

**2007**  
**Baseline Bat Monitoring Report**  
**Skyway 8 Wind Energy Project**

**Prepared for:**  
Skyway 8 Wind Energy Inc.  
c/o Environmental Business Consultants  
Mississauga, Ontario

Project No. 0703

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**NATURAL RESOURCE SOLUTIONS INC.**

Aquatic, Terrestrial and Wetland Biologists



*Draft*

**2007  
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Skyway 8 Wind Energy Project**

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## 1.0 Introduction

This report details the bat monitoring completed by Natural Resource Solutions Inc. (NRSI) at the proposed 9MW Skyway 8 Wind Farm. The proposed wind farm is located in Grey County, Ontario, north of Highway 89, northwest of the town of Shelburne. This report documents the results of the bat survey program completed in August and September of 2007. For the purposes of this report, the term “study area” refers to the leased land parcels as well as lands within 1km.

The Skyway 8 Wind Farm is proposed on lands dominated by active agricultural fields, pasture, deciduous and mixed swamp. The habitat in the study area provides suitable foraging and summer roosting habitat for bats.

To assist with the review of the bat studies pertaining to the Skyway 8 Wind Energy Project a monitoring work program was developed through consultation with the Ontario Ministry of Natural Resources (OMNR) and review of applicable guidance documents. NRSI provided a summary of the proposed biological work program to the OMNR (Midhurst District) on March 8, 2007.

Formal comments and recommendations on the work program were received from the OMNR on May 10, 2007 (Reid pers. comm. 2007). These comments and recommendations are appended to this report (Appendix I) and were incorporated and followed in the field work that NRSI carried out.

This report summarizes the findings of the bat field studies and background review conducted for this project in 2007. Extensive work on birds, vegetation and wildlife was also conducted by NRSI in 2007. Results of these field investigations are summarized in the report, *2007 Baseline Bird Behaviour Monitoring Report for the Skyway 8 Wind Energy Project* (NRSI, January 2009) and the *Skyway 8 Wind Farm Project Environmental Screening Report* (Skyway 8 Wind Energy Inc., not yet finalized).

## **2.0 Study Area**

The Skyway 8 Wind Energy Project is located in Grey County and is part of Southgate Township. The study area is located south of Dundalk, Ontario, between Concession Road 4 (Southgate Road 8) on the south, Concession Road 8 (Southgate Road 12) to the north, Grey Road 8 (Country Road 8) to the west and Melancthon-Proton Townline to the east. For the purposes of this report, the study area is defined as the leased lands and the area within 1km of these lands.

The study area is primarily used for agricultural purposes and is mainly open fields, consisting of a variety of rotational crops including corn, soy, hayfields and grazing pastures. Natural areas are dominated by deciduous and mixed swamp communities. Small areas of thicket swamp, marsh and upland deciduous forest are found as well.

All proposed turbines will be placed in agricultural fields.

**Figure 1. Study Area and Bat Monitoring Station Locations**

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### 3.0 Background Review

There are 8 species of bats that are indigenous to Ontario, all of which have ranges that overlap with the study area. Review of background sources, topographic mapping, aerial photographs, on-site vegetation mapping, and agency consultation (Woeller pers. comm. 2007; Read pers. comm. 2007) were all used to analyze the habitats within the study area for the potential to concentrate bat activity.

Based on an assessment of habitat communities from aerial photographs and OMNR mapping of the area, the study area is composed of agricultural lands surrounding and interspersed with swamps, hedgerows, old meadows and pasturelands. The wetland habitat in the study area provides suitable foraging habitat for local bat populations.

There are no known bat hibernacula such as caves or mines within the vicinity of the study area, so hibernation sites are not available. The closest known bat hibernaculum is located within Mono Cliffs Provincial Park, which is approximately 25km east of the study area.

#### 3.1 Natural Areas

There are no designated natural areas located within the leased lands. However, the Keldon Swamp Wetland Complex, a provincially significant wetland, is found immediately west of the study area across Grey Road 8. This complex is comprised of 4 individual wetlands, totaling 87% swamp and 13% marsh (NHIC 2008a). The Melancton Wetland Complex #1 is made up of 50 individual wetlands located to the east and northeast of the study area. At its closest point the complex is found 1km from within the northern study area boundary. This wetland complex is considered provincially significant. It too is predominantly composed of swamp and its individual wetlands range in size from 1.5 to 718ha (Findlay pers comm. 2009). Many other wetlands, predominantly swamp, are found within the study area and around it. These, however, are not provincially significant and many have not yet been formally evaluated.

The Keldon Esker Earth Science ANSI is provincially significant and is located 3.5km southwest of the study area. This ANSI is 70ha and was formed by the last major glacial

ice retreat in Ontario (NHIC 2008a). There are no known bat hibernacula within the study area vicinity (McKee pers comm. 2009).

### 3.2 Site Sensitivity

The habitat found within the study area consists of agricultural fields, deciduous woodlots, wetlands, hedgerows, and farm structures. Agricultural habitats typically provide suitable foraging habitat, and treed habitats and farm structures provide roosting locations for bats. There were no habitats found in the vicinity of the study area that are likely to concentrate bat populations, such as caves, mines, forested ridges, or known hibernacula.

Site characteristics of the study area were compared to the guideline document on bats and bat habitats with regards to wind power proposals (OMNR 2007). Based on the criteria outlined in determining site sensitivity, the study area has been deemed “medium,” as the study area is located within 50km of a known hibernaculum. A bat hibernaculum is located within Mono Cliffs Provincial Park, which is just under 25km from the study area. The site is not near any other known significant bat habitat, major shoreline, and forest habitat will not be cleared for turbine placement.

#### **4.0 Study Methodology**

Following the bat guideline document (OMNR 2007), NRSI biologists set-up acoustic bat monitoring equipment on 16 nights at one station (BAT-001) from early August through mid-September. Monitoring occurred on the following nights in 2007:

- August 3/4, 4/5, 13/14, 14/15, 15/16, 16/17, 27/28, 28/29, 29/30, 30/31
- September 12/13, 13/14, 17/18, 18/19, 19/20, 20/21

The monitoring period corresponds with peak bat activity and migration for Ontario's bat species.

On each monitoring night, acoustic bat monitoring equipment was set up prior to sunset and data was collected through the night until sunrise the following morning. The monitoring equipment consisted of a Pettersson D240x broadband ultrasonic detector.

The location of the monitoring station was selected in an agricultural field that is representative of the habitat found within the study area. It was also located near the site of a proposed wind turbine. Station BAT-001 was located on the west side of Melancthon-Proton Townline, at 8<sup>th</sup> Line SW (see Figure 1). The station was located at the base of a MET tower in an agricultural field, adjacent to wetland habitat approximately 200m to the west.

Abundance data was collected and analyzed for the presence of bat passes and total passes through the night. Passage rates (passes/hr) were calculated based on total number of passes recorded and length of monitoring period. Abundance monitoring was the primary form of data collection and was used to gather information on usage rates of bats within the study area.

Species data was recorded directly onto a laptop computer using the Pettersson D240x ultrasonic monitoring device, through SonoBat software. The calls were recorded using a time expansion of 10, and were analyzed with SonoBat software, to be compared with recorded calls of known species. Call sonograms were compared on the basis of peak frequency, call length, call shape, harmonics, and other acoustic attributes.

Bat call sonograms are often extremely variable and may share attributes with multiple species. It has been well documented that even expert bat researchers may misidentify bat species based on call sonograms. NRSI biologists used large call libraries from various sources, including previous projects, as a basis for call analysis.

In addition to acoustic monitoring, point counts were conducted using a handheld BATBOX III Ultrasonic Detector, to locate any concentrations of bat activity. Six stations were monitored, which are labeled as BTR-002 to BTR-007 (see Figure 1 for station locations). The BATBOX III was set at different frequencies (20, 30, and 40 Hz) to detect different species of bats within the study area. The point count stations were monitored on September 5 and 24, 2007.

## 5.0 Results

A total of 80 bat passes were recorded in 84.5 hours of acoustic monitoring, resulting in an overall passage rate of 0.9 passes/hr. During the time of year that monitoring took place, all 8 species of Ontario bats are known to be active. This chosen monitoring period also corresponds to the anticipated period of peak migration of Ontario's bat species.

### 5.1 Bat Species

NRSI biologists have confirmed the presence of 4 or 5 bat species within the study area. Hoary bat (*Lasiurus cinereus*), little brown bat (*Myotis lucifugus*), and red bat (*Lasiurus borealis*) were confirmed based on their calls. Big brown bat (*Eptesicus fuscus*) and/or silver-haired bat (*Lasionycteris noctivagans*) were also recorded in the study area, but are very hard to distinguish based on their calls. Both species have a peak call frequency between 30 and 40 kHz in addition to many other shared call characteristics (OMNR 2006). These two species are often lumped together as a result of their call similarities. Brief natural history information for all 8 bat species known to occur within Ontario is provided below, based on information from Banfield (1974), Gerson (1984), Dobbyn (1994), and the NHIC (2008).

#### **Little Brown Bat**

This species is Ontario's most common bat species and can be found throughout most of the province, with records as far north as James Bay. Little brown bats will use a variety of different habitats, usually preferring forests with nearby rivers, creeks, or meadows. This species has also adapted to urban settings and will regularly roost in buildings.

Little brown bats begin hibernating in September, congregating in caves and mines throughout Ontario. Females move from hibernation sites to nurseries in April, while males remain in hibernation until mid-May. This species is very common, with secure populations in Ontario.

#### **Big Brown Bat**

Big brown bats are the most urbanized of any Ontario bat species. They are frequently found near cities and towns, foraging along streetlamps. One of the most common Ontario bat species, the big brown bat is found throughout southern Ontario and as far north as Red Lake. It is provincially secure.

Big brown bats often forage above meadows, ponds, rivers, and along streetlights in towns and cities. Roosting of this species regularly occurs in barns

and other buildings. Occasionally they roost under bark or within small rock crevices. Big brown bats are very cold tolerant, and often do not begin hibernation until late in the fall, sometimes as late as early December. Hibernation sites are often in close proximity to summer roosting sites. Big brown bats are usually the first bat to emerge from hibernation in early April.

### **Red Bat**

Red bats are a very distinctive, medium-sized species. An apparently secure Ontario bat species (S4), red bats are found throughout southwestern Ontario with some isolated sightings further east and as far north as James Bay. Red bats are known to be strong fliers and many records of this species have been found well outside of its distribution range.

Red bats are one of Ontario's three migrating species, and usually migrate to Ontario in late May, staying until early September. Foraging of this species often occurs at or above tree height, sometimes as high as 200m. Preferred foraging habitats include hilly forest, streams, and ponds. Red bats can sometimes be found foraging in towns near streetlights. This species usually roosts solitarily in trees.

### **Hoary Bat**

Hoary bats are Ontario's largest species of bat, and one of the most distinctive. They are a solitary species, often roosting high in the trees. Hoary bats emerge from daytime roosts late in the evening to forage among forested areas, often near open meadows or lakes within or adjacent to forested communities. Hoary bats are secure within Ontario (S5), and occupy an extensive range within Ontario as far north as James Bay.

One of Ontario's migratory species, hoary bats usually arrive in Ontario in late May. This species can generally be found within Ontario as late as October, before migrating to the southern United States.

### **Silver-haired Bat**

Silver-haired bats remain in Ontario until August or September before migrating south to the United States. After hibernation, silver-haired bats return to Ontario in late May or June. Range of this species stretches as far north as Thunder Bay and James Bay, with the majority of the known populations occurring in southern Ontario. Populations of this species are apparently secure (S4) within Ontario.

Silver-haired bats can often be found foraging near forested habitats, above lakes and streams, as they prefer aquatic insects. Summer roosting usually occurs in hollow trees, loose bark, or on large, abandoned bird nests.

### **Small-footed Bat**

Small-footed bats (*Myotis leibii*) are the least common species in Ontario and are classified as having vulnerable to imperiled populations within Ontario (S2S3). The range of this species includes most of southern Ontario with some isolated summer sightings as far north as Sault Ste. Marie.

Hibernation of this species generally begins in late November and lasts until mid-April. Hibernation sites are often smaller caves with higher rates of air movement than those preferred by other bat species. Populations of this species appear to show a preference to hilly coniferous forest habitats for foraging. Little is known about roosting site habitat preferences for small-footed bats.

### **Northern Long-eared Bat**

Northern long-eared bats (*Myotis septentrionalis*) can be found foraging in forested areas with nearby meadows and rivers. Roosting habitats of this species include under tree bark, rock crevices, and sometimes behind shutters or under shingles.

This species can be found throughout much of southern Ontario, with individual records reaching Thunder Bay and Moosonee. This species may be vulnerable in Ontario, indicated by a provincial rank of 'S3?'. Northern long-eared bats often use the same hibernation sites as little brown bats and begin hibernation in late October, emerging again in early May.

### **Eastern Pipistrelle**

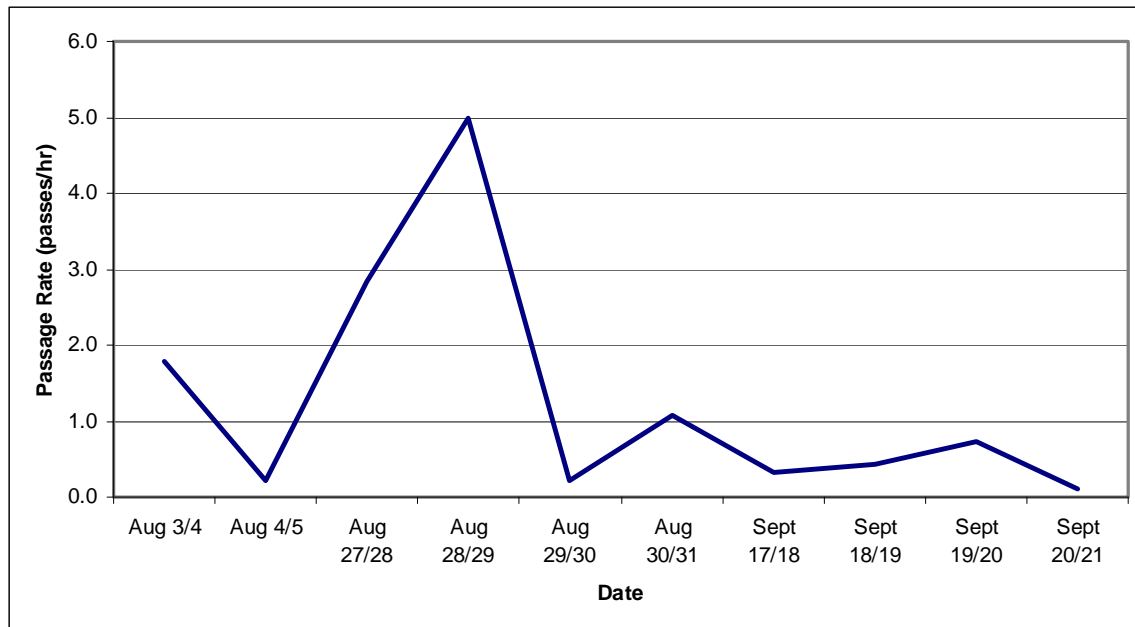
Eastern pipistrelles (*Pipistrellus subflavus*) can often be found foraging along slow moving rivers, forest edges, or above open meadows. These bats begin feeding around sunset, foraging high in the canopy hunting flying insects. Eastern pipistrelles require large trees. This species hibernates in Ontario in caves and abandoned mines, usually from mid-October through May.

Range of this species covers much of southern Ontario. Populations may be vulnerable in Ontario (S3?). Pipistrelles are usually found as single individuals or in small groups.

## **5.2 Results by Date**

Analysis by date in August showed an average passage rate of 1.4 passes/hr, while passage rates in September declined to 0.4 passes/hr. This lower passage rate in September is consistent with other bat monitoring projects undertaken by NRSI in Ontario. The observed passage rates for both August and September are low and do not give any indication that bat activity is concentrated within the study area. The highest passage rate of any date at the Skyway 8 study area was 5.0 passes/hr, recorded on the night of August 28/29, 2007 (see Figure 2). An elevated passage rate is not uncommon at this time of year and represents a portion of the swarming period for

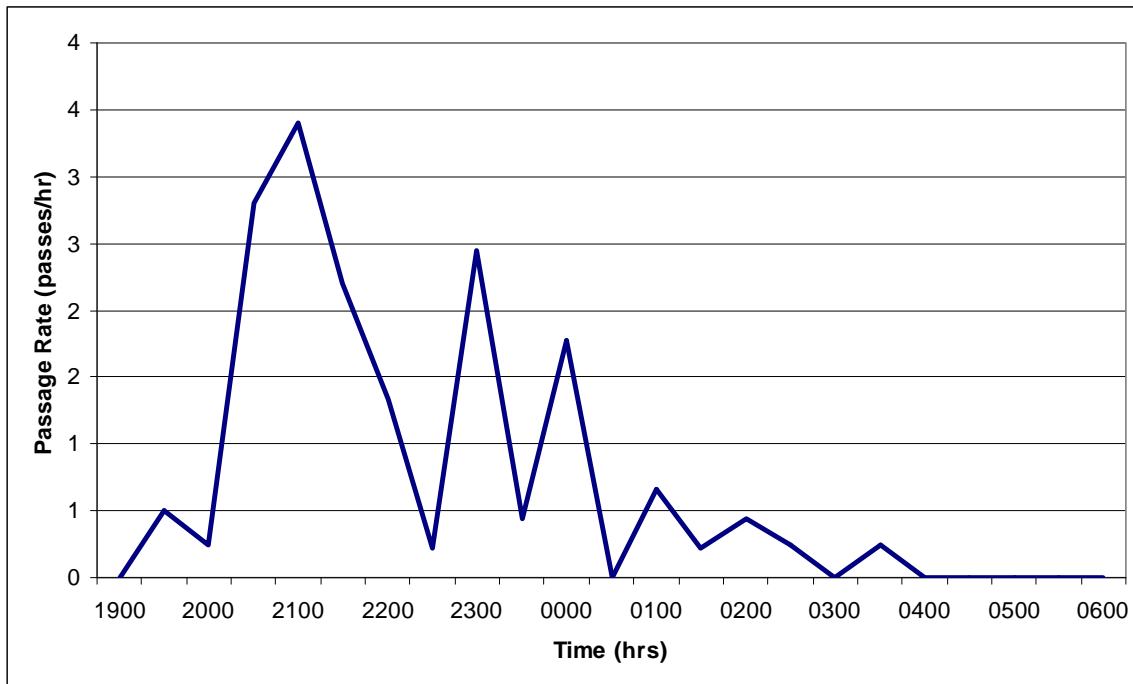
local bat populations and the period of bat migration through southern Ontario. A passage rate of 5 passes/hr, however, is still considered low.



**Figure 2. Passage Rate by Date**

### 5.3 Results by Time

Elevated passage rates began just after 2030hrs, with a peak in activity near 2100hrs (see Figure 3Figure 3. Passage Rate by Time of Day). Passage rates declined after midnight and were consistently lower for the remaining portion of the night, before dropping to zero at 0400hrs. These through-the-night passage rates are comparable to other bat monitoring projects in Ontario that showed similar peaks in activity prior to midnight.



**Figure 3. Passage Rate by Time of Day**

#### 5.4 Results of Point Count Surveys

No large concentrations of bats were observed during point count surveys. A few individual hoary bats and big brown/silver haired bats were detected during surveys near swamps. An example of the recording form used during point count surveys can be found in Appendix I. In total, only 7 bats were recorded during the point count surveys.

## 6.0 Summary of Results

The chosen monitoring period of August and September corresponds to a period when all 8 species known within Ontario are expected to be present and active within southern Ontario. This period is also anticipated to overlap with the anticipated period of migration for Ontario's migratory bat species.

An overall passage rate of 0.9 passes/hr for all stations was recorded, peaking in the month of August. The overall average passage rate for the proposed Skyway 8 Wind Farm is low and does not suggest the presence of concentrated bat activity. Consistent with other bat monitoring projects, an overnight activity peak was observed prior to midnight, declining to low but consistent activity prior to sunrise. The highest passage rate was 5.0 passes/hr, recorded on the night of August 28/29, 2007. An elevated passage rate is not uncommon at this time of year as it represents the swarming period for local bat populations and the period of bat migration through southern Ontario.

Species analysis revealed the presence of hoary bat, red bat, little brown bat, and big brown bat and/or silver-haired bat within the study area. The latter two species have very similar call characteristics and are often lumped together during call analysis.

There is little known about bat passage rates and migration routes within Ontario, making comparison of passage rates with known areas of concentrated bat activity difficult. However, based on bat monitoring conducted by NRSI at similar projects, an average passage rate of 0.9 passes/hr represents a very low passage rate. Even the highest recorded passage rate in the study area of 5 passes/hr is low. These passage rates do not suggest the presence of concentrated bat activity or heavy bat migration through the study area. Data trends and species identified within the study area are generally consistent with data found by NRSI at other monitoring sites within Ontario. Based on background review of natural areas and habitat features near the study area and results from the 2007 bat monitoring, it is anticipated that passage rates within the study area will remain low during most of the year, with the potential for small peaks in activity during the migration and summer swarming periods.

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## **APPENDIX I**

MNR Comments on Work Program



## **APPENDIX II**

### **Bat Point Count Recording Form**

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