

**Stantec**

**GRAND RENEWABLE ENERGY PARK  
DESIGN AND OPERATIONS REPORT**

## **Attachment C**

### **Environmental Effects Monitoring Plan for Wildlife and Wildlife Habitat**





**Stantec**

**GRAND RENEWABLE ENERGY PARK  
ENVIRONMENTAL EFFECTS  
MONITORING PLAN FOR WILDLIFE AND  
WILDLIFE HABITAT**

**DRAFT**

File No. 161010624/161010646  
July 2011

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## **1.0 Introduction**

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Samsung C&T (Samsung), Korea Power Electric Corporation (KEPCO), and Pattern Energy (Pattern) plan to build and operate the world's largest renewable energy cluster in Southern Ontario (Ontario Alternative Energy Cluster). Stantec Consulting Ltd. (Stantec) was retained by Samsung, Pattern and KEPCO (herein referred to as "SPK") to prepare a Natural Heritage Assessment (NHA) and Environmental Impact Study (EIS) for the proposed Grand Renewable Energy Park (the Project) (Stantec, 2011).

This Environmental Effects Monitoring Program for Wildlife and Wildlife Habitats has been prepared to outline the detailed post-construction monitoring program as it relates to direct and indirect (disturbance) effects to wildlife and wildlife habitat during construction and operation of the Project. This document also outlines performance objectives and contingency measures for adaptive management related to wildlife and wildlife habitats.

The potential environmental effects to wildlife and wildlife habitat and recommended mitigation measures, based upon this dataset, ornithological advice, and professional opinion, are set out in Section 6 of the NHA/EIS. Additionally, wildlife and wildlife habitat post-construction monitoring commitments are summarized in Tables 6.1 and 6.2, Appendix B of the NHA/EIS and are elaborated on in this document.

The purpose of this EEMP is to assess the effectiveness of the proposed mitigation measures in consideration of applicable provincial regulations and guidelines. The EEMP also provides a response and contingency plan if these criteria and standards are not met. The monitoring plan summarized in this EEMP provides details on the post-construction wildlife monitoring program for:

1. mortality of breeding birds, migratory land birds, migratory raptors (fall) and bats; and
2. the effects of disturbance on breeding birds, migratory landbirds and woodland and wetland hydrology.

Monitoring will confirm the accuracy of the impact assessments summarized in the NHA/EIS and will provide a factual foundation and basis for the implementation of the response and contingency plan described in this EEMP.

### **1.1 PURPOSE AND TIMING**

The purpose of the wildlife post-construction monitoring program is to identify performance objectives, assess the effectiveness of the proposed mitigation measures and to identify contingency measures that will be implemented if performance objectives cannot be met. Furthermore, any unanticipated potentially significant adverse environmental effects discovered

during the post-construction monitoring program will be mitigated as described in **Section 2.2** and **3.2**. Post-construction monitoring for wildlife and wildlife habitat includes the following:

### **1.1.1 Mortality Monitoring**

Details with respect to mortality monitoring are described in **Section 2.0**, but generally include:

- *mortality monitoring (Wind Project)*: Twice weekly (3-4 day intervals) mortality monitoring of birds and bats at 30% (21 of 67) of the wind turbines from May 1 to October 31, and weekly monitoring for raptors during November, for a period of three years. Searcher efficiency and scavenger trials will be conducted each year according to current guidance documents. All turbines will be monitored once per month during the period May-November for evidence of raptor fatalities.

### **1.1.2 Disturbance Monitoring**

Details with respect to disturbance monitoring are described in **Section 3.0**, but generally include:

- *potential disturbance effects to woodland breeding birds survey (Wind, Solar, Transmission Projects)*: Point counts will be established within 120 m of the wind, solar and transmission project locations and monitored twice in June, annually for three years (one year pre-construction, two years post-construction). Breeding pair density is a standard measure that can be compared among years or between control/impact sites.
- *potential disturbance effects to migratory birds survey (Wind Project)*: Surveys will be conducted to assess use of the Project area by spring and fall migrating landbirds. The number of species and the number of individual migratory landbirds will be monitored across a transect through a variety of habitats and compared to pre-construction conditions, two days per week from early April through end of May and from mid-August through end of October, for a period of three years (one year pre-construction, two years post-construction).
- *potential disturbance effects to wetland and woodland hydrology (Wind, Solar, Transmission Projects)*: During construction, surveys will be conducted weekly in and adjacent to work areas to visually assess hydrological conditions. Hydrological conditions will be monitored once seasonally in each of spring and summer during the first year of post-construction.

## **2.0 Mortality Monitoring**

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The information contained within this Section is intended to address the requirements of s. 23 of O. Reg. 359/09 with respect to bird and bat mortality monitoring.

### **2.1 PRIMARY DATA COLLECTION**

Data collection will be conducted by field personnel skilled at identifying birds by song and sight and bats by sight. To the extent possible, the same field personnel who carried out the pre-construction baseline studies will carry out the post-construction monitoring works to assist in standardizing the datasets.

The detailed monitoring methods, including duration, frequency and survey locations are discussed below.

#### **2.1.1 Bird Mortality Monitoring**

##### *Background*

Draft *Bird and Bird Habitats: Guidelines for Wind Power Projects* were released by the MNR in October, 2010, and have been considered during the preparation of this monitoring plan (MNR, 2010a).

##### *Monitoring*

Mortality monitoring within minimally-vegetated portions (i.e., Visibility Classes 1 and 2 [MNR, 2010a]) of a 50 m search area radius from the base of 30% (21 of 67) wind turbines will be conducted twice-weekly (3-4 day intervals) between May 1 and October 31. Weekly mortality surveys will be conducted at 21 turbines in November to assess raptor mortality. Additionally, all turbines will be monitored once each month between May and November for evidence of raptor fatalities.

Although all reasonable efforts will be made to conduct surveys as scheduled, surveys will not be conducted if weather (e.g. lightning, severe fog) presents safety concerns. Weather conditions will be noted when surveys were not conducted as scheduled, and every attempt will be made to complete the missed survey(s) as soon as possible.

Searcher efficiency and scavenger trials will be conducted in accordance with current MNR guidelines. Searcher efficiency trials will typically be conducted once in each of spring, summer and fall, but will be repeated if searchers change during the year. Searcher efficiency trials are designed to correct for carcasses that may be overlooked by surveyors during the survey periods. Searcher efficiency trials involve a “tester” that places bird and bat carcasses under turbines prior to the standard carcass searches to test the searcher’s detection rate. Trial

carcasses will be discreetly marked so they can be identified as study carcasses. Each trial will consist of a minimum of 10 carcasses per searcher per visibility class (20 test carcasses per searcher). Searcher efficiency ( $Se$ ) is calculated for each searcher as follows:

$$Se = \frac{\text{number of test carcasses found}}{\text{number of test carcasses placed} - \text{number of test carcasses scavenged}}$$

Scavenger trials will be conducted once a month (May-Oct) and will involve 20 carcasses of bird and bat turbine fatalities, if available, or dark-coloured poultry chicks. If available, at least one raptor carcass will be used for some trials. Carcasses will be discreetly marked so they can be identified as study carcasses. Scavenger trials are designed to correct for carcasses that are removed by predators before the search period. These trials involve the distribution of carcasses in habitat types being searched, at known locations at each wind turbine generator, followed by periodic checking (every 3 to 4 days) to determine the rate of removal. The species used for these trials, location, site conditions (i.e. visibility class) and weather conditions during the carcass surveys will be recorded. Proportions of carcasses remaining after each search interval are pooled to calculate the overall scavenger correction factors:

$$Sc = \frac{n_{\text{visit1}} + n_{\text{visit2}} + n_{\text{visit3}} + n_{\text{visit4}}}{n_{\text{visit0}} + n_{\text{visit1}} + n_{\text{visit2}} + n_{\text{visit3}}}, \text{ where}$$

**Sc** is the proportion of carcasses not removed by scavengers over the search period

$n_{\text{visit0}}$  is the total number of carcasses placed

$n_{\text{visit1}} - n_{\text{visit4}}$  are the numbers of carcasses remaining on visits 1 through 4

There are numerous published and unpublished approaches to incorporating these corrective factors into an overall assessment of total bird and bat mortality. The estimated mortality will be calculated as follows:

$$C = c / (Se \times Sc \times Ps), \text{ where}$$

**C** is the corrected number of bird or bat fatalities

**c** is the number of carcasses found

**Se** is the proportion of carcasses expected to be found by searchers (searcher efficiency)

**Sc** is the proportion of carcasses not removed by scavengers over the search period

**Ps** is the percent of the area searched.

Most birds and bats will fall within 50 m of the turbine base (MNR, 2010a). This value will be used to determine the percent of area searched ( $Ps$ ). When the entire 50 m radius search area is searched,  $Ps$  will equal 100%. If portions of the 50 m radius search area are impossible or

futile to search due to site conditions such as standing water or dense vegetation, Ps will be adjusted accordingly based on the searchers' ongoing estimates of the proportion of the search area that was physically searched. An alternative option is to use a GPS to delineate the search area and calculate the Ps.

The area searched will be determined for each turbine by mapping searchable areas on a grid (by visibility class) and counting the number of searched grid cells within 50 m. Maps of the varying search areas will be made available to review agencies. The summed area of those cells will be divided by the total area within a 50 m radius circle to determine the percent area searched for that turbine ( $Ps_x$ , where x is the turbine number).

$$Ps_x = \frac{\text{area searched within 50 m radius circle}}{7854 \text{ m}^2}$$

The overall Ps for the facility will be calculated as the average of  $Ps_1$  through  $Ps_{21}$ .

Observed fatalities will be photographed, and the species, GPS coordinates, substrate, carcass conditions (i.e. injuries), sex (where feasible) and distance and direction to the nearest turbine will be recorded along with the date, time and searcher. This approach to mortality monitoring will facilitate any potential correlation between mortality occurrences, turbine location, habitat/land use features, and season.

Bird carcasses in good condition may be collected and stored in a freezer for future use in searcher efficiency and/or scavenger removal trials. Persons handling bird carcasses will take reasonable precautions (e.g. gloves, tools etc.) to protect their personal health. Bird carcasses will be placed in heavy-duty plastic bags and transported that day to a freezer, where they will be stored until required for the trials. Carcasses of any species covered under the *Endangered Species Act, 2007* ("ESA") or the federal *Species at Risk Act* ("SARA") will be collected in a manner consistent with the conditions of applicable permits (see below). All other bird carcasses will be left in place and noted to avoid double-counting during future searches.

As of 30 June 2008, species that are extirpated, endangered, or threatened are protected under the ESA. Consequently, unless otherwise authorized, possession and transport of species at risk is prohibited under the ESA. Therefore, in order to carry out the various activities contemplated in this Plan, a permit under clause 17(2)(b) of the ESA is necessary to allow SPK and its agents to collect, possess, and transport species at risk as obtained from the Project Location. Any conditions attached to the permit relating to handling of injured birds, including raptors and species at risk, will be adhered to.

Additionally, in support of the activities contemplated in this Plan, SPK or its agents will apply for a scientific collector's permit under the *Fish and Wildlife Conservation Act* ("FWCA") from the MNR that would allow SPK and its agents to possess and transport a species protected by this legislation.

Finally, SPK or its agents will apply to Environment Canada (Canadian Wildlife Service) for a scientific collector's permit under the *Migratory Bird Convention Act, 1994* ("MBCA") that would allow SPK and its agents to collect, possess, and to utilize for scientific research purposes, deceased specimens of migratory birds obtained from the Project Location.

Other permits, approvals, and authorizations are not likely to be required from the MNR or Environment Canada to permit the monitoring activities contemplated in this Plan.

### **2.1.2 Bat Mortality Monitoring**

#### *Background*

Bat mortality has been documented at wind power facilities in a variety of habitats across North America. Nearly every monitored wind power facility in the United States and Canada has reported bat mortality with minimum annual mortality varying from < 1 to 50 bat fatalities/turbine/year (MNR, 2006). The majority of bat fatalities at wind power facilities occur in the late summer and fall, and the long-distance migratory bats (i.e., hoary bat, eastern red bat, silver-haired bat) appear to be most vulnerable to collisions with moving turbine blades. Specific factors causing bat mortality and affecting species vulnerability to wind turbine mortality remain unclear, although recent evidence from Alberta suggests that air pressure differences in the blade vortices may contribute to bat mortality. Ontario specific data is relatively sparse at this time.

#### *Monitoring*

Bat mortality monitoring will be conducted according to MNR's *Bats and Bat Habitats: Guidelines for Wind Power Projects* (2010b). In general, the mortality monitoring requirements for bats will be captured in conjunction with bird mortality monitoring (described above).

- Bat mortality monitoring will be conducted twice-weekly (3-4 day intervals) within minimally-vegetated portions (i.e., Visibility Classes 1 and 2 [MNR, 2010b]) of a 50 m search area radius from the base of 30% (21 of 67) wind turbines between May 1 and September 30 for a three-year period in accordance with MNR guidelines. This time period includes the core season when resident and migratory bats are active. Bat mortality monitoring will be conducted in conjunction with other monitoring activities (birds) for efficiency.
- Searcher efficiency trials will be conducted seasonally and carcass removal trials will be conducted monthly between May 1 and September 30. Searcher efficiency and carcass removal rates are known to be more variable for bats than for birds throughout the year and depending on habitat (in part due to the relative size of the species).

As with birds, trial carcasses will be discreetly marked so they can be identified as study carcasses. Each trial will consist of a minimum of 10 carcasses per searcher per visibility class

(for searcher efficiency trials) or 20 carcasses per trial (for scavenger removal trials). When available, at least one-third of the trial carcasses should be bats.

Bat carcasses in good condition may be collected and stored in a freezer for future use in searcher efficiency and/or scavenger removal trials. Persons handling bat carcasses will take reasonable precautions (e.g., gloves, tools etc.) to protect their personal health. Biological material will be disposed of in a way to ensure that it does not pose a public or environmental health risk and in accordance with any applicable federal, provincial, and municipal laws.

## **2.2 ADAPTIVE MANAGEMENT PROGRAM**

The adaptive management program described in this section outlines performance objectives, and contingency measures that will be implemented should the performance objectives not be met. Contingency measures may include an adaptive management approach that allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed. Potentially significant adverse effects will be assessed through review of the annual report.

The following sections describe the procedures for notifications, reporting, and adaptive management for mortality monitoring.

All bird and bat mortality will be reported in the annual report submission. Mortality rate is expressed as the number of fatalities per turbine per year (e.g. from May 1 to November 30). Mortality of priority species in Bird Conservation Region (“BCR”) 13 and mortality of all species of conservation concern, such as raptors and declining grassland/agricultural species, will be highlighted in the annual post-construction monitoring reports. A threshold approach will be used to identify and mitigate potential negative effects resulting from the operation of wind turbines.

### **2.2.1 Birds**

Post-construction mitigation, including operational controls, will be considered if annual mortality of birds exceeds the following thresholds defined by the MNR (2010a):

- 18 birds/ turbine/year at individual turbines or turbine groups;
- 0.2 raptors or vultures/turbine/year or 0.1 raptors of provincial conservation concern/turbine/year across the wind power project

Or if bird mortality during a single mortality monitoring survey exceeds:

- 10 or more birds at any one turbine; or
- 33 or more birds (including raptors) at multiple turbines

Any and all mortality of species at risk (i.e., a species listed as Endangered, Threatened or Special Concern under Schedule 1 of the federal Species at Risk Act or a species listed on the Species at Risk in Ontario list as Extirpated, Endangered, Threatened, or Special Concern under the provincial Endangered Species Act, 2007) that occurs will be reported immediately to the MNR.

If with due consideration of seasonal abundance and species composition, annual mortality levels exceed the thresholds noted above, the MNR will be engaged to initiate an appropriate response plan as set out in the MNR's Bird Guidelines (2010a), which may include some or all of the following mitigation measures (or alternate plan reasonably agreed to between SPK and the MNR<sup>1</sup>):

- Increased reporting frequency to identify potential threshold exceedance in a timely way
- Additional behavioural studies to determine factors affecting mortality rates
- Periodic shut-down of select turbines (MNR, 2010a)
- Blade feathering at specific times of year (MNR, 2010a)

Subsequent post-construction mortality and effects monitoring should be conducted for two years at individual turbines (and unmonitored turbines in near proximity) where significant bird or raptor annual mortality is identified (MNR, 2010a). Effectiveness monitoring at individual turbines should be conducted for three years where mitigation has been implemented (MNR, 2010a).

### **2.2.2 Bats**

Operational mitigation is required where annual post-construction mortality monitoring exceeds 10 bats per turbine per year (MNR, 2010b).

Operational mitigation to be implemented includes increasing cut-in speed to 5.5 m/s or feathering wind turbine blades when wind speeds are below 5.5 m/s between sunset and sunrise, from July 15 to September 30, as set out in the MNR's Bat Guidelines (2010b).

Where a post-construction monitoring annual report indicates the annual bat mortality threshold of 10 bats per turbine per year has been exceeded, operational monitoring will be implemented from sunset to sunrise, from July 15 to September 30 for the duration of the project (MNR, 2010b).

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<sup>1</sup> An alternate plan maintains flexibility within the Plan to consider alternative response ideas that may arise over the course of the Plan (e.g., changes in technology).

## **2.3 REPORTING AND REVIEW OF RESULTS**

Annual post-construction monitoring reports will summarize and analyze the results of all wildlife surveys. Reports will be submitted to the MOE within three months of the conclusion of the October mortality monitoring. All pre- and post-construction data, collected in accordance with MNR guidance and reported to MOE, will be made available for entry into the joint Canadian Wildlife Service – Canadian Wind Energy Association – Bird Studies Canada – Ontario Ministry of Natural Resources Wind Power and Birds Monitoring Database.

The monitoring program will be reassessed by MNR and SPK at the end of each monitoring year. Pending the reassessment results, the program methods, frequencies, and duration may be reasonably modified to better reflect the findings.

## **2.4 BEST MANAGEMENT PRACTICES**

SPK will include the following best management practices as part of the post-construction monitoring program (as outlined in MNR, 2010b).

### **2.4.1 White-nose Syndrome**

Carcasses of the following species found during bat mortality searches may be sent to the Canadian Cooperative Wildlife Health Centre for analysis of White-nose Syndrome and should not be used in carcass removal or searcher efficiency trials.

- *Myotis septentrionalis*
- *Myotis lucifugus*
- *Myotis leibii*
- *Perimyotis subflavus*
- *Eptesicus fuscus*

### **2.4.2 Bat Tissue Samples**

Tissue samples from bat carcasses may be used in a number of DNA analyses to provide insight into population size and structure, as well as the geographic origin migrants. SPK will contact the local MNR office prior to disposing bat carcasses, to determine if this type of research is occurring in the area.

## **3.0 Disturbance Monitoring**

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The information contained within this Section is intended to address the requirements of s. 38 of O. Reg. 359/09 with respect to disturbance effects on wildlife, wildlife habitat and wetland and woodland hydrology as outlined in Section 6.4 of the Natural Heritage Assessment and Environmental Impact Study.

### **3.1 PRIMARY DATA COLLECTION**

Data collection will be conducted by field personnel skilled at identifying birds by song and sight. To the extent possible, the same field personnel who carried out the pre-construction baseline studies will carry out the post-construction monitoring works to assist in standardizing the datasets.

The detailed monitoring methods, including duration, frequency and survey locations are discussed below.

#### **3.1.1 Woodland Breeding Birds**

##### *Background*

Wooded habitats located in, and adjacent to, the Wind, Solar and Transmission Project Locations support ten area-sensitive breeding forest bird species (Hairy Woodpecker, White-breasted Nuthatch, Veery, Ovenbird, Scarlet Tanager, Sharp-shinned Hawk, American Redstart, Cooper's Hawk, Pileated Woodpecker and Least Flycatcher) and four breeding forest bird species (Northern Flicker, Eastern Wood-Pewee, Wood Thrush, Rose-breasted Grosbeak) that have been identified as priority species by Ontario Partners in Flight (PIF) (NHA/EIS, Section 4.3.4.3, 4.4.4.3, 4.5.4.3).

Turbine 53 and its associated access road and collector line are proposed within significant habitat for declining woodland bird species (Feature 42). As such, a post-construction point count-based study will be implemented to identify and assess any actual disturbance effects to the declining woodland species in this Feature during breeding.

##### *Monitoring*

Post-construction point count surveys will be completed at the same locations within Feature 42 as were completed during pre-construction monitoring in 2010, providing technical and statistical validity to assess disturbance effects.

Each of the surveys will include a ten-minute point count at each location and each point will be surveyed twice in June, during the peak of the breeding season, for a minimum of three years

(one year pre-construction, two years post-construction). Surveys will be conducted at the times of day and under the weather conditions outlined in the MNR's guidance document (2010a).

The number of woodland species of conservation concern observed will be compared to pre-construction conditions. Particular attention will be paid to dominant species or those species identified as priority species that breed consistently or in high numbers on the site. For individual species, breeding pair density is a standard measure that will be used to compare among years.

MNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if an ecologically significant disturbance/avoidance effect is occurring, and whether such an effect is attributable to the Wind, Solar or Transmission Projects and not external factors. These discussions will determine if and when contingency measures will be undertaken. The best available science and information should be considered when determining appropriate mitigation.

### **3.1.2 Migratory Landbird Surveys**

#### *Background*

Woodlands adjacent to the Great Lakes shoreline can serve as important stopover locations for migrating landbirds. In consideration of the proximity of various woodlands to the shoreline of Lake Erie, it was determined that the site supports significant wildlife habitat in the form of seasonal concentration areas (migratory landbird stopover areas) (NHA/EIS, Section 5.2.5.1). Pre-construction and post-construction transect surveys will be implemented to assess any actual disturbance effects to migratory landbirds.

#### Monitoring

A minimum of 6 transect survey routes for migrating landbirds will be conducted within the 4 significant migratory bird stopover areas located within 120 m of a wind turbine, including Features 42, 66, 68 and 69. The route locations and survey methods will be the same as during pre- and post-construction, providing technical and statistical validity to assess disturbance effects. Surveys begin half an hour after sunrise and continue for approximately two hours. The number of individuals of each species observed on the surveys is recorded and the results will be compared to pre-construction data. The surveys will be conducted on two days per week in spring (early April through end of May) and fall (mid-August through end of October) for a minimum of three years (1 year pre-construction and 2 years post-construction).

MNR, along with the proponent and other relevant agencies, will be asked to collectively review the results of the post-construction monitoring to determine if an ecologically significant disturbance/avoidance effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when the contingency

plan will be implemented and if any additional measures are warranted. The best available science and information will be considered when determining appropriate mitigation.

### **3.1.3 Wetland and Woodland Hydrology**

#### *Background - Wetlands*

All components of the Wind Project are sited outside wetland boundaries; therefore there will be no direct loss of wetland habitat or function. Potential indirect effects may arise through changes to wetland hydrology during or after construction.

Indirect impacts resulting from construction activities, such as disturbance to wildlife, dust generation, sedimentation and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During construction, there will be increased traffic and the potential for accidental spills.

#### *Background - Woodlands*

Where components of the Wind Project are sited outside significant woodlands, there will be no direct loss or fragmentation of habitat or habitat function. Potential indirect effects may arise through changes to hydrology during or after construction. Where components are sited inside a significant woodland, hydrologic function may be adversely affected.

Indirect and direct impacts resulting from construction activities, such as disturbance to wildlife, dust generation, sedimentation and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During construction, there will be increased traffic and the potential for accidental spills.

#### *Monitoring*

Any changes to hydrological conditions in wetlands and significant woodlands located within 120 m of the Project Location will be determined through weekly visual inspection during construction, and once seasonally in spring and summer the first year post-construction.

## **3.2 ADAPTIVE MANAGEMENT PROGRAM**

The adaptive management program described in this section outlines performance objectives, and contingency measures that will be implemented should the performance objectives not be met. Contingency measures may include an adaptive management approach that allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed. Potentially significant adverse effects will be assessed through review of the annual report.

The following sections describe the procedures for notifications, reporting, and adaptive management disturbance effects monitoring.

All disturbance to bird use and impacts on wetland and woodland hydrology will be reported in the annual report submission. Disturbance is expressed as a change in the species diversity and abundance observed using the habitats adjacent the project components each year. Disturbance to priority species in Bird Conservation Region (“BCR”) 13 and disturbance of all species of conservation concern, such as declining woodland species, will be highlighted in the annual post-construction monitoring reports. A threshold approach will be used to identify and mitigate potential negative effects resulting from the operation of wind turbines.

### **3.2.1 Wildlife**

SPK and the MNR will review the post-construction monitoring results to determine if an ecologically significant effect on breeding birds is occurring, and whether such effect is attributed to the wind turbines and not external factors.

Should the performance objectives not be met, there are a number of contingency measures that may be implemented:

- Compare declines to population trends noted through province or continent-wide breeding bird surveys
- Develop additional paired point count study and/or control/impact study to confirm that decline is due to turbine disturbance, and determine extent of disturbance effect
- Investigate habitat management means to increase breeding density
- Additional post-construction monitoring and/or mitigation may be required where post-construction monitoring identifies ecologically significant disturbance effects.

Discussions will determine whether mitigation is required to replace the habitat lost through displacement, and could include, for example:

- Expanding survey to adjacent areas (e.g., to determine if the effects are localized)
- Mitigation banking, land donation, or conservation easements may be considered
- A reasonable financial contribution from SPK to an independent, qualified third party (e.g., university) to further expand the knowledge base related to bird conservation through research
- Operational controls, such as periodic turbine shut-down and/or blade feathering

The best available science and information should be considered when determining appropriate mitigation.

### **3.2.2 Wildlife Habitat**

The purpose of the hydrological monitoring is to avoid significant ponding or drying of wetland and/or woodland habitat. Should such changes be observed, contingency measures will be developed on a site-specific basis, and may include installation of additional culverts to preserve pre-construction flow patterns.

### **3.3 REPORTING AND REVIEW OF RESULTS**

Annual post-construction monitoring reports will summarize and analyze the results of all wildlife and wildlife habitat surveys. Reports will be submitted to the MOE within three months of the conclusion of the October mortality monitoring. All pre- and post-construction data, collected in accordance with MNR guidance and reported to MOE, will be made available for entry into the joint Canadian Wildlife Service – Canadian Wind Energy Association – Bird Studies Canada – Ontario Ministry of Natural Resources Wind Power and Birds Monitoring Database.

The monitoring program will be reassessed by MNR and SPK at the end of each monitoring year. Pending the reassessment results, the program methods, frequencies, and duration may be reasonably modified to better reflect the findings.

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