SKYPOWER

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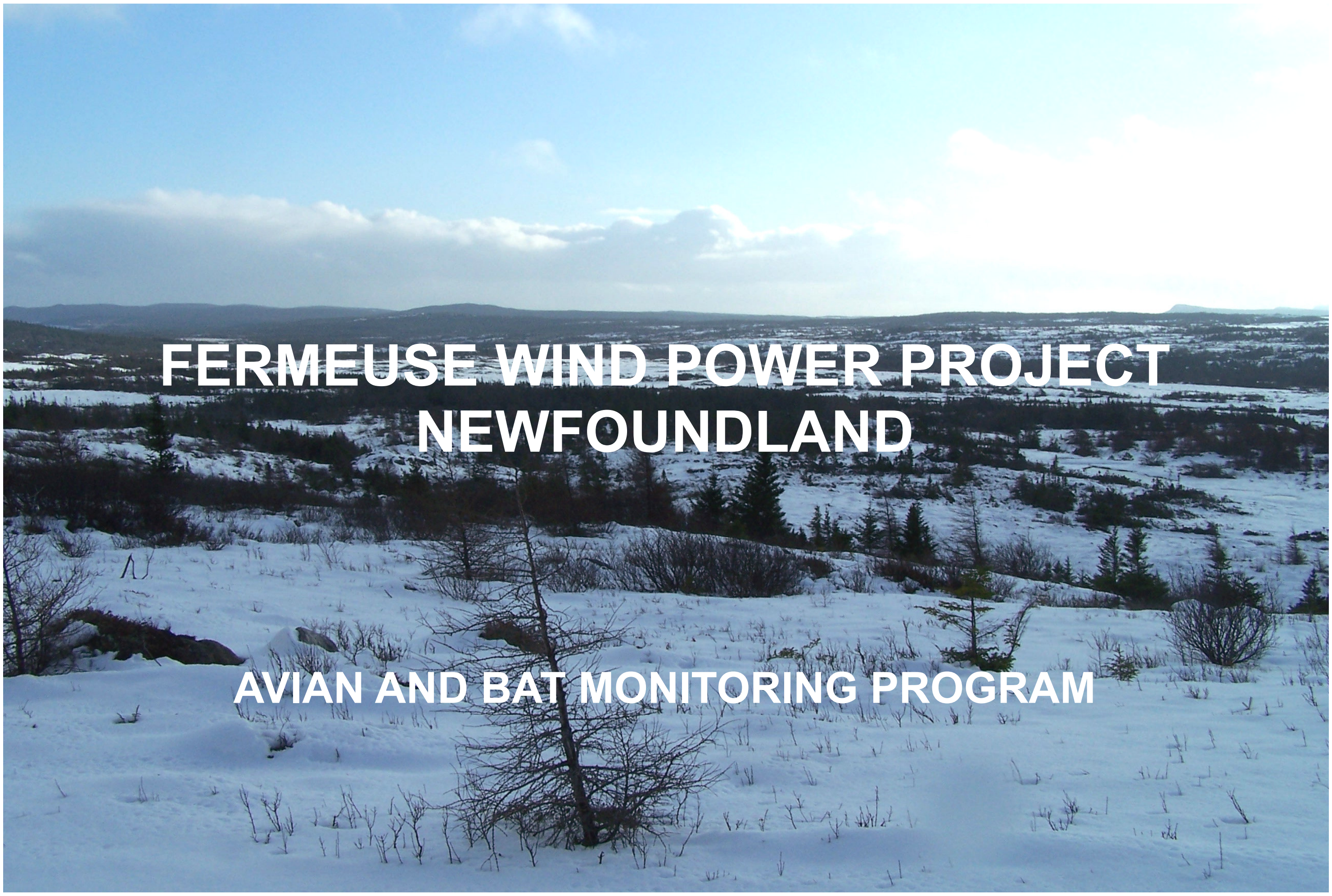

FERMEUSE WIND POWER PROJECT NEWFOUNDLAND

AVIAN AND BAT MONITORING PROGRAM

Submitted to:
Wildlife Division of the Department of Environment and Conservation of Newfoundland and Labrador and
Canadian Wildlife Services of Environment Canada

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helimax
MEMBRE GL GROUP MEMBER

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1 INTRODUCTION AND CONTEXT

SkyPower Corporation (Proponent) is proposing to develop, construct, own and operate a wind energy project on the east coast of the Avalon Peninsula, approximately 75 km south of St. John's, Newfoundland. The targeted area for the Project is located approximately 1 km west of the town of Fermeuse (Figure 1). The Project is expected to have an installed capacity of 27 MW provided by 9 3-MW turbines (Vestas V90*)* and be commissioned by December 2008. It should be noted that the number of proposed turbines has been reduced since the Environmental Registration Document was issued, when the installation of 16 1.5-MW turbines was planned. This new Project scenario significantly reduces the footprint of the Project, as the 3-MW turbines, while of higher nominal rating, occupy approximately the same surface area as the 1.5-MW machines. A revised registration document with the new Project configuration was submitted to the Department of Environment and Conservation of Newfoundland and Labrador (DEC) and the Canadian Environmental Assessment Agency (CEAA) in December 2007.

The Fermeuse Wind Power Project ("Project") was selected by Newfoundland and Labrador Hydro under its latest request for proposal for wind power.

In order to obtain the Provincial Approvals for this Project, a pre-construction avian monitoring program and a post-construction avian and bat monitoring program was prepared in accordance with conditions outlined in a letter received from the DEC (*Office of the Minister*) in September 2006 following the Project's registration. One of the stated conditions was the following:

> *Preparation of an avian and bat monitoring program, in consultation with Wildlife Division, Department of Environment and Conservation and Canadian Wildlife Service, Environment Canada which is required to be submitted to the Minister for approval.*

Following the release letter Hélimax contacted Christine Doucet of the Inland Fish and Wildlife Division of the DEC to discuss this condition. It was agreed that a pre-construction avian monitoring program and a post-construction bird and bat monitoring program were required (Pre-construction monitoring for bats was agreed to be not necessary.). These studies are presented below.

1.1 Project Proponent

The proponent of the Project is SkyPower Corporation ("SkyPower" or "Proponent"), located in Toronto. Its contact information is as follows:

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1.2 Environmental Assessment Team

Helimax Energy Inc. ("Hélimax"), a wind energy consultant, has been retained to lead the environmental assessment effort for the Fermeuse Wind Power Project. Its contact information is as follows:

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2 PRE-CONSTRUCTION AVIAN MONITORING PROGRAM

The avian monitoring program (see Appendix A) was undertaken by qualified and local biologists during the Spring, Summer and Fall of 2006. The monitoring program was based on the draft CWS guidelines and protocols and consisted of morning and evening Spring and Fall migration surveys (April through May and August through October, respectively), and breeding bird surveys in June. The program was presented and reviewed by CWS and the Inland Fish and Wildlife Division.

A total of 10 site visits in Spring, 4 visits in June-July and 9 visits in Fall were conducted. Biologists surveyed at stations located on site and in the vicinity, providing for general data on bird activity in the area.

In summary, a total of 64 species of birds were observed, the most common groups being sparrows, gulls, crows and robins. No species at risk were observed during the 3 seasons of monitoring.

It should be noted that monitoring protocols were based on a different Project layout, which comprised 16 turbines. However, the general project area has not changed with the revised Project layout, and monitoring occurred in all relevant habitats. Thus, survey efforts are considered to be adequate and fulfill provincial and federal requirements. Additionally, the new Project configuration comprises 9 turbines, which greatly reduces the Project's footprint.

Figure 1: Project Layout

3 POST-CONSTRUCTION AVIAN AND BAT MONITORING PROGRAM

This section presents the post-construction avian and bat monitoring program which aims to satisfy the above-mentioned condition (Section 1). The follow-up program for birds is based on the results of the pre-construction monitoring.

Recommended protocols for monitoring impacts of wind turbines on bats and birds include post-construction follow-up studies (Environment Canada, 2007). Extensive studies will assess both direct and indirect impacts of the Fermeuse Project. Direct impacts refer to fatalities resulting from birds and bats being killed directly by collisions with wind turbine rotors and towers. Indirect impacts refer to disruptions of foraging behaviour, breeding activities, and migratory patterns resulting from alterations in landscapes used by nocturnally active birds and bats (Natural Research Council, 2007).

The post-construction monitoring program will be supervised by a senior biologist and the monitoring field work will be performed on-site by a crew of biologists or technicians. Required permits to handle dead birds or bats will also be obtained prior to the survey work in accordance with the *Migratory Birds Convention Act*.

A post-construction report will by submitted to the DEC and the CWS once all surveys have been completed.

3.1 Monitoring of Indirect Impacts on Birds

Monitoring of indirect impacts on birds will be based on the avian surveys conducted in 2006 by Jacques Whitford 2007 (see Appendix A). The use of a similar methodology will facilitate the comparison of data collected prior to the construction phase with those that will have been collected during the post-construction phase, allowing the evaluation of potential impacts of the Project on birds. As was the case for the 2006 surveys, the follow-up monitoring will address spring and fall migration activity as well as summer breeding activity. Since the 2006 report data seem to indicate that the study area is not of great concern for birds, it is proposed to start follow-up surveys only the second year after construction and, tentatively, limit surveys to one year. If results are significant, additional surveys may be required to consider longer-term effects. The methodology uses both point count surveys and transect observations within and in proximity of the area of the proposed Project (see Appendix A), in order to document the species composition of birds as well as their vertical use of space during the spring, summer and fall periods.

In order to identify any potential impact in close proximity to the turbines, some of the survey points that have been surveyed in 2006 be replaced with similar habitats located in the vicinity of each turbine site.

The survey effort will be distributed as follow:

- Spring survey: 2 consecutive days each week from the end of April to the end of May;
- Summer survey: 2 visits of 2 consecutive days in end of June and mid-July;
- Fall survey: 9 site visits of one day from end-august to mid-October.

Table 1 shows the schedule for monitoring of indirect impacts on birds.

Table 1: Sampling Effort Distribution for Bird Surveys [number of search days per week]

Week # Survey	18	19	20	21	22	26	29	35	36	37	38	39	40	41	42	Total
Spring	2	2	2	2	2											**10**
Summer						2	2									**4**
Fall								1	2	1	2	1	1	1	1	**10**
Actual distribution of visits will depend on weather conditions.																**23**

3.2 Monitoring of Direct Impacts on Bats and Birds (mortality)

Monitoring of direct impacts on birds and bats will be based on the search for carcasses. Carcass searches are important, even on sites determined to be of a low level of concern, to evaluate the correctness of previous impact predictions and to test for the possibility of unexpected risk factors (Environment Canada 2007). For birds, the minimal duration of carcass searches for migrants is typically 6 weeks during the spring migration period and 8 weeks during the fall migration period (Environment Canada 2007). These two periods also coincide with migration of bat species.

As a significant number of breeding birds were observed in the area in 2006 (see Appendix A), a search will be performed during the breeding period following the schedule in Table 2. This period is also a sensitive one for bats, when juveniles are raised in “maternities”. Since the proximity of such a maternity could greatly increase the local densities of bats, and thus the risks of collision, carcass searches will also be conducted during two weeks in June and July.

As for the monitoring of indirect impacts on birds, work related to carcass searches will only begin the second year after construction and will be initially limited to one year. If impacts appear to be significant, additional surveys may be required.

Searches for birds and bats will be conducted during the same three field sessions, namely the spring migration, the summer period and the fall migration. During these sessions, the vicinity of each turbine will be searched, as it is generally preferable to search a larger number of turbines with a smaller search area at the base of each turbine, than to search intensively at only a few turbines (Environment Canada 2007). In order to minimize carcass loss from early morning scavengers, search activities will begin as soon after sunrise as practical. Accordingly, each turbine will be searched each day (15 minutes per turbine). During the three field sessions (spring, summer and fall), carcass searches will be conducted twice a week. The order of visits will be the same at each cycle, so that the sampling interval will be the same for each turbine. Carcass searches will be performed by two trained local workers.

The standard search area will be a 50-m radius around each turbine. A few turbines are located in peatlands and ericaceous dominated moors in which carcass searches may be difficult. Therefore, in such habitats, the search for carcasses will focus on areas where it can be done the most efficiently, namely the permanent footprint of each turbine (radius of 30 m), roads extending from them, and any areas nearby that are either bare or covered with low vegetation.

The inventory effort will be distributed as follows:

- Spring survey: each turbine visited twice a week for 6 weeks from the end of April to the end of May;
- Summer survey: each turbine visited twice a week for 2 weeks, one in late June and one in mid-July;
- Fall survey: each turbine visited twice a week for 8 weeks from end-august to mid-October.

Table 2 shows the schedule for bird and bat mortality monitoring.

Table 2: Sampling Effort Distribution for Carcass Searches (number of search days per week)

Week / Survey	17	18	19	20	21	22	26	29	35	36	37	38	39	40	41	42	Efficiency Trials	Total
Spring	2	2	2	2	2	2											2	**14**
Summer							2	2									1	**5**
Fall									2	2	2	2	2	2	2	2	2	**18**
Actual distribution of site visits will depend on weather conditions.																		**37**

Correction Factors

Regardless of the area searched, it will be necessary to calculate *correction factors* to more accurately quantify the total mortality associated with each turbine (Environment Canada 2007). In addition to the number of carcasses found, the following will be estimated:

- The proportion of carcasses that fell outside the search area;
- The proportion of carcasses within the search area that is removed by scavengers between visits (scavenger trials);
- The proportion of carcasses present in the search area that is found by each observer (efficiency trials).

The application of the first correction factor is necessary to account for carcasses that fell in areas that were not searched. A few sample turbine sites will thus be searched exhaustively to evaluate the proportion of carcasses that usually fall in the 50 m radius search area.

Correction for carcasses that were scavenged before the search period (scavenger trials) will be applied. A number of carcasses will be laid out in the search area, georeferenced by GPS, and subsequently looked for on the following day. Carcasses will be distributed at all turbines where searches are undertaken. They will also be distributed across the range of different substrates being searched, roughly in keeping with their proportions within the search area. Scavenger trials will be repeated during every field session, as the number and efficiency of scavengers may change over the course of the year.

Lastly, observers may overlook some carcasses. This percentage will vary depending on the observer, the habitat and the area being searched. As for the scavenger trials, searcher efficiency will be tested by setting out carcasses within the area to be searched for the following day. Carcasses will be placed at random locations within the search area. The location of the carcasses will be recorded so that they can be retrieved if they were not located by the searcher. These trials will not cover every turbine, but will be distributed across substrates, as in the case of the scavenger trials. This will be spread over multiple visits, so that the observer does not become aware that a test is underway. This has the added advantage of keeping human searcher efficiency high, as the searcher will be alert during every search session.

Scavenger trials will be performed by the two searchers at least once for each field session in order to account for the seasonal variation of the predation rate. Searcher efficiency will also be tested at least once during each field session (by the survey manager). These efficiency trials will be performed at random during multiple on-site visits.

4 REFERENCES

Environment Canada. 2007. Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds. *prepared by* Canadian Wildlife Service, Environment Canada. http://www.cws-scf.ec.gc.ca/publications/eval/prot/protocols_e.pdf

National Research Council [NRC]. 2007. Environmental impacts of wind energy projects. The National Academies Press, Washington, D.C., USA.

APPENDIX A PRE-CONSTRUCTION BIRD MONITORING REPORT

1 INTRODUCTION

In 2006, Hélimax Energy was retained by Vector Wind Energy to initiate environmental permitting work as per requirements from the Newfoundland and Labrador government, as well as federal requirements.

At the time it was decided that two main items needed to be undertaken in 2006: the environmental registration document and avian monitoring. The environmental registration document prepared by Hélimax presented the project, the natural and social environment of the area and any anticipated effects. The Minister of the Environment of Newfoundland/Labrador later released the project from further environmental assessment, under the condition that an avian and bat monitoring program was undertaken, as well as a noise impact assessment and a visual impact assessment.

In anticipation to these ministerial conditions, Hélimax recommended to undertake avian monitoring in 2006. No *pre-construction* bat monitoring was undertaken as none was anticipated. After discussions with the Inland Fish and Wildlife Division of the Department of Environment and Conservation in April of 2007 (pers. Communication with Christine Doucet), it was confirmed that only a *post-construction* bat monitoring program was required.

Pursuant to the announcement that the Fermeuse wind farm had been selected, Vector wind energy in the winter of 2007 asked Hélimax to prepare all necessary environmental work to fulfill the provincial requirements as well as federal requirements (as the project would apply for EcoEnergy funding). Hélimax's EA team has performed a rare plant, vegetation and watercourse assessment on the Fermeuse site in June 2007. Combined with the avian monitoring program undertaken in 2006, this field assessment completed the federal and provincial environmental monitoring requirements.

The avian monitoring program was undertaken by qualified and local biologists during the Spring, Summer and Fall of 2006. After consultation with the CWS and the Inland Fish and Wildlife Division, the monitoring program consisted of evening and morning Spring and Fall migration surveys (April, May, August, September, October), and breeding bird surveys in June. A total of 10 site visits in Spring, 4 visits in June-July and 9 visits were done. Biologists surveyed at stations located on site and in the vicinity, providing for general data on bird activity in the area. Provided that the wind energy project will be located in the area depicted in the map below, the survey efforts are expected to be adequate and fulfill provincial and federal requirements.

In summary, a total of 64 species of birds were observed, the most common groups being sparrows, gulls, crows and robins. No species at risk were observed during the 3 seasons of monitoring.

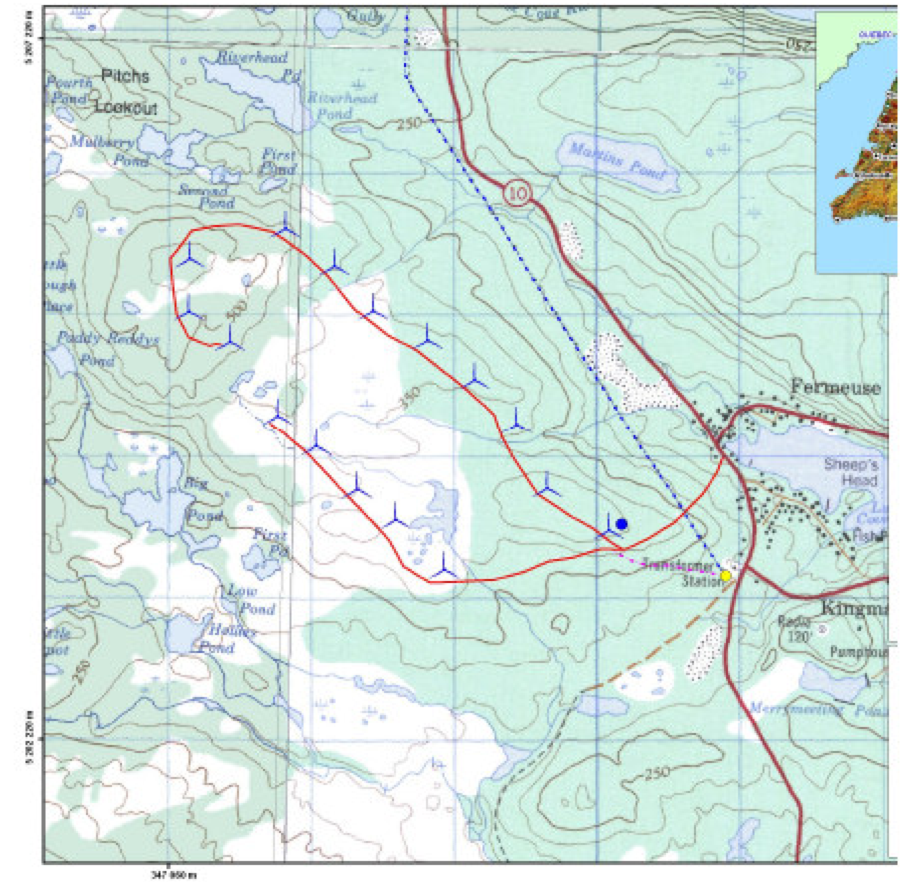

Figure1.1: Location of the proposed Fermeuse project

2006 AVIAN MONITORING REPORT