



Belle River Wind Project 2020 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 post-construction Significant Wildlife Habitat (SWH) monitoring conducted in 2020 at the Belle River WP, which represents the third year of post-construction monitoring for Bird Species of Conservation Concern (SCC) habitats and the second year of post-construction monitoring for Vegetation SCC habitats.

Methods

NRSI biologists conducted post-construction wildlife behaviour monitoring at the 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; NRSI 2015a), Environmental Effects Monitoring Plan (EEMP; NRSI 2015b), and Pre-construction Monitoring Report (NRSI 2016). As outlined in these documents, nine (9) provincially SWHs required post-construction surveys in 2020, including:

- One (1) habitat for a Bird SCC [Eastern Wood-pewee (*Contopus virens*) (EWP-006)]; and
- Eight (8) habitats for Vegetation SCC [(Missouri Ironweed) (*Veronia missurica*) (MIW-004, 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)].

In accordance with the NHA (NRSI 2015a) and the Pre-construction Monitoring Report (NRSI 2016), post-construction mortality monitoring was also required at turbines located within 120m of three (3) habitats for Butterfly SCC, including habitat for Duke's Skipper (*Euphyes dukesi*) (DUS-001, DUS-004) and Giant Swallowtail (*Papilio cresphontes*) (GSW-001).

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

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

- Point count and transect surveys for breeding Bird SCC, Eastern Wood-pewee, were conducted three (3) times from June to July;
- One (1) standardized area search was conducted for each Vegetation SCC habitat during a time period when plant species exhibit characteristics that allow for confident identification; and
- Mortality monitoring of Butterfly SCC, Duke’s Skipper and Giant Swallowtail, was conducted at two (2) turbines (T205 and T210) twice-weekly from May to October and weekly in November.

Results

Bird Species of Conservation Concern Habitat

The results of the post-construction surveys of the Bird SCC habitat (Eastern Wood-pewee) conducted in 2020, in comparison with the baseline data collected in 2015, and the post-construction results from 2018-2019 are outlined below:

Feature ID	Pre-construction Results (2015)	Post-construction Results (2018)	Post-construction Results (2019)	Post-construction Results (2020)
EWP-006	Significant	Not Significant	Significant	Significant
	Six (6) observations of Eastern Wood-pewee Highest Breeding Evidence: Probable	Two (2) observations of Eastern Wood-pewee Highest Breeding Evidence: Possible	Three (3) observations of Eastern Wood-pewee Highest Breeding Evidence: Probable	Four (4) observations of Eastern Wood-pewee Highest Breeding Evidence: Probable

The Bird SCC habitat meets the established standards for significance based on post-construction monitoring surveys conducted in 2020.

Vegetation Species of Conservation Concern Habitats

The results of the post-construction surveys of the Vegetation SCC habitats (Missouri Ironweed, Muskingum Sedge, Shellbark Hickory, Shumard Oak) conducted in 2020, in comparison with the baseline data collected in 2014-2015, and post-construction results from 2018 are outlined below:

Feature ID	Pre-Construction Results (2014-2015)	Post-Construction Results (2018)	Post-construction Results (2020)
MIW-004	Significant Ten (10) stems observed of Missouri Ironweed	Significant Twelve (12) stems observed of Missouri Ironweed	Significant Seventeen (17) stems observed of Missouri Ironweed
MIW-008	Significant Twenty-five (25) stems observed of Missouri Ironweed	Significant Twenty-five (25) stems observed of Missouri Ironweed	Significant Twenty-eight (28) stems observed of Missouri Ironweed Seventy-one (71) stems observed of Missouri Ironweed during a subsequent visit in October
MSE-006	Significant Several-hundred individuals observed of Muskingum Sedge	Significant Four-hundred and thirty-five (435) individuals observed of Muskingum Sedge	Significant Five-hundred and fourteen (514) individuals observed of Muskingum Sedge
SHH-002	Significant This species was confirmed to be present in the candidate habitat during area searches conducted with Ecological Land Classification (ELC) mapping.	Significant Twenty (20) Shellbark Hickory trees observed	Significant Sixty-five (65) Shellbark Hickory trees observed
SHH-003	Significant This species was confirmed to be present in the candidate habitat during area searches conducted with ELC mapping.	Significant Forty-four (44) Shellbark Hickory trees observed	Significant Ninety-three (93) Shellbark Hickory trees observed
SHH-004	Significant This species was confirmed to be present in the candidate habitat during area searches conducted with ELC mapping.	Significant Sixty (60) Shellbark Hickory trees observed	Significant Sixty-six (66) Shellbark Hickory trees observed
SHH-005	Significant This species was confirmed to be present in the candidate habitat during area searches conducted with ELC mapping.	Significant Four (4) Shellbark Hickory trees observed	Significant Nineteen (19) Shellbark Hickory trees observed
SHU-001	Significant This species was confirmed to be present in the candidate habitat during area searches conducted with ELC mapping.	Significant Fifteen (15) Shumard Oak trees observed	Significant Thirty-one (31) Shumard Oak trees observed

The Vegetation SCC habitats continue to meet the standards for significance based on post-construction monitoring surveys conducted in 2020.

Butterfly Species of Conservation Concern Mortality Monitoring

No Butterfly SCC mortalities were observed at turbines within 120m of Duke's Skipper (DUS-001, DUS-004) or Giant Swallowtail (GSW-001) habitats at the Belle River WP during the three (3) years of post-construction mortality monitoring conducted from 2018-2020. As a result, there are no confirmed, or suspected, operational turbine impacts to Butterfly SCC at the Belle River WP.

Additional Monitoring Commitments

Post-construction SWH monitoring conducted by NRSI in 2020 at the Belle River WP represents the second year of post-construction monitoring for Vegetation SCC habitats and the third year of post-construction monitoring for the Bird SWH.

All post-construction disturbance monitoring commitments for Bird SCC habitats have been met and no further disturbance monitoring for birds is required for the Belle River WP.

Post-construction surveys are required to be conducted for one (1) additional year (2022) for Vegetation SCC habitats (MIW-004, MIW-008, MSE-006, SHH-002, SHH-003, SHH-004, SHH-005, SHU-001) at the Belle River WP.