



## Belle River Wind Project 2018 Disturbance Monitoring

Natural Resource Solutions Inc. (NRSI) was retained to conduct post-construction wildlife monitoring at the operational Belle River Wind Project (Belle River WP) located in the Municipality of Lakeshore, Essex County, Ontario. This wind energy project has a total nameplate capacity of 100MW and consists of 40 turbines. This document provides an executive summary of the methods and results of the first year of post-construction wildlife monitoring conducted at Belle River WP in 2018.

### Methods

NRSI biologists conducted post-construction wildlife behaviour monitoring at Belle River WP following methods approved by the Ministry of Natural Resources and Forestry (MNRF) as part of the project's Natural Heritage Assessment (NHA) and Environmental Effects Monitoring Plan (EEMP) (NRSI 2015a, 2015b). As outlined in these documents, 14 provincially Significant Wildlife Habitats (SWHs) required post-construction surveys in 2018:

- One (1) Habitat for Bird Species of Conservation Concern (Eastern Wood-pewee) (*Contopus virens*) (EWP-006);
- Nine (9) Habitats for Vegetation Species of Conservation Concern [(Missouri Ironweed) (*Veronia missurica*) (MIW-004, MIW-007, MIW-008)] [(Muskingum Sedge) (*Carex muskingumgensis*) (MSE-006)] [(Shellbark Hickory) (*Carya laciniosa*) (SHH-002, SHH-003, SHH-004, SHH-005)] [(Shumard Oak) (*Quercus shumardii*) (SHU-001)] [(Pignut Hickory) (*Carya glabra*) (PGH-001)]; and
- Three (3) Habitats for Butterfly Species of Conservation Concern [(Duke's Skipper) (*Euphyes dukesi*) (DUS-001, DUS-004)] [(Giant Swallowtail) (*Papilio cressphontes*) (GSW-001)].

These habitats were identified to be provincially significant in the EIS report of the NHA (NRSI 2015a), the EEMP (NRSI 2015b), and the Pre-construction Monitoring Report (NRSI 2016), which were completed prior to the construction of the project. Provincial significance of habitats was identified based on criteria established by the MNRF, or otherwise approved by the MNRF.

In addition to the wildlife habitats outlined above, post-construction surveys were no longer required at six (6) habitats (SHU-002, HHA-002, CPR-002, UCF-004, SHH-001, MIW-003) because Turbines T19, T41, T200, and associated infrastructure were not built, resulting in no disturbance within 120m of these features and therefore no project activities occurred within 120m of this SWH.

Disturbance monitoring for a single Pignut Hickory individual is described in the EIS report of the NHA (NRSI 2015a) and is a requirement of the Renewable Energy Approval for the project. NRSI has confirmed that the individual Pignut Hickory discussed in the EIS (SCC-L [PGH-001]) was misidentified during the NHA/EIS stage of the project. Based on this clarification of information and confirmation that there is no Pignut Hickory present in the location identified by the EEMP, nor was there one

previously present, the feature is no longer a SWH for Pignut Hickory, and therefore no further monitoring is required.

As per the Environmental Impact Study (EIS) report of the NHA and the EEMP (NRSI 2015a, 2015b), the following methods were implemented for the monitoring study:

- Point count surveys for breeding Eastern Wood-pewee were conducted three (3) times from June to July.
- One (1) standardized area search was conducted for each vegetation species of conservation concern during a time period when plant species exhibit characteristics that allow for confident identification.
- Three (3) standardized area searches were conducted for each butterfly species of conservation concern habitat from late June to early August.

## Results

### Bird Species of Conservation Concern Habitat

The results of the post-construction surveys of the Bird Species of Conservation Concern habitat (Eastern Wood-pewee), in comparison with the baseline data collected in 2015, are outlined below:

Feature ID	Pre-Construction Results (2015)	Post-Construction Results (2018)
EWP-006	<b>Significant</b>	<b>Not Significant</b>
	<b>Visit #1</b> Number of Species Observations and Highest Breeding Evidence: <ul style="list-style-type: none"> <li>• 2 Possible at BMB-008</li> <li>• 1 Possible at BMB-009</li> </ul>	<b>Visit #1</b> Number of Species Observations and Highest Breeding Evidence: <ul style="list-style-type: none"> <li>• 2 Possible (BMB-008)</li> </ul>
	<b>Visit #2</b> Number of Species Observations and Highest Breeding Evidence: <ul style="list-style-type: none"> <li>• 1 Probable at BMB-008</li> <li>• 2 Probable at BMB-009</li> </ul>	<b>Visit #2</b> Number of Species Observations and Highest Breeding Evidence <ul style="list-style-type: none"> <li>• None</li> </ul>
	<b>Visit #3</b> Number of Species Observations and Highest Breeding Evidence: <ul style="list-style-type: none"> <li>• None</li> </ul>	<b>Visit #3</b> Number of Species Observations and Highest Breeding Evidence: <ul style="list-style-type: none"> <li>• None</li> </ul>

The Bird Species of Conservation Concern habitat no longer meets the provincial standards for significance based on post-construction monitoring surveys conducted in 2018.

### Vegetation Species of Conservation Concern Habitat

The results of the post-construction surveys of the Vegetation Species of Conservation Concern habitats (Missouri Ironweed, Muskingum Sedge, Pignut Hickory, Shellbark Hickory, Shumard Oak), in comparison with the baseline data collected in 2014-2015, are outlined below:

Feature ID	Pre-Construction Results (2014-2015)	Post-Construction Results (2018)
MIW-004	<b>Significant</b> Ten (10) Missouri Ironweed stems observed on the edge of forested habitat	<b>Significant</b> Twelve (12) Missouri Ironweed stems observed on the edge of forested habitat
MIW-007	<b>Significant</b> Five (5) Missouri Ironweed stems observed on the edge of forested habitat	<b>Not Significant</b> No observations of Missouri Ironweed
MIW-008	<b>Significant</b> Approximately 25 Missouri Ironweed stems observed in open meadow habitat	<b>Significant</b> Approximately 25 Missouri Ironweed stems observed in open meadow habitat
MSE-006	<b>Significant</b> Several hundred Muskingum Sedge individuals observed	<b>Significant</b> Approximately 435 Muskingum Sedge individuals observed
PGH-011	<b>Significant</b> One individual Pignut Hickory tree observed	<b>Not Significant</b> No observations of Pignut Hickory
SHH-002	<b>Significant</b> Shellbark Hickory individuals observed occasionally throughout the habitat	<b>Significant</b> Approximately 24 Shellbark Hickory trees observed
SHH-003	<b>Significant</b> Shellbark Hickory individuals observed throughout the habitat	<b>Significant</b> Approximately 44 Shellbark Hickory trees observed
SHH-004	<b>Significant</b> Shellbark Hickory individuals observed occasionally throughout the habitat	<b>Significant</b> Approximately 60 Shellbark Hickory trees observed
SHH-005	<b>Significant</b> Shellbark Hickory individuals observed occasionally throughout the habitat	<b>Significant</b> Approximately 24 Shellbark Hickory trees observed
SHU-001	<b>Significant</b> Shumard Oak individuals observed throughout the habitat	<b>Significant</b> Approximately 15 Shumard Oak trees observed

Nine (9) of the 11 significant vegetation habitats continue to meet the established standards for significance based on post-construction monitoring surveys conducted in 2018. Habitats MIW-007 and PGH-001 do not meet the provincial standards for significance. See below for a discussion on the monitoring results associated with each of these habitats.

#### Butterfly Species of Conservation Concern Habitat

The results of the post-construction surveys of the Butterfly Species of Conservation Concern habitat (Duke's Skipper and Giant Swallowtail), in comparison with the baseline data collected in 2015, are outlined below:

Feature ID	Pre-Construction Results (2015)	Post-Construction Results (2018)
DUS-001	<b>Significant</b> Six (6) observations of Duke's Skipper	<b>Significant</b> Six (6) observations of Duke's Skipper
DUS-004	<b>Significant</b> Two (2) observations of Duke's Skipper	<b>Significant</b> Five (5) observations of Duke's Skipper
GSW-001	<b>Significant</b> Two (2) observations of Giant Swallowtail	<b>Significant</b> Eleven (11) observations of Giant Swallowtail

All three (3) butterfly habitats continue to meet the established standards for significance based on post-construction monitoring surveys conducted in 2018.

### *Butterfly Species of Conservation Concern Mortality Monitoring*

In 2018, post-construction mortality monitoring occurred at Belle River WP as per EEMP guidelines (NRSI 2015c). Searches occurred twice-weekly from May to October and weekly in November at a subset of 12 turbines, and at a minimum frequency of monthly at all other turbines. During these surveys, any incidentally observed butterfly SCC mortalities (i.e. Duke's Skipper and Giant Swallowtail) at turbines within 120m of these habitats were to be recorded to assess operational turbine impacts through collisions. No mortalities of butterfly species of conservation concern were observed at the Belle River WP in 2018.

### **Additional Monitoring Commitments**

Post-construction wildlife monitoring conducted by NRSI in 2018 represents the first year of monitoring conducted at Belle River Wind.

Of the 14 habitats surveyed, three (3) habitats (EWP-006, MIW-007, and PGH-001) demonstrated a change in significance between pre-construction monitoring and the first year of post-construction monitoring in 2018, such that the habitats no longer meet the provincial standards for significance. These results, however, do not necessarily indicate disturbance or avoidance effects resulting from construction or operation of Belle River WP.

Habitat EWP-006 was observed to have slightly fewer individual species observations which exhibited possible breeding evidence, rather than the target of probable breeding evidence that would have resulted in significance determination. Based on the first year of monitoring, there is no indication that the perceived change in habitat use is a result of the construction or operation of the Belle River WP, and other environmental factors, such as weather conditions, prey availability, etc. are contributing to regular annual variation in habitat use.

Habitats MIW-007 and PGH-001 have changed in perceived significance from their identified baseline conditions for reasons completely unrelated to the construction or operation of the Belle River WP. Habitat MIW-007 appears to have undergone considerable alteration from heavy machinery, likely to improve the conditions of the agricultural drain that follows the length of the habitat. The alteration of this habitat has resulted in loss of vegetation and change in overall form and function of the habitat such that it no longer provides suitable habitat for the target species. Habitat PGH-001 was assessed during the post-construction monitoring and it was determined that the single individual Pignut Hickory identified during baseline monitoring is actually a Bitternut Hickory, indicating that this habitat was mistakenly considered SWH. The post-construction monitoring assessed the same tree as baseline conditions, but occurred at a time of year when more identifying characteristics were visible to the surveyor, resulting in a confident identification of Bitternut Hickory, which is not a SCC and does not warrant consideration as Significant Wildlife Habitat.

Based on the factors that have led to the change in perceived significance of both MIW-007 and PGH-001 being unrelated to the construction or operation of Belle River WP, it is being recommended that further study of each habitat provides no additional value.

Additional post-construction surveys will be conducted for two (2) additional years in 2019 and 2020 at Bird SCC habitat for Eastern Wood-pewee (EWP-006) as well as the following Vegetation SCC habitats in 2020 and 2022, in accordance with the EIS of the NHA and EEMP (NRSI 2015a, NRSI 2015b), and the recommendations above:

- Habitat for Vegetation Species of Conservation Concern [(Missouri Ironweed) (MIW-004, MIW-008)] [(Muskingum Sedge) (MSE-006)] [(Shellbark Hickory) (SHH-002, SHH-003, SHH-004, SHH-005)] [(Shumard Oak) (SHU-001)].