NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Goshen Wind Energy Centre

2016 Wildlife Behaviour Monitoring

Natural Resource Solutions Inc. (NRSI) conducted post-construction monitoring at the operational Goshen Wind Energy Centre (Goshen WEC) located in the Municipalities of Bluewater and South Huron in Huron County, Ontario. This wind energy project has a generating capacity of 102MW and consists of 63 turbines. This document provides an executive summary of the methods and results of the second year of post-construction wildlife monitoring conducted at the Goshen WEC in 2016.

Methods

NRSI biologists conducted post-construction wildlife behaviour monitoring at the Goshen WEC, following methods approved by the Ontario Ministry of Natural Resources and Forestry (MNRF) as part of the project's Natural Heritage Assessment (NHA) and Environmental Effects Monitoring Plan (EEMP) (AECOM 2013, 2014). As outlined in these documents, a total of 11 provincially significant wildlife habitats required post-construction surveys, including:

- Four Bat Maternity Colony habitats (BMC-189, BMC-229, BMC-326, BMC-342);
- Five Amphibian Woodland Breeding Habitats (AWO-14, AWO-25, AWO-27, AWO-30, AWO-33);
- One Colonially-Nesting Bird Breeding Habitat (Tree/Shrub) for nesting great blue herons (*Ardea herodias*) (CNB-01); and
- One Habitat for Bird Species of Conservation Concern for red-headed woodpecker (*Melanerpes erythrocephalus*) (SCB-03).

These habitats were identified to be provincially significant in the NHA, completed prior to the construction of the project. Provincial significance of habitats was identified based on criteria established by the MNRF.

Post-construction monitoring was not required at one Bat Maternity Colony habitat (BMC-757) and one Amphibian Woodland Breeding Habitat (AWO-36) because infrastructure near these habitats was not constructed.

As per the Environmental Impact Study (EIS) report of the NHA and the EEMP (AECOM 2013, 2014), the following methods were implemented for the monitoring study:

- Acoustic through-the-night bat monitoring and evening visual bat surveys were conducted on at least 10 nights in June;
- Amphibian surveys were conducted during the spring, including:
    - Calling anuran (frog) surveys (once in each of April, May, and June);
    - Egg mass surveys targeting salamanders/newts (twice in March and once in April); and
    - Larval surveys targeting salamanders/newts (once in late May and once in early June);
- Point count surveys for breeding great blue herons were conducted once in each of April and June;

- Point count surveys for breeding red-headed woodpeckers were conducted three times between late May and late June.

Results

Bat Maternity Colony Habitats

The results of the post-construction Bat Maternity Colony Habitat surveys completed by NRSI in 2016, in comparison with the baseline data collected from 2010-2011, are outlined in the table below.

Habitat ID	Pre-Construction Results (2010-2011)	Post-Construction Results (2015)	Post-Construction Results (2016)
BMC-189	**Significant** Silver-haired Bat	**Not Significant** Does not meet standards of significance for any bat species	**Significant** Big Brown Bat Silver-haired Bat
BMC-229	**Significant** Big Brown Bat Silver-haired Bat	**Significant** Big Brown Bat Silver-haired Bat	**Significant** Big Brown Bat Silver-haired Bat
BMC-326	**Significant** Big Brown Bat Silver-haired Bat	**Not Significant** Does not meet standards of significance for any bat species	**Significant** Big Brown Bat Silver-haired Bat
BMC-342	**Significant** Silver-haired Bat	**Significant** Big Brown Bat Silver-haired Bat	**Not Significant** Does not meet standards of significance for any bat species

The results observed at BMC-342 indicates this habitat currently does not meet standards of provincial significance. Additional monitoring at this habitat will help to determine whether bat abundance at this habitat continues to be lower than pre-construction or if these passage rates reflect natural annual variation in local bat population abundance. Monitoring will continue for one additional year at these (and all) significant bat habitats to observe any other variation in bat activity or species composition.

Amphibian Woodland Breeding Habitats

The results of the post-construction amphibian breeding (woodland) surveys completed by NRSI in 2016, in comparison with the baseline data collected in 2012 and 2013, are outlined below:

Habitat ID	Pre-Construction Results (2013)	Post-Construction Results (2015)	Post-Construction Results (2016)
AWO-14	**Significant** ≥20 individuals, 2 frog species	**Significant** ≥20 individuals, 1 frog species	**Not Significant** <20 individuals, 1 frog species
AWO-25	**Significant** ≥20 individuals, 2 frog species	**Significant** ≥20 individuals, 3 frog species	**Significant** ≥20 individuals, 3 frog species
AWO-27	**Significant** ≥20 individuals, 2 frog species	**Significant** ≥20 individuals, 2 frog species	**Significant** ≥20 individuals, 1 frog species
AWO-30	**Significant** ≥20 individuals, 2 frog species	**Significant** ≥20 individuals, 3 frog species	**Significant** ≥20 individuals, 2 frog species
AWO-33	**Significant** ≥20 individuals, 3 frog species	**Significant** ≥20 individuals, 3 frog species	**Significant** ≥20 individuals, 1 frog species

The results observed at AWO-14 indicates this habitat currently does not meet standards of provincial significance. However, based on observations made approximately 200m east of the delineated habitat along the same watercourse, the watercourse itself is still providing similar habitat. As a result, localized conditions in 2016 may have affected the number of species and individuals that were observed at this habitat.

Significant Bird Habitat Surveys

The results of the post-construction Colonially-Nesting Bird Breeding Habitat (Tree/Shrub) and Habitat for Species of Conservation Concern (Red-headed Woodpecker) surveys completed by NRSI in 2016, in comparison with the baseline data collected in 2013, are outlined below:

Habitat ID	Pre-Construction Results (2013)	Post-Construction Results (2015)	Post-Construction Results (2016)
CNB-01	**Significant** At least 10 nest bowls At least 12 Great Blue Herons	**Significant** At least 14 nest bowls At least 7 Great Blue Herons	**Not Significant** At least 12 nest bowls No Great Blue Herons observed on nests
SCB-03	**Significant** Pair of adults, and adult on territory Nest observed	**Significant** Pair of adults observed entering nest and carrying food Juvenile observed in nest cavity	**Significant** Pair of adults observed entering nest and carrying food Juveniles were heard vocalizing

Upon discovery that no great blue herons were using the delineated CNB-01 habitat in April, additional surveys were undertaken in May to examine the habitat from other angles and scan other nearby habitats. A colony of approximately 13 nests, with confirmed use by up to 8 individual great blue herons, was documented approximately 400m south/southeast of CNB-01, in the same contiguous treed habitat and located approximately the same distance from an operational turbine. Both habitats will be monitored in 2017 to document their usage by great blue heron.

Additional Monitoring Commitments

Post-construction wildlife monitoring conducted by NRSI in 2016 represents the second year of post-construction monitoring conducted at the Goshen Wind Energy Centre.

Post-construction surveys are required to be conducted for one additional year (2017) for all significant wildlife habitats in the Goshen WEC project area, in accordance with the EIS of the NHA and the EEMP (AECOM 2013, 2014):

- Bat Maternity Colony Habitats (BMC-189, BMC-229, BMC-326, BMC-342);
- Amphibian Woodland Breeding Habitats (AWO-14, AWO-25, AWO-27, AWO-30, AWO-33);
- Colonially-Nesting Bird Breeding Habitat (Tree/Shrub) (CNB-01); and
- Habitat for Species of Conservation Concern (Red-headed Woodpecker) (SCB-03).