Webequie Supply Road

Breeding Birds Work Plan
Webequie First Nation

August 7, 2020
661910

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1 Introduction

The proposed Webequie Supply Road Project (WSR) is a new all-season road of approximately 107 km in length from Webequie First Nation to the mineral deposit area near McFaulds Lake (also referred to as the Ring of Fire). A Location Plan for the Project is shown on **Figure 1**. The preliminary corridor for the road consists of a northwest-southeast segment running 51 km from Webequie First Nation to a 56 km segment running east before terminating near McFaulds Lake. A total of 17 km of the corridor is within Webequie First Nation Reserve lands.

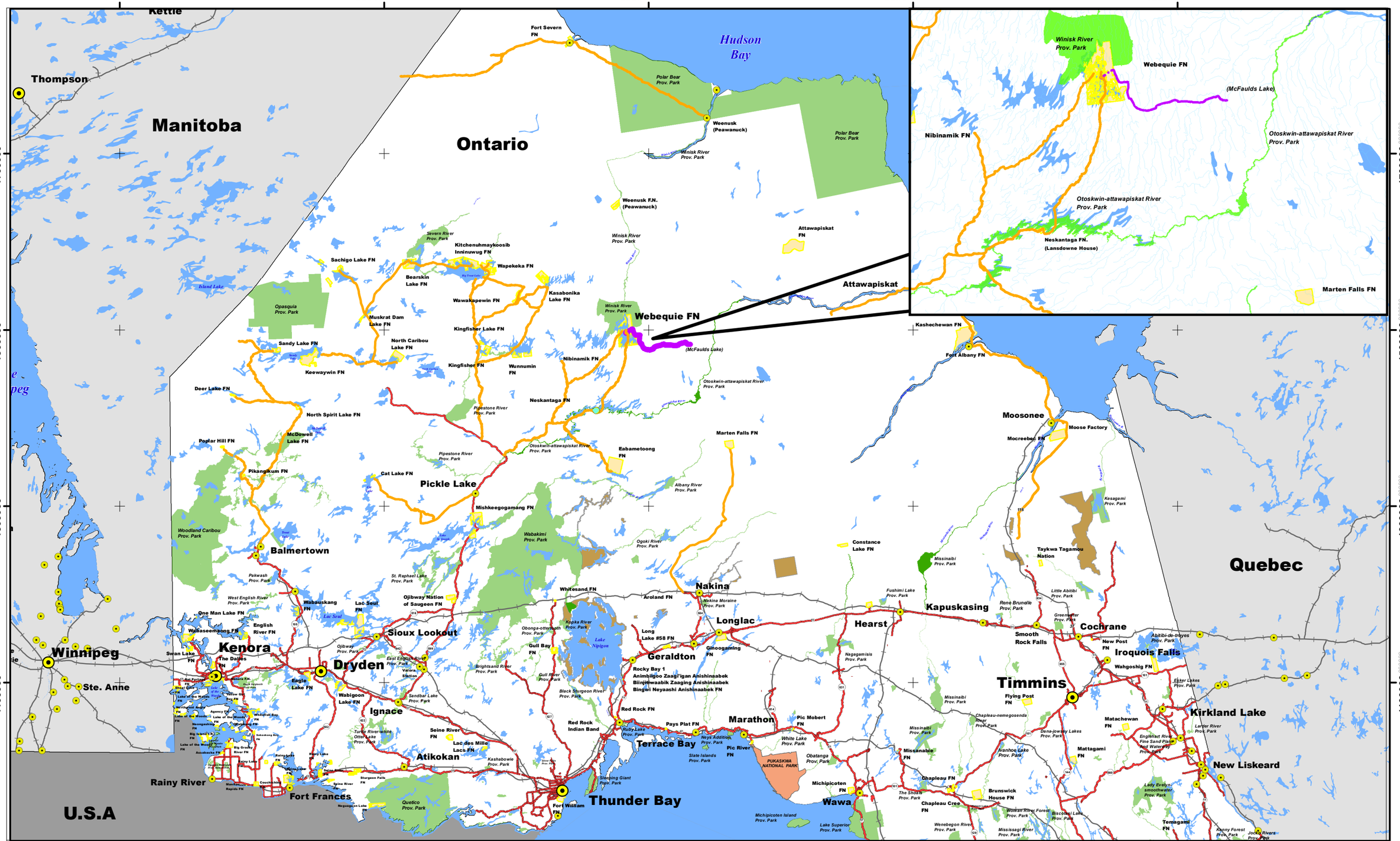
The goals and objectives of the Webequie Supply Road Project are as follows:

- To facilitate the movement of materials, supplies and people from the Webequie Airport to the area of existing mineral exploration activities and proposed mine developments in the McFaulds Lake area;
- To provide employment and other economic development opportunities to WFN community members and businesses that reside in or around the community's reserve and traditional territory, while preserving their language and culture; and
- To provide experience/training opportunities for youth to help encourage pursuit of additional skills through post-secondary education.

On May 3, 2018, the Ontario Minister of the Environment, Conservation and Parks (then Minister of the Environment and Climate Change) signed a voluntary agreement with Webequie First Nation to make the Webequie Supply Road Project subject to an Individual Environmental Assessment under Ontario's *Environmental Assessment Act.* The Project is also subject to meeting the requirements of the federal *Impact Assessment Act.* For the purposes of this work plan, the term "EA" is meant to include both the provincial environmental assessment and the federal impact assessment.

The purpose of this document is to present the work plan developed to assess the impact of the Webequie Supply Road Project (WSR, the Project) on breeding birds and their habitat. It describes the general approach that will be applied during the EA process to address the requirements of the Impact Assessment Agency of Canada (IAAC) Tailored Impact Statement Guidelines (TISG), and meet the expectations of the Ontario Ministry of the Environment, Conservation and Parks (MECP) in the context of established wildliffe considerations governing environmental assessments for road projects.

The Breeding Birds Work Plan is being submitted to the IAAC and MECP requesting that a coordinated review be undertaken with the objective to provide Webequie with technical guidance in meeting the requirements of the federal Tailored Impact Statement Guidelines for the project and the provincial Terms of Reference (ToR), which is pending approval from the MECP. Please note that Ontario's review of the work plan is preliminary and secondary to any further review and decisions related to a Final ToR.



Legend

- Proposed Preliminary Corridor for the Webequie Supply Road
- City/Town
- Airports
- Winter Roads
- All-Season Roads
- Rail
- First Nation Reserve
- Federal National Park
- Provincial Park
- Conservation Reserve
- Waterbody

WSR WEBEQUIE SUPPLY ROAD

0 50 100 Km

N

Canada Lambert Conformal Conic Projection

Webequie Supply Road

Project Location

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1.1 Defining Spatial and Temporal Boundaries

1.1.1 Spatial Boundaries

Spatial boundaries define the geographic extent within which the potential environmental effects of the Project are considered. As such, these spatial boundaries define the study areas for the effects assessment. Spatial boundaries to be established for the EA will vary depending on the valued component and will be considered separately for each. The spatial boundaries to be used in the EA will be refined and validated through input from federal and provincial government departments and ministries, Indigenous groups, the public and other interested parties.

Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential effects of the Project; community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous communities; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; and physical, ecological, technical, social, health, economic and cultural considerations.

At this stage in the EA process, the spatial boundaries for the EA will include the following three (3) study areas to capture the potential direct and indirect effects of the Project for each valued component, unless otherwise specified in a work plan:

- **Project Footprint (PF) –** is the identified areas of direct disturbance (i.e., the physical area required for Project construction and operation). The PF is defined as the 35 m right-of-way (ROW) width for the WSR and temporary or permanent areas needed to support the Project, including laydown/storage yards, construction camps, access roads and aggregate extraction sites.
- **Local Study Area (LSA)** - is identified as the area where most effects of the Project are likely to be measurable; therefore, along the PF, the LSA will be the focus of data collection to characterize existing environmental conditions. The LSA for most valued components will extend or buffer approximately 1 km from the supply road ROW boundary, and 500 metres (m) from the temporary or permanent supportive infrastructure.
- **Regional Study Area (RSA)** – encompasses the area outside of the LSA used to measure broader-scale existing environment conditions and provide regional context for the maximum predicted geographic extent of direct and indirect effects of the Project (e.g., changes to downstream surface water quality, caribou, or changes to socio-economic conditions such as regional employment and incomes). Cumulative effects of the Project in combination with past, present, and reasonably foreseeable developments are typically assessed at this larger spatial scale. The RSA is defined as extending approximately 5 km from the LSA boundary.

The study areas for the breeding bird were selected to characterize existing environmental conditions and predict the direct and indirect changes from the Project on a continuum of increasing spatial scales from the Project Footprint to broader, regional levels. The preliminary selection of study areas also considered the physical and biological properties of the valued component and related evaluation criteria. **Figure 2** presents the spatial Study study area boundaries for the subject valued component.

The baseline data collection and effects assessment relative to the spatial boundaries will focus on the set of supply road conceptual alternatives within the preliminary proposed corridor, as identified in the federal Impact Assessment Detailed Project Description (November 2019) and the provincial

Environmental Assessment draft Terms of Reference (September 2019). The alternatives include the Webequie First Nation community's preferred route for the supply road (35 m right-of-way width) along the centreline of an approximately 2 km wide preliminary proposed corridor and the optimal geotechnical route within the same corridor. The route alternatives are shown in **Figure 2** with the LSA and RSA boundaries for each route alternative combined to reflect the study area for the Project. At this stage of the EA process the supportive infrastructure components have yet to be determined. It is anticipated that additional alternative routes may be developed during the EA. For example, a route that may be based on optimizing the geometric design of the community preferred route or optimal geotechnical route may be included. Where such additional alternatives are identified, the study area will be adjusted.

For the purposes of the breeding bird work plan the decision to use the standard project study area definitions (PF, LSA and RSA) was based on habitat availability and an examination of the relative abundance of the vegetation/bird habitat classifications between the RSA and LSA. This comparison indicates that there is a marginal difference between the availability of the various defined vegetation (habitat) types as the extent of LSA under consideration is expanded to the regional level. The majority of the values (area of each habitat type) show a variation of less than 1% between the LSA and RSA, with only 4 vegetation/habitat types between 1-3% (Coniferous Swamp 1.81%, Swamp 1.86% less in the RSA, and Bog 2.27%, waterbody 2.54% more in the RSA). Given these results, it has been determined that a further expansion of the RSA is unnecessary to adequately capture the relative abundance of vegetation/habitat types affected by the Project, and that the LSA/RSA will be adequate for further detailed avian studies executed in support the effects assessment. That said, if the results of field studies and subsequent density/distribution modelling warrant it, spatial boundaries for breeding birds may be altered to adequately capture the extent of the specific VC habita/area of influence to provide a comprehensive effects analysis.

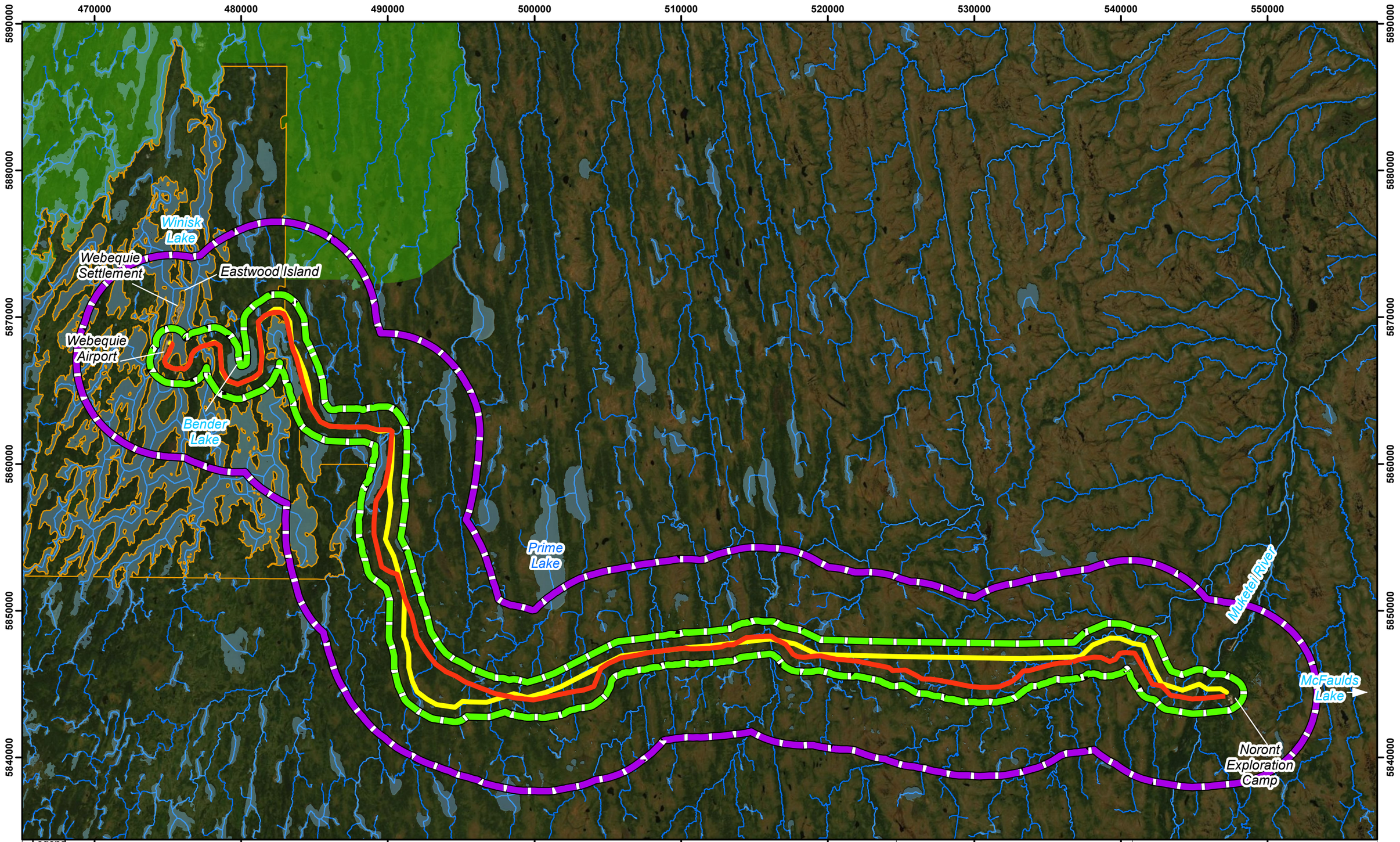
1.1.2 Temporal Boundaries

The EA process was designed to evaluate the short-term and long-term changes resulting from the implementation of the Project and associated effects on the environment, including where project activities may overlap such as the restoration (e.g., revegetation) of temporary access roads that could occur during the operation.

Implementation of the Project will occur in phases (refer to Section 4.3.4 of the ToR). The potential interactions with the natural, cultural and socio-economic environments and the potential occurrence of residual impacts are anticipated to be different in each phase. In order to focus the assessment, the key activities can be divided into the three main phases:

- **Construction Phase**: All the activities associated with the initial development of the road and supportive infrastructure;
- **Operations Phase**: All activities associated with operation and maintenance of the road and any other permanent supportive infrastructure (e.g., operations and maintenance yard, aggregate pits) that will start after construction and continue indefinitely; and
- **Decommissioning/Abandonment/Closure Phase**: The Project will be operated for an indeterminate time period; therefore, retirement (decommissioning/abandonment/closure) is not anticipated and will not be addressed in the EA. Note that clean-up and site restoration, including the decommissioning and removal of temporary infrastructure (e.g., access roads) will be addressed in the construction phase.

Although generally based on the planned stages described above, the final selection of temporal boundaries is criteria-specific and further detail will be provided in the discipline-specific assessment sections of the Environmental Assessment Report/Impact Statement (EAR/IS.). Temporal variation or patterns in potential effects associated with different criteria (e.g., habitat use by migratory birds or breeding birds, or trends over time in populations and employment) will also be considered. Baseline data collection for all biophysical valued components will be provided for a minimum of two years, unless specified otherwise. Temporal boundaries spanning more than one year will enable accounting for annual or seasonal variations (e.g., the effects of storms on migration, delays in the onset of spring conditions, or early snowfalls).



Legend

- Optimal Geotechnical Route
- Community Preferred Route
- Local Study Area (LSA 1km From Alternative Footprints)
- Regional Study Area (RSA 5km From Alternative LSA's)
- Webequie First Nation Reserve
- Waterbody
- Watercourse
- Winisk River Provincial Park

WSR WEBEQUIE SUPPLY ROAD

0 5 10 Km

N

NAD 83
UTM Zone 16N

Webequie Supply Road

Preliminary Route Alternatives and Combined Study Areas

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2 Work Plan

2.1 Methodology

This section describes the planned approach to baseline data collection and the assessment of the potential impacts of the WSR Project on migratory/breeding birds and their habitat to meet the requirements of the TISG (Sections 8.9 and 15.2) and, where applicable, meet the expectations of the MECP, the Ministry of Natural Resources and Forestry (MNRF), and Webequie First Nation community members from the consultation undertaken to date.

2.1.1 Background Data Review and Field Surveys

Information to characterize existing conditions for birds, migratory birds and their habitat for the Project will draw upon the following secondary sources:

- Previously conducted environmental studies, including Indigenous Knowledge information obtained through consultation with Indigenous communities, will be reviewed and dated information updated as required;
- Regulatory databases;
- Aerial photography;
- Geographic Information System (GIS) databases;
- Academic literature;
- Information obtained from regulatory agencies and other stakeholders;
- Canadian Conservation Data Centres;
- Existing Natural Heritage Studies within the Study Area;
- North American Landbird Conservation Plan (Bird Conservation Regions 7 and 8);
- eBird.org;
- iNaturalist.com;
- The Atlas of the Breeding Birds of Ontario; and
- Environment and Climate Change Canada's guidance on Bird Surveys.

A list of all secondary sources reviewed will be amended and documented in detail in the EAR/IS.

The primary purpose of the avian field program will be to describe biodiversity of bird species and their habitats that are found or are likely to be found in the project area. Data collected through field studies will be sufficient to fulfill the following basic requirements and objectives outlined in the TISG issued by the IAAC:

- *The following groups of migratory and non-migratory birds areconsidered as valued components: forest birds; raptors; shorebirds; waterfowl; and bog/fen birds, and other wetland birds;*
- *At minimum, the combined information from existing data and field surveys will be detailed enough to describe the distribution and abundance of all bird species in relation to the defined study areas (i.e., (PF ,LSA and RSA);*
- *Collect bird data to adequately represent the following temporal sources of variation: among years; within and among seasons (e.g., spring migration, breeding, fall migration, overwinterig); and within the 24 hour daily cycle;*

- *Collect explanatory (i.e., covariate) data necessary for modeling in such a way as to adequately represent the following spatial and temporal sources of variation: spatial variation in: land cover composition; soil type, geomorphology; hydrological processes and climatic conditions; temporal, especially annual, variation in local weather inter- and intra-annual climatic variability;*
- *Collect data in a manner that enables reliable extrapolations in space (i.e., at minimum to PF, LSA and RSA) and in time (i.e., across years);*
- *Identify any and all federal and provincial Species at Risk and/or Critical Habitat in the defined study areas for the Project; sites that are likely to be sensitive locations and habitat for birds or environmentally significant areas; and*
- *Identify areas of concentration of migratory birds, including sites used for migration, staging, breeding, feeding and resting.*

To help inform the work plan and to gather the baseline information required to support the EA, we engaged with Webequie community members who have knowledge of specific habitat areas (see Section 3.0). They provided Indigenous Knowledge and other information related to land use activities (e.g., hunting,), bird species or their habitat (e.g., staging areas, nesting areas etc.) and species of importance from a cultural or food source perspective which assisted in refining some survey locations.

The following field surveys are proposed:

- Breeding Bird Point Count Survey;
- Acoustic Bird Sampling;
- Crepuscular Bird Surveys;
- Waterfowl Migration Aerial Surveys;
- Shorebird Migration Aerial Surveys; and
- Raptor Nesting Data Collection.

2.1.2 Survey Site Selection

Survey site selection is described in the methodology for each survey type noted above.

The study areas under consideration include the standard project definitions (PF, LSA, and RSA) described in **Section 1.1** above**.**

Survey site selection focused on sampling of the lands overlapping with the selected alternative routes within the preliminary preferred corridor, that encompases the PF, LSA and RSA.

After much consideration, it was determined that developing a stratified computer driven sampling model was not an appropriate method to determine surveys sites at this stage of the study. This decision was based on the field work already completed in 2019 and the identfication of a preliminary proposed corridor and alternative conceptual routes for further consideration and analysis in the EA, as detailed in the ToR and Detailed Project Description. Instead a more focused approach was used to fully capture data along the selected conceptual routes, within suitable habitat , and within known rare and SAR habitat types, to support the effects assessment. For example, an increased sampling effort was applied to upland habitat since only 6.284% of the LSA is considered upland forest type, of which 0.334% is deciduous, 0.51% mixed, and 5.44% conifer. The site selection process was conducted by: reviewing existing aerial/lidar and satellite imagery and helicopter reconnaissance conducted during other survey types; review of results from on-going vegetation/habitat classification and other background information;

and consultation undertaken to date with Indigenous communities and government agencies. These data sources were then used to establish locations for survey sites based on the professional opinion of biologists and field fit to ensure a stratified sampling of all habitat types with adequate distribution across the LSA and RSA, were captured, as well as suitable number of sample locations within known rare habitat types and areas that may be potentially directly impacted by the Project. This selection process was conducted prior to the breeding birds field studies that were conducted in 2019, and those planned for 2020. As such, sample locations have been selected to ensure adequate representation in the LSA, RSA for the proposed WSR and supportive infrastructure (e.g., aggregate extraction areas, construction camps, access roads, etc,.) with the goal of determining any potential variation between the study areas as well as the variation between discrete habitats found therein. Species-sampling effort curves will also be used to make a final determination of whether sampling has been effective in capturing the potential species present within each site.

2.1.3 Geomatics and Habitat Typing

The ongoing vegetation classification program (refer to Vegetation Work Plan) will support the avian program habitat classification process. For that program, original source data were taken from the most recent Land Information Ontario (LIO) Wetland, Watercourse/Waterbody dataset, and the Far North Land Cover files. Digital satellite imagery was sourced from the ArcGIS base maps. It was determined that the LIO wetland and waterbody data provided the most accurate starting point for wetland feature refinement, since it generally agreed with the Far North land Cover data, while providing more detailed delineation of both the wetlands and waterbody features. Areas of no data/unknown in the LIO wetland and waterbody datasetdatasets were filled in with the values from the Land Cover dataset where applicable.

The corridor alternatives supply road conceptual alternatives (community preferred route and optimal geotechnical route) within the preliminary proposed corridor were buffered to 1 km from the PF for the LSA, and 5 km from the LSA boundary for the RSA, and then superimposed over the resulting mapping. Within the RSA, a desktop aerial interpretation survey of the forests, wetlands, lakes and rivers was conducted to refine and re-delineated all feature class polygons, and an initial vegetation type definition was applied based on published sources and available satellite imagery. The definition of the polygons within the data set were further refined to coarse ecosites, such as Shrub Bog, Conifer Forest and Treed Fen. These combined and revised data were used as the new baseline for the selection of sample points for the 2019 field season, and further refinement.

The second round of refinement, of the baseline data resulting from step one, was done within the LSA at a smaller scale, using additional LiDAR imagery and terrrian elevation and soils data gathered by JD Mollard (2016). This data, as well as the results of the 2019 summer field surveys, were used to more accurately define ecosites and their boundaries within the LSA. Data from the field survey were treated as the most accurate and those points were used to refine the classification of the polygons in which they were located; these classifications were then extrapolated to other polygons with similar visual characteristics, but not to the same degree of specificity. For example, a point may suggest an area as a specific conifer forest type, but visually similar areas separated from the polygon in which the point is located would be labeled only to Conifer Forest, since information such soil type, a key determinant of ecosite classification, is unavailable at this time. These data will be updated as future field surveys are completed and more data collected.

Habitat type will also be characterized at each distinct survey station visited during baseline bird studies. In order to support characterization at these locations, each site will be photographically documented with 13 photos, one at each cardinal direction (N, E, S, W): 1 photo at shoulder height with arm and camera extended parallel to ground, 1 photo with arm at 45-degrees (from body position) pointing down, and 1 photo with arm extended at 135-degrees (from body position) pointing up, and one photo with arm extended vertically. Photos will be interpreted by qualified individuals specialized in botanical inventory and habitat typing and knowledgeable of the vegetation communities found within the RSA. Each survey location will be classfied according to one or each of the classification schemes: Ontario Ministry of Natural Resources and Forestry's (MNRF) Ecosites of Ontario: Boreal Range ELC system, and/or the Canadian Wetland Classification System. To the extent possible, all candidate survey sites will be attributed to a 100m buffer around site centroid, areal coverage and percentage of each land cover class be assigned to sites, and these values will be used as inputs to evaluations of representative habitat.

Complete data sets from any survey sites, including GIS files will be provided. Databases and GIS files will be accompanied by detailed metadata that meets ISO 19115 standard 29.

2.1.4 Data Analysis/Abundance and Distribution Modelling

Corelative Species Distribution Models (SDMs), will be developed to provide quantitative descriptions of breeding species' or migratory bird (e.g. waterfowl staging and feeding) distributions within the project study areas based on associations between observational data and species-specific environmental predictors determined through review of existing literature. These will be further refined with point count, acoustic, and aerial survey data from the 2019, and 2020 field programs to develop Species Abundance Models (SAMs), which will be used to quantify indices of abundance or density rather than occurrence. The combination of these models will be used to identify key habitat factors for species of interest , where data is sufficient to validate the model (Milsom et al. 2000, Morrison et al. 2006). When possible, model data will be used to develop predictive maps on species distribution and abundance. These maps will be also used to predict population responses to the development of the project and inform future monitoring requirements.

Explanatory (i.e. covariate) data will be collected during each bird survey as well as through the vegetation sampling programs and background information review to support modeling so as to adequately represent the spatial and temporal sources of variation. The following presents a preliminary list of covariates which may be used to support the modelling process, dependant on individual species or guild (such as waterfowl) habitat requirements that may be extrapolated across a landscape scale*:*

- *Land Cover Composition:*
  - Land Information Ontario (LIO) Wetland, Watercourse/Waterbody classification
  - Far North Land Cover classification
  - Percent deciduous cover;
  - Percent Conifer cover;
  - Forest age (years);
  - Percent shrub cover;
  - Area of waterbody or open wetland;
  - Area and % coverage of marsh or emergent vegetation; and,
  - Percent coverage of emergent vegetation.

- *Soil Type:*
  - *Mineral; and,*
  - *Organic.*

- *Geomorphology:*
  - Percent exposed rock; and,
  - Eskers.

- *Hydrological Processes*
  - Distance to nearest waterbody or watercourse;
  - Density of waterbodies (neighbourhood metric); and,
  - Percent open water (HWL) for open wetlands.

- *Climatic Conditions;*
  - Annual range in temperature;
  - Mean seasonal minimum/maximum temperature (autum, winter, spring, summer);
  - Mean climate moisture Index;
  - Mean seasonal precipitation (autum, winter, spring, summer); and,
  - Years since fire activity.

- *Survey Data (Point count/ARU/Aerial counts)*
  - Species;
  - Number of individuals;
  - Estimated Distance from viewer (0-50m, 50-100m, 100+ m)Season;
  - Minute interval first detected (1, 2, 3….10);
  - Breeding evidence (i.e. suitable habitat, singing male, pair, nest with eggs, nest with young, etc); and,
  - SurveyCurrent weather conditions (temperature, wind [Beaufort Scale], precipitation, cloud cover [%]).

The specific approaches to the data summary and modelling can be found in the sections below which also provide an outline of the surveys conducted and planned to date. Breeding Bird Point Count Surveys.

2.1.4.1 2019 Breeding Bird Point Counts

Prior to executing the breeding bird surveys, a thorough review of background data was conducted to provide a preliminary identification of potential significant habitat within each ot the study areas. A focused consultation with relevant provincial agencies, and Webequie First Nation was also conducted to help prioritize point count location parameters, and when possible a Webequie community member will accompany surveyors to provide community input to the survey process (See Section 5, Indigenous and Public Input). A complete list of bird species known to have occurred in proximity to the Project RSA is provided in **Appendix A**. Included in this Appendix is all bird species (including scientific names) noted during both formal field survey and incidental observations in 2019.

Inventories for migratory and year-round resident bird species that are expected to nest within the project area will be conducted using principles of the Forest Bird Monitoring Program as well as the Ontario Breeding Bird Atlas survey protocols. These protocols are described in the MNRF's publication Wildlife Monitoring Programs and Inventory Techniques (Konze and McLaren 1997), the Ontario Breeding Bird

Atlas Participants Guide (OBBA, 2001) and generally in Appendix 1 of the TISG. These protocols are generally accepted to be the standard required to provide a high detection probability for all bird species and will serve to supply the data required to support the modelling of species density and distribution described in Section 2.1.9 below. Surveys will be conducted between one half hour before sunrise until five (5) hours after sunrise between June 1 and July 10, and data collected will include:

- Species;
- Number of individuals;
- Estimated Distance from viewer (0-50m, 50-100m, 100+ m);
- Minute interval first detected (1, 2, 3….10);
- Breeding evidence (i.e. suitable habitat, singing male, pair, nest with eggs, nest with young, etc); and
- Survey weather conditions (temperature, wind [Beaufort Scale], precipitation, cloud cover [%]).

This design employed in 2019 and in future will achieve high detection probability as multiple point counts are conducted per site and repeated within and across years (temporally comparable). Any incidental observations of non-target wildlife species or bird species observed between point counts was also recorded.

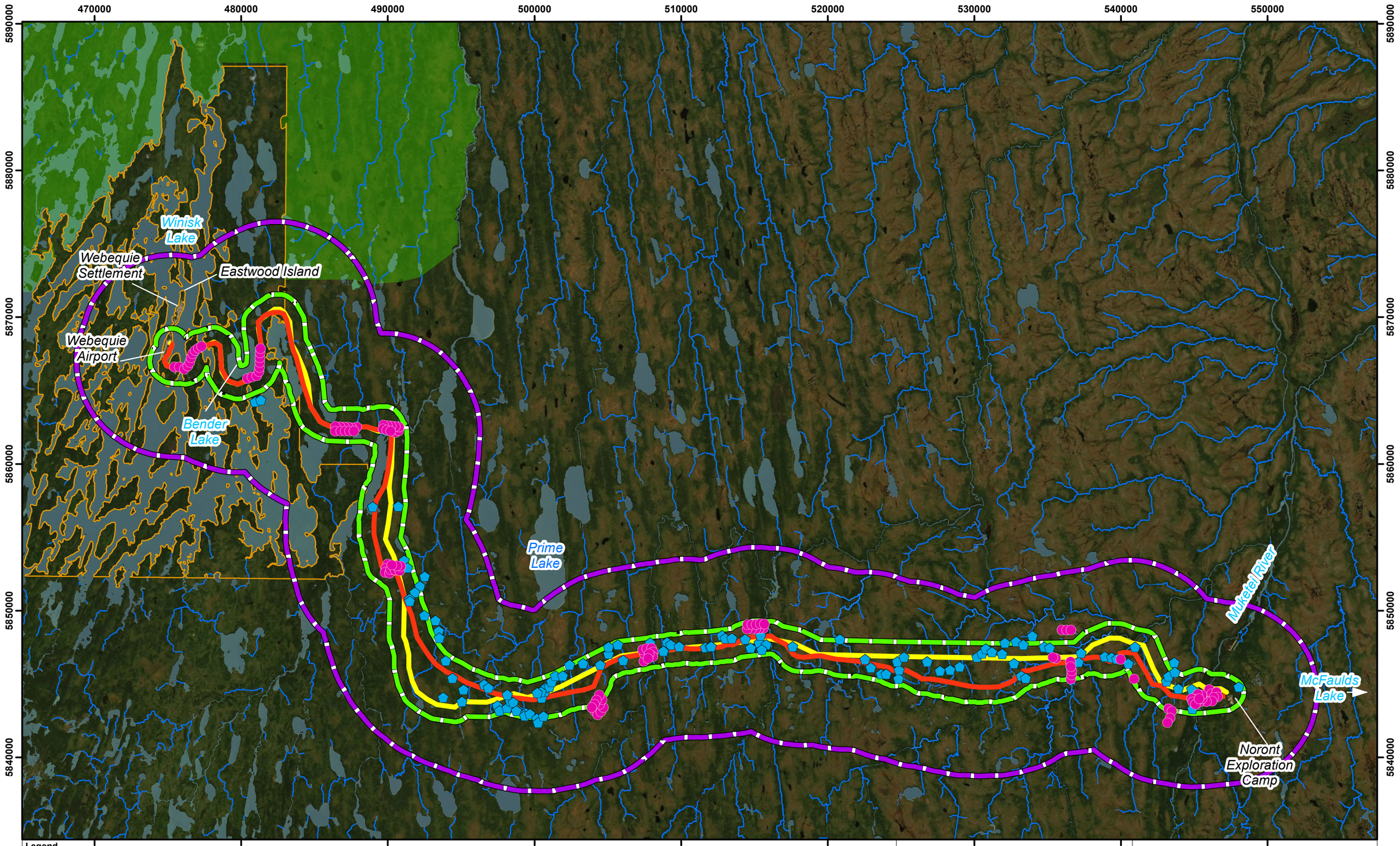
Both protocols utilize a point count survey type, in which a surveyor knowledgeable in bird identification conducts a stationary count of all birds seen and heard over a given time period. Each sample location as were surveyed by a qualified biologists skilled in visual and aural identification of Ontario bird species. Biologist used a standardized 10-minute point count recording each species encountered at 1 minute intervals with distance estimates recorded between 0-50m, 50-100m and >100m. Notes related to land cover within 100m of each sample centroid, will also be taken in order to confirm the land cover class assigned to the vegetation unit during the vegetation program. The vegetation classifications were adjusted if necessary and the resulting vegetation mapping used to provide areal coverage and percentage of each habitat classification for each site for use as inputs to the representative habitat modelling process. The majority of birds that nest within habitats that overlap the Project Footprint and LSA can be adequately sampled using this survey type.

Figure 3 shows the location of the point counts that were conducted during the 2019 breeding bird survey program.

In 2019, breeding bird point counts were conducted at 113 pre-determined stations (in 2019), positioned in 11 locations within the LSA, and encompassing six (6) distinct habitat types, including:

- Deciduous Forest;
- Coniferous Forest;
- Mixed Forest;
- Disturbed Lands;
- Treed Wetland (swamp, treed bog/fen); and
- Open Wetland (bog/fen, marsh).

It should be noted that two (2) sample points occurred in Deciduous Forest units, and deciduous forest accounts for less than 1% of the habitat found within the LSA. As a result, these points were combined with the Mixed Forest accounting for further analysis. Efforts were made to position at least 10 survey points in each of these habitat types in order to generate adequate species lists. This stratified approach ensured that the survey data accurately reflected the species composition within each habitat type, and



Legend

- Breeding Bird Survey Locations
- Surveyed Waterfowl Waterbody
- Optimal Geotechnical Route
- Community Preferred Route
- Local Study Area (LSA 1km From Alternative Footprints)
- Regional Study Area (RSA 5km From Alternative LSA's)
- Webequie First Nation Reserve
- Waterbody
- Watercourse
- Winisk River Provincial Park

WSR WEBEQUIE SUPPLY ROAD

0 5 10 Km

N

NAD 83
UTM Zone 16N

Webequie Supply Road

Breeding Bird Survey Locations and Surveyed Waterfowl Waterbodies

Date: 2020/08/06	File Number: 649920	Sub Code: 0000
Figure Number: 3		Rev. 0

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the study areas as a whole. Overall, the number of point count stations proposed for each habitat type was somewhat proportionate to the coverage of the study areas by each habitat type (refer to **Table 1**). Open water, aquatic habitats such as rivers, ponds, and lakes account for approximately 10% of the land area within the LSA. Some point counts were positioned along the edge of lakes or rivers; however habitat type for these sites were typically assigned to the major vegetation community types that surrounded or encompassed them. For example rivers in the region are typically bordered by upland conifer stands and have simple, narrow shorelines that would not be considered a new habitat type. Such points were assigned to the Conifer Forest habitat type. Alternatively, some ponds or small lakes are surrounding by meadow marsh or open peatland and were assigned to the Open Wetland habitat type.

Point Count Site Selection

In 2019, point counts were grouped in arrays of 8 to 11 points that representatively span the length of the proposed linear corridor. Arrays conducted in 2019 were positioned within 1 km of the centreline of the proposed preliminary preferred corridor. The position of arrays is primarily dependant on reasonable accessibility by helicopters (i.e. adjacent to open landing spots such as rivers, open wetlands, shoreline fens) and where surveyors can move between as many points as possible during the morning survey period to maximize survey effort. Point counts were positioned at least 300m apart in order to limit bird detection at multiple counts. To the extent possible, point counts were positioned such that the count encompassed a single vegetation community type; however, this was not always possible. In the instances where counts bordered multiple vegetation communities (e.g. riparian areas, lake shorelines), field staff indicated on the data sheet which vegetation community each bird was located.

Sample Representation

To demonstrate whether the number of breeding bird count locations were representative of the habitat in the LSA, a chi-squared (χ^2) test was performed in Microsoft Excel® comparing the number of survey stations in each habitat type to the expected number of survey stations in each habitat type within the LSA. The expected number of survey stations in each habitat type was calculated based on the proportion of each habitat type within the LSA. Statistically significant differences (i.e. p-value < 0.05) indicate under- or over-sampling of a habitat type.

Table 1: Number of Expected and Actual Breeding Bird Survey Stations within each Habitat Type

Habitat Type	LSA (ha)	% of LSA	Actual Number of Survey Stations	Expected Number of Survey Stations	Chi-Square (χ^2) Test Result
Disturbed	179.71	0.6	2	1	2.18
Rock Barren	14.45	0.1	0	0	0.06
Conifer Forest	1542.69	5.6	44	6	225.16
Mixed Forest	192.44	0.7	15	1	256.72
Lake/River	2808.05	10.1	0	11	11.48
Open Wetland	2789.37	10.1	13	11	0.22
Treed Wetland	20107.91	72.5	39	82	22.72
Total	**27634.89**	**100.0**	**113**	**113**	518.55

The number of breeding bird survey stations that were surveyed were significantly different than the expected number of survey stations based on the proportion of habitat within the LSA (χ^2 = 518.55, p-value < 0.01). According to this test, the only habitat types that were adequately sampled and representative of the habitat in the LSA were disturbed habitat and open wetland (**Table 1**). Conifer and mixed forests were over-sampled, while treed wetland habitat was under-sampled. The expected number of survey stations for rock barren habitat was zero due to the habitat occupying less than 0.05% of the LSA. Lake and river habitats were not considered as functional habitat types for the majority of species sampled during point counts. Rather, vegetation communities along the shoreline of open water habitats could be classified according to the other major habitat types. Forest habitats were over-sampled due to capturing the greater diversity of species as well as uncommon species that could be expected in these habitat types, as well as the diversity of habitat structures and age classes that could be found with these habitat types.

2019 Survey Result Summary

In 2019, Point count surveys conducted across the WSR study area in 2019 recorded a total of 83 species across 113 point count stations. This species total is comparable to several other studies conducted in the same general area. SAR recorded during point count surveys included Olive-sided Flycatcher (*Contopus cooperi*), Rusty Blackbird (*Euphagus carolina*), Canada Warbler (*Cardellina canadensis*) and Evening Grosbeak (*Coccothraustes vespertinus*). Incidental observations of Barn Swallow (*Hirundo rustica*) and Bald Eagle (*Haliaeetus leucocephalus*) were made during this survey type. A total list of bird species recorded in the LSA in 2019 is provided in **Appendix A**.

Data from seven 10 km x 10 km atlas squares that occur in close proximity to Winisk Lake and Webequie First Nation confirmed 85 recorded species. SAR recorded in these squares included Bald Eagle, Bank Swallow (*Riparia riparia*), Barn Swallow, Common Nighthawk *(Chordeiles minor*), Olive-sided Flycatcher, Rusty Blackbird, and Short-eared Owl (*Asio flammea*). The average number of species recorded per Atlas square (10 km x 10 km) in the Northern Shield was 68 (Cadman et al., 2007. In 2010, the Northeast Science and Information Section of the MNR conducted studies in and near the RSA as part of their Far North Terrestrial Biodiversity (FNTB) study from early June to mid-July (Phoenix, 2013). These studies encompassed a 100 km radius area centred on the Ring of Fire and focused on the communities of Webequie and Marten Falls. A total of 96 breeding bird species were detected, including three Special Concern SAR: Bald Eagle, Common Nighthawk and Olive-sided Flycatcher (Phoenix, 2013). Bird point count surveys were conducted in 2011 and 2012 in support of the Eagle's Nest Project EA. Of the five study areas where point counts were conducted, only those conducted at the mine site are considered close enough to be relevant to the current survey. For this study, a total of 48 plots were surveyed and only three major habitat types were present at the mine site. Overall, a total of 64 bird species were detected during point count surveys at the mine site. Three species at risk were found in the mine site area, including Common Nighthawk, Olive-sided Flycatcher and Rusty Blackbird.

Observations made during the 2019 field season indicate that cattail marsh is absent in the LSA and that little to no extensive meadow marsh habitat occurs along the preliminary proposed corridor, with extensive peatlands representing the majority of wetland habitat. The absence of these habitat types limits the opportunity to survey for marsh-obligate species of Conservation Concern such as Least Bittern (*Ixobrychus exilis*), Yellow Rail (*Coturnicops noveboracensis*), Black Tern (*Chlidonias niger*), or Short-eared Owl, as well as locally rare marsh/fen obligates such as Sora (*Porzana carolina*), American Bittern (*Botaurus lentiginosus*), Nelson's Sparrow (*Ammodramus nelsoni*), and LeConte's Sparrow (*Ammodramus leconteii*). Open, graminoid wetlands present within the RSA are largely limited to the

riparian zones bordering small watercourses, lake shore fens and open tamarack or spruce swamps. Avian diversity along riparian zones is typically high, while diversity across more open wetland habitats is generally low and is characterized by Greater Yellowlegs (*Tringa melanoleuca*), Lincoln's Sparrow (*Melospiza lincolnii*), Savannah Sparrow (*Passerculus sandwichensis*), Dark-eyed Junco (*Junco hymenalis*), and occasionally Ring-necked Duck (*Aythya collaris*) and Sandhill Crane (*Grus canadensis*).

2.1.4.2 2020 Breeding Bird Point Counts

In 2020, it is proposed that the 113 point counts that were surveyed in 2019 (PF and LSA) be repeated in 2020, in order to gain 2 years of temporal data at these locations. An additional approximately 20 new point counts are to be located within the LSA will be surveyed in 2020. In addition to survey points sampled within the LSA, approximately 50 new points will be distributed across lands scoped to be used as aggregate sources and approximately 100 new points will be positioned within the RSA. Additional arrays surveyed in 2020 will focus on: a) gaps in coverage within the LSA; b) across proposed laydown/aggregate areas/access; and c) representative habitats within the LSA and RSA.

Additional survey points will be located in LSA and RSA where helicopter-accessible is permissible and to address gaps from the 2019 survey. All survey points in the LSA and RSA will be surveyed once in 2020 and will be representative of habitat types to ensure that estimates comparing within and across the LSA and RSA are unbiased and as precise as possible.

Point counts in 2020 will be conducted using the same 10-minute survey methodology as described for the 2019 surveys, as that survey followed a very similar protocol as that prescribed by IAAC.

Sample Representation

While it is endeavoured to conduct breeding bird study that adequately sample each vegetation community type (and thus bird habitat type), vegetation communities encountered in the field may not always match the anticipated sample community. As was completed for survey points in 2019, an analysis will be conducted post-survey to compare the proportion of the proposed road alternatives that traverses each vegetation community type to the proportion of bird point counts conducted in each community type. The expected number of point counts in each community type will be calculated based on the proportion of each community type crossed by the centreline of the proposed preliminary corridor. The purpose will be to determine whether the sample of breeding bird point count locations is representative of habitats relative to the proposed route. This analysis will help determine whether any community types were significantly under-represented in the breeding bird density analysis (see below). This analysis will be conducted using the chi-squared test ($\chi 2$) in Microsoft Excel®. Significant statistical differences (i.e., p-value < 0.05) indicate under- or over-sampling of certain community types.

Paired Acoustic Surveys

Observers will also employ high quality portable acoustic recording (ARU) devices (i.e., with 360- degree recording in WAV format, selectable sampling rate, and adjustable microphone gain), mounted on a tripod. This survey type is suitable for sampling a representative species composition for the PF, LSA, and RSA including forest and bog/fen birds, as well as for locating most diurnal avian SAR that occur in the region.

Data recorded using ARUs during the morning breeding bird point counts will be used to aid in normalizing data recorded during these counts and data recorded by ARU only (see **Section 2.1.6**). Normalization methodology for will be developed through a review of primary literature and other available

methodologies which are applicable to a boreal setting. A description of methodologies will be provided in the resulting Natural Heritage Existing Conditions Report.

Data Summary and Modelling

Data collected during point count surveys will be summarized to calculate the overall avian biodiversity present within the study area, diversity at each count station, the number of BCR priority species observed for Ontario Bird Conservation Regions 7 and 8 (Environment Canada, 2014) and North American Bird Conservation Region 8 (PIF, 2008), frequency of occurrence, abundance for each species across the PF, LSA, and RSA scales, abundance for each species within each habitat type, species density across the PF, LSA, and RSA scales, and the locations of observed species of Special Concern or SAR. Observer-induced detection error for comparisons among counts will form part of the densitiy estimates conducted and will be documented in the Natural Heritage Existing Conditions Report. This report will also list those species deemed to be adequately sampled, and those not along with the rationale (e.g., detectability. availability, and perceptibility) for those conclusions.

Species distribution and abundance modelling will be conducted as described in **Section 2.1.4.** SDMs, will be developed to provide quantitative descriptions of breeding species' or migratory bird (e.g. waterfowl staging and feeding) distributions within the project study areas. Predictive models will be generated using data retrieved from the background information review and existing modelling efforts for boreal birds. Sample breeding habitat models for avian SAR including Bald Eagle, Canada Warbler, Common Nighthawk and Olive-sided Flycatcher, are presented in **Appendix B**. These models are based on those generated for the Phase 1 New Transmission Line to Pickle Lake Project undertaken by Wataynikancyap Power. As described in *Section 2.1.4*, explanatory (i.e. covariate) data collected during each bird survey as well as through the vegetation sampling programs will refine spatial modelling as to adequately represent the spatial and temporal sources of variation.

The approach to species distribution modelling will be based on the approach used in Wells *et al*. 2009 where coarse-level models were developed for focal species, which were applied to the a study area allocated to forestry activities. Species occurrences (observed detections) will be tabulated according to standardized habitat classes using point count and acoustic detections for 2019 and 2020. Expected detections will be calculated as the number of detections that would be expected within each habitat class based on its proportional area within the study area (sum of 200m buffers around bird point count stations). For each modelled species, a standardized selection index will be calculated to represent the ratio of expected: observed use of each habitat class. This quantity indicates the extent to which species' occurrences within different habitat types are proportional to their availability (null hypothesis: birds are selecting habitat in proportion to their availability). A chi-squared (χ^2) test will be used to determine whether selection across all habitat types was proportional to availability. 95% confidence intervals will be calculated around the index to estimate whether each habitat class was selected for or against. A habitat class was estimated to be selected for ("preferred") if the lower limit of the confidence interval was greater than the proportion of stations that were used; conversely, a habitat class was estimated to be selected against ("avoided") if the upper limit of the confidence interval was less than the proportion of stations that were used. Individual classes were not tested if the observed number of used stations was less than five (i.e., if an individual species was detected less than five times within a class). This approach to model testing is similar to that which has been used to develop a habitat model for Olive-sided Flycatcher Habitat (FWS, 2001).

The combination of these models will be used to identify key habitat factors for species of interest, where data is sufficient to validate the model (Milsom *et a*l. 2000, Morrison *et al*. 2006). When possible, model

data will be used to develop predictive maps on species distribution and abundance. These maps will be also used to predict population responses to the development of the project and inform future monitoring requirements. to develop species abundance models, which will be used to quantify indices of abundance or density rather than occurrence.

2.1.5 Acoustic Surveys

2.1.5.1 2020 Acoustic Surveys

Acoustic recording units (ARUs) will be deployed to survey bird presence in 2020. Deployment of ARUs will be used to obtain data to support the abundance and distribution modelling process and capture temporal variations in bird species presence, abundance and distribution across a broad range of dates (including seasons) and times of day. ARUs will be placed at least 500m apart and will proportionately sample all habitat types present, as done with the point count surveys. Table 2 presents the number of survey stations to be sampled in each habitat type. Proposed locations for ARU sampling stations are provided in **Appendix C.** Prior to executing the surveys, a thorough review of background data will be conducted to provide a preliminary identification of potential significant habitat within the LSA. A focused consultation with relevant federal/provincial agencies, Webequie First Nation will also be conducted to help prioritize ARU deployment parameters, and whenever possible a community member will accompany surveyors to provide community input to the survey process.

Table 2: Number of Expected and Proposed ARU Survey Stations within each Habitat Type

Habitat Type	LSA (ha)	% of LSA	Actual Number of Survey Stations (early breeding)[1]	Actual Number of New Survey Stations (late breeding)[2]	Total Number of Survey Stations	Expected Number of Survey Stations
Disturbed	179.71	0.6	0	3	3	1
Rock Barren	14.45	0.1	0	0	0	0
Conifer Forest	1542.69	5.6	13	0	13	4
Mixed Forest	192.44	0.7	6	0	6	1
Lake/River	2808.05	10.1	0	12	12	8
Open Wetland	2789.37	10.1	16	2	18	8
Treed Wetland	20107.91	72.5	21	0	21	53
Total	**27634.89**	**100.0**	**56**	**17**	**73**	**73**

[1] Early Breeding – Approximately May 1 to June 15[2] Late Breeding – Approximately June 16 – July 31

ARUs will also be used during the point count surveys and will be mounted on a tripod. Data will be recorded using 1- minute intervals within the 10-minute point count duration such that each individual bird is entered in the first minute interval in which it was detected. As done previously, estimated distances from observers to each bird will be recorded as: 0-50m, 50m-100m, and beyond 100m.

A total of 58 Song Meter SM4 Mini (Wildlife Acoustics Inc.) will be deployed for data collection. ARUs will be deployed at 58 locations across representative habitats in April 2020 and will record until the batteries die or sound card is filled. Batteries and sound cards of all 58 detectors will be replaced in

mid-late June of 2020. In mid-June, batteries and sound cards will be replaced at each detector and a maximum of 50% of the detectors will be moved to secondary supplemental locations and will actively record for the rest of the avian breeding season (late July), until the batteries or sound card capacity is exhausted. In total, approximately 75 survey locations will be sampled through the core avian breeding season through remote ARU use.

Once the breeding season has ended, ARUs will be left at their location to record during the fall migration period (August 1 through September 30, 2020) and during the winter (December 1, 2020 through to March 31, 2021) (i.e., collectively, Fall/Winter Recordings). Batteries will be replaced in late fall, in preparation for the winter recording period.

Recording schedule will adhere to protocols prescribed in the TISG. ARU deployments for breeding recordings will be programmed to record daily or every 2nd day, with a morning and an evening schedule. Recording will occur in two phases to avoid single recordings spanning two dates. Phase 1 will start at 00:00 (HH:MM), with a schedule of 3-minutes On and 12-minutes Off until 5 hours beyond local sunrise (i.e., SR+5hr). Phase 2 will start 30 minutes before local sunset, with a schedule of 3-minutes On and 12-minutes Off until 23:56 (HH:MM). ARUs will be set to record using a sampling rate of 44.1kHz.

Cryptic Species

Aerial photograph interpretation, aerial flight across the RSA, and point count surveys conducted in 2019 didnot identify suitable marshes within RSA that would provide suitable breeding habitat for wetland/marsh-obligate species such as Yellow Rail, Short-eared Owl, Black Tern, American Bittern, Sora, Virginia Rail (*Rallus limicola*), or Nelson's Sparrow. Suitable wetlands for these species may occur within the LSA and these will be investigated in field studies planned for 2020. ARU deployment will include open wetland, peatland, disturbed habitat, and mature forest where cryptic species such as marsh obligates, Common Nighthawk, and owls may occur. Each chosen ARU survey location will be surveyed according to the two-phase recording schedule outlined in Section 2.6.8.1 and each detector will be left to record until the batteries or sound card memory is exhausted.

Acoustic Data Analysis

Acoustic files will be analysed according to methodologies described in the TISG. Biologists skilled in identifying birds by sound and familiar with bird communities of the region sampled will conduct interpretation of acoustic files using the Wildtrax interface (https://www.wildtrax.ca/home). Each individual detected will be recorded as a data point and referenced to the first 1-minute interval it was detected. Prior to interpretation, acoustic files suitable for analysis will be identified using Kaleidoscope Pro software by creating a usable reference bank. The reference bank will be generated by way of the cluster analysis tool within Kaleidoscope Pro and then manually examining spectrograms and listening to short segments of the file in order to provide species identities to each reference cluster and vett and separate clusters than may include species that sound similar. Clusters subsequently used to auto identify other recording data that has been collected. Files with substantial wind, rain or other noise (e.g., frogs) will be excluded.

From the set of suitable files in the Breeding Recordings, one (1) 3-minute segments will be selected per week from the Night period (midnight to 1 hour before sunrise), two (2) 3-minute segments per week for the Morning period (1 hour before to 5 hours after local sunrise), and one (1) 3-minute segment per week from the Dusk period (30 minutes before to 2 hours after local sunset). From the set of suitable files in the Fall/Winter recordings, three (3) 3-minute segments per week will be selected from the morning period (1 hour before to 5 hours after local sunrise). Data analysis methods will be clearly described and transparent (e.g., annotated scripts), extract the maximum information from the data, and be appropriate

for the data and protocols. Mobile ARU units will also be deployed during the execution of the surveys to allow for a correlation/comparison of results between the two data collection methods, as well as an analysis of an aggregation of the two data sets.

The results of the acoustic data analysis will then be incorporated into the abundance and distribution modelling as described in Section 2.1.4. Data recorded using ARUs during the morning breeding bird point counts will be used to aid in normalizing data recorded during these counts and data recorded by ARU only (see Section 2.1.6). Normalization methodology for will be developed through a review of primary literature and other available methodologies which are applicable to a boreal setting. A description of methodologies will be provided in the resulting Natural Heritage Existing Conditions Report.

2.1.6 Crepuscular Bird Surveys (Common Nighthawk)

2.1.6.1 2020 Point Count Surveys

Methodology for conducting ground surveys for crepuscular birds is provided below; however this survey type will not be completed in 2020 due to access restrictions to the Webequie First Nation resulting from COVID-19 pandemic and the precautions to prevent unintended spread of the novel virus to the community. As such, SNC-Lavalin biologists will not be granted access to accommodations within the community, which precludes them from accessing areas for ground survey during the twilight hours.

Common Nighthawk is a crepuscular aerial insectivore and member of nightjar family Caprimulgidae. Nighthawk is listed as Threatened federally and as Special Concern provincially. No surveys for Common Nighthawk were conducted within the RSA in 2019. This species is known to nest in open habitats across northern Ontario and it is assumed that this species is present wherever suitable habitat is present. Across northern Ontario and particularly the vicinity of the PF, Nighthawk habitat includes areas where ground cover is sparse or has been disturbed or removed, leaving an open vegetation structure with low shrub or tree cover and areas of bare ground or rock, sparse ground cover, and woody debris for perching and roosting. Such habitats include burns, rocky outcrops, dry peat bogs, logged or cleared areas such as transmission lines and mines, gravel roads, airports, gravel pits, and quarries (COSEWIC 2018, Farrell *et al*. 2017). Among known microhabitat reequipments for Common Nighthawk nest sites is a well-drained area (Ng 2009, COSEWIC 2018). Common Nighthawks will quickly colonize areas burned by forest fires or areas cleared by humans. Few open habitats resulting from recent forest fires are present within the PF, with limited disturbed land occurring within 5 km east of Webequie. Open or sparsely treed muskeg and bog is present across much of the eastern portion of the LSA; however, much of this area is visably wet, with little deadfall, and with limited perches. Extensive newly burnt lands are present south of the RSA and are expected to be highly productive for Common Nighthawk. For safety reasons, nightime crepuscular surveys will only be conducted in road accessible areas which are extremely limited (Webequie community/Noront Camp) within the study area. Sites selected will be located in the most appropriate habitat available within these very limited areas.

In 2020, crepuscular surveys will be conducted at predetermined locations along accessible roads within Webequie First Nation and adjacent to suitable habitat for the target species. Surveys for this crepuscular species will follow survey methodology used by the Canadian Nightjar Survey (2019). Crepuscular surveys shall be undertaken in the evening between late May and early July, during periods of lunar illumination greater than 50%. In 2020, those periods will include May 29 – June 13, 2020 and June 28 – July 12, 2020. According to the Canadian Nightjar Survey methodology, nightjar surveys area to begin 30 prior to sunset and extend until 90 minutes after sunset. As per MECP directives, surveys will begin 60 minutes prior to sunset. Surveys will not be conducted in overcast, cold (>10 degrees Celsius), or

rainy conditions. Counts will consist of six (6)-minute point counts. To the extent possible, survey stations will be located at least 500m apart (rather than 1.6 km as in the standardized protocol).

Data will be collected using the standardized Canadian Nightjar Survey data form. Data collected will include date, weather conditions (lunar phase, wind, temperature, cloud cover, and precipitation), start time, count station name, UTM location, species observed, number of individuals, distance from observer, direction from observer, time period when first observed, habitat type, and breeding code. Each of the six (6) minutes of the survey will be considered a separate interval. Each individual observed will be recorded on the data sheet and the highest level of breeding evidence will be recorded during each of the six (6) intervals. Breeding codes include:

- Wing-boom (W): If the bird performed a territorial wing-boom in that one-minute interval (Common Nighthawks only).
- Call (C): If you heard the bird call during that one-minute interval.
- Visual (V): If you saw the bird, but did not hear it during that one-minute interval.
- Not detected (N): If you did not detect the bird during that one-minute interval.

For each individuals, distance from observer will be categorized as 0-100m and >100m.

Other crepuscular and nocturnal birds may be recorded during this survey, including owls, Wilson's Snipe (*Gallinago delicata*), and American Woodcock (*Scolopax minor*). Any incidental observations of non-target wildlife species will also be recorded.

2.1.6.2 Acoustic Surveys

ARU deployment described in Section 2.1.6.1 will include coverage of open peatland and disturbed habitat preferred by Common Nighthawk Some open habitats will be included during the early May deployment of breeding bird ARUs, while other open habitats will be sampled starting in late June by ARUs that are moved from their original recording positions. Crepuscular birds will be sampled through deployment of ARUs across open habitats outside of the accessible zone within the Webequie First Nation unit the batteries of the ARUs are spent. Acoustic recording for crepuscular birds can be captured during the daily ARU recording periods defined within the TISG, which include 00:01am and 5 hours after sunrise, as well as between 30 minutes before sunset until 23:56. Each detector will be left to record until the batteries or sound card memory is exhausted. Ground surveys for crepuscular birds will be paired with the use of ARUs, as described in Section 2.1.6. At this stage, whether or not presence is determined it will be assumed that appropriate measures will need to be included in the IS/EA documentation to address these species.

2.1.6.3 Data Summary and Modelling

Data collected during crepuscular bird surveys and ARU deployments will be used to develop SDMs, in a similar manner as described for breeding bird survey point counts. A sample coarse habitat model for Common Nighthawk is presented in **Appendix C**. As described in *Section 2.1.4*, explanatory (i.e. covariate) data collected during each bird survey as well as through the vegetation sampling programs will refine spatial modelling as to adequately represent the spatial and temporal sources of variation.

The combination of these models will be used to identify key habitat factors for species of interest , where data is sufficient to validate the model (Milsom *et a*l. 2000, Morrison *et al*. 2006). When possible, model data will be used to develop predictive maps on species distribution and abundance. These maps will be

also used to predict population responses to the development of the project and inform future monitoring requirements. to develop species abundance models, which will be used to quantify indices of abundance or density rather than occurrence.

2.1.7 Waterfowl Migration Survey

2.1.7.1 2019 Waterfowl Migration Survey

In 2019, a waterfowl migration survey was conducted on May 27-28. The date of survey initiation was based on FN community input and permissions to avoid disrupting the spring goose hunt. The survey consisted of flying the entire length of the proposed preferred route alternatives and circling over each lake or open wetland within 1km of the route, with particular attention to those areas identified during the background data review.

2.1.7.2 2020 Waterfowl Migration Survey

In 2020, waterfowl migration and staging surveys will be conducted to capture a good representation of waterfowl passage through the Project study area and will replicate the survey conducted in 2019 (refer to **Figure 3**). Prior to executing the surveys, a thorough review of background data will be conducted to provide a preliminary identification of potential significant waterfowl habitat within the LSA and RSA. The survey will consist of flying the entire length of the proposed preferred route alternatives and circling over each lake or open wetland within 1km of the route, with particular attention to those areas identified during the background data review and from the consultation undertaken to date. Significant coordination with First Nation hunters and community members was conducted prior to the 2020 Waterfowl surveys to determine the timing windows outlined in the workplan, and ensure appropriate ice out conditions and waterfowl presence, and the status of the migration.

Three survey flights will be conducted during both spring and fall 2020 to coincide with peak migration passage during these seasons. Spring surveys will be conducted between mid-April and mid-May, while fall surveys will be conducted between early October and early-November. The field crew will include two biologists experienced in the identification of waterfowl: one primary observer and one secondary observer/recorder/navigator. Surveys have and will continue to follow national and provincial standards for presence/not detected (USFWS and CWS 1987; RIC 1999a; Ducks Unlimited Canada 2003), although abundance data were also recorded. A Bell 206 Long Ranger helicopter was used as they provide better visibility, lower flight speed, greater manoeuvrability, and ability to vary flight heights as needed, than fixed-wing aircraft. The helicopter was flown at a relatively slow speed (80 km/h) and low altitude (100 ft above water. Three flights will take place over 10 days to account for daily variations and will depend on weather conditions. These were accompanied by a community member. Data collected included:

- Date;
- Time started and time ended;
- Weather conditions;
- Species observed;
- GPS location; and
- Number of individuals.

2.1.8 Shorebirds

For the purpose of this work plan, shorebirds are defined as wading birds within the order Charadriformes, which in northern Ontario are primarily comprised of the families Charadriidae (Plovers) and

Scolopacidae (Sandpipers, Phalaropes, and Allies). According to the background information review, a wide variety of shorebird species have the potential to migrate through the LSA and RSA en route to their breeding grounds on the James and Hudson's Bay Lowlands and areas further north.

2.1.8.1 Breeding Shorebirds

Shorebird habitat availability within the LSA and RSA is limited to six species, which include Killdeer (*Charadrius vociferus*), Spotted Sandpiper (*Actitis macularius*), Greater Yellowlegs, Lesser Yellowlegs (*Tringa flavipes*), Solitary Sandpiper (*Tringa solitaria*), Wilson's Snipe (*Gallinago delicata*) (Cadman *et al*. 2007). Ontario Breeding Bird Atlas data indicates that Lesser Yellowlegs is less abundant and patchy in distribution away from its coastal breeding grounds compared to the Greater Yellowlegs (Cadman *et al*. 2007). As such this species was not expected to occur within the LSA.

In 2019, breeding shorebirds were sampled via breeding bird point count surveys described in Section 2.1.5. During this first year of survey, 52 survey points were located in treed and open wetland habitat types, which provide much of the shorebird breeding habitat present within the LSA and RSA. Of the six possible species, only Lesser Yellowlegs was not noted in 2019. Point counts and the ground travel required to access adjacent point count locations are the best means of surveying breeding shorebirds in the LSA and RSA, as most shorebird species are small and difficult to differentiate reliably when observed from a helicopter. The results of the 2019 breeding bird survey, combined with knowledge of shorebird habitat preferences gleaned from background literature has provided a clear understanding of the vegetation community preferences of each shorebird species within the LSA.

2.1.8.2 Data Summary and Modelling

Data collected during breeding bird point count surveys and ARU deployments will be used to develop SDMs, in a similar manner as described for breeding bird survey point counts. A coarse habitat model for Greater Yellowlegs has not yet been developed. As described in *Section 2.1.4*, explanatory (i.e. covariate) data collected during each bird survey as well as through the vegetation sampling programs will refine spatial modelling as to adequately represent the spatial and temporal sources of variation..

The combination of these models will be used to identify key habitat factors for species of interest, where data is sufficient to validate the model (Milsom *et a*l. 2000, Morrison *et al*. 2006). When possible, model data will be used to develop predictive maps on species distribution and abundance. These maps will be also used to predict population responses to the development of the project and inform future monitoring requirements. to develop species abundance models, which will be used to quantify indices of abundance or density rather than occurrence.

2.1.8.3 2020 Shorebird Migration Survey

In 2019, shorebirds were recorded where observed during the spring waterfowl migration survey, which surveyed all open wetland features within the LSA. This survey was conducted between May 27-28, which falls within the spring shorebird migration window for Ontario. In 2020, shorebirds will be recorded during waterfowl migration and staging surveys along the LSA, as well as during surveys of the Winisk River, extending 50 km north from Winisk Lake. This additional survey route has the potential to provide the best shoreline habitat in proximity to the PF and provides a possible movement route for northbound migrant shorebirds. This route was identified though FN consultation. The survey will consist of flying 50 km of the Winisk River north of Winisk Lake. Significant coordination with FN hunters and community members was conducted prior to the 2020 Waterfowl surveys to determine the timing windows outlined

in the workplan, and ensure appropriate Ice out conditions and waterfowl presence, and the status of the migration.

Three survey flights will be conducted during the spring of 2020 between mid-May and mid-June, which coincides with the shorebird migration period in Ontario. Peak shorebird movement and routing is varied and determined by many variables including, but not limited to, weather, seasonal variation in ice-off and local water levels, and availability of shoreline and shallow wetland habitat. Surveys will follow general methodology used for aerial surveys used by the James Bay Shorebird Project.

The field crew will include two biologists experienced in the identification of waterfowl: one primary observer and one secondary observer/recorder/navigator. The survey will include low level flight in a Bell 206 along 50 km of the Winisk River, north of Winisk Lake. All wildlife observed will be recorded including shorebirds, waterfowl, raptors, and any other observations. Data collected will include:

- Date;
- Time started and time ended;
- Weather conditions;
- Species observed;
- GPS location; and,
- Number of individuals.

As per the James Bay Shorebird Project methodology (www.jamesbayshorebirdproject.com/protocol), shorebirds observed will be identified to the extent possible; however, similar species will typically be grouped depending on their similarities. Small shorebird species (e.g., Least Sandpiper (*Calidris minutilla*), Semipalmated Sandpiper (*Calidris pusilla*), and White-rumped Sandpiper (*Calidris fuscicollis*)) are generally not easily identified from the air, despite flying at low levels. These will be grouped into ”peeps”. Medium and large shorebird species (e.g., Black-bellied Plover (*Pluvialis squatarola*), Red Knot (*Calidris canutus*), and Hudsonian Godwit (*Limosa haemastica*)) are generally identifiable from the air and will be distinguished when possible. Greater and Lesser Yellowlegs will generally be counted as “yellowlegs species”.

Table 3 indicates the identification traits used to identify shorebirds during aerial surveys. For the purpose of the survey, determining shorebird numbers was deemed more important than absolute species identification.

Table 3: Shorebird Identification Criteria for Aerial Shorebird Surveys

Group	Species Included	Shape/Relative Size	Distinguishing Features
Peeps	Least Sandpiper, Semipalmated Sandpiper, White-rumped Sandpiper, Spotted Sandpiper, Pectoral Sandpiper, Stilt Sandpiper Semipalmated Plover, Wilson’s Snipe, Dunlin, Phalaropes, Sanderling, Solitary Sandpiper,	Small-mid-size	All have dark central stripes down tail.

Group	Species Included	Shape/Relative Size	Distinguishing Features
Yellowlegs	Lesser Yellowlegs, Greater Yellowlegs, Wilson's Phalarope	Med-size	Grey back, obvious white tail.
Red Knot	Can be included with peeps or lumped with BBPL/AGPL	Med-size, stubby, short beak	Orange on face/breast. Light tail – no dark central stripe.
Black-bellied/ American Golden Plover	Black-bellied Plover, American Golden Plover	Med-size, short beak	Black on head/breast, light base of tail. BBPL has black armpits (axillaries).
Ruddy Turnstone	-	Med-size, short beak	Marbled orange, black, white on back/wings. White base of tail with black tips.
Willet	-	Large, long gray/black beak	Obvious white and black patches on wings.
Hudsonian Godwit	-	Large, long orange beak	Bold white band at base of tail, black band at end of tail. White stripe across wings at base of primaries and secondaries.
Marbled Godwit		Large, long orange beak	Obvious Buffy/orangey wings.
Whimbrel		Large, long downcurved black beak	Speckled brown all over.
Dowitcher	Short-Billed Dowitcher, Long-billed Dowitcher	Medium-sized brown shorebird, long straight bill	White streak on rump/back, light tail.

2.1.9 Raptor Nesting Data

2.1.9.1 Field Survey Methodologies

Formal surveys for raptor nests have not been completed to date; however, extensive aerial surveys for Caribou and waterfowl have been completed across the PF, LSA and RSA. During these flight activities, particular attention was given to stick nest searches in the vicinity of rivers and lake shorelines, and unburned mature deciduous/conifer stands. The classification of nest type was, or will be determined through a combination of staff knowledge, habitat type, stick and nest size, nest placement, and visual raptor sightings, and photos when possible. If the nest type species was indiscernible they were simply recorded these as stick nests. Typically, stick nests are most readily noted during leaf-off.

In 2018, a winter survey for caribou included flying 59 north-south transects ranging from 35 km to 51 km. In all, a total of 2666 km were flown. During this survey, 23 Bald Eagle nests were identified. Osprey (*Pandion haliaetus*) and unidentified stick nests were also recorded and GPS locations were noted.

During the 2019 winter Caribou survey a total, 39 transects were flown to cover the extent the preliminary preferred corridor (107 km in length). Transects all measured 47 km in length and a total survey length of 1833 km was flown. During this survey, four (4) Bald Eagle nests were identified as well as one (1) Osprey nest and three (3) unidentified stick nests were recorded and GPS locations were noted.

In 2019, waterfowl migration and staging surveys surveyed all open waterbodies within 1km of the PF. Within the taiga landscape occupied by the Project, the tallest and most robust trees are typically situated in close proximity to watercourses and lakes. This coincides with the nesting preferences of most raptors (and Common Raven (*Corvus corax*) which build many of the nests used by raptors) which inhabit the area, such as Bald Eagle, Osprey, Red-tailed Hawk (*Buteo jamaicensis*), Merlin (*Falco sparverius*), and Great Gray Owl (*Strix nebulosa*), which use tall, robust trees to support their stick nests, as well as any species which nests in cavities of trees of large diameter (e.g. American Kestrel (*Falco americanus*), Barred Owl (*Strix varia*), Northern Hawk-Owl (*Surnia ulula*), Boreal Owl (*Aegolius funereus*)). This survey route will be repeated in 2020, as described in Section 2.1.8.

Overall, upland forest communities are rare within the PF and have thus been targeted for ground breeding birds surveys. The majority of these habitat types are located in proximity to Winisk Lake and the Noront Esker Camp. While morning point counts are not preferred methods of surveying for owls, the transects walked while moving between survey points will provide opportunities to detect raptors and raptor nests present in these habitat features.

When observed, data recorded for each raptor nest will include GPS location, associated species (if possible), relative size and characteristics (if species cannot be determined), tree species used, description of surrounding vegetation community and structure.

Raptor nest data gathered during these activities will contribute to a census of Bald Eagle and Osprey nests across the PF, LSA and RSA. Nests of other species that use stick nests (i.e. hawks, owls, ravens) will also be noted as encountered.

2.1.9.2 Data Summary and Modelling

Bald Eagle and other raptor data nesting collected during aerial winter caribou and waterfowl surveys will be used to develop SDMs, in a similar manner as described for breeding bird survey point counts. A sample coarse habitat model for Bald Eagle is presented in **Appendix C**. As described in *Section 2.1.4*, explanatory (i.e. covariate) data collected during each bird survey as well as through the vegetation sampling programs will refine spatial modelling as to adequately represent the spatial and temporal sources of variation. In the case of Bald Eagle.

The combination of these models will be used to identify key habitat factors for species of interest , where data is sufficient to validate the model (Milsom *et a*l. 2000, Morrison *et al*. 2006). When possible, model data will be used to develop predictive maps on species distribution and abundance. These maps will be also used to predict population responses to the development of the project and inform future monitoring requirements. to develop species abundance models, which will be used to quantify indices of abundance or density rather than occurrence.

2.1.10 Schedule and Reporting

The following avian field studies are currently planned for 2020-2021:

- Breeding Bird Point Count Survey (May-July 2020);
- Acoustic Bird Sampling (May 2020-February 2021);
- Crepuscular Bird Surveys (June-July 2020);
- Waterfowl Migrations Aerial Surveys (May-June 2020 and September - October 2020); and
- Raptor Nesting Data Collection (Throughout season as part of other programs).

The baseline avian presence/absence and habitat data collected in the spring, summer and fall of 2019 and 2020 and will be incorporated in a Natural Environment Existing Conditions Report that will include the raw data and the result of the modelling process in appropriate appendices. The overall baseline report is tentatively scheduled to be completed in December 2020. If any relevant data is acquired after the release of the Natural Environment Existing Conditions Report (e.g., data from ARU's) an addendum to the Natural Heritage Baseline Report will be produced if deemed necessary.

3 Criteria and Indicators

Criteria are components of the environment that are considered to have economic, social, biological, conservation, aesthetic or cultural value (Beanlands and Duinker, 1983). The assessment will focus on valued components, and applicable specific criteria, that have physical, biological, social, economic or health importance to the public, Indigenous groups, federal and provincial authorities and interested parties, and have the potential for change as a result of the Project. Valued components have been identified in the federal TISG and by the Project Team and are, in part, based on what Indigenous communities and groups, the public and stakeholders identify as valuable to them in the EA process to date. The list of valued components identified to date include the following:

- Geology, Terrain and Soils;
- Surface Water;
- Groundwater;
- Air Quality;
- Climate Change;
- Noise;
- Vegetation and Wetlands;
- Fish and Fish Habitat;
- Wildlife**,** including **Migratory/Breeding birds** (subject of this work plan);
- Archaeological Resources;
- Cultural Heritage Resources;
- Socio-economic Environment;
- Aboriginal Land and Resource Use;
- Visual/Aesthetic Environment;
- Human Health; and
- Aboriginal and Treaty Rights and Interests.

The list of valued components will be informed, validated and finalized through the engagement and consultation process, including those to whom these concerns are important and the reasons why, such as environmental, cultural, spiritual, historical, health, social, economic and their relation to the exercise of Aboriginal and Treaty rights.

The list of identified valued components and associated criteria will be validated and finalized by the Project Team through a variety of means and consideration of factors that include, but are not limited to the following:

- Engagement with Indigenous communities and groups and the extent to which the valued component is linked to the interests or exercise of Aboriginal and Treaty rights of Indigenous peoples;
- Stakeholder engagement, including discussions with interest holders, and government authorities;
- Presence, abundance and distribution within, or relevance to, the area associated with the Project;
- Extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the valued component;
- Species conservation status or concern;

- Umbrella or keystone species with potential to represent a broad range of potential effects;
- Uniqueness or rarity in the study area;
- Likelihood of an indirect effect on an associated criterion (i.e., a link exists between the affected criterion and another criterion, such as the introduction of invasives, and improved access affecting bird populations and habitat);
- Ecological, social and economic value to Indigenous communities, municipalities, stakeholders, government authorities, and the public; and
- Traditional, cultural and heritage importance to Indigenous peoples.

3.1 Criteria

Bird species that are part of a local wildlife community can be an important cultural, subsistence, and economic resource for Indigenous communities and others. For the EA the following avian guilds been selected as preliminary criteria for the EA to assess the effects of the Project on birds and their habitat:

- Forest Birds;
- Raptors;
- Shorebirds;
- Waterfowl; and
- Bog/fen birds and other wetland birds.

The five guilds were identified as criteria for the assessment of potential project effects on birds and bird habitat, in part because they are guilds of value to Indigenous communities, government agencies, the public and stakeholders based on the input from the consultation undertaken to date.

The project study area occurs is situated within the Northern Shield Region of Ontario, which extends northward from Sault Ste. Marie and across northern Ontario and gives way to the Hudson's Bay Lowlands, which surround Hudson's Bay and James' Bay. According to OBBA (Cadman et al., 2007), 211 species were recorded across the Northern Shield and 170 species were confirmed breeders. Data from seven 10 km x 10 km atlas squares which that occur in close proximity to Winisk Lake and Webequie First Nation confirmed 85 species were recorded in proximity to the study areas.

Species recorded in the OBBA are included in the species list found in **Appendix A**. SAR Species at Risk recorded in these squares included Bald Eagle, Bank Swallow, Barn Swallow, Common Nighthawk, Olive-sided Flycatcher, Rusty Blackbird, and Short-eared Owl. The average number of species recorded per Atlas square (10 km x 10 km) in the Northern Shield was 68 species (Cadman et al., 2007). According to the OBBA, species with the highest probability of observations in the Northern Shield included: White-throated Sparrow (*Zonotrichia albicollis*), Red-eyed Vireo (*Vireo olivaceus*), Yellow-rumped Warbler (*Setophaga coronata*), Swainson's Thrush (*Catharus ustulatus*), and Winter Wren (*Troglodytes hiemalis*). In 2010, the Northeast Science and Information Section of the MNRF conducted studies in and near the RSA as part of their Far North Terrestrial Biodiversity (FNTB) study from early June to mid-July (Phoenix, 2013). The FNTB study detected 96 breeding species, including three Special Concern SAR: Bald Eagle, Common Nighthawk and Olive-sided Flycatcher (Phoenix, 2013). Studies conducted in support of the Noront Eagle's Nest Project EA (2013), consisting of the Eagle's Nest Mine and associated infrastructure (including a proposed all-season road between Eagle's Nest Mine and Pickle Lake), tallied 130 bird species during the field studies, which spanned multiple seasons across 3 years. This study include surveys across several study sites, of which only the Mine Site Area was located within the current RSA.

Three species at risk were found in the mine site area, including Common Nighthawk, Olive-sided Flycatcher and Rusty Blackbird.

The majority of species that have been identified for human consumption are waterfowl (geese, and ducks) , though a number of raptors, forest birds, shorebirds, and bog/fen birds and other wetland birds are cultural important to Indigenous Peoples in the area. The list of criterion species will be finalized and developed through future engagement and consultation with Indigenous people as part of the EA. Bird species for consumption (i.e., country food) will also be identified and described as part of the socio-economic and human health valued components.

From the work undertaken to date one of the four criteria species (i.e., Canada Goose (*Branta canadensis*), Mallard (*Anas platyrhunchos*), and Blue-winged Teal (*Spatula discors*) or Green-winged Teal (*Anas carolinensis*)) are considered representative harvested species (country food) of value to communities and are found in a variety of lake and wetland habitats. The criterion included as a representative species of conservation concern include: Barn Swallow, Bank Swallow, Common Nighthawk, Canada Warbler, Olive-sided flycatcher, Rusty Blackbird, and Bald Eagle. Feedback through engagement and consultation with Indigenous communities, stakeholders, and regulators will be obtained during the EA process to finalize the criteria, including further supportive rationale for their selection.

3.2 Indicators

In order to evaluate the effects of the WSR and alternatives, each criterion will have one or more indicators that will identify how the potential environmental effects will be measured. In general, indicators represent attributes that can be used to characterize changes to criteria as a result of the Project that may demonstrate a physical, biological or socio-economic effect. As indicators represent an expression of change this may be characterized quantitatively or qualitatively to compare predicted environmental effects to existing baseline conditions. The proposed preliminary indicators for bird habitat that will be used for the EA include the following:

- **Habitat availability (Quantity and Quality)**: includes habitat quantity (the amount of habitat available for birds and their various life history stages) and habitat quality (the quality of habitat available for birds and their various life history stages). Habitat quantity will involve a quantitative assessment of potential changes to total area of habitat and any known or assumed critical life cycle habitat (e.g., breeding, rearing, etc.) as a result of implementing the Project and will be calculated and presented as absolute (i.e., area – hectares or square metres) as appropriate. The calculation will be based on the likely presence of each criteria species within each habitat type (determined using a desktop study and 2019 and 2020 field surveys), the availability of the specific habitat type, and the area of disturbance under the Project Footprint. Where the likelihood of a criteria species is unknown due to limited information, a precautionary approach will be used, and it will be assumed that the criteria species may be present. Effects on habitat quality will be a qualitative assessment of the changes in habitat quality (i.e., quality of breeding, rearing, or overwintering type habitats for criteria species) as result of implementing the Project based on existing information and the results of the field surveys.

- **Abundance and Distribution**: applies to the bird species criteria and refers to changes to abundance based on: direct changes to the population (i.e., mortality of individuals resulting from physical activities of the Project); or indirect direct changes to the population as a result of

changes to habitat availability (quantity and quality) that may affect survival and reproduction, and therefore measurable changes in abundance. Distribution relates to the spatial configuration and connectivity of habitats for birds in the study area, and the spatial distribution and movement of bird species. Distribution will be addressed using a qualitative assessment of changes to distribution that may occur via direct or indirect changes to habitat or species abundance. Abundance and distribution are proposed to be combined into one indicator for the EA as changes to distribution (i.e., connectivity) are tied to abundance (i.e., amount of birds in the population).

- **Species Richness**: refers to changes to diversity based on: direct changes to the species presence within project footprint and LSA (i.e., extirpation of individual populations resulting from physical activities of the Project); or indirect direct changes to the population matrix as a result of changes to habitat availability (quantity and quality) that may affect survival and reproduction, and therefore measurable changes in species composition.

- **Relative Overlap**: refers to presence of species in multiple habitats (i.e., availability of alternative habitats for individual populations to mitigate losses resulting from physical activities of the Project.

- **Species Habitat Specificity**: refers to species habitat specificity and changes to populations based on: direct changes to availability of specific habitat types (i.e., extirpation or reduction of individual populations resulting from physical activities of the Project); or indirect direct changes to the population matrix as a result of changes to habitat availability (quantity and quality) that may affect survival and reproduction, and therefore measurable changes in species abundance. Specific habitat types include:
  - Specialized Upland Landcover Type
  - Specialized Wetland Landcover type (e.g., Bog,Fen,Swamp,marsh etc.);
  - Specialized Riparian habitat;
  - Critical Land Forms/ Habitats of Conservation Concern, resulting from combinations of unique landforms and specific vegetation communities (e.g., Eskers, Old Growth); and,
  - Rare Species Occurrence/Potential

- **Predation/Habitat usage (other wildlife)**: refers to increased predator access and habitat utilization by new species to specific areas resulting in potential changes to populations due to increased hunting access, increased raptor and mammal predation, introduction of new species competition for available resources resulting from physical activities of the Project (e.g., new travel corridors, and increased edge habitat, introduction of non-native/invasive species, increased fire potential).

- **Cultural Significance or Importance (Indigenous People /General Public):** refers to potential changes to cultural interaction with and usage of bird resources within the project area resulting from physical activities of the Project (e.g., new travel corridors, and hunting access, introduction of non- native/invasive species, increased fire potential).

The EAR/IS will further describe the criteria and indicators, including details of how each indicator will be measured, along with data sources and rationale for selection. This will be presented in tabular format and will build on the preliminary criteria and indicators included in Appendix B to the ToR.

3.3 Effects Assessment Approach

The approach for the assessment has been developed to satisfy regulatory requirements under the *Environmental Assessment Act* and is based on the MECP *Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (MOECC, 2014), and the Terms of Reference for the Project that is currently pending approval from the MECP. The approach for the assessment has also been developed to meet the requirements of the federal TISG and specifically Section 13 – Effects Assessment. The approach has also taken into consideration the Ministry of Natural Resources and Forestry (MNRF) Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects (MNRF, 2003).

3.3.1 Consideration and Evaluation of Alternatives

The EA process requires that two types of project alternatives be considered: "alternatives to" the Undertaking (i.e., functionally different ways of addressing an identified problem or opportunity to arrive at the preferred planning solution) and "alternative methods" of carrying out the Undertaking (options for implementing the preferred planning solution). The consideration and evaluation of alternatives to the Undertaking were documented in the federal Impact Assessment Detailed Project Description (November 2019) and the provincial Environmental Assessment draft Terms of Reference (September 2019) and concluded that developing a new all-season road between Webequie and the McFaulds Lake area is the preferred alternative. It is not proposed that this analysis and conclusion be re-examined as part of the EA process, but it will be documented in the EAR/IS. Therefore, in keeping with the focussed approach, the preferred planning alternative (developing a new all-season road) has been carried forward to the initial consideration of alternative methods of carrying out the Undertaking.

The consideration of alternative methods will focus on the supply road conceptual alternatives within the proposed preliminary corridor, as identified in the Detailed Project Description (November 2019) and the draft Terms of Reference (September 2019). These alternatives include the Webequie First Nation community's preferred route for the supply road along the centreline of an approximately 2 km wide preliminary preferred corridor and the optimal geotechnical route within the same corridor (Refer to Figure 2). In addition, the following alternative methods related to supportive infrastructure and the preferred supply route will be examined.

- Alternative sites for temporary and/or permanent aggregate extraction pits and production facilities needed for construction and operation of the road, including access roads to these sites;
- Alternative sites for supportive infrastructure (i.e., temporary laydown and storage areas, and construction camps, including access roads to these areas);
- Watercourse crossing structure types (i.e., culverts, bridges), span length, lifecycle, and construction staging methods at waterbody crossings;
- Road attributes, including roadbed foundation; horizontal alignment, vertical alignment (elevation/profile), and adjustments to the cross-section and right-of-way (ROW) width of the corridor.

The assessment of alternatives will include environmental, socio-economic, cultural and technical factors, using criteria and indicators for the comparative analysis. This will also include specific consideration of community based Indigenous land and resource uses (e.g., hunting) and cultural (e.g., built, sacred or spiritual sites) criteria of value to Indigenous communities within the broader factors. As noted previously, the criteria and indicators will be developed in detail as part of the EA through input from the engagement

and consultation activities with Indigenous communities, the public and stakeholders. Both a quantitative and/or qualitative assessment of alternatives for each criterion will be conducted to allow for a comparison of the advantages and disadvantages and selection of a preliminary recommended route for the WSR and the sites/access routes for supportive infrastructure.

3.3.2 Assessment of Net Effects

A step-wise process will be used to assess the environmental effects of the Project in a systematic and transparent manner once the relevant project elements and activities and their interactions, assessment boundaries, and relevant environmental criteria and indicators are identified and finalized through the engagement and consultation process. The net effects assessment method will include the following primary steps:

- Identification of potential environmental effects;
- Identification of technically and economically feasible impact management measures;
- Prediction of net effects following implementation of impact management measures; and
- Evaluation of the predicted net effects (i.e., describe and determine the magnitude, duration, extent, frequency, and significance of the predicted net effects).

3.3.3 Identification of Potential Environmental Effects

The net effects assessment will consider the potential interactions between the project components and activities and the criteria within the identified spatial boundaries and phases of the Project (i.e., construction and operation). Potential effects of the Project on valued components will be determined by comparing baseline conditions to those expected to result from the construction and operation and maintenance of the Project. Potential effects will be described for each assessment criterion, including an indication of whether they are expected to be direct (i.e., as a result of a project component or activity affecting a valued component), or indirect (i.e., as a result of a change to one valued component affecting another valued component). Relevant project works and activities will be analysed individually to determine if there is a plausible pathway for an effect on valued components.

The assessment of potential effects to birds and birds habitat will include the characterization of baseline conditions in the project study area using both publicly available information on a regional scale and data obtained in the field or via desktop review on a local scale or site-specific basis. As potential effects from the development of the supply road and supportive infrastructure could affect aquatic environment within the PF, LSA and RSA we will also assess specific potential effects that could have lingering detrimental effects to birds and birds habitat in the study areas such as increased human access, injury or mortality of birds, physical alteration of waterbodies or channel morphology and spills.

Effects to birds and their habitat as a result of the Project will consider the specific items contained in Section 8.9 of the TISG. Briefly, the assessment of the potential effects of the Project on avian guilds and their specialized habitat will include the characterization of baseline conditions in the project study area using both publicly available information on a regional scale and data obtained in the field or via desktop review on a local scale or site-specific basis. As potential effects from the development of the road could affect avian guilds and their specialized habitat within the zone of influence within the PF, LSA, and RSA we will also assess specific potential effects that could have lingering detrimental effects to specialized avian communities in these study areas such as increased human access/hunting, increased predation, decreased food supply, fragmentation, fire potential, edge creation, hydrologic changes, invasive or parasitic species introduction, spills, and roadside vegetation management, etc.

3.3.3.1 Identification of Impact Management Measures

Once potential effects are identified, technically and economically feasible impact management measures (or "mitigation measures") to avoid and minimize potential adverse effects will be identified for each phase of the Project. Design considerations and impact management measures for birds and bird habitat will be identified to offset or eliminate potential adverse effects (e.g., construction timing constraints related to vegetation removals) and will be described in the EAR/IS. Refinements to these measures may also be made in the future detail design phase of the Project. Impact management measures will be developed for the Project based on:

- Knowledge and experience of the Project Team with linear infrastructure developments;
- Industry best management practices and applicable agency requirements and guidance; and
- Measures identified by Indigenous communities, the public and stakeholders through feedback received as part of the engagement and consultation program.

It is understood that impact management measures are not always fully effective; therefore, WFN will identify a compliance monitoring and effects monitoring program as part of the EA for implementation during the project phases (refer to Section .3.3.3.5).

3.3.3.2 Prediction of Net Effects

A net effect, or the alternative term residual effect, is considered an environmental (biophysical), social, economic or health effect from the Project and its related activities that is predicted to remain after the implementation of impact management measures. A potential effect is considered to occur where anticipated future conditions resulting from the Project differ from the conditions otherwise expected from natural change without the Project. In some situations, the recommended impact management measures will eliminate a potential adverse effect, while in other situations impact management measures may reduce, but not eliminate the effect. Impact management measures may also enhance positive effects. A potential effect that will be eliminated, or considered unlikely after impact management measures, will be identified as not resulting in a net effect (i.e., no net effect) and will not be considered further in the net effects assessment. An effect that may remain after the application of impact management measures will be identified as a net effect and will be further considered in the effects assessment. Positive effects will also be considered further in the effects assessment, including means of enhancing benefits of the Project. Neutral changes will not be carried forward for the characterization of net effects, but where identified will be characterized in terms of the confidence in the predictions and the likelihood of the effect.

3.3.3.3 Characterizing the Net Effects

The characterization of net effects will provide the foundation for determining the significance of incremental and cumulative effects from the Project for each assessment criterion. The objective of the method is to identify and predict net adverse and positive effects that have sufficient magnitude, duration, and geographic extent to cause fundamental changes to the self-sustainability or ecological function of a valued component and, therefore, result in significant combined effects.

Using the aquatic environment as an example, the magnitude of the potential effect will be qualitatively assessed by inferring the anticipated changes relative to baseline conditions using the identified preliminary criteria species and indicators related to habitat availability, distribution and abundance. Where appropriate, the magnitude of potential effects to birds/birds habitat will be quantitatively evaluated based on the proportion of the catchment area for a given waterbody that is expected to be disturbed or

influenced by a specific project activity. In general, the magnitude is the intensity of the effect or a measure of the degree of change from existing conditions and will be defined by each discipline assessment. If a significant effect is identified, the contribution of the Project to the combined effect will be described. The assessment of significance of the net effects of the Project on birds and birds habitat and other valued components will be informed by the interaction between significance factors (as defined below), in addition to those concerns raised by Indigenous groups, interested agencies, and individuals during the consultation and engagement for the EA. Therefore, predicted net effects, where identified, will be described in terms of the following significance factors (MNRF, 2003), with integration of the assessment methodology identified in the federal TISG, as required.

- **Direction** – The direction of change in effect relative to the current value, state or condition, described in terms of Positive, Neutral, or Negative.
- **Magnitude** - The measure of the degree of change from existing (baseline) conditions predicted to occur in the criterion.
- **Geographic Extent** - The spatial extent of which an effect is expected to occur/can be detected and described in terms of the PF, LSA and RSA.
- **Severity** - The level of damage to the valued component from the effect that can reasonably be expected; typically measured as the degree of destruction or degradation within the spatial area of the PF, LSA and RSA. Severity would be characterized as: Extreme; Serious, Moderate or Slight.
- **Duration/Reversibility** - Duration is the period of time over which the effect will be present between the start and end of an activity or stressor, plus the time required for the effect to be reversed. Duration and reversibility are functions of the length of time a valued component is exposed to activities. Reversibility is an indicator of the degree to which potential effects can be reversed and the valued component restored at a future predicted time. For effects that are permanent, the effect is deemed to be irreversible. Duration/Reversibility would be characterized for each adverse effect as: Short-Term (0- 5 years), Medium-Term (6-20 years), Long-Term (21 to 100 years) or Permanent (>100 years).
- **Frequency** – Is the rate of occurrence of an effect over the duration of the Project, including any seasonal or annual considerations. Frequency would be characterized as: Infrequent; Frequent or Continuous.
- **Probability or Likelihood of Occurrence** – Is a measure of the probability or likelihood an activity will result in an environmental effect. Probability or likelihood of occurrence would be characterized as: Unlikely, Possible; Probable and Certain.

The definitions and description of the above factors will be described in detail in the EAR/IS. An effort will be made to express expected changes quantitatively / numerically. For example, the magnitude (intensity) of the effect may be expressed in absolute (e.g., changes to available birds' habitat – hectares) or percentage values above (or below) baseline conditions or a guideline value (e.g. surface water quality). Additionally, the definition of effect levels may vary from one valued component or criterion to another, recognizing that the units and range of measurement are distinct for each. Lastly, effects may impact communities, Indigenous groups and stakeholders in different ways, including through a gender-based lens (refer to Section 4) and they may respond differently to them. Therefore, determining and characterizing effects will be based largely on the level of concern expressed through engagement with the Indigenous groups and community members.

3.3.3.4 Assessment of Significance

MNRF's Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects (MNRF 2003) require the assessment of significance of environmental effects and provides guidance for assessing the significance of potential environmental effects under individual criteria, for a project, and for alternatives.

In addition to the Class EA guidance, the determination of significance of net effects and cumulative effects from the Project and other previous, existing, and reasonably foreseeable developments will generally follow the guidelines and principles of the *Draft Technical Guidance Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act* (CEA Agency, 2017) and the *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act*, 2012 (CEA Agency, 2015).

In general, the assessment of significance of net effects will be applied to each valued component for which net effects are predicted, and net adverse effects or positive effects will be classified as significant or not significant (i.e., binary response). Additional details on the application of biophysical, cultural, socio-economic and health criteria and definitions that would describe "significant" and "not significant" will be provided in the EAR/IS

3.3.3.5 Identification of a Monitoring Framework

Webequie First Nation will develop a monitoring framework during the EA process for each project phase (construction and operation and maintenance). The two primary types of monitoring to be developed will include:

- Compliance monitoring; and
- Effects monitoring.

The compliance monitoring will assess and evaluate whether the Project has been constructed, implemented and/or operated in accordance with commitments made during the EA process, and any conditions of the federal IA and provincial EA approvals and other approvals required to implement the Project.

The effects monitoring will be designed to verify the prediction of the effect's assessment, and to verity the effectiveness of the impact management measures. This would include construction and operational monitoring that would identify actual effects, assess the effectiveness of the measures to minimize or eliminate adverse effects, and evaluate the need for any additional action to ensure that environmental commitments and obligations are fulfilled, and mitigation measures are effective.

4 Gender Based Analysis Plus (GBA+)

Information and data collected will be disaggregated by diverse subgroups (women, youth, elders, etc.), as part of applying a Gender Based Analysis Plus (GBA+) lens. For bird and bird habitat, the baseline information will focus on species of bird consumed and will be obtained through such methods as socio-economic and health surveys (using Survey Monkey), key informant interviews with community members who bird (gender, youth, elders), desktop research and Indigenous Knowledge where provided. This will include qualitative and quantitative data that help to characterize and describe the importance of bird species of cultural significance to Indigenous communities through a GBA+ lens, including, where feasible, the data disaggregated by sex, age, and other identity factors. Through Survey Monkey the data will be filtered and disaggregated based on the demographic questions answered (i.e., gender, age, Indigenous community membership, etc.).

The Project Team will work with the Indigenous communities to identify the appropriate participants for each of the subgroups that are willing to contribute to the baseline data collection through surveys and key informant interviews. The Project Team will tailor how they engage with these groups based on community protocols (i.e., it is expected that elders would prefer in-person dialogue and will require a community translator, versus youth, who would participate in online survey).

5 Consideration of Input from the Public and Indigenous Peoples

5.1 Public Participation

EA study participants as identified in the Agency *Public Participation Plan* dated February 24, 2020 for the WSR Project will be engaged and consulted. The Public Participation Plan was developed by the Agency to set out proposed opportunities for participation during the impact assessment process for Agency-led activities. The proponent, or its subject matter experts, may participate in activities as requested by the Agency.

The ToR provides a plan for engaging and consulting government ministries and agencies, the public and stakeholders based on EA study milestones similar to those for Indigenous communities.

All identified affected and/or interested stakeholders and members of the public will be notified at the EA study milestones. The public and stakeholders will have the opportunity to attend two (2) open house sessions that will be held in the City of Thunder Bay, focussing on:

1. Project and EA process overview; baseline data collection; spatial and temporal boundaries for assessment; criteria and indicators; and identification and preliminary evaluation of alternatives; and

2. Presentation of the selected preferred alternatives/the Project, including potential effects, mitigation, net effects and their significance and follow-up monitoring.

The open houses will include display materials and handouts containing information on the Project, the EA study process, known existing environmental conditions, the results of studies that have been conducted to date; the development and evaluation of alternatives, including the rationale for use of criteria and indicators; the project schedule; and the results of the consultation program. The Webequie Project Team will be available to receive and respond to questions and have an open dialogue regarding the EA process. Written comments may be prepared and left at the open house venue or sent to the Project Team within a specified period following the event.

The public and stakeholders will be notified regarding the commencement of the EA and submission of the Draft and Final EAR/IS. The EAR/IS will be available for review on the Project Website, and at municipal offices or nearby public libraries in:

- City of Thunder Bay
- Municipality of Greenstone
- Township of Pickle Lake
- City of Timmins
- Municipality of Sioux Lookout

In summary, the methods and activities for engagement and consultation with the public will include:

- Notification letters;
- Public notices and newspaper advertising at key EA milestones – Notice of Commencement; Notice of Open Houses; Notices for Draft and Final EAR/IS;
- Open houses;
- Communication materials for use at meetings such as slide decks, project fact sheets, handouts, etc.;
- Project Website; and
- Opportunities to review and provide comments on the Draft and Final EAR/IS.

All comments received from the public engagement and consultation activities will be tracked (i.e., Record of Consultation) and considered by the Project Team with the objective that the public be provided meaningful opportunities to participate, including in meaningful discussions in the EA process.

5.2 Indigenous Engagement and Consultation

5.2.1 Communities to be Included in the Assessment

The assessment of bird and bird habitat component will include the 22 identified Indigenous communities that are to be consulted as part of the EA process, as shown in **Table 4** below. These communities have been identified by the MECP and Agency as communities whose established or asserted Aboriginal and/or Treaty rights may be adversely affected by the Project and/or may have interests in the project. Communities marked with an asterisk are those whose Aboriginal and Treaty rights may be affected by the Project.

The table also includes those communities that have been identified by Webequie First Nation based on Elders' guiding principles and Webequie's Three-Tier approach to Indigenous consultation and engagement. WFN identified communities and assessed them based on the following criteria:

- Geographically closer to the project area than others;
- Known to have traditionally used some of the potentially affected lands in the past, or currently;
- Downstream of the Project and may experience impacts as a result of effects to waterways;
- Considered to have closer familial/clan connections to the members of WFN; and/or
- Have been involved in all-season road planning in the Region, either directly with the WFN, or in consideration of all-season road planning that the WFN has been involved with in recent years.

Based on these factors, the communities identified by WFN will be offered the deepest or intensive consultation/engagement.

Table 4: Indigenous Communities to be Consulted

Indigenous Community	Identified by WFN	Identified by MECP	Identified by IAAC
Webequie First Nation	✓	✓*	✓*
Aroland First Nation		✓*	✓*
Attawapiskat First Nation	✓	✓*	✓*
Constance Lake First Nation		✓*	✓
Eabametoong First Nation	✓	✓	✓*
Fort Albany First Nation		✓*	✓*
Ginoogaming First Nation		✓	✓
Kasabonika First Nation	✓	✓*	✓*
Kaschechewan First Nation		✓*	
Kitchenuhmaykoosib Inninuwug		✓*	✓
Kingfisher Lake First Nation		✓*	
Long Lake #58 First Nation		✓	✓
Marten Falls First Nation	✓	✓*	✓*
Mishkeegogamang First Nation		✓	
Neskantaga First Nation	✓	✓*	✓*
Nibinamik First Nation	✓	✓*	✓*
North Caribou Lake First Nation		✓	
Wapekeka First Nation		✓*	
Wawakapewin First Nation		✓*	
Weenusk (Peawanuck) First Nation	✓	✓*	✓*
Wunnumin Lake First Nation		✓*	
Métis Nation of Ontario – Region 2		✓	

5.2.2 Approach and Methods

The Project Team will consult and engage with Indigenous communities throughout the assessment process, and specifically the aquatic component with focus on those species for consumption or where use may have Indigenous cultural, social or economic importance. It is also the Project Team's objective that the EA captures Indigenous Knowledge and any issues, concerns or other information being provided by Indigenous communities accurately and appropriately. As such, Indigenous communities will have the opportunity to provide input and feedback during the following steps of the EA and more specifically the assessment of the aquatic environment as outlined in this work plan:

- Provide input to defining the bird and bird habitat study areas or spatial boundaries for the purposes of the baseline data collection and effects assessment;
- Provide input on the criteria and indicators, such as criterion bird species and metrics to measure changes to baseline bird/bird habitat conditions as a result of the Project;
- Provide input on methods and types of baseline data and information to be collected, including opportunity to provide Indigenous Knowledge;
- Validate how baseline information is captured and used in the EA;
- Provide input on the effects assessment methodology, including alternatives;
- Discuss potential effects based on predicted changes to bird/bird habitat availability, distribution and abundance; and

- Provide input to identify mitigation measures and any follow-up monitoring programs during the construction and/or operation phases of the Project, including predicted overall net effects and significance, including those that may interfere with the exercise of rights of Indigenous peoples.

A variety of activities and materials will be used to provide information and receive input from Indigenous communities during the EA process. These are outlined and detailed in the provincial ToR which includes the mechanisms, activities and events that are planned for various stages throughout the EA process and will be used at milestone points to ensure optimal engagement with Indigenous communities. In summary this includes the following:

- Notification letters sent by registered mail to all of the identified Indigenous communities and groups (i.e., Tribal Councils) informing them at key milestones (e.g., Commencement of provincial EA; Submission Draft EAR/IS and Submission of Final EAR/IS);
- Community visits throughout for those communities identified by IACC and MECP whose established or asserted Aboriginal and/or treaty rights may be adversely affected by the Project;
- Meetings (2) with off-reserve community members of the 22 Indigenous communities to be consulted as part of the EA;
- Information meetings with Métis Nation of Ontario;
- Engagement with Tribal Councils and Nishnawbe Aski Nation, with meetings held upon request;
- Communication materials for use at meetings, such as slide decks, project fact sheets, handouts, etc., including, where requested, translation to native language;
- Audio and visual products for those Indigenous communities that have the capability; community meetings and presentations will be live-streamed through local community media to allow for a wider audience to participate in the meetings;
- Use of surveys (e.g., “Survey Monkey”) or focused community-based meetings to obtain information (e.g., socio-economic, human health, etc.) and identify concerns from Indigenous people;
- Project Website (www.supplyroad.ca) for the public to review project related information and documents, including informative video tutorials (e.g., EA studies); and
- Project Newsletter letters.

Engagement with Indigenous groups has been undertaken as part of the ToR phase and included components of the work plan (e.g., baseline studies for valued components, spatial and temporal boundaries, criteria and indicators, EA alternatives, etc.) and will continue as part of the planned EA engagement activities for the Project.

All outreach efforts and consultation activities will be recorded as part of the Record of Consultation to allow for validation by the Agency and the MECP. The EAR/IS will describe how input from Indigenous communities and public was incorporated into the bird and bird habitat assessment and other valued components.

5.2.3 Indigenous Knowledge

Through engagement activities, the Project Team will also collect Indigenous Knowledge relevant to the WSR study area and specific valued components, where available, from the 16 Indigenous communities identified by Ontario and the 10 Indigenous communities identified by the Agency. Indigenous Knowledge will assist in describing existing conditions (e.g., characterizing the study area, natural environment conditions, social and economic conditions, cultural characteristics, community characteristics, past and

current land uses and other values of importance. Indigenous Knowledge will be used to assist in developing mitigation measures, monitoring commitments and accommodation measures, where necessary. The Project Team will document efforts to obtain Indigenous Knowledge. It is recognized that each community may have its own protocols and procedures to be followed in transferring Indigenous Knowledge to outside parties such as WFN and the Project Team. The Project Team will ensure that related protocols are respected and will work with each community to understand how the information will be transferred, securely stored, and applied. Additionally, the Project Team will ensure that the Indigenous Knowledge provided will be protected and kept confidential. The Project Team will seek guidance from the community as to how the information will be used and published.

As Indigenous Knowledge is holistic it can provide insights related to interrelationships between the natural, social, cultural, and economic environments, community health and well-being, Indigenous governance and resource use. Therefore, Indigenous Knowledge, where provided, will be included in all of aspects of the technical assessments of potential impacts of the Project on Indigenous peoples, or, given is holistic nature, may be presented in one section of the EAR/IS. It will also be considered in technical sections or chapters of the documents (e.g., baseline data on bird and bird habitat will include baseline information gathered through collection of Indigenous Knowledge). It is recognized that it is important to capture the context in which Indigenous groups provide their Indigenous Knowledge and to convey it in a culturally appropriate manner. Indigenous Knowledge will only be incorporated in the EAR/IS where written consent has been granted.

5.2.4 Aboriginal and Treaty Rights

The Webequie Project Team will be engaging with Indigenous communities regarding potential impacts of the Project on the exercise of rights, and where possible, the project's interference with the exercise of rights. Potential effects to be considered will include both adverse and positive effects on the current use of land and resources for traditional purposes, physical and cultural heritage, and environmental, health, social and economic conditions of Indigenous peoples impacted by the Project. For example, this will include such effects as reductions in the quantity and quality of resources available for harvesting (e.g., species of cultural importance, including traditional and medicinal plants; or interference with the current and future availability and quality of country foods (traditional foods). Webequie First Nation and the Project Team will discuss with Indigenous communities their views on how best to reflect and capture impacts on the exercise of rights in the EAR/IS. Should impacts on the exercise of Aboriginal and Treaty rights be identified, Webequie First Nation and the Project Team will work with Indigenous communities to determine appropriate mitigation measures to reduce or eliminate such impacts. Where no mitigation measures are proposed or mitigation is not possible, the Project Team will identify the adverse impacts or interference to the exercise of Aboriginal and Treaty rights and this will be described (e.g., level of severity) and documented in the EAR/IS. Webequie First Nation and the Project Team will advise Ontario and the Government of Canada on concerns Indigenous communities may have in relation to their exercise of Aboriginal and Treaty rights and whether their concerns cannot be addressed or mitigated by the Project Team.

6 Contribution to Sustainability

6.1 Overarching Approach

As recognized in the Agency's current guides to considering how a project will contribute to sustainability, it is not until baseline information has been collected and the potential effects of the Project are assessed that a full understanding or determination of the project's contribution(s) can be achieved/made. However, information and data requirements for sustainability have been considered from the outset of the WSR Project for planning purposes. In the absence of the potential effects assessment, this section outlines the general approach to determining sustainability contributions for this valued component.

The approach is based on the goal of providing a broad or holistic description of the project's potential positive and negative effects, including the interactions among those effects and the long-term consequences of the effects. In the context of the IAA requirements, sustainability means "the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generations", with the aim of "protecting the components of the environment and the health, social and economic conditions that are within the legislative authority of Parliament from adverse effects caused by a designated project", recognizing that the Minister's or the Governor in Council's public interest determination must include sustainability as one of five factors to be considered in rendering a final decision.

The approach also considers the level of effort required to assess a project's contribution to sustainability to be scalable, depending on the phase of the process and the context of the project, and can/will be adjusted/scoped as the impact assessment proceeds. For example, effects on future generations requires temporal scoping (i.e., consideration of next generation to "seventh generation"), based on expectations as to how many generations it will take for effects to become fully apparent, including return to VC baseline conditions; resilience of the VC; and whether a VC is expected to recover from effects.

As part of the public participation and Indigenous peoples engagement programs described in Section 5, the Project Team has (and will continue to) facilitate early identification of values and issues to better inform the assessment of the project's contribution to sustainability; and identify VCs that should be carried forward into that assessment, scoping related criteria and indicators to reflect the project context. As part of sustainability considerations, this information has also been used (with regard to which VCs are considered most important to Webequie First Nation) to identify alternative means of carrying out the Project and select alternatives to be carried forward for an assessment of sustainability contributions. Ultimately, with the appropriate input from the engagement and consultation program, the sustainability assessment will culminate with the development of commitments to ensuring the sustainability of Indigenous livelihood, traditional use, culture and well-being.

In identifying and scoping key VCs for sustainability contributions, the Project Team will consider VCs that:

- could experience long-term effects, including how those effects could change over time, and how they could affect future generations;
- may interact with other VCs;

- may interact with potential effects of the designated project; and/or
- may interact with project activities.

6.2 Assessment of Contribution to Sustainability

During preparation of the Impact Statement, the four (4) Sustainability Principles identified in the Agency's guides and the TISG will be applied as follows:

Principle 1 - Consider the interconnectedness and interdependence of human-ecological systems

A systems approach will be used to determine/express VC interconnectedness. The degree of interconnectedness within systems and/or subsystems may vary greatly (may be characterized as very intricate and tight/direct, or quite loose and indirect). The focus will be on those aspects that are most important to communities, the social-ecological system and to the context of a project. All interactions, pathways and connections among effects to the environment, and to health, economic and social conditions will be described, as will how these interactions may change over time. The Project Team will ensure that the description of systems and the direct and indirect relationships are guided by input from Indigenous Knowledge. It is expected that a graphic with simple pictorial images will be developed to visually represent the connections between human and ecological systems to facilitate comprehension and encourage input/feedback.

Principle 2 - Consider the well-being of present and future generations

The long-term effects on the well-being of present and future generations will be assessed. To conduct an analysis on future generations, the Project Team will first determine the potential long-term effects on well-being. This will entail consideration of the elements of environmental, health, social and economic well-being, across a spectrum of VCs, that communities identified as being valuable to them. In the context of subject VC (aquatic environment), well-being could include community cohesion, protection of the environment, culture, stress, or livelihoods. Available Comprehensive Community Plans (CCP) will be consulted to determine whether sustainability is a CCP central theme. How the environmental, health, social and economic effects on well-being could change over time will also be assessed, as information permits. Although effects on future generations could include effects beyond the lifecycle of a project, this is not expected to be major consideration for the WSR Project, as no expected decommissioning or abandonment timeframe has been identified. With respect to temporal scoping, there is still a need to determine what the "future generation" is (i.e., how far into the future the project effects will be considered). Predicted potential effects on future generations will be assessed based on the supporting data or uncertainty; any uncertainty will be documented.

Principle 3 - Maximize overall positive benefits and minimize adverse effects of the designated project

The Impact Statement will include a consideration of ways to maximize the positive benefits of the Project and consider mitigation measures that are technically and economically feasible and would mitigate any adverse effects of the Project. Sustainability considerations will include: whether additional mitigation measures are required; have additional benefits been identified and, if so, how can they be maximized; does the direction of the impact (i.e., positive or negative) shift between different groups and sub-populations; are there particular strengths or vulnerabilities in the potentially affected communities that

may influence impacts; do the impacts cause regional inequities; and do the near term benefits come at the expense of disadvantages for future generations.

Principle 4 - Apply the precautionary principle and consider uncertainty and risk of irreversible harm

The precautionary principle states that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". All uncertainties and assumptions underpinning an analysis will be described. A precautionary approach will be applied in cases where there is risk of irreversible harm (irreversible harm refers to project-related effects from which a VC is not expected to recover; reversibility is influenced by the resilience of the VC). Taking such a conservative approach may include setting out worst-case scenarios for decision-makers to consider, particularly when there is uncertainty about the significance or irreversibility of potential effects. As appropriate, the precautionary approach may be extended to commitments regarding the project's design (to prevent adverse effects, prevent pollution, deal with unplanned events) and the development of monitoring and follow-up programs to verify effects predictions, or gauge the effectiveness of mitigation measures. Uncertainty may be characterized quantitatively (e.g., description of confidence levels of modelled predictions) or qualitatively (e.g., through descriptors such as "high", "medium", and "low"). Qualitative descriptions of uncertainty will explain how the level of uncertainty was determined, identify sources of uncertainty and data gaps, and describe where and how professional judgment was used.

7 Closure

Prepared by:

<Original signed by>

Jon Pleizier, B.Sc.
Wildlife Biologist

Reviewed by:

<Original signed by>

Angela Brooks, M.Sc.
Senior Ecologist

Environment & Geoscience
Engineering, Design and Project Management

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Appendix A

List of Bird Species Detected during 2019 Field Studies

Appendix A – List of Bird Species Detected during 2019 Field Studies

Common Name	Latin Name	Provincial S-Rank[1]	ESA Status[2]	COSEWIC Status[3]	SARA Status[4]	Observed in 2019 Field Program?
Alder Flycatcher	*Empidonax alnorum*	S5B	No status	No status	No status	Yes
American Bittern	*Botaurus lentiginosus*	S4B	No status	No status	No status	No
American Black Duck	*Anas Rubripes*	S4B	No status	No status	No status	No
American Crow	*Corvus brachyrhynchos*	S5B	No status	No status	No status	Yes
American Golden Plover	*Pluvialis dominica*	S2B, S4N	No status	No status	No status	No
American Kestrel	*Falco sparverius*	S4	No status	No status	No status	No
American Redstart	*Setophaga ruticilla*	S5B	No status	No status	No status	Yes
American Robin	*Turdus migratorius*	S5B	No status	No status	No status	Yes
American Three-toed Woodpecker	*Picoides dorsalis*	S4	No status	No status	No status	Yes
American Wigeon	*Anas americana*	S4	No status	No status	No status	Yes
Arctic Tern	*Sterna paradisaea*	S4B	No status	No status	No status	No
Bald Eagle	*Aliaeetus leucocephalus*	S2N, S4B	Special Concern	Not at risk	Not at risk	Yes
Barn Swallow	*Hirundo rustica*	S4B	Threatened	Threatened	Threatened	Yes
Barred Owl	*Strix varia*	S5	No status	No status	No status	No
Bay-breasted Warbler	*Setophaga castanea*	S5B	No status	No status	No status	Yes
Belted Kingfisher	*Megaceryle alcyon*	S4B	No status	No status	No status	Yes
Black Tern	*Chlidonias niger*	S3B	Special Concern	Not at risk	Not at risk	No
Black-and-white Warbler	*Mniotilta varia*	S5B	No status	No status	No status	Yes
Black-backed Woodpecker	*Picoides arcticus*	S4	No status	No status	No status	Yes
Blackburnian Warbler	*Setophaga fusca*	S5B	No status	No status	No status	Yes
Black-capped Chickadee	*Poecile atricapillus*	S5	No status	No status	No status	Yes
Blackpoll Warbler	*Setophaga striata*	S4B	No status	No status	No status	Yes

Black-throated Green Warbler	*Setophaga virens*	S5B	No status	No status	No status	Yes
Blue Jay	*Cyanocitta cristata*	S5	No status	No status	No status	No
Blue-headed Vireo	*Vireo solitarius*	S5B	No status	No status	No status	Yes
Blue-winged Teal	*Anas discors*	S4	No status	No status	No status	No
Bohemian Waxwing	*Bombycilla garrulus*	SNA	No status	No status	No status	Yes
Bonaparte's Gull	*Chroicocephalus philadelphia*	S4B, S4N	No status	No status	No status	Yes
Boreal Chickadee	*Poecile hudsonicus*	S5	No status	No status	No status	Yes
Boreal Owl	*Aegolius funereus*	S4	No status	Not at risk	No status	No
Brant	*Branta bernicla*	S4N	No status	No status	No status	No
Broad-winged Hawk	*Buteo platypterus*	S5B	No status	No status	No status	No
Brown Creeper	*Certhia americana*	S5B	No status	No status	No status	Yes
Bufflehead	*Bucephala albeola*	S4	No status	No status	No status	Yes
Cackling Goose	*Branta hutchinsii*	S4M	No status	No status	No status	No
Canada Goose	*Branta canadensis*	S5	No status	No status	No status	Yes
Canada Jay	*Perisoreus canadensis*	S5	No status	No status	No status	Yes
Canada Warbler	*Cardinella canadensis*	S4B	Special Concern	Threatened	Threatened	Yes
Cape May Warbler	*Setophaga tigrina*	S5B	No status	No status	No status	Yes
Cedar Waxwing	*Bombycilla cedrorum*	S5B	No status	No status	No status	Yes
Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B	No status	No status	No status	Yes
Chipping Sparrow	*Spizella passerina*	S5B	No status	No status	No status	Yes
Clay-colored Sparrow	*Spizella pallida*	S4B	No status	No status	No status	No
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B	No status	No status	No status	No
Common Goldeneye	*Bucephala clangula*	S5	No status	No status	No status	Yes
Common Grackle	*Quiscalus quiscula*	S5B	No status	No status	No status	Yes
Common Loon	*Gavia immer*	S5B, S5N	No status	Not at risk	No status	Yes
Common Merganser	*Mergus merganser*	S5B, S5N	No status	No status	No status	Yes

Common Nighthawk	*Chordeiles minor*	S4B	Special Concern	Special Concern	Threatened	No
Common Raven	*Corvus corax*	S5	No status	No status	No status	Yes
Common Redpoll	*Acanthis fammea*	S4B	No status	No status	No status	Yes
Common Tern	*Sterna hirundo*	S4B	No status	Not at risk	No status	No
Common Yellowthroat	*Geothlypis trichas*	S5B	No status	No status	No status	Yes
Connecticut Warbler	*Geothlypis agilis*	S4B	No status	No status	No status	Yes
Cooper's Hawk	*Aciipiter cooperii*	S4	No status	Not at risk	No status	No
Dark-eyed Junco	*Junco hyemalis*	S5B	No status	No status	No status	Yes
Downy Woodpecker	*Picoides pubescens*	S5	No status	No status	No status	Yes
Eastern Wood-pewee	*Contopus virens*	S4B	Special Concern	Special Concern	Special Concern	No
Evening Grosbeak	*Coccothraustes vespertius*	S4B	Special Concern	Special Concern	Special Concern	Yes
Fox Sparrow	*Passerella iliaca*	S4B	No status	No status	No status	Yes
Golden-crowned Kinglet	*Regulus satrapa*	S5B	No status	No status	No status	Yes
Great Blue Heron	*Ardea herodias*	S4	No status	No status	No status	No
Great Grey Owl	*Strix nebulosa*	S4	No status	Not at risk	No status	Yes
Great Horned Owl	*Bubo virginianus*	S4	No status	No status	No status	No
Greater Scaup	*Aythya marila*	S4	No status	No status	No status	No
Greater Yellowlegs	*Tringa melanoleuca*	S4B, S4N	No status	No status	No status	Yes
Green-winged Teal	*Anas crecca*	S4	No status	No status	No status	No
Hairy Woodpecker	*Picoides villosus*	S5	No status	No status	No status	Yes
Hermit Thrush	*Catharus guttatus*	S5B	No status	No status	No status	Yes
Herring Gull	*Larus argentatus*	S5B, S5N	No status	No status	No status	Yes
Hoary Redpoll	*Acanthis hornemanni*	SNA	No status	No status	No status	No
Hooded Merganser	*Lophodytes cucullatus*	S5B, S5N	No status	No status	No status	Yes
Horned Lark	*Eremophila alpestris*	S5B	No status	No status	No status	No

Iceland Gull	*Larus glaucoides*	S4N	No status	No status	No status	No
Killdeer	*Charadrius vociferus*	S5B, S5N	No status	No status	No status	Yes
Lapland Longspur	*Calcarius lapponicus*	S3B	No status	No status	No status	No
Least Flycatcher	*Empidonax minimus*	S4B	No status	No status	No status	Yes
Least Sandpiper	*Calidris minutilla*	S4B, S4N	No status	No status	No status	No
LeConte’s Sparrow	*Ammodramus leconteii*	S4B	No status	No status	No status	Yes
Lesser Scaup	*Aythya affinis*	S4	No status	No status	No status	No
Lesser Yellowlegs	*Tringa flavipes*	S4B, S4N	No status	No status	No status	No
Lincoln's Sparrow	*Melospiza lincolnii*	S5B	No status	No status	No status	Yes
Long-eared Owl	*Asio otus*	S4	No status	No status	No status	No
Long-tailed Duck	*Clangula hyemalis*	S3B	No status	No status	No status	No
Magnolia Warbler	*Setophaga magnolia*	S5B	No status	No status	No status	Yes
Mallard	*Anas platyrhynchos*	S5	No status	No status	No status	Yes
Merlin	*Falco columbarius*	S5B	No status	Not at risk	No status	Yes
Mourning Warbler	*Geothlypis philadelphia*	S4B	No status	No status	No status	Yes
Nashville Warbler	*Oreothlypis ruficapilla*	S5B	No status	No status	No status	Yes
Nelson's Sparrow	*Ammodramus nelsoni*	S4B	No status	Not at risk	No status	No
Northern Flicker	*Colaptes auratus*	S4B	No status	No status	No status	Yes
Northern Goshawk	*Accipiter gentilis*	S4	No status	Not at risk	No status	No
Northern Harrier	*Circus cyaneus*	S4B	No status	Not at risk	No status	Yes
Northern Hawk Owl	*Surnia ulula*	S4	No status	Not at risk	No status	No
Northern Parula	*Setophaga americana*	S4B	No status	No status	No status	No
Northern Pintail	*Anas acuta*	S5	No status	No status	No status	No
Northern Shoveler	*Anas clypeata*	S4	No status	No status	No status	No
Northern Shrike	*Lanius excubitor*	SNA	No status	No status	No status	No
Northern Waterthrush	*Parkesia noveboracensis*	S5B	No status	No status	No status	Yes
Olive-sided Flycatcher	*Contopus cooperi*	S4B	Special Concern	Special Concern	Threatened	Yes

Orange-crowned Warbler	*Oreothlypis celata*	S4B	No status	No status	No status	Yes
Osprey	*Pandion haliaetus*	S5B	No status	No status	No status	Yes
Ovenbird	*Seiurus aurocapilla*	S4B	No status	No status	No status	Yes
Palm Warbler	*Setophaga palmarum*	S5B	No status	No status	No status	Yes
Peregrine Falcon	*Falco peregrinus anatum/tundrius*	S3B	Special Concern	Not at risk	Special Concern	No
Philadelphia Vireo	*Vireo philadelphicus*	S5B	No status	No status	No status	Yes
Pileated Woodpecker	*Dryocopus pileatus*	S5	No status	No status	No status	Yes
Pine Grosbeak	*Pinicola enucleator*	S4B	No status	No status	No status	No
Pine Siskin	*Spinus pinus*	S4B	No status	No status	No status	No
Purple Finch	*Haemorhous purpureus*	S4B	No status	No status	No status	Yes
Purple Sandpiper	*Caldris maritime*	SNA	No status	No status	No status	No
Red Crossbill	*Loxia curviostra*	S4B	No status	No status	No status	Yes
Red-breasted Merganser	*Mergus serrator*	S4B, S5N	No status	No status	No status	No
Red-breasted Nuthatch	*Sitta canadensis*	S5	No status	No status	No status	Yes
Red-eyed Vireo	*Vireo olivaceus*	S5B	No status	No status	No status	Yes
Red-necked Grebe	*Podiceps grisegena*	S3B, S4N	No status	Not at risk	No status	No
Red-tailed Hawk	*Buteo jamaicensis*	S5	No status	Not at risk	No status	Yes
Red-winged Blackbird	*Agelaius phoeniceus*	S4	No status	No status	No status	Yes
Ring-billed Gull	*Larus delawarensis*	S5B, S4N	No status	No status	No status	Yes
Ring-necked Duck	*Aythya collaris*	S5	No status	No status	No status	Yes
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	No status	No status	No status	No
Ruby-crowned Kinglet	*Regulus calendula*	S4B	No status	No status	No status	Yes
Ruffed Grouse	*Bonasa umbellus*	S4	No status	No status	No status	Yes
Rusty Blackbird	*Euphagus carolinus*	S4B	Not at risk	Special Concern	Special Concern	Yes
Sandhill Crane	*Antigone canadensis*	S5B	No status	Not at risk	No status	Yes
Savannah Sparrow	*Passerculus sandwichensis*	S4B	No status	No status	No status	Yes

Scarlet Tanager	*Piranga olivacea*	S4B	No status	No status	No status	No
Semipalmated Plover	*Charadrius semipalmatus*	S4B, S4N	No status	No status	No status	No
Sharp-shinned Hawk	*Accipiter striatus*	S5	No status	Not at risk	No status	Yes
Sharp-tailed Grouse	*Tympanuchus phasianellus*	S4	No status	No status	No status	Yes
Short-eared Owl	*Asio flammeus*	S2N, S4B	Special Concern	Special Concern	Special Concern	No
Snow Goose	*Chen caerulescens*	S5B	No status	No status	No status	No
Snowy Owl	*Bubo scandiacus*	SNA	No status	Not at risk	No status	No
Solitary Sandpiper	*Tringa solitaria*	S4B	No status	No status	No status	Yes
Song Sparrow	*Melospiza melodia*	S5B	No status	No status	No status	Yes
Sora	*Porzana Carolina*	S4B	No status	No status	No status	Yes
Spotted Sandpiper	*Actitis macularius*	S5	No status	No status	No status	Yes
Spruce Grouse	*Falcipennis canadensis*	S5	No status	No status	No status	Yes
Swainson's Thrush	*Catharus ustulatus*	S4B	No status	No status	No status	Yes
Swamp Sparrow	*Melospiza georgiana*	S5B	No status	No status	No status	Yes
Tennessee Warbler	*Oreothlypis peregrina*	S5B	No status	No status	No status	Yes
Tree Swallow	*Tachycineta bicolor*	S4B	No status	No status	No status	Yes
Tundra Swan	*Cygnus columbianus*	S4	No status	No status	No status	Yes
Veery	*Catharus fuscescens*	S4B	No status	No status	No status	No
White-breasted Nuthatch	*Sitta carolinensis*	S5	No status	No status	No status	No
White-crowned Sparrow	*Zonotrichia leucophrys*	S4B	No status	No status	No status	Yes
White-throated Sparrow	*Zonotrichia albicollis*	S5B	No status	No status	No status	Yes
White-winged Crossbill	*Loxia leucoptera*	S5B	No status	No status	No status	Yes
White-winged Scoter	*Melanitta fusca*	S4B, S4N	No status	No status	No status	Yes
Wilson's Snipe	*Gallinago gallinago*	S5B	No status	No status	No status	Yes
Wilson's Warbler	*Cardellina pusilla*	S4B	No status	No status	No status	Yes
Winter Wren	*Troglodytes hiemalis*	S5B	No status	No status	No status	Yes
Yellow Warbler	*Setophaga petechia*	S5B	No status	No status	No status	Yes

Yellow-bellied Flycatcher	*Empidonax flaviventris*	S5B	No status	No status	No status	Yes
Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B	No status	No status	No status	Yes
Yellow-rumped Warbler	*Setophaga coronata*	S5B	No status	No status	No status	Yes

[1] S1 = Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation;
S2 = Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation;
S3= Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank;
S4 = Common and apparently secure in Ontario; usually with more than 100 occurrences in the province; and
S5 = Very common and demonstrably secure in Ontario SE =

[2] Endangered Species Act

[3] Committee on the Status of Endangered Wildlife In Canada

[4] Species At Risk Act

Appendix B

Preliminary ARU Sampling Locations

Appendix B: Preliminary ARU Sampling Locations

Sampling Location	Longitude	Latitude	Habitat Type
MX1	-87.3142	52.95871	Open Wetland
MX2	-87.3222	52.96594	Open Wetland
MX3	-87.3133	52.96132	Open Wetland
MX4	-87.149	52.86518	Open Wetland
MX5	-86.3168	52.74984	Open Wetland
MX6	-86.3168	52.74984	Open Wetland
CF1	-87.3034	52.96255	Coniferous Forest
CF2	-87.3067	52.96126	Coniferous Forest
CF3	-87.3067	52.96126	Coniferous Forest
CF4	-87.3144	52.9541	Coniferous Forest
CF5	-87.2379	52.98075	Coniferous Forest
CF6	-87.2379	52.98075	Coniferous Forest
CF7	-87.2333	52.92461	Coniferous Forest
CF8	-87.2333	52.92461	Coniferous Forest
CF9	-87.2028	52.9345	Coniferous Forest
CF10	-87.1273	52.87778	Coniferous Forest
CF11	-87.1273	52.87778	Coniferous Forest
CF12	-86.4061	52.77306	Coniferous Forest
CF13	-86.4061	52.77306	Coniferous Forest
OW1	-87.2278	52.92483	Open Wetland
OW3	-87.0494	52.7443	Open Wetland
OW4	-87.0494	52.7443	Open Wetland
OW5	-86.9653	52.74143	Open Wetland
OW6	-86.9616	52.74969	Open Wetland
OW7	-86.9627	52.75144	Open Wetland
OW8	-86.6303	52.77999	Open Wetland
OW9	-86.6459	52.77124	Open Wetland
OW10	-86.5285	52.76148	Open Wetland
OW11	-86.5065	52.76523	Open Wetland
OW12	-86.511	52.75767	Open Wetland
OW13	-86.511	52.75767	Open Wetland
OW14	-86.511	52.75767	Open Wetland
OW15	-86.4061	52.77306	Open Wetland
OW16	-86.3829	52.76199	Open Wetland
OW17	-86.3826	52.7647	Open Wetland
OW18	-86.6009	52.76855	Open Wetland
OW19	-86.8336	52.71283	Open Wetland

Sampling Location	Longitude	Latitude	Habitat Type
TW1	-87.2379	52.98075	Treed Wetland
TW2	-87.2379	52.98075	Treed Wetland
TW3	-87.2192	52.92858	Treed Wetland
TW5	-87.1273	52.87778	Treed Wetland
TW6	-87.1477	52.88076	Treed Wetland
TW7	-87.0964	52.77515	Treed Wetland
TW8	-87.0964	52.77515	Treed Wetland
TW9	-87.0964	52.77515	Treed Wetland
TW10	-87.0964	52.77515	Treed Wetland
TW11	-87.0409	52.76611	Treed Wetland
TW12	-87.042	52.7495	Treed Wetland
TW13	-87.0691	52.7498	Treed Wetland
TW14	-86.959	52.75	Treed Wetland
TW15	-86.959	52.75	Treed Wetland
TW16	-86.6459	52.77124	Treed Wetland
TW17	-86.6459	52.77124	Treed Wetland
TW18	-86.4189	52.77648	Treed Wetland
TW19	-86.3954	52.78339	Treed Wetland
TW20	-86.3826	52.7647	Treed Wetland
TW21	-86.3829	52.76199	Treed Wetland
TW22	-86.3826	52.7647	Treed Wetland
RL1	-87.0353	52.75944	River/Lake
RL2	-87.0353	52.75944	River/Lake
RL3	-87.0364	52.76606	River/Lake
RL4	-87.0364	52.76606	River/Lake
RL5	-86.9011	52.77755	River/Lake
RL6	-86.9012	52.77798	River/Lake
RL7	-86.9012	52.77798	River/Lake
RL8	-86.9012	52.77798	River/Lake
RL09	-86.7392	52.77038	River/Lake
RL10	-86.7392	52.77038	River/Lake
RL11	-86.7392	52.77038	River/Lake
RL12	-86.7392	52.77038	River/Lake
DI1	-87.3137	52.93966	Disturbed
DI2	-87.3137	52.93966	Disturbed
DI3	-87.2085	52.84244	Disturbed

Appendix C

Sample Habitat Models for Breeding Bird Species

Table 1: Sample Model for Moderate to High Suitability Bald Eagle Nesting Habitat in northern Ontario (based on Golder, 2017)

Land Classification Scheme	Classification/Code	Parameters
Land Cover 2000	› Dense deciduous forest › Dense coniferous forest › Dense mixed forest	› Within 2.6 km of major waterbodies (i.e. greater than 300 ha); › Within 2.6 km of stream order 7 or higher watercourses using the Strahler method in the MNRF waterbody dataset
Forest Resource Inventory Ecosites[a]	NE03, NE06, NE07, NE10, NW16, NW18, NW19, NW23, NW24, NW26, NW27, C17, C18, C19, C21, C27, NW4	› Age structure greater than 80 years; › Within 2.6 km of major waterbodies (i.e. greater than 300 ha); › Within 2.6 km of Stream order 7 or higher watercourses using the Strahler method in the MNRF waterbody dataset
LIO	Cliffs	› Within 2.6 km of major waterbodies (i.e. greater than 300 ha); › Within 2.6 km of Stream order 7 or higher watercourses using the Strahler method in the MNRF waterbody dataset

[a] Ecosites (Racey et al, 1996)

Table 2: Sample Model for Moderate to High Suitability Canada Warbler Nesting in northern Ontario (based on Golder, 2017)

Land Classification Scheme	Code[a]	Parameters
Land Cover 2000	› Dense Mixed Forest › Treed Bog › Treed Fen › Regenerating Depleted Forest › Forest Depletion - Cuts › Forest Depletion - Burns › Riparian Areas	› All land cover types
Forest Resource Inventory Ecositesa	› Forest Stands (all ecosites)	› Forest Stands 6-30 years of age using year of origin attribute in the FRI dataset calibrated to 2020
	› Riparian Area (all ecosites)	
	C18, C19, C21, C22, C31, C33, NE05, NE06, NE08, NE09, NE11 NE12, NE13, NE14, NE15, NW16, NW17, NW19, NW23, NW28, NW29, NW30, NW32, NW34, NW35, NW36, NW37, NW40, NW44	› Forest Stands greater than 30 years of age using year of origin attribute in the FRI dataset calibrated to 2020

[a] Ecosites (Racey et al, 1996)

Table 3: Sample Model for Moderate to High Suitability Common Nighthawk Nesting Habitat in Northern Ontario (based on Golder, 2017)

Land Classification Scheme	Code[a]	Parameters
Land Cover 2000	› Bedrock › Sparse Forest › Forest Forest Depletion - Cuts › Forest Depletion - Burns › Forest regeneration depletion	› All land cover types
	› Dense deciduous forest › Dense coniferous forest › Dense mixed forest	› Edge areas that extend 50 m from one or more of the following cover types: › Water › Bedrock › Sparse Forest › Forest Forest Depletion - Cuts › Forest Depletion – Burns; and › Forest regeneration depletion
Forest Resource Inventory Ecosites[a]	› Forest Stands (polytype FOR)	› Pre-sapling stage. Ages 0-10 using year of origin attribute in the FRI dataset calibrated to 2020
	› Rock Barren (NW7)	
	C15, C18, C19, C20, C27, C29, NE01, NE02, NE03, NE06, NE07, NW13, NW16, NW19, NW28, NW29,	› Forest Stands 10-31 years of age using year of origin attribute in the FRI dataset calibrated to 2020
	› Forested Ecosites	› Edge areas that extend 50 m from one or more of the following areas: › Treed and open wetlands › Lakes, ponds and rivers › Burns 0-10 years old; and , › Upland ecosites and polytypes aged 0-10 years. › Aged 31 years and older using year of origin attribute in the FRI dataset calibrated to 2020

[a] Ecosites (Racey *et* al, 1996)

Table 4: Sample Model for Moderate to High Suitability Olive-sided Flycatcher Nesting Habitat in Northern Ontario (based on Golder, 2017)

Land Classification Scheme	Code[a]	Parameters
Land Cover 2000	› Dense coniferous forest › Dense mixed forest › Treed Bog › Treed Fen	› All land cover types
	› Coniferous forest › Mixed forest	› Edge areas that extend 50 m from one or more of the following cover types: › Water › Treed Fen › Treed Bog › Open Bog › Forest Forest Depletion – Cuts; and, › Forest Depletion - Burns
Forest Units	› BF1, BF-DOM, BfMx1, BfPur	› 60 years (onset age of mature forest)
	› COMX1, COMX2, ConMx MC1, MC2, OC,1, OCL, OCLow, PJ1, PjDee, PJM, PjMx1	› 70 years (onset age of mature forest)
	› CMX	› 80 years (onset age of mature forest)
Forest Resource Inventory Ecosites[a]	› Coniferous Forest › Mixed Forest	› 50 m in forest over 39 years of age using year of origin attribute in the FRI dataset calibrated to 2020 and, › Adjacent to wetlands and waterbodies
	› Burns	› Less than 25 years old
	› Cutblocks	› All

[a] Ecosites (Racey *et* al, 1996)