

Ernestown Wind Park

Landbird Migratory Stopover Habitat-use Surveys Report

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Prepared for: *Ernestown Windpark LP*

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1 INTRODUCTION

Site investigations of the Ernestown Wind Park project location determined the presence of four candidate landbird migratory stopover areas (LMSA01-04; see **Figure 1-1**). These candidate habitats were identified based on the presence of large woodlots (>10 ha) in close proximity (within 5 km) to Lake Ontario, which provide shelter and foraging opportunities for migrating songbirds and raptors. **Table 1-1** below presents additional information on the candidate habitats identified during the site investigation. Please note that two candidate habitats are not connected due to the presence of a railway separating the northern candidate habitat (LMSA02) from the southern candidate habitat (LMSA04). Similarly, LMSA02 and LMSA03 are not connected due to the distance between the woodlands which exceeds 20 m, the criteria used to differentiate adjacent woodlands.

Table 1-1: Description of Candidate Landbird Migratory Stopover Areas

| Feature ID | Project Components within 120 m | Attributes and Composition | | Function | Associated Natural Features |
|------------|--|----------------------------|---|--|-------------------------------------|
| | | Size | ELC Community | | |
| LMSA01 | Bladeswept area (93m) | 16 ha | <p>Dominant Vegetation: Sugar Maple, American Elm, Basswood, Eastern Hemlock, Eastern White Pine</p> <p>ELC Community/ID: FODM6-4 (ELC ID: 26)</p> | Woodland is > 10 ha and within 2 km of Lake Ontario. This woodland is also found in close proximity to wetland and meadow communities. | Woodland (W003) |
| LMSA02 | Access Road (0m) Collector (0m) Hardstand (0m) Turbine (0m) | 20 ha | <p>Dominant Vegetation: Shagbark Hickory, Sugar Maple, Green Ash, Eastern Cottonwood, American Elm, Bitternut Hickory, Eastern Red Cedar, Eastern White Pine</p> <p>ELC Communities: FODM9-4 (57) and SWDM2-2 (ELC ID: 60)</p> | | Woodland (W006) Wetland (WE05-4) |
| LMSA03 | Access Road (0m) Collector (0m) Bladeswept area (107m) | 64 ha | <p>Dominant Vegetation: Shagbark Hickory, Sugar Maple, Green Ash, Eastern Cottonwood, American Elm, Bitternut Hickory, Eastern Red Cedar, Eastern White Pine</p> <p>ELC Communities: FODM2-3 (ELC ID: 39)</p> | | Woodland (W006) |
| LMSA04 | Access Road (0m) Collector (0m) Hardstand (0m) Turbine (0m) | 126 ha | <p>Dominant Vegetation: American Elm, Green Ash, Eastern Red Cedar, Eastern White Pine, White Spruce</p> <p>ELC Communities: FOCM1-2 (ELC ID: 63), FOCM2-1 (ELC IDs: 64, 71, 72), FODM7-1 (ELC ID: 68) and FODM7-2 (ELC ID: 74)</p> | | Woodland (W005-4) |

The *Natural Heritage Evaluation of Significance Report* (MKI, 2012) did not report on the outcomes of the evaluation of significance for LMSA01-04, due to seasonality constraints and surveys unable to be conducted prior to the submission of the Natural Heritage Assessment. Consequently, LMSA01-04 were treated as significant and subject to additional habitat-use surveys to determine significance. This process of treating a habitat as significant and committing to undertake studies prior to construction is outlined in Appendix D of the Natural Heritage Assessment Guide (MNR, 2011).

This report presents the results from the pre-construction habitat-use surveys for LMSA01, LMSA02, LMSA03, and LMSA04.

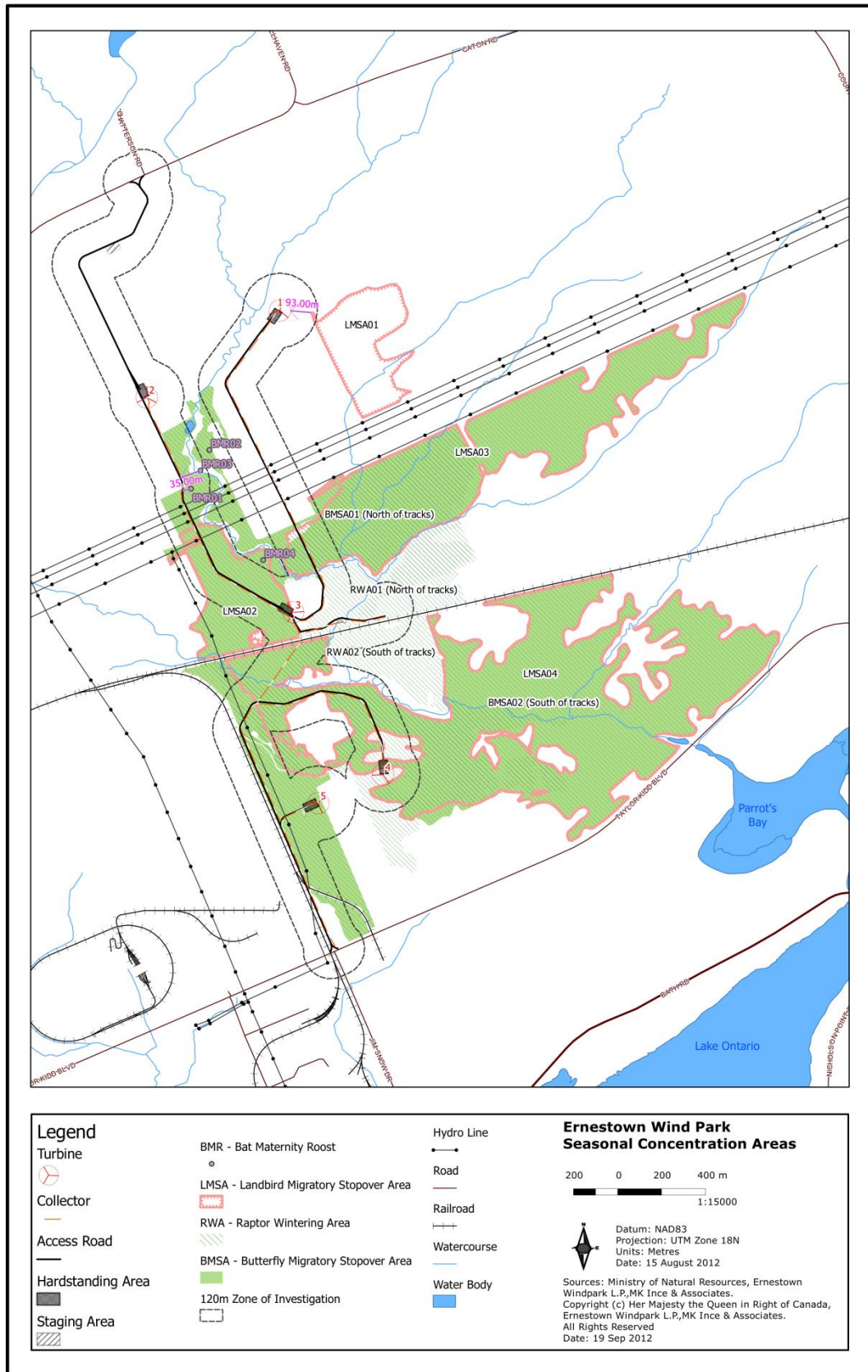


Figure 1-1: Map indicating location of candidate Landbird Migratory Stopover Areas at Ernestown Wind Park

2 METHODOLOGY

2.1 Field Evaluations

Detailed methodology for pre-construction surveys to evaluate the significance of LMSA01-04 was provided within the *Natural Heritage Environmental Impact Study Report* (MKI, 2012). In August 2012, prior to the commencement of the fall surveys, the Ministry of Natural Resources (MNR) was contacted with a copy of the methodology copied from the *Natural Heritage Environmental Impact Study Report* (MKI, 2012) as well as a map outlining the proposed transect routes.

There were two modifications made to the methodology presented in the *Natural Heritage Environmental Impact Study Report* (MKI, 2012). The first change was a decrease in the number of surveys per week, from two to one survey per week until peak migration was observed. Surveys were doubled when field investigations indicated increased migration events (i.e. increase in density and species richness). This resulted in fewer than 20 surveys per seasonal migration period (i.e. fall and spring). The second change was the inclusion of three point count surveys adjacent to LMSA04 along Taylor-Kidd Blvd at the request of the MNR to assess the applicability of extrapolating the transect data to the entire habitat polygon. Please see **Appendix A** for a copy of the protocol reviewed by the MNR in August 2012 and all associated correspondence.

The chosen transect and point count locations were discussed with the MNR prior to the commencement of field evaluations. Each transect was restricted to areas where land access had been granted by the owner and therefore some of the habitats could not be surveyed in entirety (see **Figure 2-1** for land access boundaries). It should be noted that during the spring of 2013 the quarry operators expanded the cleared area into the adjacent woodland which provided the habitat for LMSA04. As a result, transect routes were shifted to maintain surveys within forested areas (**Figure 2-2**).

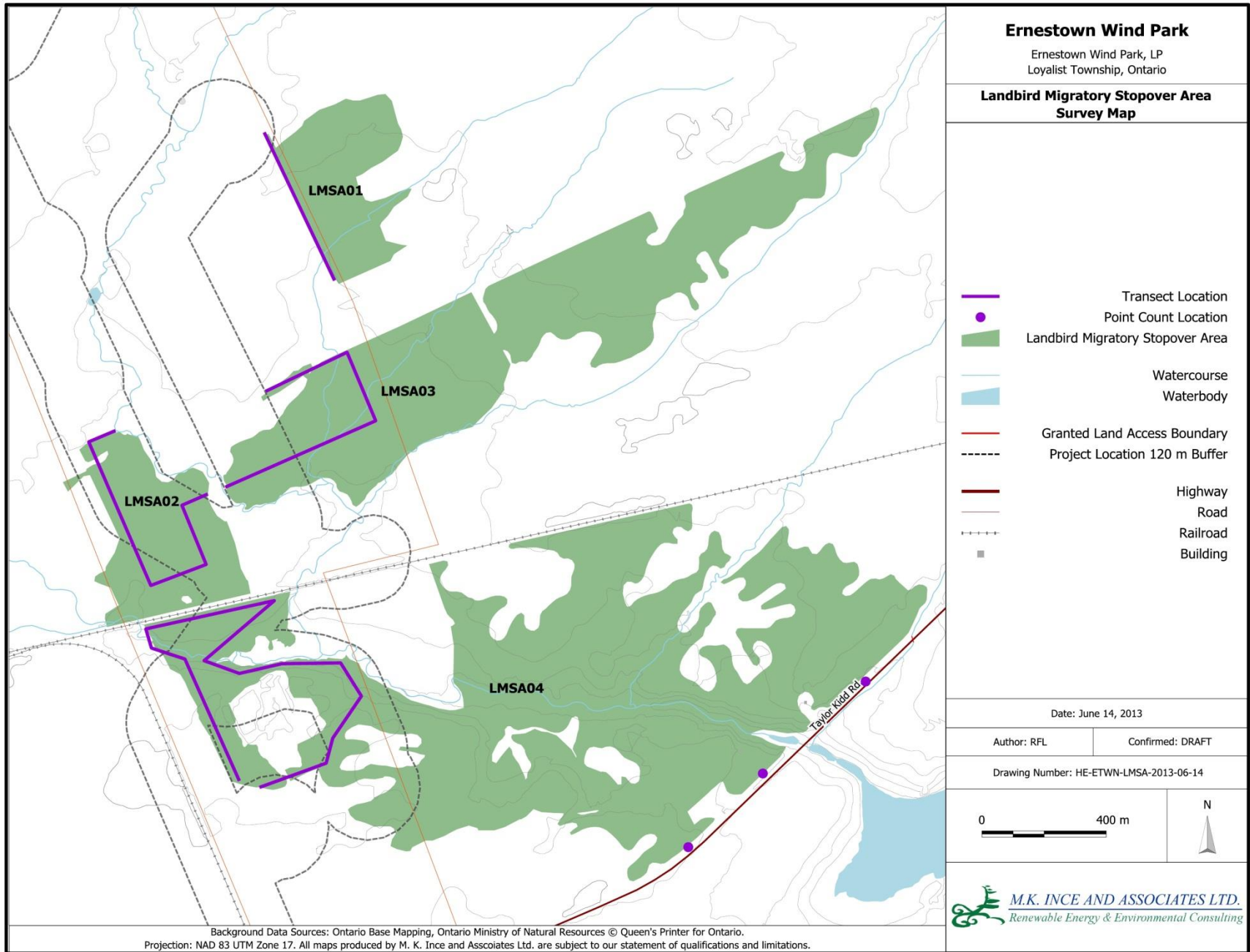


Figure 2-1: Map of Survey Locations for Landbird Habitat

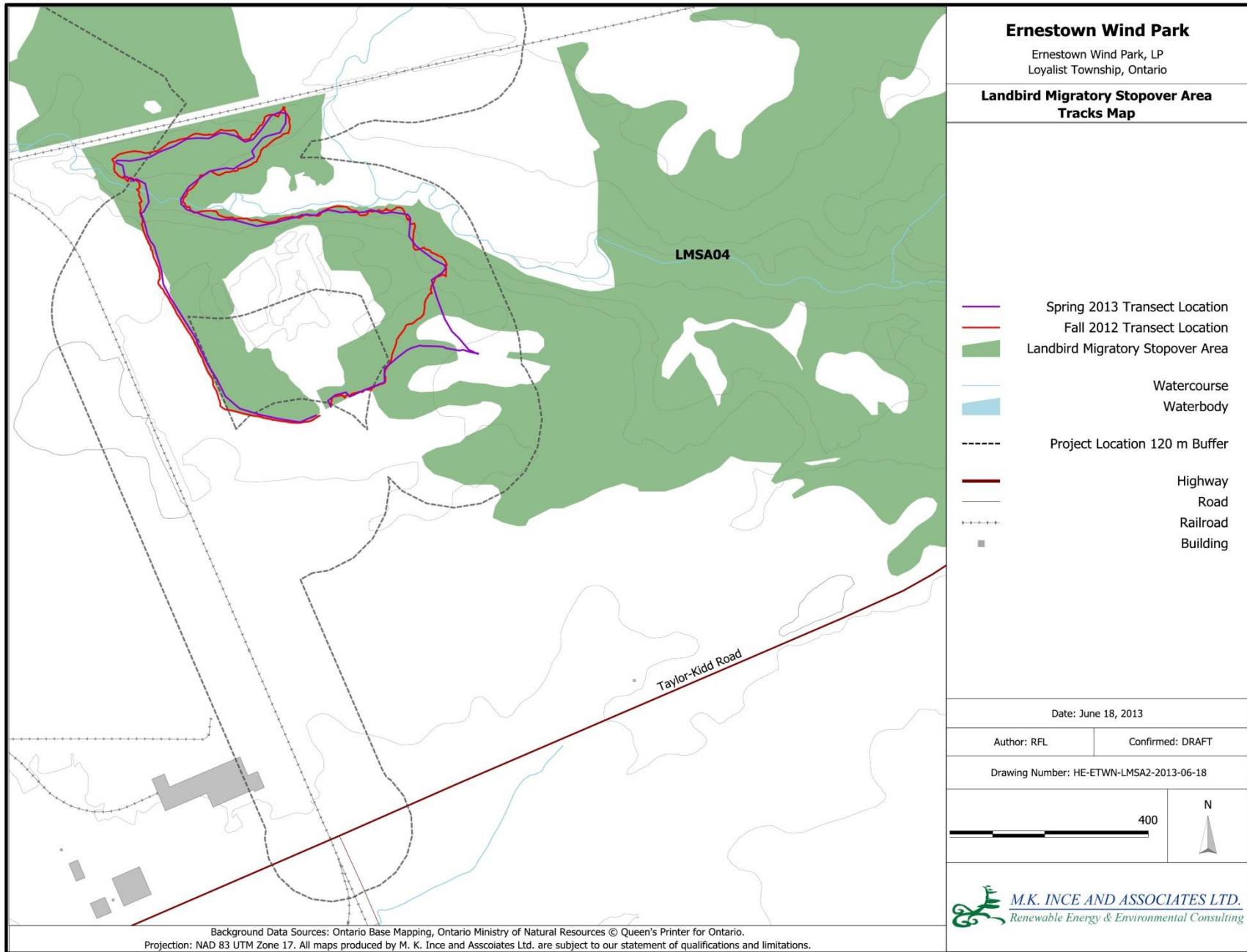


Figure 2-2: Map of survey routes differing between 2012 and 2013

A summary of the pre-construction habitat-use surveys for LMSA01-04 at the Ernestown Wind Park Project is provided in **Table 2-1** below. Details on the dates, time, weather conditions during each site visit, as well as the names of each of the investigators is provided.

Table 2-1: Summary of Site Visits

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|------------|------------|------------------|---|---|--------------------|
| Fall | 2012-08-30 | LMSA01 | 06:40-07:25 | Temp: 12°C - 22°C Cloud Cover: 0/10 Wind (beaufort): 0-1 Visibility: Unlimited Precipitation: None | Robert Tymstra |
| | | LMSA02 | 07:35-08:38 | | |
| | | LMSA03 | 07:35-08:38 | | |
| | 2012-08-31 | LMSA04 | 06:00-10:00 | Temp: 21°C-28°C Cloud Cover:10/10 Wind (beaufort): 2-3 Visibility: Unlimited Precipitation: None | Robert Tymstra |
| | 2012-09-06 | LMSA01 | 07:30-08:15 | Temp:21°C - 26°C Cloud Cover: 1/10 – 9/10 Wind (beaufort): 0-2 Visibility: Very Far Precipitation: None | Rhiannon Leshyk |
| | | LMSA02 | 09:40-10:24 | | |
| | | LMSA03 | 08:30-9:40 | | |
| | 2012-09-07 | LMSA04 | 06:00-10:05 | Temp:15°C Cloud Cover: 4/10 Wind (beaufort): 0 Visibility: Unlimited Precipitation: None | Rhiannon Leshyk |
| | 2012-09-11 | LMSA01 | 09:30-10:00 | Temp:6°C-15°C Cloud Cover:1/10-5/10 Wind (beaufort): 0 Visibility: Unlimited Precipitation: None | Rhiannon Leshyk |
| | | LMSA02 | 06:30-08:00 | | |
| | | LMSA03 | 08:00-09:15 | | |
| | 2012-09-12 | LMSA04 | 06:30-08:35 | Temp:15°C-20°C Cloud Cover:0/10 Wind (beaufort): 0-1 Visibility: Very Far Precipitation: None | Rhiannon Leshyk |
| 2012-09-19 | LMSA01 | 10:00-10:20 | Temp:5°C-10°C Cloud Cover:0/10 to 1/10 Wind (beaufort): 1-3 | Rhiannon Leshyk | |
| | LMSA02 | 06:50-08:25 | | | |

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|--------|------------|------------------|----------------|--|---------------------------------|
| | | LMSA03 | 08:30-09:35 | Visibility: Unlimited Precipitation: None | |
| | 2012-09-20 | LMSA04 | 07:30-09:20 | Temp:14°C Cloud Cover:1/10 Wind (beaufort): 2 (gusts of 4-5) Visibility: Far Precipitation: None | Rhiannon Leshyk |
| | 2012-09-27 | LMSA01 | 10:25-10:52 | Temp:7°C-10°C Cloud Cover:0/10-1/10 Wind (beaufort): 0-1 Visibility: Unlimited Precipitation: None | Rhiannon Leshyk |
| | | LMSA02 | 07:00-08:45 | | |
| | | LMSA03 | 08:45-10:05 | | |
| | 2012-09-28 | LMSA04 | 07:30-10:00 | Temp:5°C Cloud Cover:2/10 Wind (beaufort): 0-1 Visibility: Unlimited Precipitation: None | Rhiannon Leshyk |
| | 2012-10-02 | LMSA04 | 08:15-11:00 | Temp:12°C Cloud Cover:10/10 Wind (beaufort): 0-1 Visibility: Good Precipitation: Mainly none – some spitting | Rhiannon Leshyk & Daniel Stuart |
| | 2012-10-03 | LMSA01 | 10:15-10:40 | Temp:15°C Cloud Cover:9/10-10/10 Wind (beaufort): 0-1 Visibility: Fair Precipitation: None | Rhiannon Leshyk & Daniel Stuart |
| | | LMSA02 | 7:20-8:55 | | |
| | | LMSA03 | 7(9):03-10:10 | | |
| | 2012-10-04 | LMSA04 | 08:15-10:25 | Temp:17°C Cloud Cover:10/10 Wind (beaufort): 0-1 Visibility: Fair Precipitation: None | Rhiannon Leshyk & Daniel Stuart |
| | 2012-10-05 | LMSA01 | 10:00-10:20 | Temp:17°C Cloud Cover:5/10 to10/10 Wind (beaufort): 0-1 Visibility: Good Precipitation: None – Drizzling | Rhiannon Leshyk |
| | | LMSA02 | 07:15-08:30 | | |
| | | LMSA03 | 08:40-09:40 | | |

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|------------|--------------------|-----------------------|--|--|--|
| | 2012-10-09 | LMSA01 | 10:10-11:00 | Temp:7°C-14°C Cloud Cover:2/10 to8/10 | Robert Tymstra |
| | | LMSA02 | 07:00-08:45 | Wind (beaufort): 1-3 | |
| | | LMSA03 | 08:45-10:10 | Visibility: Unlimited Precipitation: N/A | |
| | 2012-10-17 | LMSA02 | 06:55-08:10 | Temp:2°C-12°C Cloud Cover:2/10 to5/10 | |
| | | LMSA03 | 08:10-9:10 | Wind (beaufort): 0 Visibility: Unlimited Precipitation: N/A | |
| | Spring | 2013-04-02 | LMSA01 | 09:15-09:30 | Temp:-6°C- -1°C Cloud Cover:2/10 to4/10 |
| LMSA02 | | | 07:15-08:05 | Wind (beaufort): 1-4 | |
| LMSA03 | | | 08:10-09:00 | Visibility: Unlimited Precipitation: None | |
| 2013-04-03 | | LMSA04 | 07:58-09:35 | Temp:-4°C Cloud Cover:0/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA04 – Point Counts | 06:53-07:34 | Wind (beaufort): 0-1 Visibility: Unlimited Precipitation: None | |
| 2013-04-09 | | LMSA04 | 07:43-09:45 | Temp:4°C Cloud Cover:10/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA04-Point Count | 06:33-07:11 | Wind (beaufort): 0-1 Visibility: Good Precipitation: None | |
| 2013-04-10 | | LMSA01 | 09:30-09:50 | Temp:4°C- 6°C Cloud Cover:10/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA02 | 07:20-08:15 | Wind (beaufort): 0-2 | |
| | | LMSA03 | 08:22-09:20 | Visibility: Unlimited Precipitation: None | |
| 2013-04-17 | | LMSA01 | 09:15-09:35 | Temp:4°C- 9°C Cloud Cover: 0/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA02 | 06:40-07:50 | Wind (beaufort): 0-2 | |
| | | LMSA03 | 08:00-09:00 | Visibility: Unlimited Precipitation: None | |
| 2013-04-18 | | LMSA04 | 06:20-08:25 | Temp:7°C Cloud Cover: 10/10 | Rhiannon Leshyk & Erin Jaggard |
| | LMSA04-Point Count | 08:42-09:23 | Wind (beaufort): 1-2 Visibility: Good Precipitation: Light | | |

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|--------|------------|---------------------|----------------|--|--------------------------------------|
| | 2013-04-23 | LMSA04 | 06:00-07:45 | Temp:5°C-9°C Cloud Cover: 0/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA04- Point Count | 08:00-08:36 | Wind (beaufort): 1-2 Visibility: Unlimited Precipitation: None | |
| | 2013-04-24 | LMSA01 | 08:55-09:10 | Temp:7°C Cloud Cover: 10/10 | Rhiannon Leshyk & Erin Jaggard |
| | | LMSA02 | 06:30-07:30 | Wind (beaufort): 0-2 Visibility: Good | |
| | | LMSA03 | 07:45-08:45 | Precipitation: None | |
| | 2013-04-30 | LMSA04 | 07:03-09:02 | Temp:10°C Cloud Cover: 10/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA04-Point Count | 06:07-06:41 | Wind (beaufort): 1-2 Visibility: Good Precipitation: None | |
| | 2013-05-01 | LMSA01 | 08:45-09:05 | Temp:12°C-15°C Cloud Cover: 9/10 to 10/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA02 | 06:30-07:30 | Wind (beaufort): 0-1 Visibility: Good | |
| | | LMSA03 | 07:37-08:35 | Precipitation: None – Very Light Drizzle | |
| | 2013-05-02 | LMSA04 | 07:00-09:10 | Temp:12°C-14°C Cloud Cover: 0/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA04-Point Count | 05:58-06:40 | Wind (beaufort): 0 Visibility: Unlimited Precipitation: None | |
| | 2013-05-03 | LMSA01 | 08:50-09:50 | Temp:15°C-16°C Cloud Cover: 3/10-5/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA02 | 06:30-07:30 | Wind (beaufort): 0 Visibility: Good - Unlimited | |
| | | LMSA03 | 07:40-08:35 | Precipitation: None | |
| | 2013-05-07 | LMSA04 | 06:54-08:30 | Temp:10°C-12°C Cloud Cover: 0/10-1/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA04-Point Count | 05:54-06:31 | Wind (beaufort): 0-1 Visibility :Unlimited Precipitation: None | |
| | 2013-05-08 | LMSA01 | 08:10-08:25 | Temp:15°C-17°C Cloud Cover: 1/10-3/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA02 | 06:05-07:05 | Wind (beaufort): 0-1 | |

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|--------|------------|--------------------|----------------|---|--|
| | | LMSA03 | 07:15-08:00 | Visibility: Unlimited Precipitation: None | |
| | | LMSA04-Point Count | 09:10-09:45 | | |
| | 2013-05-09 | LMSA01 | 07:45-08:00 | Temp:15°C-17°C Cloud Cover: 1/10-3/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA02 | 05:45-06:40 | Wind (beaufort): 0 | |
| | | LMSA03 | 06:40-07:40 | Visibility: Unlimited - Good | |
| | | LMSA04 | 08:30-09:55 | Precipitation: None | |
| | 2013-05-12 | LMSA01 | 07:35-07:50 | Temp:8°C Cloud Cover: 4/10-10/10 | Rhiannon Leshyk |
| | | LMSA02 | 05:50-06:40 | Wind (beaufort): 1-3 | |
| | | LMSA03 | 06:45-07:30 | Visibility: Unlimited - Good | |
| | | LMSA04 | 08:20-09:40 | Precipitation: None | |
| | 2013-05-13 | LMSA04 | 06:45-08:32 | Temp:3°C Cloud Cover: 6/10-10/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA04-Point Count | 05:47-06:24 | Wind (beaufort): 2-3 Visibility: Unlimited Precipitation: None | |
| | 2013-05-14 | LMSA01 | 08:00-08:15 | Temp:0°C-7°C Cloud Cover: 0/10-1/10 | Rhiannon Leshyk & Francesca Commisso |
| | | LMSA02 | 05:45-06:45 | Wind (beaufort): 0-4 | |
| | | LMSA03 | 07:00-07:55 | Visibility: Unlimited Precipitation: None | |
| | | LMSA04-Point Count | 09:00-09:34 | | |
| | 2013-05-22 | LMSA01 | 07:25-07:42 | Temp:12°C-18°C Cloud Cover: 1/10-10/10 | Rhiannon Leshyk, Erin Jaggard & Francesca Commisso |
| | | LMSA02 | 05:17-06:14 | Wind (beaufort): 0 | |
| | | LMSA03 | 06:20-07:15 | Visibility: Poor (Fog) Precipitation: None | |
| | | LMSA04 | 08:15-09:36 | | |
| | 2013-05-23 | LMSA04 | 06:50-09:15 | Temp:18°C Cloud Cover: 10/10 | Rhiannon Leshyk, Erin Jaggard & Francesca Commisso |
| | | LMSA04-Point Count | 05:50-06:25 | Wind (beaufort): 0-1 Visibility: Good Precipitation: Intermittent | |

| Season | Date | Habitat Surveyed | Start/End Time | Weather Conditions | Site Investigators |
|--------|------------|--------------------|----------------|---|--|
| | | | | drizzle | |
| | 2013-05-24 | LMSA04-Point Count | 06:05-06:38 | Temp:5°C Cloud Cover: 10/10 Wind (beaufort): 3-5 Visibility: N/A Precipitation: Light Drizzle | Rhiannon Leshyk, Erin Jaggard & Francesca Commisso |
| | 2013-05-31 | LMSA01 | 08:12-08:30 | Temp:15°C-20°C Cloud Cover: 0/10-1/10 Wind (beaufort): 0-1 Visibility: Good Precipitation: None | Rhiannon Leshyk & Francesca Commisso |
| LMSA02 | | 06:00-07:05 | | | |
| LMSA03 | | 07:10-08:00 | | | |

2.2 Analysis

Actual data for LMSA04 is presented as a summation or total, in the case of species richness, for both transect and point count surveys (spring only). When calculations were made to estimate abundance for each habitat transect and point count data were extrapolated separately using difference formulas (explained below). As transect lengths differed between years (2012-2013) the corresponding transect lengths were used in estimate analysis (**Appendix C**). No current aerial imagery exists for the woodland comprising LMSA04 and the boundaries have been recently modified from quarry activities. These changes could not be incorporated into analyses as a result and therefore the estimates reported here are likely different from that which would be obtained using the correct woodland area.

Transect and point count data was extrapolated for each habitat following methodology modified from Buckland et al. (2008) which calculates density for transect and point count sampling using the following equations:

Point counts

$$\hat{D} = \frac{n}{a} = \frac{n}{k\pi w^2}$$

Transects

$$\hat{D} = \frac{n}{a} = \frac{n}{2wL}$$

Where n is the number of birds counted of the species of interest, k is the number of plots, L is the total length of the transect and w is the fixed radius of the plot or the half width of the transect, respectively. Estimated habitat abundance is then calculated by multiplying the total area of the habitat by the density (\hat{D}). We modified the equation for point counts to reflect the density within a semi-circle as only half of the point count was within the area of interest. The modified equation is as follows:

Point counts

$$\hat{D} = \frac{n}{a} = \frac{n}{k(\frac{1}{2}\pi w^2)}$$

3 RESULTS

To evaluate each habitat, the *Significant Wildlife Habitat Ecoregion 6E Criterion Schedule* (MNR, 2012) was used. This document states that landbird migratory stopover areas are considered significant if used by >200 birds/day and there are >35 species of which at least 10 bird species are recorded on at least 5 difference survey dates. A summary of the total and daily species richness as well as the actual and estimated individual abundance of migrant landbirds observed within each habitat is shown in **Table 3-1** below. Please see **Appendix B** for a copy of all field forms containing the observations and **Appendix C** contains the data extrapolation for calculating estimated daily abundance.

Estimates obtained using the point count data were twice that of the transects. However, the point count data should be interpreted with caution because points were conducted at roadsides which favor the detection of edge species and may not be representative of the entire habitat. This fact is evidenced by the lower species richness detected through the point counts as compared to the transects. Overall, the transect data was chosen to evaluate LMSA04 because it sampled a more representative area of the habitat. Furthermore, it did not change the outcome of the evaluation of the habitat. Please see **Appendix C** of the full data analysis to calculate abundance estimates.

Table 3-1: All Landbird Observations during Pre-Construction Habitat-Use Surveys of LMSA01, LMSA02, LMSA03, and LMSA04

| Habitat | Survey Period | Observed | | Total Species Richness | >10 species/day for 5 days | Extrapolated | Significance |
|---------|---------------|--------------------------|--------------------------|------------------------|----------------------------|---------------------------|--------------|
| | | Maximum Abundance (/day) | Average Abundance (/day) | | | Maximum Abundance (/day)* | |
| LMSA01 | Fall | 45 | 15.5 | 17 | No | 60 | No |
| LMSA02 | Fall | 98 | 47 | 36 | Yes | n/a | No |
| LMSA03 | Fall | 106 | 45 | 29 | Yes | 231 | No |
| LMSA04 | Fall | 190 | 101 | 34 | Yes | 453 | No |
| LMSA01 | Spring | 21 | 9 | 24 | No | 28 | No |
| LMSA02 | Spring | 95 | 45 | 40 | Yes | n/a | No |
| LMSA03 | Spring | 94 | 54 | 38 | Yes | 205** | No |
| LMSA04 | Spring | 104 | 74 | 40 | Yes | 254 | Yes |

* LMSA02 – estimated abundance was lower than actual meaning habitat may have been over sampled therefore the raw values are the only values presented.

** Single >200 birds/day event at the end of May likely contained many breeding birds and not just migrants.

There were sufficient observations made during the site visits in the spring to meet significance for LMSA04. While LMSA03 technically meets the significance criteria, this should be interpreted with caution. This habitat exceeded >200/day only on the last survey visit during the final week of May. Many of the individuals counted during this survey were obviously breeding (i.e. carrying nesting material) and were not migrants. The values collected during the final week of surveys are likely not representative of actual migrant habitat-use.

4 CONCLUSION

There were forty-eight site visits made to Ernestown Wind Park for the evaluation of four candidate habitats treated as significant in the *Natural Heritage Evaluation of Significance Report* (MKI, 2012). Pre-construction habitat-use surveys were conducted in the fall of 2012 (August – October) and the spring of 2013 (April and May). There were sufficient observations made during the site visits in the spring to meet significance for LMSA04. However, insufficient observations were made to deem LMSA01 and LMSA02 as significant. While LMSA03 technically meets the significance criteria, this should be interpreted with caution. This habitat exceeded >200 birds/day only on the last survey visit during the final week of May. Many of the individuals counted during this survey were obviously breeding (i.e. carrying nesting material) and were not migrants. The values collected during the final week of surveys are likely not representative of actual migrant habitat-use. Consequently, the potential negative environmental effects and mitigation measures as well as the environmental effects monitoring plan for LMSA01, LMSA02 and LMSA03, presented in the *Natural Heritage Environmental Impact Study Report* (MKI, 2012), are not applicable to the Ernestown Wind Park Project, as the habitats have been determined to be not significant. LMSA04 has been determined to be significant and as a result all the potential negative environmental effects and mitigation measures as well as the environmental effects monitoring plan for LMSA04, presented in the *Natural Heritage Environmental Impact Study Report* (MKI, 2012), are applicable to the Ernestown Wind Park Project.

5 REFERENCES

- M.K. Ince and Associates Ltd. 2012. *Natural Heritage Evaluation of Significance Report*. 133p.
- M.K. Ince and Associates Ltd. 2012. *Natural Heritage Environmental Impact Study Report*. 78p.
- Ministry of Natural Resources. 2012. *Significant Wildlife Habitat Ecoregion 6E Criterion Schedule*. 42p.
- Ministry of Natural Resources. 2011. *Natural Heritage Assessment Guide for Renewable Energy Projects*. 99p.

6 QUALIFICATIONS AND LIMITATIONS

M. K. Ince & Associates Ltd. (MKI) has prepared this report in accordance with its proposal and information provided by its Client. The information and analysis contained herein is for the sole benefit of the Client and save for regulatory review purposes may not be relied upon by any other person.

MKI's assessment was made in accordance with guidelines, regulations and procedures believed to be current at this time. Changes in guidelines, regulations and enforcement policies can occur at any time and such changes could affect the conclusions and recommendations of this report.

The reports, maps and related documents may rely on information provided to MKI by the Client. This information may include but is not limited to manufacturer and construction specifications and other related information. Maps are created using a Geographic Information System (GIS) that compiles records, information, and data from various sources which may contain errors. While we have referred to and made use of reports, maps and geospatial data and specifications prepared by others, we assume no liability for the accuracy of the information contained within.

Maps and documents made available by MKI are not legal surveys and are not intended to be used as such. No original surveying is included as part of these maps. If any contradictions exist between this document and relevant municipal, provincial or federal laws, regulations, codes, or policies, the text of the laws, regulations, codes or policies will be the legal authority.

APPENDIX A – PROTOCOL AND CORRESPONDENCE

Landbird Migratory Stopover Area (LMSA01, LMSA02, LMSA03 & LMSA04) Protocol

Field staff will visit identified candidate landbird migratory stopover areas to observe for the presence of migrating birds and will evaluate habitat according to methodology outlined in the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011) for "stopover counts". Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes. Transects spaced at least 200 m apart will run north to south within candidate habitat. This will ensure that the majority of the habitat is sampled for the presence of migrating birds.

During the initial visit, transects will be walked in field and GPS tracks will be recorded. The route will also be flagged with fluorescent tags spaced ~20 m apart or within reasonable visual distance, so that the route can be followed on subsequent visits.

Surveys will be conducted by an individual experienced in identifying the birds of eastern North America both aurally and visually. Transects will be walked twice weekly in the spring, from mid-March to late May, and in the fall, from mid-August to late October. In total, 20 visits will be made during fall and another 20 during spring. All surveys will commence at sunrise and continue to no later than four hours after sunrise. No surveys will be conducted during severe weather events such as high winds and/or heavy precipitation, as this can bias results. All birds heard or seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see

Appendix A3):

- Date
- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect
- Behaviour recorded as : foraging, mobbing, migration, flying , perching, perched on ground, swimming
- Number of passes
- Height category (0=0-9m; 1=10-19m; 2=20-29m; 3=30-39m, etc.)
- Flight direction
- Direction and distance from observer

Species of particular interest (focal species) include: all migratory songbirds - for a complete list see <http://www.ec.gc.ca/nature/default.asp?lang=En&n=496E2702-1>. All migratory raptors – for a complete list see Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the woodlot is used by >200 birds/day of >35 species. At least 10 bird species recorded have to be recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant.



Thomas Bernacki <thomas.bernacki@mkince.ca>

follow-up re: Ernestown pre-construction questions and concerns

1 message

Erin Jaggard <erin.jaggard@mkince.ca>
To: "Prevost, Eric (MNR)" <eric.prevost@ontario.ca>
Cc: Thomas Bernacki <tom.bernacki@mkince.ca>

Tue, Apr 30, 2013 at 1:40 PM

Dear Eric

Thank you for your time this afternoon to clarify some questions and concerns regarding our Ernestown pre-construction surveys.

In response to my questions about the observations made thus far at ABH03 and ABH04, the presence of high abundance of spring peepers and western chorus frog, likely denotes the significance of these two candidate habitats. Given however that the EEMP requires post-construction environmental effects monitoring, it will be necessary to move forward with the two additional surveys to obtain baseline info on species diversity and abundance.

Thank you also for assuring us that observations made during post-construction environmental effects monitoring may be subject to reflexive and responsive interpretation given the complexity of the land use. As I mentioned, a large portion of LMSA04 has been compromised given the expansion of the quarry. Should changes in diversity of abundance be observed during post-construction monitoring, it may be necessary to examine other changes to the landscape (agriculture, quarry, and asphalt plant impacts) and their possible influence.

As always, be in touch.

Regards,
Erin

--

Erin Jaggard, MSc

Environmental Project Coordinator

M.K. Ince and Associates Ltd.

11 Cross Street, Dundas, Ontario L9H 2R3

Phone: 905.628.0077

Fax: 905.628.1329

Email: erin.jaggard@mkince.ca

Web: www.mkince.ca



Ernestown: Fall field work, Butterfly and Landbird Migratory Stopover surveys

Bonnie Van Tassel <bvantassel@horizonlegacy.com>
To: Thomas Bernacki <thomas.bernacki@mkince.ca>

Thu, Aug 30, 2012 at 12:03 PM

Hi Tom,

Please review Eric's comments and copy me on your reply.

Bonnie Van Tassel, Project Coordinator
Horizon Legacy Energy Corp.

801 - 2300 Yonge Street Toronto ON M4P 1E4
Tel 416.864.9977 x 8222 Fax 416.864.9568
bvantassel@horizonlegacy.com

----- Forwarded message -----

From: **Prevost, Eric (MNR)** <eric.prevost@ontario.ca>
Date: Thu, Aug 30, 2012 at 12:00 PM
Subject: RE: Ernestown: Fall field work, Butterfly and Landbird Migratory Stopover surveys
To: Bonnie Van Tassel <bvantassel@horizonlegacy.com>

Hello Bonnie,

I have reviewed the methodology and have the following comments.

The survey routes do not include the entire extent of the habitat. Transects along Taylor Kidd BLVD and the rail tracks would be appropriate to capture the entire extend of the habitat.

Field sheets should include the distance of birds or flocks from the transect line. This data later analyzed, will assist in calculating species densities and abundance at a later date.

Based on the methodologies outlined in MNR's guidelines, behavioural and flight data may not be required for subsequent analysis of significance for the habitats being surveyed.

Should you have any questions or concerns with these comments, please feel free to contact me directly.

Best wishes,

Eric R. Prevost
Renewable Energy
Planning Ecologist
Ontario Ministry of Natural Resources
Peterborough District
300 Water Street
Peterborough, ON K9J 8M5

APPENDIX B – FIELD FORMS

ERNESTOWN

Avian Stop Over Count Observations

Date: **30 AUG 2012** Surveyor(s): **ROB TYMSTRA**

Start Time: **040** End Time: **725** Duration of transect: **18T**

Eastings: **362929** Northings: **4899.515** Station #: **Transect J**

Cld. Cover: **0** Visibility: **Unlimited** Temp Range: **12°C → 15°C**

Bar. Pr. Wind (Bft): **Calm**

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|---------|----------------------|---|-----------------------|------------------------------|--|-------------------|
| MERL | 2 | Flying | 20 m | W | 50m | 2 |
| BLJA | 4 | in Woods | 0-10m | N.S | 10 m + | 4 |
| AMCR | 2 | calling distance | - | N | 50m + | 2 |
| SOSP | 2 | perched | 0 | S | 30 m + | 2 |
| CAGO | 86 | Flying | 5 → 60m | W | 50m + | 86 |
| EUST | 130 | flock flying | 10 m | N | 500 m + | 130 |
| BCCH | 2 | woods calling | 0 | E | 10 m | 2 |
| VEER | 1 | heard woods | 0 | E | 10 m | 1 |
| AMRO | 2 | heard | 0 | E | 20 m | 2 |
| AMGO | 2 | PR. flying | 10 m | S | 50 m | 2 |
| NOFL | 1 | heard | 0 | W | 200 m | 1 |
| YRWA | 1 | heard | 0 | E | 100 m | 1 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

ERNESTOWN

Avian Stop Over Count Observations

Date: Aug 30 / 2012 Surveyor(s): Rob Tymstra

Start Time: ~~8:00~~ 7:35 End Time: 8:38 Duration of transect:

Eastings: Northings: Station #: Transect 2

Cld. Cover: 0 Visibility: Unlimited Temp Range: 20-23

Bar. Pr.: Wind (Bft): W1

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|----------------------------------|----------------------|---|-----------------------|------------------------------|--|-------------------|
| REVI | 3 | calling | 0 (ground level) | — | 10-15 m | 3 |
| COYE | 4 | perched | 0 | — | 5-15 m | 4 |
| HOFI | 1 | perched | 0 | — | 10 m | 1 |
| GRCA | 2 | perched | 0 | — | 10 m | 2 |
| BLJA | 5 | " | 0 | — | 0-50 m | 5 |
| CEDW | 3 | flying | 0 0/x | W | 20 m | 3 |
| LEFL | 2 | perched | 0 | — | 15 m | 2 |
| AMRO | 1 | perched | 0 | — | 10 m | 1 |
| AMGO | 1 | flying | 0/x | — | 10 m | 1 |
| SOSP | 2 | perched | 0 | — | 25 m | 2 |
| NOFL | 1 | calling | 0 | — | 100 m W | 1 |
| WBNU | 2 | calling | 0 | — | 5 m | 2 |
| EWPE | 2 | calling perched | 0 | — | 10 m | 2 |
| BCCH | 3 | feeding | 0 | — | 10 m | 3 |
| BAOR | 1 | heard | 0 | — | 20 m W | 1 |
| Ovenbird seen after count period | | | | | | |

Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

ERNESTOWN

RECEIVED
SEP 14 2012
BY:

Avian Stop Over Count Observations

Date: Aug 30/2012 Surveyor(s): Rob Tymstra

Start Time: 735 End Time: 838 Duration of transect:

Eastings: 562327 Northings: 4898990 Station #: Transect 3

Cld. Cover: 0 Visibility: Unlimited Temp Range: 20-22

Bar. Pr. Wind (Bft): W 1

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|---------|----------------------|---|-----------------------|------------------------------|--|-------------------|
| REVI | 1 | calling | 0 | - | 10 m | 1 |
| BCCH | 5 | feeding | 0 | - | 5 m | 5 |
| WTSP | 1 | calling | 0 | - | 15 m | 1 |
| EWPE | 1 | calling | 0 | - | 10 m | 1 |
| WOTH | 1 | " | 0 | - | 20 m | 1 |
| BLJA | 8 | " | 0 | - | 10-50 m | 8 |
| NOFL | 1 | calling | 0 | - | 30 m | 1 |
| GRCA | 1 | perched | 0 | - | 10 m | 1 |
| CCYE | 2 | feeding | 0 | - | 5-10m | 2 |
| WBNV | 1 | calling | 0 | - | 10 m | 1 |
| AMCR | 2 | calling | 0 | - | 100 m | 2 |
| EUST | 8 | flying | X/O | W | 300 m | 8 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover

ERNESTOWN

Avian Stop Over Count Observations

Date: Aug 31-2012 Surveyor(s): Rob Tymstra

Start Time: 06⁰⁰ End Time: 10⁰⁰ Duration of transect: 4 hrs

Eastings: 362873 Northings: 4898128 Station #: 1 - South of Tracks

Cld. Cover: 100% Visibility: Good Temp Range: 21-28°C

Bar. Pr. 1030mb ↓ Wind (Bft): SW2 → 3

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, flying, perching, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer and Location Relative to Turbines | Total Individuals |
|---------|----------------------|---|-----------------------|------------------------------|--|-------------------|
| MODO | 12 | feeding flying | 0 | - | 10-100 m | 12 |
| GRCA | 4 | feeding | 0 | - | 10-20 m | 4 |
| CAGO | 111 | groups flying | 1, 2 | W | 30-200 m | 111 |
| EATO | 1 | calling | 0 | - | 20 m | 1 |
| BLJA | 20+ | flying, calling | 0 | all | 10-50 m | 20+ |
| AMGO | 5 | flying | 0 | - | 10-20 m | 5 |
| MAWA | 2 | feeding | 0 | - | 5 m | 2 |
| REVI | 1 | " | 0 | - | 15 m | 1 |
| NAWA | 2 | " | 0 | - | 5-10 m | 2 |
| WTSP | 3 | " | 0 | - | 5 m | 3 |
| RWBZ | 1 | calling | 0 | - | 10 m | 1 |
| BAWW | 1 | feeding singing | 0 | - | 5 m | 1 |
| BECK | 10 | feeding | 0 | - | 10-20 m | 10 |
| LEFL | 3 | calling | 0 | - | 10-15 m | 3 |
| AMRO | 4 | feeding | 0 | - | 10-20 m | 4 |
| SOSP | 12 | " | 0 | - | 5-20 m | 12 |
| COYE | 4 | " | 0 | - | 10-30 m | 4 |
| OCWA | 1 | " | 0 | - | 10 m | 1 |
| RBGR | 1 | " | 0 | - | 10 m | 1 |
| HOLA | 1 | flying | 2 | N | 50 m | 1 |
| GBHE | 1 | flushed from creek | 0 | N | 150 m | 1 |
| MAWO | 1 | calling | 0 | - | 10 m | 1 |
| CEDW | 19 | perched | 0 | - | 10 m | 19 |
| NOCA | 1 | " | 0 | - | 20 m | 1 |

Black + white warblers

Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

| | | | | | | |
|------|-----|---------|---|---|--------|-----|
| PIWO | 1 | flying | 0 | S | 50 m | 1 |
| RTHA | 1 | flying | 3 | N | 100 m | 1 |
| NOFL | 1 | calling | 0 | - | 50 m | 1 |
| HOWR | 1 | call | 0 | - | 20 m | 1 |
| CHSP | 15+ | feeding | 0 | - | 5-25 m | 15+ |

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Renewable Energy & Environmental Consulting

11:30 - Green-backed Heron - NE corner on creek - 1

Avian Stop Over Count Observations

| | | |
|----------------------------|-----------------------------|--------------------------------------|
| Date: <u>202-09-06</u> | Surveyor(s): <u>RFL</u> | |
| Start Time: <u>7:30 AM</u> | End Time: <u>8:15 AM</u> | Duration of transect: <u>45 MINS</u> |
| Eastings: _____ | Northings: _____ | Station #: <u>LMSA01</u> |
| Cld. Cover: <u>90%</u> | Visibility: <u>Very Far</u> | Temp Range: <u>21°C</u> |
| Bar. Pr.: _____ | Wind (Bft): <u>0-1</u> | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|----------------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| MULLIN | 1 | Flying | 30m | W | 50m | 1 |
| MO DO | 1 | " | " | " | " | 1 |
| BCCA | | Calming | 10m | — | 10m | 8 |
| BLJA | | " | — | — | >200 + 50 (E) | 8 |
| AMCR | | " | — | — | " | 4 |
| AMCR | | " | 0 | — | 80m (W) | 7 |
| OCRO | | Flying | 100m | NW | >200m | 16 |
| | 1 | " | " | " | " | 1 |
| WITU (200-200) | 1 | FUSHIP | ~15m | W | 5-50m (W) | 1 |
| EMPG | 1 | ORUNG | ~10m | — | 30m (C) | 1 |
| HETA | 1 | " | " | — | " | 1 |
| AMPD | 1 | FLW | 5m | E | 5m (C) | 1 |
| RBNU | | Calming | 10m | — | 10m (W) | 3 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

♀ NoHA - seen not on count in neighbouring field.
 COLO - low heard calling in distance.

Avian Stop Over Count Observations

| | | | |
|---|---|--|--|
| Date: <input style="width: 150px;" type="text" value="2012-09-06"/> | | Surveyor(s): <input style="width: 150px;" type="text" value="PPL"/> | |
| Start Time: <input style="width: 100px;" type="text" value="9:40"/> | End Time: <input style="width: 100px;" type="text" value="10:24"/> | Duration of transect: <input style="width: 100px;" type="text" value="~45mins"/> | |
| Eastings: <input style="width: 100px;" type="text"/> | Northings: <input style="width: 100px;" type="text"/> | Station #: <input style="width: 100px;" type="text" value="LMSA02"/> | |
| Cld. Cover: <input style="width: 100px;" type="text" value="50%"/> | Visibility: <input style="width: 100px;" type="text" value="J. FAL"/> | Temp Range: <input style="width: 100px;" type="text" value="26°C"/> | |
| Bar. Pr.: <input style="width: 100px;" type="text"/> | Wind (Bft): <input style="width: 100px;" type="text" value="0-1"/> | | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| BIRD | | GRUNG | 1 | - | ~20-50 | 13 |
| CAGW | | " | UR | - | ~100-200 | 8 |
| BOCK | | " | 0 | - | N10 | 6 |
| EAPR | | " | 1 | - | ~30 | 3 |
| NDFL | | " | 1 | - | ~20 | 2 |
| HANU | | " | 1 | - | ~30 | 1 |
| AMCO | | " | 1 | - | 10 | 2 |
| AMCO | | " | 1 | - | 10 | 1 |
| Dowo | | " | 1 | SE | 11 | 2 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4= 40-49 m; 5= 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover

Avian Stop Over Count Observations

Date: 2012-09-06 Surveyor(s): KFL
 Start Time: 8:30 End Time: 9:40 Duration of transect: 1 hr 10 mins
 Eastings: Northings: Station #: LMSA 03
 Cld. Cover: 10% Visibility: Very Far Temp Range: 24°C - 26°C
 Bar. Pr.: Wind (Bft): 1-2

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration) | Height Category (1-X) | Flight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|-----------------|----------------------|--|-----------------------|-------------------------------|--------------------------------------|-------------------|
| PINVO | I | Callings | 1 | - | (S) 20 | 1 |
| BLJA | | " | 1 | - | (E) 2-5m | 15 |
| GLCA | | " | 1 | - | 10-20 (S+N) | 3 |
| NOFL | | Perched, Callings | 1 | - | " | 3 |
| AMCA | | " | Unknown | - | > 200m (W) | 2 |
| AMRO | | " | 1 | W | 10m | 5 |
| AMBO | I | " | 0 | W | 5m | 1 |
| CEDR | | Callings | 1 | W | 5-10m | 7 |
| RTNA | I | Flying | 2 | N | 10 (N) | 1 |
| AMRO | | Callings | 0 | - | 7 (10) | 3 |
| EAPE | I | " | Unknown | - | E (30) | 1 |
| DBND | | Callings | 0 | - | W (10) | 3 |
| BCCH | | " | 0 | - | S (10) | 4 |
| BNNA | I | Foraging | 0 | - | SE (10) | 1 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover

Avian Stop Over Count Observations

Date: 2012-09-11 Surveyor(s): RFL
 Start Time: 9:30 End Time: 10:00AM Duration of transect: 30 mins
 Eastings: Northings: Station #: LMSA01
 Cld. Cover: 5/10^m Visibility: UNLIMITED Temp Range: 15°C
 -Bar. Pr.: Wind (Bft): Ø

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| BLJA | | CALLING | - | - | 40m W | 4 |
| Amro | I | " | Ø | - | 20m E | 1 |
| CAGE | | TRYING | X | E | >100m N | 3 |
| KILL | I | CALLING | UX | UN | 100m N | 1 |
| EJST | ~100 | PERCHED | Ø | - | 20m N | 110 |
| BCEH | | PERCHED | I | - | 10m S | 3 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

Avian Stop Over Count Observations

Date: 2012-09-11 Surveyor(s): RFL
 Start Time: 6:30 AM End Time: 8:00 AM Duration of transect: 1.5 hrs.
 Eastings: Northings: Station #: LMSA 02
 Cld. Cover: 1/10^m Visibility: UNLIMITED Temp Range: 6°C - 11°C
 Bar. Pr.: Wind (Bft): Ø

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|--------------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| RBNU | | CALLING | 0 | — | 10m NE | 4 |
| BJA | ### ## ## III | " | UNKNOWN | — | 10->200m N-SE | 19 |
| CAGO | ### ## ## ## ## ## ## ## | " | X | SW | >200m W | 24 |
| NOFL | | FLYING | 1 | SW | 5m W | 4 |
| GRCA | I | CALLING | 0 | — | 10m E | 1 |
| PIWO | I | " | UNKNOWN | — | >100m E | 1 |
| HETH | I | PERCHED | Ø | — | 10m S | 1 |
| COVE | II | CALLING | Ø | — | 10m S | 2 |
| AMCO | ### II | " | I | — | 20m SE | 7 |
| BHVI | I | PERCHED | J | — | 30m S | 1 |
| WTSE | ### | PERCHED | Ø | — | 5m S | 5 |
| PCDW | | CALLING | — | — | 20m E | 3 |
| BLNU | I | FLYING | X | NE | 50m W | 1 |
| AMRO | II | CALLING | Ø | S | 15m S | 2 |
| BCH | ### | " | Ø | — | 5-10m S | 5 |
| RBGL | I | " | II | — | " | 1 |
| OVEN | II | " | II | — | " | 2 |
| REVI | II | PERCHED | II | — | " | 2 |
| BTWA | I | " | II | — | " | 1 |
| CSWA | I | " | II | — | " | 1 |
| BTNW | I | " | II | — | " | 1 |
| NANA | I | " | II | — | " | 1 |
| ULTR | I | " | Ø | — | 10m N | 1 |
| AMCE | | CALLING | JK | JK | 200m SW | 3 |
| | | | | | | |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

BTWA - Black-throated Blue Warbler
 BTNW - " " Green " "

Avian Stop Over Count Observations

| | | | | | |
|-------------|-------------------|-------------|--------------|-----------------------|-------------|
| Date: | 2012-09-11 | | Surveyor(s): | RFL | |
| Start Time: | 8:00 AM | End Time: | 9:15 AM | Duration of transect: | 1.25 hrs |
| Easting: | | Northings: | | Station #: | LMSA 03 |
| Cld. Cover: | 2/10 ^m | Visibility: | UNLIMITED | Temp Range: | 11°C - 15°C |
| Bar. Pr.: | | Wind (Bft): | 0 | | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| GRCA | | ORUNGS | 0 | — | 10m N | 2 |
| GAPE | | " | 1 | — | 40m E | 2 |
| RBNU | | ORUNGS | 1 | — | 10m S | 4 |
| BLJA | | " | 1 | — | >20m N | 14 |
| AMCR | | " | UK | — | >200m S | 4 |
| AMRO | | " | 1 | — | 10m S | 2 |
| R9VI | | ORUNGS | 0 | — | 15m N | 1 |
| BCH | | ORUNGS | 0 | — | 20m N | 2 |
| AMCO | | ORUNGS | 1 | — | ~20m E | 3 |
| HECH | | ORUNGS | 0 | — | 10m S | 1 |
| NOFL | | " | UK | — | 40m E | 2 |
| CRZO | | FLYING | X | W | >200m N | 3 |
| COYE | | PERCHED | 0 | — | 20m N | 1 |
| DONO | | FLYING | 0 | W | 30m NW | 2 |
| CDW | | ORUNGS | 0 | — | 10m NE | 5 |
| MODO | | PERCHED | 0 | — | 10m W | 1 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

Avian Stop Over Count Observations

QUARRY IS LOUD TODAY

Date: 2012-09-12 Surveyor(s): PFL

Start Time: 6:30 AM End Time: 8:35 AM Duration of transect: 2 hrs → TRAIL
↓ TRANCE TIME!

Eastings: Northings: Station #: LMSA 04

Cld. Cover: 0 Visibility: Very Fair Temp Range: 15°C - 20°C

Bar. Pr.: Wind (Bft): 0-1

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| BCEH | | ORNING | 0 | — | 10M SE | 25 |
| AMCR | | " | UL | UN | >200M E. | 9 |
| BLBW | I | FLYING | X | NW | 100M W | 1 |
| BLJA | | CROWD | I | — | 20M W | 23 |
| (AGO) | SEE BELOW | " | | NW | >100M NW | 60 |
| BLSA | | " | X | — | 20M E | 12 |
| COVE | | " | X | — | " | 6 |
| SOSE | | PERCHED. | 0 | — | 20M E | 16 |
| ALFL | | ORNING | 0 | — | 10M NE | 2 |
| BLKI | I | " | 0 | — | 10M N | 1 |
| AMGO | | " | UL | UL | 20M NW | 16 |
| CDIA | | CROWD | 0 | — | 10M S | 5 |
| PBHE | I | FLYING | X | S | 100M E | 1 |
| NOFL | | ORNING | I | — | 20M SE | 4 |
| RTHD | I | FORAGING | 0 | — | 1M E | 1 |
| HOWR | | ORNING | 0 | — | 10M N. | 2 |
| DONO | I | " | 0 | — | 10M S | 1 |
| AMRO | | " | 0 | > | 10M SE | 3 |
| WOTH | I | " | 0 | — | 10M S | 1 |
| HAWO | I | " | 0 | — | 20M W | 1 |
| BLNU | I | " | 0 | — | 30M SE | 1 |
| EUST | | PERCHED. | 7 | — | 30M S. | 5 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

BLKI - BALTIC KINGFISHER

AGO
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Avian Stop Over Count Observations

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|---|---|---|--|
| Date: 202-09-19 | | Surveyor(s): RFL | |
| Start Time: 10:00am | End Time: 10:20am | Duration of transect: 20 mins | |
| Eastings: | Northings: | Station #: LMSA01 | |
| Cld. Cover: 0/10 | Visibility: UNLIMITED | Temp Range: 10°C | |
| Bar. Pr.: | Wind (Bft): 1-2 | | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, <i>Flocking</i>) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|---|-----------------------|---------------------------------|--------------------------------------|-------------------|
| BLJA | +4 | GRUNTING | UL | UL-EW | >100m W | 23 |
| SO SP | | " | 0 | - | 10m W | 1 |
| MG GO | | " | 1 | UL | 30m S | 2 |
| NAWA | | ALCOO'D | 0 | - | 5m E | 1 |
| TUVU | | SOARING | 6 | NE | 50m N | 1 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m 7 = 70+; X = Flyover

Avian Stop Over Count Observations

Date: 2012-09-19 Surveyor(s): RPL
 Start Time: 6:50 AM End Time: 8:25 AM Duration of transect: 95 mins.
 Eastings: _____ Northings: _____ Station #: LMSA 02
 Cld. Cover: 1/16 Visibility: UNLIMITED Temp Range: 50C
 Bar. Pr. _____ Wind (Bft): 2-3

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| WESP | IIII IIII | SINGING - CRACK | Ø | — | 10M N | 11 |
| BECH | IIII IIII | CALLING | Ø | — | 10M S | 13 |
| BLJA | IIII IIII IIII | CALLING | UR | UR | 520M SE | 20 |
| CARBA | IIII II | CALLING | Ø | — | 10M E | 7 |
| COYE | II | II SINGING | Ø | — | 5M N | 2 |
| ORGO | SW BELOW | FLYING | X | NW | 50M E | 34 |
| AMCR | IIII | CALLING | UR | UR | 5100M E | 4 |
| SUHT | V | — | Ø | — | 20M NE | 2 |
| AMRO | II | PERCHED | 1 | — | 5M N | 2 |
| VERR | II | CALLING | Ø | — | 10M E | 2 |
| SOSP | IIII IIII | SINGING - CRACK | Ø | — | 10M N | 6 |
| NOFL | I | CALLING | Ø | — | 10M N | 1 |
| WBNU | IIII | — | Ø | — | 20M E | 3 |
| YRNA | I | PERCHED | Ø | — | 5M N | 1 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover
ORGO 24 + IIII IIII

Avian Stop Over Count Observations

| | | | | | |
|-------------|------------|-------------|-----------------------|-----------------------|----------|
| Date: | 2012-09-20 | | Surveyor(s): | RFL | |
| Start Time: | 7:30 AM | End Time: | 9:20 AM | Duration of transect: | 110 MINS |
| Eastings: | | Northings: | | Station #: | LMSA04 |
| Cld. Cover: | 1/10 | Visibility: | FAR | Temp Range: | 14°C |
| Bar. Pr.: | | Wind (Bft): | SUSTAINED 2 GUSTS 4-5 | | |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| BLWA | | CALLING | 0 | - | 10m SE | 17 |
| BLWA | | CALLING | 0 | UK | 30m N | 23 |
| WTSP | | Juv. Singing & Chirps. | 0 | - | 10m SE | 8 |
| BLKI | 1 | CALLING | 0 | - | 20m NE | 1 |
| CDN | | | 1 | - | 10m NW | 8 |
| SOSP | | CALLING | 0 | - | 20m E | 18 |
| AMGO | | FLYING | X | SE | 10m W | 8 |
| GIBIT | 1 | FLUSHED | 0 | 0 | 30m E | 1 |
| AMLO | 1 | Keena | 1 | - | 40m W | 1 |
| CHSP | | CALLING | 0 | - | 10m SE | 6 |
| HAWO | | | 0 | - | 15m E | 2 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

WTSP - YOUNG BIRDS LEARNING ORAL (Juv. Singing)
 BLKI - BEECED KINGFISHER

Avian Stop Over Count Observations

Date: 2012-07-19 Surveyor(s): DFL
 Start Time: 8:30am End Time: 9:35am Duration of transect: 65 mins
 Eastings: Northings: Station #: LMSA 03
 Cld. Cover: 0/10 Visibility: UNLIMITED Temp Range: 8°C
 Bar. Pr.: Wind (Bft): 3

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, migration, | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| SOSP | I | PERCHED | Ø | — | 10m NE | 1 |
| BLJA | | CIRCLING | UX | UR | >100m S | 23 |
| BENU | II | " | Ø | — | 20m S | 3 |
| AMRE | I | FORAGING | Ø | — | 10m W | 1 |
| WRNU | | CIRCLING | Ø | — | 10m E | 5 |
| AMGO | I | 11 FLYING | I | E | 20m SE | 1 |
| MANA | I | FORAGING | I | — | 20m E | 1 |
| ONON | II | " | Ø | — | 10m N | 1 |
| RTHA | I | CIRCLING | UX | UR | 50m NE | 1 |
| BECH | | " | Ø | — | 10m W | 5 |
| AMRO | | PERCHED | Ø | — | 10m SW | 3 |
| COUW | | " | Ø | — | 10m NW | 3 |
| PIWO | I | CIRCLING | UX | UR | 50m S | 1 |
| SOSP | | " | Ø | — | 10m N | 4 |
| AMCR | | FLYING | X | NW | 50m NW | 4 |
| WTCU | | FORAGING IN SW | Ø | — | 50m W | 3 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover



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 Renewable Energy & Environmental Consulting

Avian Stop Over Count Observations

Date: 2012-09-27 Surveyor(s): RFL
 Start Time: 10:25 AM. End Time: 10:52 Duration of transect: 27 mins
 18T Eastings: 0362707 Northings: 4899979 Station #: LMSA 01
 Cld. Cover: 0/10 Visibility: UNLIM Temp Range: 10°C
 Bar. Pr. _____ Wind (Bft): 0-1

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|----------------------|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| SOSP | | PERCHING | 0 | — | 10m SW | 4 |
| WSP | | CHIRPING FORAGING | 0 | — | 10m SW - SW | 23 |
| BTA | | " | 1 | — | 100 m W | 9 |
| AMCR | | " | UR | UR | 2200m N | 3 |
| RUGR | | DRUMMING | 0 | — | 30m E | 1 |
| WSNU | | CHIRPING FORAGING | 1 | — | 40m NE | 2 |
| BCH | | PERCHING | 0-1 | — | 5m. NE | 11 |
| EATO | | FORAGING | 0 | — | 10m N | 1 |
| AMCO | | FLYING | 2 | W | 20m W | 2 |
| HAWO | | CHIRPING | UR | — | 100m W | 1 |
| SCJO | | FORAGING | 0 | — | 20m N | 2 |
| RWBL | | FLYING | X | W | 1m S | 4 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover
 45/7
 EATO - EASTERN TOWHEE

Avian Stop Over Count Observations

| | | | |
|-----------------------|------------|--------------|-----------|
| Date: | 2012-09-27 | Surveyor(s): | RA |
| Start Time: | 7:00 AM | End Time: | 8:45 AM |
| Duration of transect: | 105 mins | | |
| 18T Eastings: | 0362232 | Northings: | 4899014 |
| Station #: | LMSA 02 | | |
| Cld. Cover: | <1/10 | Visibility: | UNLIMITED |
| Bar. Pr.: | | Temp Range: | 7°C |
| | | Wind (Bft): | 0 |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|-----------------|---|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| ACRO | 22+20+10+10+15 | FLYING | X | S | >200m W | 87 |
| AMCR | | CREWING | 0 | - | >200m W | 6 |
| BLJA | | " | " | - | 10m - 20m S | 29 |
| AMRO | | " | 0 | - | 10m | 16 |
| WHSP | | " | 0 | - | 10m N | 13 |
| BLACKBIRD FLOCK | ~ 2000 + ³⁰⁰ + ⁵⁰ | FLYING | X | W | 20-100m N | ~2355 |
| SOSP | | CREWING | X | - | 10m W | 1 |
| SCW | | PERCHED | 1 | - | 10m N | 3 |
| CIRCA | | CREWING | 0 | - | 10m N | 7 |
| BCH | | " | 1 | - | 20m S | 20 |
| NOFL | | " | 1 | - | 30m W | 3 |
| BTNW | | FORAGING | 1 | - | 10m N | 3 |
| WBND | | CREWING | 1 | - | 10m N | 7 |
| BRER | | FORAGING | 0 | - | 5m N | 2 |
| RUGR | | PERCHED | 0 | E | 25m E | 4 |
| GCKI | | CREWING & PERCHED | 0-1 | - | <10m NE | 19 |
| SWTH | | PERCHED | 0 | - | 10m S | 1 |
| CDOW | | CREWING | 0 | - | 10m S | 2 |
| PIWO | | CREWING | 0 | - | 5m NW | 1 |
| NANA | | PERCHED | 1 | - | 10m N | 1 |
| MANA | | FORAGING | 1 | - | 5m W | 1 |
| RWBL | | FLYING | X | W | 5-20m S | 15 |
| DOWD | | FORAGING | 1 | - | 10m S | 2 |
| WRWA | | " | 1 | - | 15m N | 1 |
| BHVI | | " | 0 | - | 20m S | 1 |

Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

BLACKBIRD FLOCK - Approx. 2000 birds flew west over Project area probably from nighttime roost. mainly red-winged blackbirds but some starlings.

98/116

Avian Stop Over Count Observations

| | | | |
|---------------|------------|-----------------------|----------|
| Date: | 2012-09-27 | Surveyor(s): | RFL |
| Start Time: | 8:45 AM | End Time: | 10:05 AM |
| | | Duration of transect: | 80 MNS |
| 18T Eastings: | 0362709 | Northings: | 4899152 |
| | | Station #: | LMSA 03 |
| Cld. Cover: | 0/10 | Visibility: | UNLIM |
| Bar. Pr.: | | Temp Range: | 8°C |
| | | Wind (Bft): | 0 |

| Species | Tally of Individuals | Behaviour (Foraging, mobbing, flying, perched on ground) | Height Category (1-X) | Fight Direction (N, S, E, W) | Direction and Distance from Observer | Total Individuals |
|---------|---|--|-----------------------|------------------------------|--------------------------------------|-------------------|
| BLVA | ### ### ### ### | CALLING | UC | - | 20m - 2200m NS | 27 |
| CAGO | ## + 10 + 20 + 5 | " | X | W | 5100 m | 40 |
| WBNV | ### ### ### | " | 1 | - | 50m E | 18 |
| GRCA | ### ### ### ### ### | " | 0 | - | 10MS. | 29 |
| AMAO | 1 | " | 0 | - | 20m W | 1 |
| BECH | ### ### ### | " | 0 | - | 10m S | 15 |
| RWBL | ### ### | Flying | X | W | 1m NW | 10 |
| HAWO | | FORAGING | 1 | - | 10m W | 2 |
| AMCA | | CALLING | UC | UC | >200m N. | 3 |
| OMN | 1 | Flying | 0 | W | 10M S | 1 |
| RBNV | 1 | CALLING | 1 | - | 20m E | 1 |
| MANA | 1 | PERCHED | 1 | - | 5m S | 1 |
| BTNW | 1 | FORAGING | 0 | - | 10m E | 1 |
| BHVI | | CALLING/SINGING | 1 | - | 15m N. | 3 |
| VBSA | 1 | FORAGING | 1 | - | 5m N | 1 |
| WTSP | ### | CALLING | 0 | - | 10m N | 9 |
| SCJU | 1 | " | 0 | - | 10m E. | 1 |
| SOSP | | CALLING/SINGING | 0 | - | 15m N. | 2 |
| NOFL | 1 | CALLING | UN | - | 50m NE | 1 |
| GRCA | | CALLING | 0 | - | 10 m S | 2 |
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Height Category: 0 = 0-9 m; 1 = 10-19 m; 2 = 20-29 m; 3 = 30-39 m; 4 = 40-49 m; 5 = 50-59 m; 6 = 60-69 m; 7 = 70+; X = Flyover

90/13