	1,040.16	44,353.63	976,144.56	-2.29%	**-0.11%**	3,972.96	41,420.83	973,211.76	-8.75%	**-0.41%**	7580.71	37,813.09	969,604.01	-16.70%	**-0.78%**
Olive-sided Flycatcher	4.91	331.91	7,974.19	-1.46%	**-0.06%**	18.95	317.87	7,960.15	-5.63%	**-0.24%**	35.83	300.99	7,943.28	-10.64%	**-0.45%**
Ovenbird	15.86	213.82	4,081.67	-6.90%	**-0.39%**	37.51	192.17	4,060.02	-16.33%	**-0.92%**	63.02	166.65	4,034.51	-27.44%	**-1.54%**
Palm Warbler	244.37	14,781.46	318,234.73	-1.63%	**-0.08%**	1,876.69	13,149.13	316,602.41	-12.49%	**-0.59%**	4047.21	10,978.61	314,431.89	-26.94%	**-1.27%**
Ruby-crowned Kinglet	1,225.90	53,314.10	1,158,332.17	-2.25%	**-0.11%**	4,888.16	49,651.84	1,154,669.92	-8.96%	**-0.42%**	9442.70	45,097.31	1,150,115.38	-17.31%	**-0.81%**
Red-eyed Vireo	49.17	1,910.58	37,364.67	-2.51%	**-0.13%**	267.81	1,691.94	37,146.03	-13.67%	**-0.72%**	544.62	1,415.13	36,869.22	-27.79%	**-1.46%**
White-throated Sparrow	846.62	31,278.81	653,549.69	-2.64%	**-0.13%**	3,811.47	28,313.96	650,584.84	-11.86%	**-0.58%**	7545.84	24,579.59	646,850.47	-23.49%	**-1.15%**

Notes:
1. Refers to the conditions (number of individuals) after the mine has been developed for operations (i.e., the removal of the ZOI footprint in GIS analysis).
2. Change in Density is calculated as = ([Species Density during Mine Operation – Species Density]/ Species Density).



LEGEND

- Proposed Mine Feature
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Fire Disturbance Burn Area
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Fire disturbance burn areas extracted from Ontario GeoHub (Land Information Ontario, 2023)

Datum: NAD83
Projection: UTM Zone 15N

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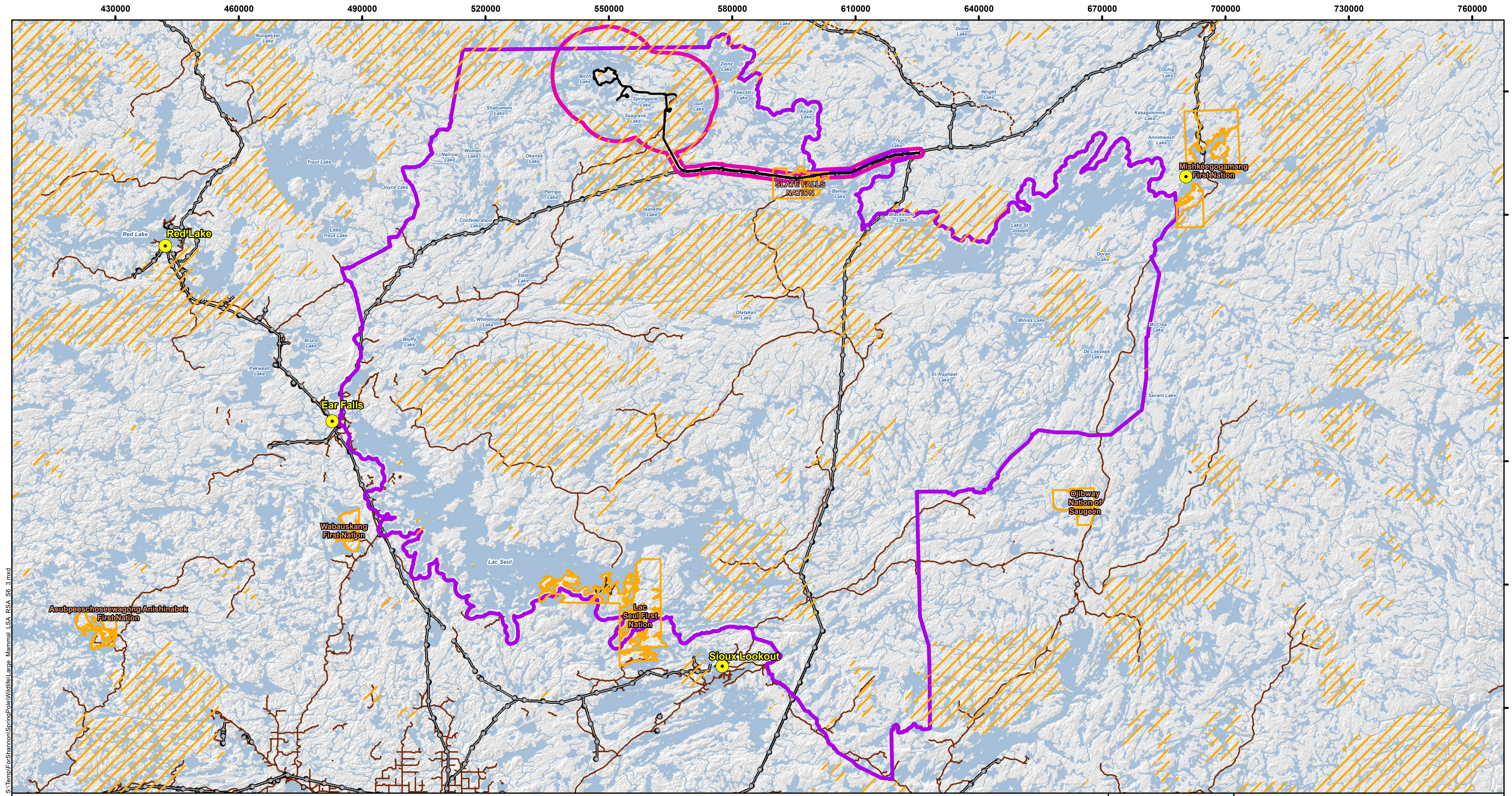
SPRINGPOLE GOLD PROJECT

Local and Regional Study Areas for Wildlife and Wildlife Habitat

PROJECT Nº: ONS2104	FIGURE: 6.12-1
SCALE: 1:500,000	DATE: May 2024



LEGEND

- Project Development Area
- Local Study Area for Large Mammals
- Regional Study Area for Large Mammals
- Town
- First Nation Reserve
- Fire Disturbance Burn Area
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Waterbody

0 12.5 25 50 75 100 125 150 175 200 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Fire disturbance burn areas extracted from Ontario GeoHub (Land Information Ontario, 2023)

Datum: NAD83
Projection: UTM Zone 15N

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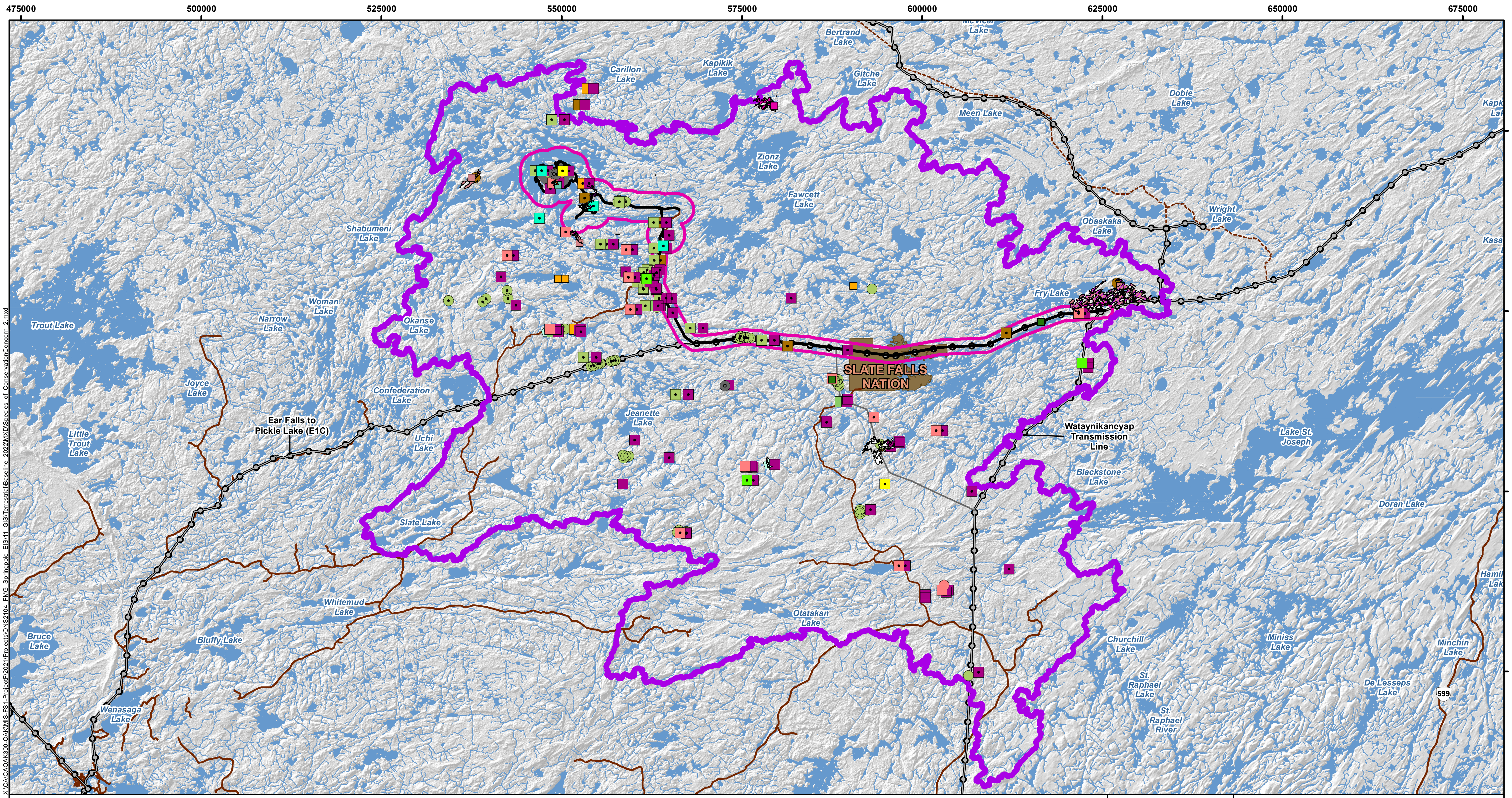
SPRINGPOLE GOLD PROJECT

Local and Regional Study Areas for Large Mammals

PROJECT N^{o}: ONS2104	**FIGURE: 6.12-2**
SCALE: 1:875,000	DATE: May 2024



LEGEND

- Proposed Mine Features
- PDA
- Wildlife Regional Study Area
- Wildlife Local Study Area
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- First Nation Reserve
- Watercourse
- Waterbody

Species of Conservation Concern Observations/Habitat

Birds

- Barn Swallow (BBS, WSP 2021)
- Barn Swallow (BBS, WSP 2022)
- Canada Warbler (ARU, 2021)
- Canada Warbler (ARU, 2022)
- Canada Warbler (BBS, WSP 2021)
- Common Nighthawk (ARU, WSP 2021)
- Common Nighthawk (ARU, WSP 2022)
- Eastern Wood-pewee (Bird ARU, WSP 2021)
- Eastern Wood-pewee (Bird ARU, WSP 2022)
- Evening Grosbeak (ARU, 2021)
- Evening Grosbeak (ARU, 2022)
- Evening Grosbeak (Incidental, WSP 2022)
- Olive-sided Flycatcher (ARU, WSP 2021)
- Olive-sided Flycatcher (ARU, WSP 2022)
- Olive-sided Flycatcher (BBS, WSP 2021)
- Olive-sided Flycatcher (BBS, WSP 2022)
- Peregrine Falcon (ARU, WSP 2022)
- Rusty Blackbird (ARU, WSP 2021)
- Rusty Blackbird (ARU, WSP 2022)
- Rusty Blackbird (BBS, WSP 2021)
- Rusty Blackbird (Incidental, WSP 2022)
- Yellow Rail (ARU, WSP 2022)
- Barn Swallow Habitat
- Evening Grosbeak Habitat

Flora

- Alpine Woodsia Habitat
- Nahanni Oak Fern Habitat
- Red Dung Moss Habitat
- Smooth Margin Nitrogen Moss Habitat
- Northern Marsh Violet Habitat
- Yellow Dung Moss / Cruet Dung Moss
- Small Yellow Pond Lilly
- Floating Marsh Marigold Habitat

Insects

- Old World Swallowtail
- Subarctic Darner
- Old World Swallowtail Habitat
- Subarctic Darner Habitat

0 10 20 40 60 80 100 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- BBS = Breeding Bird Survey and ARU = Bird Automatic Recording Unit

Datum: NAD83
Projection: UTM Zone 15N

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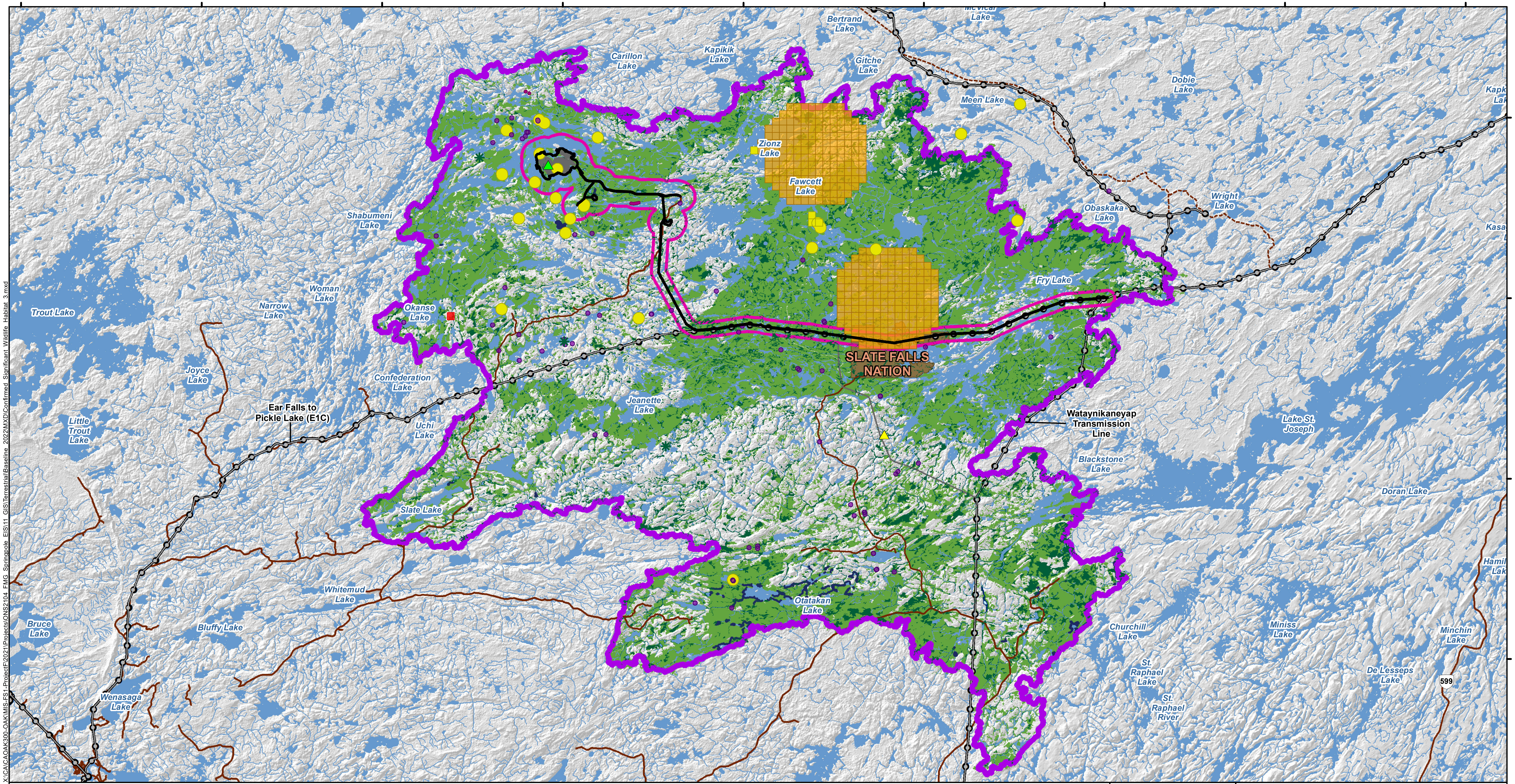
SPRINGPOLE GOLD PROJECT

Species of Conservation Concern

PROJECT Nº: ONS2104	FIGURE: 6.12-3
SCALE: 1:500,000	DATE: July 2024



LEGEND

- Proposed Mine Features
- PDA
- Wildlife Local Study Area
- Wildlife Regional Study Area
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- First Nation Reserve
- Watercourse
- Waterbody

Observations

- Bonaparte's Gull Colony (DST, 2012)
- Bonaparte's Gull Nests (Wood, 2021)

Significant Wildlife Habitat within the Wildlife Regional Study Area

- Aquatic Feeding Habitat
- Colonially Nesting Bird Breeding Habitat: Ground (NHIC Square)
- Colonially Nesting Bird Breeding Habitat: Tree/Shrub (NHIC Square)
- Eagle Habitat
- Osprey Habitat
- Marsh Bird Breeding Habitat
- Bat Maternity Colony Habitat
- Bat Hibernaculum
- Waterfowl Stopover and Staging
- Wild Rice Stand

0 10 20 40 60 80 100 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.

Datum: NAD83
Projection: UTM Zone 15N

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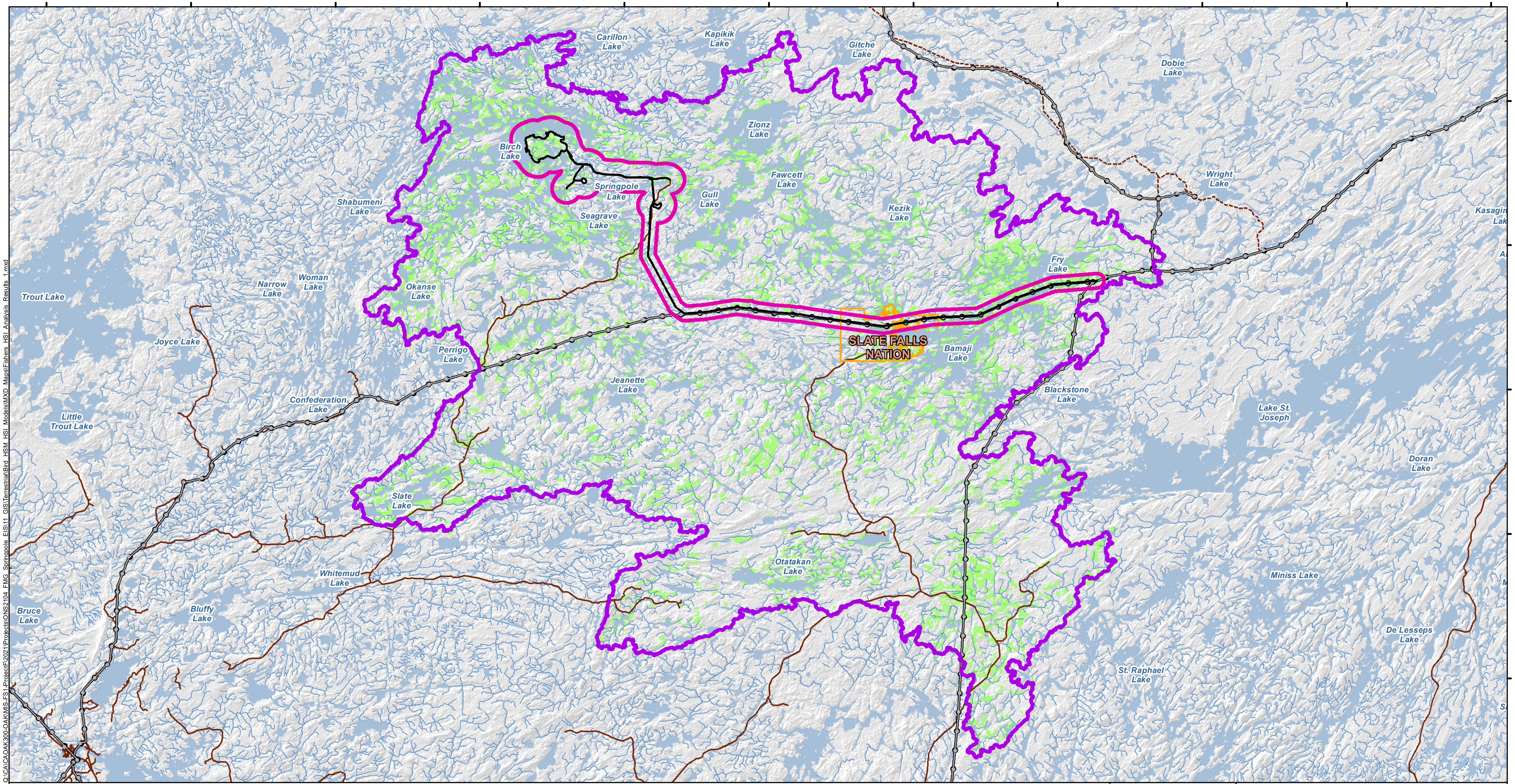
SPRINGPOLE GOLD PROJECT

Significant Wildlife Habitat

PROJECT Nº: ONS2104	**FIGURE: 6.12-4**
SCALE: 1:500,000	DATE: July 2024



LEGEND

- Fisher - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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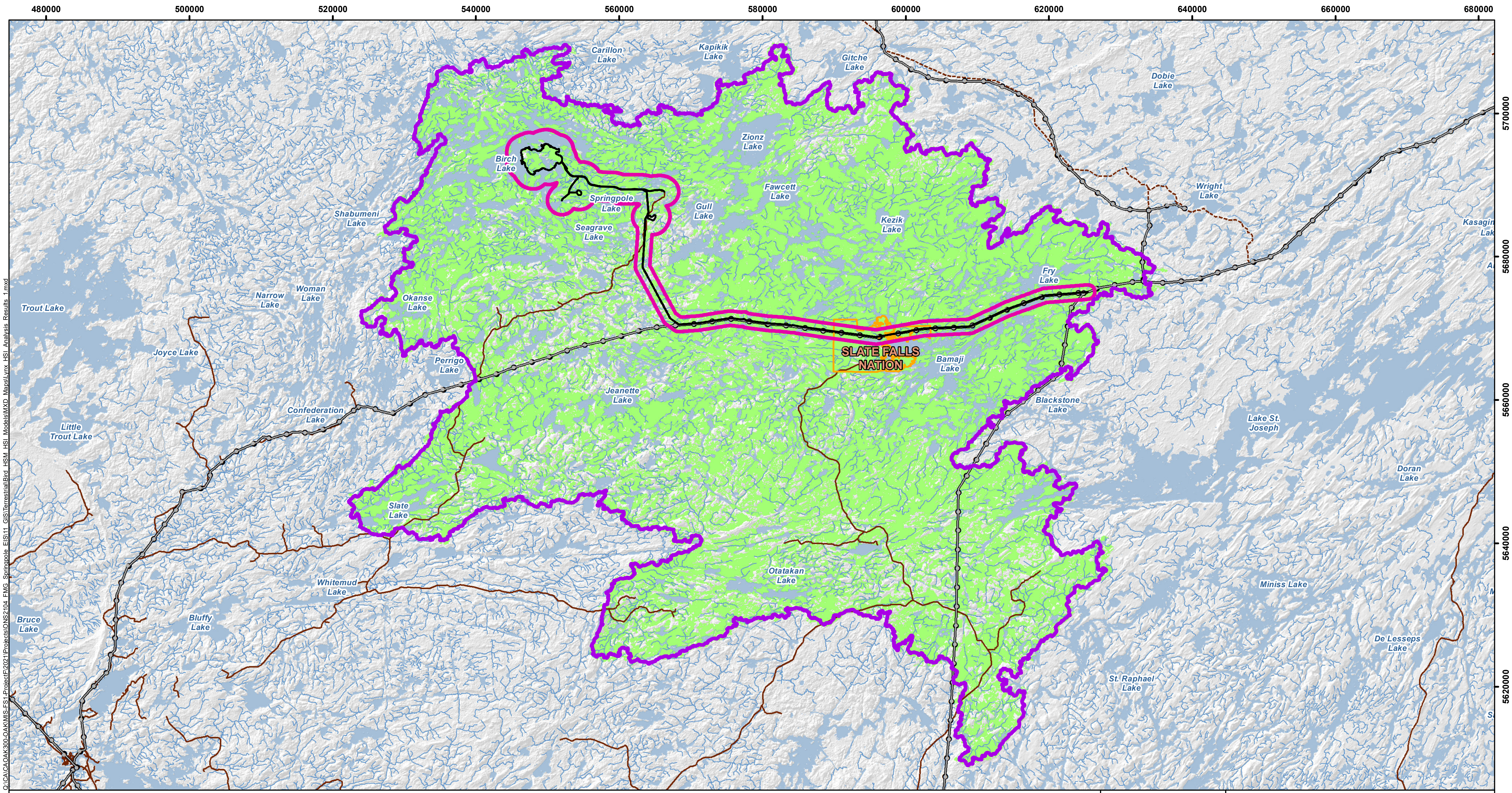
SPRINGPOLE GOLD PROJECT

Fishers Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Lynx - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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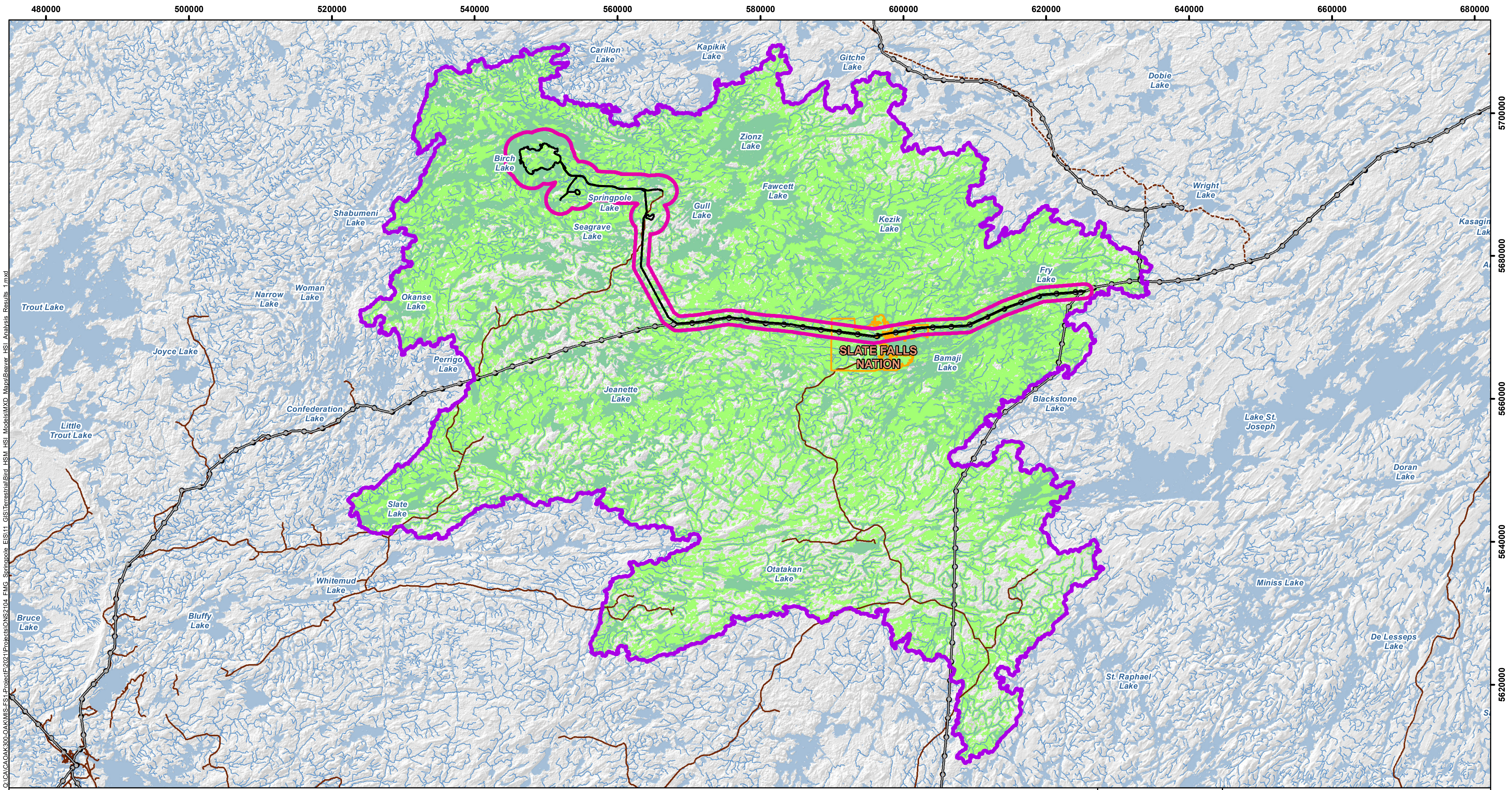
SPRINGPOLE GOLD PROJECT

Lynx Suitability Analysis Results Summary Map

PROJECT Nº: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Beaver - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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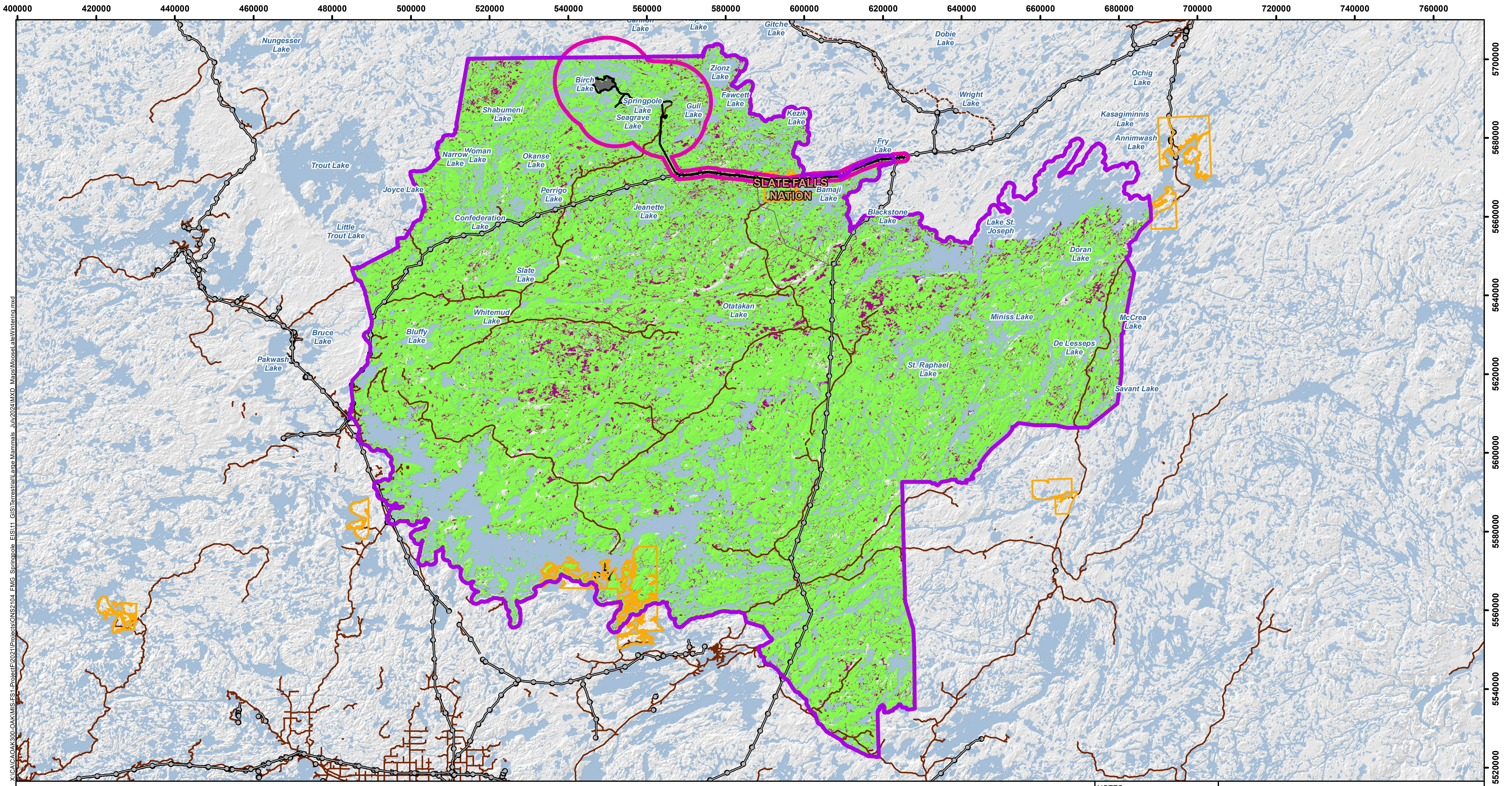
SPRINGPOLE GOLD PROJECT

Beaver Suitability Analysis Results Summary Map

PROJECT Nº: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



X:\CA\CAOAK300-OAK\MIS-FS1-ProjectF\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\Terrestrial\Large Mammals_July2024\MXD_Maps\MooseLateWintering.mxd

LEGEND

- Moose Late Wintering - Moderate to High Habitat Sustainability Area
- Moose Foraging - Moderate to High Habitat Sustainability Area
- Project Development Area
- Local Study Area for Large Mammals
- Regional Study Area for Large Mammals
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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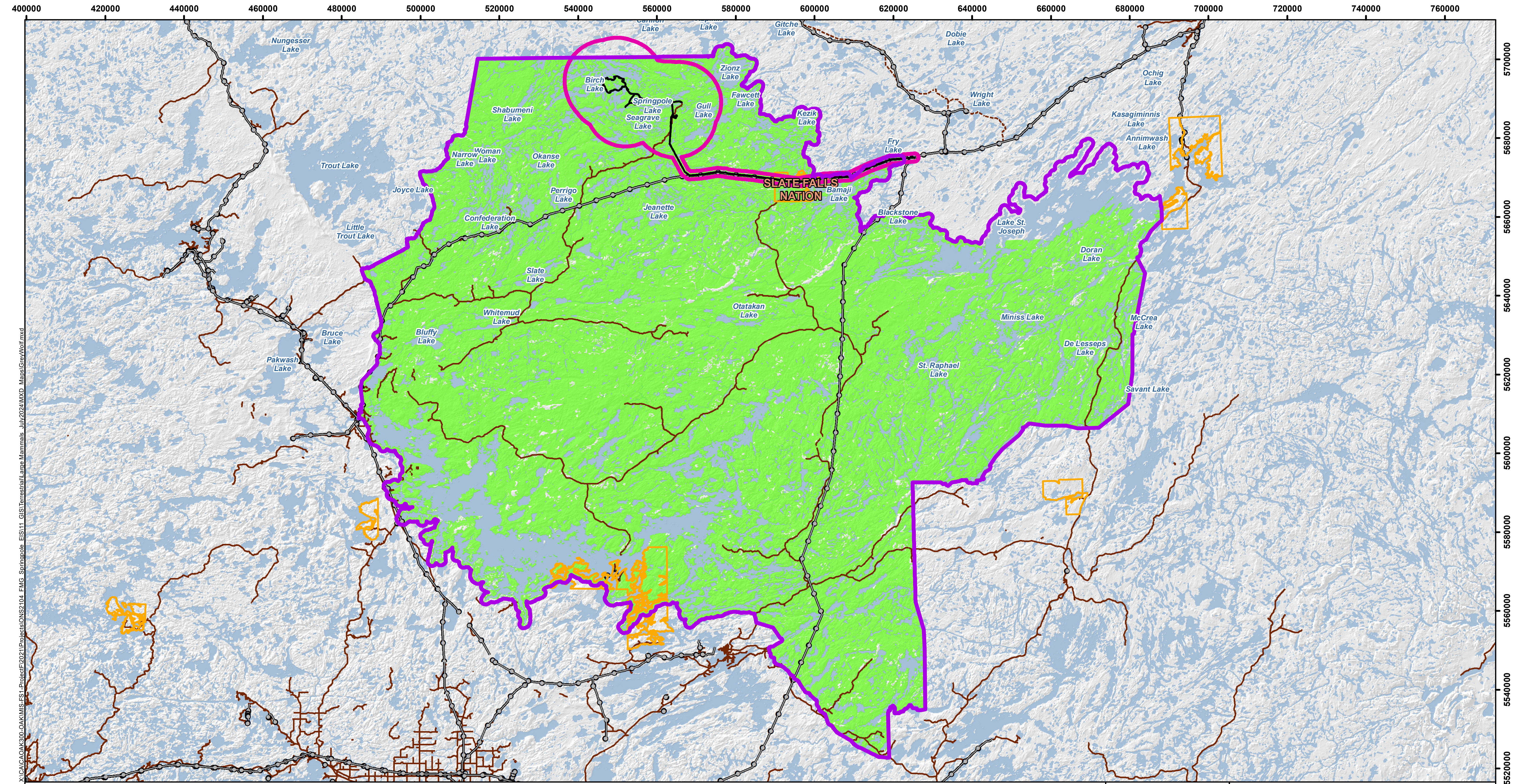
Moose - Late Winter and Foraging Suitability Analysis Results Summary Map

PROJECT Nº: ONS2104	FIGURE:
SCALE: 1:900,000	DATE: July 2024



LEGEND

- Grey Wolf - Moderate to High Habitat Sustainability Area
- Project Development Area
- Local Study Area for Large Mammals
- Regional Study Area for Large Mammals
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

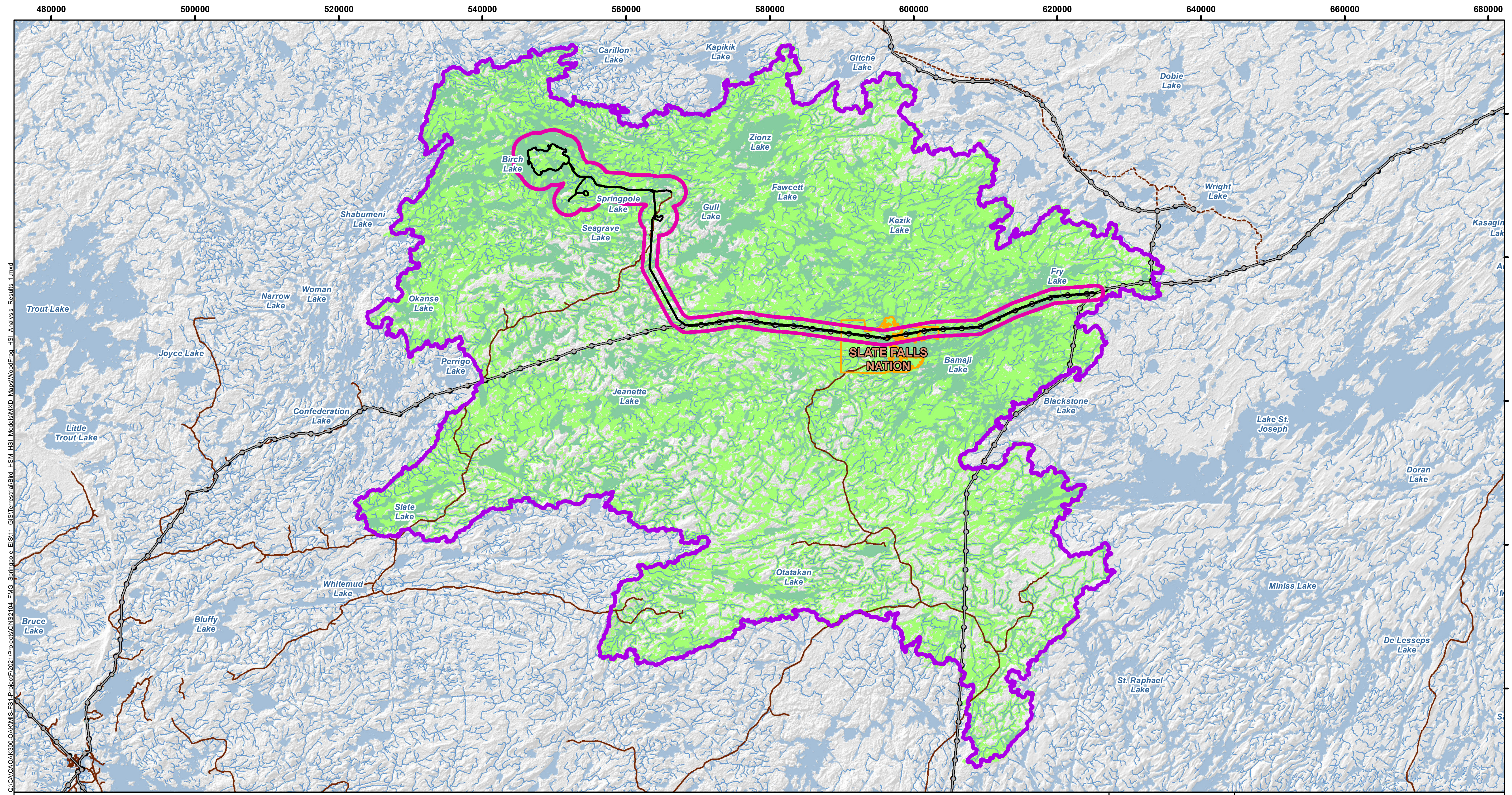
Grey Wolf Suitability Analysis Results Summary Map

PROJECT Nº: ONS2104

FIGURE:

SCALE: 1:900,000

DATE: July 2024



LEGEND

- Wood Frog - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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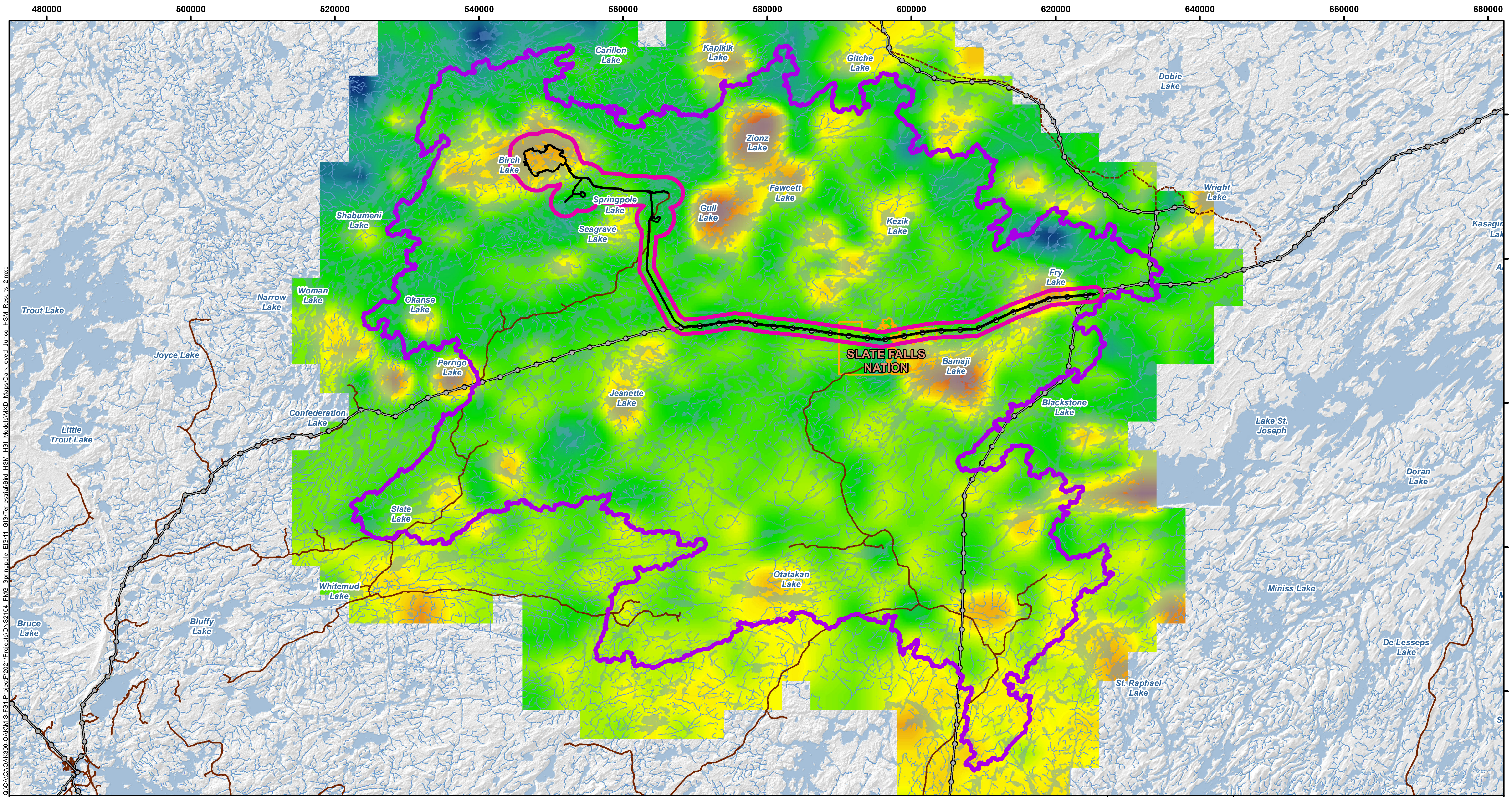
SPRINGPOLE GOLD PROJECT

Wood Frog Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Dark-eyed Junco – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability: 0 %

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

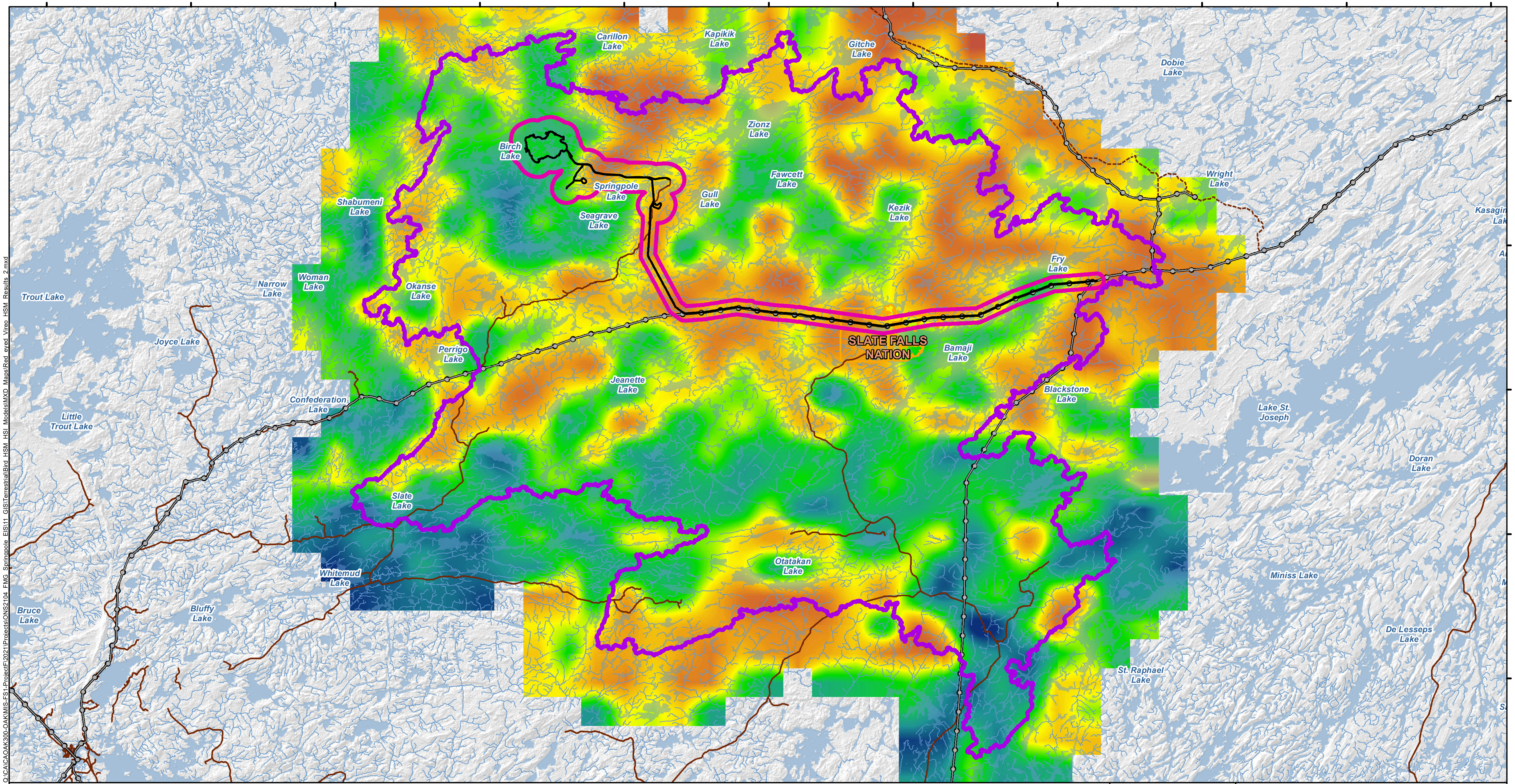
Dark-eyed Junco Habitat Suitability Model Results Summary Map

PROJECT N°: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: June 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Red-eyed Vireo – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability : 0 %

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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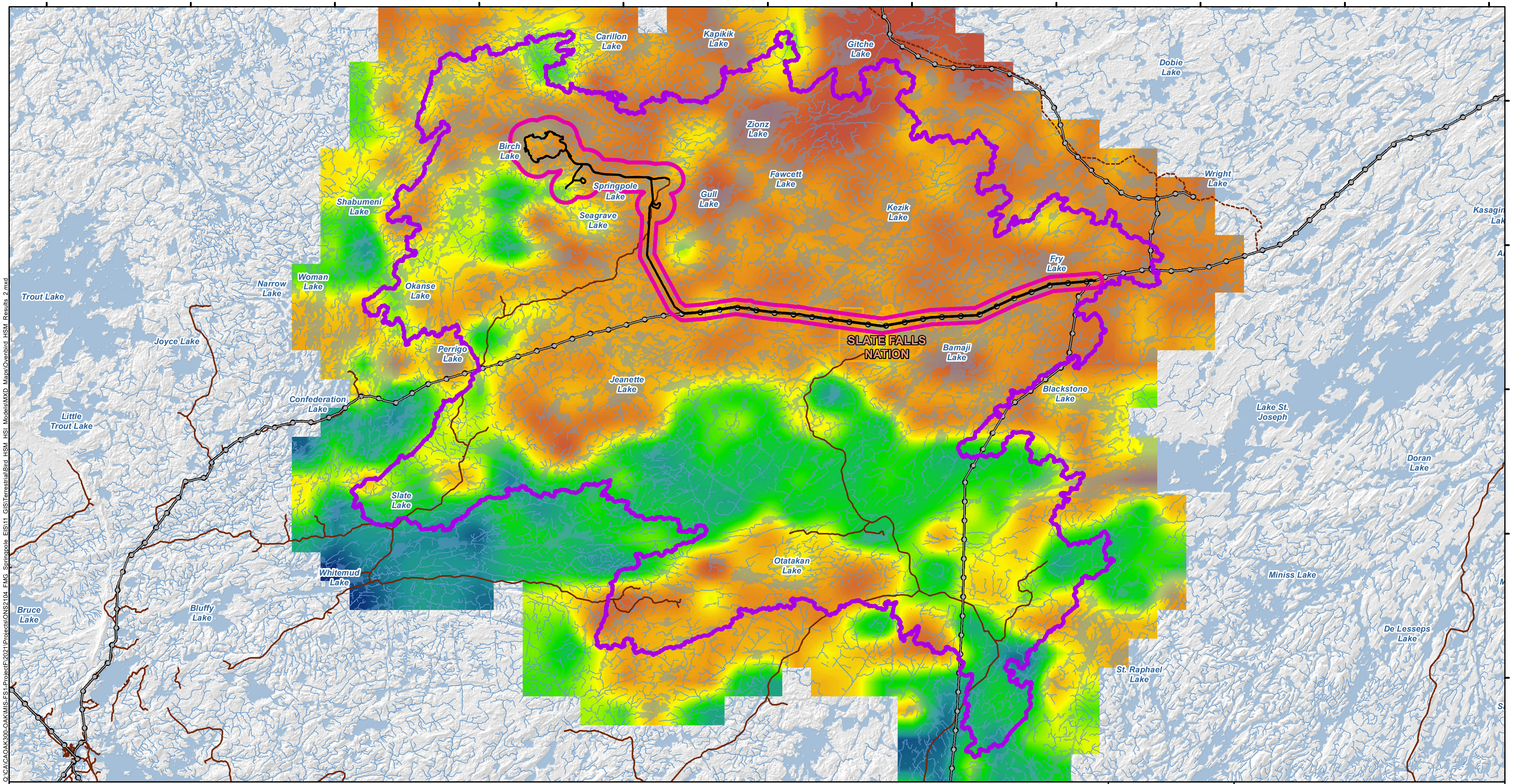
SPRINGPOLE GOLD PROJECT

Red-eyed Vireo Habitat Suitability Model Results Summary Map

PROJECT N°: ONS2104	**FIGURE:**
SCALE: 1:500,000	DATE: June 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Ovenbird – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability : 0 %

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

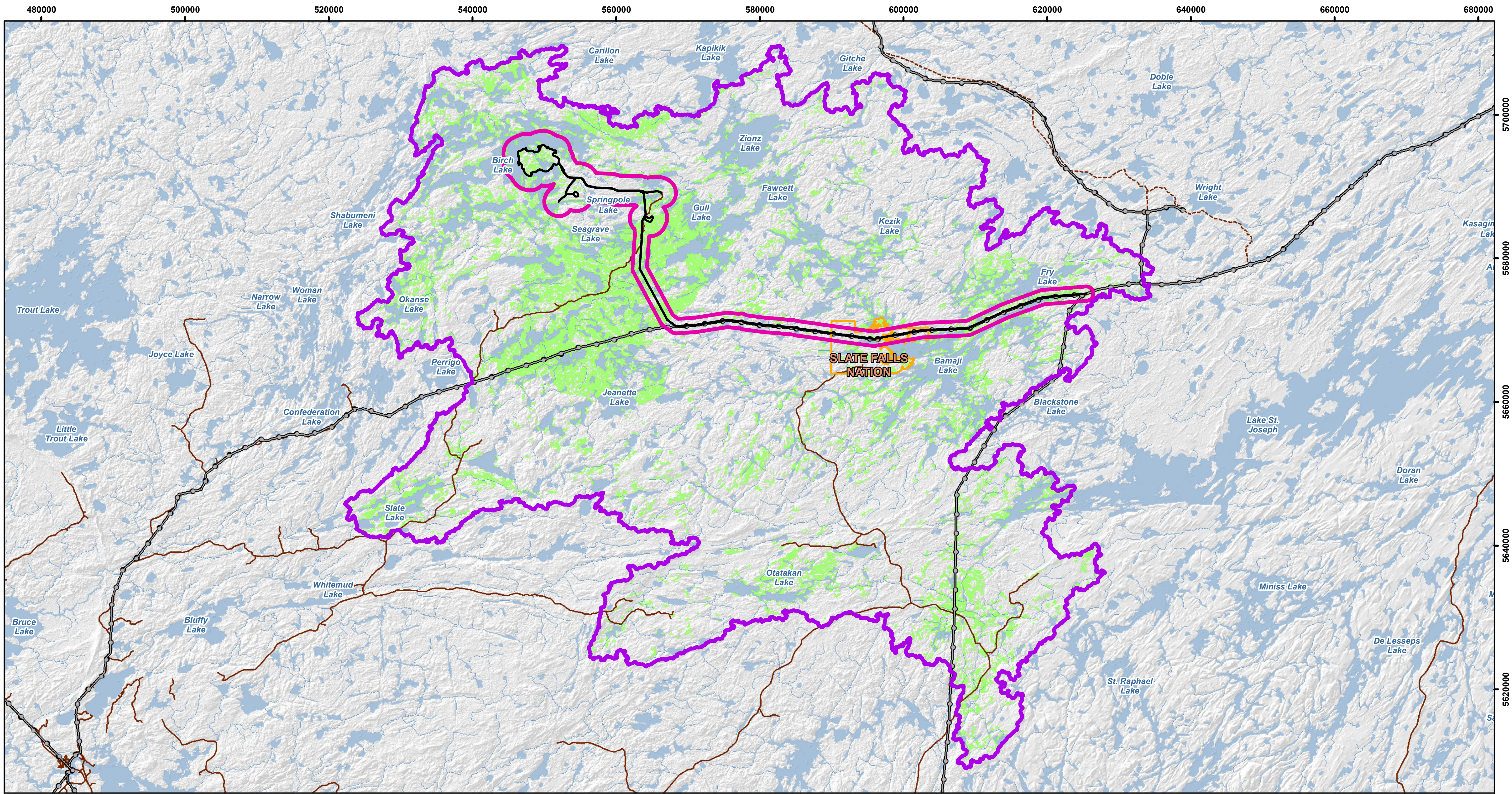
Ovenbird Habitat Suitability Model Results Summary Map

PROJECT N°: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: June 2024



LEGEND

- Great Horned Owl - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

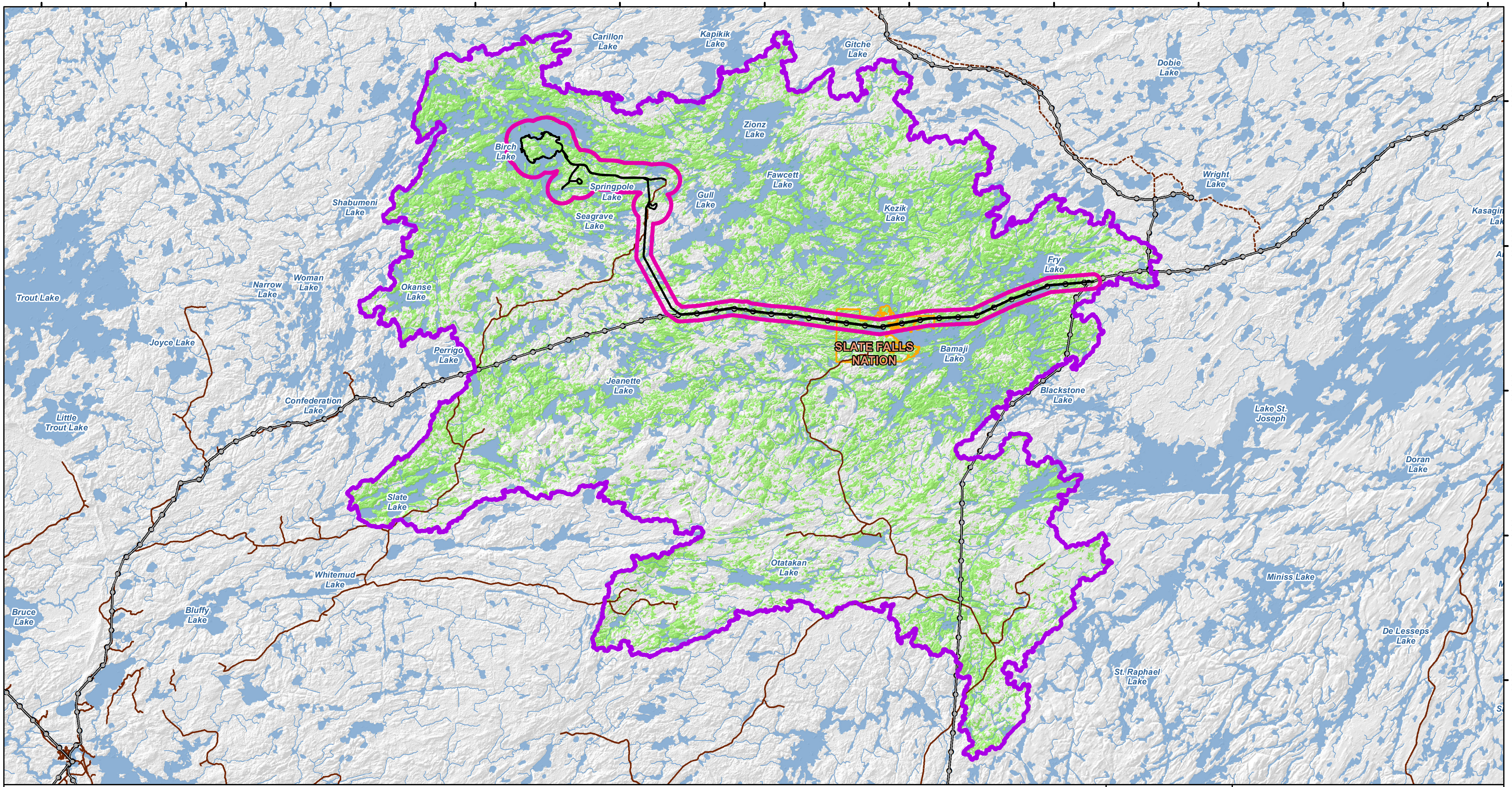
Great Horned Owl Suitability Analysis Results Summary Map

PROJECT Nº: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: April 2024



LEGEND

- Boreal Owl - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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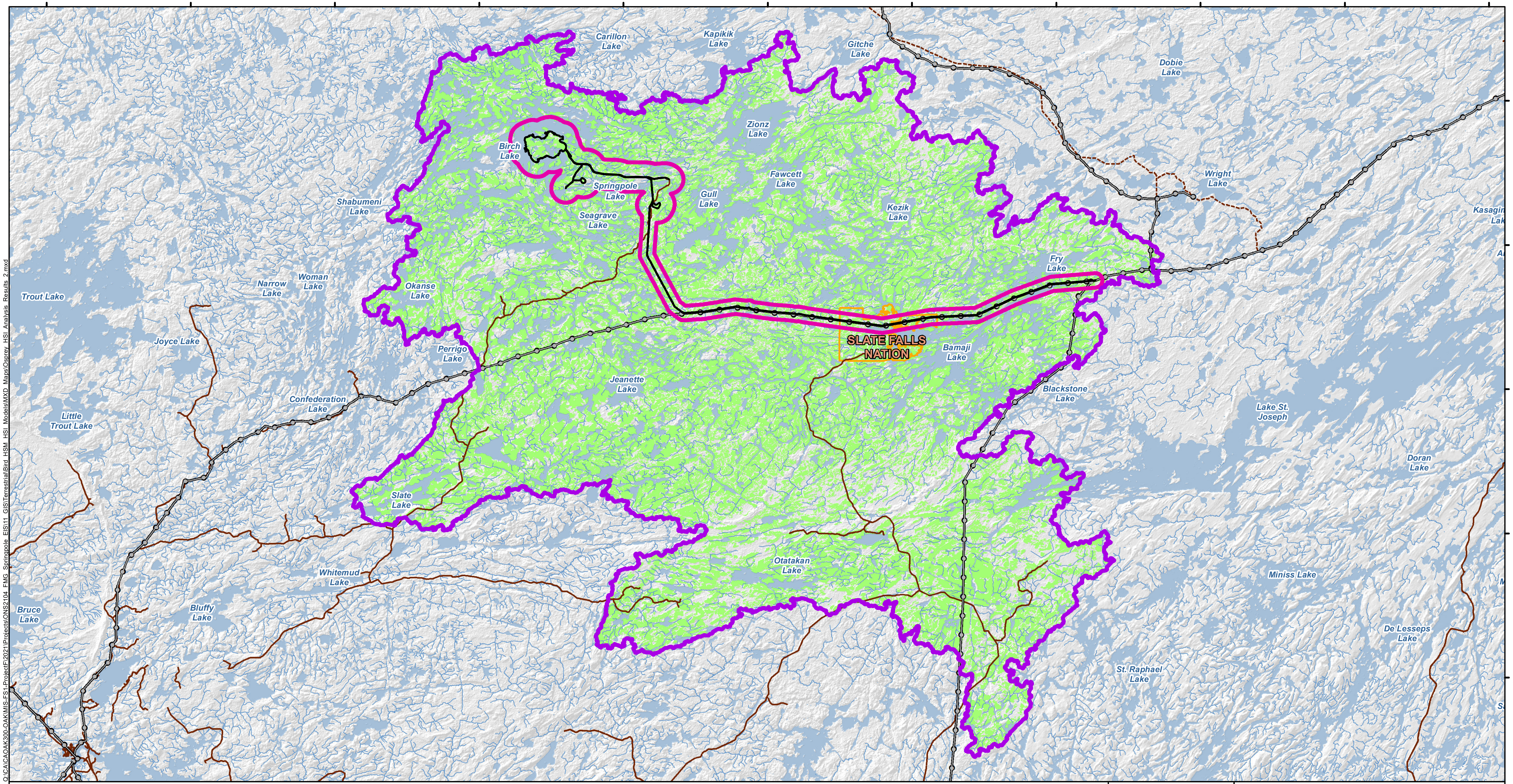
SPRINGPOLE GOLD PROJECT

Boreal Owl Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Osprey - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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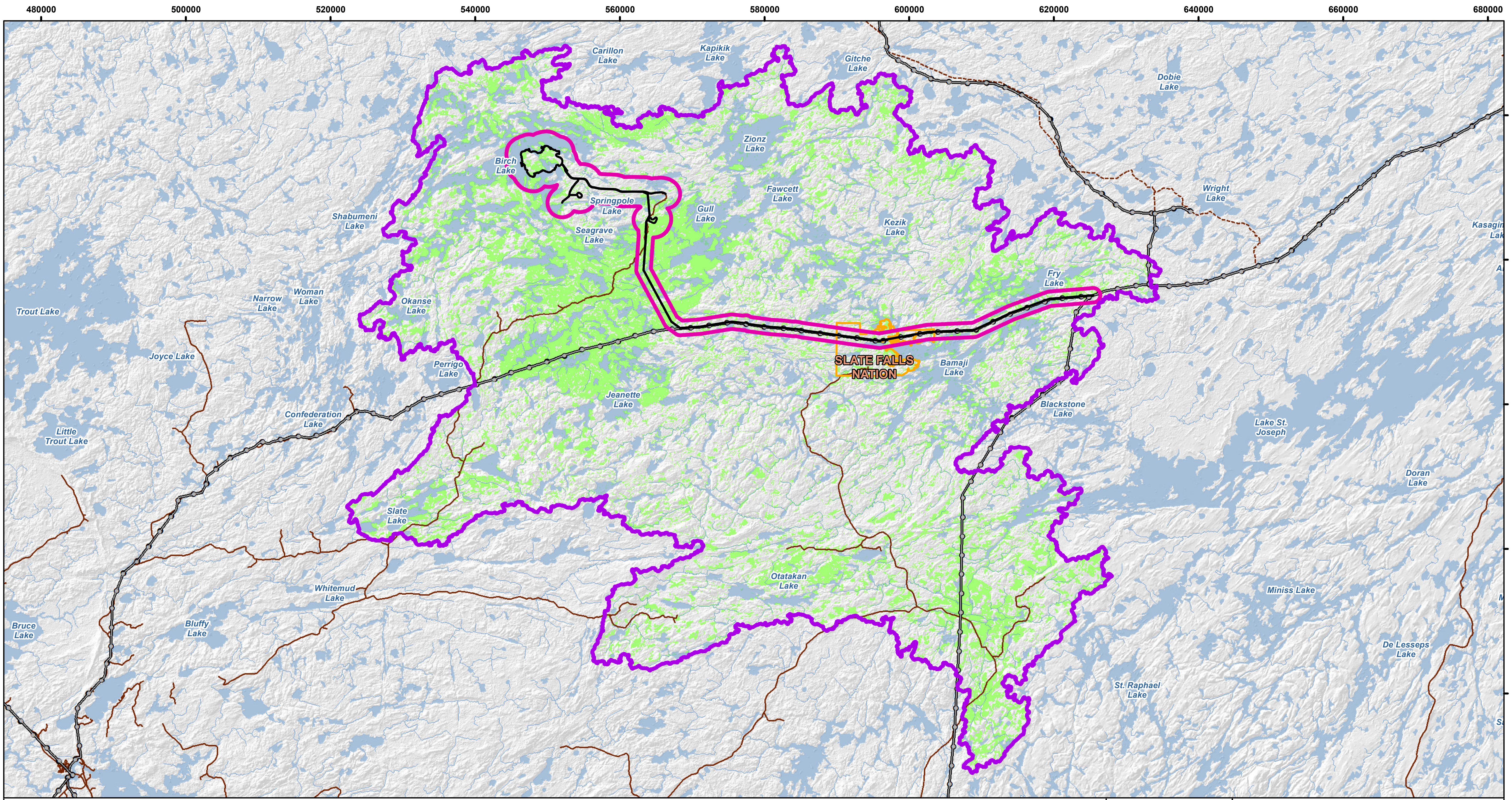
SPRINGPOLE GOLD PROJECT

Osprey Habitat Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: June 2024



LEGEND

- American Kestrel - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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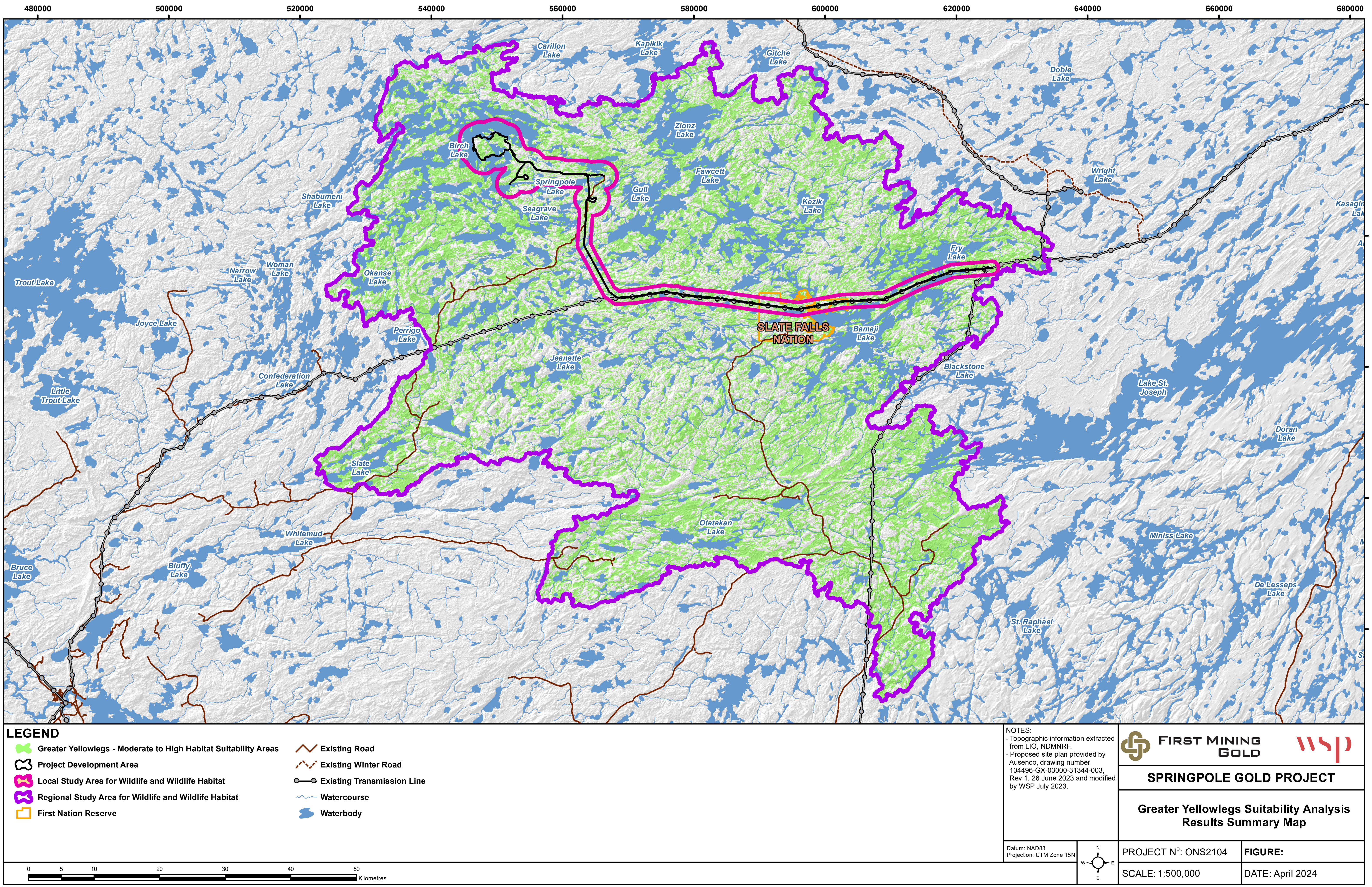
SPRINGPOLE GOLD PROJECT

American Kestrel Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



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5620000
Carillon Lake
Kapikik Lake
Gitche Lake
Dobie Lake
Zionz Lake
Birch Lake
Springpole Lake
Gull Lake
Fawcett Lake
Wright Lake
Shabumeni Lake
Seagrave Lake
Kezik Lake
Kasagir Lak
Fry Lake
Trout Lake
Narrow Lake
Woman Lake
Okanse Lake
SLATE FALLS NATION
Joyce Lake
Perrigo Lake
Bamaji Lake
Jeanette Lake
Blackstone Lake
Confederation Lake
Little Trout Lake
Lake St. Joseph
Doran Lake
Slate Lake
Otatakan Lake
Whitemud Lake
Miniss Lake
Bruce Lake
Bluffy Lake
De Lesseps Lake
St. Raphael Lake
LEGEND
Greater Yellowlegs - Moderate to High Habitat Suitability Areas
Project Development Area
Local Study Area for Wildlife and Wildlife Habitat
Regional Study Area for Wildlife and Wildlife Habitat
First Nation Reserve
Existing Road
Existing Winter Road
Existing Transmission Line
Watercourse
Waterbody
0 5 10 20 30 40 50 Kilometres
NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
Datum: NAD83
Projection: UTM Zone 15N
N W E S
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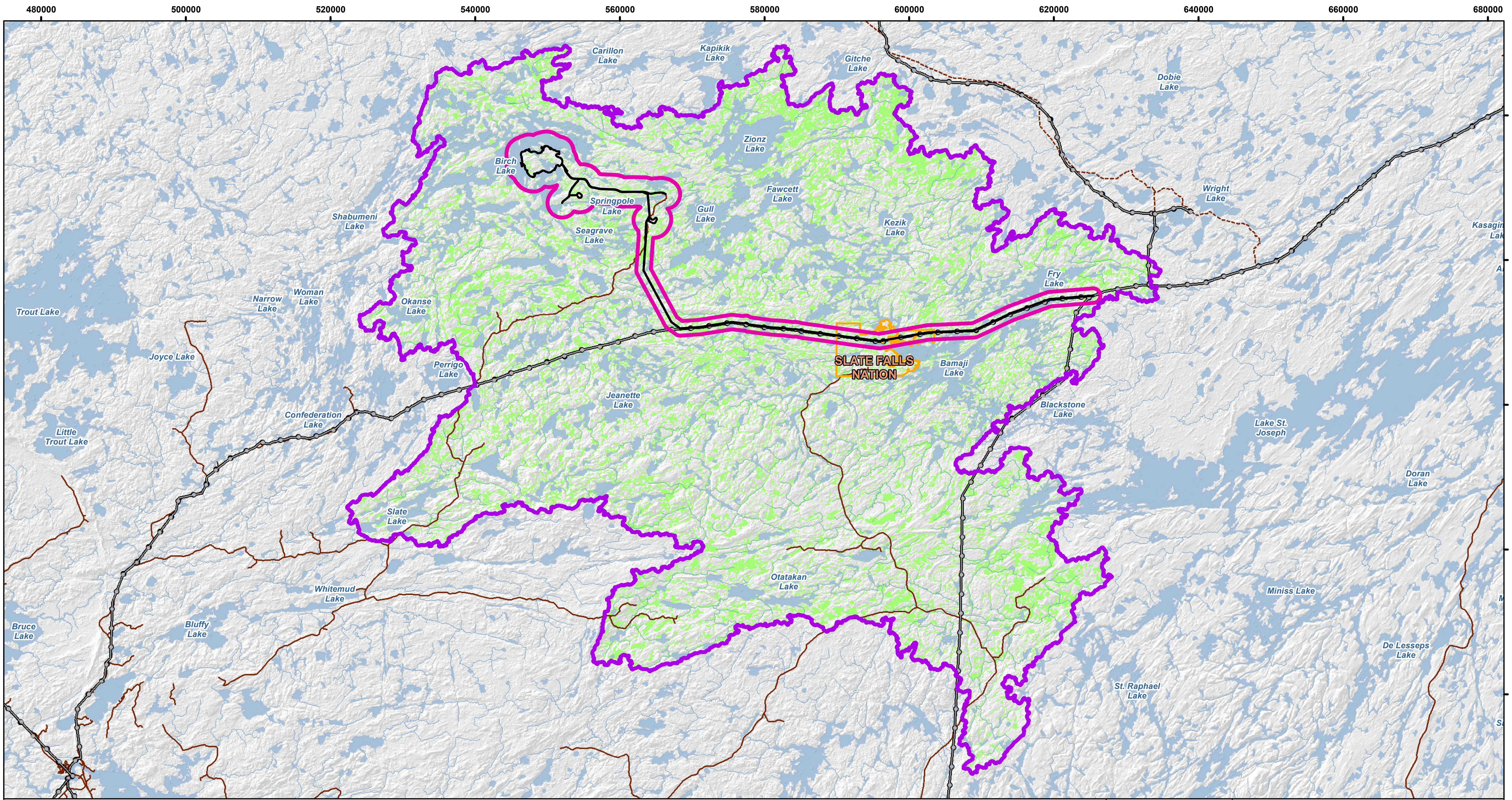
SPRINGPOLE GOLD PROJECT
Greater Yellowlegs Suitability Analysis Results Summary Map
PROJECT N°: ONS2104
FIGURE:
SCALE: 1:500,000
DATE: April 2024



LEGEND

- Wilson Snipe - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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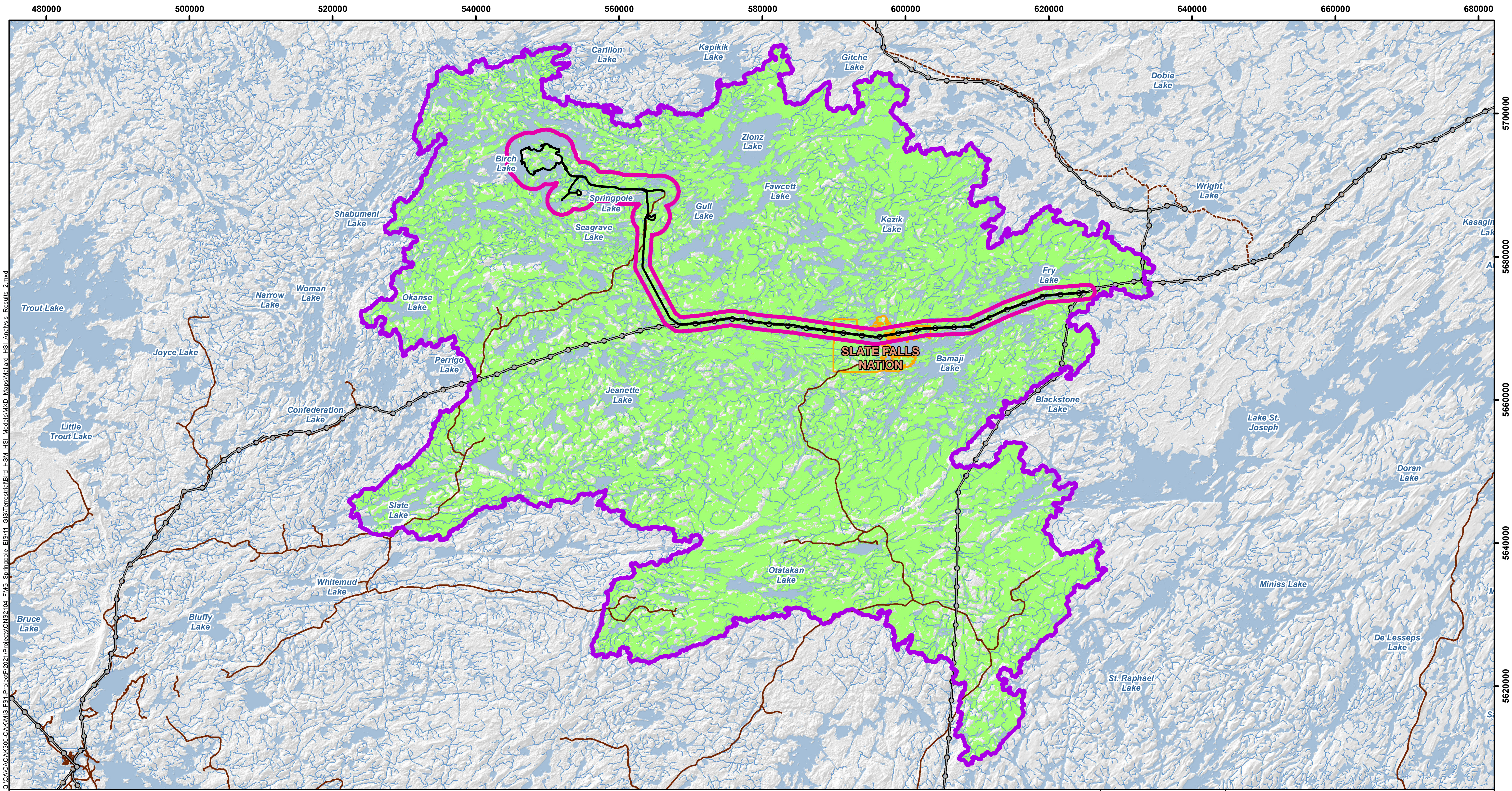
Wilson Snipe Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Mallard - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

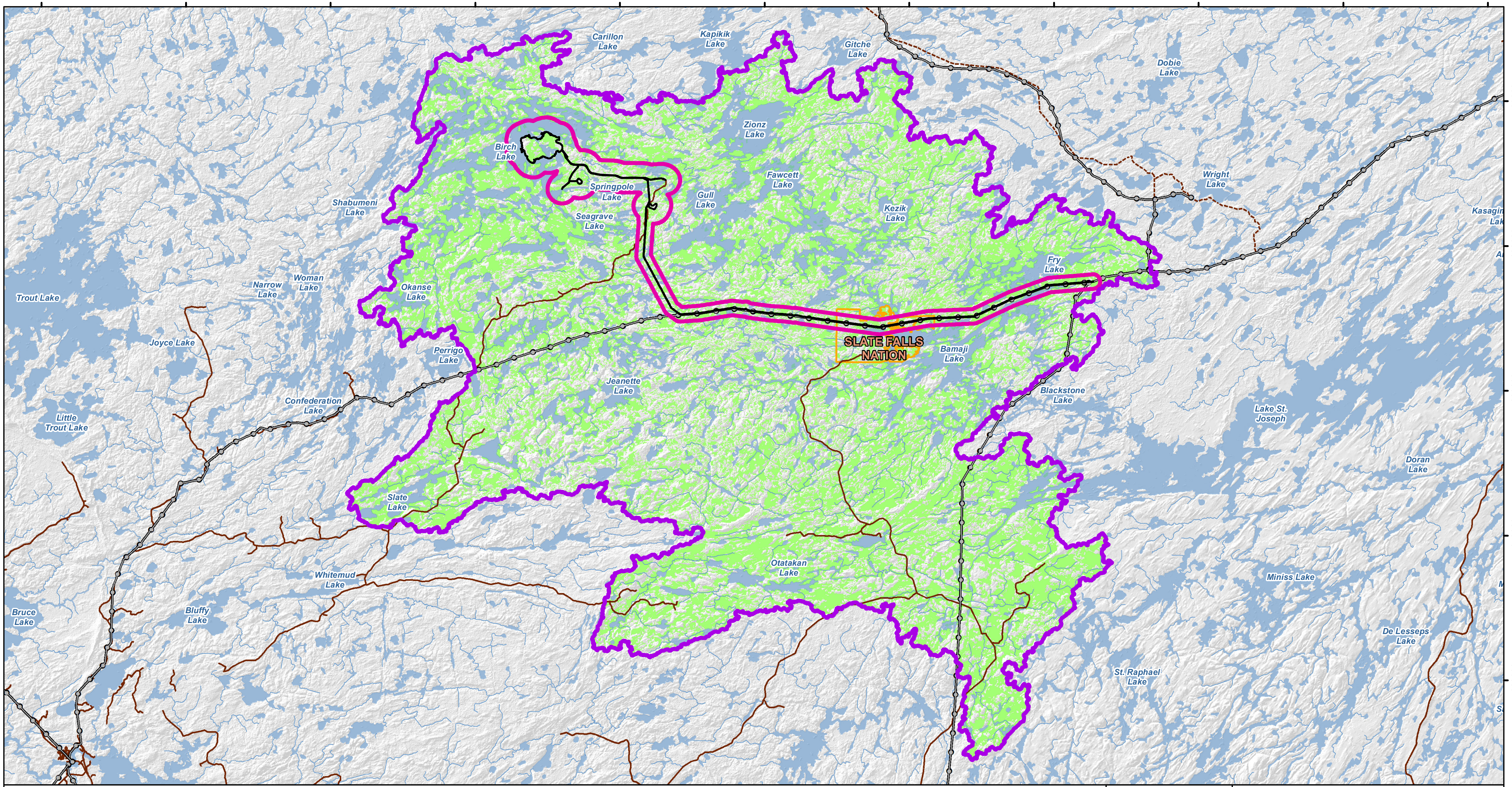
Mallard Habitat Suitability Analysis Results Summary Map

PROJECT N°: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: June 2024



LEGEND

- Lesser Yellowlegs - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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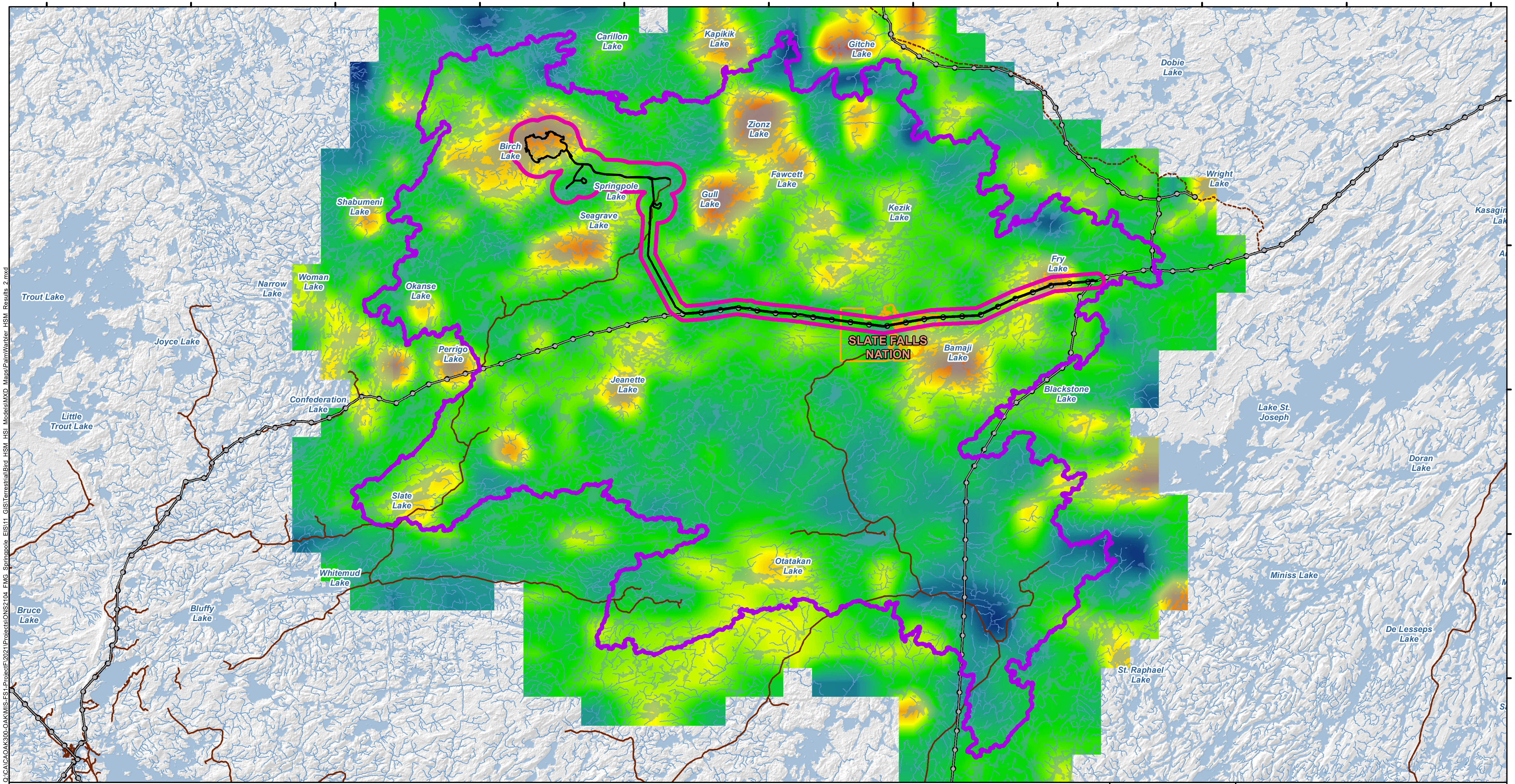
Lesser Yellowlegs Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: April 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Palm Warbler – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability : 0 %

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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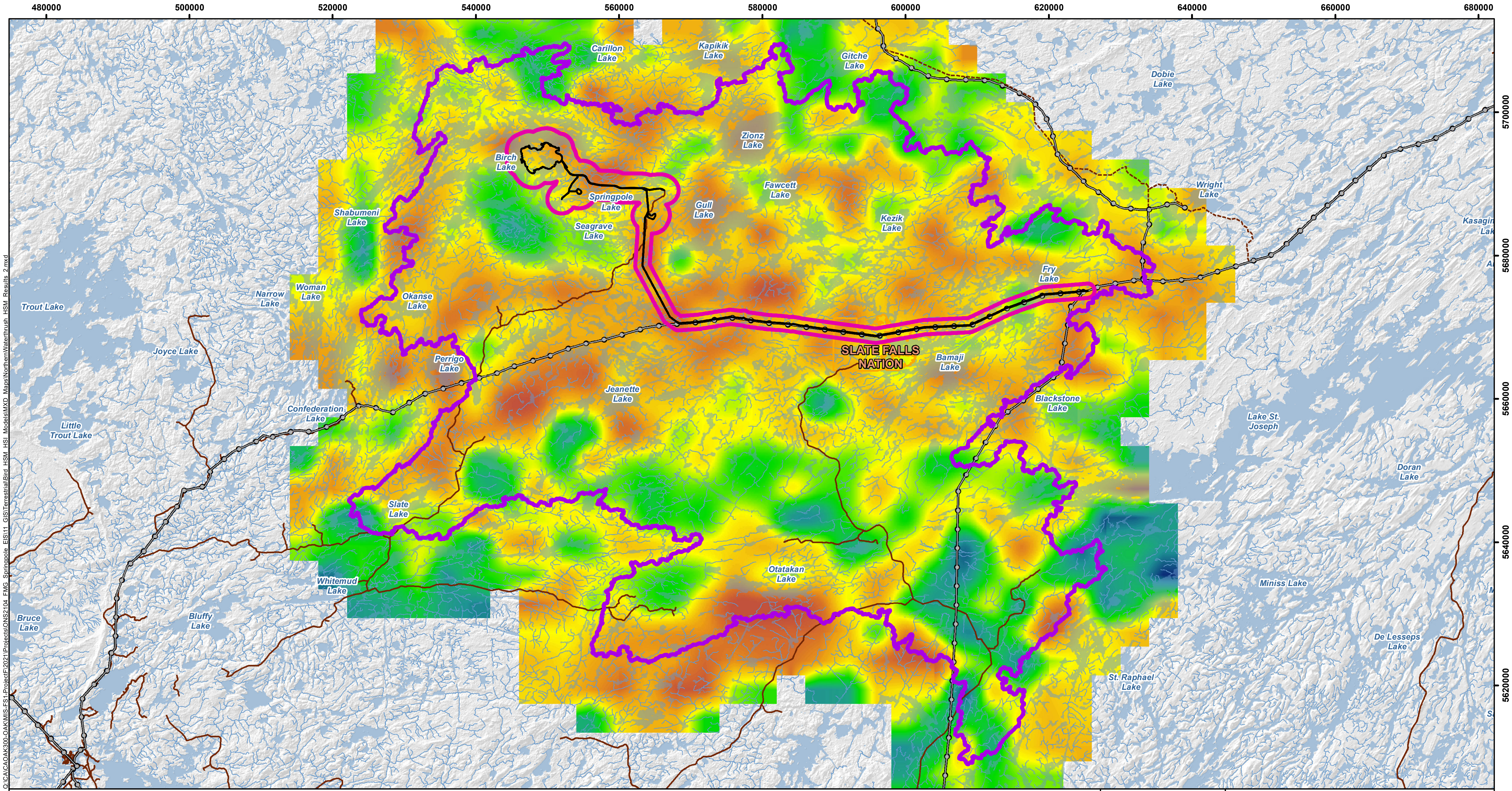
Palm Warbler Habitat Suitability Model Results Summary Map

PROJECT Nº: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: June 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Northern Waterthrush – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability : 0 %

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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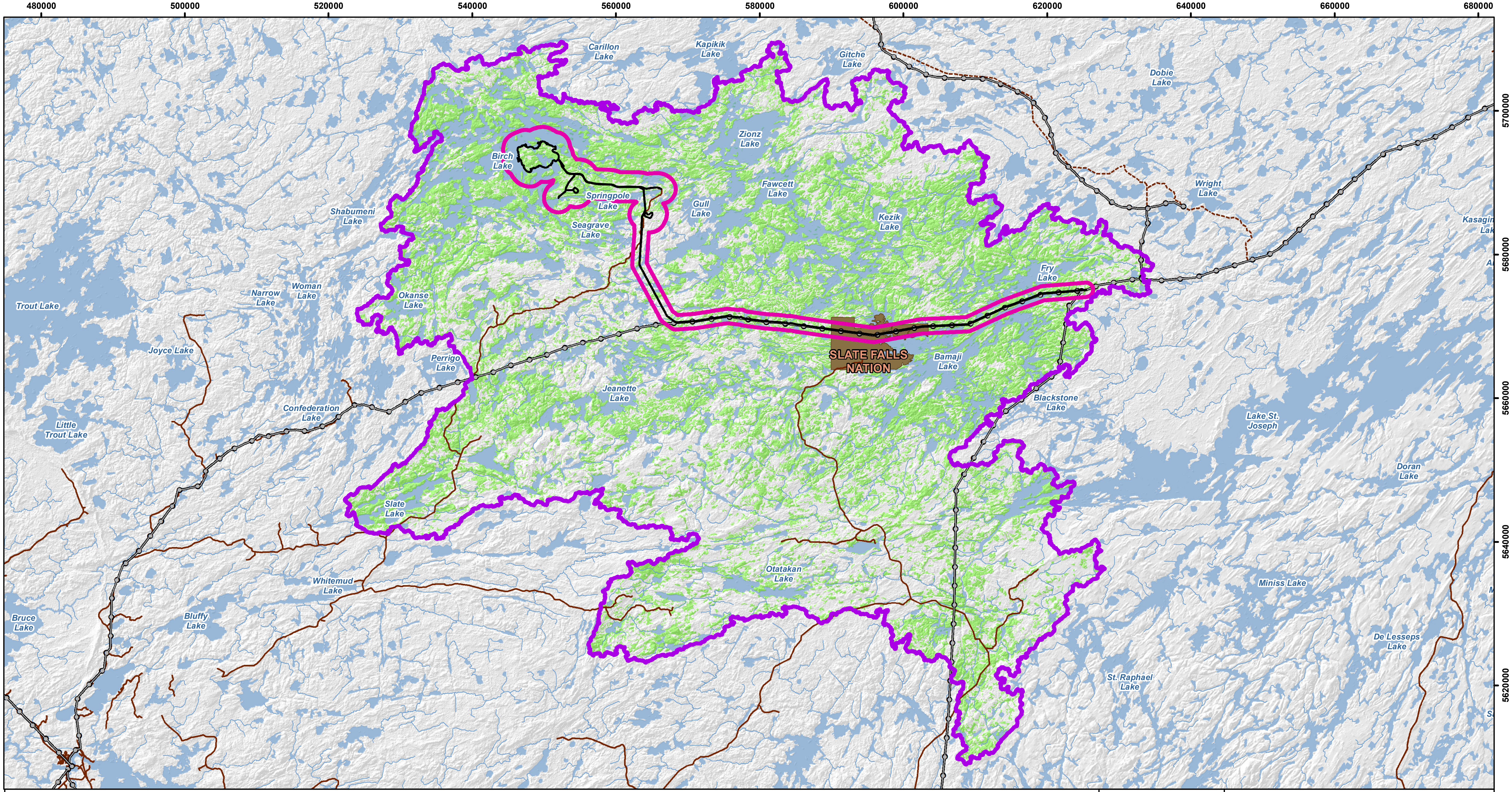
SPRINGPOLE GOLD PROJECT

Northern Waterthrush Habitat Suitability Model Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: June 2024

O:\CA\CAOAK300-OAK\WIS-ES1-Project\F\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\TerrestrialBird_HSM_HSI_Models\MXD_Maps\NorthernWaterthrush_HSM_Results_2.mxd



LEGEND

- Common Nighthawk - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

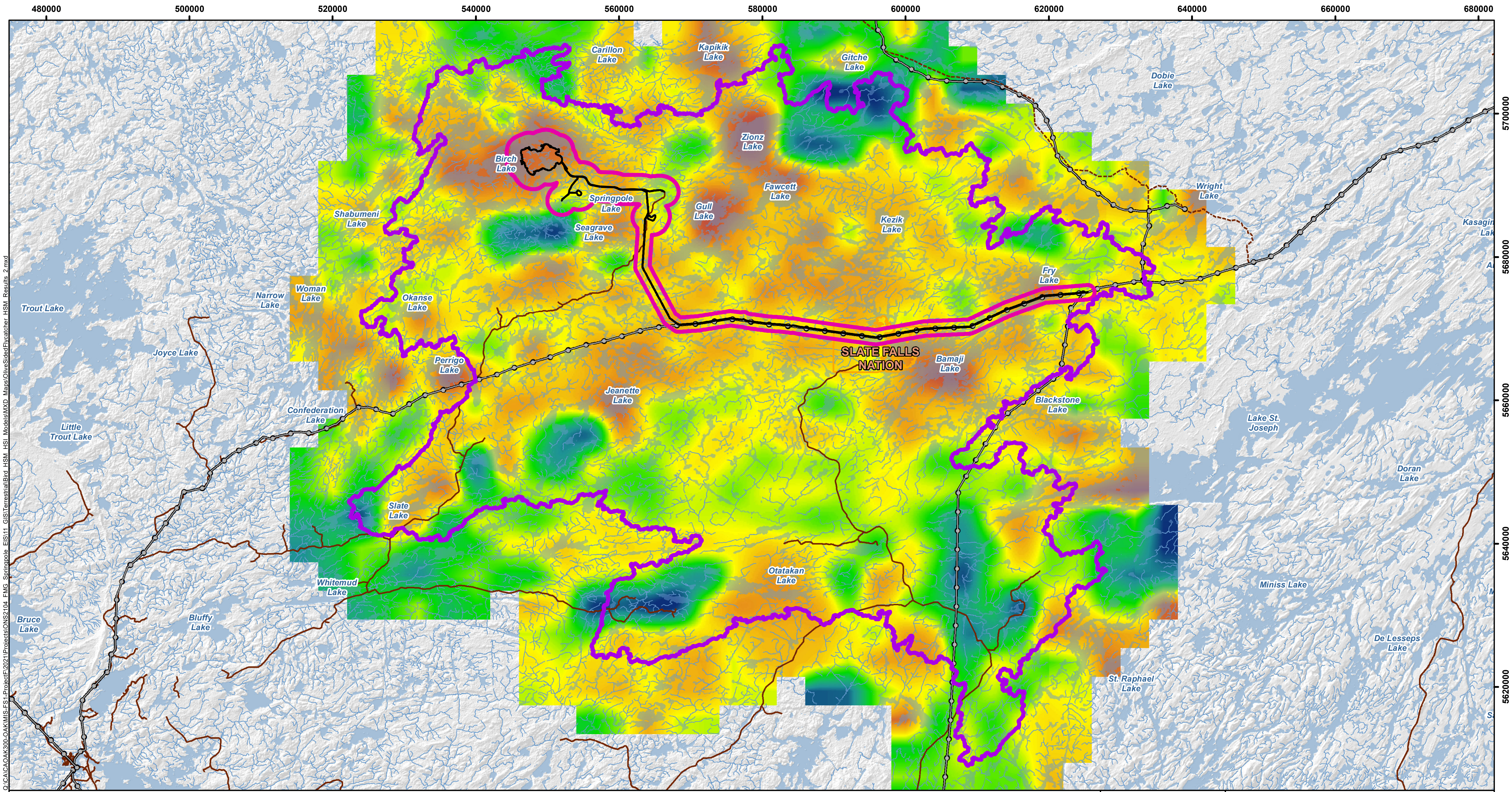
Common Nighthawk Suitability Analysis Results Summary Map

PROJECT N°: ONS2104

FIGURE:

SCALE: 1:500,000

DATE: April 2024



LEGEND

- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

Olive-sided Flycatcher – Relative Habitat Suitability Percentage (based on climate and landcover)

High Suitability : 100 %

Low Suitability : 0 %

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- Relative Habitat Suitability model is based on the Boreal Avian Modelling (BAM) Species-Specific Habitat Suitability Maps for Boreal-Breeding Passerine Species.

Datum: NAD83
Projection: UTM Zone 15N

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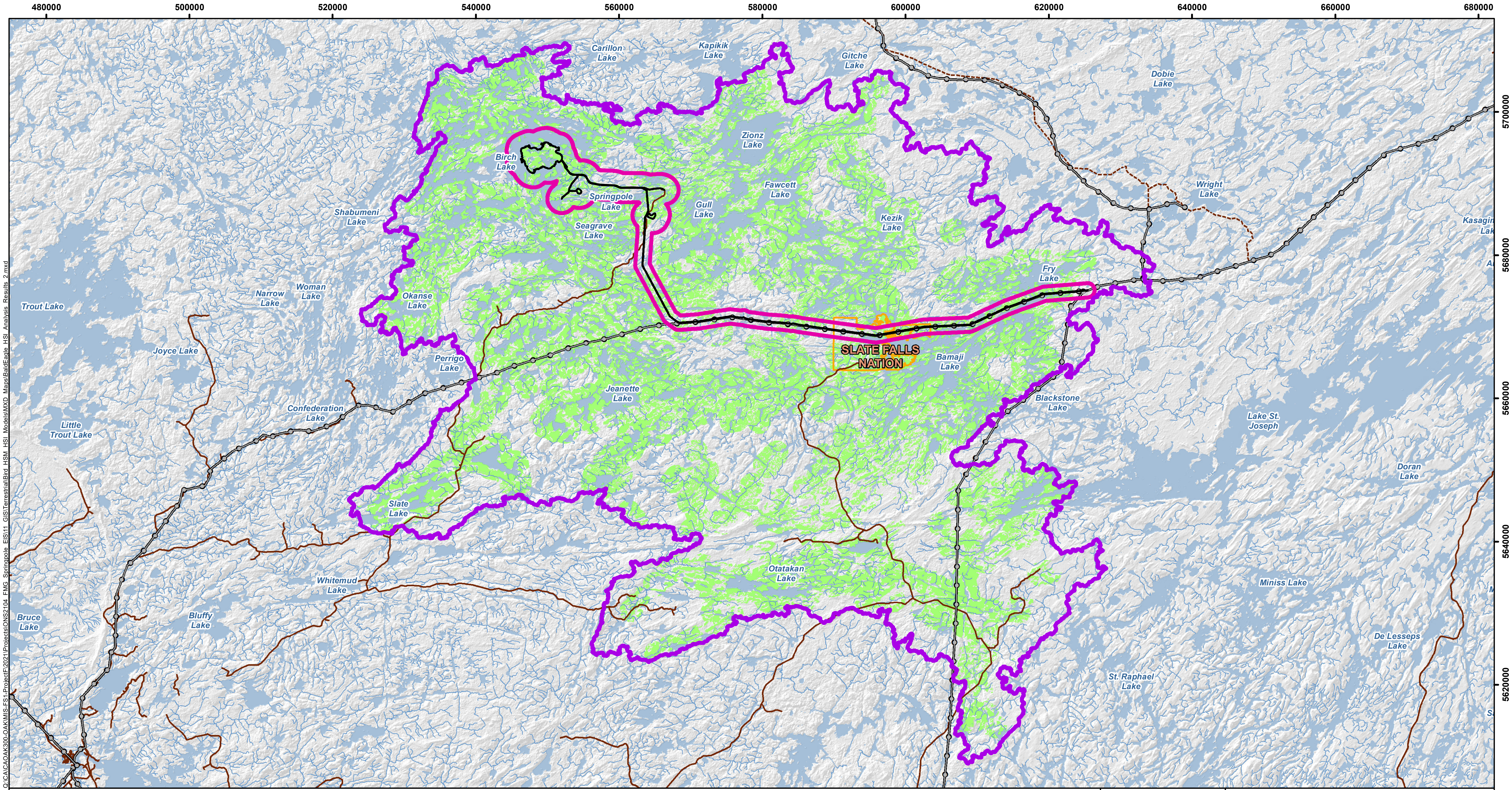
SPRINGPOLE GOLD PROJECT

Olive-sided Flycatcher Habitat Suitability Model Results Summary Map

PROJECT Nº: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: June 2024

Q:\CA\CAOAK300-OAK\MIS-FS1\Project\F2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\TerrestrialBird_HSM_HSI_Models\MXD_Maps\OliveSidedFlycatcher_HSM_Results_2.mxd



LEGEND

- Bald Eagle - Moderate to High Habitat Suitability Areas
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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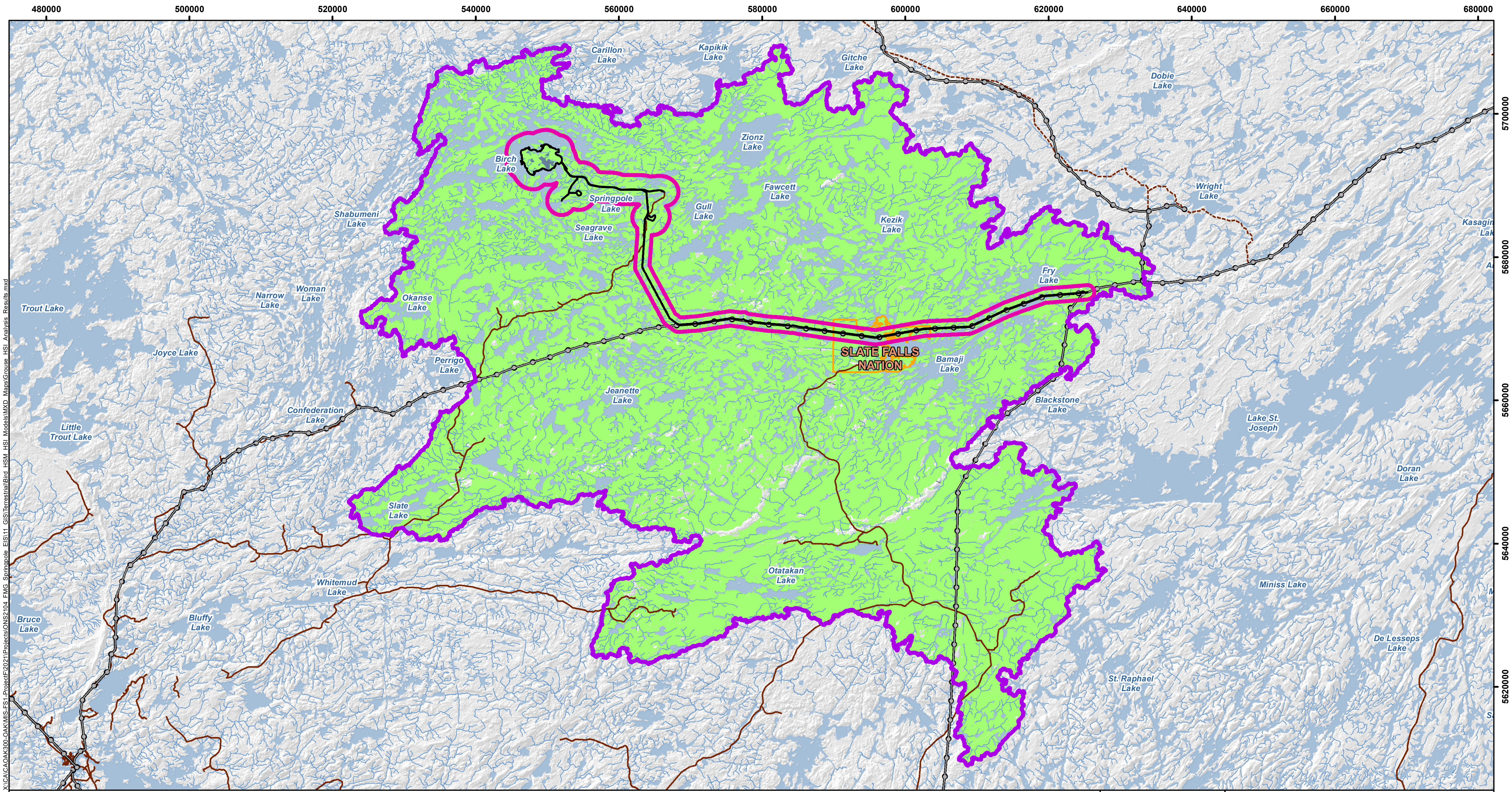
SPRINGPOLE GOLD PROJECT

Bald Eagle Habitat Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: June 2024



LEGEND

- Grouse - Moderate to High Habitat Suitability Areas
- Proposed Mine Feature
- Project Development Area
- Local Study Area for Wildlife and Wildlife Habitat
- Regional Study Area for Wildlife and Wildlife Habitat
- First Nation Reserve
- Existing Road
- Existing Winter Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 5 10 20 30 40 50 Kilometres

NOTES:
- Topographic information extracted from LIO, NDMNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

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SPRINGPOLE GOLD PROJECT

Grouse Habitat Suitability Analysis Results Summary Map

PROJECT N°: ONS2104	FIGURE:
SCALE: 1:500,000	DATE: July 2024

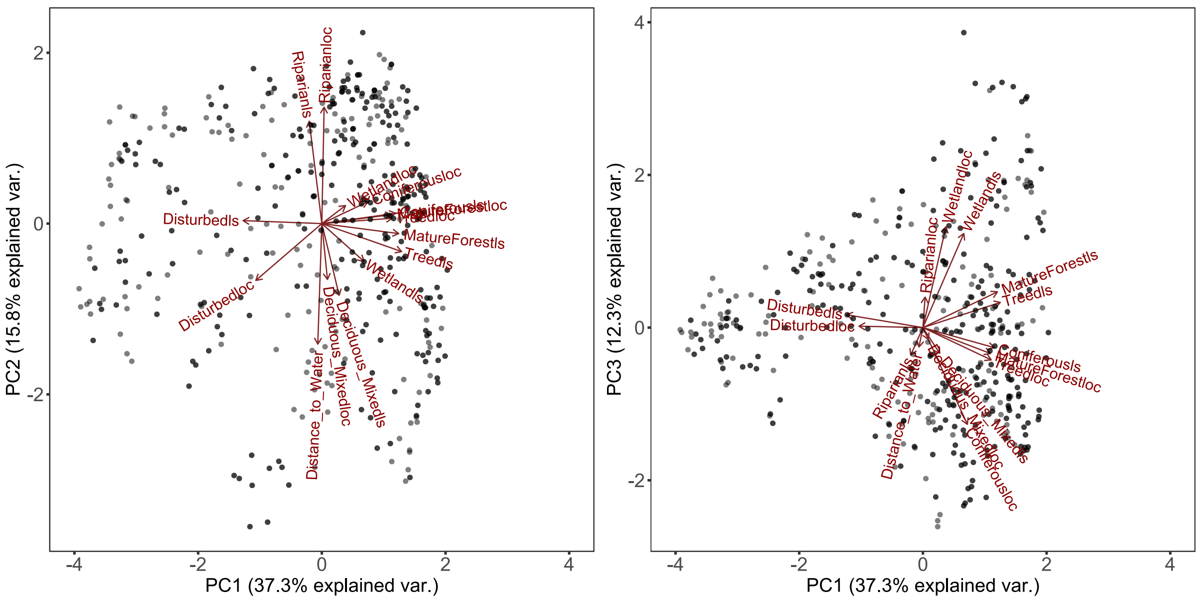

Figure 6.12-28: Biplots from a principal components analysis of habitat variables measured at two spatial scales. Variables ending in "loc" were measured at the local scale (within a 150 m radius circle around each point) and those ending in "ls" at the landscape scale (within a 5 km radius circle around each point).

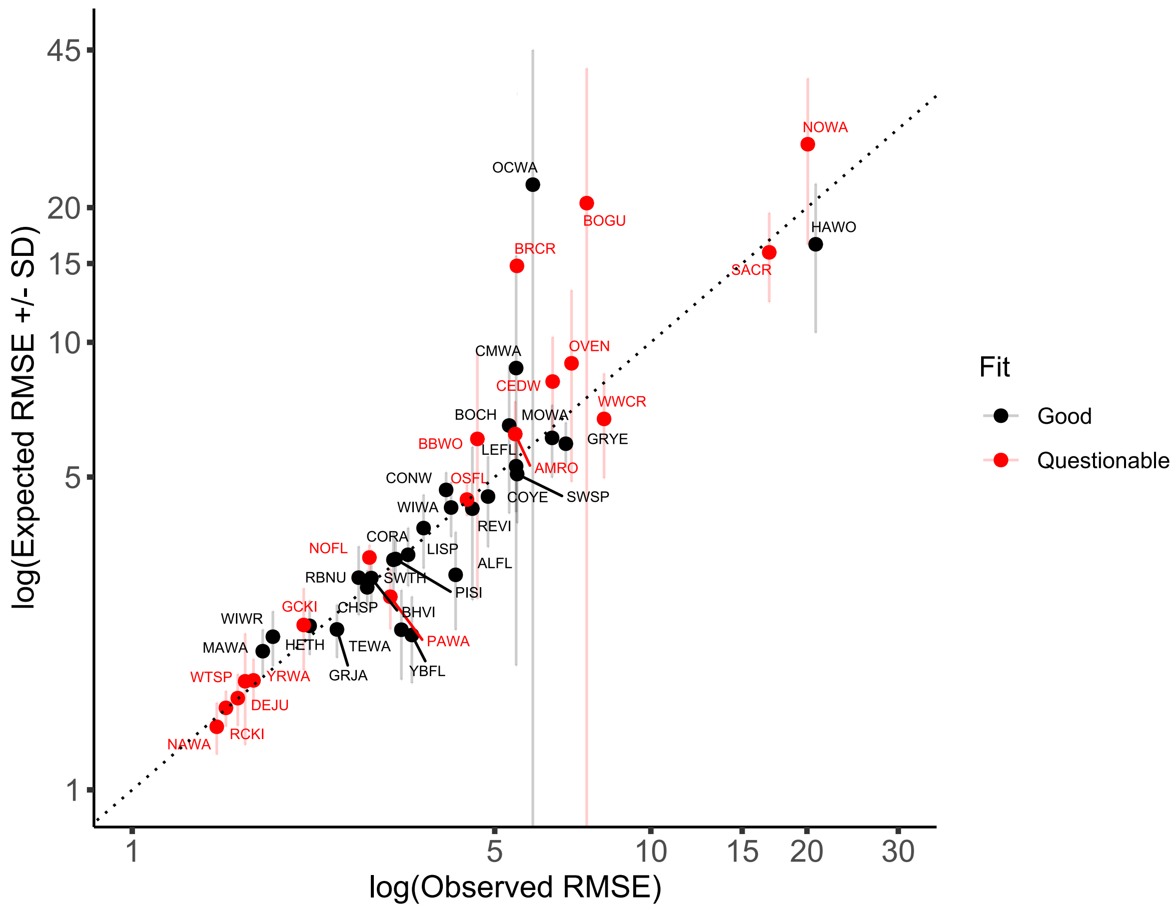

Figure 6.12-29: K-fold cross-validation results for the best-fitting density model for each species with sufficient data to model. The Expected RMSE is the mean (± standard deviation; SD) of the RMSEs obtained through k-fold validation on a large (80%) subset of the data. The Observed RMSE is calculated from the remainder of the data. Points are labelled by their corresponding species which are identified by their four-letter code. Model fit is indicated by colour.

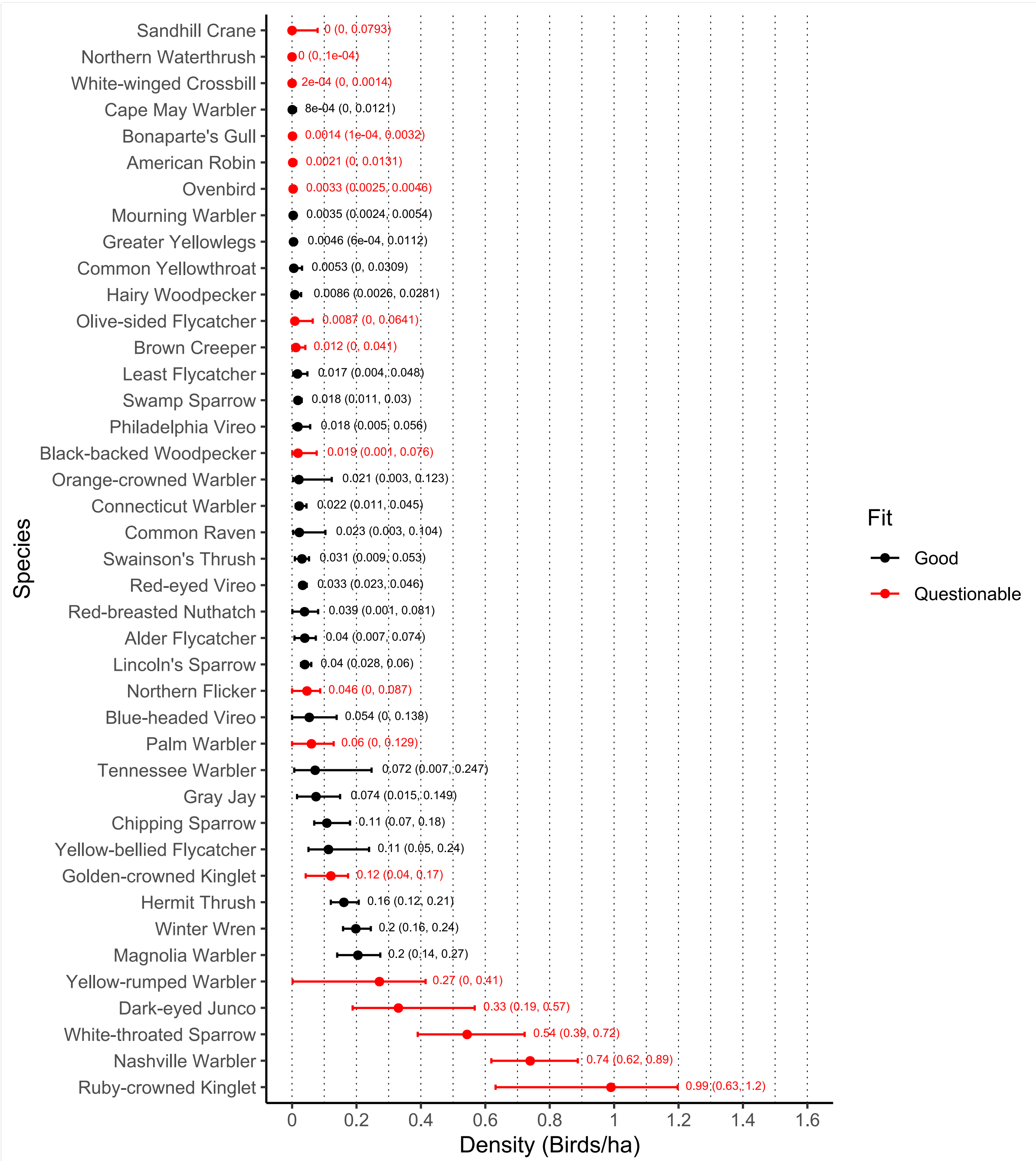

Figure 6.12-30: Average density for each species predicted by the best-fitting models across both years and treatments at average levels of the habitat covariates. Confidence intervals were obtained through hierarchical bootstrapping to incorporate the error in detection probability for the species. Model fit is indicated by colour.

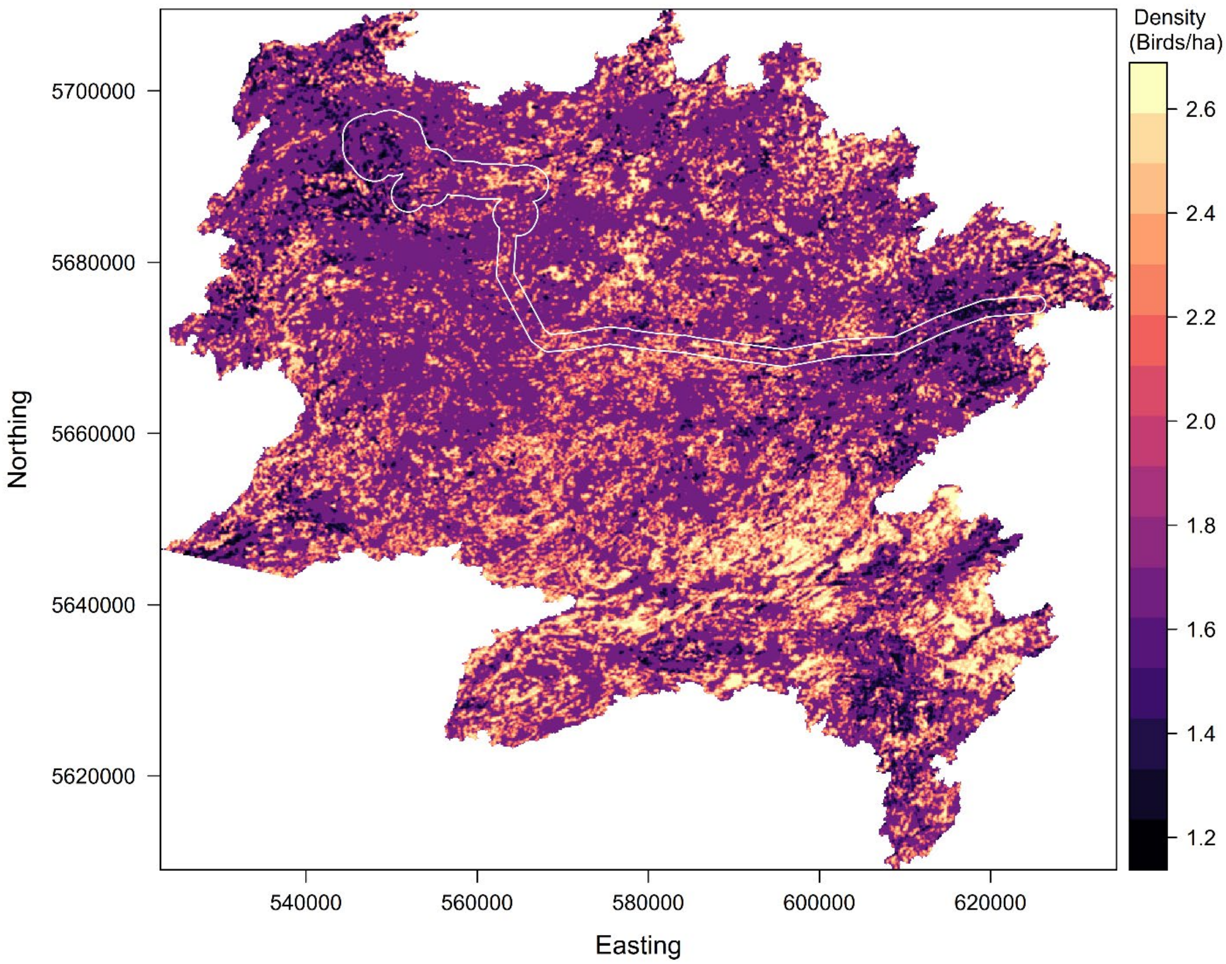

Figure 6.12-31: Predicted density surface across the RSA for Ruby-crowned Kinglet, one of the most abundant bird species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

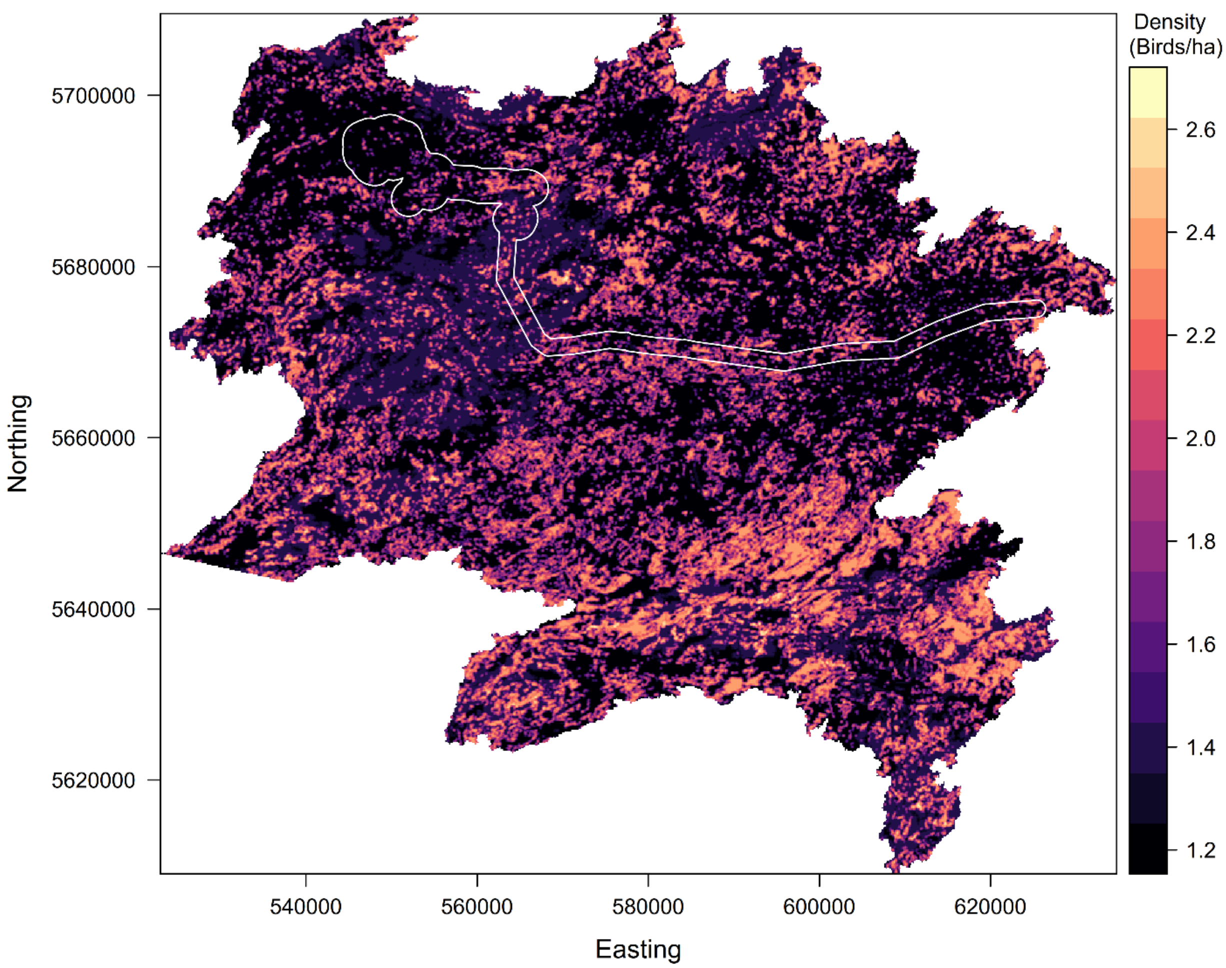

Figure 6.12-32: Predicted density surface across the RSA for Nashville Warbler, one of the most abundant bird species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

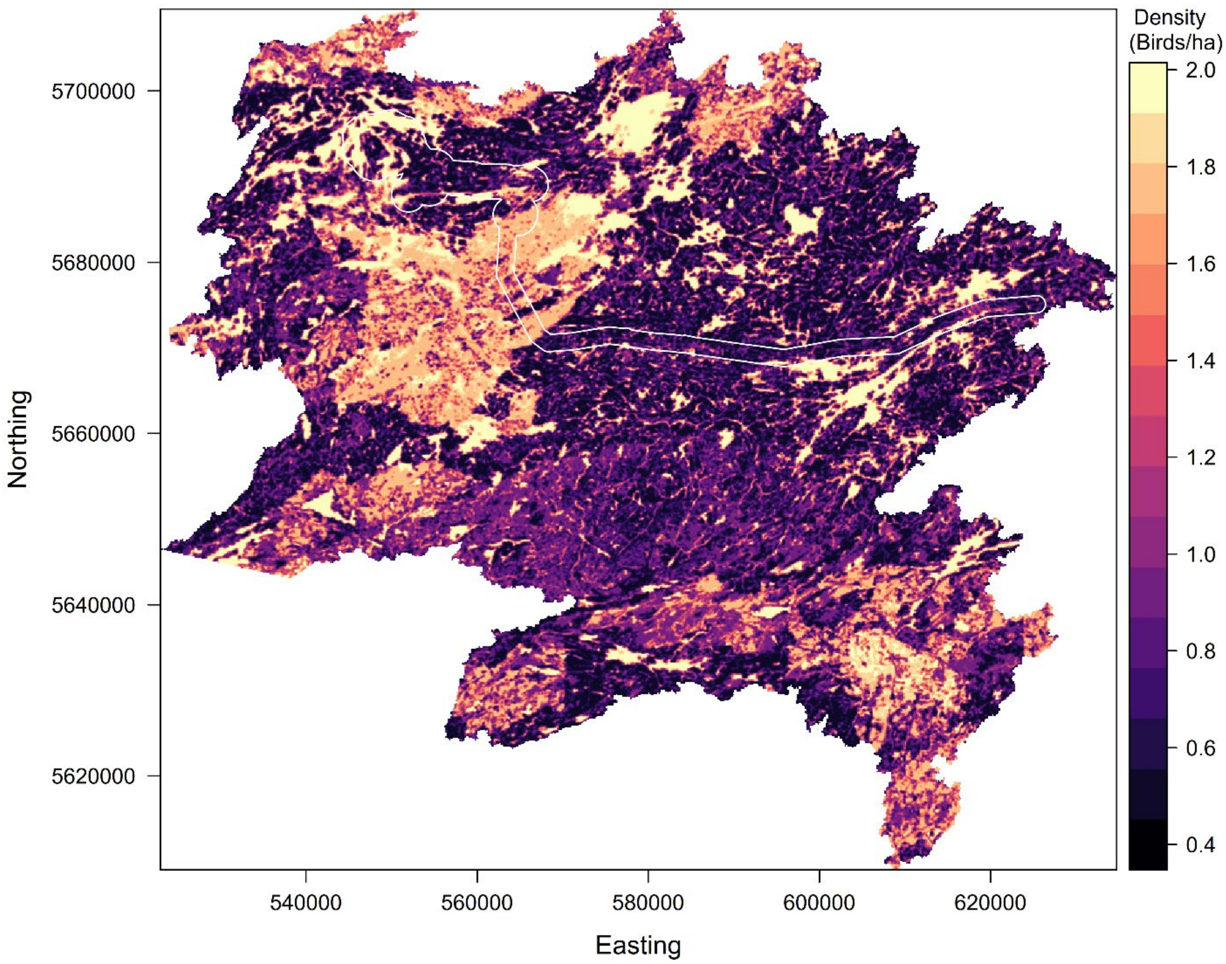

Figure 6.12-33: Predicted density surface across the RSA for White-throated Sparrow, one of the most abundant bird species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

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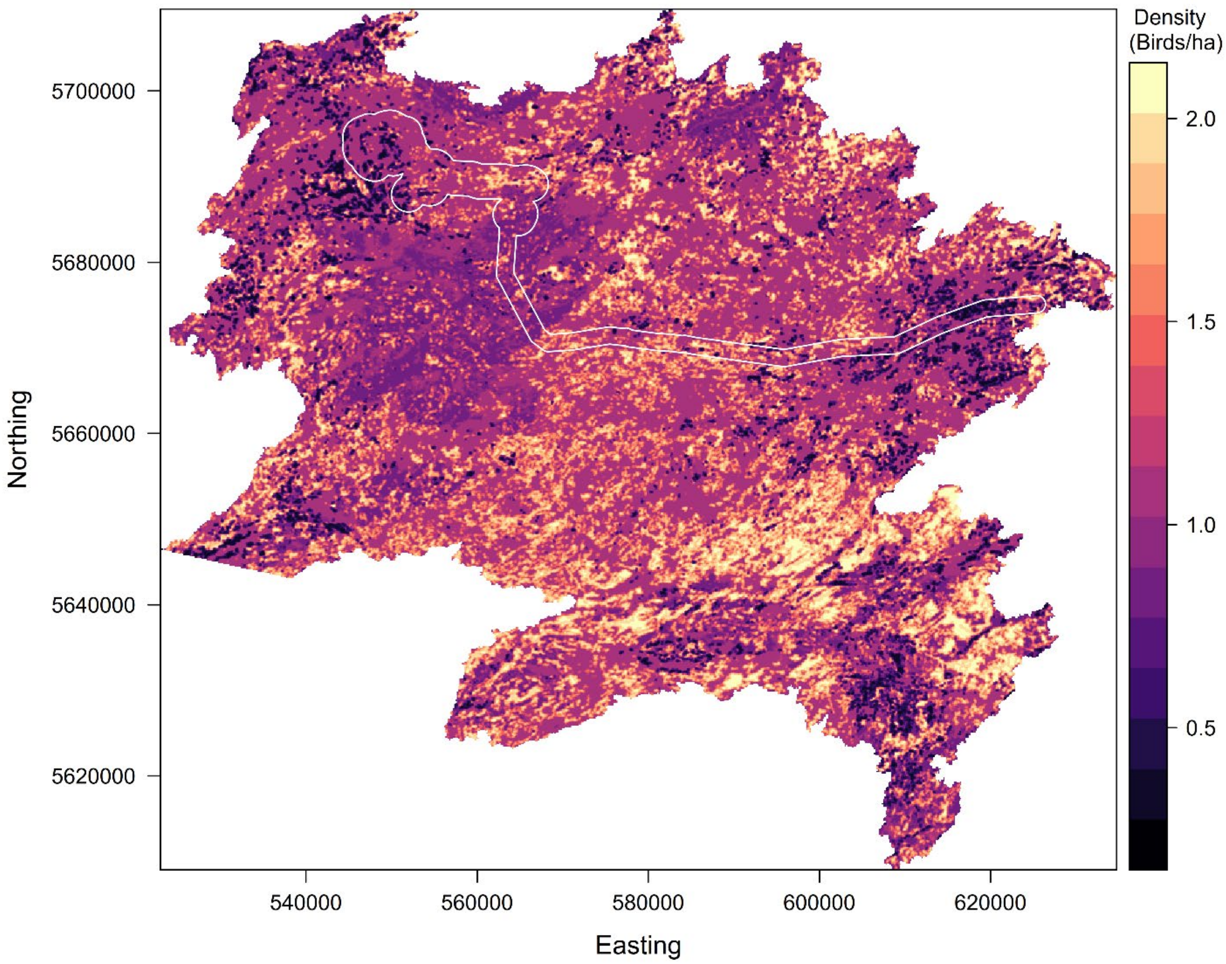

Figure 6.12-34: Predicted density surface across the RSA for Dark-eyed Junco, a forest species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

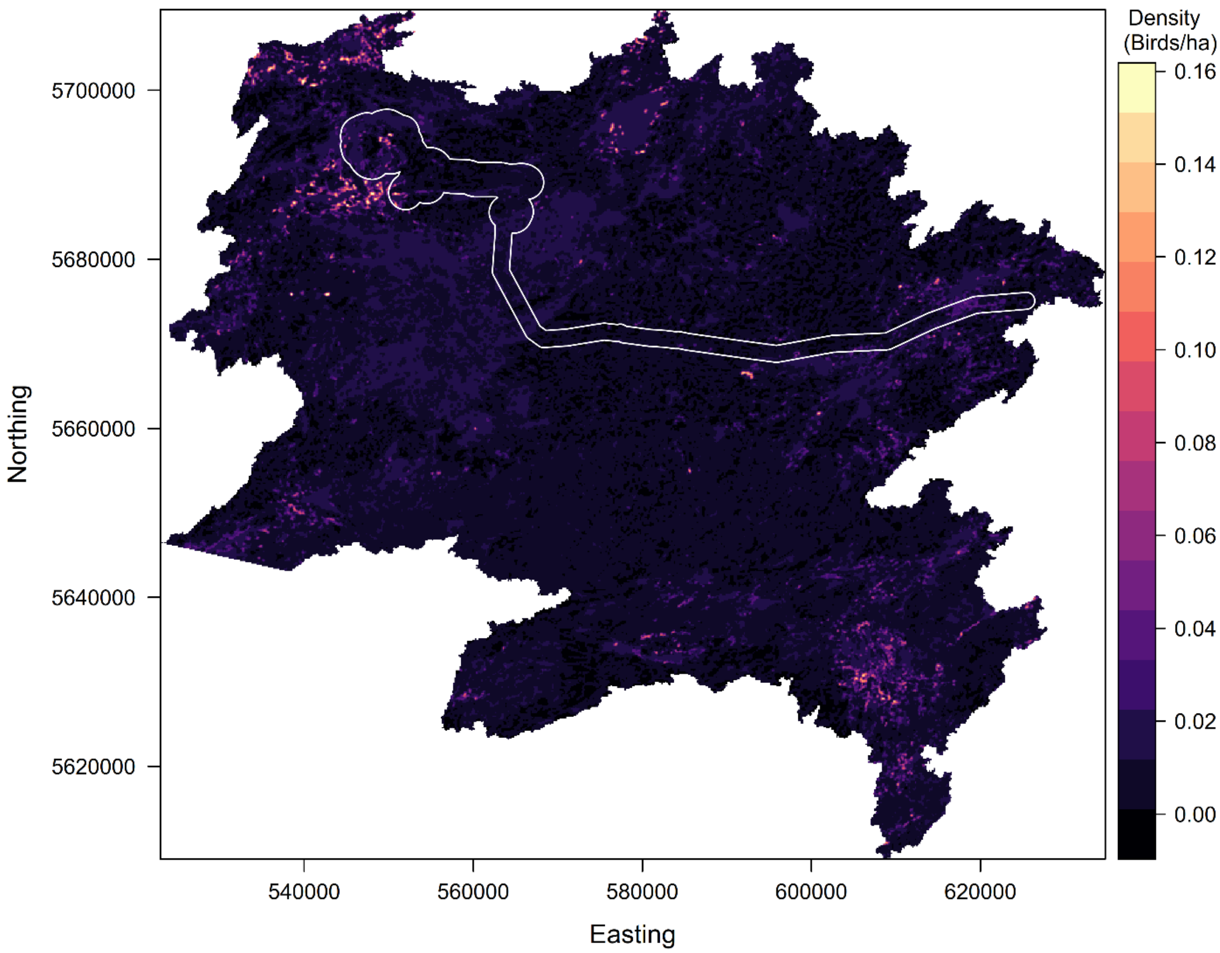

Figure 6.12-35: Predicted density surface across the RSA for Ovenbird, a forest species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

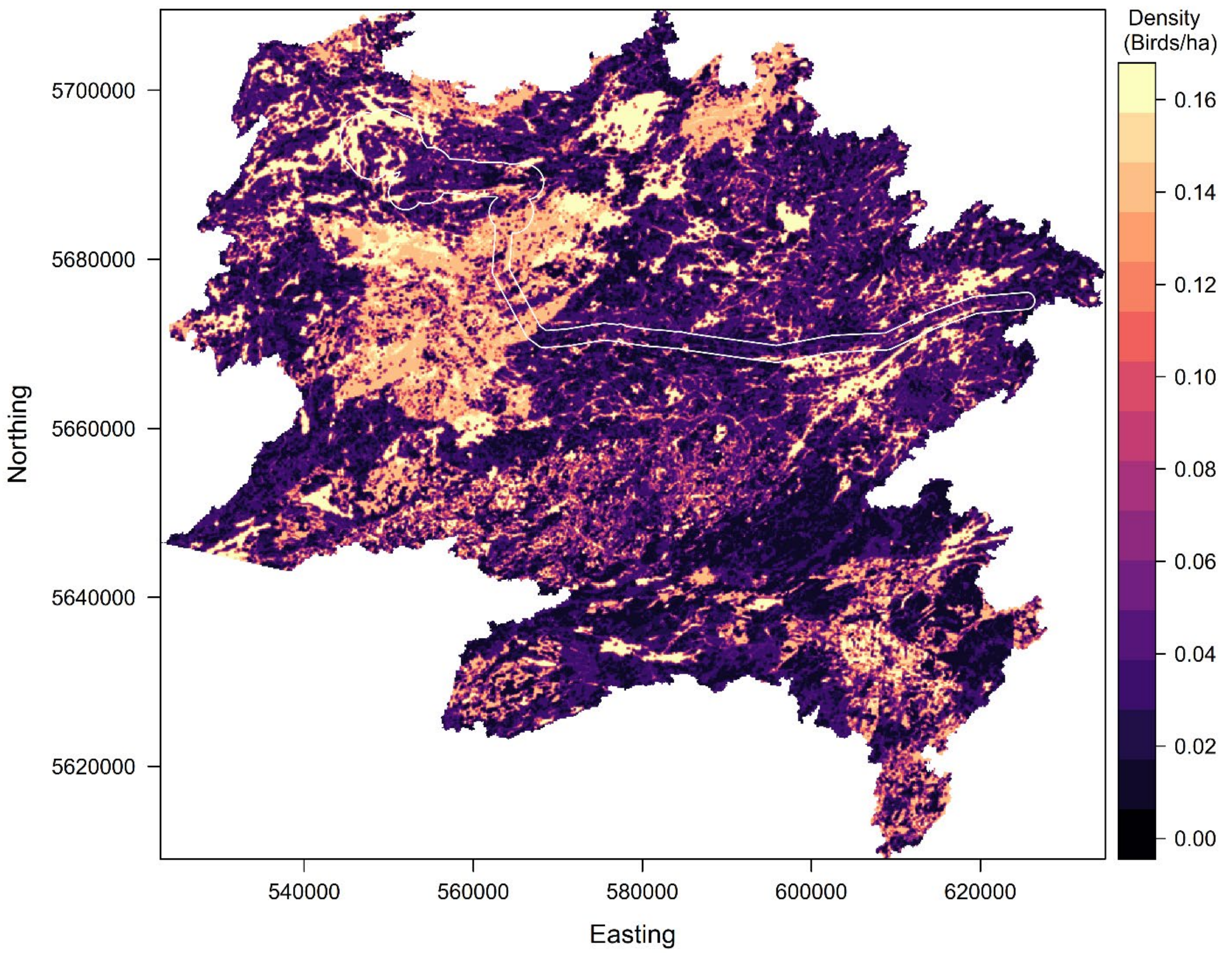

Figure 6.12-36: Predicted density surface across the RSA for Red-eyed Vireo, a forest species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

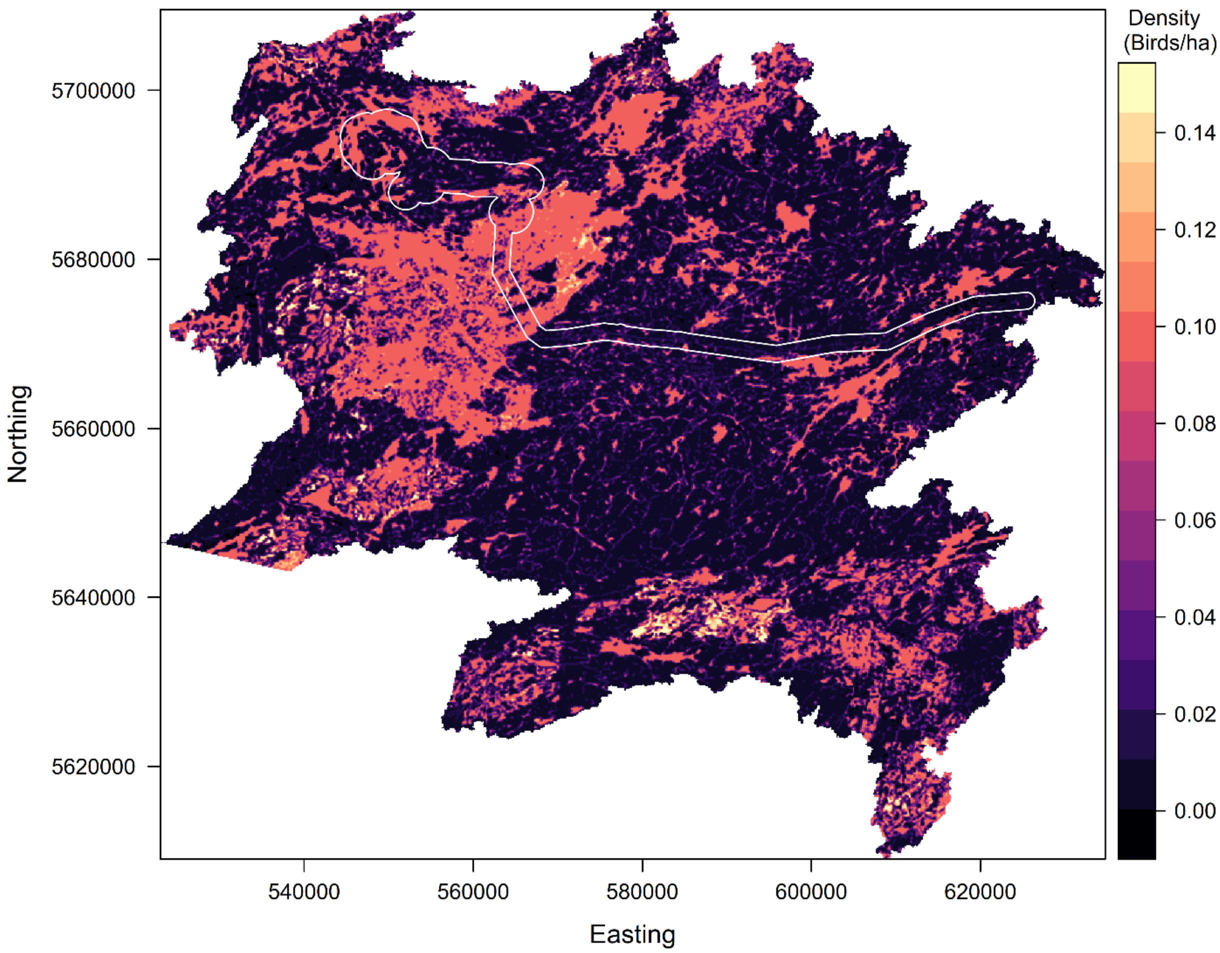

Figure 6.12-37: Predicted density surface across the RSA for Common Yellowthroat, a wetland species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

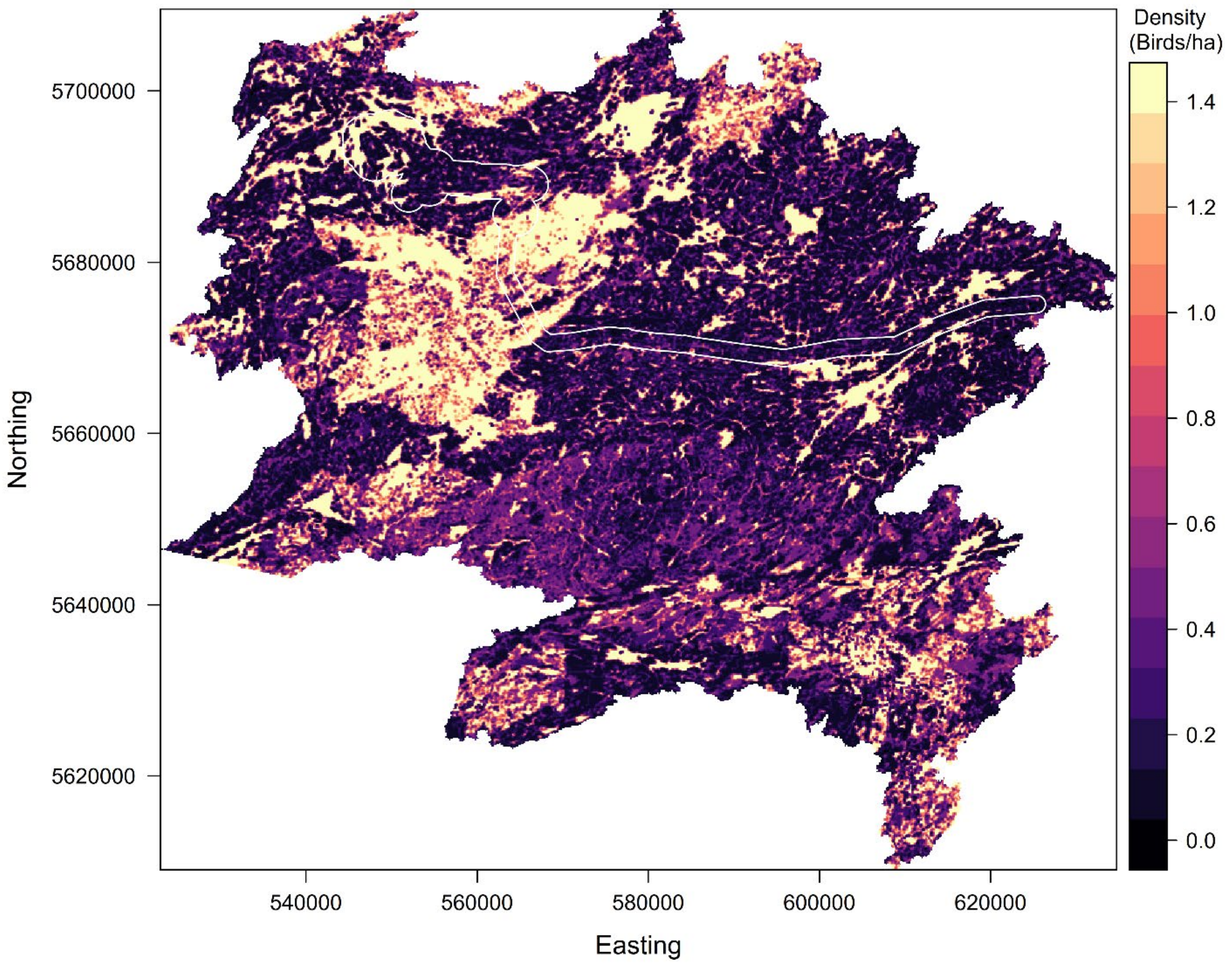

Figure 6.12-38: Predicted density surface across the RSA for Palm Warbler, a wetland species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

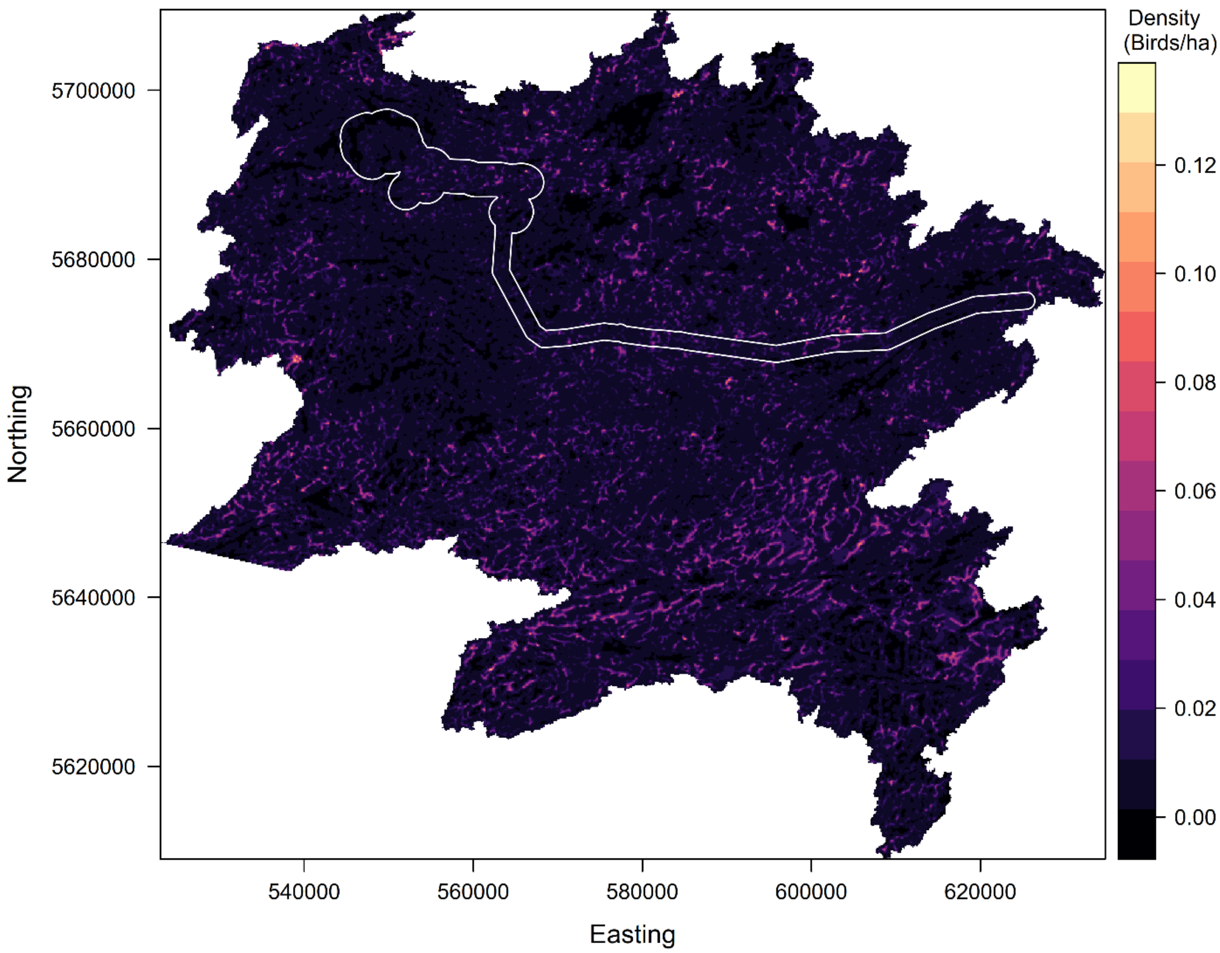

Figure 6.12-39: Predicted density surface across the RSA for Greater Yellowlegs, a shorebird species, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

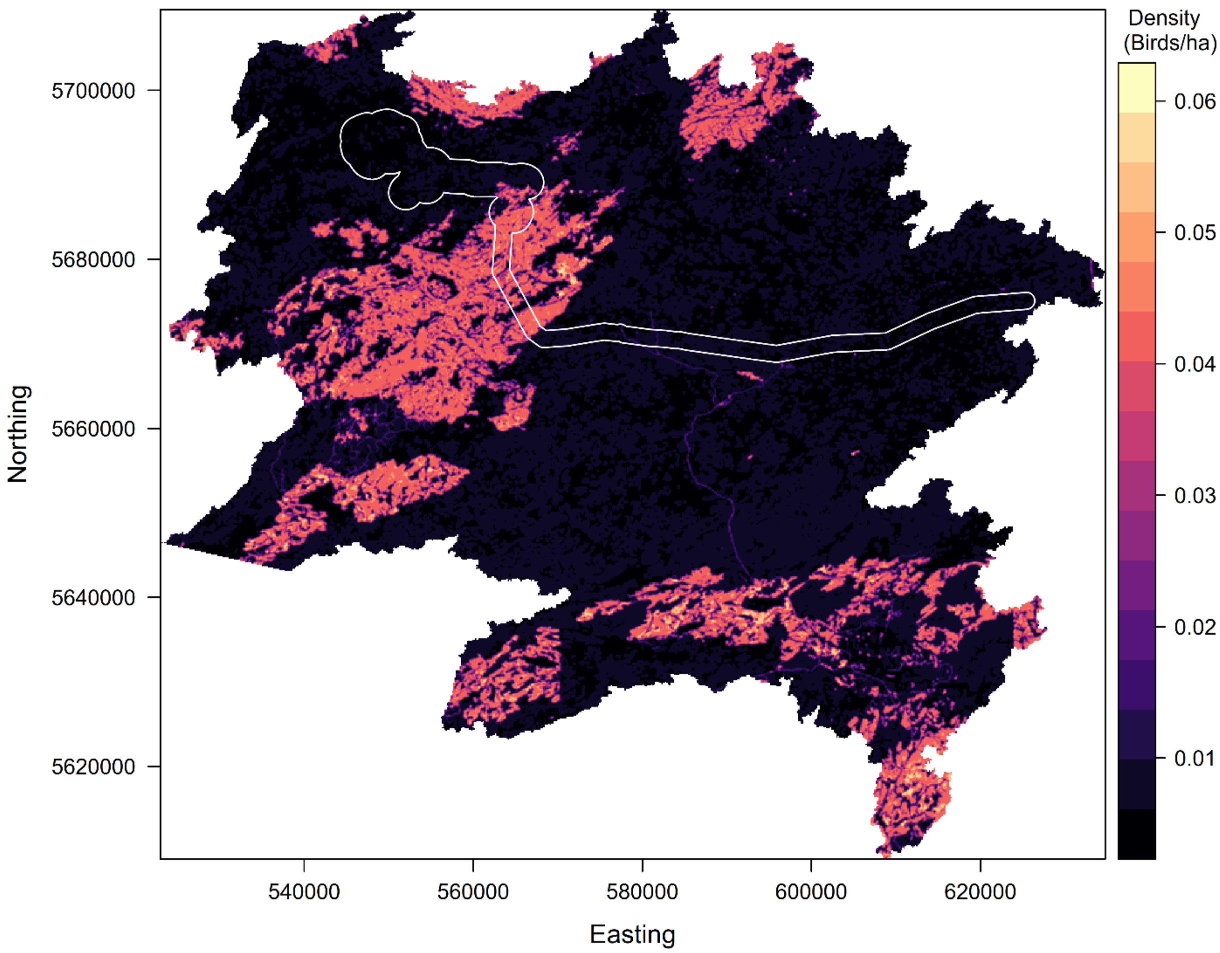

Figure 6.12-40: Predicted density surface across the RSA for Olive-sided Flycatcher, a species at risk, modelled from point count surveys. The density surface was calculated based on average levels of the temporal and weather covariates. The LSA is delineated in white. Some areas of the RSA could not be mapped due to FRI and Far North data layers missing information in these areas.

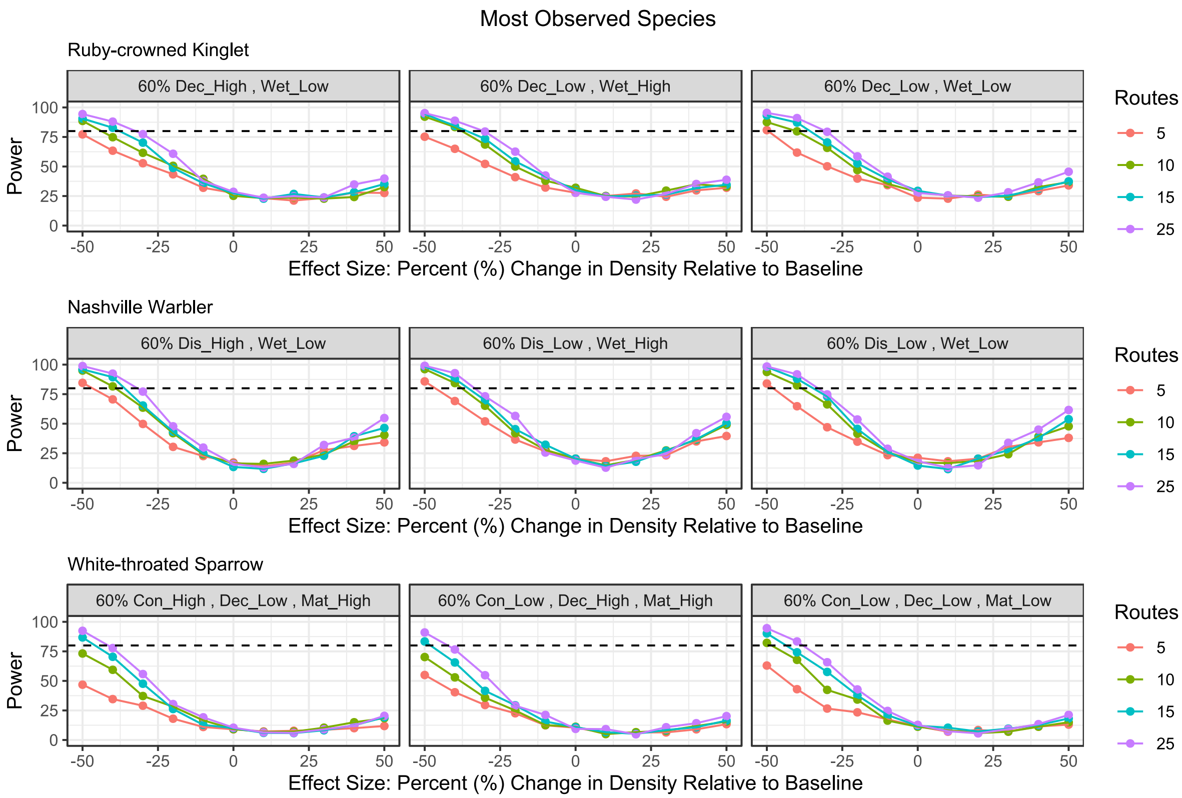

Figure 6.12-41: Power to detect a percent change in density from baseline within the LSA for the three most observed species. Power to detect a percent change in density (-50% to +50%) from baseline within the LSA for a hypothetical new year of breeding bird point count surveys for the three most observed species. Simulations were completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous / Mixed Forest, Wet = Wetland, Dist = Disturbed Habitat, Con = Coniferous Forest, Mat = Mature Forest.

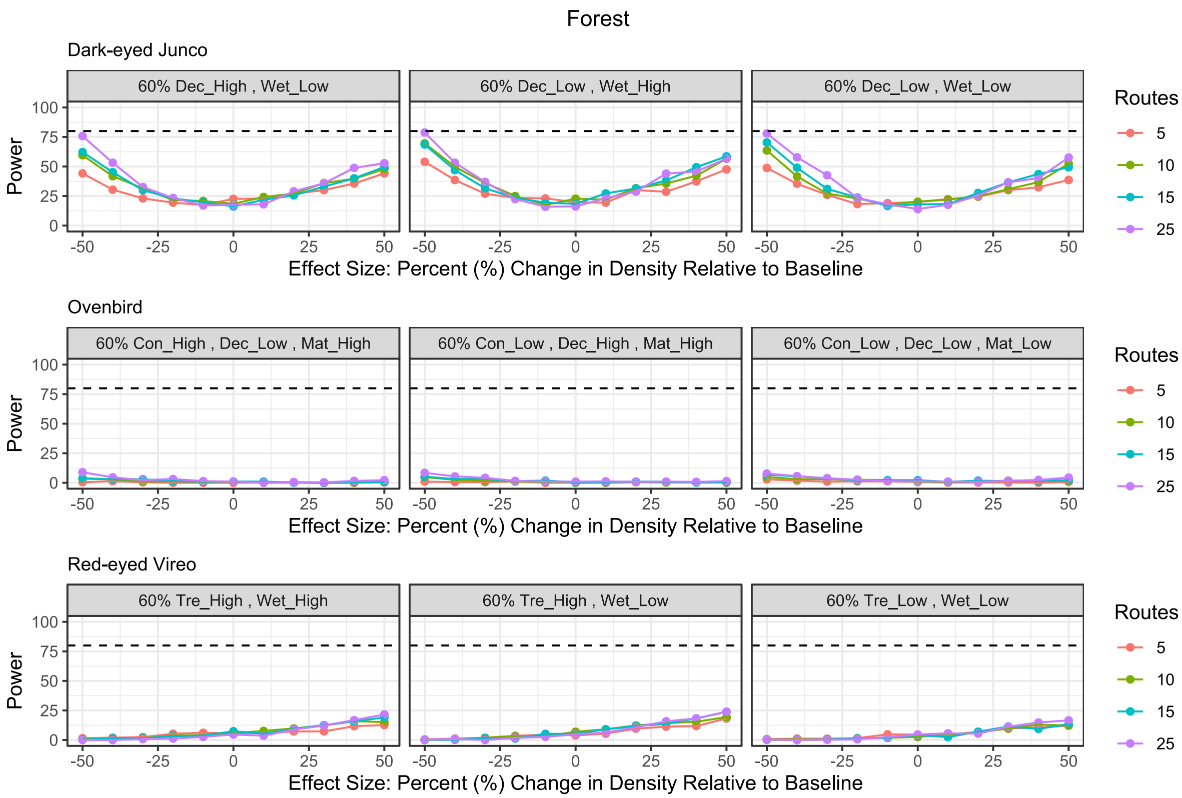

Figure 6.12-42: Power to detect a percent change in density from baseline within the LSA for the three forest proxy species. Power to detect a percent change in density (-50% to +50%) from baseline within the LSA for a hypothetical new year of breeding bird point count surveys for the three forest VCs. Simulations were completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous / Mixed Forest, Wet = Wetland, Tre = Treed Habitat, Con = Coniferous Forest, Mat = Mature Forest.

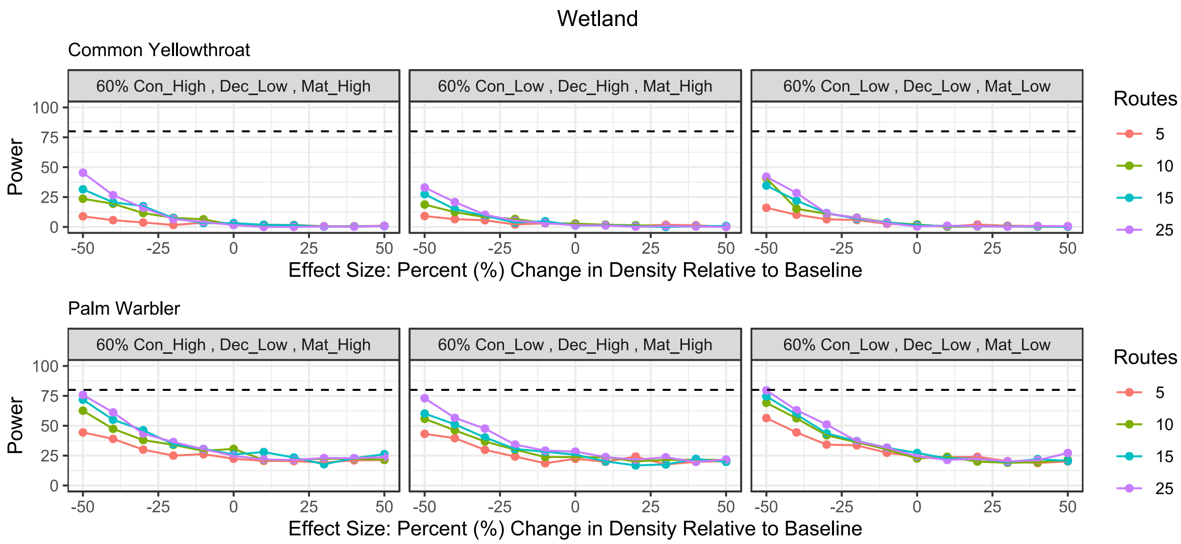

Figure 6.12-43: Power to detect a percent change in density from baseline within the LSA for the two wetland proxy species. Power to detect a percent change in density (-50% to +50%) from baseline within the LSA for a hypothetical new year of breeding bird point count surveys for two wetland VCs. Simulations were completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous / Mixed Forest, Con = Coniferous Forest, Mat = Mature Forest.

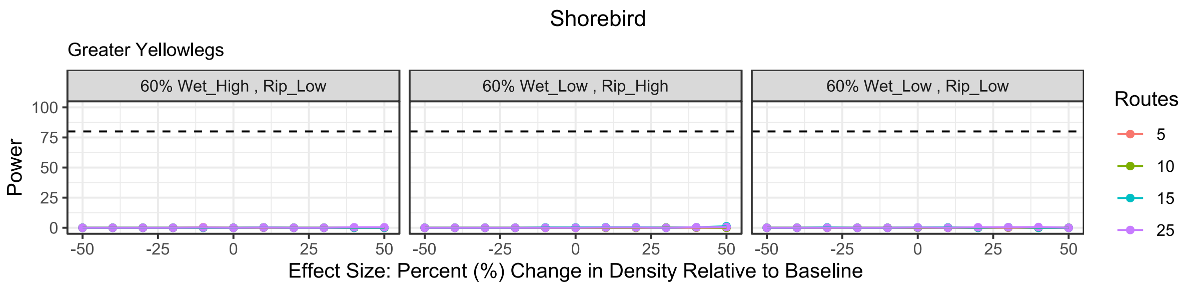

Figure 6.12-44: Power to detect a percent change in density from baseline within the LSA for the shorebird proxy species. Power to detect a percent change in density (-50% to +50%) from baseline within the LSA for a hypothetical new year of breeding bird point count surveys for a shorebird VC. Simulations were completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Wet = Wetland, Rip = Riparian Habitat.

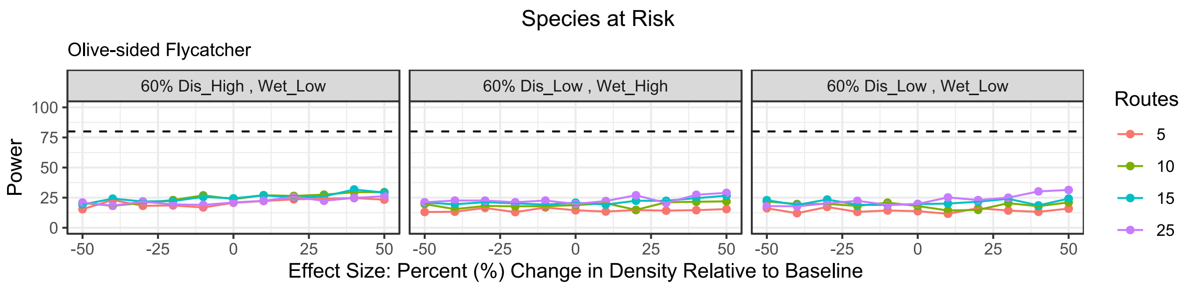

Figure 6.12-45: Power to detect a percent change in density from baseline within the LSA for the special concern proxy species. Power to detect a percent change in density (-50% to +50%) from baseline within the LSA for a hypothetical new year of breeding bird point count surveys for a special concern VC. Simulations were completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Wet = Wetland, Dist = Disturbed Habitat.

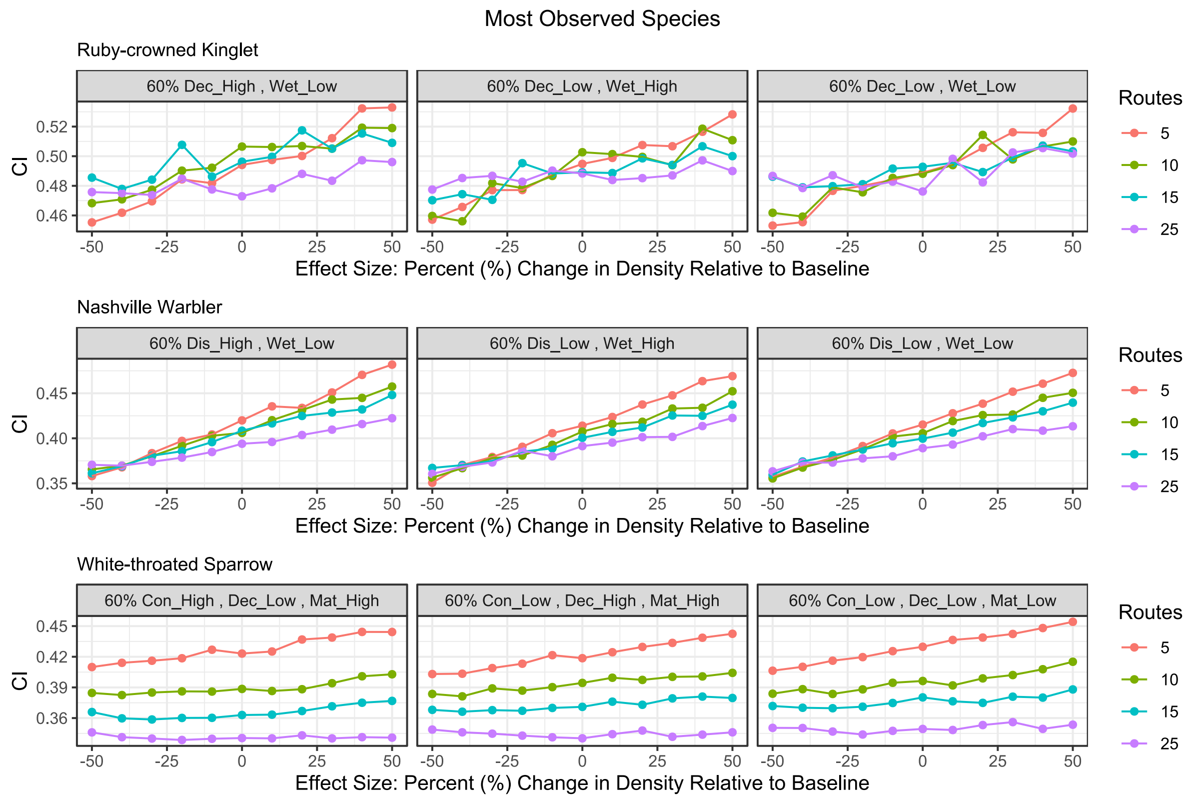

Figure 6.12-46: Confidence intervals for the predicted density for the three most observed species. Confidence intervals for the predicted density inside the LSA at the reference levels of the predictor variables averaged across all years for the three most observed species. Predictions were obtained from simulations completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous / Mixed Forest, Wet = Wetland, Dist = Disturbed Habitat, Con = Coniferous Forest, Mat = Mature Forest.

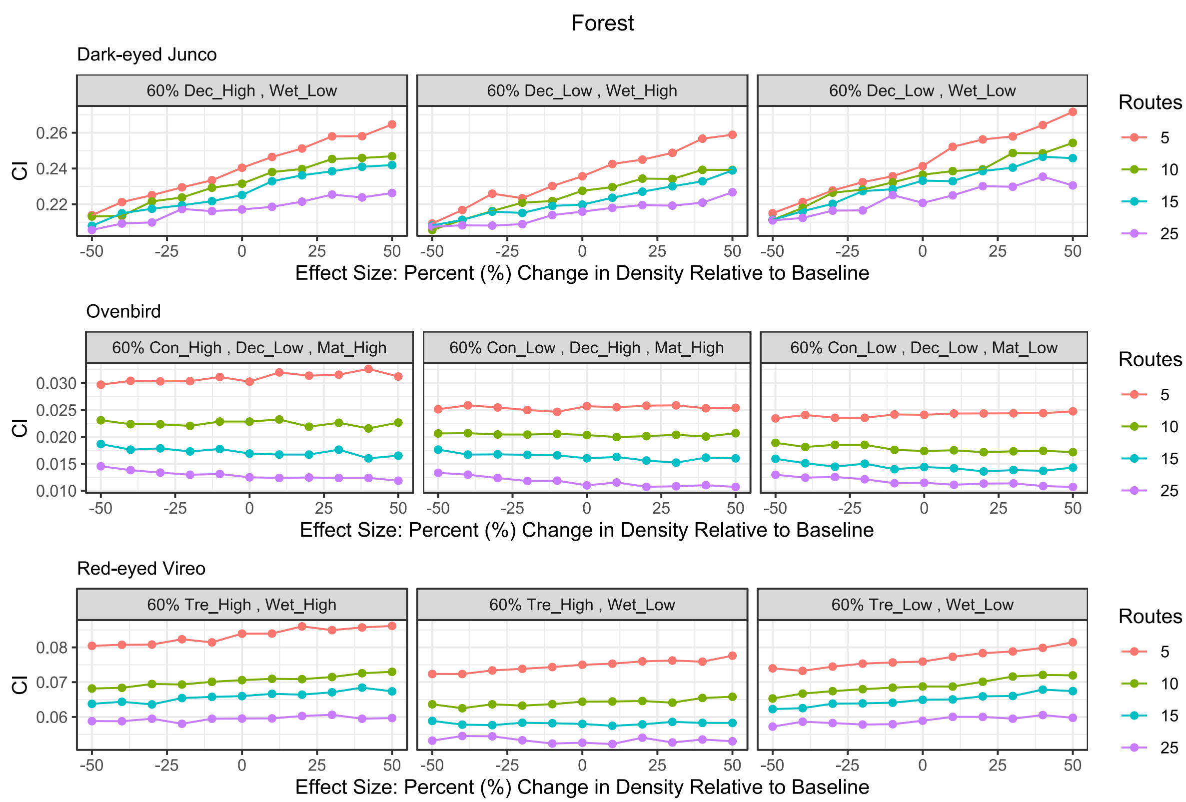

Figure 6.12-47: Confidence intervals for the predicted density for the three forest proxy species. Confidence intervals for the predicted density inside the LSA at the reference levels of the predictor variables averaged across all years for three forest VCs. Predictions were obtained from simulations completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous / Mixed Forest, Wet = Wetland, Tre = Treed Habitat, Con = Coniferous Forest, Mat = Mature Forest.

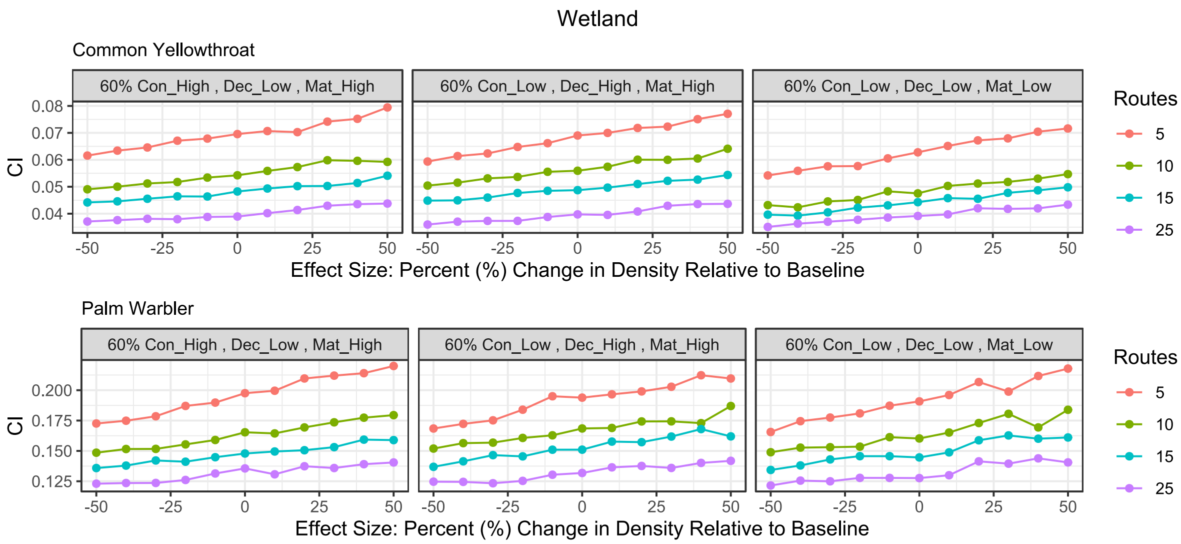

Figure 6.12-48: Confidence intervals for the predicted density for the two wetland proxy species. Confidence intervals for the predicted density inside the LSA at the reference levels of the predictor variables averaged across all years for two wetland VCs. Predictions were obtained from simulations completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Dec = Deciduous/Mixed Forest, Con = Coniferous Forest, Mat = Mature Forest.

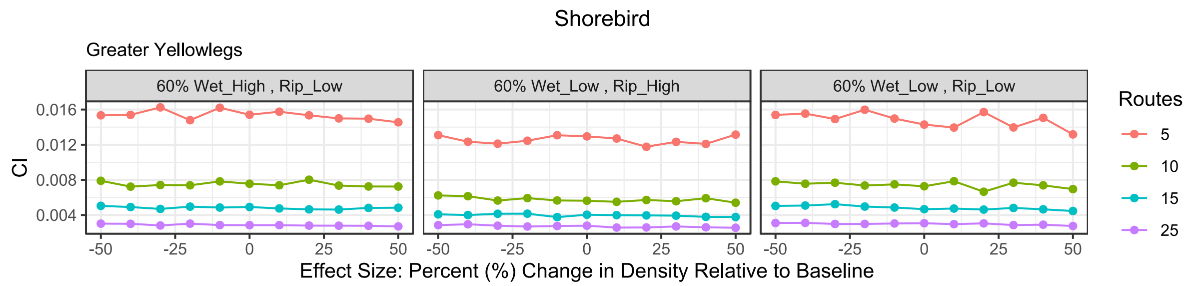

Figure 6.12-49: Confidence intervals for the predicted density for the shorebird proxy species. Confidence intervals for the predicted density inside the LSA at the reference levels of the predictor variables averaged across all years for a shorebird VC. Predictions were obtained from simulations completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Wet = Wetland, Rip = Riparian Habitat.

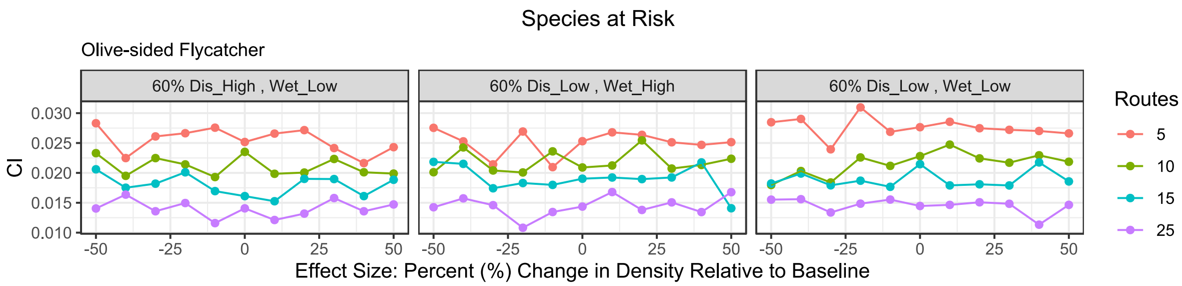

Figure 6.12-50: Confidence intervals for the predicted density for the special concern proxy species. Confidence intervals for the predicted density inside the LSA at the reference levels of the predictor variables averaged across all years for a SAR VC. Predictions were obtained from simulations completed for various levels of effect size, sample size, and habitat. Each panel for a given species represents the habitat targeted during sampling. Habitat names are abbreviated as follows: Wet = Wetland, Dist = Disturbed Habitat.

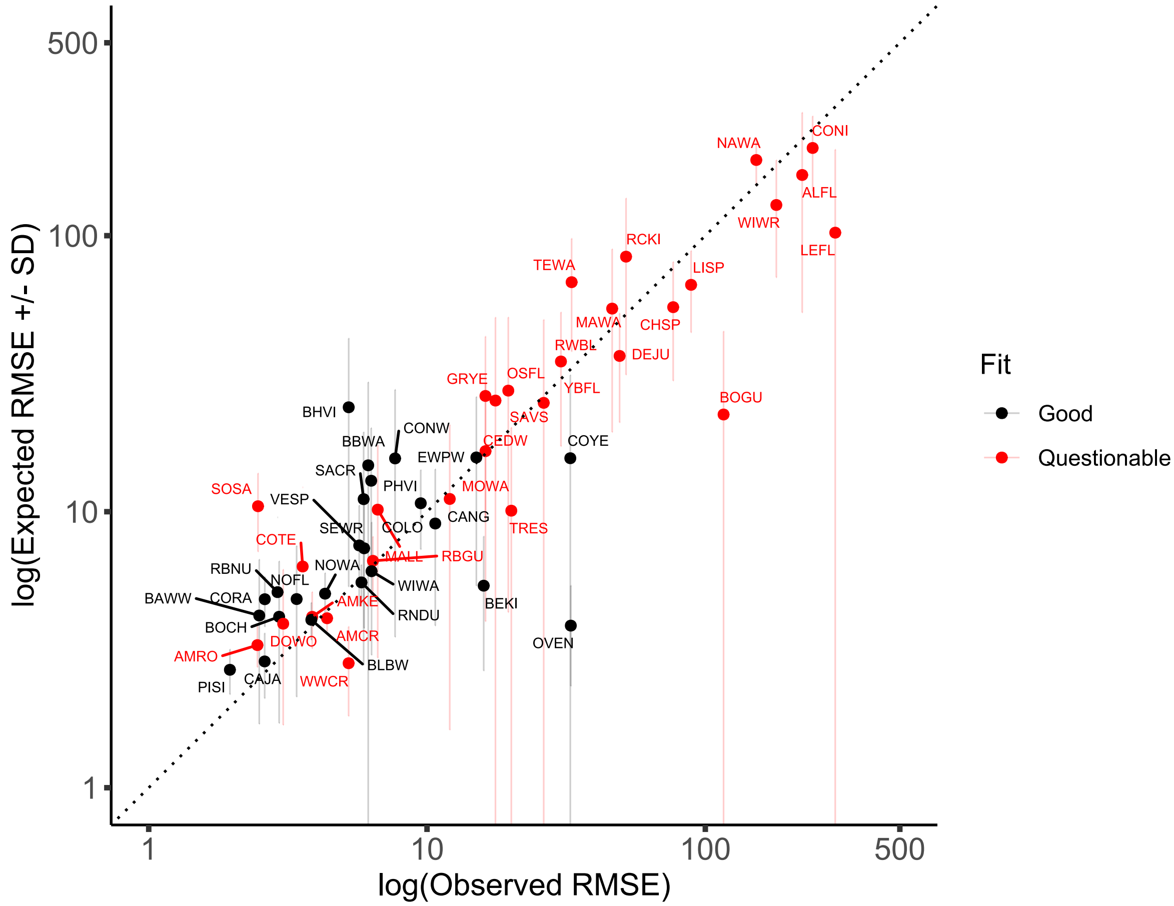

Figure 6.12-51: K-fold cross-validation results. K-fold cross-validation results for the best-fitting acoustic activity model for each species with sufficient data to model. The Expected RMSE is the mean (± standard deviation; SD) of the RMSEs obtained through k-fold validation on a large (80%) subset of the data. The Observed RMSE is calculated from the remainder of the data. Points are labelled by their corresponding species which are identified by their four-letter code. Model fit is indicated by colour.

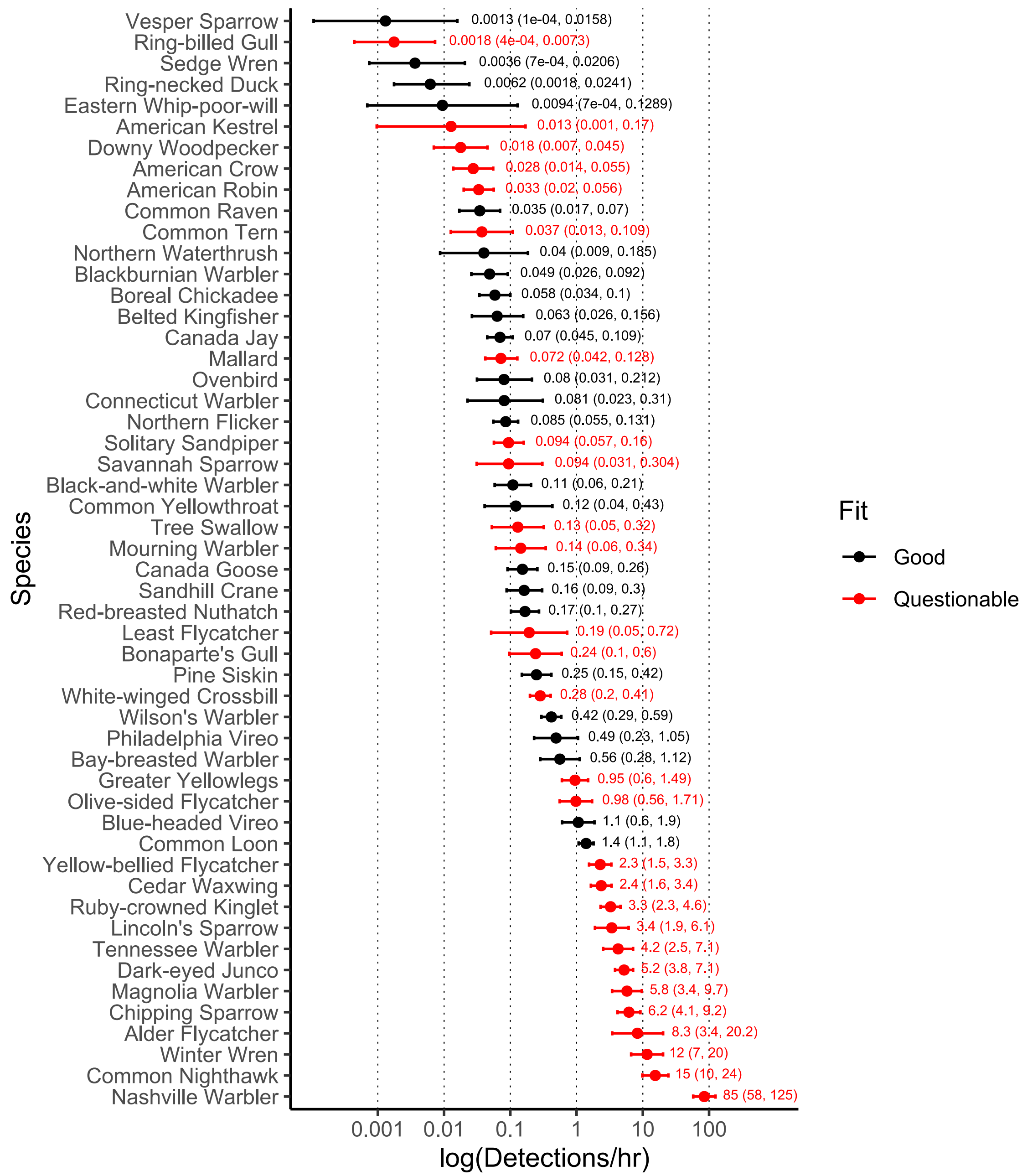

Figure 6.12-52: Average acoustic activity (detections/hr) during ARU recording periods. Average acoustic activity (detections/hr) during ARU recording periods for each species predicted by the best-fitting models across both years and treatments at average levels of the predictor covariates. Confidence intervals were estimated from standard errors of the predicted values. Model fit is indicated by colour.

Figure 6.12-53: Acoustic activity rate per week of the most frequently recorded bird species. Acoustic activity rate per week of the most frequently recorded bird species. Values are predicted average detection rate estimated by the best fitting models. Estimates were obtained for average levels of the habitat covariates (i.e., correcting for habitat variation). Values were scaled to the *maximum average detection rate for the species to help highlight its relative activity across the season.*

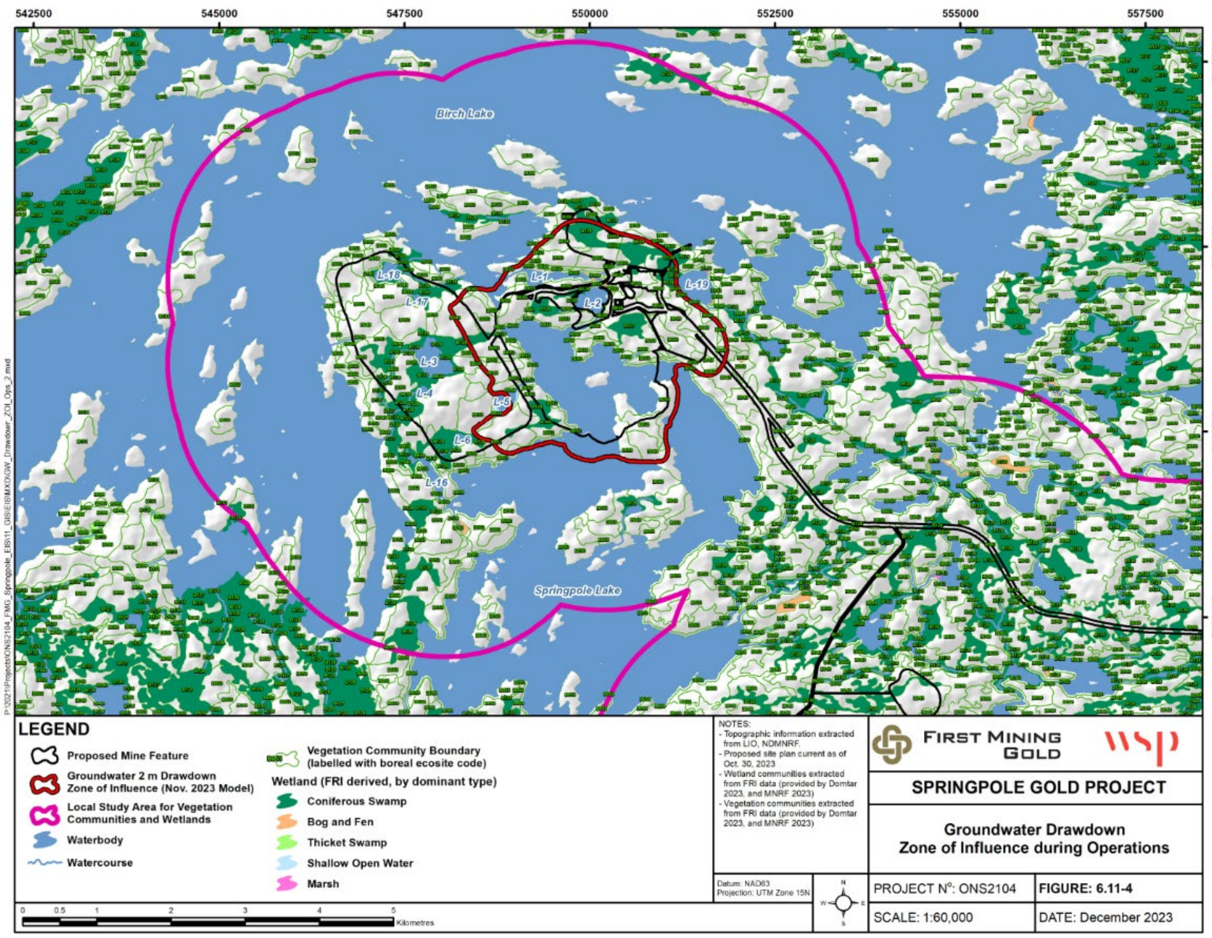

Figure 6.12-54: Groundwater Drawdown Zone of Influence during Operation

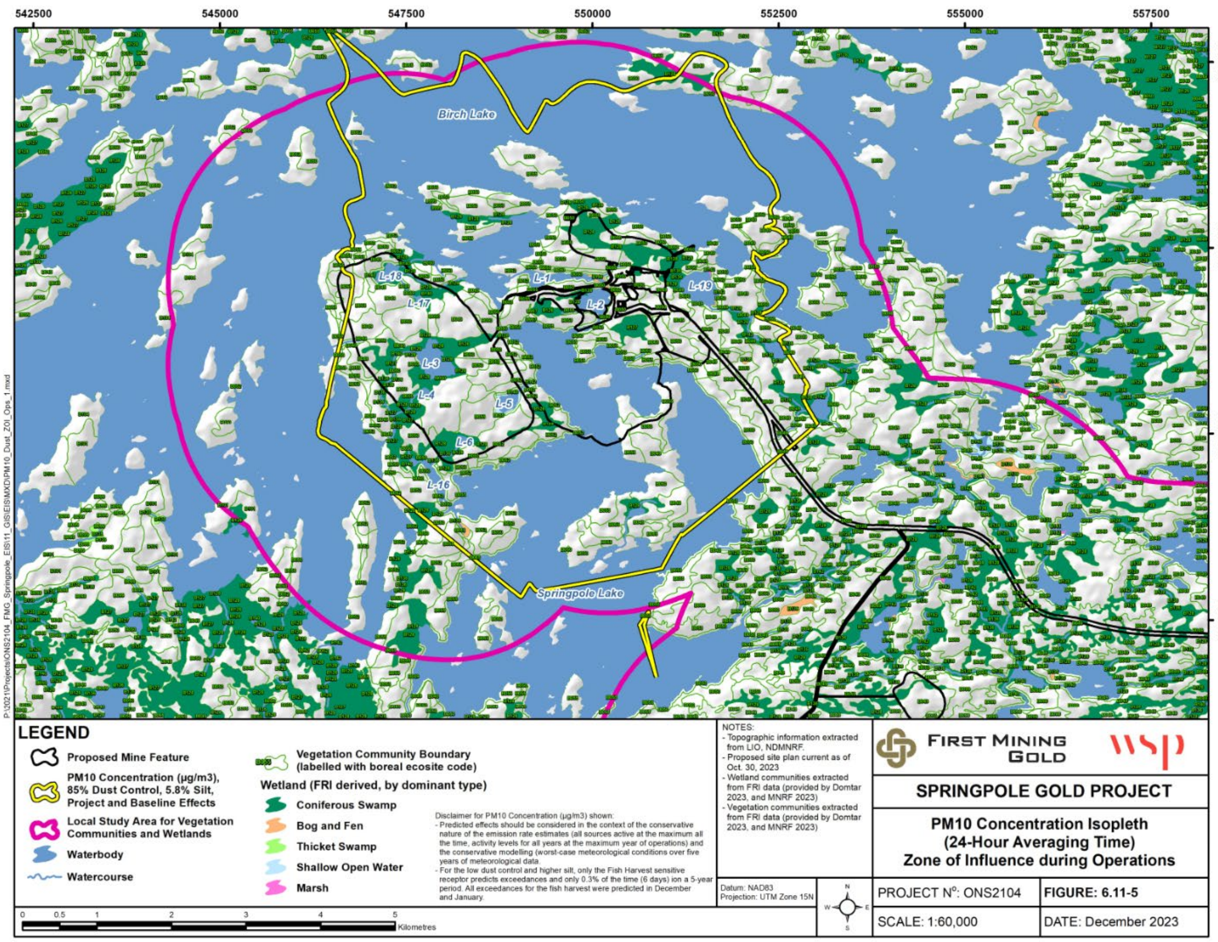

Figure 6.12-55: Air Exceedances

Figure 6.12-56: Noise Exceedances