BEJAMINS MILL WIND PROJECT

Draft Adaptive Management Plan

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Table of Contents

Natural Forces

1 Introduction

Natural Forces Development Limited Partnership (the Proponent) is proposing to develop the Benjamins Mill Wind Project (the Project), which aims to help Nova Scotia achieve its mandated targets for renewable energy production.

The Project consists of up to 28 wind turbines capable of producing up to approximately 150 MW of renewable energy to be constructed, owned, operated and maintained by the Proponent. Access roads, and an overhead collection system that interconnects to the proposed substation, which thereafter connects via a short transmission line to the existing Nova Scotia Power grid will also be included as part of the Project.

Due to the rated capacity of the Project, a provincial Class 1 Environmental Assessment (EA) is required. As part of the EA, the Proponent is proposing an Adaptive Management Plan to address issues that may arise during the post-construction monitoring efforts related to birds and bats at the turbine locations.

The goal of an Adaptive Management Plan is to closely monitor the in-situ impacts of a project once it is in operation.

The Adaptive Management Plan for the Project will be finalized in consultation with Canadian Wildlife Service (CWS) and approved by Nova Scotia Environment and Climate Change (NSECC) and Nova Scotia Natural Resources and Renewables Wildlife Branch (NSNRR) prior to start of the Project's post-construction monitoring.

2 Purpose

The purpose of this Adaptive Management Plan is to provide NSECC with the Proponent's preliminary plan to address the risk of impacts to migrant avian species due to the perceived risk associated with the turbine height proposed.

The Adaptive Management Plan will:

- support science-based management of the Project to ensure wildlife and habitat impacts resulting from the Project are avoided, minimized, or offset;
- improve the understanding of interaction between wind turbines with heights near or over 200 metres and migrant avian species using evidence-based monitoring results in the field; and
- ensure that mitigation measures are implemented as required and that these measures are evaluated and continually improved.

3 Regulatory Framework

Below are the regulatory frameworks which are necessary to consider for the development of an Adaptive Management Plan.

3.1 Environment Act

Nova Scotia's Environmental Assessment Regulations - Environment Act requires all proposed wind projects with a combined design production rating equal to or greater than 2 MW to conduct an Class 1 EIA. As the Project will have a nameplate capacity greater than 2 MW, a Class 1 EIA was required. The EIA has been prepared for the Project in accordance with the Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia (NS Environmental Assessment Branch 2021).

3.2 Migratory Birds Convention Act

As a tall structure, there is a possibility for the Project to impact migratory birds. The Proponent recognizes their responsibility under the Federal *Migratory Birds Convention Act* and the implications should a migratory species be impacted.

Migratory birds and their eggs, nests, and young are protected under the *Migratory Birds Convention Act* (MBCA). Migratory birds protected by the MBCA generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most land birds (birds with principally terrestrial life cycles). The list of species protected by the MBCA can be found at: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/list.html. Bird species not listed may also be protected under other legislation.

Under Section 6 of the *Migratory Birds Regulations* (MBR), it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities.

3.3 Federal Species at Risk Act

The federal Species at Risk Act is meant to prevent wildlife species in Canada from extinction and to provide for the recovery of species that are at risk as a result of human activity. Under the federal SARA the following prohibitions apply to the Project:

No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.

No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual.

3.4 Nova Scotia Endangered Species Act

The purpose of this Act is to prevent wildlife species from being extirpated from the Province, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to conserve species of special concern to prevent them from becoming endangered or threatened. Under the Nova Scotia Endangered Species Act, the following prohibitions apply to the Project:

No person shall

> (a) kill, injure, possess, disturb, take or interfere with or attempt to kill, injure, possess, disturb, take or interfere with an endangered or threatened species or any part or product thereof;
>
> (b) possess for sale, offer for sale, sell, buy, trade or barter an endangered or threatened species or any part or product thereof;
>
> (c) destroy, disturb or interfere with or attempt to destroy, disturb or interfere with the specific dwelling place or area occupied or habitually occupied by one or more individuals or populations of an endangered or threatened species, including the nest, nest shelter, hibernaculum or den of an endangered or threatened species;

3.5 Wildlife Act

The Wildlife Act provides protection to all wildlife including any vertebrate animal or bird or any hybrid offspring of a vertebrate animal or bird, excluding fish and the hybrid offspring of fish, of any species of vertebrate animal or bird that is usually wild by nature in the Province, whether or not the vertebrate animal or bird is bred or reared in captivity.

This Act also applies to all hunting and angling. No employee or contractor for the Project will be permitted to hunt on the project lands during construction. Following the and Wildlife Act regulations, appropriate “No Hunting” signs will be posted during construction for worker safety.

4 Adaptive Management

The Saskatchewan Adaptive Management Guidelines for Wind Energy Projects (MOE, 2018) defines adaptive management as a systematic science-based process intended to improve policies and practices by learning from the outcome of management decisions and to reduce scientific uncertainty. It further allows for adaptability in monitoring, management actions

based on observed outcomes, and utilizes feedback from assessment of project design and operation.

The wind industry has advanced in recent years with onshore wind turbines growing larger with current blade tips reaching up to 205m. Though literature on altitudinal distribution of migratory species (Mabee, 2006) demonstrates that an increased risk to migratory birds is not expected as turbines increase from 100m to 150m and up to ~200m, this Adaptive Management Plan outlines the monitoring, consultation, and mitigation that will be implemented based on the observed impact. This plan will ensure that there is an increase level of effort in management of potential impacts through mitigation and offset approaches appropriate to impacts detected on site. This in turn will provide additional certainty that impacts beyond those predicted through the EIA process will be assessed and addressed for the Project which proposes to use a turbine with a maximum height of 205 m.

As stated in the Wind Turbines and Birds - A Guidance Document for Environmental Assessment (CWS, 2006), "adopting an adaptive management approach and reporting on the successes and the failures of certain methods will help guide future research and development in wind energy." The Proponent acknowledges that wind energy is a growing and evolving field where research is constantly being conducted. This program will monitor any new literature on the topic and will aim to implement updates to technologies, methodologies and understandings of the effects of wind projects.

4.1 Management guidelines

This proposed plan demonstrates a tiered approach and should an impact be observed, some form of assessment and mitigation will be required based on the severity of impact. As an adaptive management plan is meant to be flexible to adapt to the situation at hand, all scenarios in which impacts are observed will be reported and further consultation will provide an additional safeguard to arrange for the implementation of the appropriate mitigation measures if required.

4.2 Management response

Avoidance

The first step in adaptive management is to implement measures that will help to avoid impacts which can be effectively accomplished within the initial site finding phase of project development. Throughout the development phase of the Project the following measures have been implemented to avoid impacts on migratory species:

- Siting the Project away from Important Bird Areas (The nearest Important Bird Area is at least 3.9 km away from all proposed WTGs)
- Situating the project on previously disturbed lands;

- Siting turbines at least 30 m from wetlands and watercourses;
- Avoiding wetland disturbance with transmission line poles and,
- Micro-siting all infrastructure away from observed species at risk and potential species at risk (SAR) habitats, where feasible.

Mitigation

If impacts to migratory species due to the turbine cannot be avoided, the second step in adaptive management is mitigation. Mitigation measures can be implemented during the construction and operation phase of the Project which have been found to effectively reduce impacts. The mitigation measures proposed throughout the EIA process that will be implemented for the Project include the following:

- Reducing the footprint of the Project through selection of a turbine model, that can produce more energy thus reducing the number of turbines on site;
- Using the minimum amount of pilot warning and obstruction avoidance lighting as determined by Transport Canada;
- Using lights with short flash durations and ability to emit no light during the "off phase" of the flash;
- Using lights that operate at the minimum intensity and minimum frequency allowable by Transport Canada;
- Ensuring maintenance protocols instruct workers to turn off all work lights upon leaving the site; and
- Minimizing potential interaction with ground nesting species by revegetating the project area either naturally occurring or using native local vegetation, where possible.

As the Project becomes operational, and post-construction monitoring is conducted to determine impacts, additional mitigation may be required. There are several mitigation measures that can be implemented during operation to support efforts to reduce unanticipated mortalities. The Proponent is proposing to use the tiered adaptive management approach to address unanticipated impacts, however the Proponent will consult with NSECC and further Regulators to determine the most appropriate response when an unanticipated mortality event occurs on site. Outlined below are the proposed management responses. Management responses can be adapted after a single spring or fall monitoring event, season or after the full year. NSECC and CWS will be notified within 24 hours should a mortality event occur, and a formal report following each year of monitoring will be prepared and shared with aforementioned regulators. A mortality event refers to the mortality of an individual migratory SAR bird or 10 or more migratory birds in one night.

Tier 1 Management Response

The management response for Tier 1 will include the typical post-construction mortality monitoring as outlined in the EIA and discussed with NSECC. Generally, this includes two years of post-construction carcass searches. If continued observance over these two years shows low impacts, reduced monitoring or no additional monitoring may be implemented.

Tier 2 Management Response

If impacts are observed during any post-construction monitoring period, further consultation with NSECC and CWS will occur to determine the appropriate response. Tier 2 management response includes passive mitigation measures. The mitigation implemented at Tier 2 will provide additional information on the potential cause of impact. The level of effort, based on the observed impact, will be further determined with NSECC and CWS. Some measures proposed for this tier include the following:

- Cause and effect analysis;
- Extended monitoring program; and
- Increased reporting frequency.

Tier 3 Management Response

If, during any post-construction monitoring period, impacts are observed that are considered significant after further consultation with CWS, additional active mitigation will be implemented. The level of effort and mitigation approaches will be determined based on the observed impact and in consultation with NSECC and CWS. Mitigation measures proposed for this tier include the measures from Tier 2 described previously and may include the following should they be deemed necessary through consultation with appropriate bodies:

- Blade feathering; and
- Extended monitoring program to determine mitigation procedures and their effectiveness.

5 Draft Post-Construction Monitoring and Reporting

The proposed protocols outlined below will be finalized in consultation with NSECC and CWS for approval prior to being implemented. As mentioned in Section 4, the Proponent will consult with regulators to implement updates to methodology based on most up-to-date research when in the operational phase.

As there are no province-specific guidelines for Nova Scotia, mortality surveys will be designed in consultation with NSECC and CWS, and will be conducted according to the protocols set out by New Brunswick Post Construction Bat and Bird Mortality Survey Guidelines for Wind Farm Development (2011). Scavenger rates and searcher efficiency trials will also be implemented according to the recommended protocols. A request for a scientific collection permit will be submitted to appropriate regulatory bodies prior to the commencement of the surveys.

Carcass Searches

The following schedule and search effort for bird and bat carcass searches have been established following New Brunswick Post Construction Bat and Bird Mortality Survey Guidelines for Wind Farm Development (2011):

- Three times a week (Monday, Wednesday, Friday) from March 31st – October 31st

An intensive survey area, or grid, of the maximum extent of the cleared area surrounding the turbine. The grid will be divided into a series of transects, spaced approximately five-meters apart, starting at the centre of the grid. In total, the grid will be divided into a minimum of 21 transects depending on the cleared area surrounding the turbine. Transects will be marked on each end with pin flags, of alternating color, and tracked with a GPS for simple and accurate repetition of surveys.

During each carcass search, all relevant information such as wind direction and other weather-related factors (fog, snow, etc.) will be recorded. In addition to weather related factors, the search area, date, and search time for the turbine will be recorded. Furthermore, for every carcass found, the following information will be recorded:

- Project Name and Location;
- A unique carcass identification number;
- Turbine/met tower or reference plot number;
- Observer;
- Date and time collected;
- Species;
- Sex;
- Age class;
- Habitat type surrounding the turbine location;
- Distance to and identity of other nearby structures (i.e. fence, power-line, substation);

- Distance from observer at time of detection; and
- Carcass condition and any comments indicating the suspected cause of mortality.

Carcasses will be collected and kept frozen until the appropriate disposal method is determined by NSDRR. If required, they will be transferred to the appropriate research entity for authentication and retention.

Scavenger Trials

Carcass removal rates by scavengers will be assessed during carcass searches in each season. In each season, carcasses will be placed in the grid and surrounding vicinity for scavenger trials. Some carcasses may be placed on access roads, to reduce the effect of artificial supplementation of scavengers, which has been shown to increase scavenger activity. Carcasses used for scavenger trials will include small chicks or appropriate surrogate carcasses that are spotted or darker in colour.

Carcasses will be laid out in the grid and coordinates recorded. Carcasses will be placed before daylight, using gloves, and will be thawed. Carcasses will be discreetly marked with a unique identification number and assessed for persistence over various intervals (typically persistence is checked during the 4 carcass searches following placement). Carcasses will be randomly distributed on the turbine grid and associated access road. Each trial will include 20 carcasses distributed across a range of habitats. If scavenger rates approach 60% during the scavenger removal trials, the Proponent will consult with NSDNRR to determine whether carcass surveys should be continued or modified, as very high scavenger activity can bias the results of mortality surveys.

Results from the carcass removal trials will be used to calculate an overall scavenger correction factor. The scavenger correction factor will combine data from each seasonal scavenger trial to calculate an overall scavenger correction factor for the year. In addition, scavenger correction factors will be calculated for each season to help in discussion of seasonal effects of scavenger rates.

Searcher Efficiency Trials

Carcasses will be placed at random locations within the search area to test searcher efficiency. Carcasses will be placed by a 'tester' unknown to the searcher and the location of each carcass will be recorded to retrieve the carcass should it not be found by the searcher. At least 20 trial carcasses will be distributed across substrates and habitat types. The searcher efficiency trials will be completed throughout the carcass searching program (once every season: spring, summer, and fall) for all searchers involved in the carcass searching program. Carcasses used for searcher efficiency trials will include small chicks or suitable surrogates that are spotted or darker in colour. All carcasses used in searcher efficiency trials will be discretely marked to ensure that the searcher was aware that the carcass was part of the searcher efficiency trial,

rather than a collision victim. Carcasses will be marked with a rubber band or twist-tie wrapped around a foot.

- Any carcasses that are not found will be retrieved immediately after the search to determine whether they were scavenged or overlooked. Data recorded for each bird placed will include:
- Date, time and location it was placed, along with the species name;
- Date and time it was searched for; and,
- Whether it was found, overlooked or scavenged, along with the name of the searcher.

Reporting and Communication

Natural Forces Development Limited Partnership will stay in regular contact with the assigned contacts at NSECC and NSNRR.

After each spring and fall monitoring period, the Proponent will provide an email update on the results of the monitoring and any impact observed to NSECC to forward onto applicable Regulators such as NSNRR and CWS. Though an update will be provided after each monitoring period, should a significant mortality event occur, NSECC will be notified within 24 hours.

In additional to seasonal updates, a formal annual report will be prepared by the third-party consultant conducting post-construction monitoring. This report will include the methods (to be approved by NSECC and CWS), monitoring results, and recommendations from the Spring and Fall monitoring period and will include all applicable correction factors to determine accurate impacts related to the Project operation. Consultation with NSECC, NSNRR, and CWS will be ongoing throughout the post-construction monitoring period and additional updates can also be provided upon request.

6 Closure

This Adaptive Management Plan is being proposed for the Project. Natural Forces Development Limited Partnership is proposing this Plan to closely monitoring the in-situ impacts of the proposed turbines which will reach a maximum height of 205m.

The approach presented in this Plan has been adapted from the Saskatchewan (2018) *Adaptive Management Guidelines for Saskatchewan Wind Energy Projects*. This adaptive management approach has been implemented in western jurisdictions as a solution to monitor the observed impacts from taller turbines.

The EIA conducted for the Project anticipates low impact to avian species. However, should there be unanticipated impacts, this Plan will ensure that an increase level of effort in

mitigation and offset approaches appropriate to the impacts detected on site are implemented. This in turn will provide additional certainty that impacts beyond those predicted through the EIA process will be assessed and mitigated for the Project.

The final Adaptive Management Plan will be developed in consultation with CWS and approved by NSECC prior to the Project's commissioning date.

7 References

CWS (2006) Wind turbines and birds: A guidance document for environmental assessment.

CWS (2007) Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds

Erickson, W.P. et al., (2014) A comprehensive analysis of small-passerine fatalities from collision with turbines at wind energy facilities. PLoS ONE 9:e107491.

Mabee et al. (2006) Nocturnal Bird Migration Over an Appalachian Ridge at a Proposed Wind Power Project. Wildlife Society Bulletin 34: 682-690

New Brunswick Department of Natural Resources and Energy Development (2011) Post Construction Nat and Bird Mortality Survey Guidelines for Wind Farm Development in New Brunswick.

Nova Scotia Environmental Assessment Branch (2021) Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia.

Saskatchewan Ministry of Environment (2018) Adaptive Management Guidelines for Saskatchewan Wind Energy Projects.

Zimmerling, J. et al. (2013) Canadian estimate of bird mortality due to collisions and direct habitat loss associated with wind turbine developments. Avian Conservation and Ecology 8(2): 10.