Ministry of the Environment, Conservation and Parks

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357-2020-2118

August 20, 2020

Mr. Kenneth Little
For: Nation Rise Wind Farm Limited Partnership
219 Dufferin Street, Unit 217 C
Toronto ON M6K 3J1
Email: Ken.Little@edpr.com

Re: ESA Mitigation Plan for operation of Nation Rise Wind Farm

Dear Mr. Little:

This notice is in response to the Nation Rise Wind Farm Operational Mitigation Plan (the "Mitigation Plan") submitted to the Province pursuant to paragraph 1 subsection 23.20 (7) of Ontario Regulation 242/08 (the Regulation) made under the *Endangered Species Act, 2007* (ESA).

The Mitigation Plan dated June 17, 2020 (a copy of which is attached to this notice) relates to the operation of the Nation Rise Wind Farm in in the Township of North Stormont, Ontario and identifies the following species listed on the Species at Risk in Ontario List as species that will likely be affected as a result of the operation of the facility:

- Little Brown Myotis - Endangered
- Northern Myotis – Endangered
- Bobolink – Threatened
- Eastern Meadowlark – Threatened
- Eastern Whip-poor-will – Threatened
- Barn Swallow – Threatened
- Bank Swallow – Threatened

Based on the review of the Mitigation Plan carried out by the Ministry of the Environment, Conservation and Parks, I am of the opinion that there are no grounds under subsection 23.20(8) of the Regulation to refuse to approve the Mitigation Plan.

This letter constitutes notice under paragraph 3 of subsection 23.20 (7) of the Regulation that I approve the Mitigation Plan.

Please retain this notice as confirmation of my approval and keep a copy attached to the approved Operational Mitigation Plan.

…2

Nation Rise Wind Farm
Operational Mitigation Plan

Prepared for:
Nation Rise Wind Farm LP
219 Dufferin St., Unit 217C
Toronto, Ontario
M6K 3J1

Project No. 1756 l June 2020

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Nation Rise Wind Farm
Operational Mitigation Plan

Project Team:

Staff	Role
Andrew Ryckman	Project Advisor
Lillian Knopf	Project Manager/Biologist
Charlotte Teat	Terrestrial and Wetland Biologist

Operational Mitigation Plan Submission History:

Date	Details
August 29, 2017	Original Submission
July 11, 2018	Updated with additional commitments
June 17, 2020	Updated in response to MECP comments dated June 10, 2020

Report submitted on June 17, 2020

Andrew Ryckman
Senior Terrestrial & Wetland Biologist

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1.0 Introduction

The Nation Rise Wind Farm (Project) is a proposed wind energy generating facility of up to 33 permitted wind turbines, with a nameplate capacity of approximately 100 megawatts (MW), located in the Township of North Stormont, Ontario. The Project is being proposed by Nation Rise Wind Farm Limited Partnership, a wholly-owned subsidiary of EDP Renewables Canada Ltd. (EDPR).

Natural Resource Solutions Inc. (NRSI) was retained in April 2016 by DNV GL, on behalf of Nation Rise Wind Farm Limited Partnership (the Proponent), to address the requirements of Ontario Regulation 242/08 of the *Endangered Species Act* (ESA), 2007, which includes assistance with the submission of the Notice of Activity (NOA) and the development of an Operational Mitigation Plan.

This Operational Mitigation Plan has been prepared as a follow-up to the NOA for the Project (confirmation number: M-102-9194218094). This plan outlines the background information review, potential negative impacts (if any), mitigation measures and monitoring associated with Species at Risk (SAR) identified in the NOA. The purpose of this plan is to outline how the potential impacts (if any) on SAR will be minimized during the operational phase of the Nation Rise Wind Farm.

Nation Rise Wind Farm Limited Partnership is proposing to develop the Project in eastern Ontario, within the Township of North Stormont and the United Counties of Stormont, Dundas and Glengarry, Ontario. More specifically, the Project is located in the western portion of North Stormont bounded to the south by the Township of South Stormont and to the west by the boundary of the Township of North Dundas. The north portion of the Project is delimited by the municipality boundaries of Russell and The Nation. Courville Road and MacMillan Road are the east boundaries of the Project. More Project details can be found in Table 1. See Map 1 for an illustration of the Project Area and natural features.

Table 1. Summary of Project Details

Project Name		Nation Rise Wind Farm	
Number of Turbines Permitted	Up to 33	Nameplate Capacity (MW)	Approx. 100
Municipality/County		Township of North Stormont	
Nearest Town		Crysler, Ontario	
MNRF District	Kemptville	Ecoregion District	6E
Applicant	Nation Rise Wind Farm Limited Partnership		
Notice of Activity Confirmation Number	M-102-9194218094		
Kenneth Little 219 Dufferin Street Unit 217 C Toronto, Ontario M6K 3J1			
	Phone #	416-502-9463	
	Email	Ken.Little@edpr.com	
Consultant[1]	Natural Resource Solutions Inc.		
Andrew Ryckman 225 Labrador Dr., Unit 1 Waterloo, ON N2K 4M8			
	Phone #	519-725-2227	
	Email	aryckman@nrsi.on.ca	

[1] NRSI was retained as a disciplinary expert to complete this mitigation plan.

2.0 Operational Mitigation Plan Requirements

The ESA, which came into force on June 30, 2008, provides a strong framework for the protection and recovery of Ontario's SAR and their habitats. Species protected by the Act are listed on the Species at Risk in Ontario (SARO) website (MECP 2020). There are two key provisions in the ESA to protect SAR:

> Section 9 - prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading or offering to buy, sell, lease or trade species listed as extirpated, endangered, or threatened.
>
> Section 10 - prohibits the damage or destruction of the habitat of an endangered, threatened, and in some cases extirpated species on the SARO list.

Section 23.20, subsection (2) of the ESA Ontario Regulation 242/08 outlines: Clause 9 (1) (a) and subsection 10 (1) of the Act do not apply to a person who is engaged in the operation of a wind facility and who, in the course of the operation of the wind facility, kills, harms or harasses a member of a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species, or damages or destroys the habitat of such a species, if the person satisfies the conditions set out in subsection (4).

According to subsection (4), the following are the conditions that a person who operates a wind facility must satisfy for the purposes of subsection (2):

1. Before doing anything, in the course of operating the wind facility, that is prohibited under clause 9 (1) (a) or subsection 10 (1) of the Act, the person must,
    i. give the Minister notice of the fact that the person is operating a wind facility by submitting a notice of activity form, available on the Registry, to the Minister through the Registry.
    ii. subject to subsections (5) and (6), prepare in accordance with subsection (9) a mitigation plan that meets the requirements of subsection (10), and
    iii. in the case of a person described in subsection (6), ensure that the conditions set out in subsection (7) are satisfied.

This plan has been prepared in accordance with Section 23.20 of the ESA.

3.0 Staff Roles

In accordance with the ESA, this mitigation plan has been prepared by individuals who have considerable experience relating to the species identified in this plan. Brief summaries of experience and credentials have been provided below for each of the key staff that has been involved in the preparation of this mitigation plan.

Andrew Ryckman, B.Sc., P. Biol.

Andrew is a Terrestrial and Wetland Biologist with more than 12 years of environmental experience. He routinely manages the natural heritage aspects of renewable energy projects, with specific expertise relating to bats and herpetofauna. Andrew has coordinated over 20,000 hours of acoustic bat monitoring across Canada, including visual exit surveys at over 650 potential maternity roost habitats. He has working experience with several acoustic detectors and has developed leading edge survey methods using high resolution infrared cameras to assess potential roost locations. Andrew is well versed in sonogram identification and has prepared an Ontario bat call library as a reference tool for bat call identification. Andrew has also managed the biological monitoring and impact assessments relating to more than 100 proposed wind energy facilities, totaling more than 7,000MW of proposed power, and is familiar with the potential impacts of wind energy facilities on bats, including impacts on little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*). As part of these assessments, he has also coordinated post-construction monitoring studies at several facilities across Canada to assess the impacts and identify potential mortality trends or risk factors.

Andrew has authored, or co-authored, several posters and presentations specifically relating to bat activity, behaviour patterns, monitoring protocol, and risk of turbine interactions. He was also invited to give a presentation at a bat habitat assessment workshop that was led by the Ministry of Natural Resources and Forestry (MNRF) in October 2012. Andrew is certified in the Ecological Land Classification (ELC) system (2010), and has successfully completed a Bat Conservation International Acoustic Monitoring Workshop (2008).

Andrew's role was to provide technical input into this Operational Mitigation Plan based on his experience in assessing and mitigating potential impacts to bats at proposed and operational wind energy facilities.

Lillian Knopf, B.Sc. (Env.)

Lillian is a Terrestrial and Wetland Biologist with over 6 years of experience in the environmental field. She has managed components of several renewable energy projects, and has experience coordinating and conducting field investigations, including surveys of birds, bats, reptiles, amphibians, and vegetation inventories. Lillian has prepared reports for consulting firms, academia, and government agencies and has participated in reporting for wind energy projects throughout Ontario. Lillian has coordinated the post-construction mortality monitoring at several operational wind energy facilities across Ontario and is familiar with the

monitoring methods, risk assessments, and mitigation strategies associated with assessing potential impacts and minimizing potential impacts to birds and bats as a result of operational wind turbines. Lillian is also an M.Sc. Candidate in biology at the University of Waterloo.

Lillian assisted with the development of this plan, including establishing mitigation measures and providing technical input.

Charlotte Teat, M.E.S.
Charlotte is a Terrestrial and Wetland Biologist with more than 8 years of experience in biological monitoring and conducts environmental impact assessments on a variety of project types. Charlotte has completed her Bachelor of Environmental Studies and has a Master of Environmental Studies from the University of Waterloo. Charlotte has managed a variety of environmental projects, and has coordinated numerous types of surveys, including vegetation community delineations, bat surveys, mammal studies, breeding bird surveys and herpetofauna studies. She is certified in the Ontario Wetland Evaluation System (OWES) (2012) and in the Ecological Land Classification (ELC) system for southern Ontario (2013). Her experience includes developing monitoring programs, leading field crews, analyzing data, and assessing potential impacts to significant bird and bat habitats, including consideration for little brown myotis, northern myotis, bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*) and bank swallow (*Riparia riparia*) at proposed wind energy facilities.

Charlotte assisted with the development of this plan, including establishing mitigation measures and providing technical input.

4.0 Identification of Species at Risk

As part of the comprehensive background review and site-specific field studies completed at the Nation Rise Wind Farm by NRSI (NRSI 2017a, NRSI 2017b, NRSI 2017c, NRSI 2017d), two bat SAR and five bird SAR have been identified as potentially being present within the general vicinity of this Project, including little brown myotis, northern myotis, bobolink, eastern meadowlark, barn swallow, bank swallow, and eastern whip-poor-will. Each of these species has been considered with respect to the presence of habitat, confirmed abundance (if any), species behaviour, and literature review of mortality observations at other projects, to determine whether any of these SAR have the potential to be impacted by the Project (see Table 2).

Although existing mitigation measures, monitoring programs, and contingency plans to minimize potential impacts on birds and bats have already been established for this Project, some SAR have the potential to be impacted during the operational phase of this Project. These potential impacts (if any) would be related to individuals of a species, and not the population of the species as a whole, and are in absence of the detailed mitigation plan below which has been developed to further reduce the potential for SAR impacts at this Project. A detailed assessment of potential impacts to the seven SAR listed in the NOA is provided in Table 2.

In addition to the potential for the species listed in the NOA to be impacted by the operation of the Nation Rise Wind Farm, NRSI has also considered the potential for habitat of these (or other) SAR to be impacted by the operation of this facility. The Project has been sited such that wooded habitats on private property will not be removed for the installation of the Project. Minor habitat removal may be required within natural habitats within the Municipal road right-of-way (ROW) or in non-agricultural open habitats that may provide habitat for some of the species listed within this plan. As any such impact to habitat will occur as a result of the development and construction of the facility, and not during the operational phase, the potential for habitat removal is being addressed separately. The potential for the operational phase of the Project to impact habitat of the species listed in this plan has been included in Table 2 below.

Table 2. Species at Risk

Species Name	SARO Status	Habitat Presence	Potential Operational Impacts to Habitat	Individual Presence	Potential Impacts to Individuals
Bats					
Little Brown Myotis *Myotis lucifugus*	END	Potential habitat could be present to a limited extent within the vicinity of the Project in the form of deciduous forests, wetlands, and occasional mature trees.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Detailed exit surveys were conducted in June 2017 and no little brown myotis were observed entering or exiting cavities. Through proactive (i.e. optional) acoustic bat monitoring conducted in 2017, a very small number of little brown myotis calls were recorded, representing <1% of all recorded calls.	While the operation of the Nation Rise Wind Farm causes some risk of potential impacts to individuals of this species, such impacts are unlikely to occur, and there is no expected impact to local populations. Information collected by NRSI indicates that the impacts to this species in recent years across Ontario are very minimal, representing only approximately 1-3% of bat mortalities in the years 2014-2017 (across a variety of other habitat types and landscapes). Further, none of these various other projects had the same Operational Mitigation Plan mitigation measures as this Project.
Northern Myotis *Myotis septentrionalis*	END	Potential habitat could be present to a limited extent within the vicinity of the Project in the form of deciduous forests and occasional mature trees.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Detailed exit surveys were conducted in June 2017 and no northern myotis were observed entering or exiting cavities. Through proactive (i.e. optional) acoustic bat monitoring conducted in 2017, a very small number of Northern Myotis calls were recorded, representing <0.1% of all recorded calls.	While the operation of the Nation Rise Wind Farm causes some risk of potential impacts to individuals of this species, such impacts are unlikely to occur, and there is no expected impact to local populations. Information on wind energy mortalities of this species in Ontario indicates that <0.3% of bat mortalities are of this species. Information collected by NRSI indicates no documented mortality of this species in recent years.
Birds					

Species Name	SARO Status	Habitat Presence	Potential Operational Impacts to Habitat	Individual Presence	Potential Impacts to Individuals
Eastern Whip-poor-will *Antrostomus vociferus*	THR	Potential habitat is present to a limited extent within the vicinity of the Project in the form of open deciduous forests and woodland edges that could be used by this species.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Background information and site-specific field surveys indicate that this species has the potential to migrate through the Project Area and may breed in the vicinity of the Project Area in very low numbers.	The operation of the Nation Rise Wind Farm has a limited potential to result in infrequent impacts to individuals of this species, and there is no expected impact to local populations. Compiled information of wind energy mortalities of this species in Ontario indicates that approximately 0.07% of documented bird mortalities are of this species.
Bobolink *Dolichonyx oryzivorus*	THR	The majority of the fields in the vicinity of the Project consist of row crop agriculture; however, a limited amount of perennial crops, pastures, and open meadow habitat is present within the Project Area and could potentially provide suitable breeding habitat for bobolink.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Background information and site-specific field surveys indicate that this species has the potential to migrate through the Project Area and may have potential breeding territories in the vicinity of the Project Area.	The operation of the Nation Rise Wind Farm has a limited potential to result in infrequent impacts to individuals of this species, and there is no expected impact to local populations. Compiled information of wind energy mortalities of this species in Ontario indicates that approximately 1.53% of documented bird mortalities are of this species.
Barn Swallow *Hirundo rustica*	THR	Potential breeding habitat is present within the general vicinity of the Project Area in the form of box culverts, bridges, and agricultural buildings.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Background information and site-specific field surveys indicate that this species has the potential to migrate through the Project Area and may have potential breeding territories in the vicinity of the Project Area.	The operation of the Nation Rise Wind Farm has a limited potential to result in infrequent impacts to individuals of this species, and there is no expected impact to local populations. Compiled information of wind energy mortalities of this species in Ontario indicates that approximately 1.09% of documented bird mortalities are of this species.

Species Name	SARO Status	Habitat Presence	Potential Operational Impacts to Habitat	Individual Presence	Potential Impacts to Individuals
Bank Swallow *Riparia riparia*	THR	Potential breeding habitat is not expected to be present within the Project Area.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Background information and site-specific field surveys indicate that this species has the potential to migrate through the Project Area and may breed in the vicinity of the Project Area.	The operation of the Nation Rise Wind Farm has a limited potential to result in infrequent impacts to individuals of this species, and there is no expected impact to local populations. Compiled information of wind energy mortalities of this species in Ontario indicates that approximately 1.17% of documented bird mortalities are of this species.
Eastern Meadowlark *Sturnella magna*	THR	The majority of the fields in the vicinity of the Project consist of row crop agriculture; however, a limited amount of perennial crops, pastures, and open meadow habitat is present within the Project Area and could potentially provide suitable breeding habitat for eastern meadowlark.	No impacts to the habitat of this species are expected as a result of the operation of this facility.	Background information and site-specific field surveys indicate that this species has the potential to migrate through the Project Area and may have potential breeding territories in the vicinity of the Project Area.	The operation of the Nation Rise Wind Farm has the potential to result in very infrequent impacts to individuals of this species, and there is no expected impact to local populations. Compiled information of wind energy mortalities of this species in Ontario indicates that approximately 0.03% of documented bird mortalities are of this species. .

5.0 Mitigation Plan

As part of the Natural Heritage Assessment (NHA; NRSI 2017a, NRSI 2017b, NRSI 2017c, NRSI 2017d) and Environmental Effects Monitoring Plan (EEMP; NRSI 2017e) for the Project, mitigation measures, monitoring programs, and contingency measures have already been established to minimize the potential for impacts to SAR during the operation of this Project. These include siting the proposed development outside of candidate or confirmed significant habitats (or those treated as potentially significant) and outside significant woodlands. Siting of the turbines appropriately is the first key step that an operator can take to minimize, and in many cases avoid, potential impacts to SAR. Although this step must be performed prior to the Project becoming operational, it is strongly linked to the operational phase of the Project. After the installation of turbine towers, siting of which has occurred using best available site-specific information and following a comprehensive permitting and consultation process, it is not feasible for specific turbine locations to be changed. As a result, several additional mitigation and contingency measures have been established in this plan to continue to minimize any potential risks to the species listed in the NOA.

Further mitigation measures and contingency approaches have also been established to minimize any potential impact on SAR during the operational phase of this Project. The Operational Mitigation Plan below outlines the approach that will be implemented at the Nation Rise Wind Farm to minimize any potential impacts on bird and bat SAR while the facility is in operation, in accordance with Section 23.20, subsection (4), paragraph 4 of the ESA Ontario Regulation 242/08. This plan is based on current and relevant literature, takes into account the survey work at the site that has been conducted, and provides a reasonable approach to avoid or minimize and mitigate potential impacts to the species identified in the NOA. For the purpose of this mitigation plan, each species listed in the NOA has been discussed separately below.

Given the operational duration of this Project, the proposed species-specific Operational Mitigation Plans may warrant reconsideration under specific circumstances such as, but not limited to:

- More effective mitigation measures being found,

- The species is no longer considered a SAR,
- Significant increases in population size are noted or populations otherwise stabilize,
- Other relevant changes in species population,
- Ongoing mortality monitoring indicates reduced risk to the identified species,
- Species found in the area of operation are newly listed to the SARO list, or already listed SAR species are newly identified in the area of operation.

In applicable circumstances, this Operational Mitigation Plan may be revised based on the best scientific information available and industry standards, in which case the Ministry of the Environment, Conservation and Parks (MECP) will be notified of any updates. The adequacy of this Operational Mitigation Plan will be assessed on an ongoing basis to ensure protection of each of the seven species listed in the NOA. If changes are proposed to this Operational Mitigation Plan, additional effectiveness monitoring may be required to ensure the revised approach is equally effective in avoiding or minimizing and mitigating potential risks to the species listed in the NOA.

In accordance with Section 23.20, subsection (4), paragraph 4 and subsection (11) of the ESA Ontario Regulation 242/08, steps will be taken at the onset of the operational phase (i.e. commencement of operations) of this facility to minimize and take reasonable steps to avoid adverse effects on the seven species listed in the NOA.

5.1 Turbine Lighting Strategy

A lighting approach has been developed for the Nation Rise Wind Farm that will be implemented at the onset of the operational phase of this Project to minimize impacts to the species listed on the NOA. The lighting approach taken throughout the Nation Rise Wind Farm follows the key steps below, similar to those recommended by the U.S. Fish and Wildlife wind energy guidelines (2012):

- Implement red LED flashing lights on turbines that are required to be lit by Transport Canada,
- Light turbines and permanent meteorological/communication towers to the minimum federal standards,
- Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction,
- Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum,
- Any internal nacelle lighting will only be used when occupied.

The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to result in no increased risk of mortality compared with turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting approach taken at other structures, such as the substation, operations building (if applicable), base of turbines, etc., has been designed to reduce potential attractions for birds and bats to the vicinity of operational wind turbines. This approach will be implemented at the Nation Rise Wind Farm at the onset of the operational phase to reduce the potential for impacts to the seven species listed in the NOA.

5.2 Technical Advisory Committee

Following each year of monitoring, a third-party independent bat expert will review the results to determine if operation of the Project is resulting in any adverse effects on the SAR bat species listed. In the unlikely event that a mortality of a listed bat species is documented, a Technical Advisory Committee, composed of the third-party bat expert, Project operator, and consultant retained to conduct mortality monitoring, will be consulted to assess the potential for adverse effects to the species and adequacy of the Operational Mitigation Plan. This approach is being implemented proactively at the onset of the operational phase of the Project to ensure adaptive management actions are regularly and thoroughly reviewed and determined to be effective at avoiding or minimizing the potential risk to the species listed on the NOA.

5.3 Operational Curtailment

In addition, operational mitigation will be proactively implemented throughout the Project at commencement of Project operation. At all turbines, the pitch of turbine blades will be locked perpendicular to the wind direction (i.e. feathered) below the cut-in speed of 5.5 m/s throughout the main period of bat activity, from July 1st to September 30th, and below wind speeds of 3.0 m/s during the remainder of the active season for bats, from May 1st to June 30th and for the month of October. The operational adjustments described above will be implemented each year during the above time periods from sunset to sunrise every night. The main period of the bat active season has been

determined taking into account the results of a comprehensive acoustic monitoring program, and is consistent with published literature. These proactive curtailment measures will be implemented at the onset of the operational phase, and have been shown to significantly reduce the risk of bat mortality at other operational facilities (Good et al. 2012).

5.4 Approach to Habitat Protection

Regular operation of the project is not anticipated to result in adverse impacts to habitat used by the species listed in the NOA. However, maintenance activities may occasionally be required in the vicinity of habitats used by these species. Maintenance activities will avoid habitats for species listed in the NOA, wherever possible. The following mitigation measures will be implemented across the site during maintenance activities which have any potential to affect species listed in the NOA, or their habitat:

- Clearly delineate work areas to avoid accidental encroachment into habitat,
- Implement sedimentation and erosion control measures,
- Implement dust suppression, as required,
- Re-vegetate any disturbed areas as soon as maintenance activity is complete.

Vehicle refueling or washing, and chemical storage will be located at least 30m from any confirmed habitat for species listed in the NOA. Maintenance to roads and collector lines located within 30m of habitat for the five bird species listed in the NOA will not be undertaken during the breeding bird season, from May 1st to July 31st, unless necessary for safety and/or environmental protection.

5.5 Approach to Adaptive Operational Mitigation

The development of this Operational Mitigation Plan has taken into consideration the potential for observed impacts to the species listed in the NOA, the results of surveys that have been conducted, as well as the specific behaviour, habitat, and life cycle characteristics for each species, to determine appropriate measures to minimize, and mitigate against, potential impacts.

As stated, the approach taken in this plan involves proactive changes to the operation of all turbines (known as “curtailment”) from the outset of operation of the Project for the purpose of minimizing any mortality risk, as described above. The plan provides

additional measures in respect of seven steps associated with Project phase and/or observed mortality levels (if any), that each requires the implementation of additional mitigation measures based on the Project phase and/or level of impact observed. The 7 identified steps are as follows:

- Turbine Energization
- Start of REA Monitoring
- Isolated Impact
- Repeat Impact
- Continued Impact
- Sustained Impact
- Diverse Impact

The above levels of possible mortality impact set out in the plan are not in fact expected to occur. These levels of possible impact are shown in more detail in Tables 3-6 below and are applicable to each of the seven species listed in the NOA. The mitigation measures required at each level of possible impact may be refined and augmented if needed, based on the results of the monitoring data and discussions with the Technical Advisory Committee.

In addition to outlining steps to address any of the possible levels of impact identified above, this plan also requires ongoing commitments including monitoring, reporting, and contributions to scientific research, relevant to the species listed in the NOA.

5.6 Species at Risk Mitigation Measures

In accordance with the ESA, any species listed on the NOA for a project registered under Section 23.20 requires the development of a mitigation plan which outlines the steps taken to minimize adverse impacts on each species. In accordance with the NOA submitted for the Nation Rise Wind Farm, specific mitigation plans have been prepared for the following species:

- Little Brown Myotis
- Northern Myotis
- Eastern Whip-poor-will
- Bobolink
- Barn Swallow
- Bank Swallow
- Eastern Meadowlark

The specific mitigation plans for each of the above-listed species are outlined in the following sections.

5.6.1 Little Brown Myotis

Mitigation measures and commitments, if necessary, to avoid or minimize impacts from the operation of the Nation Rise Wind Farm on the little brown myotis are outlined in Table 3. In the unlikely event mitigation measures are not found to be effective in sufficiently avoiding or minimizing adverse effects to little brown myotis, the MECP will be notified of any further operational mitigation measures or contingencies.

Table 3 below sets out various mitigation measures that will be implemented if various levels of mortality impact were to occur. As stated, we do not expect any of those levels of impact to actually occur. The mortality risk for this Project is low.

Table 3. Mitigation Measures and Commitments (if necessary) for Minimizing Impacts to Little Brown Myotis During the Operation of the Nation Rise Wind Farm

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
Turbine Energization	**Habitat Mapping** None	Detailed mapping of suitable bat habitats was completed as part of the NHA (NRSI 2017b). As a result, no additional habitat mapping is proposed at the onset of the operational phase of this Project.	N/A
	Behaviour Surveys None	Bat exit surveys were conducted in June 2017 at suitable habitats within 120m of the proposed development, following the commitments in the NHA, to identify potential concentration areas of bats. No concentration areas of bats were identified during these surveys. A comprehensive acoustic monitoring program has also already been completed. As a result, no further behaviour surveys are proposed at the onset of the operational phase of this Project.	N/A
	Mortality Monitoring Turbines are expected to become energized no earlier than October 2020, with some limited pre-commissioning tests occurring during the summer months of 2020 that will result in periodic spinning of individual turbines or turbine groups. These pre-commissioning tests will be brief and limited to daylight hours. Based on the anticipated timing of energization, the onset of REA monitoring is anticipated to occur on May 1, 2021 (refer to the 'Start of REA Monitoring' row below). In the event that turbine energization is delayed and occurs between May and September 2021, each turbine will be monitored once per calendar month from the time the turbine is back fed into the grid until the end of September 2021, and REA monitoring will begin on May 1, 2022 (refer to the 'Start of REA Monitoring' row below). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for little brown myotis mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed.	Monthly searches at all turbines are expected to identify any potential concerns or high-risk turbines for little brown myotis mortalities. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring until September corresponds to the period when mortalities of this species (if any) would be expected to be observed (NRSI Unpublished). This timing is also consistent with published literature. Daily mortality monitoring at an additional 10 turbines in the month of August will allow for an assessment of the effects of nightly weather conditions which will be correlated to any fatality. This timeframe is considered ideal for daily Myotis-specific monitoring.	Mortality monitoring will be implemented to identify any little brown myotis mortalities that may occur at this facility (though such mortality is not expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	During the first year of operation, Myotis-specific mortality monitoring will take place daily at an additional 10 turbines during the month of August. If the data from year one of daily monitoring in August is not sufficient to assess the effects of weather on any fatality (i.e. weather was not variable enough over the 20-day period), then daily Myotis-specific searches will be repeated in August in year two and the cumulative findings will be correlated to weather conditions as best possible. A statistical analysis will be completed after each year of mortality monitoring. This will include assessment of seasonal patterns, year to year changes in any mortality rates of the species, effect of turbine location, and effects of weather variables. Any mortality will be reported in annual reports in accordance with paragraph 23.20 (4) 7 O.Reg. 242/08. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of the operational phase of this Project.	N/A
	Changes in Turbine Operation At the onset of the operational phase of this Project, and for the life of the Project, the pitch of the turbine blades at all turbines will be locked perpendicular to the wind direction (i.e. feathered) nightly from sunset to sunrise below a cut-in speed of 5.5 m/s during the main bat activity period of July 1st to September 30th, and below a cut-in speed of 3.0 m/s during the remainder of the bat	At the onset of the operational phase of this Project, there is no expected impact to this species. Locking the pitch of turbine blades (i.e. feathering) during the active season for bats, May 1st to October 31st , with an increased cut-in speed used during the main activity period, has been shown to significantly reduce the risk of bat mortality (Good et al. 2012).	Feathering of turbine blades will be implemented to further reduce the potential for little brown myotis mortality from the onset of turbine operation.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	active period of May 1st to June 30th and for the entire month of October		
	Next Steps In the event a little brown myotis mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Start of REA Monitoring	**Habitat Mapping** None	Detailed mapping of suitable bat habitats was completed as part of the NHA (NRSI 2017b). As a result, no additional habitat mapping is proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Behaviour Surveys None	Bat exit surveys were conducted in June 2017 at suitable habitats within 120m of the proposed development, following the commitments in the NHA, to identify potential concentration areas of bats. No concentration areas of bats were identified during these surveys. A comprehensive acoustic monitoring program has also already been completed. As a result, no further behaviour surveys are proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Mortality Monitoring A subset of at least 30% of the turbines will be monitored twice-weekly from May 1st to October 31st to assess estimated bird and bat mortality levels, as identified in the NHA (NRSI 2017d) and EEMP (NRSI 2017e). For the purpose of this plan, the turbine subset will be referred to as 'REA turbines'. These surveys will continue for the first 3 years of operation of the Project, and will follow the methods outlined in the MNRF's *Bats and Bat Habitats* guidelines (OMNR 2011a). The turbines not chosen as part of the 30% subsample will be monitored monthly from May to September (inclusive). For the purpose of this plan, these turbines will be referred to as 'non-REA turbines'. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for little brown myotis mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed.	This approach for mortality monitoring is consistent with the REA requirements (OMNR 2011a, OMNR 2011b). Monthly searches at non-REA turbines are expected to identify any potential concerns or high-risk turbines. Based on NRSI's experience conducting post-construction mortality monitoring, the May to September monitoring period corresponds to the period when mortalities of this species (if any were to occur) are expected to be observed (NRSI Unpublished). The timing is consistent with published literature	Mortality monitoring will be implemented to identify any little brown myotis mortalities that may occur at this facility (though no such mortality is expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information, including skeletal measurements, photographs, characteristics, and/or carcass, will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of REA mortality monitoring.	N/A
	Changes in Turbine Operation None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of REA mortality monitoring.	N/A
	Next Steps In the event a little brown myotis mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Isolated Impact	**Habitat Mapping** Mapping of any suitable habitat within 200m of the operational turbine will occur if an isolated impact is noted. This mapping exercise will include all potential natural or human-made habitats. Habitats will be mapped to the level of detail possible, with a goal of identifying any individual cavity tree, suitable roosting habitat, foraging area, or potential flight path within 200m of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches an isolated impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact.	The 200m area of interest is expected to identify any suitable habitat within the immediate vicinity of the turbine.	Identify potential bat habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If an isolated impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine.	An increase in search frequency from monthly to weekly will assist in identifying whether the particular turbine is having a greater impact on little brown myotis.	Provide an increased search effort to further assist in assessing any potential direct impacts to little brown myotis.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA mortality monitoring commitments are completed, the search frequency of this turbine will be increased from monthly to weekly from the date of observation to the end of September of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bat mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify observed mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation The Technical Advisory Committee will be consulted to assess the potential for adverse effect to little brown myotis to occur, and to identify any additional reasonable steps that may need to be taken at this point to ensure the requirements of section 23.20 O.Reg 242/08 are met, to avoid or minimize any adverse effects. If appropriate, turbine curtailment measures in 23.20 (11) (beyond the blade locking already in place as described above) will be implemented to ensure that the Project is not having any significant impact on little brown myotis.	The Technical Advisory Committee will determine if the operation of the Project is having any adverse impacts on little brown myotis and may also recommend additional operational mitigation measures for implementation at the Project.	Consult the Technical Advisory Committee expert opinion on the impact of the operation of the Project on little brown myotis.
	Next Steps If another little brown myotis mortality is noted in the same year, the level of impact increases to a 'Repeat Impact' (discussed below).		

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If no additional little brown myotis mortalities are noted at this turbine for the remainder of the year, no additional monitoring or mitigation measures are required. If there were to be mortality of this species, at the same turbine, in a subsequent year, this would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Repeat Impact	**Habitat Mapping** Mapping of suitable habitat within 1km of the operational turbine will occur if a repeat impact is noted. This mapping exercise will include all potential natural or human-made habitats. Habitats will be mapped to the level of detail possible, with a goal of identifying any individual cavity tree, suitable roosting habitat, foraging area, or potential flight path within 1km of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches a repeat impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact. It is expected that site access may become a limiting factor when considering some of the habitats up to 1km from the operational turbine. Where access cannot be obtained, habitat mapping will be conducted from the closest observable point (e.g. roadside, neighbouring property, etc.), using binoculars, where appropriate, and/or through air photo interpretation using detailed aerial photography.	A mapped area of 1km is expected to overlap with any habitats that could potentially concentrate bat activity near a Repeat Impact turbine or otherwise be important for the life cycle of this SAR (Henry et al. 2002, Broders et al. 2006, Gonsalves et al. 2013).	Identify potential bat concentration areas and any preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.
	Behaviour Surveys If a repeat impact is noted, behaviour surveys will be completed within the habitats identified as part of the habitat mapping exercise described above (within 1km of the turbine) to determine any possible cause and effect relationship between bat habitat and mortality. These surveys will occur in the following year that a repeat impact is reached, to coincide with the seasonality that the mortalities were documented. Survey methods may vary depending on time of year of the mortality observation, extent of suitable	Behaviour surveys will be conducted using available information from the habitat assessment (see above) to determine whether any concentrations of bats are present within 1km of the operational turbine.	Behaviour surveys will be used to further define the potential areas which could possibly be at higher risk for bat mortalities, and will also allow for a direct comparison between bat species and abundance in suitable habitats and the bat mortality information collected at the operational turbine.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	habitat, type of habitat, site access, etc. It is expected that either the 2010 or 2011 MNRF guidelines will be used as a basis for the study methods, depending on the type of information of interest (i.e. general abundance, presence of maternity colonies, species diversity, etc.). Methods will be developed in consultation with the MECP, and are expected to include acoustic monitoring and/or exit surveys to assess the potential impact of the operational turbine on local little brown myotis abundance and distribution during the roosting, swarming, and/or migration seasons.		
	Mortality Monitoring If a repeat impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency will occur twice-weekly from the date of observation to the end of September of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bat mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Mortality monitoring will occur the following year at a minimum search frequency of twice-weekly for a two week period before and after the date of all previous mortalities of this species, and weekly for the remainder of the time period from May 1 to September 30. If a new mortality is documented in a week where no previous mortality had been observed, then weekly monitoring will be increased to twice-weekly for the following two weeks.	An increase in search frequency from weekly to twice-weekly provides an increased effort to more accurately characterize the potential impacts to little brown myotis.	Provide an increased search effort to further assist in assessing any potential direct impacts to little brown myotis.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation In the event that any turbine is observed to have a repeated impact on this species during the periphery of the bat active season of May 1st to June 30th or during the month of October (when cut-in speeds are at 3.0 m/s), the cut-in speed of that operational turbine will be increased to 5.5 m/s (sunset to sunrise) until the end of the main bat activity period (September 30th) of that year. In the unlikely event that a repeat impact is documented in October, the mitigation strategy, described above, will be implemented until the end of October of that year. In the unlikely event that a repeated impact on this species is documented during the main activity season for bats, July 1st to September 30th, when turbines are operating with a 5.5 m/s cut-in speed, The Technical Advisory Committee will be consulted to assess the potential for adverse effect to little brown myotis to occur. The Technical Advisory Committee will identify any additional reasonable steps that may need to be taken at this point to ensure the requirements of section 23.20 O.Reg 242/08 are met, to avoid or minimize any adverse effects. If appropriate, turbine curtailment measures in 23.20 (11) (beyond the blade locking already in place as described above) will be implemented to ensure that the Project is not having any significant impact on little brown myotis.	At this level of impact (which is not expected), this turbine has the potential to present a higher risk to little brown myotis. As a result, additional operational curtailment will be implemented as a proven approach to further reduce the potential for bat mortalities (Good et al. 2012). These observed mortalities could be a result of several influential variables (i.e. weather, population variations, etc.), but may not be indicative of this turbine having an overall higher risk to little brown myotis. The timing of curtailment has been established based on the expected periods when bat activity, and associated risk of mortality, is highest, which generally lasts until the end of September for this species. If similar levels of mortality of this species are still observed after mitigation has been removed, additional steps will be taken (see 'Continued Impact'). For turbines that are already operating at a cut-in speed of 5.5 m/s at the time of the repeated impact, the Technical Advisory Committee will determine if the operation of the Project is having any adverse impacts on little brown myotis and may also recommend additional operational mitigation measures for implementation at the Project.	The change in the operation of the turbine will further reduce the potential for impacts to little brown myotis during the time period when this species is expected to be most active.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	Next Steps If an additional little brown myotis mortality is noted at this turbine during the remainder of the monitoring season or again in the following year, there will be no immediate changes to the approach described above, aside from any other specific requirements of this plan. If 2 additional little brown myotis mortalities are noted at this turbine during the remainder of the monitoring season or 2 mortalities are noted again in the following year (i.e. another Repeat Impact), then this turbine would be considered to have a 'Continued Impact' (discussed below). If the above levels of mortality are not met, this turbine will not require any additional monitoring or mitigation beyond what is described above or otherwise required by this Operational Mitigation Plan. If there were to be a mortality of this species, at the same turbine, in a subsequent year, that would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Continued Impact	**Habitat Mapping** None	At this level of impact, the benefits of mapping additional habitat have been determined to be negligible.	N/A
	Behaviour Surveys None	At this level of impact, the benefits of conducting behaviour surveys have been determined to be negligible.	N/A
	Mortality Monitoring If a Continued Impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the Continued Impact is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency of this turbine will be weekly from the date this level of impact is reached to the end of September of that year. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Where a Continued Impact is observed, all other turbines within 1km ('Clustered') of the Continued Impact turbine will be searched at a frequency of bi-weekly (every 2 weeks) from the date this level of impact is reached to the end of September of that year. Mortality monitoring will be required to occur at the turbine where a Continued Impact was reached for a subsequent 3 years from May to September. The first year of monitoring will consist of weekly	A twice-weekly search frequency provides a level of effort that is expected to more accurately characterize the potential impacts to little brown myotis. This is intended to reduce the potential for mortalities being removed from beneath wind turbines as a result of scavenging activity, and will ensure that mortalities are not in the late stages of decomposition so that they can be more easily identified (Morrison 2002, Smallwood 2007). Bi-weekly monitoring (every 2 weeks) at 'Clustered' turbines (within 1km of the Continued Impact turbine) will provide an increased level of accuracy for identifying whether similar risk factors are associated with nearby turbines. A more frequent search frequency will increase the likelihood of carcasses being encountered through a reduced impact of the searcher efficiency and scavenger variables. After the implementation of operational mitigation measures (see 'Changes in Turbine Operation' below), a minimum search frequency of monthly is expected to provide adequate opportunity to observe any additional little brown myotis mortalities that may still be occurring at this operational turbine.	Provide an increased search effort to further assist in assessing potential direct impacts to little brown myotis.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	monitoring, while the last two years of monitoring will be conducted at a frequency of monthly when mitigation is in place and weekly when mitigation is not in place. Any required monitoring at 'Clustered' turbines will be finished at the end of the monitoring year unless additional mortalities are noted. If additional mortalities are noted, those turbines will follow the mitigation and monitoring required for the applicable level of impact. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation If a turbine is determined to have a continued Impact on little brown myotis during the periphery of the bat active season, May 1st to June 30th and the month of October (when the turbine is operating with a cut-in speed of 3.0 m/s), the cut-in speed of the operational turbine will be immediately increased to 5.5m/s (sunset to sunrise). This measure will be implemented immediately and will remain in place until the end of the main bat active season (September 30th) of that year. In the unlikely event that a continued impact is documented in October, the mitigation strategy, described above, will be implemented until the end of October of that year. This mitigation measure will be implemented for a minimum 4-week period, corresponding to the 2 weeks before and after all previous little brown	At this level of impact, this turbine has been determined to represent a higher risk to little brown myotis. As a result, additional operational curtailment will be implemented as a proven approach to reduce the potential for bat mortalities at this particular turbine (Good et al. 2012). Additional operational mitigation will be implemented during the 4-week period surrounding any observed mortality event(s) (i.e. 2 weeks prior and 2 weeks after). This time period has been chosen to accurately reflect the site-specific period when little brown myotis may be using the areas near the turbines and therefore more susceptible to potential impacts. For turbines that are already operating at a cut-in speed of 5.5 m/s at the time of the continued impact, the Technical Advisory Committee will determine if the operation of the Project is having any adverse impacts on little brown myotis	The change in the operation of the turbine will further reduce the potential for impacts to little brown myotis during the time period when this species is expected to be most active.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	myotis mortalities have been observed in each successive year for the life of the Project or until the risk to the species has been reduced or eliminated (i.e. due to additional information on population sizes or other developments in mitigation techniques). In the unlikely event that a continued impact on this species is documented during the main activity season for bats, July 1st to September 30th, when turbines are operating with a 5.5 m/s cut-in speed, The Technical Advisory Committee will be consulted to assess the potential for adverse effect to little brown myotis to occur. The Technical Advisory Committee will identify any additional reasonable steps that may need to be taken at this point to ensure the requirements of section 23.20 O.Reg 242/08 are met, to avoid or minimize any adverse effects. If appropriate, turbine curtailment measures in 23.20 (11) (beyond the blade locking already in place as described above) will be implemented to ensure that the Project is not having any significant impact on little brown myotis.	and may also recommend additional operational mitigation measures for implementation at the Project.	
	Next Steps If any additional little brown myotis mortalities are noted at this turbine outside of the period when mitigation is occurring, mitigation will be implemented for two weeks following the observation and in the following year mitigation will be implemented for the full 4 week period (centred around the date of the observation) for the life of the Project. An observed little brown myotis mortality during a period when operational mitigation is not already occurring does not warrant consideration under 'Sustained Impact', as described below. If a mortality is thought to be unrepresentative of the true impacts (e.g. a late mortality in October, which would otherwise require immediate mitigation), the MECP may be approached to discuss the validity of implementing mitigation associated with uncharacteristic impacts. An alternate approach may be taken to increase monitoring and/or implement mitigation at a time of higher risk, if approved by the MECP. Unless otherwise agreed upon with the MECP, if an additional 2 little brown myotis mortalities are noted at this turbine within the period when mitigation has already been implemented, it will be determined to have a 'Sustained Impact' (discussed below) and the MECP will be notified of additional measures, if any, that may be required.		
Sustained Impact	If a Sustained Impact on little brown myotis is observed following the implementation of the mitigation measures outlined in all the steps above, the MECP will be notified of additional steps, if any, that may be required to further minimize impacts to this species. Any additional steps will be determined by the Technical Advisory Committee and could include, but would not be limited to: • Extending the timing of operational mitigation earlier or later in the season, • Adjusting cut-in speeds,		

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	• Habitat compensation (i.e. installing bat houses and/or afforestation), • Contributions to research projects. If changes to the operation of the turbines are made to further minimize the potential impacts to little brown myotis, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through September for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3-year period, the MECP will be notified if any changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, based on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Diverse Impact*	For a Project of this size (up to 33 turbines), a 'Diverse Impact' will be considered to be reached if more than 9 of the turbines reach (or exceed) an 'Isolated Impact' or when the total little brown myotis mortalities, measured across the Project, are more than 10 in a single monitoring year. If a Diverse Impact relating to little brown myotis is noted across this facility, the MECP will be notified of additional steps, if any, that may be required to further minimize impacts to this species. Any additional steps will be determined by the Technical Advisory Committee and could include, but would not be limited to: • Extending the timing of operational mitigation earlier or later in the season, • Adjusting cut-in speeds, • Habitat compensation (i.e. installing bat houses and/or afforestation), • Contributions to research projects, • Periodic shutting down of turbines. If changes to the operation of the turbines are made to further minimize the potential impacts to little brown myotis, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through September for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3-year period, the MECP will be notified if any changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Ongoing Commitments	**<u>Long Term Monitoring</u>** Mortality monitoring specific to little brown myotis will occur for the first 3 years that this facility is operational, and every 5 years thereafter. This requirement is exclusive of any additional monitoring that may be required based on the observations of little brown myotis mortalities. If changes to the operation of the turbine(s) are made to minimize further potential impacts to the species, additional effectiveness monitoring (i.e., mortality searches) will be required. These searches will be completed at the specific	A monthly search frequency is expected to identify turbines that have a potentially higher risk of mortality to little brown myotis and therefore identify which turbines require additional monitoring to characterize and ultimately minimize and mitigate potential impacts to this species. Based on NRSI's experience conducting post-construction mortality monitoring, the May to September monitoring period corresponds to the period when mortalities of this species are expected to be observed (NRSI Unpublished). This is consistent with the summary of resident bat mortalities in published literature.	Identify turbines with the potential to impact little brown myotis throughout the life of the Project through a long-term monitoring program and the associated progressive increases to a base monitoring program if mortalities are documented.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	turbine(s) at a minimum of once per month from May through September for 3 additional years. After review of the full monitoring results in years 1-3, the need for and scope of additional monitoring in years 4-6 will be determined in consultation with the Technical Advisory Committee. During each year that monitoring occurs, the search frequency will occur at a minimum of once per month during the months of May to October (inclusive). These searches will focus on an area of 80m around the turbine base, where bats are most likely to fall. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. These surveys will be completed by a qualified individual, and where possible, should be conducted by the same person conducting the post-construction mortality monitoring under REA. More frequent searches may be required at certain turbines or during specific years if REA monitoring is still occurring or as a result of the implementation of operational mitigation/adaptive mortality monitoring programs. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and little brown myotis cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or the carcass will be provided to the MECP for discussion as to how to proceed.	Following the mitigation steps above, the frequency of mortality monitoring will be increased immediately from monthly to weekly and increased in frequency again if additional mortalities are still observed. All of the required mitigation measures and/or monitoring continue to be applied if mortalities are observed during the long-term (every 5 years) monitoring program.	
	Reporting In accordance with the ESA requirements, annual reporting will occur for the first 3 years of the operation of this facility and every 5 years thereafter.	Reports will be prepared in accordance with the ESA, and will document all impacts to little brown myotis (if any), changes in monitoring or mitigation measures, and other steps taken to minimize potential impacts to little brown myotis since the completion of the previous report. Annual reports will also include information related to mitigation objectives that are	Inform the MECP of any potential impacts on little brown myotis and confirm the steps taken to minimize any observed (or potential) impacts.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	For all reporting years, this report will be prepared as a separate report to the *Post-construction Mortality Monitoring Report*, which is required under the REA conditions for this Project. Reports will be retained for a minimum of 5 years, and will be available to be submitted to the MECP within 14 days of receiving a request for it.	reached, summaries of any habitat mapping and behavioural monitoring, as well as any applicable results of searcher efficiency trials conducted under the REA post-construction monitoring.	
	Contribution to Research The MECP will be notified of all little brown myotis mortalities within 24hrs (or next business day) of a confirmed identification. All resident bat species will be transferred to the Canadian Cooperative Wildlife Health Centre (CCWHC) in Guelph for analysis for White-nose Syndrome or other research purposes, if accepted by the CCWHC.	Provide information to the MECP for their ongoing assessment of mortality trends or patterns within Ontario. This central database of information may be used to further refine Project requirements, site-specific recommendations, or even identify areas of high risk to bat mortality within Ontario.	Provide the MECP with the resources needed to track any mortality patterns, changes in population, or identify any other potential concerns that may be obtained through a review of mortality data.
	Consultation with Independent Bat Expert During each year that monitoring occurs, the monitoring results will be reviewed by a third-party, independent bat expert. A Technical Advisory Committee, composed of the third-party bat expert, a delegate of the Project operator, and the principal investigator, will be consulted to assess the potential for adverse impacts on little brown myotis and the adequacy of the Operational Mitigation Plan, should a little brown myotis mortality be documented at the Project.	The third-party bat expert, as part of the Technical Advisory Committee, will determine if the operation of the Project is having any adverse impacts on little brown myotis and may also recommend additional operational mitigation measures for implementation at the Project.	Obtain an independent, expert opinion on the impact of the operation of the Project on little brown myotis.
	Implementation of a Turbine Lighting Design A lighting approach has been developed for the Nation Rise Wind Farm that will be implemented at the commencement of the operational phase of this Project and will take reasonable steps to minimize impacts to little brown myotis. The lighting approach taken throughout the Project will follow the key steps below, similar to those recommended by the U.S. Fish and Wildlife wind energy guidelines (2012):	The implementation of a turbine lighting design is expected to further reduce the risk of little brown myotis mortalities at operational turbines. The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to reduce the risk of mortality to the same levels as turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting	The implementation of a turbine lighting design will minimize potential risk of impacts to the species.

Project Phase/ Level of Impact / Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	• Implement red LED flashing lights on turbines, • Light turbines and permanent meteorological/communication towers to the minimum federal standards, • Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction, • Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum, • Any internal nacelle lighting will only be used when occupied.	approach taken at other structures, including the substation, operations building (if applicable), base of turbines, etc., has been designed to reduce potential attractions for bats to the vicinity of operational wind turbines.	
	Updates to the Operational Mitigation Plan The Operational Mitigation Plan will be updated at least once every five years to include information obtained through the monitoring completed to date and adapted to detail the steps that have been implemented to minimize any adverse effects on the Species. The Operational Mitigation Plan may also be updated based on new research and best available science regarding effective and reasonably feasible mitigation and avoidance measures at operational wind facilities.	Updates to the Operational Mitigation Plan will be made a minimum of once every five years to ensure the most up to date information, research and methods are being utilized to minimize potential impacts to the species.	Use the most up to date information to inform the Operational Mitigation Plan.

**The Diverse Impact level currently assumes that 33 turbines will be operational. In the event that less than 33 turbines are operational, the number of turbines or mortalities needed to trigger a Diverse Impact may be revised proportionately to equal 20% of operational turbines. If the values within the Diverse Impact level are revised, the MECP will be notified.*

5.6.2 Northern Myotis

Given the similarities between this species and little brown myotis, discussed above, the same commitments apply for mitigating and avoiding or minimizing any potential impacts to northern myotis individuals. Please refer to Table 3 for more detail on the mitigation measures and other commitments that will be implemented in the unlikely event of any impacts to northern myotis as a result of the operation of the Nation Rise Wind Farm.

5.6.3 Eastern Whip-poor-will

Mitigation measures and commitments, if necessary, to minimize any potential impacts from the operation of the Nation Rise Wind Farm on eastern whip-poor-will are outlined below in Table 4. In the unlikely event that mitigation measures are not found to be effective in minimizing adverse effects to eastern whip-poor-will, the MECP will be notified of any further operational mitigation measures or contingencies.

Table 4 below sets out various mitigation measures that will be implemented if various levels of mortality impact were to occur. As stated, we do not expect any of those levels of impact to actually occur. The mortality risk for this Project is low.

Table 4. Mitigation Measures and Commitments (if necessary) for Minimizing Impacts to Eastern Whip-poor-will During the Operation of the Nation Rise Wind Farm

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
Turbine Energization	**Habitat Mapping** None	Detailed mapping of open deciduous forests and woodland edges was completed as part of the NHA (NRSI 2017b). As a result, no additional habitat mapping is proposed at the onset of the operational phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the operational phase of this Project.	N/A
	Mortality Monitoring Turbines are expected to become energized no earlier than October 2020, with some limited pre-commissioning tests occurring during the summer months of 2020 that will result in periodic spinning of individual turbines or turbine groups. These pre-commissioning tests will be brief and limited to daylight hours. Based on the anticipated timing of energization, the onset of REA monitoring is anticipated to occur on May 1, 2021 (refer to the 'Start of REA Monitoring' row below). In the event that turbine energization is delayed and occurs between May and October 2021, each turbine will be monitored once per calendar month from the time the turbine is back fed into the grid until the end of October 2021, and REA monitoring will begin on May 1, 2022 (refer to the 'Start of REA Monitoring' row below). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for eastern whip-poor-will mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the	Monthly searches at all turbines are expected to allow for searches to identify any potential concerns or high-risk turbines for eastern whip-poor-will mortalities. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring until October corresponds to the period when mortalities of this species are expected to be observed (NRSI Unpublished).	Mortality monitoring will be implemented to identify any eastern whip-poor-will mortalities that may occur at this facility (though such mortality is not expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	appropriate information, including skeletal measurements, photographs, characteristics, and/or carcass, will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of the operational phase of this Project.	N/A
	Changes in Turbine Operation None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of the operational phase of this Project.	N/A
	Next Steps In the event an eastern whip-poor-will mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Start of REA Monitoring	**Habitat Mapping** None	Detailed mapping of suitable eastern whip-poor-will habitats was completed as part of the NHA (NRSI 2017b) and Species at Risk Report (NRSI 2017F). As a result, no additional habitat mapping is proposed at the onset of the operational phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the operational phase of this Project.	N/A
	Mortality Monitoring A subset of at least 30% of the turbines will be monitored twice-weekly from May 1st to October 31st to assess estimated bird and bat mortality levels, as identified in the NHA (NRSI 2017d) and EEMP (NRSI 2017e). These surveys will continue for the first 3 years of operation of the Project, and will follow the methods outlined in the MNRF's *Birds and Bird Habitats* guidelines (OMNR 2011b). The turbines not chosen as part of the 30% subsample will be monitored monthly from May to October (inclusive). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for eastern whip-poor-will mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed.	This approach for mortality monitoring is consistent with the REA requirements (OMNR 2011a, OMNR 2011b). Monthly searches at non-REA turbines are expected to allow for searches to identify any potential concerns or high-risk turbines. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species (if any were to occur) are expected to be observed (NRSI Unpublished). The timing is consistent with the summary of bird mortalities in published literature.	Mortality monitoring will be implemented to identify any eastern whip-poor-will mortalities that may occur at this facility (though no such mortality is expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of REA mortality monitoring.	N/A
	Changes in Turbine Operation None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of REA mortality monitoring.	N/A
	Next Steps In the event an eastern whip-poor-will mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Isolated Impact	**Habitat Mapping** Mapping of any suitable habitat within 200m of the operational turbine will occur if an isolated impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 200m of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches an isolated impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact.	The 200m area of interest is expected to identify any suitable habitat within the immediate vicinity of the turbine.	Identify potential eastern whip-poor-will concentration areas and preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If an isolated impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA mortality monitoring	An increase in search frequency from monthly to weekly will assist in identifying whether the particular turbine is having a greater impact on eastern whip-poor-will.	Provide an increased search effort to further assist in assessing any potential direct impacts to eastern whip-poor-will.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	commitments are completed, the search frequency of this turbine will be increased from monthly to weekly from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for eastern whip-poor-will mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify observed mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been determined to provide little benefit if an isolated impact has occurred.	N/A
	Next Steps If 2 additional eastern whip-poor-will mortalities are noted in the same year, the level of impact increases to a 'Repeat Impact' (discussed below). If no mortalities or 1 additional eastern whip-poor-will mortality is noted at this turbine for the remainder of the year, no additional monitoring or mitigation measures are required. If there were to be 2 additional mortalities of this species, at the same turbine, in a subsequent year, this would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Repeat Impact	**Habitat Mapping** Mapping of suitable habitat within 1km of the operational turbine will occur if a repeat impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 1km of the turbine (measured from blade tip).	A mapped area of 1km is expected to overlap with any habitats that could potentially concentrate eastern whip-poor-will activity near a Repeat Impact turbine or otherwise be important for the life cycle of this SAR.	Identify potential eastern whip-poor-will concentration areas and any preferred habitat around operational turbines. The identification of these habitats will assist in

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	Habitat mapping will occur once at each turbine that reaches a repeat impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact. It is expected that site access may become a limiting factor when considering some of the habitats up to 1km from the operational turbine. Where access cannot be obtained, habitat mapping will be conducted from the closest observable point (e.g. roadside, neighbouring property, etc.), using binoculars, where appropriate, and/or through air photo interpretation using detailed aerial photography.		assessing any existing cause and effect relationships.
	Behaviour Surveys If a repeat impact is noted, behaviour surveys will be completed within the habitats identified as part of the habitat mapping exercise described above (within 1km of the turbine) to determine any possible cause and effect relationship between eastern whip-poor-will habitat and mortality. These surveys will occur in the following year that a repeat impact is reached to coincide with the seasonality that mortalities were documented. The specific survey methods used, which may vary considerably depending on time of year of the mortality observation, extent of suitable habitat, type of habitat, site access, etc., will be developed in consultation with the MECP. It is expected that the 2011 MNRF guidelines (OMNR 2011b) will be used as a basis for the study methods, depending on the type of information of interest (i.e. general abundance, presence of breeding habitat, specific diversity, etc.). Methods may include point count surveys to assess the potential impact of the operational turbine on eastern whip-poor-will abundance and distribution during the breeding and/or migration seasons.	Behaviour surveys will be conducted using available information from the habitat assessment (see above) to determine whether any concentrations of eastern whip-poor-will are present within 1km of the operational turbine.	Behaviour surveys will be used to further define the potential areas which could possibly be at higher risk for eastern whip-poor-will mortalities, and will also allow for a direct comparison between bird species and abundance in suitable habitats and the bird mortality information collected at the operational turbine.
	Mortality Monitoring	An increase in search frequency from weekly to twice-weekly provides an increased effort to more accurately characterize the potential impacts to eastern whip-poor-will.	Provide an increased search effort to further assist in assessing any

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If a repeat impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency will occur twice-weekly from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for eastern whip-poor-will mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Mortality monitoring will occur the following year at a minimum search frequency of twice-weekly for a two-week period before and after the date of all previous mortalities of this species, and weekly for the remainder of the time period from May 1 to October 31. If a new mortality is documented in a week where no previous mortality had been observed, then weekly monitoring will be increased to twice-weekly for the following two weeks. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		potential direct impacts to eastern whip-poor-will.
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been	N/A

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
		determined to provide little benefit at this level of impact on the species.	
	Next Steps If an additional eastern whip-poor-will mortality is noted at this turbine during the remainder of the monitoring season or again in the following year, there will be no immediate changes to the approach described above, aside from any other specific requirements of this plan. If 2 additional eastern whip-poor-will mortalities are noted at this turbine during the remainder of the monitoring season or 2 mortalities are noted again in the following year (i.e. another Repeat Impact), then this turbine would be considered to have a 'Continued Impact' (discussed below). If the above levels of mortality are not met, this turbine will not require any additional monitoring or mitigation beyond what is described above or otherwise required by this Operational Mitigation Plan. If there were to be a mortality of this species, at the same turbine, in a subsequent year, that would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Continued Impact	**Habitat Mapping** None	At this level of impact, the benefits of mapping additional habitat have been determined to be negligible.	N/A
	Behaviour Surveys For all habitat creation that occurs as a result of a turbine reaching a 'Continued Impact' (discussed below), behaviour monitoring will be required to assess the ongoing use of the created/enhanced habitats. To assess the success of the created or enhanced habitat, it will be surveyed annually for the first 3 years after it has been created, then will be monitored during each subsequent reporting year. Monitoring stations will be chosen based on the size, shape, and accessibility of the habitat and will provide adequate coverage of the habitat. Monitoring methods will be developed in consultation with the MECP, and each station will be surveyed 3 times per monitoring year in appropriate weather conditions between late May and mid-July.	Behaviour surveys will be completed to assess the success of any created or enhanced habitat for this species.	Determine and evaluate the success of created or enhanced habitat to ensure the overall impacts to the species have been minimized through the improvements of other habitats.
	Mortality Monitoring If a Continued Impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the Continued Impact is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency of this turbine will be twice-weekly from the date this	A twice-weekly search frequency provides a level of effort that is expected to more accurately characterize the potential impacts to eastern whip-poor-will. This is intended to reduce the potential for mortalities being removed from beneath wind turbines as a result of scavenging activity, and will ensure that mortalities are not in the late stages of decomposition so that they can be more easily identified (Morrison 2002, Smallwood 2007).	Provide an increased search effort to further assist in assessing potential direct impacts to eastern whip-poor-will.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	level of impact is reached to the end of October of that year. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Where a Continued Impact is observed, all other turbines within 1km ('Clustered') of the Continued Impact turbine will be searched weekly from the date this level of impact is reached to the end of October of that year. Mortality monitoring will be required to occur at the turbine where a Continued Impact was reached for a subsequent 3 years from May to October (inclusive). The first year of monitoring will consist of twice-weekly monitoring to further characterize potential impacts, while the last two years of monitoring will be conducted weekly to ensure additional mortalities (if any) are documented. Any required monitoring at 'Clustered' turbines will be finished at the end of the monitoring year unless additional mortalities are noted. If additional mortalities are noted, those turbines will follow the mitigation and monitoring required for the applicable level of impact. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.	Bi-weekly monitoring (every 2 weeks) at 'Clustered' turbines (within 1km of the Continued Impact turbine) will provide an increased level of accuracy for identifying whether similar risk factors are associated with nearby turbines. A more frequent search frequency will increase the likelihood of carcasses being encountered through a reduced impact of the searcher efficiency and scavenger variables. A minimum search frequency of weekly is expected to provide adequate opportunity to observe any additional eastern whip-poor-will mortalities that may still be occurring at this operational turbine.	
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation	At this level of impact, this turbine has the potential to present a higher risk to the species. As a result, operational curtailment will	The change in the operation of the turbine

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	In the event that a turbine is observed to have a 'Continued Impact' on eastern whip-poor-will, shut down of that turbine will occur immediately until the end of October. Turbine shut down will be from 2 hrs before sunset to 2 hrs after sunrise. The mitigation measure described above will be removed at the end of October and will not be implemented the following year. Monitoring in the subsequent year at this turbine will be used to help assess the effectiveness of the operational mitigation. However, should a repeat impact be observed during the following year, the turbine will be considered to have a Sustained Impact on the species and further mitigation as detailed below will be implemented. If behavioural studies and habitat mapping provide more detailed information regarding the species, these dates and times may be changed in consultation with the MECP in order to reflect actual site use and mortality risk and patterns. If the results of the mortality monitoring, behaviour surveys and habitat mapping indicated that there is increased risk to the species during only either the breeding season or the migration season then operational mitigation may be changed in consultation with the MECP in order to reflect the period of increased risk.	be implemented as an approach to reduce the potential for bird mortalities at this particular turbine.	will reduce the potential for impacts to eastern whip-poor-will during the time period when this species is expected to be most active.
	Next Steps If any additional eastern whip-poor-will mortalities are noted at this turbine, it will be determined to have a 'Sustained Impact' (discussed below) and the MECP will be notified if any additional measures may be required.		
Sustained Impact	If a Sustained Impact on eastern whip-poor-will is observed following the implementation of the measures outlined in all the steps above, the MECP will be notified if additional steps, if any, are required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Additional habitat creation, • Contributions to research projects. If changes to the operation of the turbines are made to further minimize the potential impacts to eastern whip-poor-will, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased		

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3 year period, the MECP will be notified if any changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Diverse Impact*	For a Project of this size (up to 33 turbines), a 'Diverse Impact' will be considered to be reached if more than 9 of the turbines reach (or exceed) an 'Isolated Impact' or when the total eastern whip-poor-will mortalities, measured across the Project, are more than 10 in a single monitoring year. If a Diverse Impact relating to eastern whip-poor-will is noted across this facility, the MECP will be notified of additional steps, if any, that may be required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Additional habitat creation, • Contributions to research projects, • Periodic shutting down of turbines. If changes to the operation of the turbines are made to further minimize the potential impacts to eastern whip-poor-will, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3-year period, the MECP will be notified if changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Ongoing Commitments	**<u>Long Term Monitoring</u>** Mortality monitoring specific to eastern whip-poor-will will occur for the first 3 years that this facility is operational, and every 5 years thereafter. This requirement is exclusive of any additional monitoring that may be required based on the observations of eastern whip-poor-will mortalities. If changes to the operation of the turbine(s) are made to minimize further potential impacts to the species, additional effectiveness monitoring (i.e., mortality searches) will be required. These searches will be completed at the specific turbine(s) at a minimum of once per month from May through October for 3 additional years. After review of the full monitoring results in years 1-3, the need for and scope of additional monitoring in years 4-6 will be determined in consultation with the Technical Advisory Committee.	A monthly search frequency is expected to identify turbines that have a potentially higher risk of mortality to eastern whip-poor-will and therefore identify which turbines require additional monitoring to characterize and ultimately minimize and mitigate potential impacts to this species. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species may be encountered (NRSI Unpublished). This is consistent with the summary of bird mortalities in the published literature. Following the mitigation steps above, the frequency of mortality monitoring will be increased immediately from monthly to weekly and increased in frequency again if additional mortalities are still observed. All of the required mitigation measures and/or monitoring continue to be applied if mortalities are observed during the long-term (every 5 years) monitoring program.	Identify turbines with the potential to impact eastern whip-poor-will throughout the life of the Project through a long-term monitoring program and the associated progressive increases to a base monitoring program if mortalities are documented.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	During each year that monitoring occurs, the search frequency will occur at a minimum of once per month during the months of May to October (inclusive). These searches will focus on an area of 80m around the turbine base, where birds are most likely to fall. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. These surveys will be completed by a qualified individual, and where possible, should be conducted by the same person conducting the post-construction mortality monitoring under REA. More frequent searches may be required at certain turbines or during specific years if REA monitoring is still occurring or as a result of the implementation of operational mitigation/adaptive mortality monitoring programs. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and eastern whip-poor-will cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Reporting In accordance with the ESA requirements, annual reporting will occur for the first 3 years of the operation of this facility and every 5 years thereafter. For all reporting years, this report will be prepared as a separate report to the *Post-construction Mortality Monitoring Report* which is required under the REA conditions for this Project. Reports will be retained for a minimum of 5 years, and will be available to be submitted to the MECP within 14 days of receiving a request for it.	Reports will be prepared in accordance with the ESA and will document all impacts to eastern whip-poor-will (if any), changes in monitoring or mitigation measures, and other steps taken to minimize potential impacts to eastern whip-poor-will since the completion of the previous report. Annual reports will also include information related to mitigation objectives that are reached, summaries of any habitat mapping and behavioural monitoring, as well as any applicable results of searcher efficiency trials conducted under the REA post-construction monitoring.	Inform the MECP of any potential impacts to eastern whip-poor-will and confirm the steps taken to minimize any observed (or potential) impacts.
	Contribution to Research	Provide information to the MECP for their ongoing assessment of mortality trends or patterns within Ontario. This central database	Provide the MECP with the resources needed to

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	The MECP will be notified of all eastern whip-poor-will mortalities within 24hrs (or next business day) of a confirmed identification.	of information may be used to further refine Project requirements, site-specific recommendations, or even identify areas of high risk to bird mortality within Ontario.	track any mortality patterns, changes in population, or identify any other potential concerns that may be obtained through a review of mortality data.
	Implementation of a Turbine Lighting Design Alighting approach has been developed for the Nation Rise Wind Farm that will be implemented at the commencement of the operational phase of this Project and will take reasonable steps to minimize impacts to eastern whip-poor-will. The lighting approach taken throughout the Project will follow the key steps below, similar to those recommended by the U.S. Fish and Wildlife wind energy guidelines (2012): • Implement red LED flashing lights on turbines, • Light turbines and permanent meteorological/communication towers to the minimum federal standards, • Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction, • Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum, • Any internal nacelle lighting will only be used when occupied.	The implementation of a turbine lighting design is expected to further reduce the risk of eastern whip-poor-will mortalities at operational turbines. The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to reduce the risk of mortality to the same levels as turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting approach taken at other structures, including the substation, operations building (if applicable), base of turbines, etc., has been designed to reduce potential attractions for birds to the vicinity of operational wind turbines.	The implementation of a turbine lighting design will minimize potential risk of impacts to the species.
	Updates to the Operational Mitigation Plan The Operational Mitigation Plan will be updated at least once every five years to include information obtained through the monitoring completed to date and adapted to detail the steps that have been implemented to minimize any adverse effects on the Species. The Operational Mitigation Plan may also be updated based on new research and best available science regarding effective and reasonably feasible	Updates to the Operational Mitigation Plan will be made a minimum of once every five years to ensure the most up to date information, research and methods are being utilized to minimize potential impacts to the species.	Use the most up to date information to inform the Operational Mitigation Plan.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	mitigation and avoidance measures at operational wind facilities.		

**The Diverse Impact level currently assumes that 33 turbines will be operational. In the event that less than 33 turbines are operational, the number of turbines or mortalities needed to trigger a Diverse Impact may be revised proportionately to equal 20% of operational turbines. If the values within the Diverse Impact level are revised, the MECP will be notified.*

5.6.4 Bobolink

Mitigation measures and commitments, if necessary, to minimize any potential impacts from the operation of the Nation Rise Wind Farm on bobolink are outlined in Table 5. In the unlikely event that mitigation measures are not found to be effective in minimizing adverse effects to bobolink, the MECP will be notified of any further operational mitigation measures or contingencies.

Table 5 below sets out various mitigation measures that will be implemented if various levels of mortality impact were to occur. As stated, we do not expect any of those levels of impact to actually occur. The mortality risk for this Project is low.

Table 5. Mitigation Measures and Commitments (if necessary) for Minimizing Impacts to Bobolink During the Operation of the Nation Rise Wind Farm

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
Turbine Energization	**Habitat Mapping** None	Detailed mapping of suitable grassland habitats was completed as part of the NHA (NRSI 2017b). As a result, no additional habitat mapping is proposed at the onset of the operational phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the operational phase of this Project.	N/A
	Mortality Monitoring Turbines are expected to become energized no earlier than October 2020, with some limited pre-commissioning tests occurring during the summer months of 2020 that will result in periodic spinning of individual turbines or turbine groups. These pre-commissioning tests will be brief and limited to daylight hours. Based on the anticipated timing of energization, the onset of REA monitoring is anticipated to occur on May 1, 2021 (refer to the 'Start of REA Monitoring' row below). In the event that turbine energization is delayed and occurs between May and October 2021, each turbine will be monitored once per calendar month from the time the turbine is back fed into the grid until the end of October 2021, and REA monitoring will begin on May 1, 2022 (refer to the 'Start of REA Monitoring' row below). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bobolink mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements,	Monthly searches at all turbines are expected to allow for searches to identify any potential concerns or high-risk turbines for bobolink mortalities. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring until October corresponds to the period when mortalities of this species are expected to be observed (NRSI Unpublished).	Mortality monitoring will be implemented to identify any bobolink mortalities that may occur at this facility (though such mortality is not expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of the operational phase of this Project.	N/A
	Changes in Turbine Operation None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of the operational phase of this Project.	N/A
	Next Steps In the event a bobolink mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Start of REA Monitoring	**Habitat Mapping** None	Detailed mapping of suitable grassland habitats was completed as part of the NHA (NRSI 2017b). As a result, no additional habitat mapping is proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Mortality Monitoring A subset of at least 30% of the turbines will be monitored twice-weekly from May 1st to October 31st to assess estimated bird and bat mortality levels, as identified in the NHA (NRSI 2017d) and EEMP (NRSI 2017e). These surveys will continue for the first 3 years of operation of the Project, and will follow the methods outlined in the MNRF's *Birds and Bird Habitats* guidelines (OMNR 2011b). The turbines not chosen as part of the 30% subsample will be monitored monthly from May to October (inclusive). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bobolink mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species	This approach for mortality monitoring is consistent with the REA requirements (OMNR 2011a, OMNR 2011b). Monthly searches at non-REA turbines are expected to allow for searches to identify any potential concerns or high-risk turbines. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species (if any were to occur) are expected to be observed (NRSI Unpublished). The timing is consistent with the summary of bird mortalities in the published literature.	Mortality monitoring will be implemented to identify any bobolink mortalities that may occur at this facility (though no such mortality is expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of REA mortality monitoring.	N/A
	Changes in Turbine Operation None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of REA mortality monitoring.	N/A
	Next Steps In the event a bobolink mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Isolated Impact	**Habitat Mapping** Mapping of any suitable habitat within 200m of the operational turbine will occur if an isolated impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 200m of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches an isolated impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact.	The 200m area of interest is expected to identify any suitable habitat within the immediate vicinity of the turbine.	Identify potential bobolink concentration areas and preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If an isolated impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA mortality monitoring commitments are completed, the search frequency of this turbine will be increased from monthly to weekly	An increase in search frequency from monthly to weekly will assist in identifying whether the particular turbine is having a greater impact on bobolink.	Provide an increased search effort to further assist in assessing any potential direct impacts to bobolink.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bobolink mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify observed mortalities to the species level. If a confident species identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been determined to provide little benefit if an isolated impact has occurred.	N/A
	Next Steps If 2 additional bobolink mortalities are noted in the same year, the level of impact increases to a 'Repeat Impact' (discussed below). If no mortalities or 1 additional bobolink mortality is noted at this turbine for the remainder of the year, no additional monitoring or mitigation measures are required. If there were to be 2 additional mortalities of this species, at the same turbine, in a subsequent year, this would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Repeat Impact	**Habitat Mapping** Mapping of suitable habitat within 1km of the operational turbine will occur if a repeat impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 1km of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches a repeat impact and will be reviewed and	A mapped area of 1km is expected to overlap with habitats that could potentially concentrate bird activity near a Repeat Impact turbine or otherwise be important for the life cycle of this SAR.	Identify potential bobolink concentration areas and any preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	modified, as necessary, in each subsequent year that a turbine reaches this level of impact. It is expected that site access may become a limiting factor when considering some of the habitats up to 1km from the operational turbine. Where access cannot be obtained, habitat mapping will be conducted from the closest observable point (e.g. roadside, neighbouring property, etc.), using binoculars, where appropriate, and/or through air photo interpretation using detailed aerial photography.		
	Behaviour Surveys If a repeat impact is noted, behaviour surveys will be completed within the habitats identified as part of the habitat mapping exercise described above (within 1km of the turbine) to determine any possible cause and effect relationship between bobolink habitat and mortality. These surveys will occur in the following year that a repeat impact is reached to coincide with the seasonality that mortalities were documented. The specific survey methods used, which may vary considerably depending on time of year of the mortality observation, extent of suitable habitat, type of habitat, site access, etc., will be developed in consultation with the MECP. It is expected that the 2011 MNRF guidelines (OMNR 2011b) will be used as a basis for the study methods, depending on the type of information of interest (i.e. general abundance, presence of breeding habitat, specific diversity, etc.). Methods may include point count surveys to assess the potential impact of the operational turbine on bobolink abundance and distribution during the breeding and/or migration seasons.	Behaviour surveys will be conducted using available information from the habitat assessment (see above) to determine whether any concentrations of bobolink are present within 1km of the operational turbine.	Behaviour surveys will be used to further define the potential areas which could possibly be at higher risk for bobolink mortalities, and will also allow for a direct comparison between bird species and abundance in suitable habitats and the bird mortality information collected at the operational turbine.
	Mortality Monitoring If a repeat impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA commitments are	An increase in search frequency from weekly to twice-weekly provides an increased effort to more accurately characterize the potential impacts to bobolink.	Provide an increased search effort to further assist in assessing any potential direct impacts to bobolink.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	completed, the search frequency will occur weekly from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for bobolink mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Mortality monitoring will occur the following year at a minimum search frequency of twice-weekly for a two week period before and after the date of all previous mortalities of this species, and weekly for the remainder of the time period from May 1 to October 31. If a new mortality is documented in a week where no previous mortality had been observed, then weekly monitoring will be increased to twice-weekly for the following two weeks. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been determined to provide little benefit at this level of impact on the species.	N/A
	Next Steps If an additional bobolink mortality is noted at this turbine during the remainder of the monitoring season or again in the following year, there will be no immediate changes to the approach described above, aside from any other specific requirements of this plan. If 2 additional bobolink mortalities are noted at this turbine during the remainder of the monitoring season or 2 mortalities are noted again in the following year (i.e. another Repeat Impact), then this turbine would be considered to have a 'Continued Impact' (discussed below).		

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If the above levels of mortality are not met, this turbine will not require any additional monitoring or mitigation beyond what is described above or otherwise required by this Operational Mitigation Plan. If there were to be a mortality of this species, at the same turbine, in a subsequent year, that would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Continued Impact	**Habitat Mapping** None	At this level of impact, the benefits of mapping additional habitat have been determined to be negligible.	N/A
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If a Continued Impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the Continued Impact is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency of this turbine will be weekly from the date this level of impact is reached to the end of September of that year. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Where a Continued Impact is observed, all other turbines within 1km ('Clustered') of the Continued Impact turbine will be searched weekly from the date this level of impact is reached to the end of September of that year. Mortality monitoring will be required to occur at the turbine where a Continued Impact was reached for a subsequent 3 years from May to October (inclusive). The first year of monitoring will consist of twice-weekly monitoring to further characterize potential impacts, while the last two years of monitoring will be conducted weekly to ensure additional mortalities (if any) are documented. Any required monitoring at 'Clustered' turbines will be finished at the end of the monitoring year unless	A twice-weekly search frequency provides a level of effort that is expected to more accurately characterize the potential impacts to bobolink. This is intended to reduce the potential for mortalities being removed from beneath wind turbines as a result of scavenging activity, and will ensure that mortalities are not in the late stages of decomposition so that they can be more easily identified (Morrison 2002, Smallwood 2007). Weekly monitoring at 'Clustered' turbines (within 1km of the Continued Impact turbine) will provide an increased level of accuracy for identifying whether similar risk factors are associated with nearby turbines. A more frequent search frequency will increase the likelihood of carcasses being encountered through a reduced impact of the searcher efficiency and scavenger variables. A minimum search frequency of weekly is expected to provide adequate opportunity to observe any additional bobolink mortalities that may still be occurring at this operational turbine.	Provide an increased search effort to further assist in assessing potential direct impacts to bobolink.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	additional mortalities are noted. If additional mortalities are noted, those turbines will follow the mitigation and monitoring required for the applicable level of impact. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation In the event that a turbine is observed to have a 'Continued Impact' on bobolink, shut down of that turbine will occur immediately until the end of September. Turbine shut down will be from 1 hr before sunrise until noon and from 4 pm until 2 hours after sunset. The mitigation measure described above will be removed at the end of September and will not be implemented the following year. Monitoring in the subsequent year at this turbine will be used to help assess the effectiveness of the operational mitigation. However, should a repeat impact be observed during the following year, the turbine will be considered to have a Sustained Impact on the species and further mitigation as detailed below will be implemented. If behavioural studies and habitat mapping provide more detailed information regarding the species, these dates and times may be changed in consultation with the MECP in order to reflect actual site use and mortality risk and patterns.	At this level of impact, this turbine has the potential to present a higher risk to the species. As a result, operational curtailment will be implemented as an approach to reduce the potential for bird mortalities at this particular turbine.	The change in the operation of the turbine will further reduce the potential for impacts to bobolink during the time period when this species is expected to be most active.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If the results of the mortality monitoring, behaviour surveys and habitat mapping indicated that there is increased risk to the species during only either the breeding season or the migration season then operational mitigation may be changed in consultation with the MECP in order to reflect the period of increased risk.		
	Next Steps If any additional bobolink mortalities are noted at this turbine, it will be determined to have a 'Sustained Impact' (discussed below) and the MECP will be notified if any additional measures may be required.		
Sustained Impact	If a Sustained Impact on bobolink is observed following the implementation of the measures outlined in all the steps above, the MECP will be notified if additional steps, if any, are required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Additional habitat creation, • Contributions to research projects If changes to the operation of the turbines are made to further minimize the potential impacts to bobolink, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3-year period, the MECP will be notified if any changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Diverse Impact*	For a Project of this size (up to 33 turbines), a 'Diverse Impact' will be considered to be reached when more than 9 of the turbines reach (or exceed) an 'Isolated Impact' or when the total bobolink mortalities, measured across the Project, are more than 10 in a single monitoring year. If a Diverse Impact relating to bobolink is noted across this facility, the MECP will be notified of additional steps, if any, that may be required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Additional habitat creation, • Contributions to research projects • Periodic shutting down of turbines. If changes to the operation of the turbines are made to further minimize the potential impacts to bobolink, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3-year period, the MECP will be notified if changes in search frequency or mitigation measures are necessary.		

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Ongoing Commitments	**<u>Long Term Monitoring</u>** Mortality monitoring specific to bobolink will occur for the first 3 years that this facility is operational, and every 5 years thereafter. This requirement is exclusive of any additional monitoring that may be required based on the observations of bobolink mortalities. If changes to the operation of the turbine(s) are made to minimize further potential impacts to the species, additional effectiveness monitoring (i.e., mortality searches) will be required. These searches will be completed at the specific turbine(s) at a minimum of once per month from May through September for 3 additional years. After review of the full monitoring results in years 1-3, the need for and scope of additional monitoring in years 4-6 will be determined in consultation with the Technical Advisory Committee. During each year that monitoring occurs, the search frequency will occur at a minimum of once per month during the months of May to October (inclusive). These searches will focus on an area of 80m around the turbine base, where birds are most likely to fall. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. These surveys will be completed by a qualified individual, and where possible, should be conducted by the same person conducting the post-construction mortality monitoring under REA. More frequent searches may be required at certain turbines or during specific years if REA monitoring is still occurring or as a result of the implementation of operational mitigation/adaptive mortality monitoring programs. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species	A monthly search frequency is expected to identify turbines that have a potentially higher risk of mortality to bobolink and therefore identify which turbines require additional monitoring to characterize and ultimately minimize and mitigate potential impacts to this species. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species may be encountered (NRSI Unpublished). This is consistent with the summary of bird mortalities in published literature. Following the mitigation steps above, the frequency of mortality monitoring will be increased immediately from monthly to weekly and increased in frequency again if additional mortalities are still observed. All of the required mitigation measures and/or monitoring continue to be applied if mortalities are observed during the long-term (every 5 years) monitoring program.	Identify turbines with the potential to impact bobolink throughout the life of the Project through a long-term monitoring program and the associated progressive increases to a base monitoring program if mortalities are documented.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	identification is not determined to be possible (and bobolink cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Reporting In accordance with the ESA requirements, annual reporting will occur for the first 3 years of the operation of this facility and every 5 years thereafter. For all reporting years, this report will be prepared as a separate report to the *Post-construction Mortality Monitoring Report* which is required under the REA conditions for this Project. Reports will be retained for a minimum of 5 years, and will be available to be submitted to the MECP within 14 days of receiving a request for it.	Reports will be prepared in accordance with the ESA and will document all impacts to bobolink (if any), changes in monitoring or mitigation measures, and other steps taken to minimize potential impacts to bobolink since the completion of the previous report. Annual reports will also include information related to mitigation objectives that are reached, summaries of any habitat mapping and behavioural monitoring, as well as any applicable results of searcher efficiency trials conducted under the REA post-construction monitoring.	Inform the MECP of any potential impacts to bobolink and confirm the steps taken to minimize any observed (or potential) impacts.
	Contribution to Research The MECP will be notified of all bobolink mortalities within 24hrs (or next business day) of a confirmed identification.	Provide information to the MECP for their ongoing assessment of mortality trends or patterns within Ontario. This central database of information may be used to further refine Project requirements, site-specific recommendations, or even identify areas of high risk to bird mortality within Ontario.	Provide the MECP with the resources needed to track any mortality patterns, changes in population, or identify any other potential concerns that may be obtained through a review of mortality data.
	Implementation of a Turbine Lighting Design A lighting approach has been developed for the Nation Rise Wind Farm that will be implemented at the commencement of the operational phase of this Project and will take reasonable steps to minimize impacts to bobolink. The lighting approach taken throughout the Project will follow the key steps below, similar to those recommended by the U.S. Fish and Wildlife wind energy guidelines (2012): • Implement red LED flashing lights on turbines,	The implementation of a turbine lighting design is expected to further reduce the risk of bobolink mortalities at operational turbines. The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to reduce the risk of mortality to the same levels as turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting approach taken at other structures, including the substation, operations building (if applicable), base of turbines, etc., has been	The implementation of a turbine lighting design will minimize potential risk of impacts to the species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	• Light turbines and permanent meteorological/communication towers to the minimum federal standards, • Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction, • Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum, • Any internal nacelle lighting will only be used when occupied.	designed to reduce potential attractions for birds to the vicinity of operational wind turbines.	
	Updates to the Operational Mitigation Plan The Operational Mitigation Plan will be updated at least once every five years to include information obtained through the monitoring completed to date and adapted to detail the steps that have been implemented to minimize any adverse effects on the Species. The Operational Mitigation Plan may also be updated based on new research and best available science regarding effective and reasonably feasible mitigation and avoidance measures at operational wind facilities.	Updates to the Operational Mitigation Plan will be made a minimum of once every five years to ensure the most up to date information, research and methods are being utilized to minimize potential impacts to the species.	Use the most up to date information to inform the Operational Mitigation Plan.

**The Diverse Impact level currently assumes that 33 turbines will be operational. In the event that less than 33 turbines are operational, the number of turbines or mortalities needed to trigger a Diverse Impact may be revised proportionately to equal 20% of operational turbines. If the values within the Diverse Impact level are revised, the MECP will be notified.*

5.6.5 Eastern Meadowlark

Given the similarities between this species and bobolink, discussed above, the same commitments apply for mitigating and minimizing any potential impacts to eastern meadowlark individuals. Please refer to Table 5 for more detail on the mitigation measures and other commitments that will be implemented in the event of any impacts to eastern meadowlark as a result of the operation of the Nation Rise Wind Farm. In the unlikely event that mitigation measures are not found to be effective in minimizing adverse effects to eastern meadowlark, the MECP will be notified of any further operational mitigation measures or other contingencies.

As stated, the mortality risk for this Project is low, and the corresponding potential for the Project to reach any of the identified levels of impact is similarly low.

5.6.6 Barn Swallow

Mitigation measures and commitments, if necessary, to minimize any potential impacts from the operation of the Nation Rise Wind Farm on barn swallow are outlined in Table 6. In the unlikely event that mitigation measures are not found to be effective in minimizing adverse effects to barn swallow, the MECP will be notified of any further operational mitigation measures or other contingencies.

Table 6 below sets out various mitigation measures that will be implemented if various levels of mortality impact were to occur. As stated, we do not expect any of those levels of impact to actually occur. The mortality risk for this Project is low.

Table 6. Mitigation Measures and Commitments (if necessary) for Minimizing Impacts to Barn Swallow During the Operation of the Nation Rise Wind Farm

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
Turbine Energization	**Habitat Mapping** None	Detailed mapping of suitable habitat for barn swallow that may overlap with the Project Location was completed as part of the Species at Risk Report (NRSI 2017F). As a result, no additional habitat mapping is proposed at the onset of the operational phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the operational phase of this Project.	N/A
	Mortality Monitoring Turbines are expected to become energized no earlier than October 2020, with some limited pre-commissioning tests occurring during the summer months of 2020 that will result in periodic spinning of individual turbines or turbine groups. These pre-commissioning tests will be brief and limited to daylight hours. Based on the anticipated timing of energization, the onset of REA monitoring is anticipated to occur on May 1, 2021 (refer to the 'Start of REA Monitoring' row below). In the event that turbine energization is delayed and occurs between May and October 2021, each turbine will be monitored once per calendar month from the time the turbine is back fed into the grid until the end of October 2021, and REA monitoring will begin on May 1, 2022 (refer to the 'Start of REA Monitoring' row below). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for barn swallow mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements,	Monthly searches at all turbines are expected to allow for searches to identify any potential concerns or high-risk turbines for barn swallow mortalities. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring until October corresponds to the period when mortalities of this species are expected to be observed (NRSI Unpublished).	Mortality monitoring will be implemented to identify any barn swallow mortalities that may occur at this facility (though such mortality is not expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of the operational phase of this Project.	N/A
	Changes in Turbine Operation None	At the onset of the operational phase of this Project, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of the operational phase of this Project.	N/A
	Next Steps In the event a barn swallow mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Start of REA Monitoring	**Habitat Mapping** None	Detailed mapping of suitable habitat for barn swallow that may overlap with the Project Location was completed as part of the Species at Risk Report (NRSI 2017F). As a result, no additional habitat mapping is proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Behaviour Surveys None	No behaviour surveys are proposed at the onset of the Start of REA Monitoring phase of this Project.	N/A
	Mortality Monitoring A subset of at least 30% of the turbines will be monitored twice-weekly from May 1st to October 31st to assess estimated bird and bat mortality levels, as identified in the NHA (NRSI 2017d) and EEMP (NRSI 2017e). These surveys will continue for the first 3 years of operation of the Project and will follow the methods outlined in the MNRF's *Birds and Bird Habitats* guidelines (OMNR 2011b). The turbines not chosen as part of the 30% subsample will be monitored monthly from May to October (inclusive). An approximate 80m search radius will be examined with an effort suitable to adequately search the area for barn swallow mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed.	This approach for mortality monitoring is consistent with the REA requirements (OMNR 2011a, OMNR 2011b). Monthly searches at non-REA turbines are expected to identify any potential concerns or high-risk turbines. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species (if any were to occur) are expected to be observed (NRSI Unpublished). The timing is consistent with the summary of bird mortalities in published literature.	Mortality monitoring will be implemented to identify any barn swallow mortalities that may occur at this facility (though no such mortality is expected) for the purpose of applying any necessary mitigation measures to avoid or minimize impacts to this species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no habitat creation or enhancement is proposed at the onset of REA mortality monitoring.	N/A
	Changes in Turbine Operation None	At the onset of REA mortality monitoring, there is no expected impact to this species. As a result, no change in the approach to turbine operation is proposed at the onset of REA mortality monitoring.	N/A
	Next Steps In the event a barn swallow mortality is noted, this turbine will be considered to have an 'Isolated Impact' (discussed below).		
Isolated Impact	**Habitat Mapping** Mapping of any suitable habitat within 200m of the operational turbine will occur if an isolated impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 200m of the turbine (measured from blade tip). Habitat mapping will occur once at each turbine that reaches an isolated impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact.	The 200m area of interest is expected to identify any suitable habitat within the immediate vicinity of the turbine.	Identify potential barn swallow concentration areas and preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing cause and effect relationships.
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If an isolated impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA mortality monitoring	An increase in search frequency from monthly to weekly will assist in identifying whether the particular turbine is having a greater impact on barn swallow.	Provide an increased search effort to further assist in assessing any potential direct impacts to barn swallow.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	commitments are completed, the search frequency of this turbine will be increased from monthly to weekly from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for barn swallow mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. All reasonable steps will be taken to identify observed mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been determined to provide little benefit if an isolated impact has occurred.	N/A
	Next Steps If 2 additional barn swallow mortalities are noted in the same year, the level of impact increases to a 'Repeat Impact' (discussed below). If no mortalities or one additional barn swallow mortality is noted at this turbine for the remainder of the year, no additional monitoring or mitigation measures are required. If there were to be 2 additional mortalities of this species, at the same turbine, in a subsequent year, this would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Repeat Impact	**Habitat Mapping** Mapping of suitable habitat within 1km of the operational turbine will occur if a repeat impact is noted. This mapping exercise will include the documentation of all potential breeding or foraging habitats for this species. Habitats will be mapped to the level of detail possible within 1km of the turbine (measured from blade tip).	A mapped area of 1km is expected to overlap with any habitats that could potentially concentrate bird activity near a Repeat Impact turbine or otherwise be important for the life cycle of this SAR.	Identify potential barn swallow concentration areas and any preferred habitat around operational turbines. The identification of these habitats will assist in assessing any existing

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	Habitat mapping will occur once at each turbine that reaches a repeat impact and will be reviewed and modified, as necessary, in each subsequent year that a turbine reaches this level of impact. It is expected that site access may become a limiting factor when considering some of the habitats up to 1km from the operational turbine. Where access cannot be obtained, habitat mapping will be conducted from the closest observable point (e.g. roadside, neighbouring property, etc.), using binoculars, where appropriate, and/or through air photo interpretation using detailed aerial photography.		cause and effect relationships.
	Behaviour Surveys If a repeat impact is noted, behaviour surveys will be completed within the habitats identified as part of the habitat mapping exercise described above (within 1km of the turbine) to determine any possible cause and effect relationship between barn swallow habitat and mortality. These surveys will occur in the following year that a repeat impact is reached to coincide with the seasonality that the mortalities were documented. The specific survey methods, which may vary considerably depending on time of year of the mortality observation, extent of suitable habitat, type of habitat, site access, etc., will be developed in consultation with the MECP. It is expected that the 2011 MNRF guidelines (OMNR 2011b) will be used as a basis for the study methods, depending on the type of information of interest (i.e. general abundance, presence of breeding habitat, specific diversity, etc.). Methods may include point count surveys to assess the potential impact of the operational turbine on barn swallow abundance and distribution during the breeding and/or migration seasons, including documenting flight paths from	Behaviour surveys will be conducted using available information from the habitat assessment (see above) to determine whether any concentrations of barn swallows are present within 1km of the operational turbine.	Behaviour surveys will be used to further define the potential areas which could possibly be at higher risk for barn swallow mortalities, and will also allow for a direct comparison between bird species and abundance in suitable habitats and the bird mortality information collected at the operational turbine.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	barn swallow habitats in relation to the turbine location.		
	Mortality Monitoring If a repeat impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the mortality is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency will occur twice-weekly from the date of observation to the end of October of that year. An approximate 80m search radius will be examined with an effort suitable to adequately search the area for barn swallow mortalities. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Mortality monitoring will occur the following year at a minimum search frequency of twice-weekly for a two week period before and after the date of all previous mortalities of this species, and weekly for the remainder of the time period from May 1 to October 31. If a new mortality is documented in a week where no previous mortality had been observed, then weekly monitoring will be increased to twice-weekly for the following two weeks. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.	An increase in search frequency from weekly to twice-weekly provides an increased effort to more accurately characterize the potential impacts to barn swallow.	Provide an increased search effort to further assist in assessing any potential direct impacts to barn swallow.
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	Changes in Turbine Operation None	This level of impact does not confirm that there is an increased level of risk associated with this turbine. Changes to the operation of the turbine have been considered, but have been determined to provide little benefit at this level of impact on the species.	N/A
	Next Steps If an additional barn swallow mortality is noted at this turbine during the remainder of the monitoring season or again in the following year, there will be no immediate changes to the approach described above, aside from any other specific requirements of this plan. If 2 additional barn swallow mortalities are noted at this turbine during the remainder of the monitoring season or 2 mortalities are noted again in the following year (i.e. another Repeat Impact), then this turbine would be considered to have a 'Continued Impact' (discussed below). If the above levels of mortality are not met, this turbine will not require any additional monitoring or mitigation beyond what is described above or otherwise required by this Operational Mitigation Plan. If there were to be a mortality of this species, at the same turbine, in a subsequent year, that would trigger the mitigation commitments and increased monitoring associated with the Isolated Impact.		
Continued Impact	**Habitat Mapping** None	At this level of impact, the benefits of mapping additional habitat have been determined to be negligible.	N/A
	Behaviour Surveys None	Behaviour surveys have been considered, but have been determined to have little potential benefit at this level of impact on the species.	N/A
	Mortality Monitoring If a Continued Impact is observed at a REA turbine, no changes are proposed to occur to the monitoring program already implemented at this turbine. If the Continued Impact is observed at a non-REA turbine, or at a REA turbine after the REA commitments are completed, the search frequency of this turbine will be twice-weekly from the date this level of impact is reached to the end of October of that year. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. Where a Continued Impact is observed, all other turbines within 1km ('Clustered') of the Continued Impact turbine will be searched weekly from the date this level of impact is reached to the end of October of that year.	A twice-weekly search frequency provides a level of effort that is expected to more accurately characterize the potential impacts to barn swallow. This is intended to reduce the potential for mortalities being removed from beneath wind turbines as a result of scavenging activity, and will ensure that mortalities are not in the late stages of decomposition so that they can be more easily identified (Morrison 2002, Smallwood 2007). Weekly monitoring at 'Clustered' turbines (within 1km of the Continued Impact turbine) will provide an increased level of accuracy for identifying whether similar risk factors are associated with nearby turbines. A more frequent search frequency will increase the likelihood of carcasses being encountered through a reduced impact of the searcher efficiency and scavenger variables. A minimum search frequency of weekly is expected to provide adequate opportunity to observe any additional barn swallow mortalities that may still be occurring at this operational turbine.	Provide an increased search effort to further assist in assessing potential direct impacts to barn swallow.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	Mortality monitoring will be required to occur at the turbine where a Continued Impact was reached for a subsequent 3 years from May to October (inclusive). The first year of monitoring will consist of twice-weekly monitoring to further characterize potential impacts, while the last two years of monitoring will be conducted weekly to ensure additional mortalities (if any) are documented. Any required monitoring at 'Clustered' turbines will be finished at the end of the monitoring year unless additional mortalities are noted. If additional mortalities are noted, those turbines will follow the mitigation and monitoring required for the applicable level of impact. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Habitat Creation or Enhancement None	Habitat creation or enhancement has been considered, but has been determined to have little potential benefit at this level of impact on the species.	N/A
	Changes in Turbine Operation In the event that a turbine is observed to have a 'Continued Impact' on barn swallow, shut down of that turbine will occur immediately until the end of October. Turbine shut down will be from 1 hr before sunrise until noon and from 4 pm until 2 hours after sunset. The mitigation measure described above will be removed at the end of October and will not be implemented the following year. Monitoring in the subsequent year at this turbine will be used to help assess the effectiveness of the operational mitigation. However, should a repeat impact be observed during	At this level of impact, this turbine has the potential to present a higher risk to the species. As a result, operational curtailment will be implemented as an approach to reduce the potential for bird mortalities at this particular turbine.	The change in the operation of the turbine will further reduce the potential for impacts to barn swallow during the time period when this species is expected to be most active.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	the following year, the turbine will be considered to have a Sustained Impact on the species and further mitigation as detailed below will be implemented. If behavioural studies and habitat mapping provide more detailed information regarding the species, these dates and times may be changed in consultation with the MECP in order to reflect actual site use and mortality risk and patterns. If the results of the mortality monitoring, behaviour surveys and habitat mapping indicated that there is increased risk to the species during only either the breeding season or the migration season then operational mitigation may be changed in consultation with the MECP in order to reflect the period of increased risk.		
	Next Steps If any additional barn swallow mortalities are noted at this turbine, it will be determined to have a 'Sustained Impact' (discussed below) and the MECP will be notified if any additional measures may be required.		
Sustained Impact	If a Sustained Impact on barn swallow is observed following the implementation of the measures outlined in all the steps above, the MECP will be notified if additional steps, if any, are required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Habitat creation, • Contributions to research projects. If changes to the operation of the turbines are made to further minimize the potential impacts to barn swallow, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3 year period, the MECP will be notified if any changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Diverse Impact*	For a Project of this size (up to 33 turbines), a 'Diverse Impact' will be considered to be reached when more than 9 of the turbines reach (or exceed) an 'Isolated Impact' or when the total barn swallow mortalities, measured across the Project, are more than 10 in a single monitoring year. If a Diverse Impact relating to barn swallow is noted across this facility, the MECP will be notified of additional steps, if any, that may be required to further minimize impacts to this species. Examples could include, but would not be limited to: • Implementing operational mitigation during particular seasons, • Habitat creation, • Contributions to research projects,		

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	• Periodic shutting down of turbines. If changes to the operation of the turbines are made to further minimize the potential impacts to barn swallow, an additional 3 years of effectiveness monitoring will be required. These searches will be completed at this specific turbine at a minimum of once per month from May through October for 3 years. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. If additional mortalities of this species are observed during this 3 year period, the MECP will be notified if changes in search frequency or mitigation measures are necessary. If additional mitigation measures include habitat compensation, the appropriate monitoring program, if required, depending on the type and extent of habitat compensation being implemented, will be prepared and the MECP will be notified.		
Ongoing Commitments	**<u>Long Term Monitoring</u>** Mortality monitoring specific to barn swallow will occur for the first 3 years that this facility is operational, and every 5 years thereafter. This requirement is exclusive of any additional monitoring that may be required based on the observations of barn swallow mortalities. If changes to the operation of the turbine(s) are made to minimize further potential impacts to the species, additional effectiveness monitoring (i.e., mortality searches) will be required. These searches will be completed at the specific turbine(s) at a minimum of once per month from May through October for 3 additional years. After review of the full monitoring results in years 1-3, the need for and scope of additional monitoring in years 4-6 will be determined in consultation with the Technical Advisory Committee. During each year that monitoring occurs, the search frequency will occur at a minimum of once per month during the months of May to October (inclusive). These searches will focus on an area of 80m around the turbine base, where birds are most likely to fall. If an 80m search area cannot be maintained at low levels of vegetation, or otherwise high visibility, the effort spent will be increased to ensure a thorough search is completed. These surveys will be completed by a qualified individual, and where possible, should be conducted by the same person conducting the post-construction mortality monitoring	A monthly search frequency is expected to identify turbines that have a potentially higher risk of mortality to barn swallow and therefore identify which turbines require additional monitoring to characterize and ultimately minimize and mitigate potential impacts to this species. Based on NRSI's experience conducting post-construction mortality monitoring, monitoring from May to October corresponds to the period when mortalities of this species may be encountered (NRSI Unpublished). This is consistent with the summary of bird mortalities in published literature. Following the mitigation steps above, the frequency of mortality monitoring will be increased immediately from monthly to weekly and increased in frequency again if additional mortalities are still observed. All of the required mitigation measures and/or monitoring continue to be applied if mortalities are observed during the long-term (every 5 years) monitoring program.	Identify turbines with the potential to impact barn swallows throughout the life of the Project through a long-term monitoring program and the associated progressive increases to a base monitoring program if mortalities are documented.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	under REA. More frequent searches may be required at certain turbines or during specific years if REA monitoring is still occurring or as a result of the implementation of operational mitigation/adaptive mortality monitoring programs. All reasonable steps will be taken to identify any mortalities to the species level. If a confident species identification is not determined to be possible (and barn swallow cannot be ruled out), the appropriate information including skeletal measurements, photographs, characteristics, and/or carcass will be provided to the MECP for discussion as to how to proceed.		
	Reporting In accordance with the ESA requirements, annual reporting will occur for the first 3 years of the operation of this facility and every 5 years thereafter. For all reporting years, this report will be prepared as a separate report to the *Post-construction Mortality Monitoring Report* which is required under the REA conditions for this Project. Reports will be retained for a minimum of 5 years and will be available to be submitted to the MECP within 14 days of receiving a request for it.	Reports will be prepared in accordance with the ESA and will document all impacts to barn swallow (if any), changes in monitoring or mitigation measures, and other steps taken to minimize potential impacts to barn swallows since the completion of the previous report. Annual reports will also include information related to mitigation objectives that are reached, summaries of any habitat mapping and behavioural monitoring, as well as any applicable results of searcher efficiency trials conducted under the REA post-construction monitoring.	Inform the MECP of any potential impacts to barn swallows and confirm the steps taken to minimize any observed (or potential) impacts.
	Contribution to Research The MECP will be notified of all barn swallow mortalities within 24hrs (or next business day) of a confirmed identification.	Provide information to the MECP for their ongoing assessment of mortality trends or patterns within Ontario. This central database of information may be used to further refine Project requirements, site-specific recommendations, or even identify areas of high risk to bird mortality within Ontario.	Provide the MECP with the resources needed to track any mortality patterns, changes in population, or identify any other potential concerns that may be obtained through a review of mortality data.
	Implementation of a Turbine Lighting Design A lighting approach has been developed for the Nation Rise Wind Farm that will be implemented at the commencement of the operational phase of this Project and will take reasonable steps to minimize	The implementation of a turbine lighting design is expected to further reduce the risk of barn swallow mortalities at operational turbines.	The implementation of a turbine lighting design will minimize potential risk of impacts to the species.

Project Phase/ Level of Impact/ Ongoing Commitments	Description of Mitigation Measure	Rationale	Objective
	impacts to barn swallow. The lighting approach taken throughout the Project will follow the key steps below, similar to those recommended by the U.S. Fish and Wildlife wind energy guidelines (2012): • Implement red LED flashing lights on turbines, • Light turbines and permanent meteorological/communication towers to the minimum federal standards, • Ground-level lights (i.e. buildings, turbine bases, etc.) will be directed downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction, • Use of high-intensity lighting or spotlights, if required, will be temporary and will be kept to a minimum, Any internal nacelle lighting will only be used when occupied.	The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to reduce the risk of mortality to the same levels as turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting approach taken at other structures, including the substation, operations building (if applicable), base of turbines, etc., has been designed to reduce potential attractions for birds to the vicinity of operational wind turbines.	
	Updates to the Operational Mitigation Plan The Operational Mitigation Plan will be updated at least once every five years to include information obtained through the monitoring completed to date and adapted to detail the steps that have been implemented to minimize any adverse effects on the Species. The Operational Mitigation Plan may also be updated based on new research and best available science regarding effective and reasonably feasible mitigation and avoidance measures at operational wind facilities.	Updates to the Operational Mitigation Plan will be made a minimum of once every five years to ensure the most up to date information, research and methods are being utilized to minimize potential impacts to the species.	Use the most up to date information to inform the Operational Mitigation Plan.

**The Diverse Impact level currently assumes that 33 turbines will be operational. In the event that less than 33 turbines are operational, the number of turbines or mortalities needed to trigger a Diverse Impact may be revised proportionately to equal 20% of operational turbines. If the values within the Diverse Impact level are revised, the MECP will be notified.*

5.6.7 Bank Swallow

Given the similarities between this species and barn swallow, discussed above, the same commitments apply for mitigating and minimizing any potential impacts to bank swallow individuals. Please refer to Table 6 for more detail on the mitigation measures and other commitments that will be implemented in event of any impacts to bank swallow as a result of the operation of the Nation Rise Wind Farm. In the unlikely event that mitigation measures are not found to be effective in minimizing adverse effects to bank swallow, the MECP will be notified of any further operational mitigation measures or other contingencies.

6.0 Summary and Conclusions

The above mitigation plans have been prepared in accordance with the ESA and Ontario Regulation 242/08, Section 23.20 for the purpose of avoiding and/or mitigating any potential impacts on SAR as a result of the operation of the Nation Rise Wind Farm. Background information, site-specific habitat mapping and species inventories, disciplinary experts, literature review, and agency input have all been considered. Based on this comprehensive consideration of SAR in the vicinity of the Project Area, the above mitigation plans have been developed with specific commitments to avoid and/or mitigate against any potential impacts to the following species:

- Little Brown Myotis
- Northern Myotis
- Eastern Whip-poor-will
- Bobolink
- Eastern Meadowlark
- Barn Swallow
- Bank Swallow

In order to ensure that any potential impacts to the above species are avoided and/or minimized, a series of mitigation, monitoring, and contingency commitments have been established for the operational phase of the Nation Rise Wind Farm. These commitments include previously established measures as part of the REA permitting process, as well as, out an abundance of caution, additional measures that have been developed within this Operational Mitigation Plan to avoid and/or minimize any impacts on the SAR identified in the NOA.

This Operational Mitigation Plan has used current and available knowledge on the potential for any SAR interactions at the Nation Rise Wind Farm and has established specific mitigation measures to ensure any potential impact is avoided, minimized and/or mitigated. Assuming the mitigation measures and monitoring commitments outlined above are implemented in accordance with the ESA and Ontario Regulation 242/08, Section 23.20, it is expected that potential for any impacts to SAR at the Nation Rise Wind Farm will be negligible.

Given the anticipated long life of this Project, anticipated changes in SAR population sizes during that time, and/or advances in turbine or mitigation technology and

techniques, there may be a need to update this plan to reflect the best available scientific information. If there is reason to expect that there is a decreased risk to SAR or a more successful alternate approach, the mitigation measures proposed in this plan may be revised based on the best scientific information available and industry standards, in which case the MECP will be notified of any updates.

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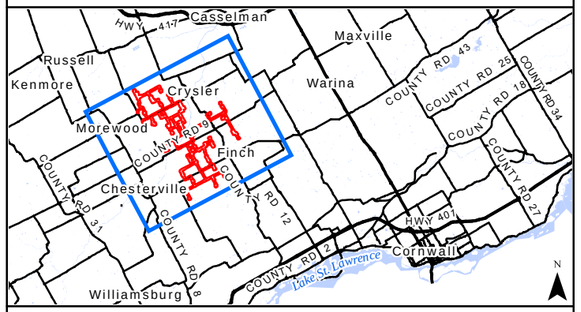
Maps

Map 1

Nation Rise Wind Farm

Project Area



Legend

- Utility Line
- Railway
- Primary Road
- Secondary Road
- Permanent Watercourse (LIO)
- Intermittent Watercourse (LIO)
- Open Water (LIO)
- Provincially Significant Wetland (PSW) (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area (LIO)
- Municipal Boundary
- Proposed Turbine

Project Components

- Proposed Access Road and Collection System
- Proposed Above/Underground Collection System
- Proposed Underground Collection System
- Proposed Turbine Laydown Area, Access Roads, Collection Line
- Proposed Laydown Areas
- Porposed Temporary Turning Radii
- Proposed Temporary Access Road for Construction
- Proposed Crane Path
- Proposed Meteorological Tower Footprint and Access Road
- Proposed Substation

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1756 Date: August 29, 2017	NAD83 - UTM Zone 18 Size: 11x17" **1:68,000**

0 1 2 3 4 Kilometers

N

Path: X:\1756_Nation_Rise_Wind_Project\NRSI_1756_RR_Map1_ProjectArea_70K_2017_08_29_GCS.mxd

If you have any additional questions, please do not hesitate to contact the Permissions and Compliance Section, Species at Risk Branch by email at SAROntario@ontario.ca.

Sincerely,

Jeff Yurek
Minister of the Environment, Conservation and Parks

Enclosure