

Appendix N-5: Avian Baseline Surveys for the Seneca Wind Project

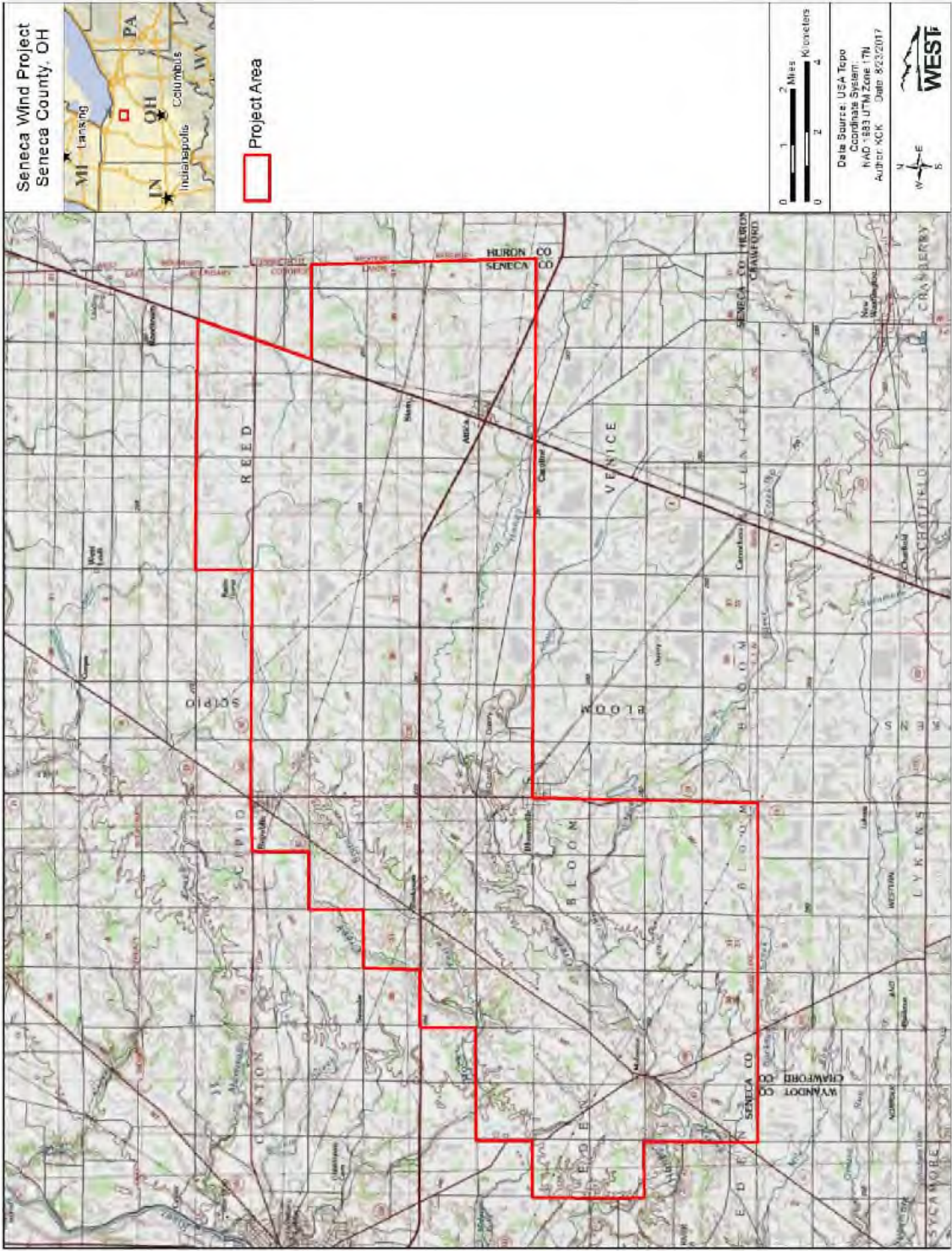


Figure 2. Location of the Seneca Wind Project, Seneca County, Ohio.

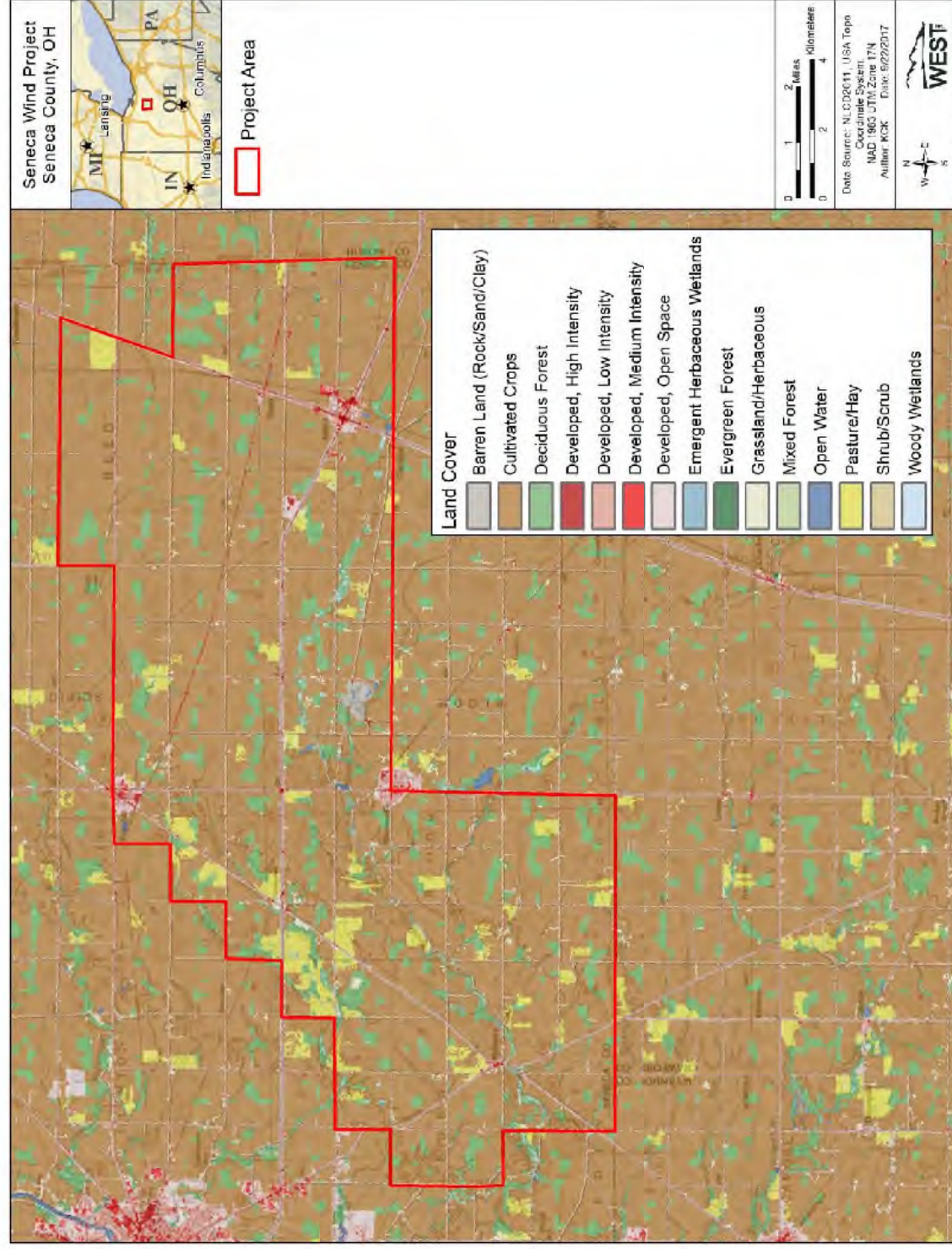


Figure 3. The land cover types and coverage within the Seneca Wind Project, Seneca County, Ohio (US Geological Survey National Land Cover Database 2011, Homer et al. 2015).

METHODS

The year one study in the Project area consisted of large bird surveys and incidental wildlife observations for federally or state-listed and other special-status species.

Large Bird Surveys

Large bird surveys (variable circular plots) were conducted using methods similar to Reynolds et al. (1980). Methods were consistent with guidance from the USFWS for completing eagle conservation plans (USFWS 2016) and the study plan was reviewed and approved by the USFWS (K. Lott, USFWS, pers comm.) in July 2016.

Survey Plots

Twenty-eight survey points were established along public roads within the Project area (Figure 4). Each survey point was centered on a circular survey plot with an 800-meter (m; 2,625-foot [ft]) radius. Circular plots covered approximately 30.0% of the Project area.

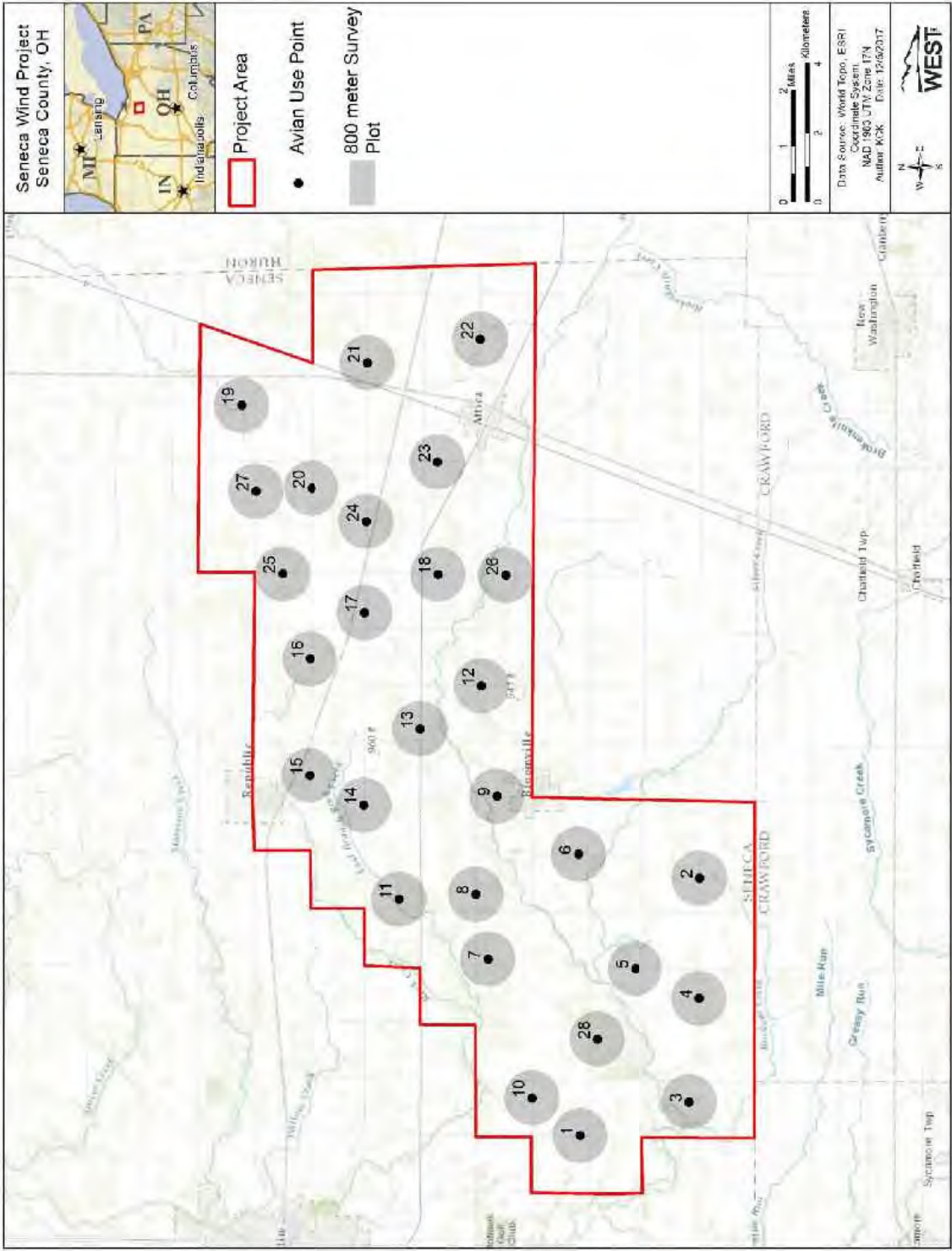


Figure 4. Location of survey plots for large bird surveys in the Seneca Wind Project, Seneca County, Ohio.

Survey Methods

Each survey plot was surveyed for 60 minutes (min). Surveys focused on eagle observations; however, other large birds (i.e., raptors, shorebirds, waterfowl, waterbirds, and vultures) and federally and state-listed species were also recorded. Flight or movement paths for eagles and other large birds were mapped and given corresponding unique observation numbers. The map indicated whether the bird was within or outside the survey plot based on reference markers at known distances from the plot center. Recent aerial photographs were used to aid in recording locations of observations as accurately as possible. Flight paths and perch locations were digitized using ArcGIS 10.3.

During each survey, the estimated distance to each bird observed was recorded to the nearest 5 m (16 ft). The date, start and end time of observation period, plot number, species or best possible identification, number of individuals, sex and age class (if identifiable), distance from plot center when first observed (m), closest distance (m), height above ground (m), activity, and habitat were recorded.

Bird behavior and habitat were recorded for each bird observation. For eagle observations, additional behavior and habitat data were recorded during each 1-min interval the bird was within view, per the ECPG (USFWS 2016). Behavior categories included soaring flight, flapping-gliding, hunting kiting or hovering, stooping or diving at prey, stooping or diving in an antagonistic context with other birds, perched, being mobbed, undulating or territorial flight, auditory, and other (noted in comments). The initial flight patterns and habitat types (at first observation) were uniquely identified on the data sheet and subsequent patterns and habitats were recorded. The flight direction of observed birds was recorded on the data sheet map. Approximate flight height at first observation was recorded to the nearest 5 m (16 ft) and the approximate lowest and highest flight heights observed were also recorded. Any comments or unusual observations were noted in the comments section. Weather information recorded for each survey plot included temperature, wind speed, wind direction, precipitation, and cloud cover.

Observation Schedule

Surveys were conducted from August 2016 – August 2017. Surveys were conducted approximately every week (seven survey plots each week). Surveys were scheduled to approximately cover all daylight hours on the survey day, as appropriate for the season in which each survey was conducted. To the extent practical, each plot was surveyed the same number of times.

Incidental wildlife observations provide records of special-status wildlife seen outside of the standardized surveys. All special-status species were recorded in a similar fashion to standardized surveys. The observation number, date, time, species, number of individuals, sex/age class, distance from observer, activity, height above ground (for bird species) and habitat were recorded. The location of special-status species was recorded in Universal

Transverse Mercator (UTM) coordinates using a hand-held Global Positioning System (GPS) unit.

Statistical Analysis

For analysis purposes, a visit was defined as the required length of time, in days, to survey all of the plots once within the study area. Visits were assigned according to the following criteria: 1) a single visit had to be completed in a single season, and 2) a visit could be spread across multiple dates, but a single date could not contain surveys from multiple visits. Under certain circumstances, such as extreme weather conditions, plots were not surveyed during some visits. In these cases, a visit might not have constituted a survey of all plots.

Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. Following surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. Potentially erroneous data was identified using a series of database queries. Irregular codes or data suspected as being questionable were discussed with the observer and/or project manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms, and appropriate changes in all steps were made.

Data Compilation and Storage

A Microsoft® Access database was developed to store, organize, and retrieve survey data. Data were keyed into the electronic database using a pre-defined protocol to facilitate subsequent QA/QC and data analysis. All data forms, field notebooks (if provided), and electronic data files were retained for reference.

Large Bird Surveys

Bird Diversity and Species Richness

Bird diversity was illustrated by the total number of unique species observed. Species lists (with the number of observations and the number of groups) were generated by season and included all observations of birds detected, regardless of their distance from the observer. In some cases, the tally may represent repeated sightings of the same individual. For example, a sum of 50 individuals of northern harrier may be 50 unique birds or it may be one bird observed on 50 separate visits or something in between. Species richness by season was calculated by averaging the total number of species observed within each plot during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall species richness was calculated as a weighted average of seasonal values by the number of days in each season. Species diversity and richness were compared among seasons for surveys.

Bird Use, Percent of Use, and Frequency of Occurrence

For generating standardized eagle observation estimates, large birds detected within the 800-m (2,625 ft) radius plot at any time were used in the analysis. The metric used to measure mean bird use was the number of birds per plot per survey. These standardized estimates of mean bird use were used to compare differences between bird types, seasons, survey plots, and other studies where similar methods were used. Mean use by season was calculated by summing the total number of birds seen within each plot during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall mean use was calculated as a weighted average of seasonal values by the number of days in each season.

Bird Flight Height and Behavior

Bird flight heights are important metrics to assess potential exposure. Flight height information was used to calculate the percentage of birds observed flying within the rotor-swept height (RSH) for turbines likely to be used in the Project area. A RSH for potential collision with a turbine blade of 25 – 150 m (82 – 492 ft) above ground level (AGL) was used for the purposes of the analysis. The flight height recorded during the initial observation was used to calculate the percentage of birds flying within the RSH and mean flight height. The percentage of birds flying within the RSH at any time was calculated using the lowest and highest flight heights recorded.

Bird Exposure Index

The bird exposure index is used as a relative measure of species-specific risk of turbine collision and the species most likely to occur as fatalities in the wind energy facility. A relative index of bird exposure (R) was calculated for bird species observed during the surveys using the following formula:

$$R = A * P_f * P_t$$

Where A equals mean relative use for species *i* (large bird observations within 800 m (2,625 ft) of the observer) averaged across all surveys, P_f equals the proportion of all observations of species *i* where activity was recorded as flying (an index to the approximate percentage of time species *i* spends flying during the daylight period), and P_t equals the proportion of all initial flight height observations of species *i* within the likely RSH. The exposure index does not account for other possible collision risk factors, such as foraging or courtship behavior.

Spatial Use

Large bird flight paths were qualitatively compared to study area characteristics (e.g., topographic features). The objective of mapping observed large bird locations and flight paths was to identify areas of concentrated use by diurnal raptors and other large birds and/or consistent flight patterns within the study area. This information can be useful in turbine layout design or micro-siting individual turbines to reduce risk to birds.

Eagle Minutes

Following survey protocols described in the ECPG, eagle minutes were recorded within the 3-dimensional survey plots (i.e., cylinders) inclusive of the area within 800 m (2,625 ft) of the survey point and up to 200 m (656 ft) AGL. Eagle minutes were defined as the number of minutes an eagle was observed in flight¹ within these cylinders during the 60-min survey event. These observations were then summed to document eagle minutes per survey plot. Temporal variation was evaluated by calculating eagle minutes per month over the 12-month study.

RESULTS

Large Bird Surveys

A total of 359 surveys were conducted from August 16, 2016 – August 15, 2017. An 800 m (2,625 ft) viewshed was used when calculating species richness, use, percent composition, percent frequency, and exposure index for all large bird species observed.

Bird Diversity and Species Richness

Twenty-one unique species were observed over the course of surveys (Table 2). A mean of 1.85 large bird species/800-m plot/60-min survey were recorded. Bird diversity (the number of unique species observed) was highest during the spring (16 species), followed by winter (15), fall (13), and summer (12). Large bird species richness (mean number of species per plot per survey) was highest during the spring (2.46 species/plot/survey), followed by winter (2.05), fall (1.86) and summer (1.07).

Table 2. Summary of species richness (species/800-meter plot/60-min survey), and sample size by season and overall during the large bird surveys at the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Season | Number of Visits | # Surveys Conducted | # Unique Species | Species Richness |
|----------------|------------------|---------------------|------------------|------------------|
| Spring | 3 | 84 | 16 | 2.46 |
| Summer | 4 | 112 | 12 | 1.07 |
| Fall | 3 | 79 | 13 | 1.86 |
| Winter | 3 | 84 | 15 | 2.05 |
| Overall | 13 | 359 | 21 | 1.85 |

A total of 2,758 birds were observed within 1,024 separate groups (defined as one or more individuals) during the surveys (Appendix A). Four species (19.0% of all species) composed 74.9% of all observations and included: turkey vulture (*Cathartes aura*), Canada goose (*Branta canadensis*), mourning dove (*Zenaidura macroura*), and American crow (*Corvus brachyrhynchos*). All other species accounted for less than 6.5% of the observations, individually. A total of 295 diurnal raptors, including 79 bald eagles, were recorded during surveys (Appendix A).

¹ Observations of perched eagles do not apply to eagle minutes.

Bird Use, Percent of Use, and Frequency of Occurrence

Mean bird use, percent of use, and frequency of occurrence were calculated by season for all bird types (Table 3) and species (Appendix B). The highest overall large bird use occurred during the winter (10.64 birds/800-m plot/60-min survey), followed by fall (9.93), spring (7.46), and summer (4.01).

Waterfowl

Waterfowl had the highest use during the winter (5.18 birds/plot/60-min survey), compared to other times of the year (Table 3). High waterfowl use during the winter was due to several large groups of Canada goose that composed 44.7% of the overall winter bird use (Appendix B). Otherwise, waterfowl composed less than 5.2% of the overall large bird use in the other seasons. Waterfowl were observed most frequently during the winter (21.4%), followed by spring (13.1%), fall (1.4%) and summer (0.9%; Table 3).

Shorebirds

Shorebirds had the highest use during fall (0.70 birds/plot/60-min survey), compared to other times of the year (spring 0.56, summer 0.35, and winter 0.18; Table 3). Shorebirds composed less than 9.0% of the overall large bird use for all four seasons. Shorebirds were observed during 31.0% of the spring surveys compared to less than 15.0% at other times of the year (Table 3).

Diurnal Raptors

Diurnal raptor use was highest during the winter (1.12 birds/plot/60-min survey), followed by fall (0.94), spring (0.75) and summer (0.43; Table 3). Higher use during the winter was primarily due to high winter use of the Project area by red-tailed hawk (*Buteo jamaicensis*; 0.58 birds/plot/60-min survey) compared to other diurnal raptor species observed. Red-tailed hawk also had the highest use of any diurnal raptor during the spring (0.49) and summer (0.20; Appendix B). Bald eagle (*Haliaeetus leucocephalus*) had the highest use of any diurnal raptor during the fall (0.31 birds/plot/60-min survey). Bald eagles were also recorded during the summer, spring, and winter with mean use ranging from 0.10 to 0.15 birds/plot/60-min survey (Appendix B). Bald eagles were observed during 18.0% of fall surveys, 10.7% of winter surveys, 8.9% of summer surveys, and 7.1% of spring surveys.

Vultures

Turkey vulture was the only vulture species observed, and use by turkey vulture was relatively even during the fall and spring (4.60 and 4.23 birds/plot/60-min survey, respectively; Table 3, Appendix B). Turkey vulture composed 56.6 % of overall large bird use during the spring, 50.6% during the summer, 46.3% during the fall, and 1.5% during the winter. Turkey vultures were observed during 78.6% of surveys during the spring, 54.9% of fall surveys, 38.4% of summer surveys, and 4.8% of winter surveys (Table 3).

Doves/Pigeons

Dove and pigeon use was highest during the fall (3.01 birds/plot/60-min survey) compared to winter (1.81), summer (1.05), and spring (0.25; Table 3). Dove and pigeons were observed during 29.6% of fall surveys, 23.8% of winter surveys, 18.8% of summer surveys, and 13.1% of spring surveys (Appendix B).

Large Corvids

American crow was the only species of large corvid recorded during surveys. Large corvid use was highest during the winter (2.10 birds/plot/60-min survey) and spring (1.17; Table 3), followed by fall (0.58) and summer (0.04; Table 3). Large corvids accounted for 19.7% of overall large bird use during the winter, 15.6% during the spring, 5.9% during the fall, and 1.1% during the summer. Large corvids were observed during 52.4% of winter surveys, 39.3% of spring surveys, 15.5% of fall surveys, and 3.6% of summer surveys (Table 3, Appendix B).

Table 3. Mean bird use (number of birds/800-meter plot/60-min survey), percent of total use (%), and frequency of occurrence (%) for each large bird type by season during the large bird surveys at the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Type/Species | Mean Use | | | | % of Use | | | | % Frequency | | | |
|-------------------------|-------------|-------------|--------------|-------------|------------|------------|------------|------------|-------------|------|--------|--------|
| | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Spring | Winter |
| Waterbirds | 0.08 | 0 | 0.02 | 0.10 | 2.0 | 0 | 0.2 | 1.3 | 5.4 | 0 | 7.1 | 2.4 |
| Waterfowl | 0.03 | 0.09 | 5.18 | 0.38 | 0.7 | 0.9 | 48.7 | 5.1 | 0.9 | 1.4 | 13.1 | 21.4 |
| Shorebirds | 0.35 | 0.70 | 0.18 | 0.56 | 8.7 | 7.1 | 1.7 | 7.5 | 8.9 | 14.9 | 31.0 | 10.7 |
| Gulls/Terns | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0.3 | 0 | 0 | 1.2 | 0 |
| Diurnal Raptors | 0.43 | 0.94 | 1.12 | 0.75 | 10.7 | 9.5 | 10.5 | 10.0 | 25.9 | 52.0 | 51.2 | 59.5 |
| <u>Accipiters</u> | <0.01 | 0.07 | 0.05 | 0.02 | 0.2 | 0.7 | 0.4 | 0.3 | 0.9 | 7.2 | 2.4 | 4.8 |
| <u>Buteos</u> | 0.20 | 0.23 | 0.58 | 0.50 | 4.9 | 2.3 | 5.5 | 6.7 | 13.4 | 18.0 | 36.9 | 35.7 |
| <u>Northern Harrier</u> | 0 | 0.05 | 0.10 | 0.02 | 0 | 0.5 | 0.9 | 0.3 | 0 | 3.6 | 2.4 | 8.3 |
| <u>Eagles</u> | 0.14 | 0.31 | 0.15 | 0.10 | 3.6 | 3.2 | 1.5 | 1.3 | 8.9 | 18.0 | 7.1 | 10.7 |
| <u>Falcons</u> | 0.08 | 0.25 | 0.24 | 0.11 | 2.0 | 2.5 | 2.2 | 1.4 | 5.4 | 17.3 | 10.7 | 22.6 |
| <u>Osprey</u> | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.2 | 0 | 0 |
| <u>Other Raptors</u> | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.4 | 0 | 0 |
| Vultures | 2.03 | 4.60 | 0.15 | 4.23 | 50.6 | 46.3 | 1.5 | 56.6 | 38.4 | 54.9 | 78.6 | 4.8 |
| Upland Game | | | | | | | | | | | | |
| Birds | 0 | 0 | 0.08 | 0.01 | 0 | 0 | 0.8 | 0.2 | 0 | 0 | 1.2 | 1.2 |
| Doves/Pigeons | 1.05 | 3.01 | 1.81 | 0.25 | 26.3 | 30.4 | 17.0 | 3.3 | 18.8 | 29.6 | 13.1 | 23.8 |
| Large Corvids | 0.04 | 0.58 | 2.10 | 1.17 | 1.1 | 5.9 | 19.7 | 15.6 | 3.6 | 15.5 | 39.3 | 52.4 |
| Overall | 4.01 | 9.93 | 10.64 | 7.46 | 100 | 100 | 100 | 100 | | | | |

Bird Flight Height and Behavior

Flight height characteristics, based on initial flight height observations and estimated use, were estimated for large bird types and species (Tables 4 and 5). During surveys, 894 groups of large birds were observed flying within the 800-m plot, totaling 2,376 individuals. Overall, 68.1% of flying large birds were recorded within the RSH, 15.9% were below the RSH, and 16.0% were flying above the RSH (25 – 150 m [82 – 492 ft] AGL). Diurnal raptors were observed flying in the RSH 58.0% of the time, below the RSH 22.8% of the time, and above the RSH 19.2% of the time. Eagles were observed flying within the RSH 67.3% of the time (Table 4).

Table 4. Flight height characteristics by bird type^a and raptor subtype during large bird surveys at the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Bird Type | # Groups Flying | # Obs Flying | Mean Flight Height (m) | % Obs Flying | % within Flight Height Categories | | |
|----------------------------|-----------------|--------------|------------------------|--------------|-----------------------------------|----------------------|-------------|
| | | | | | 0-25 m | 25-150m ^b | >150m |
| Waterbirds | 18 | 19 | 81.67 | 100 | 5.3 | 84.2 | 10.5 |
| Waterfowl | 45 | 394 | 83.67 | 82.8 | 5.3 | 58.9 | 35.8 |
| Shorebirds | 54 | 99 | 31.61 | 65.6 | 52.5 | 47.5 | 0 |
| Gulls/Terns | 1 | 2 | 250.00 | 100 | 0 | 0 | 100 |
| Diurnal Raptors | 195 | 224 | 103.67 | 80.6 | 22.8 | 58.0 | 19.2 |
| <u>Accipiters</u> | 10 | 10 | 95.00 | 83.3 | 20.0 | 60.0 | 20.0 |
| <u>Buteos</u> | 85 | 107 | 111.99 | 81.7 | 9.3 | 70.1 | 20.6 |
| <u>Northern Harrier</u> | 13 | 14 | 8.77 | 100 | 92.9 | 7.1 | 0 |
| <u>Eagles</u> | 53 | 55 | 162.74 | 88.7 | 0 | 67.3 | 32.7 |
| <u>Falcons</u> | 32 | 36 | 24.31 | 63.2 | 72.2 | 27.8 | 0 |
| <u>Osprey</u> | 1 | 1 | 30.00 | 100 | 0 | 100 | 0 |
| <u>Other Raptors</u> | 1 | 1 | 200.00 | 100 | 0 | 0 | 100 |
| Vultures | 367 | 936 | 110.08 | 99.0 | 1.7 | 79.0 | 19.3 |
| Upland Game Birds | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Doves/Pigeons | 89 | 403 | 27.31 | 75.5 | 37.2 | 62.0 | 0.7 |
| Large Corvids | 125 | 299 | 38.50 | 91.2 | 29.1 | 68.2 | 2.7 |
| Large Birds Overall | 894 | 2,376 | 83.95 | 86.7 | 15.9 | 68.1 | 16.0 |

^a 800-meter (m; 2,625-foot [ft]) radius plot for large birds.

^b The likely “rotor-swept height” for potential collision with a turbine blade, or 25 to 150 m (82 to 492 ft) above ground level.

Note: obs = observations

Bird Exposure Index

A relative exposure index based on initial flight height observations and relative abundance (defined as the use estimate) was calculated for each bird species (Appendix C). The exposure index does not account for other possible collision risk factors, such as foraging or courtship behavior. Those species that had exposure to the RSH are listed in Table 5, and a complete list of all species is presented in Appendix C. Turkey vulture had a higher exposure index than any other species (2.23); all other large bird species had an exposure index less than 1.00. Red-tailed hawk had the highest exposure index of all diurnal raptor species (0.21) followed by bald eagle (0.11; Table 5). All other diurnal raptor species had an exposure index of 0.02 or less.

Table 5. Relative exposure index and flight characteristics for large bird species^a during large bird surveys^c at the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Species | # Groups Flying | Overall Mean Use | % Flying | % Flying within RSH ^b based on Initial obs | Exposure Index | % Within RSH at Anytime |
|-------------------|-----------------|------------------|----------|---|----------------|-------------------------|
| turkey vulture | 367 | 2.85 | 99.0 | 79.0 | 2.23 | 88.2 |
| Canada goose | 40 | 1.18 | 81.1 | 62.6 | 0.60 | 63.2 |
| American crow | 125 | 0.93 | 91.2 | 68.2 | 0.58 | 75.3 |
| rock pigeon | 24 | 0.53 | 88.6 | 85.2 | 0.40 | 86.5 |
| mourning dove | 65 | 1.02 | 69.1 | 47.6 | 0.34 | 51.2 |
| red-tailed hawk | 84 | 0.37 | 81.5 | 69.8 | 0.21 | 76.4 |
| killdeer | 54 | 0.46 | 65.6 | 47.5 | 0.14 | 64.6 |
| bald eagle | 53 | 0.18 | 88.7 | 67.3 | 0.11 | 76.4 |
| great blue heron | 17 | 0.05 | 100 | 83.3 | 0.04 | 88.9 |
| American kestrel | 30 | 0.16 | 61.1 | 24.2 | 0.02 | 39.4 |
| Cooper's hawk | 10 | 0.04 | 83.3 | 60.0 | 0.02 | 70.0 |
| mallard | 2 | 0.02 | 100 | 100 | 0.02 | 100 |
| snow goose | 1 | 0.01 | 100 | 100 | 0.01 | 100 |
| peregrine falcon | 2 | 0.01 | 100 | 66.7 | <0.01 | 100 |
| osprey | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| rough-legged hawk | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| northern harrier | 13 | 0.04 | 100 | 7.1 | <0.01 | 14.3 |
| common goldeneye | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| green heron | 1 | <0.01 | 100 | 100 | <0.01 | 100 |

a Only includes species with actual exposure index values; see Appendix C for full listing.

b The likely "rotor-swept height" for potential collision with a turbine blade, or 25 to 150 meters (m; 82 to 492 feet [ft]) above ground level.

c. 800-m (2,625-ft) radius plot for large birds.

Spatial Use

For all large bird species combined, use was highest at survey plots 6 and 12 (18.92 and 18.31 birds/60-min survey, respectively; Figure 5, Appendix D). Bird use at other survey plots ranged from 2.67 to 13.77 birds/60-min survey. Diurnal raptor use was highest at plots 12 and 3 (1.54 and 1.46 birds/60-min survey, respectively; other plots had diurnal raptor use ranging from 0.25 to 1.38 birds/60-min survey. Eagle use was highest at plot 12 (0.77 birds/60-min survey) and ranged from 0 to 0.69 birds/60-min survey at other plots. Flight paths of eagles and other federally or state-listed species were digitized and mapped (Figure 6).

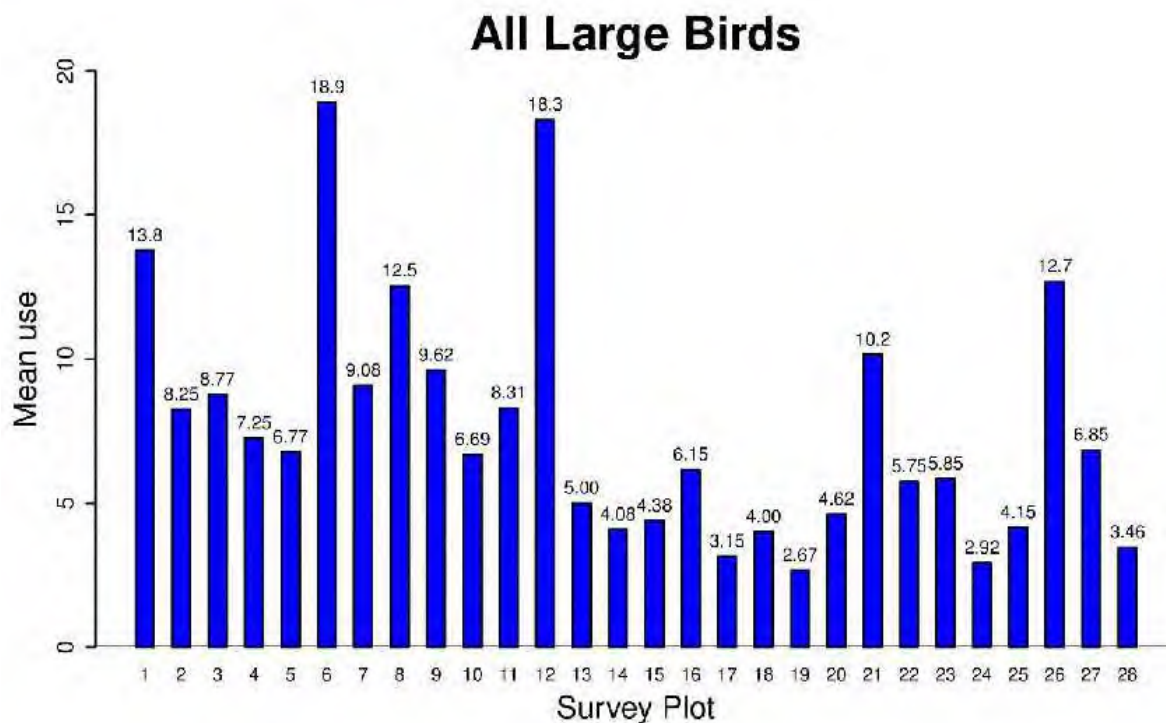


Figure 5a. Overall large bird use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

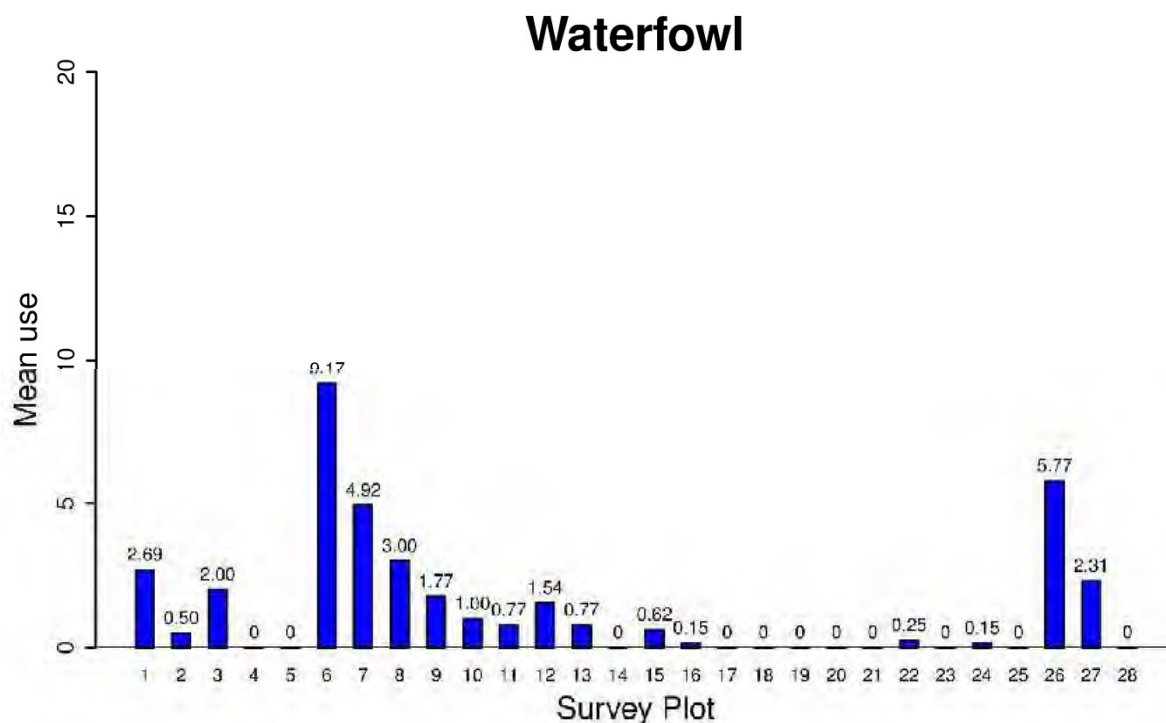


Figure 5b. Waterfowl use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

Shorebirds

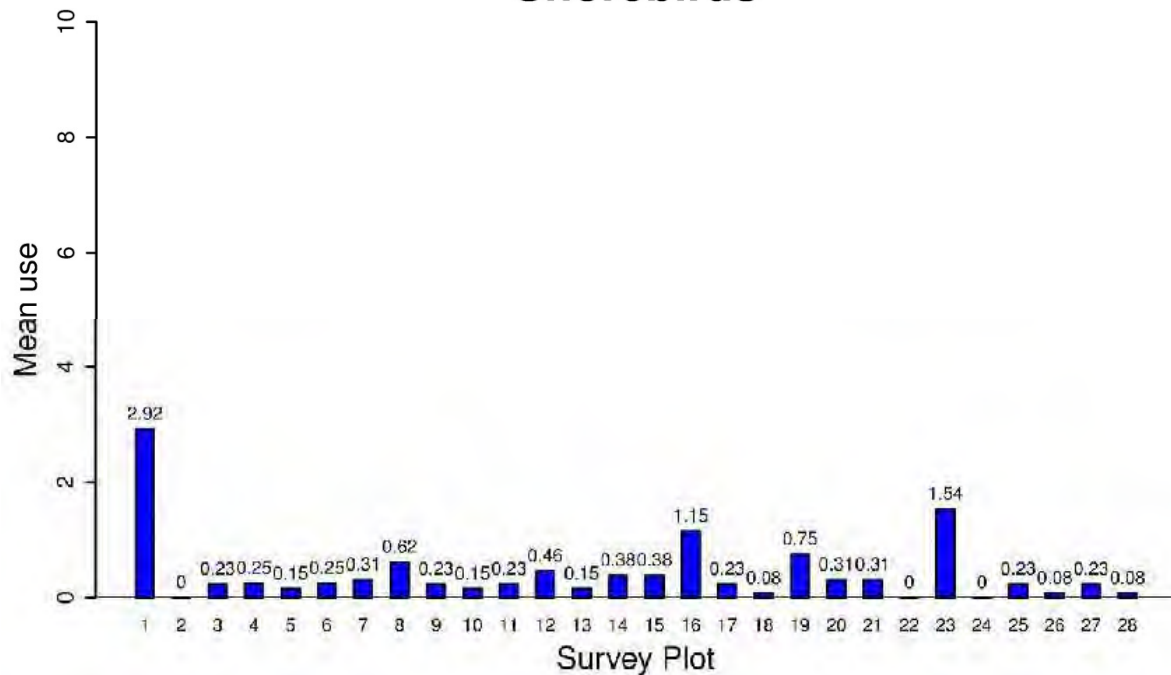


Figure 5c. Shorebird use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

Diurnal Raptors

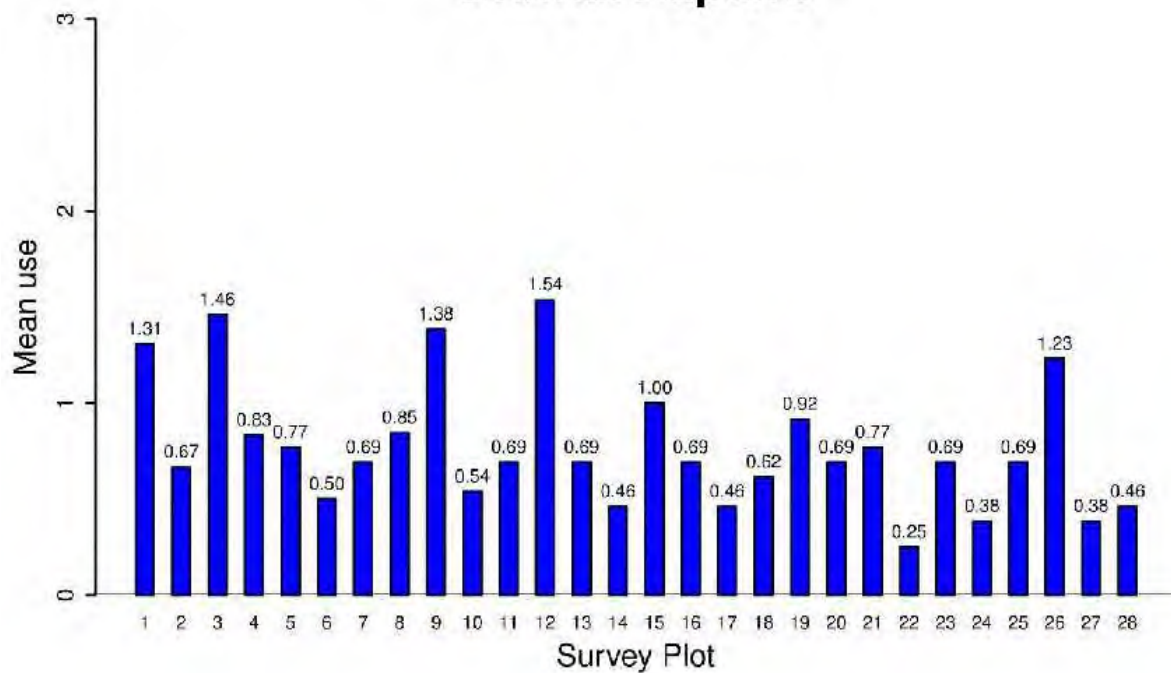


Figure 5d. Diurnal raptor use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

Eagles

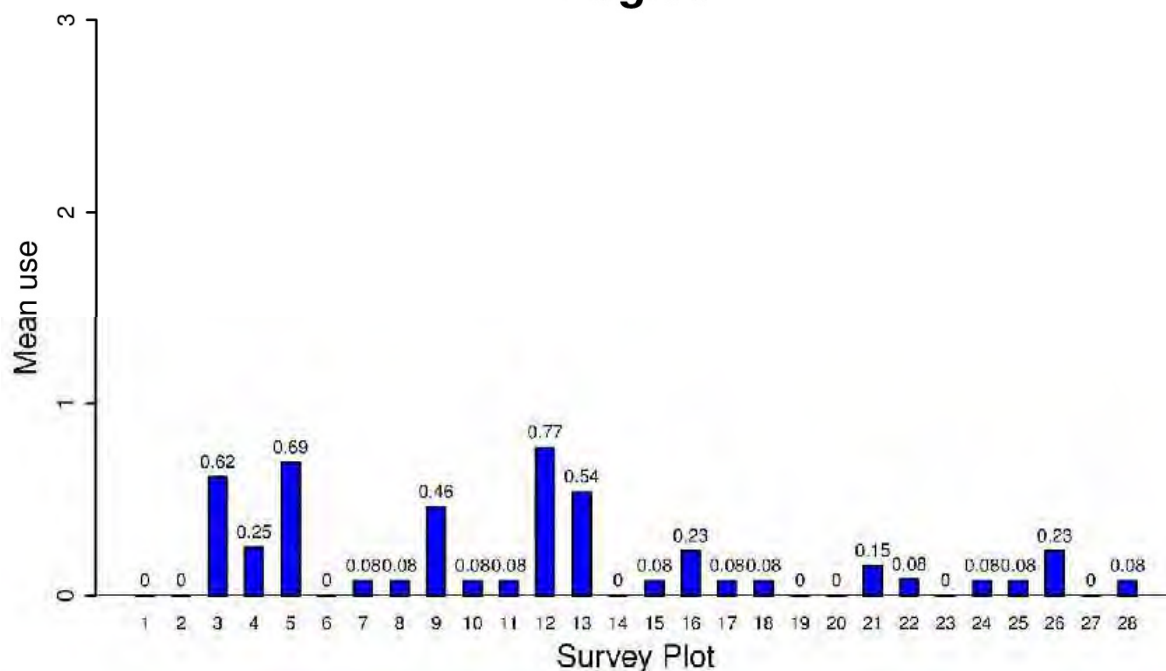


Figure 5e. Bald eagle use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

Vultures

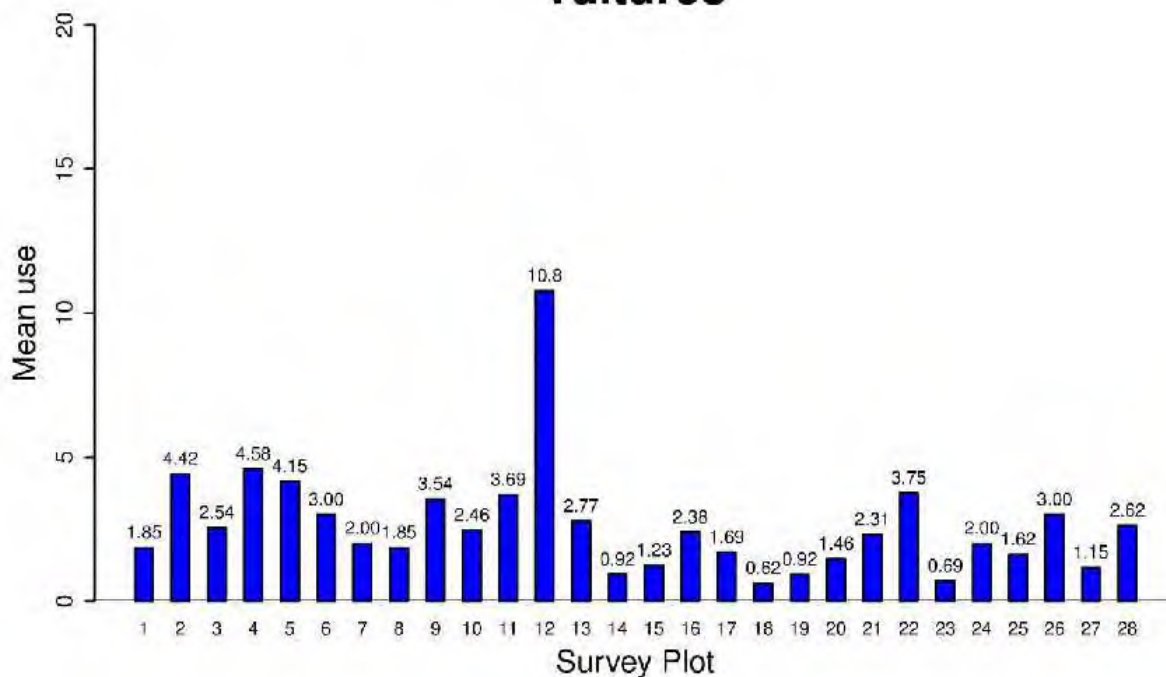


Figure 5f. Vulture use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

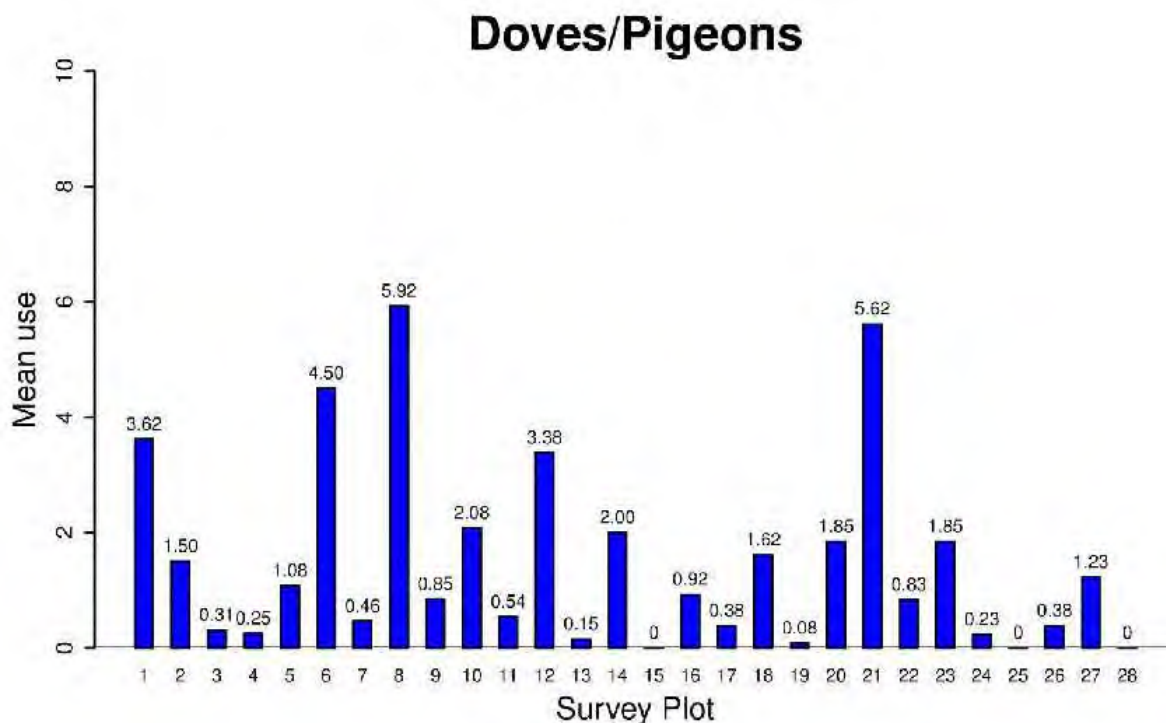


Figure 5g. Dove and pigeon use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

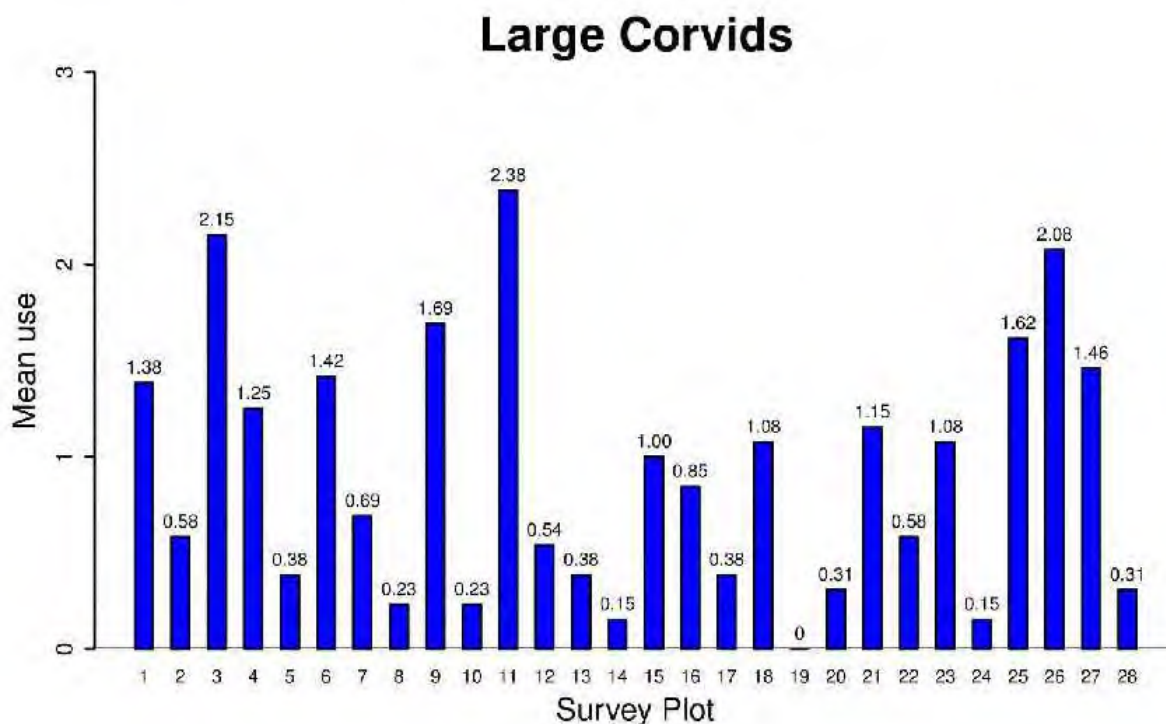


Figure 5h. Large corvid use by observation plot during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

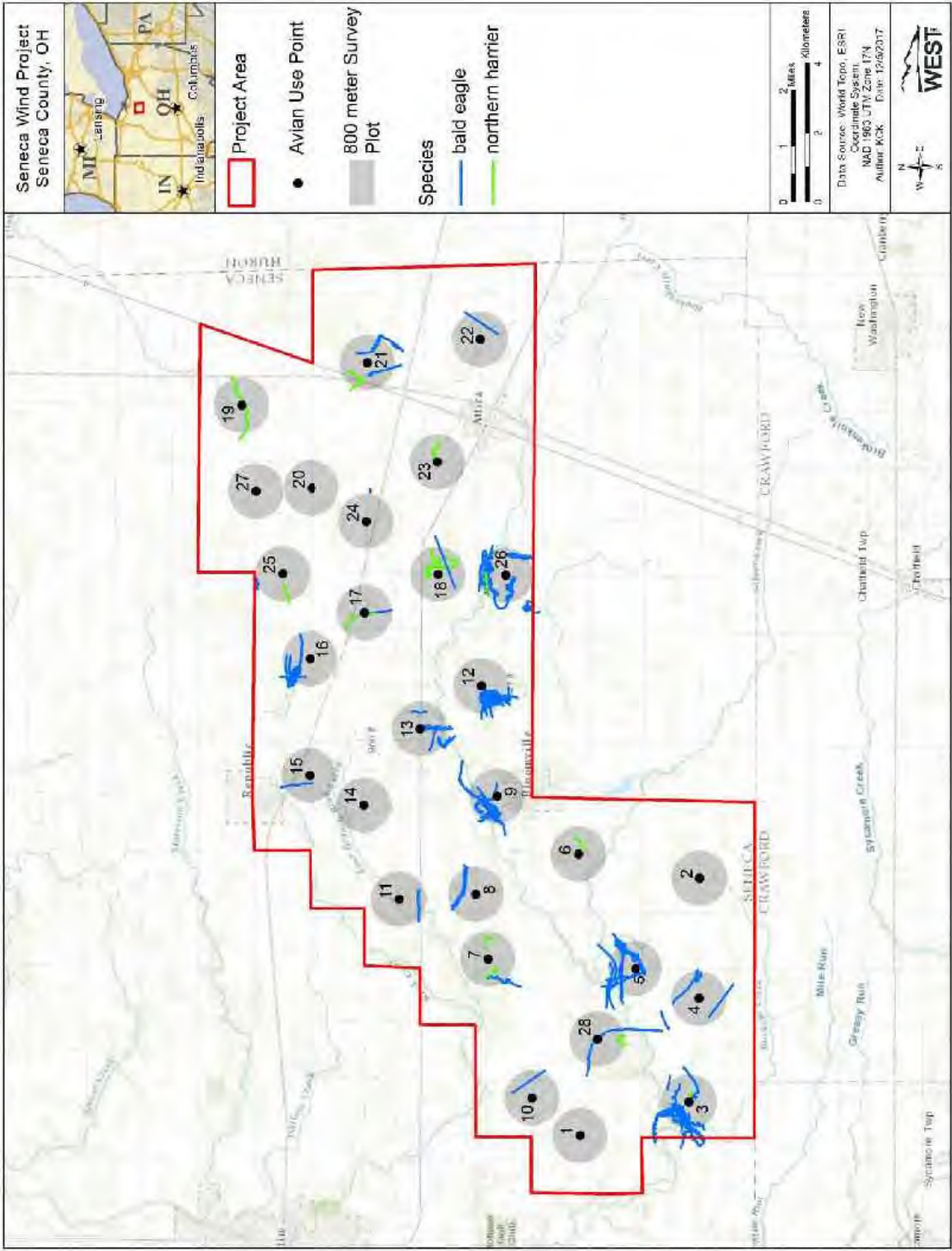


Figure 6. Flight paths for bald eagle (*Haliaeetus leucocephalus*) and northern harrier (*Circus cyaneus*) during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

Eagle Minutes

During surveys 193 eagle minutes were documented within the 3-dimensional survey plots (i.e., cylinders) inclusive of the area within 800 m (2,625 ft) of the survey point and up to 200 m AGL (Table 6a). The most eagle minutes were recorded during November 2016 (98 min), followed by December 2016 (25 min), and October 2016, February 2017, and March 2017 (11 min, each). Six or fewer eagle minutes were recorded during all other months (Table 6a). The relatively high number of eagle minutes recorded in November resulted from one observation of five eagles observed soaring within the 800-m x 200-m (2,625 x 656 ft) cylinder of survey plot 12 for an extended period of time.

Table 6a. Number of eagle minutes¹ by month during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Month Year | Eagle Minutes ¹ |
|----------------|----------------------------|
| August 2016 | 4 |
| September 2016 | 6 |
| October 2016 | 11 |
| November 2016 | 98 |
| December 2016 | 25 |
| January 2017 | 6 |
| February 2017 | 11 |
| March 2017 | 11 |
| April 2017 | 2 |
| May 2017 | 4 |
| June 2017 | 5 |
| July 2017 | 6 |
| August 2017 | 4 |
| Total | 193 |

¹ Observations of eagles flying within an 800-meter (m; 2,625-foot [ft]) x 200-m (656-ft) cylinder

Eagle minutes were documented at 16 of the observation points (Table 6b). Point 12 had the highest recorded eagle minutes (83 min), followed by Point 26 (22 min), and Point 3 (20 min). Eleven or fewer eagle minutes were recorded at all other points (Table 6b).

Table 6b. Number of eagle minutes¹ by survey location during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Survey Plot | Eagle Minutes ¹ |
|-------------|----------------------------|
| 3 | 20 |
| 4 | 9 |
| 5 | 11 |
| 7 | 3 |
| 9 | 11 |
| 10 | 3 |
| 12 | 83 |
| 13 | 8 |
| 15 | 3 |
| 16 | 5 |
| 17 | 3 |
| 18 | 2 |
| 21 | 6 |
| 24 | 2 |

Table 6b. Number of eagle minutes¹ by survey location during large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Survey Plot | Eagle Minutes ¹ |
|--------------|----------------------------|
| 25 | 2 |
| 26 | 22 |
| Total | 193 |

¹ Observations of eagles flying within an 800-meter (m; 2,625-foot [ft]) x 200-m (656-ft) cylinder

Special-Status Species Observations

Two special-status species were recorded during surveys (Table 7). This is a tally that in some cases may represent repeated observations of the same individual. During surveys, 79 bald eagle and 14 northern harrier (*Circus cyaneus*) observations were recorded. An additional 40 bald eagle observations were recorded incidentally during both the large bird surveys and passerine migration surveys (presented in a separate report). The bald eagle is federally protected by the Bald and Golden Eagle Protection Act (BGEPA 1940) and the northern harrier is a state-listed endangered species (ODNR 2017).

Table 7. Summary of special-status species observations recorded at the Seneca Wind Project during large bird surveys (LB) and as incidental wildlife observations (Inc.) from August 16, 2016 – August 15, 2017.

| Species | Scientific Name | Status | LB | | INC* | | Total | |
|------------------|---------------------------------|--------|-----------|-----------|-----------|-----------|------------|------------|
| | | | # grps | # obs | # grps | # obs | # grps | # obs |
| bald eagle | <i>Haliaeetus leucocephalus</i> | BGEPA | 73 | 79 | 33 | 40 | 106 | 119 |
| northern harrier | <i>Circus cyaneus</i> | SE | 13 | 14 | - | - | 13 | 14 |
| Total | 2 species | | 86 | 93 | 33 | 40 | 119 | 133 |

*Incidental eagle observations are the total reported from large bird surveys and passerine migration surveys
BGEPA=federal protections under the Bald and Golden Eagle Protection Act (BGEPA 1940); SE = state endangered (ODNR 2017)

Note: grps = groups, obs = observations

REFERENCES

- Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) § 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, Section (§) 2, 54 Statute (Stat.) 251; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. As amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.
- ESRI. 2013. World Topographic Map. ArcGIS Resource Center. ESRI, producers of ArcGIS software. ESRI, Redlands, California. Last modified June 6, 2013. Accessed November 2016.
- Homer, C. G., J. A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J. D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a Decade of Land Cover Change Information. Photogrammetric Engineering and Remote Sensing 81(5): 345-354. Available online at: <http://www.mrlc.gov/nlcd2011.php>
- North American Datum (NAD). 1983. NAD83 Geodetic Datum.

- Ohio Department of Natural Resources (ODNR). 2009. Ohio Department of Natural Resources Terrestrial Wind Energy Voluntary Cooperation Agreement. June 2, 2009. Draft version available online at: <http://www.dnr.state.oh.us/LinkClick.aspx?fileticket=Cba3egkse7M%3D&tabid=21467>
- Ohio Department of Natural Resources (ODNR). 2017. Ohio's Listed Species: Wildlife That Are Considered to Be Endangered, Threatened, Species of Concern, Special Interest, Extirpated, or Extinct in Ohio. Updated September 2017. 10 pp. Available online at: <http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/publications/information/pub356.pdf>
- Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. *Condor* 82(3): 309-313.
- USA Topo. 2017. USA Topo Maps. US Geological Survey (USGS) topographical maps for the United States. ArcGIS. ESRI, producers of ArcGIS software. Redlands, California.
- US Fish and Wildlife Service (USFWS). 2016. Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests; Final Rule. 50 CFR 13 and 22. United States Fish and Wildlife Service, Department of the Interior. 81 Federal Register (FR) 242: 91494-91554. December 16, 2016.
- US Geological Survey (USGS) National Land Cover Database (NLCD). 2011. National Land Cover Database 2011 (NLCD 2011). Multi-Resolution Land Characteristics Consortium (MRLC), National Land Cover Database (NLCD). USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. Available online at: <http://www.mrlc.gov/nlcd2011.php>; Legend at: http://www.mrlc.gov/nlcd11_leg.php
- US Geological Survey (USGS). 2017. Usgs Topographic Maps. Last updated January 17, 2017. Homepage available at: <https://nationalmap.gov/ustopo/index.html>

**Appendix A. All Bird Types and Species Observed in the Seneca Wind Project during
Large Bird Surveys from August 16, 2016 – August 15, 2017**

Appendix A. Summary of individuals and group observations by bird type and species for large bird surveys at the Seneca Wind Project^a from August 16, 2016 – August 15, 2017.

| Type/Species | Scientific Name | Summer | | | Fall | | | Winter | | | Spring | | | Total | |
|--------------------------|---------------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|--------|-------|-------|
| | | # grps | # obs | # obs | # grps | # obs | # obs | # grps | # obs | # obs | # grps | # obs | # grps | # obs | # obs |
| Waterbirds | | 9 | 9 | 0 | 0 | 0 | 2 | 2 | 2 | 7 | 8 | 18 | 19 | | |
| great blue heron | <i>Ardea herodias</i> | 8 | 8 | 0 | 0 | 0 | 2 | 2 | 2 | 7 | 8 | 17 | 18 | | |
| green heron | <i>Butorides virescens</i> | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| Waterfowl | | 1 | 3 | 1 | 6 | 6 | 34 | 435 | 32 | 13 | 32 | 49 | 476 | | |
| Canada goose | <i>Branta canadensis</i> | 1 | 3 | 1 | 6 | 6 | 31 | 400 | 26 | 11 | 26 | 44 | 435 | | |
| common goldeneye | <i>Bucephala clangula</i> | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | | |
| mallard | <i>Anas platyrhynchos</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 2 | 6 | | |
| snow goose | <i>Chen caerulescens</i> | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 1 | 4 | | |
| unidentified duck | | 0 | 0 | 0 | 0 | 0 | 1 | 30 | 0 | 0 | 0 | 1 | 30 | | |
| Shorebirds | | 10 | 39 | 16 | 50 | 50 | 13 | 15 | 47 | 31 | 47 | 70 | 151 | | |
| killdeer | <i>Charadrius vociferus</i> | 10 | 39 | 16 | 50 | 50 | 13 | 15 | 47 | 31 | 47 | 70 | 151 | | |
| Gulls/Terns | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 1 | 2 | | |
| ring-billed gull | <i>Larus delawarensis</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | | |
| Diurnal Raptors | | 46 | 52 | 67 | 73 | 73 | 82 | 98 | 72 | 62 | 72 | 257 | 295 | | |
| <i>Accipiter</i> | | 1 | 1 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 2 | 12 | 12 | | |
| Cooper's hawk | <i>Accipiter cooperii</i> | 1 | 1 | 5 | 5 | 5 | 4 | 4 | 2 | 2 | 2 | 12 | 12 | | |
| <i>Buteos</i> | | 19 | 22 | 17 | 18 | 18 | 36 | 49 | 42 | 34 | 42 | 106 | 131 | | |
| red-tailed hawk | <i>Buteo jamaicensis</i> | 19 | 22 | 17 | 18 | 18 | 36 | 49 | 41 | 33 | 41 | 105 | 130 | | |
| rough-legged hawk | <i>Buteo lagopus</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | | |
| <i>Northern Harrier</i> | | 0 | 0 | 3 | 4 | 4 | 8 | 8 | 2 | 2 | 2 | 13 | 14 | | |
| northern harrier | <i>Circus cyaneus</i> | 0 | 0 | 3 | 4 | 4 | 8 | 8 | 2 | 2 | 2 | 13 | 14 | | |
| <i>Eagles</i> | | 20 | 20 | 23 | 25 | 25 | 15 | 17 | 17 | 15 | 17 | 73 | 79 | | |
| bald eagle | <i>Haliaeetus leucocephalus</i> | 20 | 20 | 23 | 25 | 25 | 15 | 17 | 17 | 15 | 17 | 73 | 79 | | |
| <i>Falcons</i> | | 6 | 9 | 17 | 19 | 19 | 19 | 20 | 9 | 9 | 9 | 51 | 57 | | |
| American kestrel | <i>Falco sparverius</i> | 6 | 9 | 15 | 16 | 16 | 19 | 20 | 9 | 9 | 9 | 49 | 54 | | |
| peregrine falcon | <i>Falco peregrinus</i> | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | | |
| Osprey | | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| osprey | <i>Pandion haliaetus</i> | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| Other Raptors | | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| unidentified raptor | | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | |
| Vultures | | 99 | 227 | 121 | 350 | 350 | 6 | 13 | 355 | 145 | 355 | 371 | 945 | | |
| turkey vulture | <i>Cathartes aura</i> | 99 | 227 | 121 | 350 | 350 | 6 | 13 | 355 | 145 | 355 | 371 | 945 | | |
| Upland Game Birds | | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 1 | 1 | 2 | 8 | | |
| wild turkey | <i>Meleagris gallopavo</i> | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 1 | 1 | 2 | 8 | | |

Appendix A. Summary of individuals and group observations by bird type and species for large bird surveys at the Seneca Wind Project^a from August 16, 2016 – August 15, 2017.

| Type/Species | Scientific Name | Summer | | | Fall | | | Winter | | | Spring | | | Total | | |
|----------------------|------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|--------------|-------|
| | | # grps | # obs | # grps | # obs | # grps | # obs | # grps | # obs | # grps | # obs | # grps | # obs | # grps | # obs | # obs |
| Doves/Pigeons | | 43 | 118 | 35 | 243 | 26 | 152 | 13 | 21 | 13 | 21 | 13 | 21 | 117 | 534 | |
| mourning dove | <i>Zenaida macroura</i> | 39 | 96 | 23 | 168 | 16 | 75 | 12 | 20 | 12 | 20 | 12 | 20 | 90 | 359 | |
| rock pigeon | <i>Columba livia</i> | 4 | 22 | 12 | 75 | 10 | 77 | 1 | 1 | 1 | 1 | 1 | 1 | 27 | 175 | |
| Large Corvids | | 4 | 5 | 15 | 49 | 75 | 176 | 45 | 98 | 45 | 98 | 45 | 98 | 139 | 328 | |
| American crow | <i>Corvus brachyrhynchos</i> | 4 | 5 | 15 | 49 | 75 | 176 | 45 | 98 | 45 | 98 | 45 | 98 | 139 | 328 | |
| Overall | | 212 | 453 | 255 | 771 | 239 | 898 | 318 | 636 | 318 | 636 | 318 | 636 | 1,024 | 2,758 | |

^a Regardless of distance from observer.

**Appendix B. Mean Use, Percent of Use, and Frequency of Occurrence for Large Birds
Observed during Large Bird Surveys in the Seneca Wind Project from August 16, 2016 –
August 15, 2017**

Appendix B. Mean large bird use (number of large birds/800-meter plot/60-min survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during the large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Type/Species | Mean Use | | | | % of Use | | | | % Frequency | | | |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring |
| Waterbirds | 0.08 | 0 | 0.02 | 0.10 | 2.0 | 0 | 0.2 | 1.3 | 5.4 | 0 | 2.4 | 7.1 |
| great blue heron | 0.07 | 0 | 0.02 | 0.10 | 1.8 | 0 | 0.2 | 1.3 | 4.5 | 0 | 2.4 | 7.1 |
| green heron | <0.01 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 |
| Waterfowl | 0.03 | 0.09 | 5.18 | 0.38 | 0.7 | 0.9 | 48.7 | 5.1 | 0.9 | 1.4 | 21.4 | 13.1 |
| Canada goose | 0.03 | 0.09 | 4.76 | 0.31 | 0.7 | 0.9 | 44.7 | 4.1 | 0.9 | 1.4 | 20.2 | 11.9 |
| common goldeneye | 0 | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.2 | 0 |
| mallard | 0 | 0 | 0 | 0.07 | 0 | 0 | 0 | 1.0 | 0 | 0 | 0 | 2.4 |
| snow goose | 0 | 0 | 0.05 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 1.2 | 0 |
| unidentified duck | 0 | 0 | 0.36 | 0 | 0 | 0 | 3.4 | 0 | 0 | 0 | 1.2 | 0 |
| Shorebirds | 0.35 | 0.70 | 0.18 | 0.56 | 8.7 | 7.1 | 1.7 | 7.5 | 8.9 | 14.9 | 10.7 | 31.0 |
| killdeer | 0.35 | 0.70 | 0.18 | 0.56 | 8.7 | 7.1 | 1.7 | 7.5 | 8.9 | 14.9 | 10.7 | 31.0 |
| Gulls/Terns | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 1.2 |
| ring-billed gull | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 1.2 |
| Diurnal Raptors | 0.43 | 0.94 | 1.12 | 0.75 | 10.7 | 9.5 | 10.5 | 10.0 | 25.9 | 52.0 | 59.5 | 51.2 |
| <i>Accipiters</i> | <0.01 | 0.07 | 0.05 | 0.02 | 0.2 | 0.7 | 0.4 | 0.3 | 0.9 | 7.2 | 4.8 | 2.4 |
| Cooper's hawk | <0.01 | 0.07 | 0.05 | 0.02 | 0.2 | 0.7 | 0.4 | 0.3 | 0.9 | 7.2 | 4.8 | 2.4 |
| <i>Buteos</i> | 0.20 | 0.23 | 0.58 | 0.50 | 4.9 | 2.3 | 5.5 | 6.7 | 13.4 | 18.0 | 35.7 | 36.9 |
| red-tailed hawk | 0.20 | 0.23 | 0.58 | 0.49 | 4.9 | 2.3 | 5.5 | 6.5 | 13.4 | 18.0 | 35.7 | 35.7 |
| rough-legged hawk | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 1.2 |
| <i>Northern Harrier</i> | 0 | 0.05 | 0.10 | 0.02 | 0 | 0.5 | 0.9 | 0.3 | 0 | 3.6 | 8.3 | 2.4 |
| northern harrier | 0 | 0.05 | 0.10 | 0.02 | 0 | 0.5 | 0.9 | 0.3 | 0 | 3.6 | 8.3 | 2.4 |
| <i>Eagles</i> | 0.14 | 0.31 | 0.15 | 0.10 | 3.6 | 3.2 | 1.5 | 1.3 | 8.9 | 18.0 | 10.7 | 7.1 |
| bald eagle | 0.14 | 0.31 | 0.15 | 0.10 | 3.6 | 3.2 | 1.5 | 1.3 | 8.9 | 18.0 | 10.7 | 7.1 |
| <i>Falcons</i> | 0.08 | 0.25 | 0.24 | 0.11 | 2.0 | 2.5 | 2.2 | 1.4 | 5.4 | 17.3 | 22.6 | 10.7 |
| American kestrel | 0.08 | 0.21 | 0.24 | 0.11 | 2.0 | 2.2 | 2.2 | 1.4 | 5.4 | 16.1 | 22.6 | 10.7 |
| peregrine falcon | 0 | 0.04 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 2.6 | 0 | 0 |
| Osprey | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.2 | 0 | 0 |
| osprey | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.2 | 0 | 0 |
| Other Raptors | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.4 | 0 | 0 |
| unidentified raptor | 0 | 0.01 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 1.4 | 0 | 0 |
| Vultures | 2.03 | 4.60 | 0.15 | 4.23 | 50.6 | 46.3 | 1.5 | 56.6 | 38.4 | 54.9 | 4.8 | 78.6 |
| turkey vulture | 2.03 | 4.60 | 0.15 | 4.23 | 50.6 | 46.3 | 1.5 | 56.6 | 38.4 | 54.9 | 4.8 | 78.6 |
| Upland Game Birds | 0 | 0 | 0.08 | 0.01 | 0 | 0 | 0.8 | 0.2 | 0 | 0 | 1.2 | 1.2 |
| wild turkey | 0 | 0 | 0.08 | 0.01 | 0 | 0 | 0.8 | 0.2 | 0 | 0 | 1.2 | 1.2 |

Appendix B. Mean large bird use (number of large birds/800-meter plot/60-min survey), percent of total use (%), and frequency of occurrence (%) for each large bird type and species by season during the large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Type/Species | Mean Use | | | % of Use | | | % Frequency | | |
|----------------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer |
| Doves/Pigeons | 1.05 | 3.01 | 1.81 | 0.25 | 26.3 | 30.4 | 17.0 | 3.3 | 18.8 |
| mourning dove | 0.86 | 2.02 | 0.89 | 0.24 | 21.4 | 20.3 | 8.4 | 3.2 | 18.8 |
| rock pigeon | 0.20 | 1.00 | 0.92 | 0.01 | 4.9 | 10.0 | 8.6 | 0.2 | 2.7 |
| Large Corvids | 0.04 | 0.58 | 2.10 | 1.17 | 1.1 | 5.9 | 19.7 | 15.6 | 3.6 |
| American crow | 0.04 | 0.58 | 2.10 | 1.17 | 1.1 | 5.9 | 19.7 | 15.6 | 3.6 |
| Overall | 4.01 | 9.93 | 10.64 | 7.46 | 100 | 100 | 100 | 100 | 100 |

**Appendix C. Species Exposure Indices for Large Birds during Large Bird Surveys in the
Seneca Wind Project from August 16, 2016 – August 15, 2017**

Appendix C. Relative exposure index and flight characteristics for each large bird species during the large bird surveys in the Seneca Wind Project from August 16, 2016 – August 15, 2017.

| Species | # Groups Flying | Overall Mean Use | % Flying | % Flying within RSH based on initial obs | Exposure Index | % Within RSH at anytime |
|---------------------|------------------------|-------------------------|-----------------|---|-----------------------|--------------------------------|
| turkey vulture | 367 | 2.85 | 99.0 | 79.0 | 2.23 | 88.2 |
| Canada goose | 40 | 1.18 | 81.1 | 62.6 | 0.60 | 63.2 |
| American crow | 125 | 0.93 | 91.2 | 68.2 | 0.58 | 75.3 |
| rock pigeon | 24 | 0.53 | 88.6 | 85.2 | 0.40 | 86.5 |
| mourning dove | 65 | 1.02 | 69.1 | 47.6 | 0.34 | 51.2 |
| red-tailed hawk | 84 | 0.37 | 81.5 | 69.8 | 0.21 | 76.4 |
| killdeer | 54 | 0.46 | 65.6 | 47.5 | 0.14 | 64.6 |
| bald eagle | 53 | 0.18 | 88.7 | 67.3 | 0.11 | 76.4 |
| great blue heron | 17 | 0.05 | 100 | 83.3 | 0.04 | 88.9 |
| American kestrel | 30 | 0.16 | 61.1 | 24.2 | 0.02 | 39.4 |
| Cooper's hawk | 10 | 0.04 | 83.3 | 60.0 | 0.02 | 70.0 |
| mallard | 2 | 0.02 | 100 | 100 | 0.02 | 100 |
| snow goose | 1 | 0.01 | 100 | 100 | 0.01 | 100 |
| peregrine falcon | 2 | 0.01 | 100 | 66.7 | <0.01 | 100 |
| osprey | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| rough-legged hawk | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| northern harrier | 13 | 0.04 | 100 | 7.1 | <0.01 | 14.3 |
| common goldeneye | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| green heron | 1 | <0.01 | 100 | 100 | <0.01 | 100 |
| unidentified duck | 1 | 0.08 | 100 | 0 | 0 | 0 |
| wild turkey | 0 | 0.02 | 0 | 0 | 0 | 0 |
| ring-billed gull | 1 | <0.01 | 100 | 0 | 0 | 0 |
| unidentified raptor | 1 | <0.01 | 100 | 0 | 0 | 100 |

**Appendix D. Mean Use by Point for All Birds, Major Bird Types, and Diurnal Raptor
Subtypes during Large Bird Surveys in the Seneca Wind Project from August 16, 2016 –
August 15, 2017**

Appendix D1. Mean use (number of birds/60-minute survey) by plot for all birds^a, major bird types, and diurnal raptor subtypes observed in the Seneca Wind Project during large bird surveys from August 16, 2016 – August 15, 2017.

| Bird Type | Survey Plot | | | | | | | | | | |
|-------------------------|--------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Waterbirds | 0 | 0 | 0.08 | 0.08 | 0.23 | 0.08 | 0 | 0.08 | 0.08 | 0.23 | 0 |
| Waterfowl | 2.69 | 0.50 | 2.00 | 0 | 0 | 9.17 | 4.92 | 3.00 | 1.77 | 1.00 | 0.77 |
| Shorebirds | 2.92 | 0 | 0.23 | 0.25 | 0.15 | 0.25 | 0.31 | 0.62 | 0.23 | 0.15 | 0.23 |
| Gulls/Terns | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diurnal Raptors | 1.31 | 0.67 | 1.46 | 0.83 | 0.77 | 0.50 | 0.69 | 0.85 | 1.38 | 0.54 | 0.69 |
| <u>Accipiters</u> | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0.08 | 0.08 | 0 | 0.08 |
| <u>Buteos</u> | 0.77 | 0.25 | 0.69 | 0.42 | 0.08 | 0.33 | 0.31 | 0.54 | 0.77 | 0.31 | 0.54 |
| <u>Northern Harrier</u> | 0 | 0 | 0.08 | 0 | 0 | 0.08 | 0.23 | 0 | 0 | 0 | 0 |
| <u>Eagles</u> | 0 | 0 | 0.62 | 0.25 | 0.69 | 0 | 0.08 | 0.08 | 0.46 | 0.08 | 0.08 |
| <u>Falcons</u> | 0.54 | 0.42 | 0.08 | 0.08 | 0 | 0.08 | 0.08 | 0.15 | 0.08 | 0.15 | 0 |
| Osprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Raptors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vultures | 1.85 | 4.42 | 2.54 | 4.58 | 4.15 | 3.00 | 2.00 | 1.85 | 3.54 | 2.46 | 3.69 |
| Upland Game Birds | 0 | 0.58 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 |
| Doves/Pigeons | 3.62 | 1.50 | 0.31 | 0.25 | 1.08 | 4.5 | 0.46 | 5.92 | 0.85 | 2.08 | 0.54 |
| Large Corvids | 1.38 | 0.58 | 2.15 | 1.25 | 0.38 | 1.42 | 0.69 | 0.23 | 1.69 | 0.23 | 2.38 |
| All Large Birds | 13.77 | 8.25 | 8.77 | 7.25 | 6.77 | 18.92 | 9.08 | 12.54 | 9.62 | 6.69 | 8.31 |

^a. 800-meter (m; 2,625-foot) radius plot for large birds.

Appendix D1 (*continued*). Mean use (number of birds/60-minute survey) by plot for all birds, major bird types, and diurnal raptor subtypes observed in the Seneca Wind Project during large bird surveys from August 16, 2016 – August 15, 2017.

| Bird Type | Survey Plots | | | | | | | | | | |
|-------------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|
| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| Waterbirds | 0.08 | 0.08 | 0 | 0.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 |
| Waterfowl | 1.54 | 0.77 | 0 | 0.62 | 0.15 | 0 | 0 | 0 | 0 | 0 | 0.25 |
| Shorebirds | 0.46 | 0.15 | 0.38 | 0.38 | 1.15 | 0.23 | 0.08 | 0.75 | 0.31 | 0.31 | 0 |
| Gulls/Terns | 0 | 0 | 0.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diurnal Raptors | 1.54 | 0.69 | 0.46 | 1.00 | 0.69 | 0.46 | 0.62 | 0.92 | 0.69 | 0.77 | 0.25 |
| <u>Accipiters</u> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 |
| <u>Buteos</u> | 0.54 | 0.08 | 0.38 | 0.77 | 0.23 | 0.23 | 0.23 | 0.83 | 0 | 0.08 | 0.08 |
| <u>Northern Harrier</u> | 0 | 0 | 0 | 0 | 0 | 0.08 | 0.08 | 0.08 | 0 | 0.15 | 0 |
| <u>Eagles</u> | 0.77 | 0.54 | 0 | 0.08 | 0.23 | 0.08 | 0.08 | 0 | 0 | 0.15 | 0.08 |
| <u>Falcons</u> | 0.23 | 0.08 | 0.08 | 0.15 | 0.23 | 0.08 | 0.23 | 0 | 0.62 | 0.31 | 0.08 |
| Osprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Raptors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 |
| Vultures | 10.77 | 2.77 | 0.92 | 1.23 | 2.38 | 1.69 | 0.62 | 0.92 | 1.46 | 2.31 | 3.75 |
| Upland Game Birds | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Doves/Pigeons | 3.38 | 0.15 | 2.00 | 0 | 0.92 | 0.38 | 1.62 | 0.08 | 1.85 | 5.62 | 0.83 |
| Large Corvids | 0.54 | 0.38 | 0.15 | 1.00 | 0.85 | 0.38 | 1.08 | 0 | 0.31 | 1.15 | 0.58 |
| All Large Birds | 18.31 | 5.00 | 4.08 | 4.38 | 6.15 | 3.15 | 4.00 | 2.67 | 4.62 | 10.15 | 5.75 |

^a. 800-meter (m; 2,625-foot) radius plot for large birds.

Appendix N-6: Passerine Migration Surveys for the Seneca Wind Project

Passerine Migration Surveys for the Seneca Wind Project Seneca County, Ohio

**Draft Report
August 17, 2016 – May 31, 2017**



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September 2017



EXECUTIVE SUMMARY

This report presents the results of the 2016 – 2017 passerine migration surveys conducted by Western EcoSystems Technology, Inc. for the Seneca Wind Project (Project or Project area) located in Seneca County, Ohio. Survey methods followed the Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*. The survey objective was to estimate the temporal and overall rate of use of the combined forest, shrub, and wooded wetland habitats in the Project area by passerines during the spring and fall migration seasons.

Surveys were conducted once weekly during fall (August 17 to October 13, 2016) and spring (April 12 to May 31, 2017). The Project was temporarily halted in mid-October 2016, therefore, the fall surveys did not extend to November 15 as recommended within the ODNR protocol. Passerine migration surveys consisted of 10-minute (min) counts at each point, in which all birds seen or heard within 200 meters (m; 656 feet) of the surveyor were recorded. Due to the scarcity of shrub/scrub or wooded wetland habitat, survey points were located along public roads adjacent to forested habitat. All surveys were completed between dawn and 1000. Per ODNR protocol, all birds seen or heard were recorded during surveys, but the emphasis was placed on passerines and federally and state-listed species.

A total of 8,114 individuals in 3,588 groups were observed during surveys, with passerines comprising the majority of birds observed. American robin, blue jay, European starling, American goldfinch, red-winged blackbird, and brown-headed cowbird were the most abundant birds observed during the study period. Mean use for small birds, including passerines, was higher in spring (18.88 birds/200-m/10-minute survey) than in fall (11.22 birds/200-m/10-minute survey), and small bird use was highest at Point 10.

No federally or state-listed threatened or endangered species were observed during surveys. Three Ohio species of special concern (black vulture, bobolink and yellow-bellied sapsucker) and four Ohio species of special interest (golden-crowned kinglet, hermit thrush, least flycatcher and red-breasted nuthatch) were recorded during surveys. All seven state-listed species were observed in limited numbers, with bobolink and hermit thrush observed most often with 10 individuals each.

Forty-two Bald eagles were observed during surveys and incidentally in the Project area. Eagle observation surveys have been completed in the Project area and those results, including a discussion of potential impacts from Project development, will be presented in a separate report.

STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

| | |
|------------------|-------------------------------------|
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INTRODUCTION

Shoener Environmental, Inc. (Shoener) is developing the Seneca Wind Project (the Project or Project area) in Seneca County, Ohio (Figure 1). Western EcoSystems Technology, Inc. (WEST) conducted baseline wildlife surveys in the Project area using survey protocols consistent with recommendations in the Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) and the US Fish and Wildlife Service Eagle Conservation Plan Guidance (USFWS 2013). WEST developed a study plan for the Project that was reviewed and approved on July 15, 2016 (K. Lott, USFWS, pers. comm. and J. Norris, ODNR, pers. comm.).

This report includes results from the 2016 – 2017 passerine migration surveys. The survey objective was to estimate the temporal and overall rate of use of the combined forest, shrub, and wooded wetland habitats in the Project area by passerines during the spring and fall migration seasons.

PROJECT AREA

The proposed 241.6-square kilometer (km²; 59,704.4-acre [ac]) Project area is located in portions of Scipio, Reed, Eden, Bloom, and Venice townships (Figure 2). According to the US Geological Survey (USGS) National Land Cover Database (NLCD), the Project area is dominated by croplands (76.0%; Table 1, Figure 3; USGS NLCD 2011, Homer et al. 2015). Deciduous forest (10.5%), developed areas (5.1%), and pasture and hay fields (4.6%) are the next most common land cover types within the Project area. All other land cover types comprise less than 2.0% of the Project area, individually (Table 1, Figure 3).

Table 1. Land cover types and composition at the Seneca Wind Project.

| Habitat | Square Kilometers | Acres | % Composition |
|------------------------------|-------------------|------------------|---------------|
| Cultivated Crops | 183.5 | 45,354.0 | 76.0 |
| Deciduous Forest | 25.3 | 6,262.2 | 10.5 |
| Developed, Open Space | 12.3 | 3,049.3 | 5.1 |
| Pasture/Hay | 11.2 | 2,768.0 | 4.6 |
| Developed, Low Intensity | 4.0 | 997.6 | 1.7 |
| Grassland/Herbaceous | 2.3 | 570.6 | 1.0 |
| Developed, Medium Intensity | 0.8 | 207 | 0.4 |
| Barren Land (Rock/Sand/Clay) | 0.7 | 161.9 | 0.3 |
| Woody Wetlands | 0.5 | 122.2 | 0.2 |
| Open Water | 0.3 | 78.7 | 0.1 |
| Developed, High Intensity | 0.2 | 54.1 | 0.1 |
| Emergent Herbaceous Wetlands | 0.2 | 48.3 | <0.1 |
| Evergreen Forest | 0.1 | 13.1 | <0.1 |
| Mixed Forest | 0.1 | 11.1 | <0.1 |
| Shrub/Scrub | <0.1 | 6.2 | <0.1 |
| Total | 241.59 | 59,704.35 | 100 |

Source: US Geological Survey National Land Cover Database 2011, Homer et al. 2015.

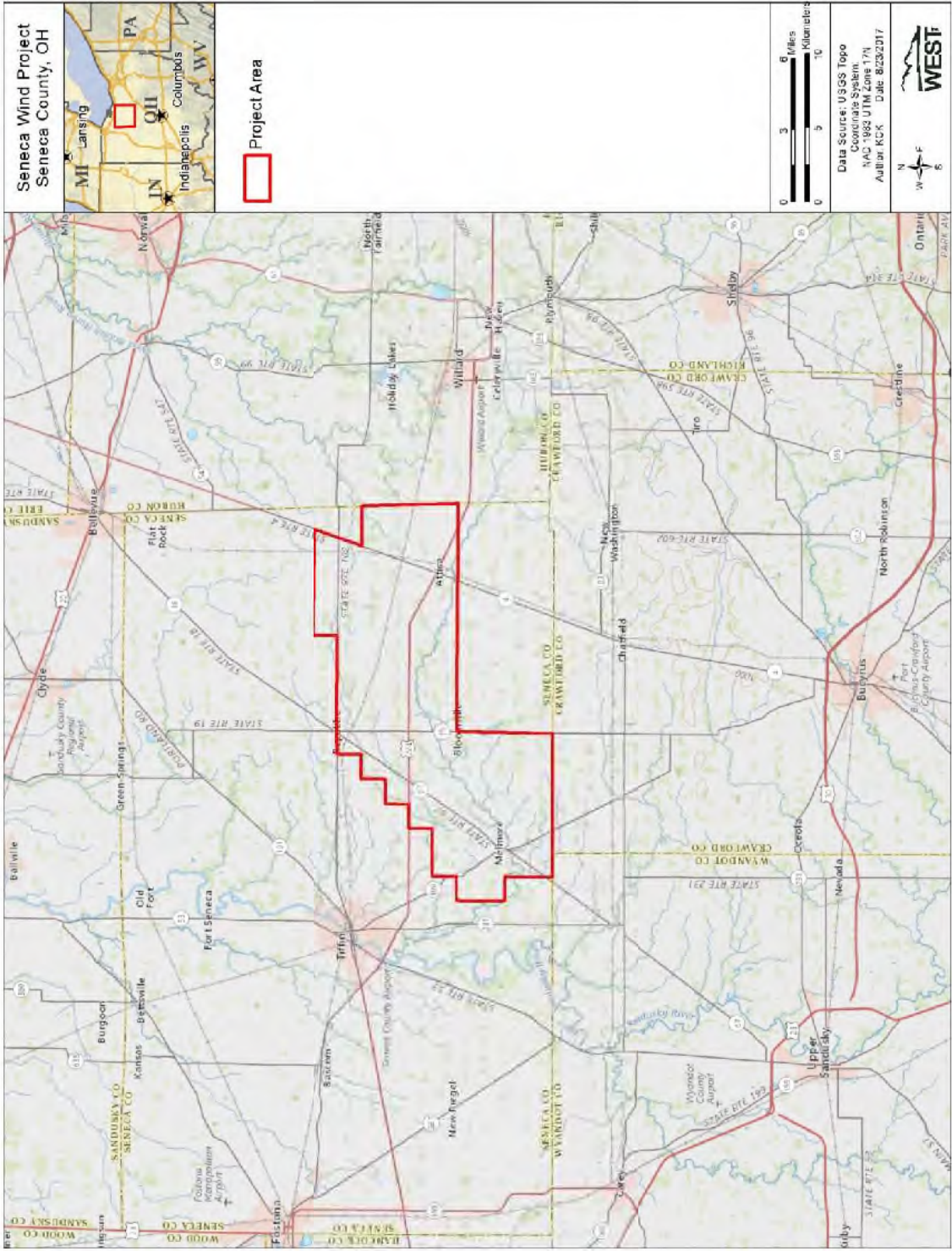


Figure 1. Overview of the Seneca Wind Project, Seneca County, Ohio.

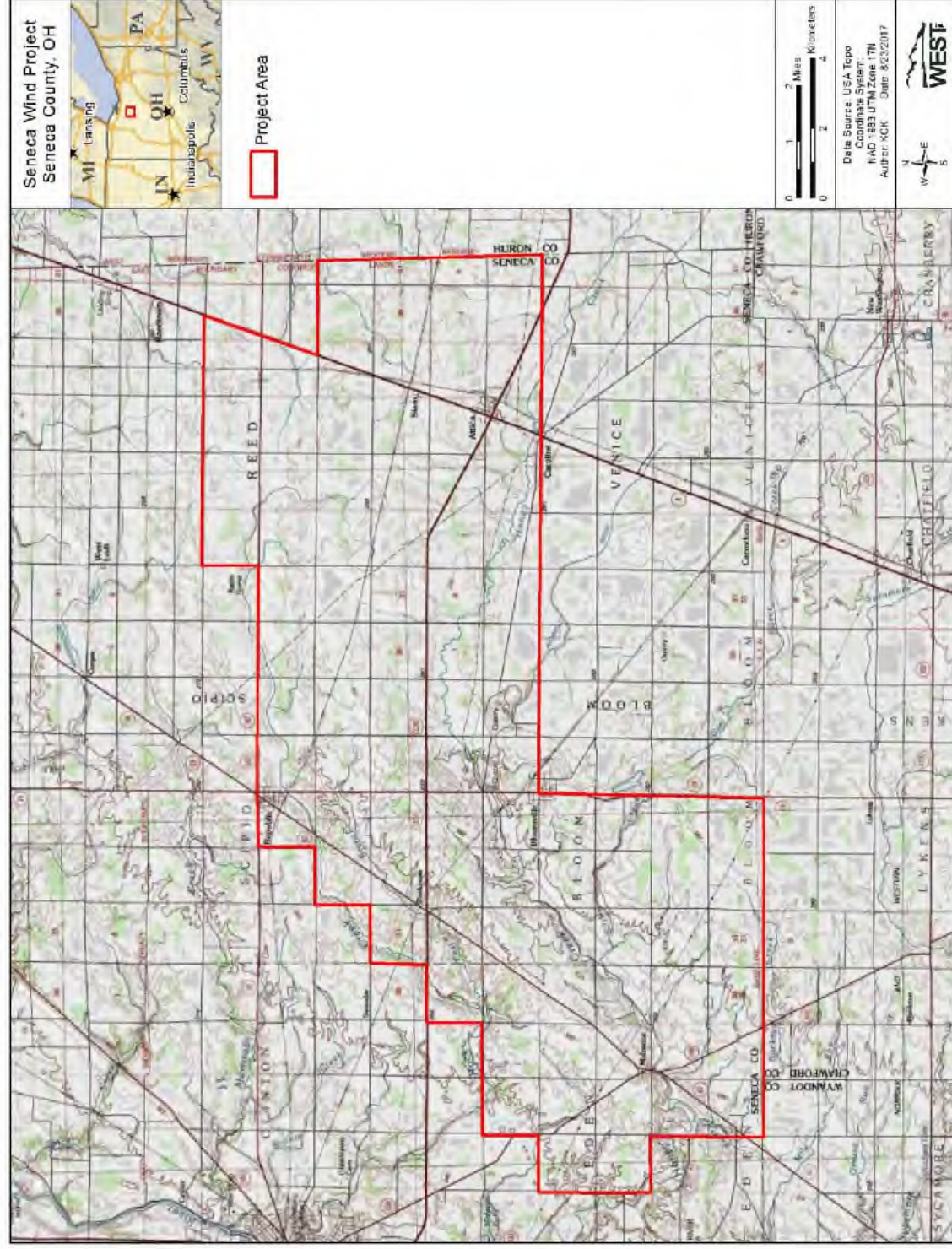


Figure 2. Location of the Seneca Wind Project, Seneca County, Ohio.

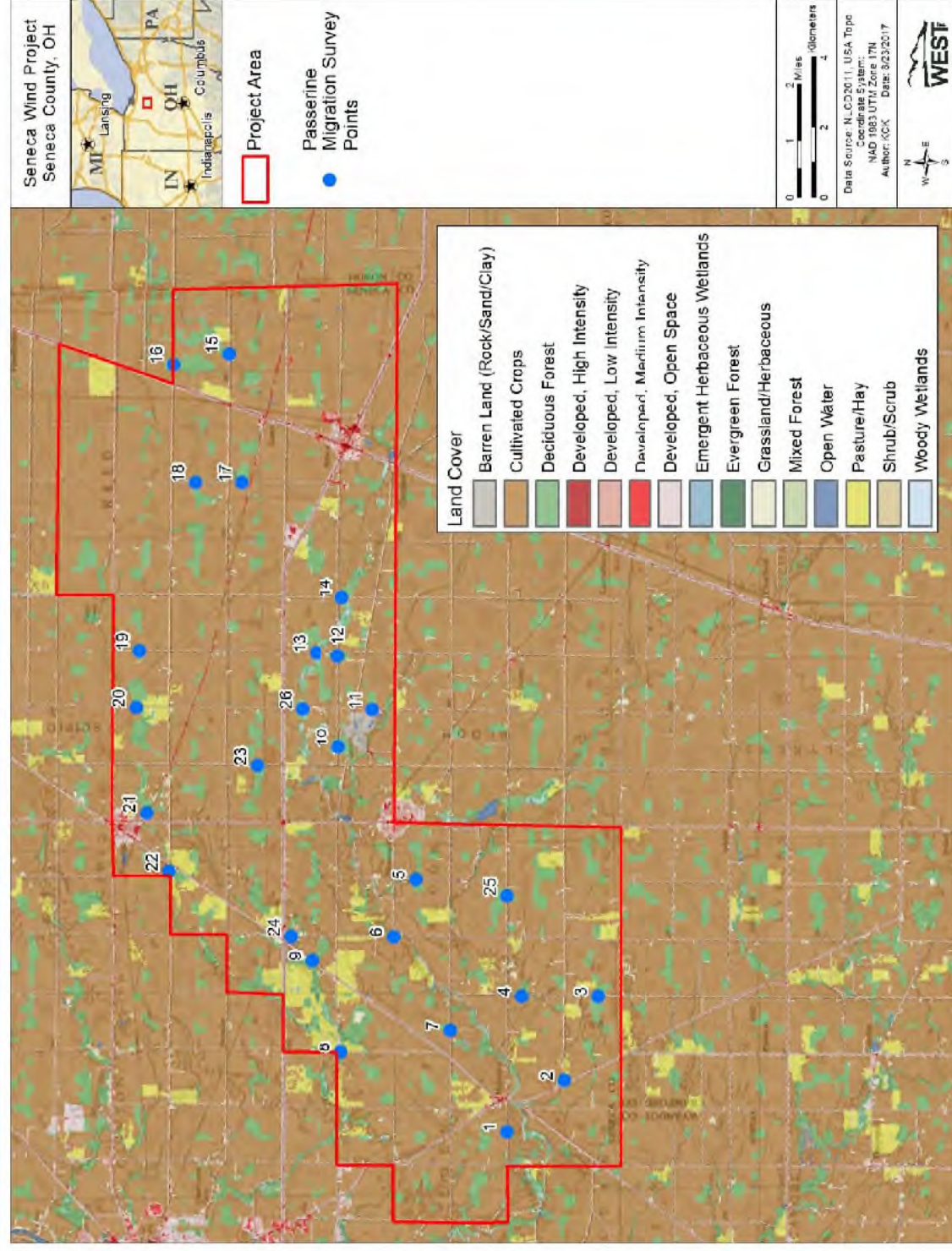


Figure 3. Land cover and locations of passerine migration survey points within the Seneca Wind Project, Seneca County, Ohio (US Geological Survey National Land Cover Database 2011, Homer et al. 2015).

METHODS

Survey Methods

Per the NLCD (Homer et al. 2015), there are 26.0 km² (6,414.9 ac) of forest, shrub, and wooded wetland within the Project area. ODNR protocol recommends one point-count location for every 1.0 km² (247.1 ac) of combined forest, shrub and wooded wetland. Shrub and wooded wetlands are uncommon in the Project area (less than 1.0%). No forested areas were located on leased parcels of land. Thus, 26 surveys plots were located along public roads adjacent to forested habitat within the Project area (Figure 3).

Passerine migration data consisted of counts of birds observed within circular plots around fixed observation points following standard methods (Reynolds et al. 1980). Surveys consisted of 10-minute (min) counts at each survey plot, in which all birds seen or heard within 200 meters (m; 656 feet [ft]) of the point were recorded. Weekly surveys were conducted during fall (August 17 to October 13, 2016) and spring (April 12 to May 31, 2017). The Project was temporarily halted in mid-October 2016, therefore, the surveys did not extend to November 15 as recommended within the ODNR protocol. All surveys were completed between dawn and 1000 H.

At each survey, the date, start and end time of each observation period, and weather information (e.g., temperature, wind speed and direction, and cloud cover) were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from observer, closest distance, behavior, and habitat(s) were recorded for each observation. Approximate flight height and distance from survey plot center at first observation were recorded to the nearest one-m (three-ft) interval. The behavior of each bird observed during surveys was also recorded. Behavior categories included perched (PE), soaring (SO), flapping (FL), foraging (FO), gliding (GL), hovering (HO), auditory (AUD), and other (OT, noted in comments). Any comments or unusual observations were noted in the comments section.

Observations of federally or state-listed species (defined as species protected under the Endangered Species Act [1973], Bald and Golden Eagle Protection Act [BGEPA; 1940], or listed as threatened or endangered by the state of Ohio [ODNR 2016]) were recorded during the surveys, as well as in-transit within the Project area (i.e., incidental observations).

Statistical Analysis

For analysis purposes, a visit was defined as the required length of time, in days, to survey all of the plots once within the Project area. Per ODNR protocol, seasons were defined as fall (August 1 to November 15) and spring (April 1 to May 31; ODNR 2009).

Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including field data collection, data entry, data analysis and report preparation. Following

surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. Periodically, the study team leader reviewed data forms to ensure completeness and legibility. Potentially erroneous data was identified using a series of database queries. Irregular codes or data suspected of being questionable were discussed with the observer and/or survey manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw datasheets, and appropriate changes in all steps were made.

Data Compilation and Storage

A database was developed to store, organize, and retrieve survey data. Data were keyed into the electronic database using a pre-defined protocol to facilitate subsequent QA/QC and data analysis. All datasheets and electronic data files were retained for reference.

Bird Diversity

Bird diversity was illustrated using species richness, measured as the total number of unique species observed. Species lists (with the number of observations and the number of groups) were generated by season and included all observations of birds detected within the 200-m buffer. In some cases, the tally may represent repeated sightings of the same individual. Species richness was calculated for each season by first averaging the total number of species observed within each plot during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall species richness was calculated as a weighted average of seasonal values by the number of days in each season for each survey type.

Mean Use and Frequency of Occurrence

All birds detected within the 200-m radius plot were used to calculate standardized avian use estimates. Standardized estimates of mean bird use (number of birds per plot per survey) were used to compare differences between bird types, seasons, and survey points. Mean use by season was calculated by summing the total number of birds seen within each plot during a visit, then averaging across plots within each visit, followed by averaging across visits within the season. Overall mean use was calculated as a weighted average of seasonal values by the number of days in each season. In addition, mean use was spatially compared among points across the Project.

RESULTS

A total of 442 passerine migration surveys were conducted throughout the fall and spring survey periods for a total of 73.7 survey hours. The number of observations and groups recorded by species during passerine migration surveys are presented in Appendix A.

Bird Diversity

A total of 8,114 individuals, 3,588 groups and 92 identifiable species were observed during the 442 surveys. Passerines constituted the majority of observations, consisting of 67 (72.8%) of the species observed (Appendix A). Overall species richness was 5.72 species/200-m plot/10-

min survey for small birds and 0.67 for large birds. More unique species were observed during the spring (79 species) than the fall (60 species; Appendix A). Six species comprised 49.5% of all observations: American robin (*Turdus migratorius*; 15.6%), blue jay (*Cyanocitta cristata*; 7.3%), European starling (*Sturnus vulgaris*; 7.1%), American goldfinch (*Spinus tristis*; 6.9%), red-winged blackbird (*Agelaius phoeniceus*; 6.5%), and brown-headed cowbird (*Molothrus ater*; 6.1%). All other species accounted for 4.3% or fewer observations, individually (Appendix A).

Bird Use, Percent of Use, and Frequency of Occurrence

For small birds, including passerines, the highest mean use occurred during the spring with 18.88 birds/200-m plot/10-min survey compared to 11.22 birds/200-m plot/10-min survey during the fall (Table 2).

Table 2. Mean bird use (number of birds/200-meter plot/10-minute survey), percent of total use (%), and frequency of occurrence (%) for each bird type and species by season during passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13) and spring 2017 (April 13 through May 31).

| Type / Species | Mean Use | | % of Use | | % Frequency | |
|---------------------------|--------------|--------------|------------|------------|-------------|--------|
| | Fall | Spring | Fall | Spring | Fall | Spring |
| Waterbirds | <0.01 | 0.05 | 0.5 | 3.4 | 0.9 | 3.4 |
| Waterfowl | 0.09 | 0.06 | 5.7 | 4.1 | 2.6 | 2.4 |
| Shorebirds | 0.2 | 0.07 | 12.2 | 4.8 | 10.7 | 5.3 |
| Diurnal Raptors | 0.03 | 0.11 | 1.8 | 7.6 | 3 | 9.6 |
| <u>Accipiters</u> | 0 | 0.04 | 0 | 3.1 | 0 | 3.8 |
| <u>Buteos</u> | 0.01 | 0.05 | 0.8 | 3.8 | 1.3 | 4.8 |
| <u>Eagles</u> | 0 | <0.01 | 0 | 0.7 | 0 | 1 |
| <u>Falcons</u> | 0.02 | 0 | 1 | 0 | 1.7 | 0 |
| <u>Vultures</u> | 0.19 | 0.31 | 11.7 | 22.1 | 7.3 | 14.9 |
| Upland Game Birds | <0.01 | 0 | 0.3 | 0 | 0.4 | 0 |
| Doves/Pigeons | 0.79 | 0.33 | 48.2 | 23.4 | 23.1 | 18.3 |
| Large Corvids | 0.32 | 0.48 | 19.5 | 34.5 | 12.4 | 20.2 |
| Large Bird Overall | 1.64 | 1.39 | 100 | 100 | | |
| Passerines | 9.57 | 17.83 | 85.3 | 94.4 | 93.2 | 100 |
| Cuckoos | <0.01 | 0 | <0.1 | 0 | 0.4 | 0 |
| Swifts/Hummingbirds | 0.15 | 0.09 | 1.3 | 0.5 | 7.7 | 3.8 |
| Woodpeckers | 0.86 | 0.97 | 7.7 | 5.1 | 50.4 | 62 |
| Unidentified Small Birds | 0.64 | <0.01 | 5.7 | <0.1 | 14.1 | 0.5 |
| Small Bird Overall | 11.22 | 18.88 | 100 | 100 | | |

Small bird use, including passerines, was highest at Point 10 (34.06 birds/200-m plot/10-min survey; Table 3). Use at the remaining points ranged from 7.12 (Point 1) to 24.59 (Point 15; Table 3).

Table 3. Mean use for all birds (number of birds/200-meter plot/10-minute survey) by point for all major bird types observed during passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13) and spring 2017 (April 13 through May 31).

| Bird Type | Survey Point | | | | | | | | | | | | |
|---------------------------|--------------|--------------|-------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Waterbirds | 0.06 | 0.06 | 0 | 0.18 | 0 | 0 | 0 | 0.12 | 0 | 0 | 0.06 | 0 | 0.06 |
| Waterfowl | 0.12 | 0 | 0 | 0 | 0.76 | 0 | 0 | 0.41 | 0 | 0 | 0 | 0 | 0.18 |
| Shorebirds | 0 | 0.06 | 0 | 0.59 | 0 | 0.06 | 0.12 | 0.12 | 0.29 | 0.06 | 0 | 0 | 0 |
| Diurnal Raptors | 0.06 | 0 | 0.06 | 0 | 0 | 0.06 | 0.24 | 0.12 | 0.06 | 0 | 0 | 0.24 | 0.18 |
| <u>Accipiters</u> | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.24 | 0 | 0 | 0 | 0 | 0.06 | 0 |
| <u>Buteos</u> | 0.06 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0.12 | 0.06 | 0 | 0 | 0.18 | 0.12 |
| <u>Eagles</u> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 |
| <u>Falcons</u> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vultures | 0 | 0 | 0.24 | 0 | 0.06 | 0.12 | 0.24 | 0.41 | 0.59 | 0.82 | 1.18 | 0.76 | 1.00 |
| Upland Game Birds | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 |
| Doves/Pigeons | 0.12 | 0.35 | 0 | 0.71 | 0.65 | 0.06 | 0.18 | 0.18 | 0.41 | 0.71 | 0.12 | 0.12 | 0.47 |
| Large Corvids | 0.29 | 1.00 | 1.00 | 1.06 | 0.24 | 0 | 0.18 | 0.06 | 0.18 | 0.06 | 0.29 | 0.06 | 1.12 |
| Large Bird Overall | 0.65 | 1.47 | 1.29 | 2.53 | 1.71 | 0.29 | 0.94 | 1.41 | 1.59 | 1.65 | 1.65 | 1.18 | 3.00 |
| Passerines | 6.12 | 12.65 | 7.88 | 9.06 | 13.18 | 14.59 | 7.12 | 24.41 | 10.71 | 33.35 | 9.94 | 11.18 | 13.29 |
| Cuckoos | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swifts/Hummingbirds | 0.06 | 0 | 0.24 | 0 | 0 | 0.06 | 0.06 | 0 | 0.12 | 0.18 | 0 | 0.12 | 0 |
| Woodpeckers | 0.82 | 0.94 | 1.24 | 0.94 | 0.65 | 1.88 | 0.06 | 1.47 | 0.88 | 0.35 | 0.18 | 2.00 | 0.59 |
| Unidentified Small Birds | 0.12 | 0.24 | 0.18 | 0.88 | 0.12 | 0.06 | 0.06 | 1.71 | 0.06 | 0.18 | 0.18 | 1.29 | 0 |
| Small Bird Overall | 7.12 | 13.88 | 9.53 | 10.88 | 13.94 | 16.59 | 7.29 | 27.59 | 11.76 | 34.06 | 10.29 | 14.59 | 13.88 |

Table 3 (continued). Mean use for all birds (number of birds/200-meter plot/10-minute survey) by point for all major bird types observed during passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13) and spring 2017 (April 13 through May 31).

| Bird Type | Survey Point | | | | | | | | | | | | |
|---------------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| Waterbirds | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0.12 | 0 | 0 |
| Waterfowl | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0.35 | 0.12 | 0 |
| Shorebirds | 0.29 | 0.35 | 0 | 0.12 | 0 | 0.24 | 0.06 | 0.53 | 0.29 | 0.18 | 0.06 | 0.06 | 0.12 |
| Diurnal Raptors | 0 | 0.24 | 0 | 0 | 0 | 0 | 0.18 | 0.06 | 0.12 | 0 | 0.06 | 0 | 0.06 |
| <u>Accipiters</u> | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | 0 | 0.06 | 0 | 0 | 0 | 0 |
| <u>Buteos</u> | 0 | 0.06 | 0 | 0 | 0 | 0 | 0.06 | 0 | 0.06 | 0 | 0 | 0 | 0.06 |
| <u>Eagles</u> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 |
| <u>Falcons</u> | 0 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 |
| Vultures | 0 | 0 | 0.12 | 0.18 | 0 | 0.12 | 0.18 | 0 | 0 | 0 | 0.18 | 0 | 0.24 |
| Upland Game Birds | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Doves/Pigeons | 0.12 | 3.41 | 0.88 | 0.35 | 0.12 | 0.76 | 0.24 | 1.06 | 0.71 | 2.65 | 0.35 | 0.18 | 0 |
| Large Corvids | 0.29 | 0 | 0.24 | 0.29 | 1.47 | 0.41 | 0.76 | 0.18 | 0.18 | 0.12 | 0.53 | 0.18 | 0.12 |
| Large Bird Overall | 0.71 | 4.00 | 1.24 | 0.94 | 1.71 | 1.53 | 1.41 | 1.82 | 1.29 | 2.94 | 1.65 | 0.53 | 0.53 |
| Passerines | 10.59 | 23.94 | 11.12 | 9.06 | 12.00 | 12.18 | 11.41 | 19.24 | 12.94 | 12.65 | 14.76 | 13.71 | 12.76 |
| Cuckoos | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swifts/Hummingbirds | 0.12 | 0.53 | 0 | 0.06 | 0 | 0 | 0.06 | 0.47 | 0.12 | 0 | 0.12 | 0.71 | 0.12 |
| Woodpeckers | 2.18 | 0.06 | 0.47 | 0.59 | 0.53 | 1.53 | 0.82 | 0.29 | 0.59 | 1.12 | 0.76 | 1.71 | 1.00 |
| Unidentified Small Birds | 0 | 0.06 | 0.24 | 0.12 | 0.29 | 0.35 | 0 | 1.53 | 0 | 0 | 0 | 0.53 | 0.71 |
| Small Bird Overall | 12.88 | 24.59 | 11.82 | 9.82 | 12.82 | 14.06 | 12.29 | 21.53 | 13.65 | 13.76 | 15.65 | 16.65 | 14.59 |

Sensitive Species

No federally or state-listed threatened or endangered species were observed during surveys in the Project area. Three Ohio species of special concern and four Ohio species of special interest were observed during surveys (Table 4; ODNR 2016). Forty-two observations of bald eagles (*Haliaeetus leucocephalus*), protected under the BGEPA (1940), were also recorded (Table 4).

Table 4. Summary of federally and/or state-listed species observed during passerine migration surveys (PMS) and as incidental observations (Inc.) at the Seneca Wind Project from fall 2016 (August 17 through October 13) and spring 2017 (April 13 through May 31).

| Species | Scientific Name | Status | | PMS | | Inc. | | Overall | |
|--------------------------|---------------------------------|--------|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | Ohio | Federal | # grps | # obs | # grps | # obs | # grps | # obs |
| bald eagle | <i>Haliaeetus leucocephalus</i> | | BGEPA | 2 | 2 | 33 | 40 | 35 | 42 |
| black vulture | <i>Coragyps atratus</i> | SSC | | 1 | 1 | 0 | 0 | 1 | 1 |
| bobolink | <i>Dolichonyx oryzivorus</i> | SSC | | 2 | 10 | 0 | 0 | 2 | 10 |
| golden-crowned kinglet | <i>Regulus satrapa</i> | SSI | | 3 | 8 | 0 | 0 | 3 | 8 |
| hermit thrush | <i>Catharus guttatus</i> | SSI | | 9 | 10 | 0 | 0 | 9 | 10 |
| least flycatcher | <i>Empidonax minimus</i> | SSI | | 4 | 4 | 0 | 0 | 4 | 4 |
| red-breasted nuthatch | <i>Sitta canadensis</i> | SSI | | 2 | 2 | 0 | 0 | 2 | 2 |
| yellow-bellied sapsucker | <i>Sphyrapicus varius</i> | SSC | | 1 | 1 | 0 | 0 | 1 | 1 |
| Total | 8 species | | | 24 | 38 | 33 | 40 | 57 | 78 |

BGEPA=federal protections under the Bald and Golden Eagle Protection Act (BGEPA 1940); SSC=Species of Concern (ODNR 2016); SSI=Species of Special Interest (ODNR 2016)

Note: grps = groups; obs = observations

CONCLUSIONS

Data collected during the passerine migration surveys show the Project area was used as stopover habitat by some passerine species, but generally indicates that development of the Project is not likely to cause significant impacts to these species. The majority of species observed during surveys are widespread and abundant. No federally or state-listed threatened or endangered species were observed during surveys.

Forty-two observations of bald eagles, protected under the BGEPA (1940) were observed throughout the Project area. Eagle observation surveys have been completed in the Project area and those results, including a discussion of potential eagle impacts from Project development, will be presented in a separate report.

REFERENCES

- Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) § 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, Section (§) 2, 54 Statute (Stat.) 251; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. As amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.
- Endangered Species Act (ESA). 1973. 16 United States Code (USC) §§ 1531-1544, Public Law (PL) 93-205, December 28, 1973, as amended, PL 100-478 [16 USC 1531 *et seq.*]; 50 Code of Federal Regulations (CFR) 402.
- Homer, C. G., J. A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J. D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a Decade of Land Cover Change Information. Photogrammetric Engineering and Remote Sensing 81(5): 345-354. Available online at: <http://www.mrlc.gov/nlcd2011.php>
- Ohio Department of Natural Resources (ODNR). 2009. On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio. ODNR Division of Wildlife.
- Ohio Department of Natural Resources (ODNR). 2016. Ohio's Listed Species. Wildlife That are Considered to be Endangered, Threatened, Species of Concern, Special Interest, Extirpated, or Extinct in Ohio. Publication 5356 (R0316). Updated: March 2016. 10 pp. Available online at: <http://wildlife.ohiodnr.gov/portals/wildlife/pdfs/publications/information/pub356.pdf>
- Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.
- US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. Executive Summary and frontmatter + 103 pp. Available online at: http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf
- US Geological Survey (USGS) National Land Cover Database (NLCD). 2011. National Land Cover Database 2011 (Nlcd 2011). Multi-Resolution Land Characteristics Consortium (MRLC), National Land Cover Database (NLCD). USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. Available online at: <http://www.mrlc.gov/nlcd2011.php>; Legend at: http://www.mrlc.gov/nlcd11_leg.php
- US Geological Survey (USGS). 2017. USGS Topographic Maps. Last updated January 17, 2017. Homepage available at: <https://nationalmap.gov/ustopo/index.html>

**Appendix A. Species Observed at the Seneca Wind Project during Passerine Migration
Surveys in fall 2016 (August 17 through October 13, 2016) and spring 2017 (April 13
through May 31, 2017)**

Appendix A. Summary of observations (obs) and groups (grps) by bird type and species for passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13, 2016) and spring 2017 (April 13 through May 31, 2017).

| Type / Species | Scientific Name | Fall | | Spring | | Total | |
|------------------------------|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | # grps | # obs | # grps | # obs | # grps | # obs |
| Waterbirds | | 2 | 2 | 7 | 10 | 9 | 12 |
| great blue heron | <i>Ardea herodias</i> | 2 | 2 | 7 | 10 | 9 | 12 |
| Waterfowl | | 6 | 22 | 5 | 12 | 11 | 34 |
| Canada goose | <i>Branta canadensis</i> | 4 | 17 | 1 | 5 | 5 | 22 |
| wood duck | <i>Aix sponsa</i> | 2 | 5 | 4 | 7 | 6 | 12 |
| Shorebirds | | 26 | 47 | 11 | 14 | 37 | 61 |
| killdeer | <i>Charadrius vociferus</i> | 26 | 47 | 11 | 14 | 37 | 61 |
| Diurnal Raptors | | 7 | 7 | 20 | 22 | 27 | 29 |
| <u>Accipiters</u> | | 0 | 0 | 8 | 9 | 8 | 9 |
| Cooper's hawk | <i>Accipiter cooperii</i> | 0 | 0 | 8 | 9 | 8 | 9 |
| <u>Buteos</u> | | 3 | 3 | 10 | 11 | 13 | 14 |
| red-tailed hawk | <i>Buteo jamaicensis</i> | 3 | 3 | 10 | 11 | 13 | 14 |
| <u>Eagles</u> | | 0 | 0 | 2 | 2 | 2 | 2 |
| bald eagle | <i>Haliaeetus leucocephalus</i> | 0 | 0 | 2 | 2 | 2 | 2 |
| <u>Falcons</u> | | 4 | 4 | 0 | 0 | 4 | 4 |
| American kestrel | <i>Falco sparverius</i> | 4 | 4 | 0 | 0 | 4 | 4 |
| Vultures | | 18 | 45 | 31 | 64 | 49 | 109 |
| black vulture | <i>Coragyps atratus</i> | 1 | 1 | 0 | 0 | 1 | 1 |
| turkey vulture | <i>Cathartes aura</i> | 17 | 44 | 31 | 64 | 48 | 108 |
| Upland Game Birds | | 1 | 1 | 0 | 0 | 1 | 1 |
| wild turkey | <i>Meleagris gallopavo</i> | 1 | 1 | 0 | 0 | 1 | 1 |
| Doves/Pigeons | | 67 | 185 | 38 | 68 | 105 | 253 |
| mourning dove | <i>Zenaida macroura</i> | 58 | 144 | 38 | 68 | 96 | 212 |
| rock pigeon | <i>Columba livia</i> | 9 | 41 | 0 | 0 | 9 | 41 |
| Large Corvids | | 30 | 75 | 42 | 100 | 72 | 175 |
| American crow | <i>Corvus brachyrhynchos</i> | 30 | 75 | 42 | 100 | 72 | 175 |
| Cuckoos | | 3 | 3 | 0 | 0 | 3 | 3 |
| yellow-billed cuckoo | <i>Coccyzus americanus</i> | 3 | 3 | 0 | 0 | 3 | 3 |
| Passerines | | 1,103 | 2,834 | 1,639 | 3,833 | 2,742 | 6,667 |
| Acadian flycatcher | <i>Empidonax virescens</i> | 3 | 3 | 1 | 1 | 4 | 4 |
| alder flycatcher | <i>Empidonax alnorum</i> | 0 | 0 | 12 | 12 | 12 | 12 |
| American goldfinch | <i>Spinus tristis</i> | 106 | 179 | 136 | 384 | 242 | 563 |
| American redstart | <i>Setophaga ruticilla</i> | 1 | 1 | 7 | 9 | 8 | 10 |
| American robin | <i>Turdus migratorius</i> | 149 | 804 | 160 | 462 | 309 | 1266 |
| Baltimore oriole | <i>Icterus galbula</i> | 23 | 27 | 38 | 66 | 61 | 93 |
| bank swallow | <i>Riparia riparia</i> | 3 | 6 | 0 | 0 | 3 | 6 |
| barn swallow | <i>Hirundo rustica</i> | 23 | 41 | 30 | 47 | 53 | 88 |
| bay-breasted warbler | <i>Setophaga castanea</i> | 1 | 1 | 0 | 0 | 1 | 1 |
| black-capped chickadee | <i>Poecile atricapilla</i> | 30 | 39 | 39 | 54 | 69 | 93 |
| black-throated green warbler | <i>Setophaga virens</i> | 0 | 0 | 1 | 1 | 1 | 1 |
| blue-gray gnatcatcher | <i>Poliophtila caerulea</i> | 0 | 0 | 15 | 36 | 15 | 36 |
| blue-headed vireo | <i>Vireo solitarius</i> | 0 | 0 | 1 | 3 | 1 | 3 |
| blue jay | <i>Cyanocitta cristata</i> | 184 | 373 | 114 | 218 | 298 | 591 |
| bobolink | <i>Dolichonyx oryzivorus</i> | 0 | 0 | 2 | 10 | 2 | 10 |
| brown-headed cowbird | <i>Molothrus ater</i> | 1 | 50 | 140 | 442 | 141 | 492 |
| brown thrasher | <i>Toxostoma rufum</i> | 0 | 0 | 13 | 13 | 13 | 13 |
| Carolina wren | <i>Thryothorus ludovicianus</i> | 15 | 15 | 0 | 0 | 15 | 15 |
| cedar waxwing | <i>Bombicilla cedrorum</i> | 7 | 58 | 7 | 68 | 14 | 126 |
| chestnut-sided warbler | <i>Setophaga pensylvanica</i> | 0 | 0 | 1 | 1 | 1 | 1 |
| chipping sparrow | <i>Spizella passerina</i> | 7 | 15 | 127 | 253 | 134 | 268 |

Appendix A. Summary of observations (obs) and groups (grps) by bird type and species for passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13, 2016) and spring 2017 (April 13 through May 31, 2017).

| Type / Species | Scientific Name | Fall | | Spring | | Total | |
|-------------------------------|-----------------------------------|-----------|----------|-----------|----------|-----------|----------|
| | | # grps | # obs | # grps | # obs | # grps | # obs |
| common grackle | <i>Quiscalus quiscula</i> | 4 | 11 | 97 | 340 | 101 | 351 |
| common yellowthroat | <i>Geothlypis trichas</i> | 0 | 0 | 3 | 3 | 3 | 3 |
| eastern bluebird | <i>Sialia sialis</i> | 25 | 41 | 17 | 21 | 42 | 62 |
| eastern kingbird | <i>Tyrannus tyrannus</i> | 0 | 0 | 3 | 4 | 3 | 4 |
| eastern meadowlark | <i>Sturnella magna</i> | 1 | 2 | 4 | 4 | 5 | 6 |
| eastern phoebe | <i>Sayornis phoebe</i> | 3 | 3 | 9 | 14 | 12 | 17 |
| eastern towhee | <i>Pipilo erythrophthalmus</i> | 3 | 3 | 1 | 1 | 4 | 4 |
| eastern wood-pewee | <i>Contopus virens</i> | 56 | 61 | 1 | 1 | 57 | 62 |
| European starling | <i>Sturnus vulgaris</i> | 65 | 488 | 33 | 92 | 98 | 580 |
| field sparrow | <i>Spizella pusilla</i> | 3 | 3 | 2 | 3 | 5 | 6 |
| golden-crowned kinglet | <i>Regulus satrapa</i> | 0 | 0 | 3 | 8 | 3 | 8 |
| gray catbird | <i>Dumetella carolinensis</i> | 65 | 79 | 39 | 62 | 104 | 141 |
| great crested flycatcher | <i>Myiarchus crinitus</i> | 3 | 13 | 6 | 9 | 9 | 22 |
| hermit thrush | <i>Catharus guttatus</i> | 0 | 0 | 9 | 10 | 9 | 10 |
| horned lark | <i>Eremophila alpestris</i> | 1 | 1 | 5 | 8 | 6 | 9 |
| house finch | <i>Haemorhous mexicanus</i> | 13 | 27 | 5 | 5 | 18 | 32 |
| house sparrow | <i>Passer domesticus</i> | 18 | 51 | 9 | 47 | 27 | 98 |
| house wren | <i>Troglodytes aedon</i> | 9 | 9 | 35 | 57 | 44 | 66 |
| indigo bunting | <i>Passerina cyanea</i> | 6 | 6 | 20 | 25 | 26 | 31 |
| least flycatcher | <i>Empidonax minimus</i> | 0 | 0 | 4 | 4 | 4 | 4 |
| Nashville warbler | <i>Oreothlypis ruficapilla</i> | 0 | 0 | 1 | 1 | 1 | 1 |
| northern cardinal | <i>Cardinalis cardinalis</i> | 42 | 44 | 79 | 120 | 121 | 164 |
| northern rough-winged swallow | <i>Stelgidopteryx serripennis</i> | 0 | 0 | 4 | 8 | 4 | 8 |
| orchard oriole | <i>Icterus spurius</i> | 0 | 0 | 3 | 4 | 3 | 4 |
| palm warbler | <i>Setophaga palmarum</i> | 0 | 0 | 3 | 6 | 3 | 6 |
| Philadelphia vireo | <i>Vireo philadelphicus</i> | 0 | 0 | 1 | 2 | 1 | 2 |
| pine warbler | <i>Setophaga pinus</i> | 0 | 0 | 1 | 2 | 1 | 2 |
| red-breasted nuthatch | <i>Sitta canadensis</i> | 2 | 2 | 0 | 0 | 2 | 2 |
| red-eyed vireo | <i>Vireo olivaceus</i> | 15 | 16 | 10 | 14 | 25 | 30 |
| red-winged blackbird | <i>Agelaius phoeniceus</i> | 17 | 59 | 114 | 471 | 131 | 530 |
| rose-breasted grosbeak | <i>Pheucticus ludovicianus</i> | 3 | 3 | 6 | 7 | 9 | 10 |
| ruby-crowned kinglet | <i>Regulus calendula</i> | 1 | 1 | 7 | 9 | 8 | 10 |
| scarlet tanager | <i>Piranga olivacea</i> | 0 | 0 | 2 | 2 | 2 | 2 |
| slate-colored junco | <i>Junco hyemalis hyemalis</i> | 1 | 1 | 5 | 7 | 6 | 8 |
| song sparrow | <i>Melospiza melodia</i> | 18 | 18 | 65 | 90 | 83 | 108 |
| Swainson's thrush | <i>Catharus ustulatus</i> | 1 | 1 | 5 | 5 | 6 | 6 |
| tree swallow | <i>Tachycineta bicolor</i> | 1 | 3 | 19 | 28 | 20 | 31 |
| tufted titmouse | <i>Baeolophus bicolor</i> | 41 | 76 | 72 | 118 | 113 | 194 |
| unidentified flycatcher | | 1 | 1 | 1 | 2 | 2 | 3 |
| unidentified passerine | | 0 | 0 | 14 | 25 | 14 | 25 |
| unidentified warbler | | 0 | 0 | 2 | 5 | 2 | 5 |
| warbling vireo | <i>Vireo gilvus</i> | 2 | 2 | 4 | 6 | 6 | 8 |
| white-breasted nuthatch | <i>Sitta carolinensis</i> | 110 | 176 | 36 | 39 | 146 | 215 |
| white-crowned sparrow | <i>Zonotrichia leucophrys</i> | 0 | 0 | 1 | 1 | 1 | 1 |
| white-throated sparrow | <i>Zonotrichia albicollis</i> | 1 | 1 | 3 | 10 | 4 | 11 |
| yellow-breasted Chat | <i>Icteria virens</i> | 0 | 0 | 1 | 1 | 1 | 1 |
| yellow-rumped warbler | <i>Setophaga coronata</i> | 8 | 9 | 17 | 29 | 25 | 38 |
| yellow-throated vireo | <i>Vireo flavifrons</i> | 11 | 11 | 0 | 0 | 11 | 11 |
| yellow warbler | <i>Setophaga petechia</i> | 0 | 0 | 14 | 23 | 14 | 23 |

Appendix A. Summary of observations (obs) and groups (grps) by bird type and species for passerine migration surveys at the Seneca Wind Project from fall 2016 (August 17 through October 13, 2016) and spring 2017 (April 13 through May 31, 2017).

| Type / Species | Scientific Name | Fall | | Spring | | Total | |
|----------------------------|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | # grps | # obs | # grps | # obs | # grps | # obs |
| Swifts/Hummingbirds | | 19 | 39 | 9 | 18 | 28 | 57 |
| chimney swift | <i>Chaetura pelagica</i> | 14 | 34 | 6 | 14 | 20 | 48 |
| ruby-throated hummingbird | <i>Archilochus colubris</i> | 5 | 5 | 0 | 0 | 5 | 5 |
| unidentified hummingbird | | 0 | 0 | 3 | 4 | 3 | 4 |
| Woodpeckers | | 288 | 318 | 176 | 220 | 464 | 538 |
| downy woodpecker | <i>Picoides pubescens</i> | 72 | 75 | 34 | 40 | 106 | 115 |
| hairy woodpecker | <i>Picoides villosus</i> | 8 | 9 | 3 | 3 | 11 | 12 |
| northern flicker | <i>Colaptes auratus</i> | 45 | 48 | 32 | 37 | 77 | 85 |
| pileated woodpecker | <i>Dryocopus pileatus</i> | 13 | 13 | 7 | 8 | 20 | 21 |
| red-bellied woodpecker | <i>Melanerpes carolinus</i> | 110 | 119 | 89 | 121 | 199 | 240 |
| red-headed woodpecker | <i>Melanerpes erythrocephalus</i> | 39 | 53 | 11 | 11 | 50 | 64 |
| yellow-bellied sapsucker | <i>Sphyrapicus varius</i> | 1 | 1 | 0 | 0 | 1 | 1 |
| Kingfishers | | 1 | 1 | 0 | 0 | 1 | 1 |
| belted kingfisher | <i>Megaceryle alcyon</i> | 1 | 1 | 0 | 0 | 1 | 1 |
| Unidentified Birds | | 38 | 173 | 1 | 1 | 39 | 174 |
| unidentified bird (small) | | 38 | 173 | 1 | 1 | 39 | 174 |
| Overall | | 1,609 | 3,752 | 1,979 | 4,362 | 3,588 | 8,114 |

Note: grps = groups; obs = observations

Appendix N-7: Waterfowl Survey

WATERFOWL SURVEY

SENECA WIND PROJECT SENECA COUNTY, OHIO

Prepared for:

SENECA WIND LLC
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106

Prepared by:



239 Main Street • Suite 301 • Dickson City, PA 18519
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July 2018



INTRODUCTION

Seneca Wind LLC is developing the Seneca Wind Project (Project) in Seneca County, Ohio. The proposed 200-megawatt (MW) Project is planned within an approximately 56,876-acre (ac; 230-square kilometer [km²]) Project area (Figure 1).

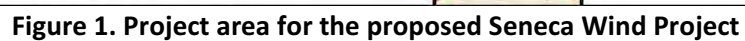
Shoener Environmental Inc. (Shoener) conducted baseline wildlife surveys in the Project area using survey protocols consistent with recommendations in the Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009). This report summarizes the waterfowl survey performed by Shoener in 2017 and 2018. The survey objective was to identify and quantify the waterfowl species that use the Project area during fall, winter, and spring.

METHODS

A waterfowl survey following ODNR protocols was performed at 6 survey points adjacent to Honey Creek and Silver Creek Wildlife Area, a nearby wetland restoration area (Figure 2). Survey points were selected based on consultation with the ODNR (Attachment 1). Representative photos of the survey points are provided in Attachment 2.

Surveys were performed on a twice-monthly basis between September 2017 and April 2018. During each survey, a biologist would stop at each survey point and census the waterfowl visible or audible from the point location. Species included in the census were typical waterfowl (e.g., ducks, geese, and swans) and other water birds (e.g., cormorants and kingfishers), collectively referred to as "waterfowl". If no waterfowl were visible or audible at the time of arrival, the biologist spent 2-3 minutes recording data on weather conditions, survey times and date, and any relevant notes, during which time they would also scan for the appearance of any waterfowl on the visible landscape. When waterfowl were observed, the observer spent sufficient time, up to a maximum of 15 minutes, to accurately count the number of individuals of each species and note any relevant behaviors (e.g., flying, swimming, etc).

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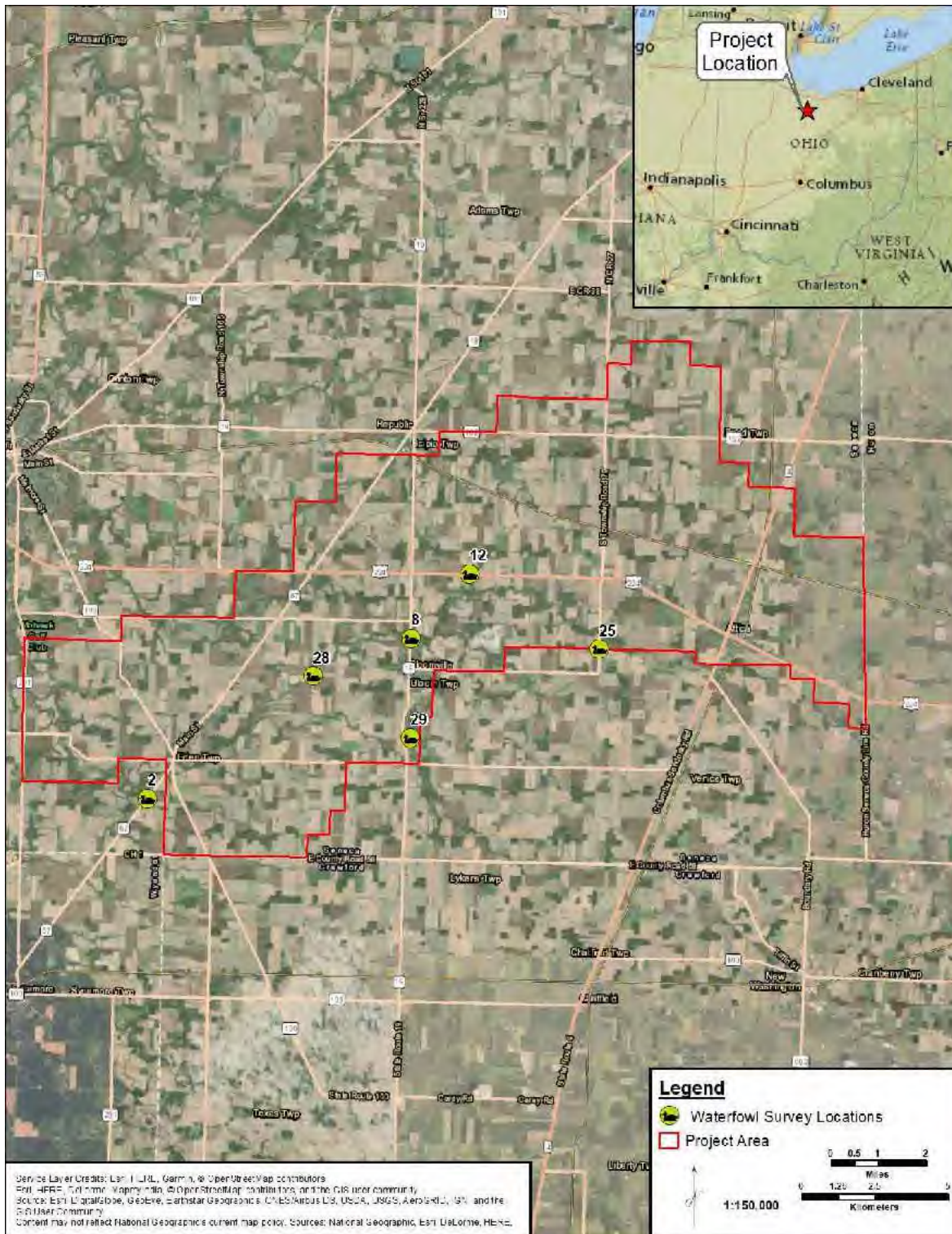


Figure 2. Waterfowl survey points at the proposed Seneca Wind Project

RESULTS

In total, 16 rounds of surveys were performed. A total of 293 individuals of 10 species were observed (Tables 1 and 2). No state- or federally listed or non-listed species of concern were observed. Canada goose (*Branta canadensis*) was the waterfowl species that had the greatest number of observations (n = 248 individuals; 84.6% of all observations), followed by wood duck (*Aix sponsa*; n = 16; 5.5%) (Table 1). Most (n = 157; 53.5%) of the observations were recorded in December, although all these observations were Canada geese, followed by April (n = 57; 19.4%), which consisted of observations of 6 species (Table 1). Point 12 held the highest number (n = 107; 36.5%) of waterfowl observations, followed by Point 25 (n = 91; 31.1%) (Table 2), although many of the observations at both points 12 and 25 were Canada geese flying over the Project (n = 93 and n = 91, respectively). Point 29, located at the Silver Creek Wildlife Area, had the third-highest number of waterfowl observations (n = 46; 15.7%), and the greatest diversity of the species (n = 9; Table 2).

Table 1. Number of individuals observed by waterfowl species and calendar month at the Seneca Wind Project, September 2017 to April 2018

| Species | September | October | November | December | January | February | March | April | Total |
|--------------------------|-----------|-----------|-----------|------------|----------|----------|-----------|-----------|------------|
| Canada Goose | 0 | 7 | 0 | 157 | 0 | 0 | 43 | 41 | 248 |
| Wood Duck | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 16 |
| Mallard | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 8 | 12 |
| Pied-Billed Grebe | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Great Blue Heron | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 7 |
| Double-Crested Cormorant | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Belted Kingfisher | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mute Swan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Common Merganser | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Blue-Winged Teal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| All | 6 | 12 | 16 | 157 | 0 | 0 | 45 | 57 | 293 |

Table 2. Number of individuals observed by waterfowl species and survey point at the Seneca Wind Project, September 2017 to April 2018

| Species | Point | | | | | | Total |
|--------------------------|----------|-----------|------------|-----------|-----------|-----------|------------|
| | 2 | 8 | 12 | 25 | 28 | 29 | |
| Canada Goose | 4 | 22 | 93 | 91 | 13 | 25 | 248 |
| Wood Duck | 0 | 0 | 14 | 0 | 0 | 2 | 16 |
| Mallard | 0 | 0 | 0 | 0 | 6 | 6 | 12 |
| Pied-Billed Grebe | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| Great Blue Heron | 0 | 1 | 0 | 0 | 2 | 4 | 7 |
| Double-Crested Cormorant | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Belted Kingfisher | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Mute Swan | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Common Merganser | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Blue-Winged Teal | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| All | 4 | 24 | 107 | 91 | 21 | 46 | 293 |



REFERENCES

ODNR. 2009. Exhibit A, On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, An Addendum to the Ohio Department of Natural Resources Voluntary Cooperative Agreement. Dated May 4, 2009. Available online at: <http://wildlife.ohiodnr.gov/species-and-habitats/fish-and-wildlife-research/wildlife-and-wind-energy>. Accessed on: March 5, 2018. 40 pp.



Attachment 1: Regulatory Agency Correspondence



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife

Michael R. Miller, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

August 17, 2017

To all interested parties:

Based upon the revised project boundary map received July 2017, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared initial survey recommendations for the proposed Seneca project located in Seneca County regarding wildlife species.

Currently the project falls within regions of the state that DOW has identified as needing extensive monitoring efforts based on GIS analysis of the site. However, previous DOW recommendations have determined the habitat is not what DOW considers high-quality stopover habitat for migrating passerines and waterfowl. Therefore, the proposed facility was classified as a "moderate" site under the current protocols. If the developer decides to amend the current boundaries, the DOW will revise our survey recommendations.

State-listed plant and animal species occur in Seneca County and the list can be found here: <http://wildlife.ohiodnr.gov/species-and-habitats/state-listed-species/state-listed-species-by-county#plants>. Additional surveys may be warranted to determine presence of state-listed species if construction will impact suitable habitat. Once the turbine locations have been determined, please consult with DOW to determine if such surveys are needed.

The attached table summarizes the types and level of survey effort recommended by the DOW. Results from these studies will help assess the potential impact the turbines may pose and will influence our recommendations to the Ohio Power Siting Board.

Monitoring should follow those methods described within the "On-shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

If you have any questions, please feel free to contact me at erin.hazelton@dnr.state.oh.us or 614.265.6349.

A handwritten signature in blue ink that reads "ER Hazelton".

Erin Hazelton
Ohio Division of Wildlife
2045 Morse Road
Columbus, Ohio 43229

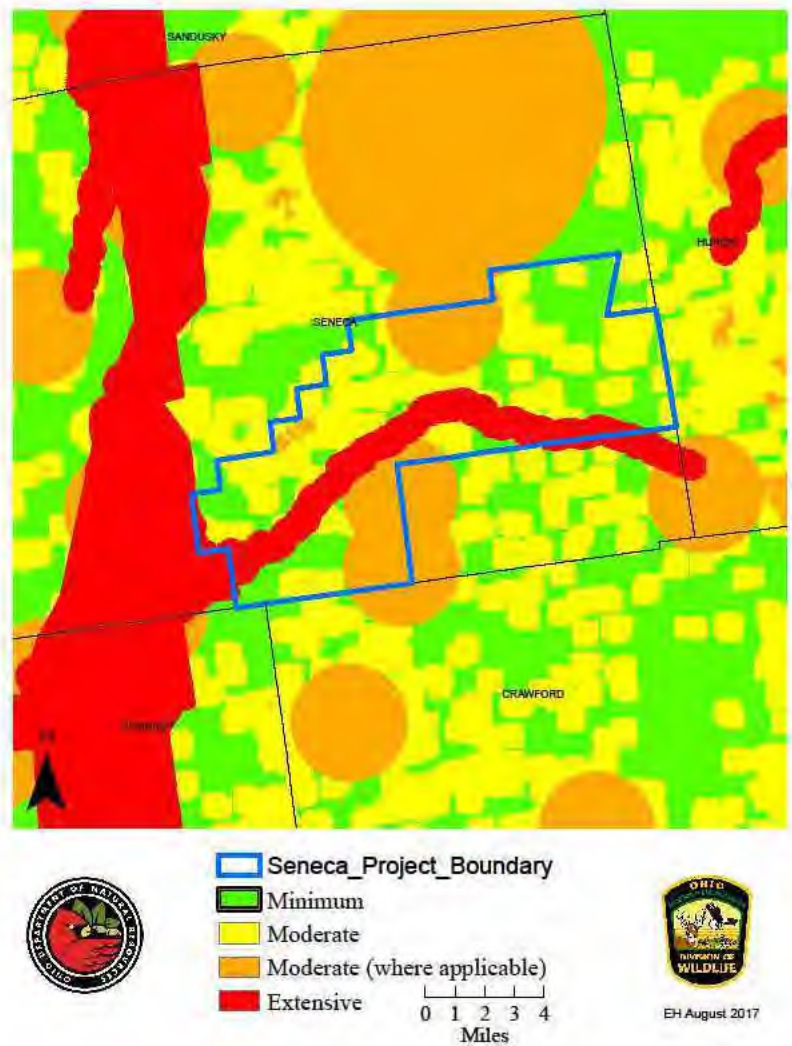
cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Mr. Grant Zeto, Ohio Power Siting Board
Mr. Ashton Holderbaum, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Ms. Kate Haley Parsons, DOW

Seneca Wind Project (August 2017)

Survey type

| | |
|--|--|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. If turbines are placed in agricultural land, this requirement may be waived by DOW after reviewing the proposed turbine locations. |
| Raptor nest searches | Nest searches should occur on and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | Please consult with USFWS on bald eagle nests located within the search area. Nests should be monitored to assess daily bird activity. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within DOW's monitoring protocols. |
| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration survey points | 26 |
| Diurnal bird/raptor migration survey points | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl survey points | NS |
| Bat mist-netting survey points | 52 |
| Nocturnal marsh bird survey points | Survey points on Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Waterfowl survey points | Survey points for Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Shorebird migration survey points | NS |
| Radar monitoring locations | NS |
| Aquatic species surveys | This requirement may be waived by DOW after reviewing the proposed turbine locations. |
| Wetland species surveys | This requirement may be waived by DOW after reviewing the proposed turbine locations. |

NS = Not required based on the lack of suitable habitat



Survey effort map with the revised boundary for the proposed Seneca project (August 2017).

Seneca survey protocol

Erin.Hazelton@dnr.state.oh.us <Erin.Hazelton@dnr.state.oh.us>
To: Brad Romano <bromano@shoener.com>
Cc: "Kate.Parsons@dnr.state.oh.us" <Kate.Parsons@dnr.state.oh.us>

Thu, Aug 24, 2017 at 12:57 PM

Hello Brad,

Per our phone call this afternoon, just a few pre-construction survey recommendations to clarify for the Seneca County wind project:

- Waterfowl Surveys: please include 5 survey points along or in fields immediately adjacent to Honey Creek and one at Silver Creek Wildlife Area or Garlo Heritage Nature Preserve. Stops need to be long enough to document species counts, if present, twice a month as described the ODNR monitoring protocol document.
- Please adapt those same points (or modify as needed) for the spring time marsh bird surveys, as described in the protocol document.

As always, please let me know if any other questions come up once you are out in the field.

Thank you,

Erin

Erin Hazelton

Wind Energy/Wildlife Administrator

ODNR Division of Wildlife

[2045 Morse Road](#)

[Columbus, OH 43229](#)

Phone: 614-265-6349

Email: Erin.Hazelton@dnr.state.oh.us

Good intentions can hurt, leave wildlife in the wild. Visit wildohio.gov/staywild to find out more.



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife

Michael R. Miller, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

April 25, 2018

To all interested parties:

Based upon the revised project boundary map received April 2018, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared initial survey recommendations for the proposed Seneca project located in Seneca, Huron, and Crawford counties regarding wildlife species.

Currently the project falls within regions of the state that DOW has identified as needing extensive monitoring efforts based on GIS analysis of the site. However, previous DOW recommendations have determined the habitat is not what DOW considers high-quality stopover habitat for migrating passerines and waterfowl. Therefore, the proposed facility was classified as a "moderate" site under the current protocols. If the developer decides to amend the current boundaries, the DOW will revise our survey recommendations.

State-listed plant species occur in Seneca, Huron, and Crawford counties and the list can be found here: <http://wildlife.ohiodnr.gov/species-and-habitats/state-listed-species/state-listed-species-by-county#plants>. Additional surveys may be warranted to determine presence of state-listed species if construction will impact aquatic or wetland habitat. Once the turbine, road, pad and other infrastructure locations have been determined, please consult with DOW to determine if such surveys are needed.

The attached table summarizes the types and level of survey effort recommended by the DOW. Results from these studies will help assess the potential impact the turbines may pose and will influence our recommendations to the Ohio Power Siting Board.

Monitoring should follow those methods described within the "On-shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

If you have any questions, please feel free to contact me at erin.hazelton@dnr.state.oh.us or 614.265.6349.

A handwritten signature in blue ink that reads "ER Hazelton".

Erin Hazelton
Ohio Division of Wildlife
2045 Morse Road
Columbus, Ohio 43229

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Mr. Grant Zeto, Ohio Power Siting Board
Mr. Ashton Holderbaum, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Ms. Kate Haley Parsons, DOW

Seneca Wind Project (April 2018)

Survey type

| | |
|--|--|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. If turbines are placed in agricultural land, this requirement may be waived by DOW after reviewing the proposed turbine locations. |
| Raptor nest searches | Nest searches should occur on and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | Please consult with USFWS on bald eagle nests located within the search area. Nests should be monitored to assess daily bird activity. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within DOW's monitoring protocols. |
| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration survey points | 26 |
| Diurnal bird/raptor migration survey points | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl survey points | NS |
| Bat mist-netting survey points | 51 |
| Nocturnal marsh bird survey points | Survey points on Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Waterfowl survey points | Survey points for Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Shorebird migration survey points | NS |
| Radar monitoring locations | NS |
| Aquatic species surveys | This requirement may be waived by DOW after reviewing the proposed turbine/infrastructure locations. |
| Wetland species surveys | This requirement may be waived by DOW after reviewing the proposed turbine/infrastructure locations. |

NS = Not required based on the lack of suitable habitat



Attachment 2: Representative Survey Point Photographs

Attachment 2: Representative Survey Point Photographs



Description: Waterfowl Survey Point 28
Direction: Facing northeast along Silver Creek
Date: June 2018



Description: Waterfowl Survey Point 29
Direction: Facing southeast overlooking Olgierd Lake
Date: June 2018

Appendix N-8: Nocturnal Marsh Bird Survey

NOCTURNAL MARSH BIRD SURVEY

SENECA WIND PROJECT SENECA COUNTY, OHIO

Prepared for:

SENECA WIND LLC
2180 South 1300 East, Suite 600
Salt Lake City, UT 84106

Prepared by:



239 Main Street • Suite 301 • Dickson City, PA 18519
V: 570.489.6920 • F: 570.309.0024
www.shoener.com

July 2018

INTRODUCTION

Seneca Wind LLC is developing the Seneca Wind Project (Project) in Seneca County, Ohio. The proposed 200-megawatt (MW) Project is planned within an approximately 56,876-acre (ac; 230-square kilometer [km²]) Project area (Figure 1).

Shoener Environmental Inc. (Shoener) conducted baseline wildlife surveys in the Project area using survey protocols consistent with recommendations in the Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009). This report summarizes results from a nocturnal marsh bird survey conducted for the Project between May 20 and June 15, 2018. The survey objective was to determine whether protected marsh bird species are present in the Project area during the breeding season.

METHODS

Playback-response surveys were performed at 6 points within or adjacent to the Project area (Figure 2). Survey points were selected in potentially suitable habitat (e.g., wetlands) in close proximity to waterfowl survey locations requested by ODNR in survey effort letters dated August 17, 2017 and April 25, 2018, and additional correspondence (E. Hazelton Pers. Communication August 24, 2017) (Attachment 1). Surveys were conducted weekly at each point between May 20 and June 15, 2018. Representative photos of the survey points are provided in Attachment 2.

Surveys were performed by Shoener Biologists Jessica Noe and Kevin Chapman +/- 1 hour of sunrise or sunset. During the surveys, the calls of five marsh bird species were played, in the order below, for 30 seconds each, separated by a 30-second silent "listening" period. The five marsh bird species in the playback calls included: least bittern (*Ixobrychus exilis*), sora (*Porzana carolina*), Virginia rail (*Rallus limicola*), king rail (*Rallus elegans*), and American bittern (*Botaurus lentiginosus*). An all-weather speaker capable of broadcasting the calls at a sound pressure level of 80-90 dB at 1 meter from the speaker was utilized. During the playback and listening periods, the biologists listened for responses by individuals of any of the aforementioned species.

The number of individuals, by species, responding to each sequence was recorded. In addition, the start and end time, weather conditions, and any general notes were recorded on field datasheets. Weather conditions, including sky condition (cloud cover and/or precipitation), temperature, wind speed and direction, were recorded immediately following each survey.



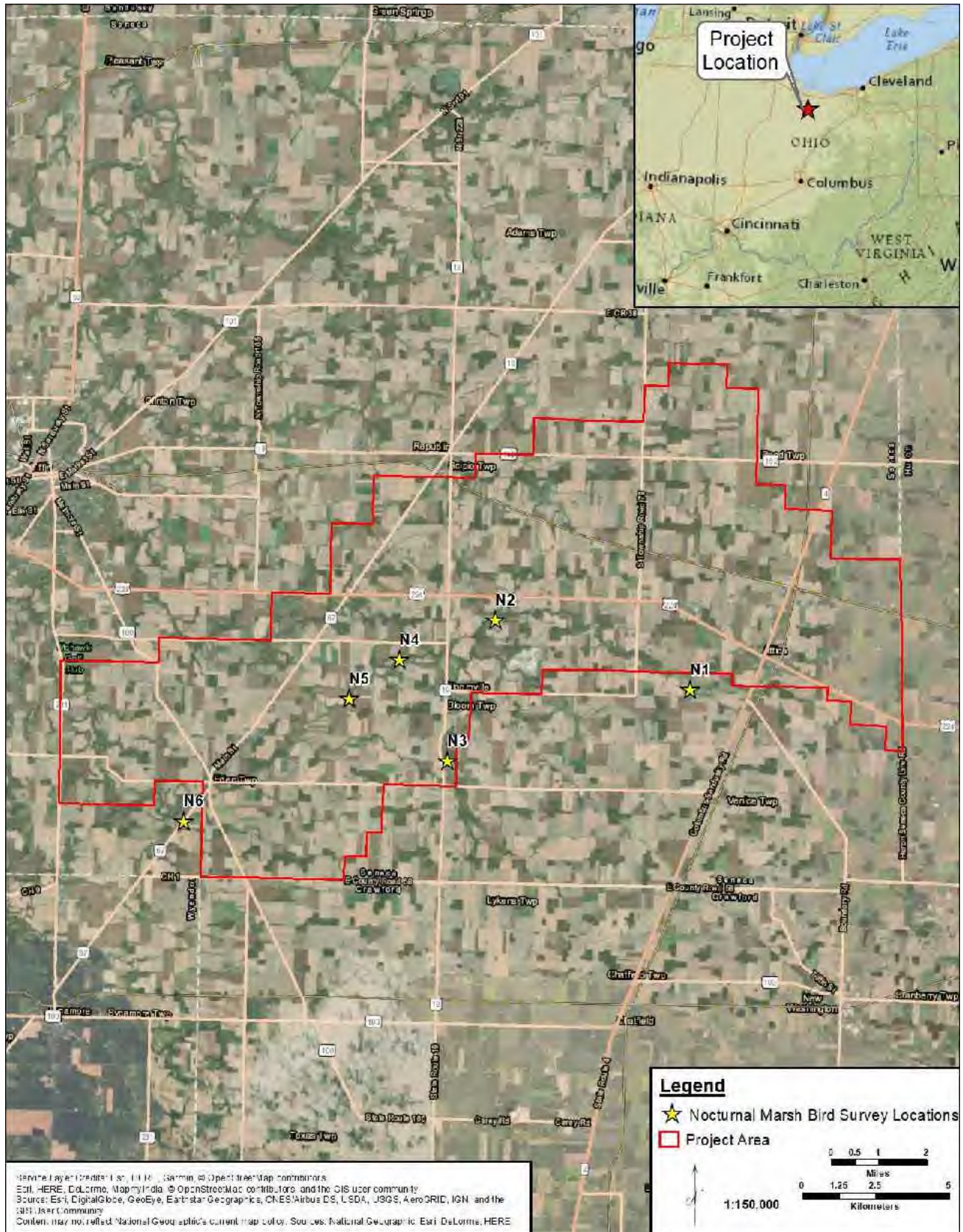


Figure 2. Project area and nocturnal marsh bird survey locations for the Seneca Wind Energy Project

RESULTS

Surveys were conducted at each of the 6 points on May 23, 2018, May 30, 2018, June 6, 2018, and June 12, 2018 for a total of 24 surveys. In total, 15 birds were observed during the surveys. Species observed included: 8 mallard (*Anas platyrhynchos*), 5 great blue heron (*Ardea herodias*), 1 sora (*Porzana carolina*), and 1 great egret (*Ardea alba*) (Table 1). Of the species observed during the surveys, only the sora and great egret are listed as state species of special concern.

Table 1. Summary of species observed during nocturnal marsh bird surveys for the Seneca Wind Project, Seneca County, Ohio

| Survey Date | Survey Point | Common Name (<i>Species Name</i>) | Number Observed | Status |
|-------------|--------------|---|-----------------|--------------------------|
| 5/23/2018 | N4 | Mallard (<i>Anas platyrhynchos</i>) | 2 | - |
| 5/23/2018 | N4 | Great blue heron (<i>Ardea herodias</i>) | 2 | - |
| 5/23/2018 | N3 | Great blue heron | 2 | - |
| 5/30/2018 | N1 | Sora (<i>Porzana Carolina</i>) | 1 | State Species of Concern |
| 5/30/2018 | N1 | Great blue heron | 1 | - |
| 6/12/2018 | N3 | Great egret (<i>Ardea alba</i>) | 1 | State Species of Concern |
| 6/12/2018 | N3 | Mallard | 6 | - |

REFERENCES

ODNR. 2009. Exhibit A, On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, An Addendum to the Ohio Department of Natural Resources Voluntary Cooperative Agreement. Dated May 4, 2009. Available online at: <http://wildlife.ohiodnr.gov/species-and-habitats/fish-and-wildlife-research/wildlife-and-wind-energy>. Accessed on: March 5, 2018. 40 pp.

Attachment 1: Regulatory Agency Correspondence



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife

Michael R. Miller, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

August 17, 2017

To all interested parties:

Based upon the revised project boundary map received July 2017, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared initial survey recommendations for the proposed Seneca project located in Seneca County regarding wildlife species.

Currently the project falls within regions of the state that DOW has identified as needing extensive monitoring efforts based on GIS analysis of the site. However, previous DOW recommendations have determined the habitat is not what DOW considers high-quality stopover habitat for migrating passerines and waterfowl. Therefore, the proposed facility was classified as a "moderate" site under the current protocols. If the developer decides to amend the current boundaries, the DOW will revise our survey recommendations.

State-listed plant and animal species occur in Seneca County and the list can be found here: <http://wildlife.ohiodnr.gov/species-and-habitats/state-listed-species/state-listed-species-by-county#plants>. Additional surveys may be warranted to determine presence of state-listed species if construction will impact suitable habitat. Once the turbine locations have been determined, please consult with DOW to determine if such surveys are needed.

The attached table summarizes the types and level of survey effort recommended by the DOW. Results from these studies will help assess the potential impact the turbines may pose and will influence our recommendations to the Ohio Power Siting Board.

Monitoring should follow those methods described within the "On-shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

If you have any questions, please feel free to contact me at erin.hazelton@dnr.state.oh.us or 614.265.6349.

A handwritten signature in blue ink that reads "ER Hazelton".

Erin Hazelton
Ohio Division of Wildlife
2045 Morse Road
Columbus, Ohio 43229

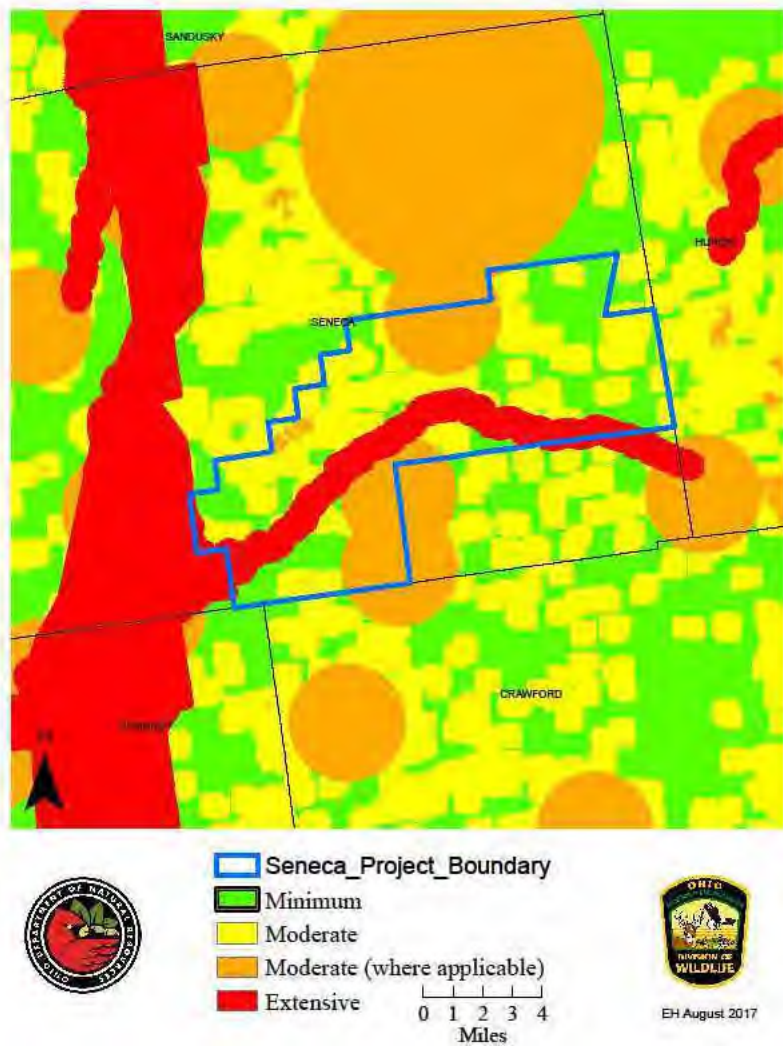
cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Mr. Grant Zeto, Ohio Power Siting Board
Mr. Ashton Holderbaum, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Ms. Kate Haley Parsons, DOW

Seneca Wind Project (August 2017)

Survey type

| | |
|--|--|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. If turbines are placed in agricultural land, this requirement may be waived by DOW after reviewing the proposed turbine locations. |
| Raptor nest searches | Nest searches should occur on and within a 1-mile buffer of the proposed facility. |
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| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration survey points | 26 |
| Diurnal bird/raptor migration survey points | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl survey points | NS |
| Bat mist-netting survey points | 52 |
| Nocturnal marsh bird survey points | Survey points on Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Waterfowl survey points | Survey points for Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Shorebird migration survey points | NS |
| Radar monitoring locations | NS |
| Aquatic species surveys | This requirement may be waived by DOW after reviewing the proposed turbine locations. |
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Survey effort map with the revised boundary for the proposed Seneca project (August 2017).

Seneca survey protocol

Erin.Hazelton@dnr.state.oh.us <Erin.Hazelton@dnr.state.oh.us>
To: Brad Romano <bromano@shoener.com>
Cc: "Kate.Parsons@dnr.state.oh.us" <Kate.Parsons@dnr.state.oh.us>

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Ohio Division of Wildlife
2045 Morse Road
Columbus, Ohio 43229

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Mr. Grant Zeto, Ohio Power Siting Board
Mr. Ashton Holderbaum, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Ms. Kate Haley Parsons, DOW

Seneca Wind Project (April 2018)

Survey type

| | |
|--|--|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. If turbines are placed in agricultural land, this requirement may be waived by DOW after reviewing the proposed turbine locations. |
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| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl survey points | NS |
| Bat mist-netting survey points | 51 |
| Nocturnal marsh bird survey points | Survey points on Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Waterfowl survey points | Survey points for Silver Creek WA, Honey Creek, and Sandusky River, as per protocols |
| Shorebird migration survey points | NS |
| Radar monitoring locations | NS |
| Aquatic species surveys | This requirement may be waived by DOW after reviewing the proposed turbine/infrastructure locations. |
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NS = Not required based on the lack of suitable habitat

Attachment 2: Representative Survey Point Photographs

Attachment 2: Representative Survey Point Photographs



Description: Nocturnal Marsh Bird Survey Point N3
Direction: Facing southeast overlooking Olgierd Lake
Date: June 2018



Description: Nocturnal Marsh Bird Survey Point N4
Direction: Facing west overlooking Money Creek
Date: June 2018



Description: Nocturnal Marsh Bird Survey Point N5
Direction: facing southwest overlooking Money Creek
Date: June 2018

Appendix O: Proximity of Structures to Project Features

TABLE O-1
STRUCTURES WITHIN 1,500 FEET OF A PROPOSED TURBINE

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Barn | 555 feet south-southeast | Turbine 07 | Participating |
| Barn | 575 feet south | Turbine 07 | Participating |
| Barn | 700 feet north | Turbine 71 | Participating |
| Barn | 720 feet south-southeast | Turbine 07 | Participating |
| Barn | 730 feet southwest | Turbine 12 | Participating |
| Barn | 730 feet north | Turbine 24 | Participating |
| Barn | 735 feet south | Turbine 12 | Participating |
| Barn | 735 feet south-southwest | Turbine 47 | Participating |
| House | 745 feet south-southwest | Turbine 07 | Participating |
| Barn | 760 feet southwest | Turbine 56 | Participating |
| Tank | 780 feet northeast | Turbine 80 | Participating |
| Barn | 790 feet south | Turbine 47 | Participating |
| Silos | 795 feet southwest | Turbine 47 | Participating |
| House | 820 feet northeast | Turbine 58 | Participating |
| Barn | 820 feet north | Turbine 71 | Participating |
| Silo | 825 feet south | Turbine 12 | Participating |
| Barn | 840 feet southeast | Turbine 48 | Participating |
| Barn | 845 feet southwest | Turbine 04 | Participating |
| Barn | 850 feet northeast | Turbine 19 | Participating |
| Barn | 850 feet northwest | Turbine 46 | Participating |
| Barn | 855 feet southwest | Turbine 85 | Participating |
| Barn | 860 feet northeast | Turbine 05 | Participating |
| Silo | 865 feet south | Turbine 12 | Participating |
| Barn | 885 feet north-northwest | Turbine 46 | Participating |
| Garage | 900 feet northeast | Turbine 58 | Participating |
| Barn | 910 feet south-southwest | Turbine 47 | Participating |
| Silos | 915 feet southwest | Turbine 47 | Participating |
| Barn | 930 feet northwest | Turbine 46 | Participating |
| Barn | 935 feet south-southwest | Turbine 26 | Participating |
| Barn | 940 feet northeast | Turbine 05 | Participating |
| Barn | 945 feet north | Turbine 46 | Participating |
| Barn | 950 feet northeast | Turbine 19 | Participating |
| Silos | 950 feet southwest | Turbine 47 | Participating |
| Barn | 960 feet south | Turbine 26 | Participating |
| Barn | 965 feet east | Turbine 42 | Participating |
| Silos | 970 feet south | Turbine 26 | Participating |
| Barn | 970 feet southwest | Turbine 47 | Participating |
| Silo | 980 feet north | Turbine 43 | Participating |
| Silo | 990 feet north | Turbine 43 | Participating |
| House | 1,000 feet south | Turbine 12 | Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Barn | 1,000 feet northeast | Turbine 19 | Participating |
| Barn | 1,000 feet northwest | Turbine 71 | Participating |
| House | 1,020 feet northeast | Turbine 05 | Participating |
| Barn | 1,020 feet north | Turbine 71 | Participating |
| Barn | 1,025 feet southwest | Turbine 26 | Participating |
| House | 1,025 feet west | Turbine 35 | Participating |
| Barn | 1,025 feet south | Turbine 71 | Participating |
| Barn | 1,030 feet west | Turbine 07 | Participating |
| Barn | 1,030 feet southeast | Turbine 31 | Participating |
| House | 1,030 feet west-southwest | Turbine 85 | Participating |
| Silo | 1,035 feet northeast | Turbine 18 | Participating |
| Barn | 1,040 feet east | Turbine 42 | Participating |
| Barn | 1,050 feet north | Turbine 43 | Participating |
| Barn | 1,050 feet west-southwest | Turbine 52 | Participating |
| House | 1,055 feet east-northeast | Turbine 55 | Participating |
| Silos | 1,060 feet west-southwest | Turbine 07 | Participating |
| Garage | 1,060 feet south | Turbine 26 | Participating |
| Barn | 1,070 feet west-southwest | Turbine 07 | Participating |
| House | 1,080 feet northeast | Turbine 19 | Participating |
| Outbuilding | 1,080 feet north | Turbine 43 | Participating |
| House | 1,080 feet north-northwest | Turbine 46 | Participating |
| Barn | 1,085 feet north | Turbine 71 | Participating |
| Silo | 1,085 feet northeast | Turbine 75 | Participating |
| Barn | 1,095 feet southwest | Turbine 26 | Participating |
| Barn | 1,095 feet west-southwest | Turbine 52 | Participating |
| Barn | 1,095 feet south | Turbine 71 | Participating |
| Barn | 1,100 feet southwest | Turbine 47 | Participating |
| Silo | 1,105 feet southwest | Turbine 04 | Participating |
| Silo | 1,110 feet southwest | Turbine 04 | Participating |
| Barn | 1,110 feet southeast | Turbine 31 | Participating |
| House | 1,115 feet south-southwest | Turbine 26 | Participating |
| Outbuilding | 1,125 feet north-northwest | Turbine 43 | Participating |
| Barn | 1,125 feet west-southwest | Turbine 52 | Participating |
| House | 1,130 feet southeast | Turbine 48 | Participating |
| Barn | 1,130 feet south | Turbine 71 | Participating |
| House | 1,145 feet west | Turbine 35 | Participating |
| Garage | 1,150 feet southwest | Turbine 58 | Non-Participating |
| Silos | 1,155 feet north-northwest | Turbine 11 | Participating |
| Barn | 1,160 feet southwest | Turbine 04 | Participating |
| Barn | 1,160 feet northwest | Turbine 08 | Participating |
| House | 1,160 feet north-northwest | Turbine 43 | Participating |
| Silos | 1,175 feet northeast | Turbine 18 | Participating |
| Tower | 1,175 feet southwest | Turbine 47 | Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Barn | 1,180 feet west-southwest | Turbine 52 | Participating |
| Barn | 1,180 feet south | Turbine 71 | Non-Participating |
| Barn | 1,190 feet west-southwest | Turbine 74 | Participating |
| Garage | 1,200 feet south | Turbine 02 | Participating |
| Barn | 1,200 feet southeast | Turbine 48 | Participating |
| Outbuilding | 1,200 feet southwest | Turbine 48 | Participating |
| Barn | 1,205 feet southwest | Turbine 71 | Non-Participating |
| House | 1,210 feet northwest | Turbine 05 | Participating |
| Garage | 1,210 feet south | Turbine 71 | Non-Participating |
| Barn | 1,215 feet southeast | Turbine 48 | Participating |
| House | 1,215 feet south-southwest | Turbine 48 | Participating |
| Garage | 1,215 feet west-northwest | Turbine 61 | Participating |
| Barn | 1,220 feet south | Turbine 02 | Participating |
| Silos | 1,225 feet northeast | Turbine 18 | Participating |
| Garage | 1,225 feet west | Turbine 56 | Participating |
| Barn | 1,225 feet south | Turbine 71 | Participating |
| Garage | 1,230 feet southeast | Turbine 12 | Participating |
| Barn | 1,230 feet northeast | Turbine 18 | Participating |
| Silo | 1,230 feet southeast | Turbine 52 | Participating |
| Barn | 1,235 feet south-southeast | Turbine 52 | Participating |
| Barn | 1,240 feet northeast | Turbine 18 | Participating |
| Outbuilding | 1,240 feet northeast | Turbine 27 | Participating |
| Barn | 1,250 feet north-northwest | Turbine 11 | Participating |
| House | 1,250 feet southwest | Turbine 47 | Participating |
| House | 1,255 feet southwest | Turbine 04 | Participating |
| Outbuilding | 1,260 feet south | Turbine 02 | Participating |
| House | 1,260 feet west | Turbine 56 | Participating |
| House | 1,260 feet west | Turbine 61 | Non-Participating |
| Barn | 1,265 feet west | Turbine 52 | Participating |
| House | 1,265 feet northwest | Turbine 58 | Participating |
| House | 1,270 feet west-southwest | Turbine 07 | Participating |
| Tanks | 1,270 feet northwest | Turbine 71 | Participating |
| Barn | 1,270 feet south-southwest | Turbine 72 | Non-Participating |
| House | 1,275 feet east | Turbine 42 | Participating |
| Barn | 1,285 feet southeast | Turbine 60 | Participating |
| Barn | 1,285 feet southwest | Turbine 61 | Participating |
| Garage | 1,290 feet north-northwest | Turbine 15 | Participating |
| Outbuilding | 1,290 feet northeast | Turbine 27 | Participating |
| Barn | 1,290 feet south-southwest | Turbine 78 | Participating |
| House | 1,295 feet south | Turbine 71 | Non-Participating |
| Barn | 1,295 feet south-southeast | Turbine 78 | Participating |
| Tanks | 1,300 feet northeast | Turbine 24 | Participating |
| Trailer | 1,300 feet southeast | Turbine 52 | Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Outbuilding | 1,310 feet northwest | Turbine 08 | Participating |
| House | 1,310 feet southeast | Turbine 12 | Participating |
| Outbuilding | 1,320 feet northeast | Turbine 27 | Participating |
| Barn | 1,320 feet southeast | Turbine 30 | Participating |
| Barn | 1,320 feet west | Turbine 52 | Participating |
| House | 1,325 feet south | Turbine 71 | Non-Participating |
| House | 1,325 feet southwest | Turbine 71 | Non-Participating |
| Trailer | 1,335 feet southwest | Turbine 88 | Participating |
| House | 1,340 feet northwest | Turbine 08 | Participating |
| Barn | 1,340 feet north-northwest | Turbine 11 | Participating |
| Barn | 1,340 feet south | Turbine 72 | Non-Participating |
| Silos | 1,340 feet south-southwest | Turbine 78 | Participating |
| Barn | 1,345 feet south-southeast | Turbine 78 | Participating |
| Barn | 1,350 feet northeast | Turbine 18 | Participating |
| House | 1,360 feet east-southeast | Turbine 06 | Participating |
| House | 1,360 feet southwest | Turbine 53 | Participating |
| Barn | 1,360 feet southwest | Turbine 61 | Participating |
| Barn | 1,360 feet southwest | Turbine 72 | Non-Participating |
| Barn | 1,365 feet south-southwest | Turbine 78 | Participating |
| Barn | 1,370 feet southeast | Turbine 31 | Participating |
| Barn | 1,370 feet west-northwest | Turbine 94 | Non-Participating |
| Barn | 1,375 feet north-northwest | Turbine 11 | Participating |
| Barn | 1,375 feet south-southwest | Turbine 78 | Participating |
| Garage | 1,380 feet south | Turbine 02 | Participating |
| Barn | 1,380 feet east-southeast | Turbine 10 | Non-Participating |
| Barn | 1,380 feet southeast | Turbine 23 | Non-Participating |
| House | 1,380 feet northwest | Turbine 69 | Participating |
| Barn | 1,380 feet northwest | Turbine 70 | Non-Participating |
| Barn | 1,390 feet southwest | Turbine 61 | Participating |
| House | 1,390 feet northwest | Turbine 69 | Participating |
| Barn | 1,395 feet northeast | Turbine 27 | Participating |
| Barn | 1,395 feet southeast | Turbine 31 | Participating |
| House | 1,395 feet southeast | Turbine 52 | Participating |
| Barn | 1,400 feet east | Turbine 09 | Non-Participating |
| House | 1,400 feet northwest | Turbine 15 | Participating |
| Barn | 1,400 feet northwest | Turbine 58 | Participating |
| Barn | 1,400 feet north | Turbine 79 | Participating |
| House | 1,405 feet northeast | Turbine 27 | Participating |
| House | 1,410 feet north-northeast | Turbine 08 | Non-Participating |
| Outbuilding | 1,410 feet northwest | Turbine 58 | Participating |
| Garage | 1,410 feet west-southwest | Turbine 74 | Non-Participating |
| Barn | 1,410 feet southeast | Turbine 87 | Non-Participating |
| Silo | 1,415 feet south-southeast | Turbine 78 | Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Barn | 1,420 feet southeast | Turbine 23 | Non-Participating |
| Barn | 1,420 feet southeast | Turbine 26 | Non-Participating |
| Garage | 1,425 feet southeast | Turbine 06 | Participating |
| Garage | 1,425 feet northwest | Turbine 46 | Participating |
| House | 1,430 feet south | Turbine 02 | Participating |
| Garage | 1,430 feet southeast | Turbine 52 | Participating |
| House | 1,430 feet northwest | Turbine 59 | Non-Participating |
| House | 1,435 feet southwest | Turbine 12 | Participating |
| Garage | 1,440 feet north-northwest | Turbine 11 | Participating |
| House | 1,440 feet south-southwest | Turbine 52 | Participating |
| Silo | 1,440 feet south-southeast | Turbine 78 | Participating |
| House | 1,445 feet south-southeast | Turbine 04 | Non-Participating |
| Barn | 1,445 feet southeast | Turbine 87 | Non-Participating |
| Barn | 1,450 feet northeast | Turbine 10 | Non-Participating |
| House | 1,450 feet north | Turbine 17 | Participating |
| House | 1,450 feet northeast | Turbine 26 | Non-Participating |
| Garage | 1,450 feet northeast | Turbine 26 | Non-Participating |
| Silo | 1,450 feet south-southwest | Turbine 57 | Non-Participating |
| Garage | 1,450 feet southwest | Turbine 61 | Participating |
| Barn | 1,450 feet southwest | Turbine 64 | Participating |
| Barn | 1,450 feet west-southwest | Turbine 74 | Non-Participating |
| Garage | 1,450 feet southeast | Turbine 91 | Non-Participating |
| Barn | 1,455 feet south-southeast | Turbine 78 | Participating |
| House | 1,460 feet northeast | Turbine 05 | Non-Participating |
| Barn | 1,460 feet south-southeast | Turbine 09 | Non-Participating |
| House | 1,460 feet east-northeast | Turbine 16 | Non-Participating |
| Barn | 1,460 feet southeast | Turbine 42 | Non-Participating |
| Garage | 1,460 feet northwest | Turbine 72 | Non-Participating |
| Barn | 1,460 feet south | Turbine 72 | Non-Participating |
| House | 1,460 feet northeast | Turbine 75 | Participating |
| House | 1,465 feet southeast | Turbine 06 | Participating |
| Barn | 1,465 feet northeast | Turbine 10 | Non-Participating |
| House | 1,465 feet north-northwest | Turbine 11 | Participating |
| Barn | 1,465 feet north-northwest | Turbine 17 | Participating |
| House | 1,465 feet northeast | Turbine 18 | Participating |
| Garage | 1,465 feet southwest | Turbine 53 | Participating |
| Barn | 1,470 feet east-northeast | Turbine 09 | Non-Participating |
| House | 1,470 feet north-northwest | Turbine 11 | Participating |
| Silo | 1,470 feet south-southwest | Turbine 57 | Non-Participating |
| Barn | 1,475 feet south-southeast | Turbine 09 | Non-Participating |
| Garage | 1,475 feet northwest | Turbine 63 | Participating |
| House | 1,475 feet southeast | Turbine 91 | Non-Participating |
| Barn | 1,480 feet northwest | Turbine 05 | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| House | 1,480 feet southeast | Turbine 38 | Non-Participating |
| House | 1,480 feet northeast | Turbine 39 | Non-Participating |
| House | 1,480 feet northeast | Turbine 42 | Non-Participating |
| House | 1,480 feet southwest | Turbine 56 | Non-Participating |
| Garage | 1,480 feet southwest | Turbine 58 | Non-Participating |
| Garage | 1,480 feet northwest | Turbine 59 | Non-Participating |
| House | 1,480 feet northwest | Turbine 61 | Participating |
| House | 1,480 feet northwest | Turbine 72 | Non-Participating |
| Barn | 1,480 feet northwest | Turbine 74 | Non-Participating |
| House | 1,480 feet west-southwest | Turbine 74 | Non-Participating |
| Barn | 1,480 feet northeast | Turbine 75 | Participating |
| Barn | 1,480 feet southeast | Turbine 83 | Non-Participating |
| Barn | 1,485 feet southeast | Turbine 23 | Non-Participating |
| Barn | 1,485 feet south-southwest | Turbine 57 | Non-Participating |
| Barn | 1,485 feet southwest | Turbine 72 | Non-Participating |
| House | 1,485 feet south-southwest | Turbine 78 | Participating |
| Barn | 1,490 feet south-southeast | Turbine 04 | Non-Participating |
| House | 1,490 feet southeast | Turbine 12 | Non-Participating |
| Garage | 1,490 feet northeast | Turbine 56 | Non-Participating |
| House | 1,490 feet southwest | Turbine 58 | Non-Participating |
| Garage | 1,490 feet south-southwest | Turbine 72 | Non-Participating |
| House | 1,490 feet south | Turbine 72 | Non-Participating |
| Barn | 1,490 feet south-southeast | Turbine 78 | Participating |
| Barn | 1,490 feet south-southwest | Turbine 94 | Non-Participating |
| House | 1,495 feet south-southwest | Turbine 72 | Non-Participating |
| House | 1,500 feet southeast | Turbine 04 | Non-Participating |
| Barn | 1,500 feet north-northeast | Turbine 08 | Non-Participating |
| House | 1,500 feet southeast | Turbine 10 | Non-Participating |
| Barn | 1,500 feet northeast | Turbine 11 | Non-Participating |
| Garage | 1,500 feet north | Turbine 12 | Non-Participating |
| House | 1,500 feet southeast | Turbine 12 | Non-Participating |
| Barn | 1,500 feet northeast | Turbine 20 | Non-Participating |
| House | 1,500 feet southeast | Turbine 26 | Non-Participating |
| Barn | 1,500 feet east-southeast | Turbine 27 | Non-Participating |
| House | 1,500 feet southeast | Turbine 33 | Non-Participating |
| House | 1,500 feet southwest | Turbine 61 | Participating |
| Barn | 1,500 feet north-northwest | Turbine 68 | Participating |
| House | 1,500 feet southwest | Turbine 72 | Non-Participating |
| House | 1,500 feet east-northeast | Turbine 85 | Non-Participating |
| House | 1,500 feet southeast | Turbine 87 | Non-Participating |
| Barn | 1,500 feet southeast | Turbine 87 | Non-Participating |
| Silo | 1,500 feet southeast | Turbine 89 | Participating |
| Silo | 1,500 feet northeast | Turbine 92 | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Barn | 1,500 feet northeast | Turbine 92 | Non-Participating |
| House | 1,500 feet west-northwest | Turbine 94 | Non-Participating |
| House | 1,500 feet west-northwest | Turbine 94 | Non-Participating |
| Garage | 1,500 feet northwest | Turbine 95 | Participating |

TABLE O-2
STRUCTURES WITHIN 250 FEET OF A PROPOSED PROJECT COMPONENT

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|-----------------------------------|--|
| Garage | 10 feet west | Electrical Connection Lines | Participating |
| Silos | 10 feet west | Electrical Connection Lines | Participating |
| Barn | 10 feet southeast | Site Road | Participating |
| Outbuilding | 20 feet north | Electrical Connection Lines | Non-Participating |
| House | 20 feet north | Electrical Connection Lines | Non-Participating |
| Garage | 20 feet north | Electrical Connection Lines | Non-Participating |
| Barn | 25 feet south | Substation | Non-Participating |
| Trailer | 30 feet south | Substation | Non-Participating |
| Silos | 30 feet south | Electrical Connection Lines | Participating |
| Barn | 30 feet north | Electrical Connection Lines | Non-Participating |
| Barn | 35 feet south-southeast | Electrical Connection Lines | Participating |
| Barn | 35 feet north | Electrical Connection Lines | Non-Participating |
| House | 40 feet north-northeast | Site Road | Non-Participating |
| Barn | 40 feet south | Electrical Connection Lines | Participating |
| Barn | 40 feet south | Electrical Connection Lines | Participating |
| Garage | 50 feet north | Site Road | Non-Participating |
| Barn | 50 feet west | Site Road | Non-Participating |
| Garage | 50 feet west | Site Road | Non-Participating |
| House | 50 feet north | Electrical Connection Lines | Non-Participating |
| House | 55 feet south | 138-kV Electrical Interconnection | Non-Participating |
| Garage | 55 feet south | 138-kV Electrical Interconnection | Non-Participating |
| Barn | 55 feet south | Site Road | Participating |
| Barn | 55 feet southeast | Electrical Connection Lines | Participating |
| Garage | 60 feet north | Electrical Connection Lines | Non-Participating |
| House | 60 feet north-northeast | Site Road | Non-Participating |
| Tower | 60 feet west | Electrical Connection Lines | Participating |
| House | 65 feet north | Site Road | Non-Participating |
| House | 65 feet northwest | Electrical Connection Lines | Participating |
| Garage | 65 feet southeast | Electrical Connection Lines | Participating |
| House | 65 feet east-northeast | Site Road | Non-Participating |
| House | 70 feet north | Electrical Connection Lines | Non-Participating |
| House | 70 feet west | Site Road | Non-Participating |
| Garage | 70 feet north | Electrical Connection Lines | Non-Participating |
| House | 70 feet south | Electrical Connection Lines | Non-Participating |
| House | 75 feet west | Electrical Connection Lines | Non-Participating |
| Barn | 75 feet west | Site Road | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| House | 80 feet north | Electrical Connection Lines | Participating |
| Barn | 80 feet southeast | Electrical Connection Lines | Participating |
| Municipal | 80 feet south-southwest | Site Road | Non-Participating |
| House | 85 feet southeast | Electrical Connection Lines | Participating |
| House | 85 feet north | Site Road | Participating |
| Garage | 85 feet east | Electrical Connection Lines | Participating |
| House | 90 feet east-southeast | Site Road | Participating |
| Trailer | 90 feet east | Electrical Connection Lines | Participating |
| House | 90 feet west | Site Road | Non-Participating |
| Outbuilding | 90 feet southwest | Site Road | Non-Participating |
| House | 90 feet north-northeast | Site Road | Non-Participating |
| Barn | 90 feet southwest | Electrical Connection Lines | Participating |
| House | 95 feet north | Electrical Connection Lines | Non-Participating |
| Garage | 95 feet south | Substation | Non-Participating |
| Outbuilding | 95 feet west-southwest | Electrical Connection Lines | Participating |
| House | 95 feet south-southeast | Electrical Connection Lines | Non-Participating |
| Barn | 95 feet west-southwest | Site Road | Non-Participating |
| House | 100 feet east-northeast | Cranewalk | Participating |
| House | 100 feet east | Site Road | Non-Participating |
| House | 100 feet northeast | Site Road | Non-Participating |
| Barn | 100 feet west | Electrical Connection Lines | Participating |
| Barn | 100 feet southeast | Site Road | Non-Participating |
| House | 100 feet south-southeast | Site Road | Non-Participating |
| Barn | 105 feet southeast | Electrical Connection Lines | Participating |
| Barn | 105 feet south-southwest | Site Road | Non-Participating |
| Barn | 110 feet northeast | Site Road | Participating |
| House | 110 feet west | Site Road | Participating |
| House | 110 feet east | Electrical Connection Lines | Participating |
| House | 110 feet south-southwest | Electrical Connection Lines | Participating |
| Barn | 110 feet south | Electrical Connection Lines | Non-Participating |
| Garage | 115 feet northwest | Electrical Connection Lines | Participating |
| Barn | 115 feet east | Electrical Connection Lines | Participating |
| House | 115 feet east | Electrical Connection Lines | Participating |
| House | 120 feet east | Electrical Connection Lines | Non-Participating |
| Barn | 120 feet east | Site Road | Participating |
| House | 120 feet south-southeast | Site Road | Non-Participating |
| House | 120 feet east | Cranewalk | Non-Participating |
| Barn | 120 feet southwest | Site Road | Non-Participating |
| House | 120 feet northeast | Site Road | Non-Participating |
| Outbuilding | 120 feet northwest | Electrical Connection Lines | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|-----------------------------------|--|
| House | 120 feet northeast | Electrical Connection Lines | Participating |
| Barn | 125 feet notheast | Site Road | Participating |
| House | 125 feet southeast | Electrical Connection Lines | Participating |
| House | 125 feet northeast | Electrical Connection Lines | Non-Participating |
| Barn | 125 feet southeast | Electrical Connection Lines | Participating |
| Barn | 125 feet south | Electrical Connection Lines | Non-Participating |
| Garage | 130 feet north-northeast | Site Road | Non-Participating |
| Barn | 130 feet south | Site Road | Participating |
| Tanks | 130 feet northwest | Electrical Connection Lines | Non-Participating |
| Business | 130 feet northeast | Site Road | Non-Participating |
| House | 130 feet north | Electrical Connection Lines | Non-Participating |
| House | 130 feet east | Site Road | Non-Participating |
| Outbuilding | 130 feet south | Site Road | Non-Participating |
| Barn | 130 feet south | Electrical Connection Lines | Non-Participating |
| Barn | 135 feet north | Electrical Connection Lines | Participating |
| Tanks | 135 feet northwest | Electrical Connection Lines | Non-Participating |
| House | 135 feet west-southwest | Site Road | Non-Participating |
| Barn | 140 feet south | 138-kV Electrical Interconnection | Non-Participating |
| Barn | 140 feet southwest | Electrical Connection Lines | Participating |
| Barn | 140 feet northeast | Site Road | Participating |
| Garage | 140 feet east | Electrical Connection Lines | Participating |
| Barn | 140 feet southeast | Site Road | Non-Participating |
| House | 145 feet west | Electrical Connection Lines | Participating |
| House | 145 feet west-southwest | Site Road | Non-Participating |
| Barn | 145 feet north | Electrical Connection Lines | Participating |
| Barn | 145 feet north | Electrical Connection Lines | Non-Participating |
| Barn | 145 feet east | Cranewalk | Participating |
| Barn | 145 feet southwest | Electrical Connection Lines | Participating |
| Barn | 150 feet southwest | Electrical Connection Lines | Participating |
| Barn | 150 feet west | Site Road | Non-Participating |
| Barn | 150 feet southeast | Site Road | Non-Participating |
| Barn | 150 feet southeast | Site Road | Non-Participating |
| Barn | 150 feet east-southeast | Electrical Connection Lines | Participating |
| House | 150 feet northwest | Site Road | Non-Participating |
| Barn | 150 feet south | Site Road | Non-Participating |
| Garage | 155 feet south | Site Road | Non-Participating |
| House | 155 feet southwest | Site Road | Non-Participating |
| Outbuilding | 155 feet north | Site Road | Non-Participating |
| Outbuilding | 155 feet north | Site Road | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|-----------------------------------|--|
| Barn | 155 feet east | Site Road | Non-Participating |
| Barn | 155 feet southeast | Electrical Connection Lines | Participating |
| House | 155 feet southwest | Site Road | Participating |
| Silo | 155 feet southwest | Site Road | Non-Participating |
| House | 155 feet north | Electrical Connection Lines | Participating |
| Barn | 155 feet west-southwest | Site Road | Participating |
| House | 155 feet northwest | Electrical Connection Lines | Non-Participating |
| Outbuilding | 155 feet east-southeast | Site Road | Non-Participating |
| Barn | 160 feet south | Site Road | Participating |
| House | 160 feet northwest | Electrical Connection Lines | Non-Participating |
| Barn | 160 feet northwest | Electrical Connection Lines | Participating |
| Silo | 160 feet northwest | Site Road | Participating |
| Barn | 160 feet southeast | Electrical Connection Lines | Participating |
| Trailer | 160 feet north | Electrical Connection Lines | Non-Participating |
| Garage | 160 feet northwest | Electrical Connection Lines | Non-Participating |
| Barn | 165 feet east | Site Road | Participating |
| Barn | 165 feet west-southwest | Electrical Connection Lines | Participating |
| Barn | 165 feet northeast | Electrical Connection Lines | Participating |
| Garage | 165 feet north | Site Road | Participating |
| Garage | 165 feet east | Site Road | Participating |
| Garage | 165 feet east | Site Road | Non-Participating |
| House | 170 feet south | 138-kV Electrical Interconnection | Non-Participating |
| Garage | 170 feet northwest | Electrical Connection Lines | Non-Participating |
| Barn | 170 feet north | Site Road | Non-Participating |
| Barn | 170 feet southeast | Electrical Connection Lines | Participating |
| Barn | 170 feet east | Site Road | Participating |
| Barn | 170 feet north | Electrical Connection Lines | Non-Participating |
| Garage | 170 feet east | Site Road | Non-Participating |
| Barn | 170 feet west-northwest | Site Road | Participating |
| Silo | 170 feet southeast | Electrical Connection Lines | Participating |
| Barn | 170 feet northeast | Site Road | Non-Participating |
| Barn | 170 feet southwest | Electrical Connection Lines | Participating |
| House | 175 feet north-northwest | Site Road | Non-Participating |
| Garage | 175 feet south-southeast | Site Road | Non-Participating |
| Barn | 175 feet northwest | Site Road | Participating |
| House | 175 feet northwest | Site Road | Non-Participating |
| Barn | 175 feet east | Electrical Connection Lines | Participating |
| House | 175 feet northwest | Electrical Connection Lines | Non-Participating |
| House | 180 feet south | Substation | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| House | 180 feet northeast | Site Road | Non-Participating |
| House | 180 feet south | Site Road | Non-Participating |
| Garage | 180 feet south-southwest | Electrical Connection Lines | Participating |
| Garage | 180 feet north | Site Road | Non-Participating |
| Garage | 180 feet northwest | Site Road | Non-Participating |
| House | 180 feet east-northeast | Electrical Connection Lines | Non-Participating |
| Barn | 180 feet north | Electrical Connection Lines | Participating |
| Silo | 180 feet west | Site Road | Participating |
| Silo | 180 feet west | Site Road | Participating |
| Barn | 180 feet northeast | Site Road | Non-Participating |
| Barn | 180 feet west-southwest | Site Road | Participating |
| House | 185 feet southwest | Site Road | Non-Participating |
| Barn | 185 feet northwest | Electrical Connection Lines | Participating |
| Barn | 185 feet west | Electrical Connection Lines | Participating |
| Silo | 185 feet southeast | Electrical Connection Lines | Participating |
| Barn | 185 feet east-southeast | Site Road | Non-Participating |
| House | 190 feet east | Site Road | Non-Participating |
| House | 190 feet northwest | Electrical Connection Lines | Participating |
| Barn | 190 feet south | Electrical Connection Lines | Participating |
| House | 190 feet east-northeast | Electrical Connection Lines | Participating |
| Barn | 190 feet northeast | Electrical Connection Lines | Non-Participating |
| Trailer | 190 feet west | Site Road | Participating |
| House | 190 feet east | Site Road | Non-Participating |
| Barn | 190 feet south | Site Road | Non-Participating |
| Barn | 195 feet north | Electrical Connection Lines | Non-Participating |
| Outbuilding | 200 feet west | Electrical Connection Lines | Participating |
| House | 200 feet northeast | Site Road | Participating |
| House | 200 feet southwest | Electrical Connection Lines | Participating |
| Barn | 200 feet southwest | Electrical Connection Lines | Participating |
| House | 200 feet northwest | Site Road | Non-Participating |
| House | 200 feet southeast | Electrical Connection Lines | Participating |
| Barn | 200 feet northeast | Site Road | Non-Participating |
| Barn | 200 feet northwest | Electrical Connection Lines | Non-Participating |
| House | 200 feet southeast | Site Road | Non-Participating |
| House | 200 feet southwest | Site Road | Non-Participating |
| Barn | 200 feet east-southeast | Site Road | Non-Participating |
| Outbuilding | 200 feet east-southeast | Site Road | Non-Participating |
| House | 205 feet east-southeast | Electrical Connection Lines | Participating |
| Barn | 205 feet northwest | Site Road | Participating |
| Barn | 205 feet east-northeast | Electrical Connection Lines | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Garage | 205 feet north | Electrical Connection Lines | Participating |
| House | 210 feet northwest | Electrical Connection Lines | Non-Participating |
| Garage | 210 feet north | Site Road | Non-Participating |
| Silo | 210 feet northwest | Cranewalk | Participating |
| Barn | 210 feet southeast | Electrical Connection Lines | Participating |
| Barn | 210 feet northwest | Site Road | Participating |
| Barn | 210 feet northwest | Electrical Connection Lines | Participating |
| Barn | 210 feet northwest | Site Road | Participating |
| Barn | 210 feet northeast | Site Road | Non-Participating |
| Barn | 210 feet east | Electrical Connection Lines | Participating |
| Barn | 210 feet east | Site Road | Non-Participating |
| Barn | 210 feet south | Site Road | Participating |
| Barn | 210 feet south | Electrical Connection Lines | Participating |
| House | 215 feet east | Site Road | Non-Participating |
| Barn | 215 feet northwest | Site Road | Participating |
| Barn | 215 feet east | Site Road | Non-Participating |
| House | 220 feet southeast | Site Road | Non-Participating |
| Barn | 220 feet north | Site Road | Non-Participating |
| Barn | 220 feet southwest | Electrical Connection Lines | Participating |
| House | 220 feet north | Site Road | Non-Participating |
| Garage | 220 feet northwest | Site Road | Non-Participating |
| Outbuilding | 220 feet west | Site Road | Participating |
| Garage | 220 feet southeast | Electrical Connection Lines | Participating |
| Barn | 225 feet south | Site Road | Participating |
| House | 225 feet northwest | Site Road | Participating |
| Garage | 225 feet west-southwest | Site Road | Non-Participating |
| House | 225 feet north | Site Road | Non-Participating |
| Barn | 225 feet east | Site Road | Participating |
| Silo | 225 feet northwest | Cranewalk | Participating |
| Silo | 225 feet east-northeast | Electrical Connection Lines | Participating |
| Garage | 225 feet south-southwest | Electrical Connection Lines | Participating |
| Barn | 225 feet east | Site Road | Participating |
| House | 225 feet east-southeast | Site Road | Non-Participating |
| House | 230 feet southeast | Site Road | Non-Participating |
| Barn | 230 feet south-southeast | Site Road | Participating |
| Barn | 230 feet southwest | Site Road | Non-Participating |
| House | 230 feet northeast | Site Road | Participating |
| Barn | 230 feet west | Site Road | Participating |
| Garage | 230 feet north | Cranewalk | Participating |
| House | 230 feet west | Site Road | Non-Participating |

| Structure Type | Distance and Direction to Nearest Project Component | Closest Project Component | Lease Status of Underlying Parcel |
|-----------------------|--|----------------------------------|--|
| Trailer | 235 feet southwest | Site Road | Non-Participating |
| Barn | 235 feet southeast | Site Road | Non-Participating |
| Garage | 235 feet north | Electrical Connection Lines | Non-Participating |
| Garage | 240 feet northwest | Site Road | Non-Participating |
| Garage | 240 feet northeast | Site Road | Participating |
| House | 240 feet southeast | Electrical Connection Lines | Non-Participating |
| Trailer | 240 feet northwest | Electrical Connection Lines | Non-Participating |
| House | 250 feet north | Site Road | Non-Participating |
| House | 250 feet south | Electrical Connection Lines | Non-Participating |
| Outbuilding | 250 feet southwest | Electrical Connection Lines | Participating |
| Garage | 250 feet northwest | Electrical Connection Lines | Non-Participating |
| House | 250 feet west-northwest | Site Road | Non-Participating |
| Silo | 250 feet southeast | Electrical Connection Lines | Participating |
| House | 250 feet south | Electrical Connection Lines | Participating |
| House | 250 feet west | Electrical Connection Lines | Non-Participating |
| Barn | 250 feet southeast | Electrical Connection Lines | Participating |
| Outbuilding | 250 feet southeast | Site Road | Non-Participating |
| Barn | 250 feet east | Site Road | Non-Participating |
| Barn | 250 feet northwest | Site Road | Non-Participating |

Appendix P: Cultural Resource Review

Cultural Resources Records Review

**Seneca Wind
Seneca County, Ohio**



July 2018

PRESENTED TO

Seneca Wind LLC

2180 South 1300 East Suite 500
Salt Lake City, Utah 84106

PRESENTED BY

Tetra Tech, Inc.

2001 Killebrew Drive, Suite 141
Bloomington, Minnesota 55425

MANAGEMENT SUMMARY

Seneca Wind Energy LLC (Seneca Wind), a subsidiary of sPower Development Company LLC (sPower), contracted with Tetra Tech, Inc. (Tetra Tech) to conduct a cultural resources records review for the proposed Seneca Wind project (the Project) located in southeastern Seneca County, Ohio. The Project will require Ohio Power Siting Board (OPSB) approval; this evaluation is in support of the Application for a Certificate of Environmental Compatibility and Public Need (the Application). The Project Area used for the cultural resources records review of the Seneca Wind Farm is comprised of approximately 56,876 acres (88.9 square miles). The Study Area for the Project is defined as a 10-mile buffer around the Project Area and is comprised of approximately 576,122 acres (900.2 square miles).

The cultural resources records review was prepared to meet the requirements of Ohio Administrative Code (OAC) Chapter 4906-4-08(D), which requires that the applicant shall identify any registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within 10 miles of the project area. Landmarks are defined per OAC 4909-4-08(D)- 1 as, “those districts, sites, buildings, structures, and objects that are recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the state historical preservation office, or the Ohio department of natural resources.” The OAC 4906-4-08(D) also requires that the applicant evaluate impacts of the proposed project on the landmarks and describe plans to mitigate adverse impacts (if any).

The cultural resource records review identified no National Register of Historic Properties (NRHP) listed resources and three NRHP Determination of Eligibility (DOE) resources within the Project Area. The William Baker House (OHI No. SEN0111911) is located within the north-central portion of the Project Area and two houses without OHI numbers are located in Bloomville, within the south-central portion of the Project Area. The cultural resources records review identified an additional 66 listed or eligible resources within the Study Area.

A formal impact assessment has not been conducted for the Project at this time. Seneca Wind will work with the Ohio Historic Preservation Office (OHPO) to develop a protocol for assessing impacts to cultural landmarks. If any adverse impacts are identified, Seneca Wind will work with the OHPO and the Seneca, Crawford, Huron, and Wyandot County Historical societies, as appropriate, to mitigate those adverse impacts.

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1.0 INTRODUCTION

Seneca Wind Energy LLC (Seneca Wind), a subsidiary of sPower Development Company LLC (sPower), contracted with Tetra Tech, Inc. (Tetra Tech) to conduct a cultural resources records review for the proposed Seneca Wind project (the Project) located within southeast Seneca County, Ohio (Appendix A, Figure 1). The Project will require Ohio Power Siting Board (OPSB) approval and this document has been prepared in support of an Application for a Certificate of Environmental Compatibility and Public Need (the Application).

The cultural resources records review was prepared to meet the requirements of Ohio Administrative Code (OAC) Chapter 4906-4-08(D) which states that the applicant shall identify any registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within 10 miles of the project area. Landmarks are defined per OAC 4909-4-08(D)- 1 as, “those districts, sites, buildings, structures, and objects that are recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the state historical preservation office, or the Ohio department of natural resources.” The OAC 4906-4-08(D) also requires that the applicant evaluate impacts of the proposed project on the landmarks and describe plans to mitigate adverse impacts (if any).

The Project Area used for the cultural resources records review of the Seneca Wind Farm is comprised of approximately 56,876 acres (88.9 square miles). The Study Area for the Project is defined as a 10-mile buffer around the Project Area and is comprised of approximately 576,122 acres (900.2 square miles).

1.1 ORGANIZATION OF THE REPORT

This report details the research methods, results of the literature review, and impact assessment. Mr. Adam Holven served as Principal Investigator and Ms. Britt McNamara served as lead author. Supporting documentation for this investigation includes Appendix A – Figures, and Appendix B – Historical Maps.

1.2 METHODS

Tetra Tech conducted a desktop review of the Study Area using the Ohio Historic Preservation Office (OHPO) Online Mapping System (OMS) on June 19, 2018. The following datasets of the OMS were consulted:

- Previously conducted Phase I, II, and III cultural resources surveys
- Ohio Archaeological Inventory (OAI)
- National Register of Historic Places (NRHP)
- NRHP Determination of Eligibility (DOE) properties
- Ohio Historic Inventory (OHI)
- Historic Bridge Inventory

- Ohio Genealogical Society (OGS) cemetery files

Tetra Tech also reviewed the National Park Service National Landmark list for Ohio for any properties within Seneca, Huron, or Crawford Counties.

The cultural resources records review also included a review of historic sources including United States Department of the Interior (DOI) - Bureau of Land Management (BLM) - General Land Office (GLO) Records maps, plat maps, and topographic maps (Table 1). These documents were examined to identify historic structures, railroads, roads, and trails that might be in the vicinity of the Project Area and that may not be recorded at OHPO.

Table 1. Historic Resources Reviewed within the Project Area.

| Type | Year | Reference |
|-----------------------------|------|--|
| GLO Plat | 1821 | DOI – BLM – GLO |
| Atlas | 1874 | D.J. Stewart |
| Atlas | 1896 | Rerick Brothers |
| 7.5-minute Topographic Maps | 1960 | United States Geological Survey (USGS) |

2.0 RESULTS OF CULTURAL RESOURCES RECORDS REVIEW

2.1 PREVIOUSLY CONDUCTED CULTURAL RESOURCES SURVEYS

The records review identified nine Phase I cultural resource surveys within the Project Area; however, no previous Phase II cultural resource surveys and no historic structure surveys were identified within the Project Area (Appendix A, Figure 2; Table 2). An additional 81 Phase I cultural resource surveys, 6 Phase II cultural resource surveys, and 3 historic structure surveys have been conducted in the Study Area (Appendix A, Figure 2).

Table 2. Previous Cultural Resource Investigations Conducted within the Project Area

| Database No. | Description |
|--------------|--|
| AS15951 | Interim Report on Archaeological Survey of the Proposed Independence Pipeline Corridor through Defiance, Henry, Wood, Seneca, Huron, Ashland, Wayne, Stark, Summit, and Columbiana Counties, Ohio (Maymon et al. 1998) |
| SE15709 | Literature Review and Reconnaissance Survey of the Eden Township Road 58 Bridge Replacement and Road Realignment in Eden Township, Seneca County, Ohio (Mustain and Gibbs 1994) |
| SE15713 | Phase I-III Cultural Resources Investigations of the Proposed Line D-233 Replacement in Bloom Township, Seneca County, Ohio (Bennett et al. 1992) |
| SE16183 | Phase I Archaeological Survey Report for Proposed Water Treatment Plant Site, Village of Attica, Venice Township, Seneca County, Ohio (Kreinbrink 2003a) |
| SE16214 | Phase I Archaeological Survey Report for Proposed Water Treatment Plant Site, Village of Attica, Venice Township, Seneca County, Ohio (Kreinbrink 2003b) |
| SE19203 | Phase I Archaeological Investigations for American Electric Power's Approximately 11.5 km Melmore-Tiffin 138kV Line Rebuild Project in Eden and Clinton Townships, Seneca County, Ohio (Weller 2013a) |
| SE19241 | Phase I Cultural Resources Management Investigations for the 5.5 ha (13.5 ac) Melmore 138kV Switching Station in Eden Township, Seneca County, Ohio (Weller 2013b) |
| SE19647 | Phase I Cultural Resources Management Investigations for the Proposed 17.8 ha (44 ac) Attica Wastewater Treatment Lagoon in Venice Township, Seneca County, Ohio (Weller 2014) |
| SE19880 | Phase I Archaeological Survey for the Bloomville/Frankart Wireless Cellular Tower in the Village of Bloomville, Seneca County, Ohio (CTL# 15510108COLa) (Lawhon and Brown 2015) |

2.2 PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES

There are 128 previously recorded archaeological sites located within the Project Area (Appendix A, Figure 3). Recorded sites included Native American isolated finds, lithic scatters, artifact scatters, and burial mounds, and non-aboriginal historic scatters and foundations. The recorded archaeological sites are either unevaluated or Not Eligible for the NRHP. An additional 1,294 previously recorded archaeological sites (not depicted on Figure 3) were identified within the Study Area.

2.3 PREVIOUSLY RECORDED HISTORIC AND ARCHITECTURAL RESOURCES

2.3.1 NRHP Listed Districts and Properties

The records reviewed failed to identify any NRHP listed historic districts or NRHP listed properties within the Project Area (Appendix A, Figure 3).

The records review identified 9 NRHP-listed historic districts within the Study Area and 41 NRHP-listed properties within the Study Area (Appendix A, Figure 3; Table 3). However, two of the properties in the NRHP-listed properties database are noted to be no longer listed on the NRHP. Most of the listed historic districts and properties are located in the town of Tiffin, approximately 5 miles northwest of the Project Area.

Table 3: NRHP-Listed Districts and Properties within the Study Area.

| Reference No. | Name | Location |
|---------------|---|--------------------------------|
| 78002189 | Downtown Tiffin Historic District | Tiffin, Seneca County |
| 79001944 | Fort Ball Historic District | Tiffin, Seneca County |
| 79001976 | Umsted Farm | Tiffin, Seneca County |
| 80003224 | North Sandusky Street Historic District | Tiffin, Seneca County |
| 80003225 | Northeast Tiffin Historic District | Tiffin, Seneca County |
| 80003231 | Webster Manufacturing | Tiffin, Seneca County |
| 82001487 | St. Boniface Roman Catholic Church, School, and Rectory | New Reigel, Seneca County |
| 90001499 | National Orphan's Home Junior Order United American Mechanics | Tiffin, Seneca County |
| 93000896 | Hunts Corner Historic District | Hunts Corner, Huron County |
| 02001730 | National Home, Daughters of America | Tiffin, Seneca County |
| 06000201 | Tremont House | Bellevue, Huron County |
| 73001534 | Founders Hall, Heidelberg College | Tiffin, Seneca County |
| 75001440 | Phoenix Mills | Steuben, Huron County |
| 75001558 | Parker Covered Bridge | Upper Sandusky, Wyandot County |
| 75002166 | Baltimore and Ohio Railroad Depot (DELISTED) | Willard, Huron Count |
| 79001941 | Heter Farm | Bellevue, Seneca County |
| 79001945 | Miami Street Grade School | Tiffin, Seneca County |
| 79002764 | The Octagon | Tiffin, Seneca County |
| 79002766 | Gerhart-Rust Residence | Tiffin, Seneca County |
| 79002768 | President's House | Tiffin, Seneca County |
| 79002770 | Fine Arts Building (DELISTED) | Tiffin, Seneca County |
| 79002771 | Williard Hall | Tiffin, Seneca County |
| 79002773 | Pfleiderer Center for Religion and the Humanities | Tiffin, Seneca County |
| 79002775 | Laird Hall | Tiffin, Seneca County |

| Reference No. | Name | Location |
|---------------|---|---------------------------|
| 79002776 | France Hall | Tiffin, Seneca County |
| 79002777 | Great Hall | Tiffin, Seneca County |
| 79002778 | College Hall | Tiffin, Seneca County |
| 79002779 | Aigler Alumni Building | Tiffin, Seneca County |
| 79002780 | Black Student Union Center | Tiffin, Seneca County |
| 79002782 | Social Science House | Tiffin, Seneca County |
| 79003646 | Henny Barn | Flat Rock, Seneca County |
| 80002973 | Smith Road Bridge | Bucyrus, Crawford County |
| 80003217 | Beatty Glass Company | Tiffin, Seneca County |
| 80003218 | Bowman's Distillery | Tiffin, Seneca County |
| 80003219 | Hanson Machinery Company | Tiffin, Seneca County |
| 80003220 | Hedges-Hunter-Keller-Bacon Gristmill | Tiffin, Seneca County |
| 80003221 | Hunter, William, House | Tiffin, Seneca County |
| 80003222 | Mueller Brewery | Tiffin, Seneca County |
| 80003223 | Mueller, Christ, House | Tiffin, Seneca County |
| 80003226 | Ohio Lantern Company | Tiffin, Seneca County |
| 80003227 | Tiffin Agricultural Works | Tiffin, Seneca County |
| 80003228 | Tiffin Art Metal Company | Tiffin, Seneca County |
| 80003229 | Tiffin Waterworks | Tiffin, Seneca County |
| 80003230 | Wagner Brothers Bottling Works | Tiffin, Seneca County |
| 86001562 | Bagby--Hossler House | Tiffin, Seneca County |
| 87001982 | Omar Chapel | Attica, Seneca County |
| 93000878 | Springdale | Tiffin, Seneca County |
| 93000880 | Pleasant Ridge United Methodist Church and Cemetery | Tiffin, Seneca County |
| 96000116 | Plymouth Greenlawn Cemetery Chapel | Plymouth, Richland County |
| 99000094 | Tubbs--Sourwine House | Plymouth, Richland County |

2.3.2 NRHP DOE Properties

The records review identified three NRHP DOE properties within the Project area. The William Baker House (OHI No. SEN0111911) is located within the north-central portion of the Project Area and two houses are located within Bloomville (unknown OHI Nos.). Another 10 NRHP DOE properties are located within the Study Area (Appendix A, Figure 3; Table 4).

Table 4. NRHP DOE Properties within the Study Area

| OHI No. | Name | Location |
|------------|-----------------------|----------------------------|
| CRA0013203 | Barn | Chatfield, Crawford County |
| HUR0062008 | U.S. Post Office | Willard, Huron County |
| SAN0042112 | MJ Callaghan Building | Bellvue, Sandusky County |
| SAN0046612 | House | Bellvue, Sandusky County |
| SEN0062609 | Rosina Brown House | Tiffin, Seneca County |
| UNK0000000 | Unknown | Tiffin, Seneca County |
| UNK0000000 | Unknown | Crawford County |
| UNK0000000 | Unknown | Tiffin, Seneca County |
| UNK0000000 | Unknown | Tiffin, Seneca County |
| UNK0000000 | Unknown | Seneca County |

2.3.3 OHI Properties

The records review identified 33 properties in the OHI database within the Project Area that are not included in the NRHP-listed properties or NRHP DOE properties databases (Appendix A, Figure 3). These OHI properties are not eligible or unevaluated for listing on the NRHP. An additional 1,552 properties are located within the Study Area that are not include in the NRHP listed properties or NRHP DOE properties databases (Appendix A, Figure 3).

2.3.4 Historic Bridge Inventory

The records review did not identify any historic bridges within the Project Area; however, the records review identified six historic bridges within the Study Area (Appendix A, Figure 3; Table 5). Five of the bridges are eligible for listing on the NRHP and one bridge is listed on the NRHP.

Table 5. Historic Bridges within the Study Area

| Bridge No. | Name | Location | NRHP Status |
|------------|---|------------------------------|-------------|
| 3942007 | TR 100 (Hanville Corner Rd.) over West Branch Huron River | Fairfield Twp., Huron County | Eligible |
| 3946304 | TR 109 over West Branch Huron River | New Haven Twp., Huron County | Eligible |
| 7450192 | TR 80 over Royer Ditch | Thompson Twp., Seneca County | Eligible |
| 7460104 | Huss St. over Willow Creek | Tiffin, Seneca County | Eligible |
| 7460112 | River Rd. over Willow Creek | Tiffin, Seneca County | Eligible |
| 8834350 | CR 40A (Parker Covered Bridge) over Sandusky River | Crane Twp., Wyandot County | Listed |

2.3.5 OGS Cemetery Files

The records review identified 18 inventoried cemeteries within the Project Area and an additional 195 inventoried cemeteries within the Study Area (Appendix A, Figure 3).

2.4 HISTORIC ATLAS AND MAP REVIEW

Tetra Tech reviewed the GLO maps, plat maps, and topographic quadrangles to identify the presence of towns, farmsteads, trails, roads, railroads, and other manmade features that may be present in the Project Area.

2.4.1 1821 GLO Plats

A review of the 1821 GLO plats for Township 1 North, Ranges 15, 16, 17, and 18 East, and Township 2 North, Ranges 16, 17, and 18 East identified four paths, one road, one Native American sugar camp, one deer lick, and a portion of the Van Metre Indian Reservation within the Project Area (Appendix B, Map 1).

2.4.2 1874 D.J. Stewart Atlas

A review of the D.J. Stewart (1874) atlas revealed that the Project Area was located in Bloom, Eden, Reed, Scipio, and Venice townships of Seneca County (Appendix B, Map 2). The Baltimore, Pittsburgh, and Chicago Railroad and the Toledo, Tiffin, and Eastern Railroad were illustrated traversing the central portion of the Project Area. Multiple small towns were illustrated in the Project Area including Attica, Attica Station, Bloomville, and Melmore. Multiple stone quarries, 13 cemeteries, and approximately 605 structures were also illustrated in the Project Area.

2.4.3 1896 Rerick Brothers Atlas

A review of the Rerick Brothers (1896) atlas revealed additional development in the Project Area (Appendix B, Map 3). Two additional railroads, the Sandusky & Columbus and the Rockaway Station Spur, were illustrated traversing the Project Area, and approximately 619 structures were illustrated in the Project Area. However, only 9 cemeteries were illustrated in the Project Area.

2.4.4 1960 USGS Topographic Maps

A review of the 1960 USGS 7.5-minute Attica, Bloomville, Centerton, Fireside, Lykens, and Tiffin South Topographic Quadrangles revealed few significant changes within the Project Area from the Rerick Brothers (1896) atlas (Appendix B, Map 4). A northwest-southeast trending pipeline was illustrated within the center portion of the Project Area and an additional railroad line associated with a quarry was also illustrated within the Project Area. Additionally, there was an increase in the number of structures in the Project Area to approximately 1,204; however, this increase may be related to the increase in detail on the topographic quadrangles rather than a reflection of an increased population.

2.5 RECORDS REVIEW SYNOPSIS

Based on the results of the records review, there are three NRHP DOE resources within the Project Area. An additional 66 listed or eligible resources are located within the Study Area. The historical plats, atlases, and topographic maps reveal that the character of the Project Area historically was rural and has not changed significantly through time.

3.0 IMPACT ASSESSMENT

A formal impact assessment has not been conducted for this Project at this time. However, Seneca Wind has committed to avoiding direct impacts to above-ground cultural resources (i.e., historic structures and cemeteries) and will work with the OHPO to develop an appropriate protocol to assess impacts to landmarks within the indirect (visual) area of potential effects (APE). Direct and indirect impacts to previously recorded archaeological resources and as yet unidentified archaeological resources are currently unknown. Seneca Wind will work with the OHPO to develop an appropriate survey methodology to identify new archaeological resources within the APE for direct effects. If any adverse impacts are identified to cultural landmarks, Seneca Wind will work with the OHPO and the Seneca, Crawford, Huron, and Wyandot County Historical societies, as appropriate, to mitigate those adverse impacts.

4.0 REFERENCES CITED

Bennett, P., R. Walsh, and E.J. Harris

- 1992 *Phase I-III Cultural Resources Investigations of the Proposed Line D-233 Replacement in Bloom Township, Seneca County, Ohio* . Database No. SE15713, on file at the Ohio Historic Preservation Office, Columbus.

Kreinbrink, J.

- 2003a *Phase I Archaeological Survey Report for Proposed Water Treatment Plant Site, Village of Attica, Venice Township, Seneca County, Ohio* . Database No. SE16183, on file at the Ohio Historic Preservation Office, Columbus.
- 2003b *Phase I Archaeological Survey Report for Proposed Water Treatment Plant Site, Village of Attica, Venice Township, Seneca County, Ohio* . Database No. SE16214, on file at the Ohio Historic Preservation Office, Columbus.

Lawhon, C. and J. Brown

- 2015 *Phase I Archaeological Survey for the Bloomville/Frankart Wireless Cellular Tower in the Village of Bloomville, Seneca County, Ohio (CTL# 15510108COLa)* . Database No. SE19880, on file at the Ohio Historic Preservation Office, Columbus.

Maymon, J. et al.

- 1998 *Interim Report on Archaeological Survey of the Proposed Independence Pipeline Corridor through Defiance, Henry, Wood, Seneca, Huron, Ashland, Wayne, Stark, Summit, and Columbiana Counties, Ohio*. Database No. AS15951, on file at the Ohio Historic Preservation Office, Columbus.

Mustain, C. and K. Gibb

- 1994 *Literature Review and Reconnaissance Survey of the Eden Township Road 58 Bridge Replacement and road Realignment in Eden Township, Seneca County, Ohio* . Database No. SE15709, on file at the Ohio Historic Preservation Office, Columbus.

Rerick Brothers

- 1896 *The County of Seneca, Ohio, an Imperial Atlas and Art Folio* . Rerick Brothers Topographers and Publishers, Richmond, Indiana.

Stewart, D.J.

- 1874 *Combination Atlas Map of Seneca County Ohio* . D.J Stewart, Philadelphia, Pennsylvania.

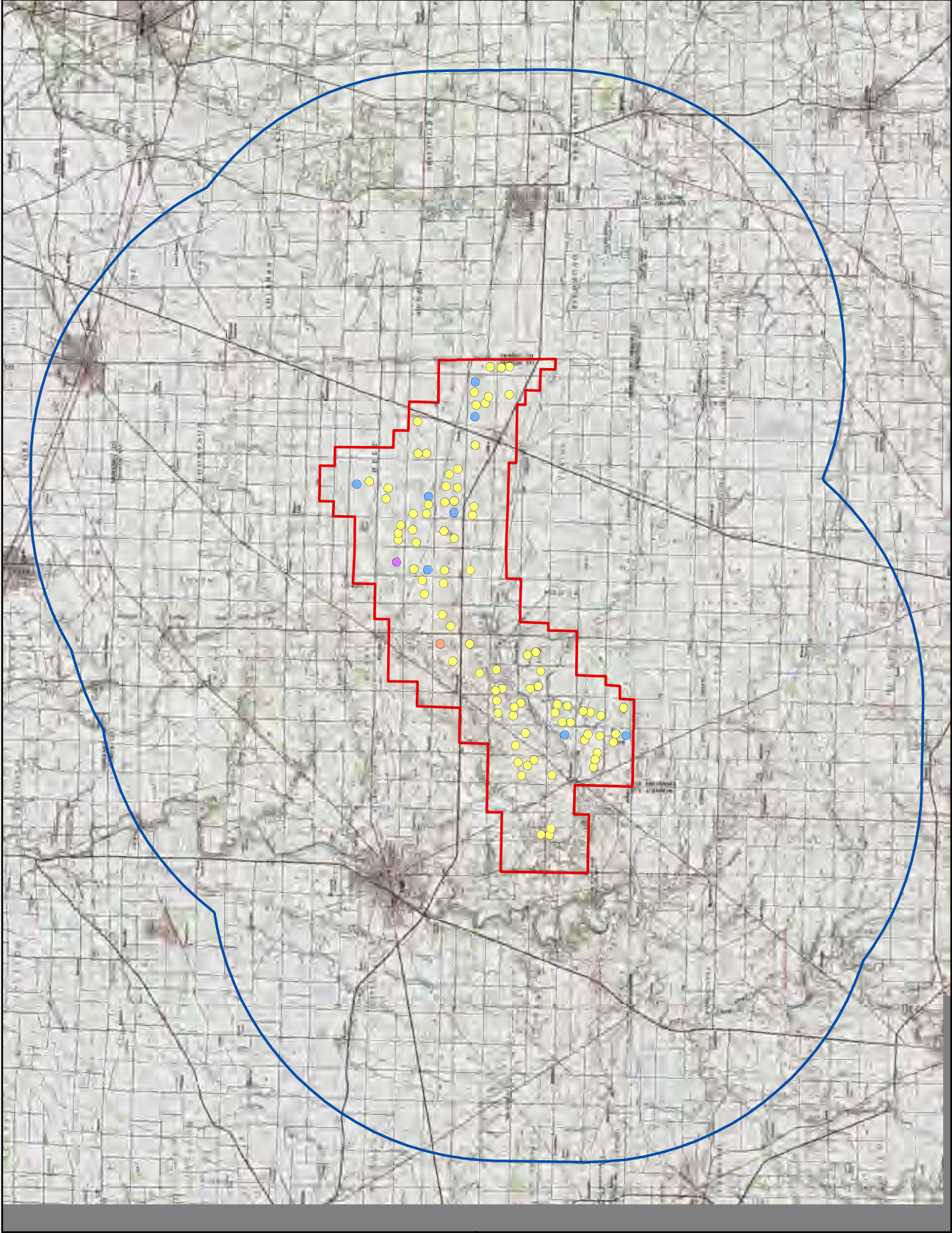
United States Department of the Interior (DOI), General Land Office Records

- 1821 Seneca County, Ohio. Electronic Document, <https://glorerecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=OH|cty=147>, accessed June 26, 2018.

Weller, R.

- 2013a *Phase I Archaeological Investigations for American Electric Power's Approximately 11.5 km Melmore-Tiffin 138kV Line Rebuild Project in Eden and Clinton Townships, Seneca County, Ohio* . Database No. SE19203, on file at the Ohio Historic Preservation Office, Columbus.
- 2013b *Phase I Cultural Resources Management Investigations for the 5.5 ha (13.5 ac) Melmore 138kV Switching Station in Eden Township, Seneca County, Ohio* . Database No. SE19241, on file at the Ohio Historic Preservation Office, Columbus.
- 2014 *Phase I Cultural Resources Management Investigations for the Proposed 17.8 ha (44 ac) Attica Wastewater Treatment Lagoon in Venice Township, Seneca County, Ohio* . Database No. SE19647, on file at the Ohio State Historic Preservation Office, Columbus.

APPENDIX A. FIGURES



Project Area

10-mile Study Area

Turbine Type (Hub Height)

GE 2.3-116 (80 m)

GE 2.3-116 (90 m)

GE 2.3-116 (94 m)

GE 2.5-127 (134 m)



Figure 1
Project Vicinity
Seneca Wind
Seneca County, Ohio



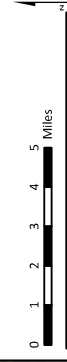
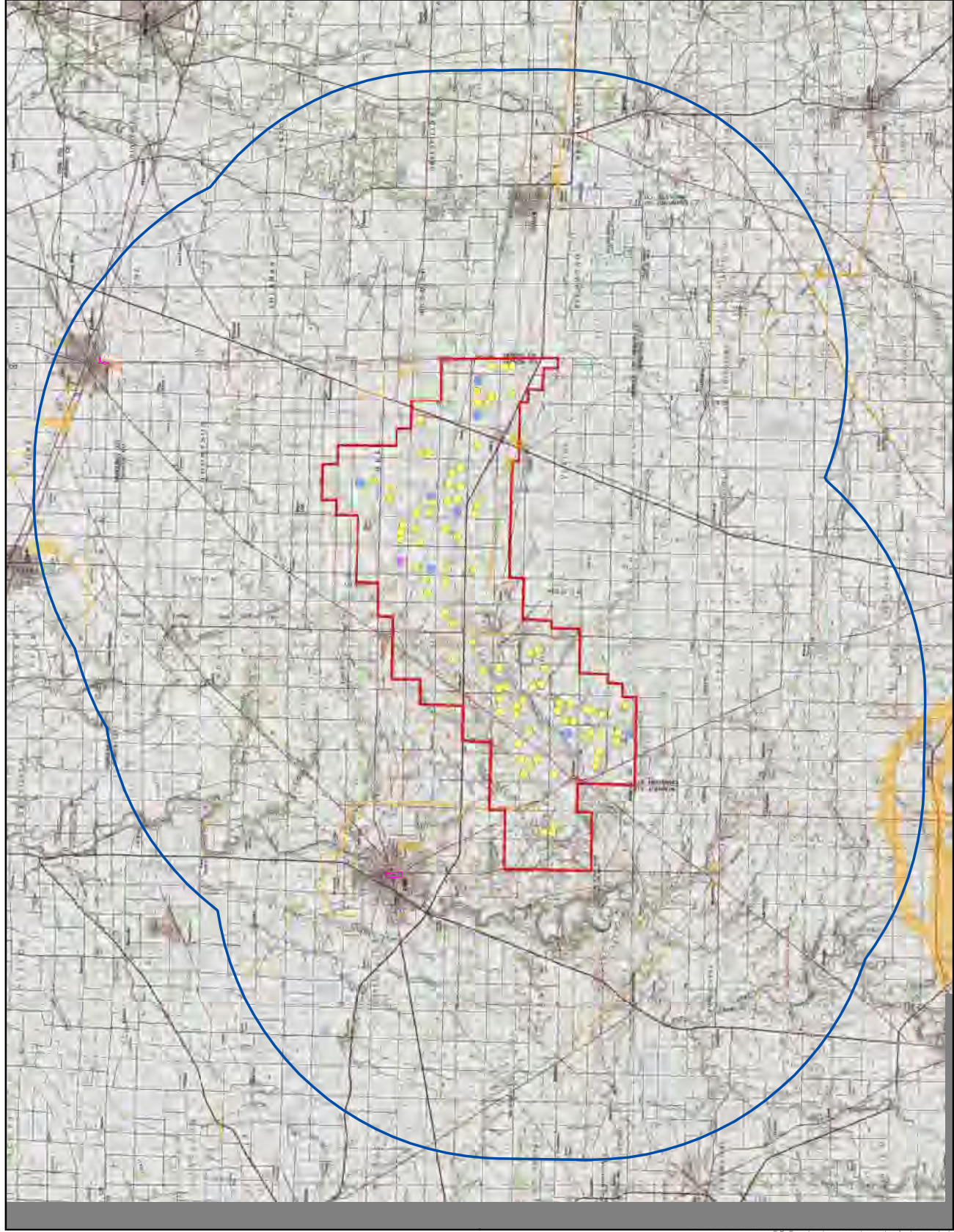


Figure 2
Previously Conducted
Cultural Resources Surveys
Seneca Wind
Seneca County, Ohio

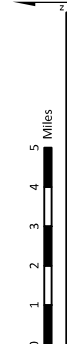
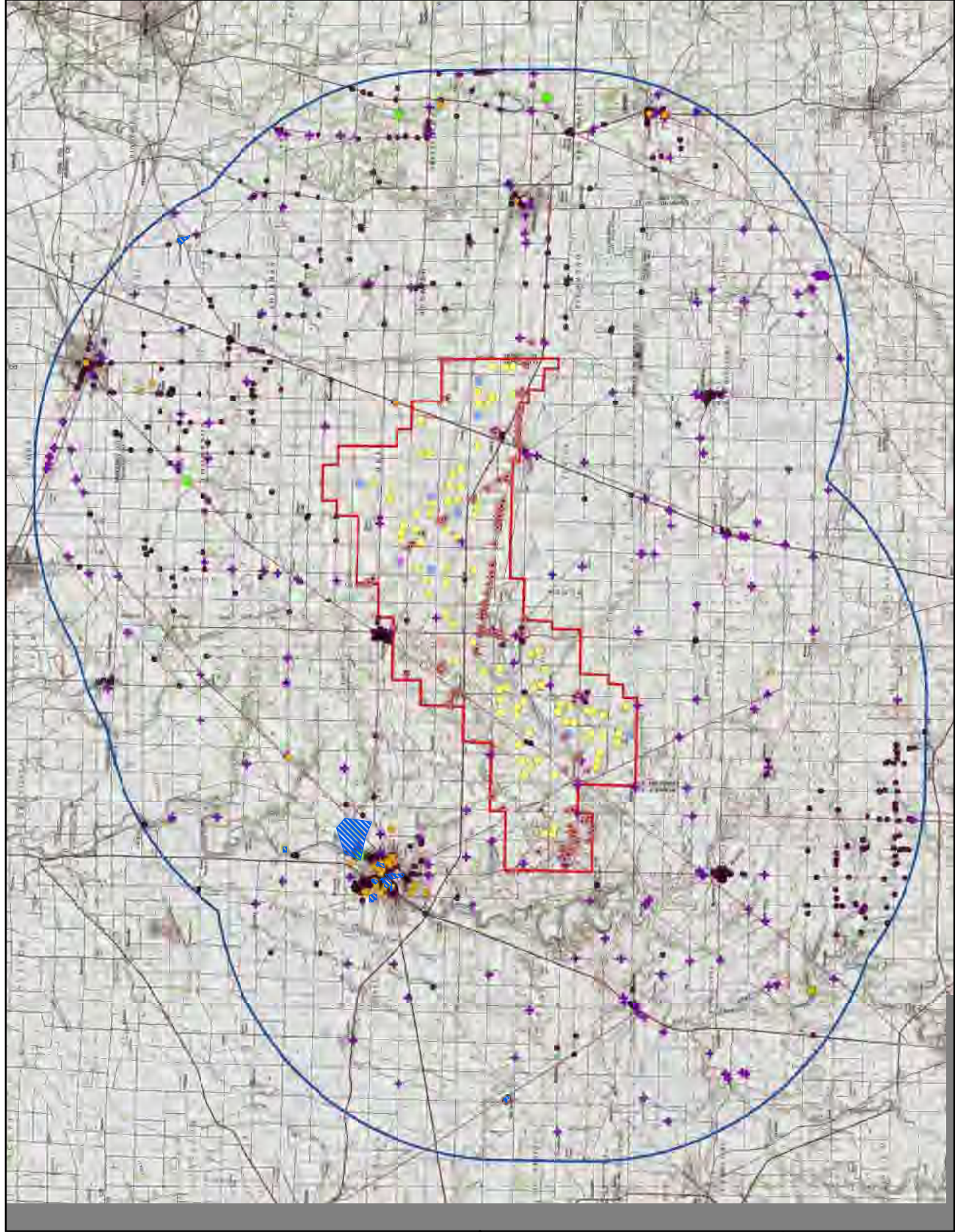
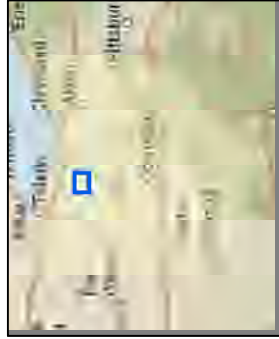


Figure 3
Previously Recorded
Cultural Resources
Seneca Wind
Seneca County, Ohio

APPENDIX B. HISTORICAL MAPS



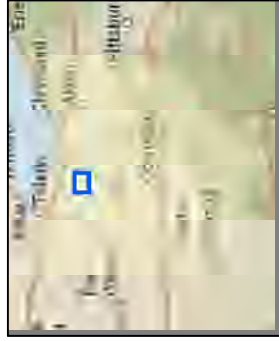
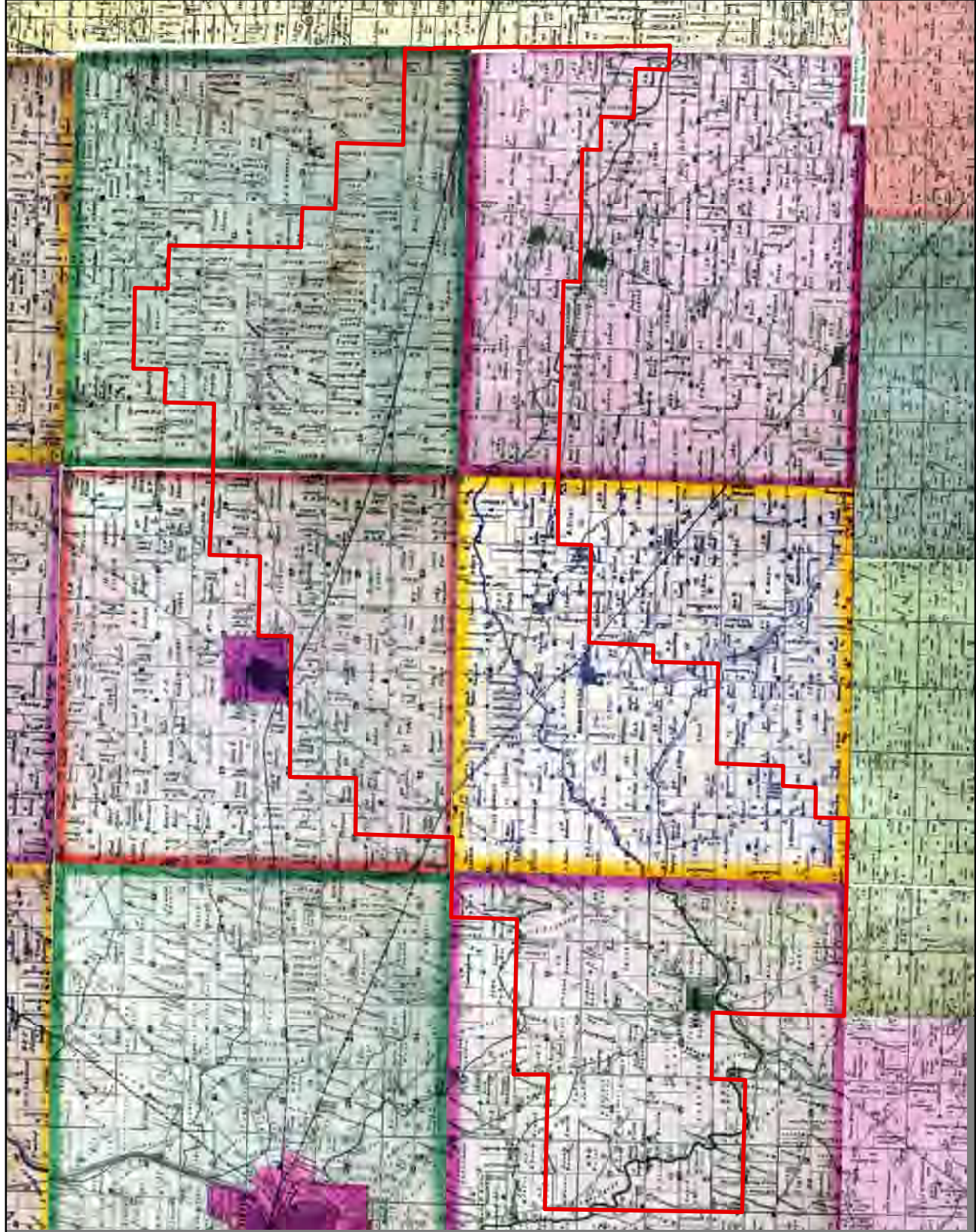
Project Area




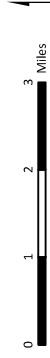
Map 1
1821 GLO Plats
Seneca Wind
Seneca County, Ohio



Source: Map adapted from US GLO Plats 1821 Seneca County, OH. Project data provided by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.

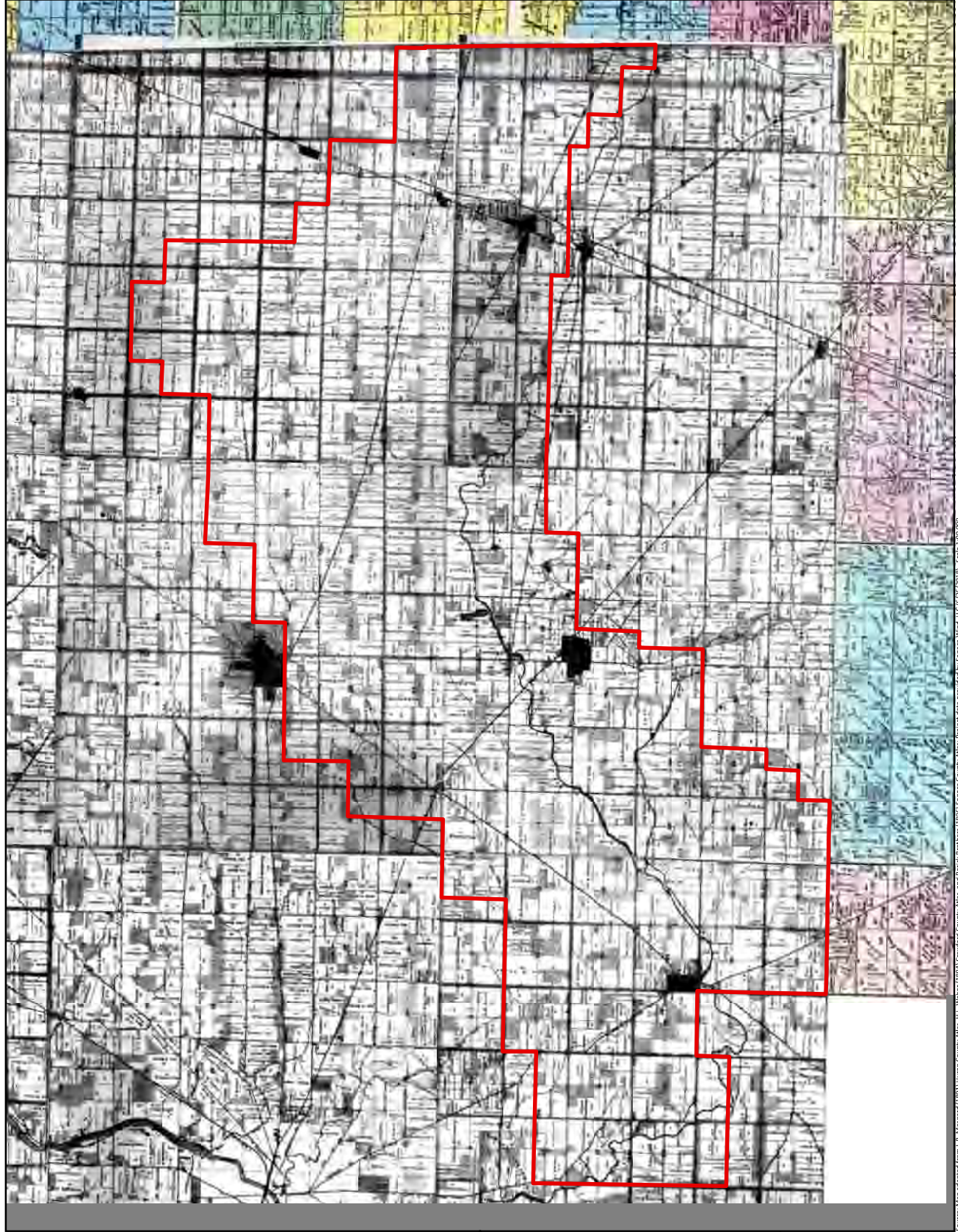


 Project Area



Map 2
1874 D.J. Stewart Atlas
Seneca Wind
Seneca County, Ohio

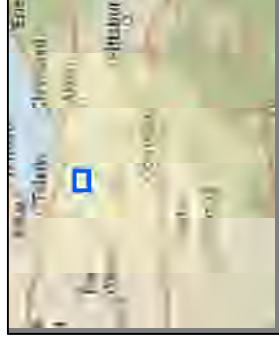
7/10/2018 8:\Project\Stewart\SenecaWind\GIS\CDM Map2 06/21/18.mxd [View document](#)
Source: Map adapted from Gould and Storr (1873) Crawford County Atlas, D.J. Stewart (1874) Seneca County Atlas, and Harrison and Howe (1879) Wayne County Atlas; Project data provided by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.

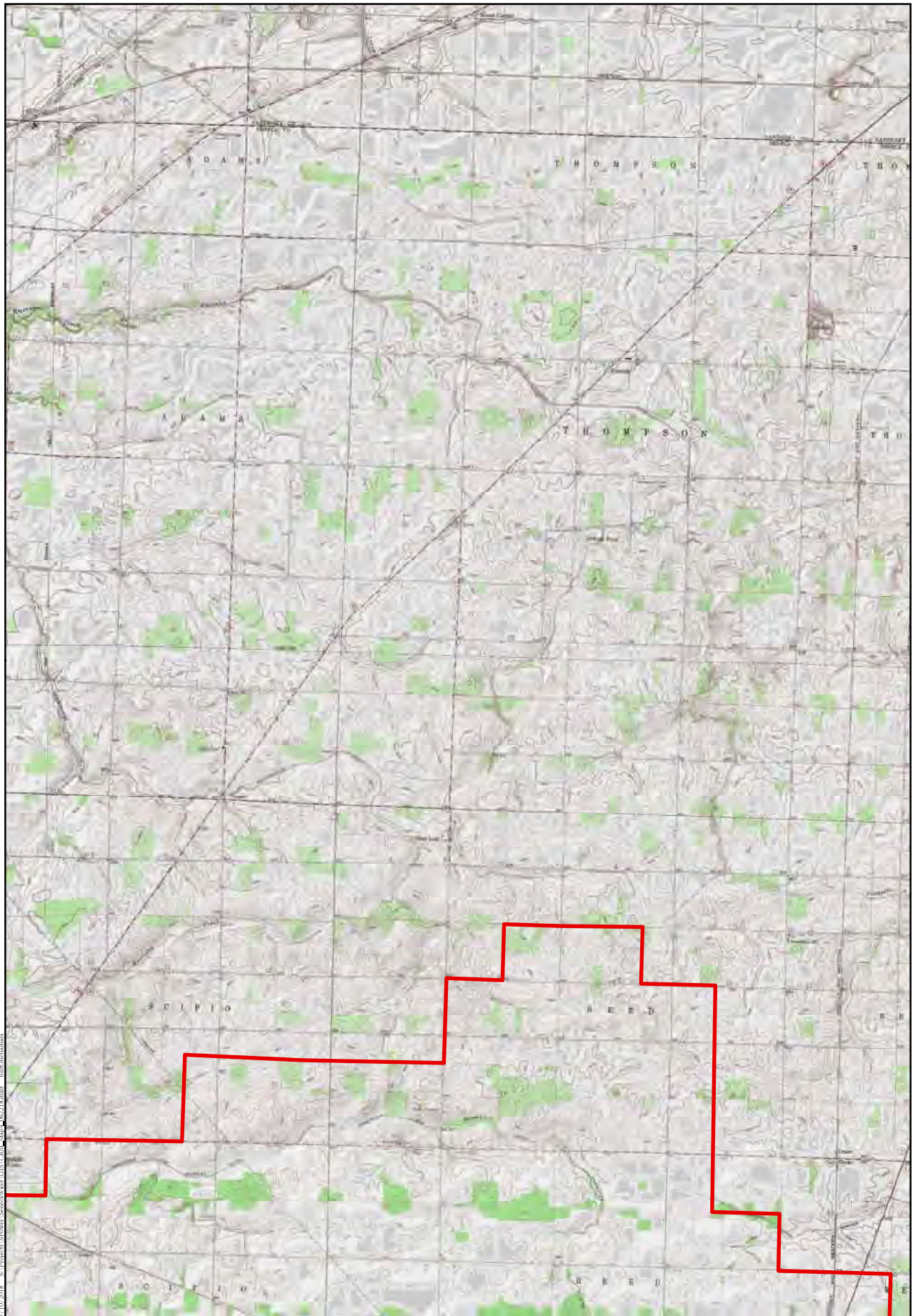


Project Area

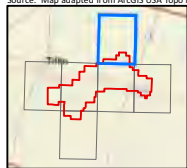


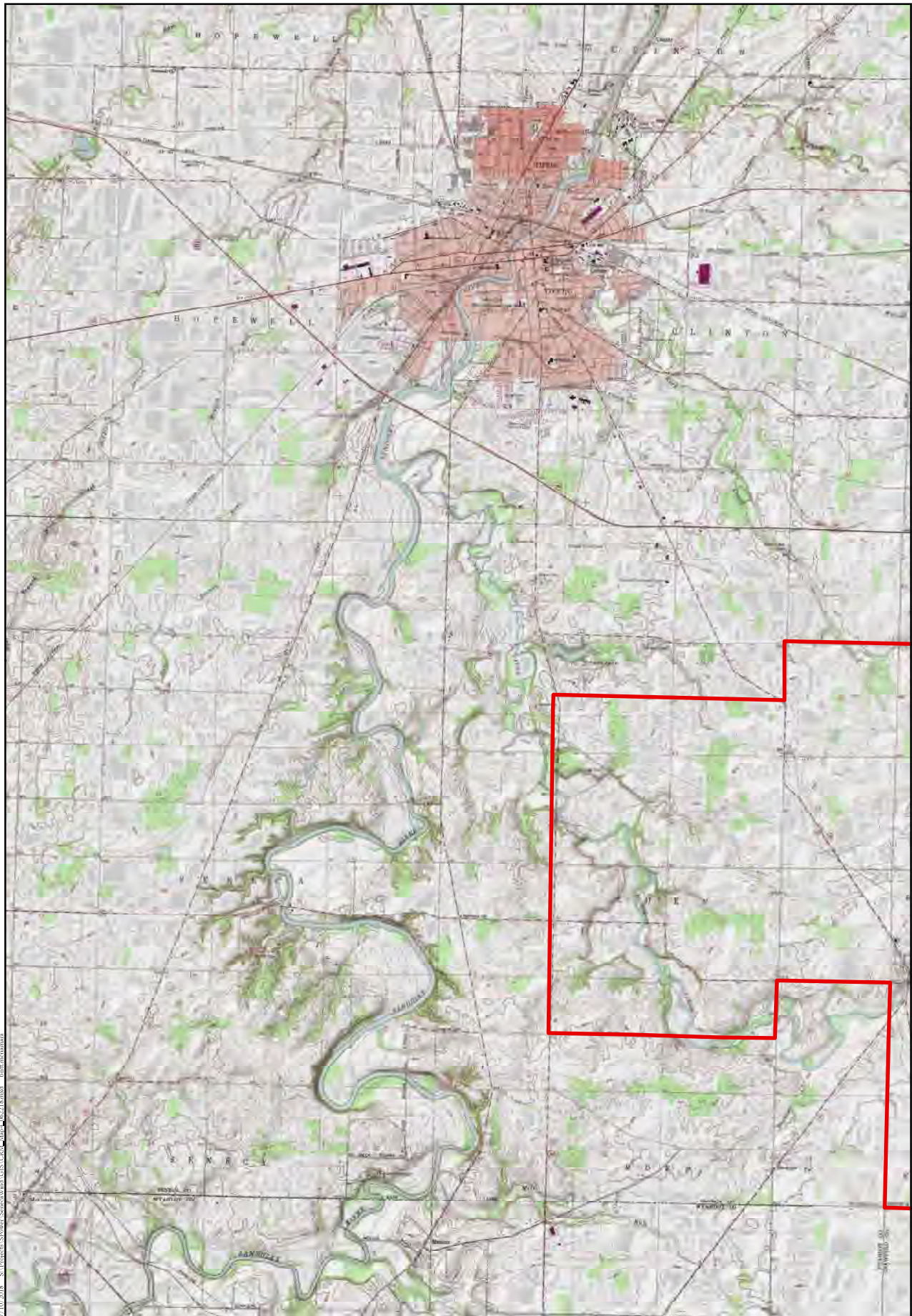
Map 3
1896 Rerick Brothers Atlas
Seneca Wind
Seneca County, Ohio



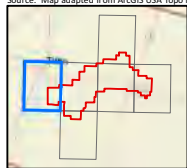


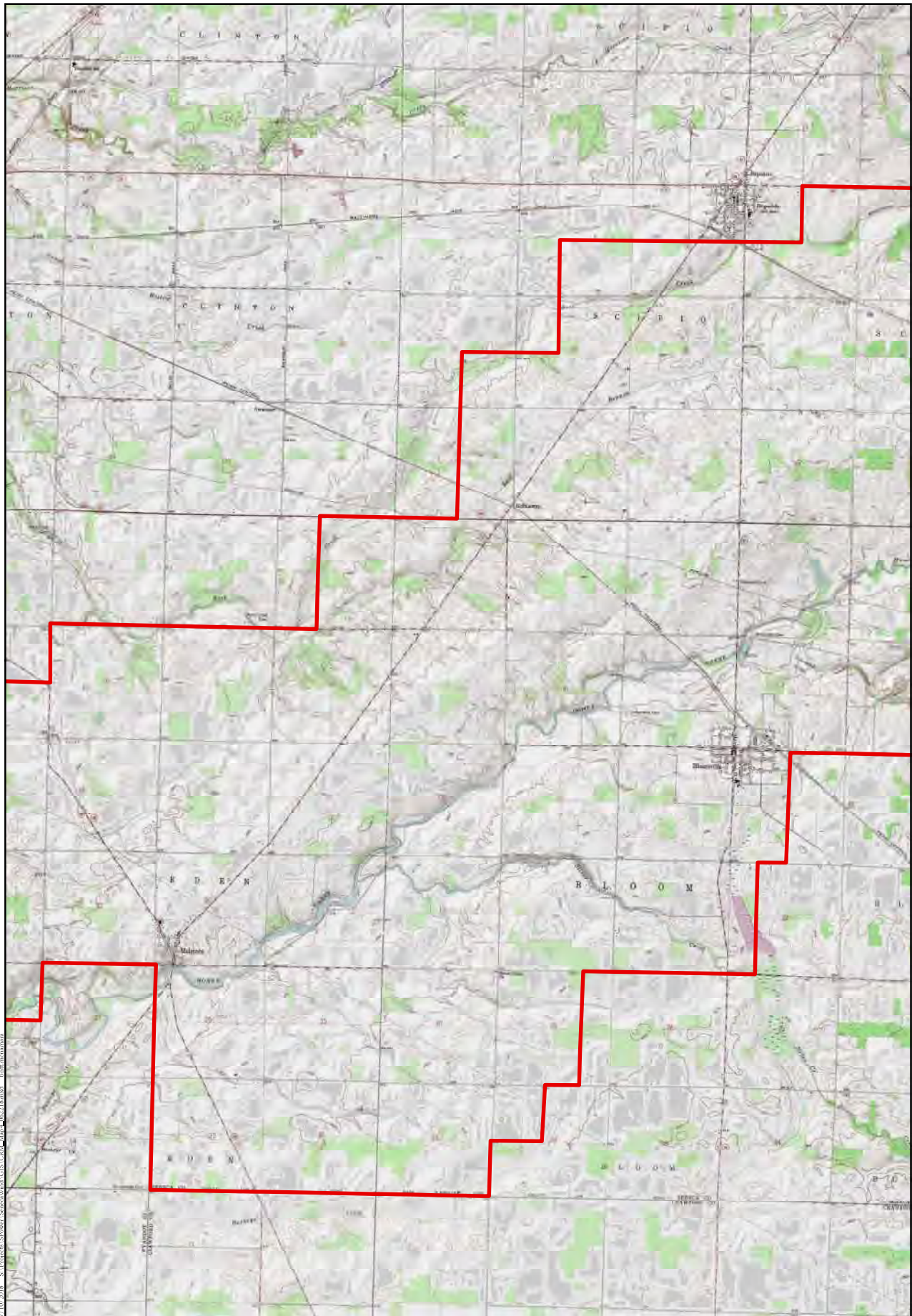
Source: Map adapted from ArcGIS USA Topo Map Server; 1960 USGS 7.5-minute Atica, Bloomville, Centerton, Fireside, Lylens, & Tiffin South, OH Quadrangles; Project data by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.



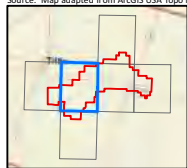


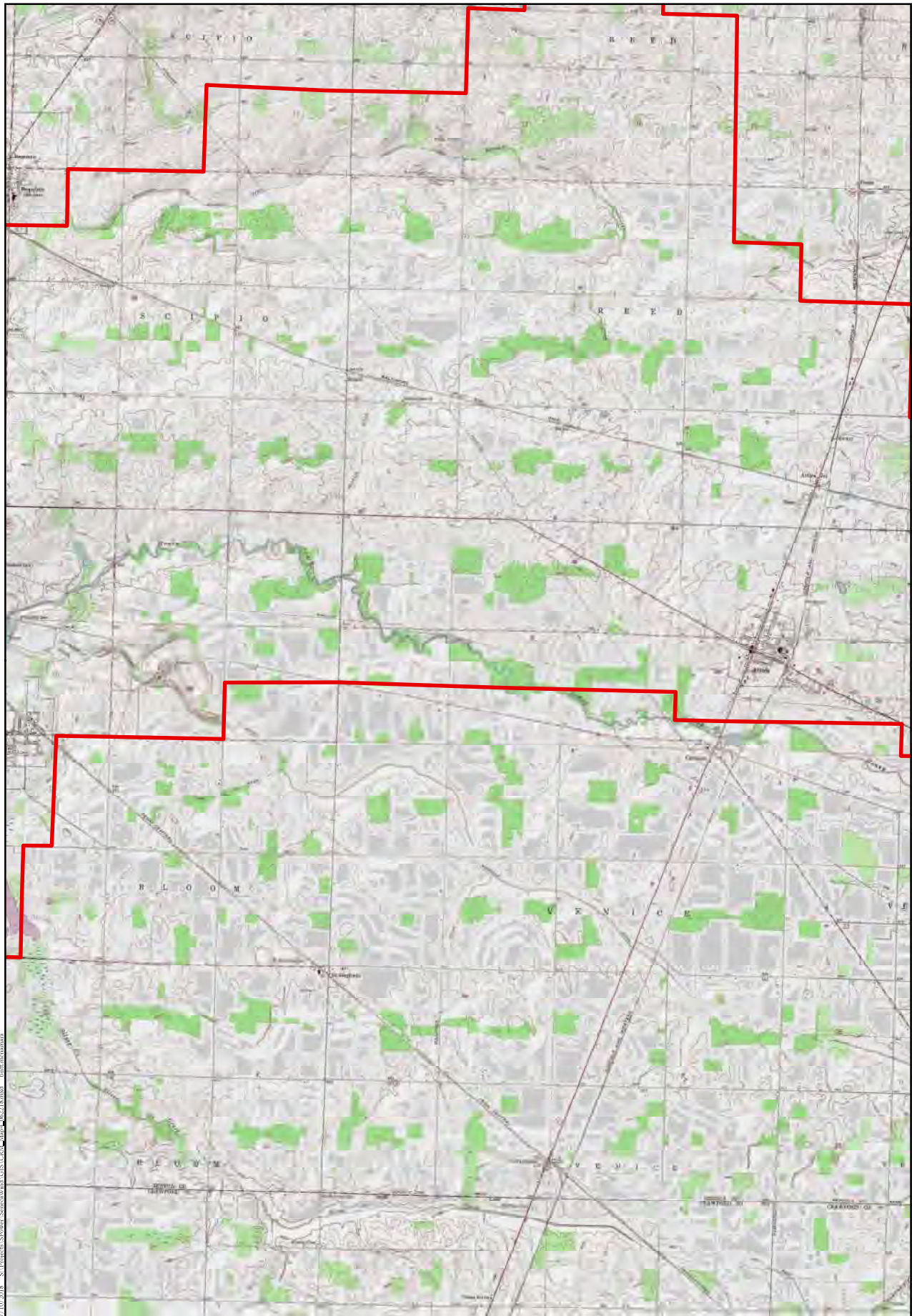
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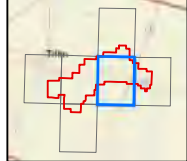


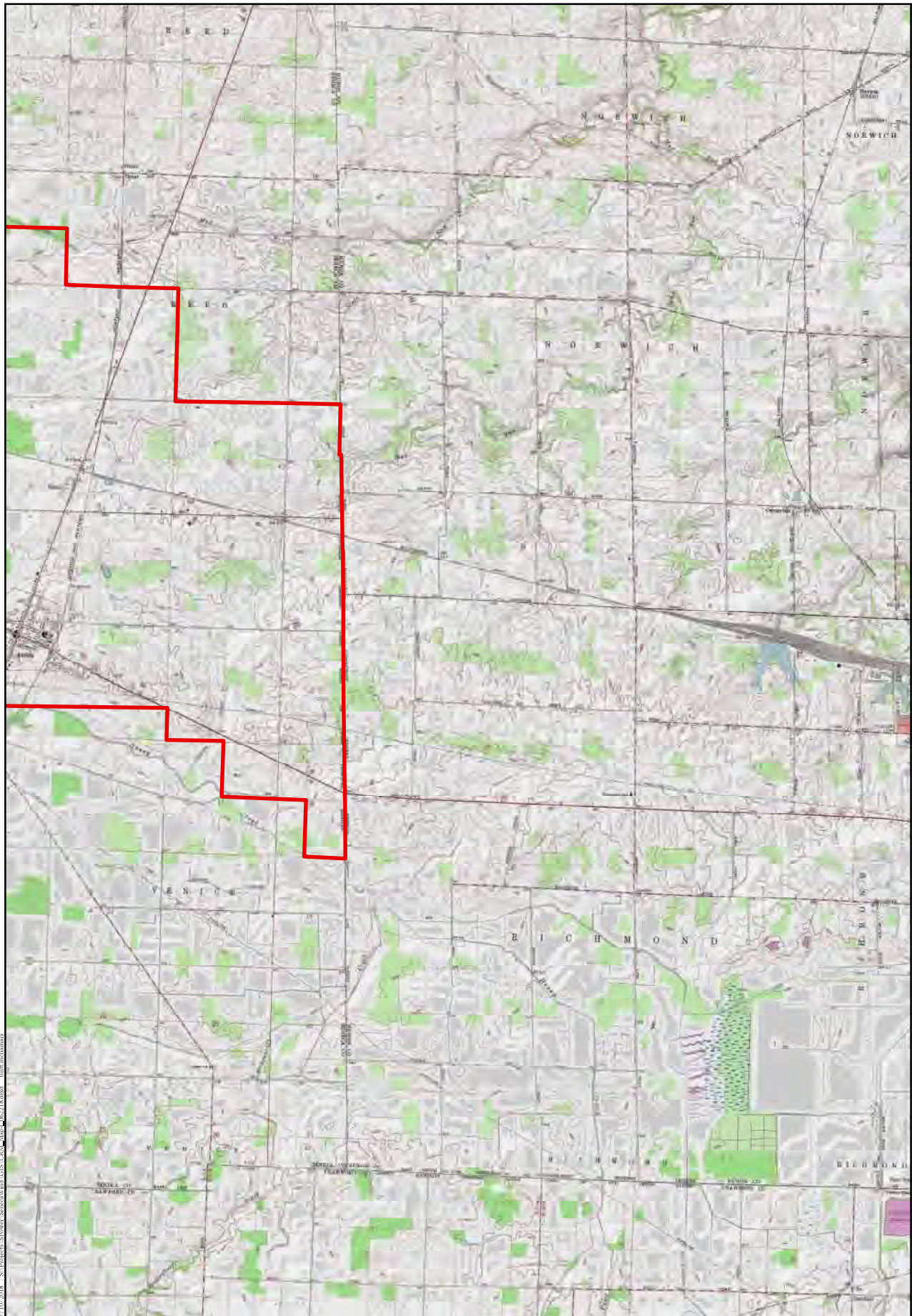
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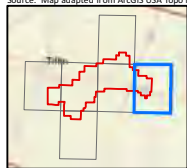


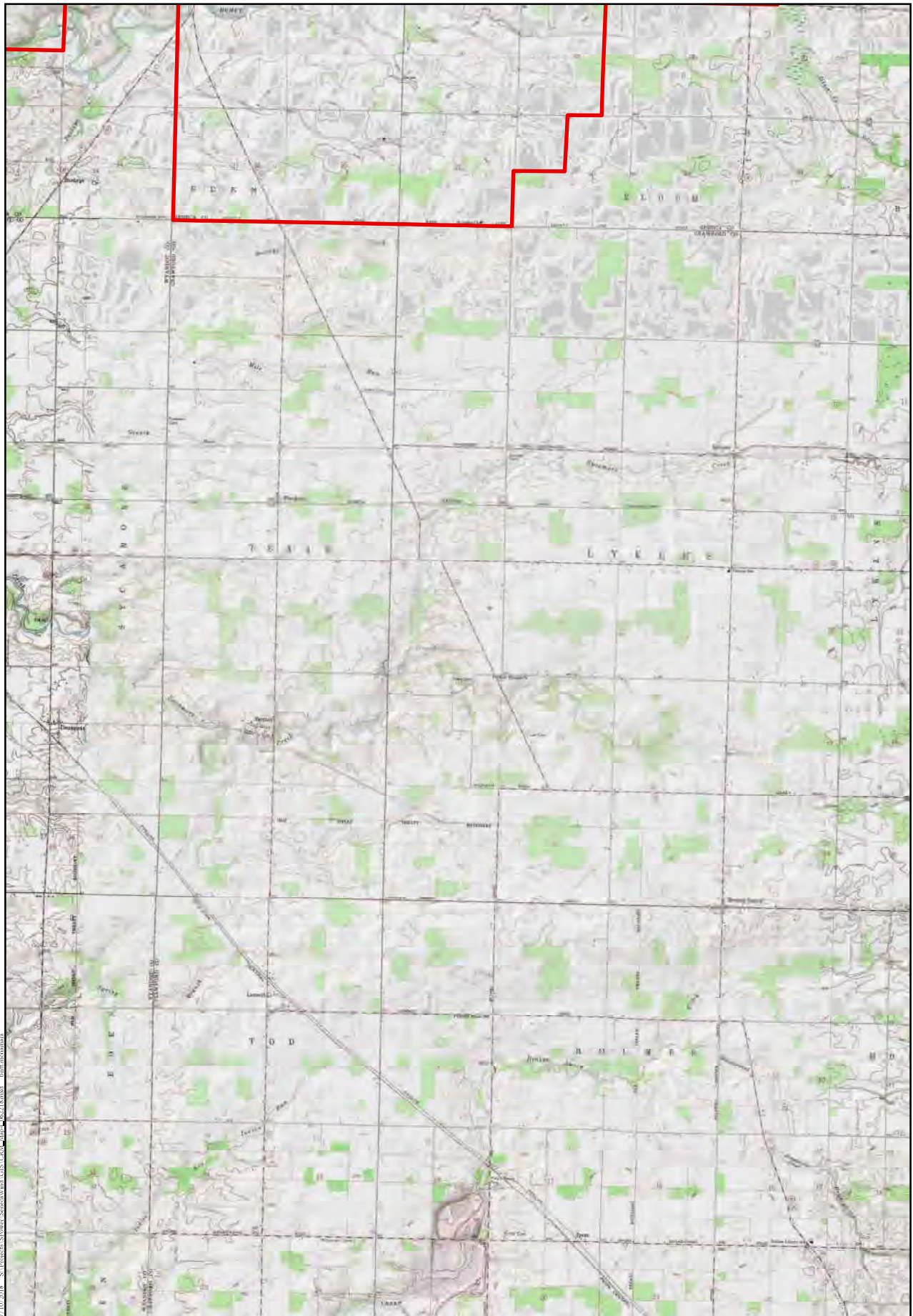
Source: Map adapted from ArcGIS USA Topo Map Server, 1960 USGS 7.5-minute Atica, Bloomville, Centerton, Fireside, Lyles, & Tiffin South, OH Quadrangles; Project data by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.



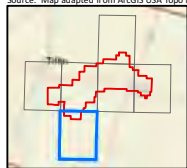


Source: Map adapted from ArcGIS USA Topo Map Server; 1960 USGS 7.5-minute Attica, Bloomville, Centerton, Fireside, Lykens, & Tiffin South, OH Quadrangles; Project data by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.





Source: Map adapted from ArcGIS USA Topo Map Server, 1960 USGS 7.5-minute Attica, Bloomville, Centerton, Fireside, Lykens, & Tiffin South, OH Quadrangles; Project data by Seneca Wind, LLC (6/25/2018). Scale 1:50,000.



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Teresa Orahood on behalf of Dylan F. Borchers