



ecology and environment, inc.

Memorandum

To: Heritage Wind, LLC
From: Justin Zoladz
Date: September 26, 2017
Re: 2017 Breeding Bird Survey Results

1 Project Description

Heritage Wind, LLC (Heritage) is developing the Heritage Wind Project (Project) in the town of Barre, Orleans County, New York (Figure 1-1). The proposed Project would generate up to 200 megawatts (MW) of electricity from approximately 67 wind turbine generators (WTGs) and include access roads, underground electrical collection lines, a substation, permanent meteorological towers, and a temporary construction staging area. The Project area includes an airport setback area where turbines are unlikely to be installed.

Breeding bird surveys were conducted from May 26 to June 27, 2017, in accordance with the New York State Department of Environmental Conservation (NYSDEC) *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (Guidelines [NYSDEC 2016]). Methodology was discussed and approved by the NYSDEC in November 2016.

The methodology and results of the breeding bird survey effort are summarized in this memorandum.

2 Methodology

Three rounds of transect-based breeding bird surveys were conducted in the Project area from May 26 through June 27, 2017, which includes the avian breeding season for many of the species expected to occur in Orleans County. The objectives of the surveys were to collect information on the occurrence and distribution of breeding birds within the Project area and characterize the avian community throughout buildable areas within the Project area.

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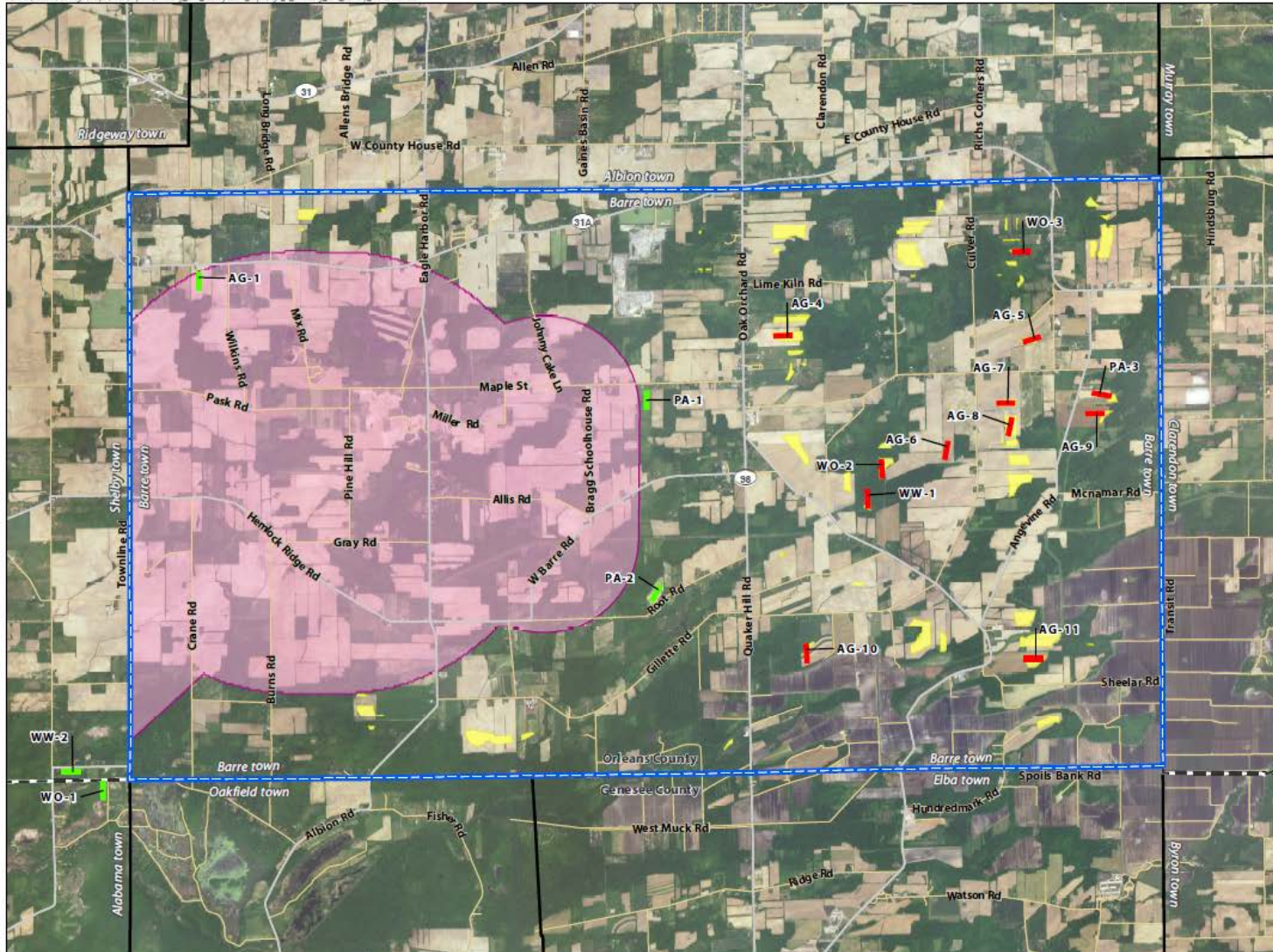


Figure 1-1
Heritage Wind
Breeding Bird Survey Transects
 Barre, Orleans County, NY

Legend

- BBS Transect - Buildable Area
- BBS Transect - Control
- Buildable Area - May 2017
- Proposed Airport Setback
- Project Area
- County Boundary
- Town Boundary
- Major Road
- Street



SCALE



SOURCE: ESRI 2012, 2016; NAD 2011; NYS GIS Program Office 2016; Ecology and Environment, Inc. 2017.

Seventeen 300-meter survey transects, each with six 50-meter survey blocks, were established within the Project area (See Figure 1-1), based on NYSDEC Guidelines and based on anticipated turbine locations, site accessibility and the distribution of habitat types identified in the Project area.

Transects were distributed across all habitat types observed within the Project area, with 12 of the 17 (70%) of the transects placed in agricultural/crop and hayfield/pasture habitats that represent more likely areas of turbine placement. Habitat types were broadly characterized (i.e., agricultural/crop, hayfield/pasture, deciduous forest, and woody wetland) based on field verification at each transect location. Table 2-1 lists habitat type percentages throughout the Project area and within buildable areas and the number of transects that correspond to each habitat type. A list of all survey transects and associated habitat is presented in Table 2-2.

Table 2-1 Habitat Types within Total Project Area and within Buildable Areas and Number of 2017 Survey Transects per Habitat Type

| Habitat Type | Total Project Area Percent Cover ¹ | Buildable Areas Percent Cover ² | Survey Transects ³ |
|-------------------|---|--|-------------------------------|
| Agricultural/crop | 42.7% | 70.3% | 8.5 |
| Hayfield/pasture | 17.3% | 17.7% | 3.5 |
| Deciduous forest | 7.5% | 7.4% | 3 |
| Woody wetland | 24.7% | 1.8% | 2 |

Note:

- ¹ The remaining 7.8% comprises multiple habitats taking up minimal space within the Project area, including residential and commercial use space.
- ² The remaining 2.8% comprises multiple habitats taking up minimal space within the Project area, including residential and commercial use space.
- ³ One transect was composed of a combination of two habitat types.

Table 2-2 Breeding Bird Survey Transects (2017), with Access Road and Primary Habitat Description

| Transect Name | In Buildable Area or Control | | |
|---------------|------------------------------|---------------|--|
| | Area or Control | Access Road | Primary Habitat Description |
| AG-1 | Control | West Lee | Agriculture: cornfield |
| AG-4 | Buildable | Oak Orchard | Agriculture: cornfield |
| AG-5 | Buildable | Mathes | Agriculture: cornfield |
| AG-6 | Buildable | Culver | Half hayfield and half agriculture: cornfield |
| AG-7 | Buildable | Culver | Agriculture: soybean |
| AG-8 | Buildable | Culver | Agriculture: soybean |
| AG-9 | Buildable | Angevine | Agriculture: cornfield |
| AG-10 | Buildable | Delano Steele | Agriculture: cornfield with strips of hayfield |
| AG-11 | Buildable | Oak Orchard | Agriculture: soybean |
| PA-1 | Control | Maple | Clover/grass pasture with scattered shrubs |

Table 2-2 Breeding Bird Survey Transects (2017), with Access Road and Primary Habitat Description

| Transect Name | In Buildable Area or Control | Access Road | Primary Habitat Description |
|---------------|------------------------------|-------------|------------------------------------|
| PA-2 | Control | Root | Pasture grass |
| PA-3 | Buildable | Angevine | Alfalfa hayfield |
| WO-1 | Control | Podunk | Ash-maple-poplar forest |
| WO-2 | Buildable | Oak Orchard | Maple-beech-ash hardwood forest |
| WO-3 | Buildable | East Lee | Ash-maple-poplar forest |
| WW-1 | Buildable | Oak Orchard | Ash-maple forest |
| WW-2 | Control | Podunk | Mixed ash-maple-pine-spruce forest |

Surveys of each transect were conducted approximately one week apart, with each set taking four survey days to complete by one biologist. Surveys were conducted between a half-hour prior to sunrise (approximately 5:05 a.m.) and approximately 10:30 a.m. during favorable weather conditions. To compensate for generally higher levels of bird activity in the early morning compared with late morning, surveys were conducted along transects at different times in the morning as logistics permitted.

All birds seen or heard were identified, recorded, and parsed into two groups: those within 50 meters on either side of the transect and those identified outside of 50 meters on either side of the transect. Every 50 meters (i.e., at the beginning and end of each block), the surveyor stopped for a period of at least 5 minutes, for a total of seven stops per transect. At each stop, the surveyor recorded species heard or seen and then continued to slowly walk along the transect. Birds detected between the 50-meter stops were also recorded.

For each bird observation, the surveyor recorded species, number of birds per sighting, approximate distance from the surveyor, how the bird was detected (visual or auditory), whether the bird was within or outside 50 meters from the surveyor, and any additional notes, including behavior (i.e., nesting behaviors, singing, foraging, or flying). Standard weather data (e.g., the temperature, cloud cover, wind speed and direction) were also recorded at the start and end of each 300-meter transect survey.

Although all birds were recorded regardless of distance from the transect, only native and protected birds located within approximately 50 meters of the transect were used in an assessment of species diversity and habitat use. In the NYSDEC Guidelines, bird resources do not include non-native or introduced bird species. Additional bird data collected beyond 50 meters of the transects and introduced species are presented in Attachment A.

3 Results

Each survey set consisted of four survey days. Table 3-1 presents the dates for each survey round.

Table 3-1 Survey Dates of Breeding Bird Surveys

| Survey Round | Dates |
|--------------|------------------------|
| 1 | May 26, 27, 30, June 3 |
| 2 | June 8, 9, 13, 14 |
| 3 | June 21, 22, 25, 27 |

A total of 87 species were identified during the surveys, consisting of 2,115 bird observations. Of these, 59 species (594 observations [28%]) were within 50 meters of the transects. Among those recorded within 50 meters of the transect, 148 (25%) were detections of birds flying over the transect rather than using the habitat. The total number of observations within 50 meters of each transect ranged from 3 to 94 (0 to 76 for non-flyover detections), with an average for all transects of 34.9 observations per transect (average of 27.9 for non-flyover detections). Total species per transect within 50 meters (including fly-over detections) ranged from 3 to 29, with an average of 12.3 species per transect for all transects.

Bird diversity and abundance along survey transects was influenced largely by habitat type (Table 3-2). Based only on birds identified within 50 meters of the transects, species diversity was highest in deciduous forest habitat (45 species), followed by woody wetlands (29 species), hayfield/pasture (23 species), and agricultural/crop transects (18 species). A similar trend was identified for the average number of species detected per transect by habitat type, where species diversity was highest in deciduous forest (23.7 species per transect) and woody wetlands (21.0 species per transect), and lower in hayfield/pasture (13.3 species per transect) and agricultural/crop (6.2 species per transect) habitats.

The total number of observations by habitat type ranged from 118 to 220, and for non-flyover detections the number ranged from 73 to 188. The average number of non-flyover birds per transect within each habitat type was highest in deciduous forest and woody wetlands (62.7 and 55.0 birds/transect, respectively), lower in hayfield/pasture habitat (20.9), and lowest within agricultural/crop habitat (8.8). All bird species and numbers identified during surveys were typical of the habitats examined.

Table 3-2 May/June 2017 Breeding Bird Survey Results by Habitat

| | Agriculture/ Crop | Hayfield/ Pasture | Deciduous Forest | Woody Wetland |
|---|----------------------|----------------------|---------------------|------------------|
| All Bird Detections within 50 Meters of Transect | | | | |
| Total Species | 18 | 23 | 45 | 29 |
| Average Number of Species per Transect | 6.2 | 13.3 | 23.7 | 21.0 |
| Average Number of Birds per Transect | 16.0 | 33.7 | 73.3 | 60.0 |
| Total Number of Birds | 136 | 118 | 220 | 120 |

Table 3-2 May/June 2017 Breeding Bird Survey Results by Habitat

| | Agriculture/ Crop | Hayfield/ Pasture | Deciduous Forest | Woody Wetland |
|---|----------------------|----------------------|---------------------|------------------|
| Non-flyover Bird Detections within 50 Meters of Transect | | | | |
| Total Species | 13 | 17 | 41 | 27 |
| Average Number of Species per Transect | 3.6 | 9.0 | 21.3 | 20.0 |
| Average Number of Birds per Transect | 8.8 | 20.9 | 62.7 | 55.0 |
| Total Number of Birds | 75 | 73 | 188 | 110 |

Five New York State species of special concern were detected either within or beyond 50 meters, including 73 horned lark (*Eremophila alpestris*) detections, six vesper sparrow (*Pooecetes gramineus*) detections, one cerulean warbler (*Setophaga cerulea*), one Cooper’s hawk (*Accipiter cooperii*), and one common nighthawk (*Chordeiles minor*). Horned larks were observed at all nine agricultural transects during at least one survey, and horned larks were detected during all three visits at transects AG-1, AG-4, AG-5, AG-7, AG-8, AG-9, and AG-10. Vesper sparrows were detected during all three visits at transect AG-6 and during one visit at transects AG-5, AG-8, and AG-11. One cerulean warbler was heard singing at transect WO-2 on May 30, 2017. One Cooper’s hawk flew through transect WO-2 on June 13, 2017. One common nighthawk flew over transect PA-1 on May 27, 2017; however, because this species migrates through Western New York into early June, and recent known breeding locations in Western New York have been limited to urban areas, the nighthawk was likely a late migrant rather than a breeder.

The time it took to complete each 50-meter survey block for each transect varied based on the level of bird activity at the time and the terrain traversed. The average completion time was 47.4 minutes per transect. The surveys were conducted under weather conditions that were not likely to affect detection rates of birds, such as precipitation or strong winds. Weather conditions on the mornings varied from clear to overcast, with typically calm or light winds, although on one transect winds reached 10 to 12 miles per hour. Temperatures ranged from 50°F to 76°F. There was light or misting rain during two of the total 51 transects conducted.

4 Discussion

The species composition was consistent with what was anticipated for the examined habitats and location of the Project area. No federally-listed or state-listed threatened or endangered species were documented in the Project area during the 2017 breeding bird surveys. Two state-listed species of special concern, vesper sparrow and horned lark, were documented in low numbers.

The survey results suggest that the greatest bird diversity occurs within deciduous forested habitat, is moderate in woody wetland and hayfield/pasture habitats, and lowest in agricultural/crop habitats. Average bird density per transect was lowest in the agricultural/crop habitat, suggesting that project disturbances in these areas may have less effect on breeding birds than in other habitats. Conversely, the less common habitats (i.e., deciduous and woody wetlands and pasture) presented a far greater average number of birds per transect and therefore may be considered more sensitive.

Across all breeding bird surveys, the three most abundant species within 50 meters were American goldfinch (*Spinus tristis*), gray catbird (*Dumetella carolinensis*), and red-winged blackbird (*Agelaius phoeniceus*). American goldfinch was detected in all four habitats, with the majority being fly-over detections. Gray catbirds are common in wooded habitats, and red-winged blackbirds are common residents of hayfield/pasture habitats. Overall, agricultural/crop habitat is considered to be the most likely areas for disturbance and installation of project facilities. The results of this survey suggest that agricultural/crop habitat experiences lower bird activity during the breeding season compared with the other dominant habitat types within the Project area.

Attachment A
Additional Bird Survey Data

Birds Identified during 2017 Breeding Bird Survey

| Common Name | Total Birds Identified | Birds Identified at less than or equal to 50 meters | Birds Identified beyond 50 meters |
|-----------------------------------|------------------------|---|-----------------------------------|
| Canada Goose | 69 | 0 | 69 |
| Wood Duck | 5 | 0 | 5 |
| Hooded Merganser | 1 | 0 | 1 |
| Ring-necked Pheasant ¹ | 1 | 0 | 1 |
| Wild Turkey | 1 | 0 | 1 |
| Great Blue Heron | 7 | 2 | 5 |
| Green Heron | 1 | 0 | 1 |
| Turkey Vulture | 34 | 3 | 31 |
| Cooper's Hawk | 1 | 0 | 1 |
| Red-tailed Hawk | 4 | 0 | 4 |
| American Kestrel | 1 | 0 | 1 |
| Killdeer | 32 | 9 | 23 |
| Spotted Sandpiper | 6 | 1 | 5 |
| American Woodcock | 1 | 1 | 0 |
| Ring-billed Gull | 5 | 0 | 5 |
| Rock Pigeon ¹ | 3 | 0 | 3 |
| Mourning Dove | 45 | 2 | 43 |
| Yellow-billed Cuckoo | 5 | 0 | 5 |
| Black-billed Cuckoo | 4 | 0 | 4 |
| Barred Owl | 1 | 0 | 1 |
| Common Nighthawk | 1 | 1 | 0 |
| Ruby-throated Hummingbird | 3 | 3 | 0 |
| Belted Kingfisher | 1 | 0 | 1 |
| Red-bellied Woodpecker | 27 | 3 | 24 |
| Yellow-bellied Sapsucker | 1 | 1 | 0 |
| Downy Woodpecker | 15 | 5 | 10 |
| Hairy Woodpecker | 4 | 1 | 3 |
| Northern Flicker | 15 | 2 | 13 |
| Pileated Woodpecker | 5 | 0 | 5 |
| Eastern Wood-Pewee | 30 | 8 | 22 |
| Alder Flycatcher | 8 | 2 | 6 |
| Willow Flycatcher | 16 | 0 | 16 |
| Alder/Willow Flycatcher | 3 | 3 | 0 |
| Least Flycatcher | 4 | 0 | 4 |
| Eastern Phoebe | 9 | 0 | 9 |
| Great Crested Flycatcher | 20 | 2 | 18 |
| Eastern Kingbird | 10 | 0 | 10 |
| Yellow-throated Vireo | 11 | 1 | 10 |
| Warbling Vireo | 15 | 1 | 14 |
| Red-eyed Vireo | 26 | 10 | 16 |
| Blue Jay | 41 | 5 | 36 |
| American Crow | 65 | 0 | 65 |
| Common Raven | 3 | 0 | 3 |

Birds Identified during 2017 Breeding Bird Survey

| Common Name | Total Birds Identified | Birds Identified at less than or equal to 50 meters | Birds Identified beyond 50 meters |
|--------------------------------|------------------------|---|-----------------------------------|
| Horned Lark | 73 | 27 | 46 |
| Tree Swallow | 9 | 6 | 3 |
| Barn Swallow | 50 | 18 | 32 |
| Black-capped Chickadee | 30 | 10 | 20 |
| Tufted Titmouse | 1 | 0 | 1 |
| White-breasted Nuthatch | 11 | 3 | 8 |
| Brown Creeper | 5 | 5 | 0 |
| House Wren | 14 | 3 | 11 |
| Blue-gray Gnatcatcher | 3 | 3 | 0 |
| Eastern Bluebird | 5 | 0 | 5 |
| Veery | 32 | 14 | 18 |
| Hermit Thrush | 1 | 0 | 1 |
| Wood Thrush | 54 | 14 | 40 |
| American Robin | 81 | 16 | 65 |
| Gray Catbird | 90 | 43 | 47 |
| Brown Thrasher | 7 | 1 | 6 |
| European Starling ¹ | 65 | 5 | 60 |
| Cedar Waxwing | 48 | 27 | 21 |
| Ovenbird | 27 | 8 | 19 |
| Northern Waterthrush | 1 | 0 | 1 |
| Blue-winged Warbler | 17 | 10 | 7 |
| Nashville Warbler | 1 | 0 | 1 |
| Mourning Warbler | 4 | 0 | 4 |
| Common Yellowthroat | 60 | 19 | 41 |
| Hooded Warbler | 4 | 2 | 2 |
| American Redstart | 50 | 25 | 25 |
| Cerulean Warbler | 1 | 1 | 0 |
| Yellow Warbler | 110 | 32 | 78 |
| Chestnut-sided Warbler | 2 | 2 | 0 |
| Black-throated Blue Warbler | 1 | 0 | 1 |
| Eastern Towhee | 3 | 3 | 0 |
| Chipping Sparrow | 17 | 2 | 15 |
| Field Sparrow | 26 | 7 | 19 |
| Vesper Sparrow | 6 | 2 | 4 |
| Savannah Sparrow | 44 | 14 | 30 |
| Song Sparrow | 120 | 25 | 95 |
| Swamp Sparrow | 26 | 13 | 13 |
| Scarlet Tanager | 8 | 4 | 4 |
| Northern Cardinal | 63 | 14 | 49 |
| Rose-breasted Grosbeak | 34 | 5 | 29 |
| Indigo Bunting | 37 | 1 | 36 |
| Bobolink | 9 | 3 | 6 |
| Red-winged Blackbird | 144 | 43 | 101 |

Birds Identified during 2017 Breeding Bird Survey

| Common Name | Total Birds Identified | Birds Identified at less than or equal to 50 meters | Birds Identified beyond 50 meters |
|----------------------------|------------------------|---|-----------------------------------|
| Eastern Meadowlark | 1 | 0 | 1 |
| Common Grackle | 35 | 10 | 25 |
| Brown-headed Cowbird | 58 | 22 | 36 |
| Baltimore Oriole | 30 | 13 | 17 |
| American Goldfinch | 75 | 53 | 22 |
| House Sparrow ¹ | 2 | 0 | 2 |
| Unidentified duck | 4 | 0 | 4 |
| Unidentified accipiter | 1 | 0 | 1 |
| Unidentified songbird | 2 | 1 | 1 |
| Unidentified woodpecker | 11 | 1 | 10 |
| Unidentified flycatcher | 1 | 0 | 1 |
| Unidentified thrush | 1 | 1 | 0 |
| Unidentified warbler | 4 | 1 | 3 |
| Unidentified sparrow | 5 | 1 | 4 |
| Unidentified blackbird | 2 | 0 | 2 |
| Total Birds | 2,186 | 599 | 1,587 |

Note:

¹ Indicates introduced species