Pre-Construction Breeding Bird Surveys
Number Three Wind Energy Project
Lewis County, New York

Final Report
June – July 2016

Prepared for:

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1 INTRODUCTION

Number Three Wind Energy, LLC (Number Three) is developing the Number Three Wind Energy Project (Project) in Lewis County, New York (Figure 1). To assist in the development of the Project, Number Three contracted Western EcoSystems Technology, Inc. (WEST) to conduct pre-construction breeding bird surveys. This study was designed and conducted to meet objectives and recommendations of the New York State Department of Environmental Conservation (NYSDEC) 2016 G*uidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (NYSDEC 2016a) and the United States Fish and Wildlife Service (USFWS) *Land-Based Wind Energy Guidelines* (USFWS 2012). This final report contains results of pre-construction breeding bird use surveys conducted from June 4 – July 12, 2016.

Use of the Project area by breeding birds was assessed per the NYSDEC guidelines (NYSDEC 2016a) and in accordance with the approved study plan dated July 16, 2016. The objectives of these surveys were to investigate breeding bird use and the potential presence of sensitive or state-listed birds. Per the NYDEC guidelines, this report includes the metrics of interest in the Planning and Reporting Section (NYSDEC 2016, pages 21-22) and bird use data that will be used for a future before-after-control-impact (BACI) analysis after the Project is constructed (NYSDEC 2016a, page 12). The NYSDEC metrics of interest and where addressed in the report (parenthetic) include:

- The number, location and length of each potential turbine, electric line, and control transect (Section 3.1.1);
- The overall survey period, and date, time, and durations of surveys conducted at each point (Section 3.1.3 and Appendix A);
- A description of habitat surrounding each transect (Section 4.1);
- The number of species observed overall (Section 4.3.1 and Appendix C);
- The total number of individuals of each species observed overall (Appendix C1 and C2);
- The number of individuals of each species observed at each transect point (Appendix A);
- A summary of the number and behavior of birds seen (e.g. individual, moving in a small flock, feeding, resting, carrying nesting material, food, or fecal sac, etc.), and whether any active nests or recently fledged young were observed (Appendix A);
- Which birds were identified visually or via vocalizations (Appendix A);
- The point(s) and transect(s) with the highest and lowest: number of species, species diversity, frequency, and abundance (Section 4.3.1 and Appendix D);
- The habitat type(s) with the highest and lowest: number of species, species diversity, frequency, and abundance (Section 4.3.1 and Table 3);
- A description of weather conditions during and immediately prior to survey days (Appendix B);
- A list of all species with dates and point where they were observed (Appendix A);
- The number and identification of the observer(s) conducting each survey (Study Participant Section);

- A description of any disruptions and/or distractions that occurred during each sampling period that may have precluded an adequate survey (Appendix A);
- A detailed discussion of all methods, results, and recommendations (Sections 3, 4, and 5);
- One or more tables and graphs, as needed, depicting the above information, as well as all species with the dates and points where they were observed, the locations of proposed or existing turbines and other project components (Appendix A and throughout the report as needed);
- One or more maps, as needed, which displays all observations of all individuals of state and federally listed species, species of concern, species of greatest conservation need (SGCN), and any other species targeted at the site. Detailed information on the location, method of detection, behavior, flight paths, and all other relevant data should be clearly shown on the map(s), or otherwise made available in the report (Appendix A and I); and
- Shapefiles depicting the date, location and behavior of each individual of all state and federally listed species observed on site, and shapefiles of all transects and point locations (provided to A. Giampoli [Invenergy, LLC] via email on March 29, 2017).

2 STUDY AREA

The Project area encompasses approximately 7,473 hectares (ha; 18,466 acres [ac]) in Lewis County, New York (Figure 1). Based on the results of vegetation mapping completed within the Project area (WEST 2017), 94.1% of the Project area is dominated by three major cover types: hay/pasture (35.2%), deciduous forest (32.4%), and cultivated crops (26.5%; Table 1, Figure 2). Developed, low intensity; shrub/scrub; herbaceous; and open water make up the remaining 5.9%. Of the 82 ha (203 ac; 1.1%) not accessible or visible during mapping, the U.S. Geological Survey (USGS) National Land Cover Dataset (NLCD; USGS NLCD 2011, Homer et al. 2015) showed 79.0% is dominated by hay/pasture (34.6%), herbaceous (18.0%), cultivated crops (14.2%), and deciduous forest (12.2%). Woody wetlands, shrub/scrub, mixed forest, emergent wetlands, evergreen forest, and open water compose the remaining 21.1% (Table 1, Figure 2).

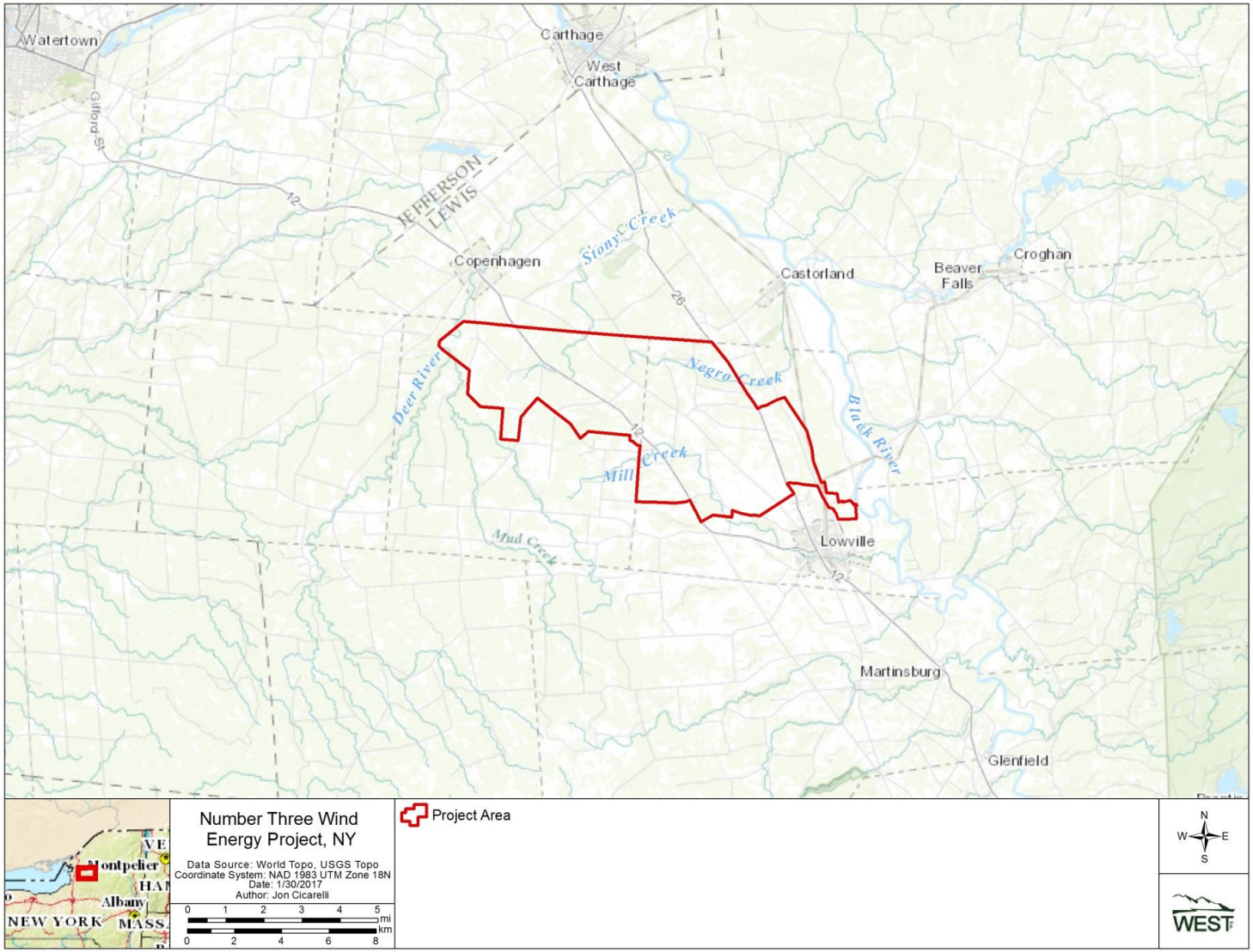


Figure 1. Location of the Number Three Wind Energy Project area in Lewis County, New York.

Table 1. Land cover types based on vegetation mapping within the Number Three Wind Energy Project area in Lewis County, New York, and National Land Cover Database types for areas not accessible or not visible from public roads.

Cover Type	Detailed Vegetation Mapping[1]			NLCD[2]		
	Hectares	Acres	Percent (%)	Hectares	Acres	Percent (%)
Hay/Pasture	2,598.7	6,421.4	35.2	28.4	70.2	34.6
Deciduous Forest	2,391.8	5,910.3	32.4	10.1	24.9	12.2
Cultivated Crops	1,959.6	4,842.3	26.5	11.7	28.8	14.2
Developed, Low Intensity	276.8	684.0	3.7	0.0	0.0	0.0
Shrub/Scrub	142.4	351.9	1.9	5.4	13.3	6.5
Herbaceous	14.3	35.4	0.2	14.8	36.6	18.0
Open Water	7.2	17.9	0.1	0.1	0.1	0.1
Woody Wetlands	0.0	0.0	0.0	6.9	17.0	8.4
Mixed Forest	0.0	0.0	0.0	2.6	6.5	3.2
Emergent Wetlands	0.0	0.0	0.0	1.9	4.8	2.4
Evergreen Forest	0.0	0.0	0.0	0.4	1.0	0.5
Totals[3, 4]	**7,390.9**	**18,263.2**	**100.0**	**82.2**	**203.1**	**100.0**

[1] Based on vegetation mapping completed by WEST during field reconnaissance
[2] Represents areas not accessible or visible during vegetation mapping and based on data from the National Land Cover Dataset (NLCD; USGS NLCD 2011, Homer et al. 2015)
[33] Sums of values may not add to total value shown, due to rounding
[4] Project area totals 7,473 ha (18,466 ac), combining vegetation mapping and NLCD data

3 METHODS

3.1 Field Methods

3.1.1 *Survey Transects and Plots*

Twenty-four 300-meter (m; 984-ft) long transects were systematically placed within major vegetation types in the Project area (Figure 2) taking the following criteria into consideration:

- Equally sample the major vegetation types present in the Project area (i.e., forested and hay/pasture avoiding cultivated fields to the extent practical);
- Survey turbine transects (i.e., proposed turbine locations) with land access; and
- Survey control transects (i.e., at least 500 m [1,640 ft] from proposed turbine locations) with land access.

Sixteen turbine transects and eight control transects were established in the Project area (Figure 2). All transects were comprised of six, 50-m (164-ft) radius point count survey plots placed in a straight line along the transect at the following distances: 25 m (82 ft), 75 m (246 ft), 125 m (410 ft), 175 m (574 ft), 225 m (738 ft), and 275 m (902 ft). Data were collected at each point count survey plot; however, the aggregate data from all six point count survey plots along a single transect were used to calculate transect level statistics. The dominant vegetation type was determined at 50-m (164-ft) intervals starting at one end of each transect based on an ocular estimate of dominant plant species present.

Of the 16 turbine transects, eight were located in hay/pasture vegetation and eight were located in forested vegetation. Of the eight control transects, four were located in hay/pasture vegetation and four were located in forested vegetation (Table 2).

Table 2. Dominant vegetation types at each point located at 50-meter (164-foot) intervals along each survey transect[1] within the Number Three Wind Energy Project area in Lewis County, New York, 2016.

	Number of Point Count Locations				Number of Point Count Locations		
Transect	Hay/pasture	Forested	Classification	Transect	Hay/pasture	Forested	Classification
T1	7	0	Hay/pasture	T16	1	6	Forested
T2	7	0	Hay/pasture	T19	3	4	Forested
T3	3	4	Forested	T23	0	7	Forested
T4	0	7	Forested	T24	3	4	Forested
T5	7	0	Hay/pasture	C12	6	1	Hay/pasture
T6	7	0	Hay/pasture	C13	7	0	Hay/pasture
T7	1	6	Forested	C14	0	7	Forested
T8	7	0	Hay/pasture	C17	0	7	Forested
T9	7	0	Hay/pasture	C18	7	0	Hay/pasture
T10	6	1	Hay/pasture	C20	0	7	Forested
T11	7	0	Hay/pasture	C21	7	0	Hay/pasture
T15	1	6	Forested	C22	0	7	Forested

[1]T = Turbine transect; C = Control transect

3.1.2 *Survey Methods*

A qualified biologist completed surveys between a half-hour before to four hours after sunrise on days without inclement weather (e.g., rain) or strong winds (greater than 16-24 km per hour [kph; 10-15 mi per hour [mph]). At each point-count survey plot, a 5-minute point count was conducted, during which detections of breeding birds that were seen or heard were recorded on standard data forms.

For each point count survey the following data were recorded: start and end time of the survey period; point number; temperature, wind speed, wind direction, and cloud cover; sources of disturbances, such as roads and farms; species; number of observations; how observed (visual or auditory); behavior (nesting, flying, perching, singing, etc.); and approximate distance to each bird from the point-count location. Binoculars were used to assist in locating and identifying birds.

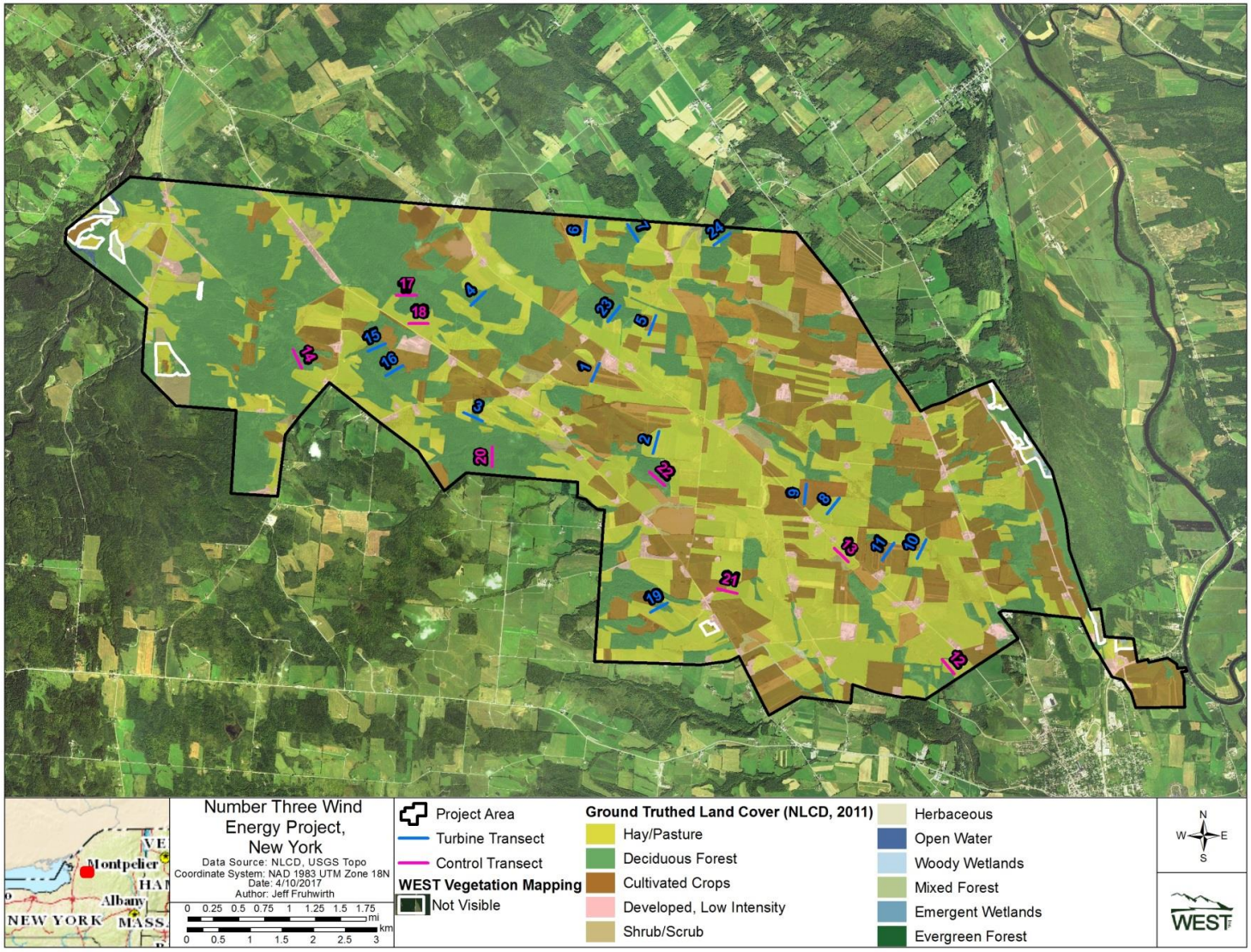


Figure 2. Land cover types present and breeding bird survey transect locations within the Number Three Wind Project area in Lewis County, New York.

3.1.3 *Survey Schedule*

Four survey events occurred between June 4 and July 12, 2016. For the purposes of this report, a survey event was defined as a complete survey of all 24 transects. All four survey events were completed within one-week periods and were separated by at least one week. Transect survey order was varied to avoid surveying any one transect at the same time of day during each survey event. All 24 transects were surveyed during each survey event, resulting in 96 transect surveys.

3.2 Data Analysis

3.2.1 *Bird Species Composition, Relative Abundance, and Diversity*

For data analysis, each transect was analyzed using an aggregate of all bird data collected at each of the six point count survey plots along that transect. A list of all bird observations and the number of observations by species and subtype observed along each transect was generated for each survey event, and for the overall study period, representing species composition and relative abundance per transect. Bird diversity was expressed as the total number of species[1] observed per transect. In some cases, the tally of observations may represent repeated sightings of the same individual.

3.2.2 *Bird Use, Percent of Use, and Frequency*

Estimates of bird use, calculated as the number of birds per transect per survey event (birds/transect/survey event) were calculated by determining the number of birds observed during each visit and then averaging by the number of transects surveyed during that survey event. A second averaging occurred across the number of survey events during the study period.

Percent of use was calculated as the proportion of total mean use that was attributable to a particular bird type or species. Frequency was calculated as the percent of surveys in which a particular bird type or species was observed.

3.2.3 *Spatial Use*

Differences in bird use between transect type (turbine or control transect) were assessed using two methods to investigate spatial use patterns across the Project area. First, comparisons were made at the transect level. Use for passerine subtypes and species at turbine and control transects was compared using a Mann-Whitney U-test for both forested and hay/pasture vegetation types. Second, comparisons were made between turbine and control transects at the point count survey plot level for passerine subtypes and species using a Mann-Whitney U-test. In effect, differences between turbine and control transects were evaluated, among and within point count survey plots, after controlling for vegetation types. Only passerine subgroups or species with sufficient sample sizes (i.e., at least 30 observations) were included in these analyses.

[1] Unidentified species were only included in the number of species if they were the only observed species of that guild (e.g., unidentified duck would only be included if it were the only duck observed).

3.3 Sensitive Species

The list of species observed during the survey was compared to the USFWS Information, Planning, and Conservation System Trust Resources Report (USFWS 2016) and the NSYDEC and New York Natural Heritage Program (NYNHP) resources (NYSDEC 2016b, NYNHP 2016, respectively) to determine whether any federally or state-listed endangered, threatened, species of special concern, and SGCN were observed during surveys. These resources also were used during preparation of the Site Characterization Survey report to determine possible occurrences of sensitive species within the Project area (Bay et al. 2016).

3.4 Incidental Observations

Incidental bird observations were recorded but not used in the quantitative analysis. Incidental observations included birds observed in transit between point count locations and flyovers of raptors, vultures, waterfowl, shorebirds, waterbirds, and corvids.

3.5 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 during report preparation. Following field surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. Potentially erroneous data were identified using a series of database queries. Irregular codes or data suspected as 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. A Microsoft® ACCESS database was developed to store, organize, and retrieve data. Data were keyed into the electronic database using pre-defined protocols to facilitate subsequent QA/QC and data analysis. All data forms and electronic data files were retained for reference. A senior level statistician reviewed the report methods and results for accuracy and study design and a WEST Invenergy liaison reviewed the document to ensure the document adheres to Invenergy reporting standards.

4 RESULTS

4.1 Breeding Bird Survey

Dates, species observed per transect per survey event, species per point count survey plot per survey event, behavior, method of detection, and disruptions or distractions recorded during all survey events are presented in Appendix A. A list of weather conditions recorded during and immediately prior to survey events is presented in Appendix B.

4.2 Statistical Analysis

4.2.1 *Bird Species Composition, Relative Abundance, and Diversity*

Overall, 2,219 bird observations within 1,868 separate groups were recorded (Appendix C1). The majority (94.5%) of birds observed were passerines. The most commonly observed passerine subtypes included warblers and blackbirds/orioles (Appendix C1). Six species accounted for

43.9% of observations: ovenbird (*Seiurus aurocapill*; 232 observations), Savannah sparrow (*Passerculus sandwichensis*; 180), red-eyed vireo (*Vireo olivaceus*; 173), song sparrow (*Melospiza melodia*; 154), European starling (*Sturnus vulgaris*; 119), and common grackle (*Quiscalus quiscula*; 116). All other species comprised less than 5% of the observations. Eighty species were observed at all transects during all survey events. Transect T4 and survey plot 4 of 6 along T10 had the highest species diversity (14.3 species/transect/survey event and 6.0 species/point/survey event, respectively) and transect C18 and point 1 of 6 along T1 had the lowest species diversity (2.0 species/transect/survey event and 0 species/point/survey event; Appendix D1 and D2). Overall, transects in forested areas had greater species diversity than transects in hay/pasture (41.8 and 35.3 species/transect/survey event, respectively; Table 3).

Table 3. Species observed, species diversity (average number of species observed across all survey events), total observations (sum of all observed birds), and frequency (percent of survey events with observations) recorded by transect vegetation type during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Transect Type	# of Species Observed	Species Diversity	Total Observations	Frequency (%)
Forested	61	41.8	1,259	100
Hay/pasture	58	35.3	960	100

4.2.2 *Bird Use, Percent of Use, and Species Frequency*

Mean use was 23.1 birds/transect/survey event (Table 4). Passerines were observed on 100% of the transect surveys (Table 4, Appendix E). Of the passerine subtypes, warblers accounted for 20.5% of bird use and blackbirds/orioles accounted for 19.4%. Warblers were observed during 59.4% of all surveys, while blackbirds/orioles were observed during 56.2% of surveys (Table 4). The most frequently observed passerine subtype was grassland birds/sparrows. Of the other bird types, only woodpeckers were frequently observed (32.3%).

Approximately 43.9% of the overall mean use was composed of the same six species that were observed most frequently. Ovenbird (2.4 birds/transect/survey event) had the highest mean use, followed by Savannah sparrow (1.9), red-eyed vireo (1.8), song sparrow (1.6), European starling, and common grackle (1.2 each; Appendix E).

Based on the threshold of 30 or more observations recorded, 12 passerine subtypes and 20 species were further analyzed (Table 5). Due to inherent differences in the habitat types used by species within the blackbird/oriole, grassland bird/sparrow, and warbler subtypes, comparisons at the passerine subtype level are not presented.

There were no major differences in subtype and species use values between turbine and control transects for both the forested and hay/pasture vegetation types (Table 5). These results were expected given that no turbines are currently present and therefore bird use at the control transects is likely representative of the turbine transects. The purpose of the current study is to provide pre-construction baseline data for the BACI study, which will use data collected at the same turbine and control transects post-construction to assess potential effects of the turbines on bird use.

Table 4. Mean bird use (number of birds/transect/survey), percent of use, and frequency of occurrence for each bird type and passerine subtype observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Mean Use	% of Use	% Frequency
Waterfowl	<0.1	<0.1	2.1
Shorebirds	<0.1	0.4	7.3
Gulls/Terns	0.2	0.9	7.3
Diurnal Raptors	0.1	0.5	8.3
Owls	<0.1	<0.1	1.0
Vultures	<0.1	<0.1	1.0
Doves/Pigeons	0.1	0.5	8.3
Passerines	21.8	94.5	100.0
Blackbirds/Orioles	*4.5*	*19.4*	*56.2*
Creepers/Nuthatches	*0.4*	*1.9*	*25.0*
Finches/Crossbills	*0.7*	*3.1*	*43.8*
Flycatchers	*1.3*	*5.6*	*50.0*
Gnatcatchers/Kinglets	*<0.1*	*0.3*	*5.2*
Grassland Birds/Sparrows	*3.8*	*16.5*	*79.2*
Mimids	*0.3*	*1.2*	*13.5*
Swallows	*0.4*	*1.6*	*10.4*
Tanagers	*0.5*	*2.3*	*27.1*
Grosbeaks	*0.2*	*0.7*	*12.5*
Thrushes	*1.5*	*6.6*	*53.1*
Titmice/Chickadees	*0.5*	*2.2*	*17.7*
Vireos	*1.9*	*8.4*	*45.8*
Warblers	*4.7*	*20.5*	*59.4*
Waxwings	*0.2*	*0.8*	*9.4*
Wrens	*0.4*	*1.8*	*24.0*
Corvids	*0.4*	*1.8*	*17.7*
Cuckoos	<0.1	<0.1	2.1
Swifts/Hummingbirds	<0.1	<0.1	1.0
Woodpeckers	0.7	2.8	32.3
Kingfishers	<0.1	<0.1	1.0
Overall[1]	**23.1**	**100.0**	

[1]Sums of values may not add to total value shown, due to rounding

4.2.3 *Spatial Use*

At turbine transects, overall bird use was highest at transect T23 (41.2 birds/transect/survey event; forested classification) where use was mainly composed of passerines (39.8; Appendix F1). Passerine use values at other turbine transects ranged from 5.0 (transect T9, hay/pasture classification) to 32.0 (transect T4, forested classification) birds/transect/survey event (Appendix F1).

At control transects, overall bird use was highest at transect C12 (56.5 birds/transect/survey event, hay/pasture classification) where use also was mainly composed of passerines (55.8; Appendix F2). Passerine use values at other control transects ranged from 9.5 (transect C18, hay/pasture classification) to 31.5 (transect C20, forested classification) birds/transect/survey event (Appendix F2).

For both control and turbine transects, use varied across the Project area, with no consistent differences in use between transects dominated by either hay/pasture or forested vegetation types (Table 5 and Appendix F1 and F2).

Table 5. Comparison of overall mean use at turbine and control transects for passerine subtypes and selected species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016 (statistically significant differences [p-values less than or equal to 0.05] per Mann-Whitney U-test are bolded).

Bird Species/Type	Scientific Name	Forested Vegetation				Hay/Pasture Vegetation			
		Mean Use Turbine Transects	Mean Use Control Transects	Difference of Means[1]	P-value[2]	Mean Use Turbine Transects	Mean Use Control Transects	Difference of Means[1]	P-value[2]
Blackbirds/Orioles									
bobolink	*Dolichonyx oryzivorus*	<0.1	0.0	*	0.48	0.1	0.2	*	0.21
common grackle	*Quiscalus quiscula*	<0.1	<0.1	*	0.62	**<0.1**	**0.5**	**-0.4**	**0.00**
European starling	*Sturnus vulgaris*	0.0	0.0	*	NA	<0.1	0.5	-0.4	0.84
red-winged blackbird	*Agelaius phoeniceus*	<0.1	<0.1	*	0.62	0.1	0.3	-0.1	0.16
Creepers/Nuthatches		*<0.1*	*<0.1*	*	*0.10*	*<0.1*	*0*	*	*0.48*
Finches/Crossbills		***<0.1***	***<0.1***	*****	***0.00***	*<0.1*	*<0.1*	*	*0.20*
American goldfinch	*Spinus tristis*	**<0.1**	**<0.1**	*****	**0.00**	<0.1	<0.1	*	0.20
Flycatchers		***0.3***	***<0.1***	***0.2***	***0.00***	*<0.1*	*<0.1*	*	*0.37*
eastern wood-pewee	*Contopus virens*	**0.2**	**<0.1**	**0.1**	**0.00**	<0.1	0.0	*	0.32
Grassland Birds/Sparrows									
Savannah sparrow	*Passerculus sandwichensis*	0.0	0.0	*	NA	**0.4**	**0.2**	**0.1**	**0.03**
song sparrow	*Melospiza melodia*	<0.1	0.1	*	0.12	0.2	0.2	*	0.23
Swallows		*0.0*	*0.0*	*	*NA*	*<0.1*	*<0.1*	*	*0.89*
barn swallow	*Hirundo rustica*	0.0	0.0	*	NA	<0.1	<0.1	*	0.57
Tanagers		*<0.1*	*<0.1*	*	*0.51*	*<0.1*	*0.0*	*	*0.11*
scarlet tanager	*Piranga olivacea*	<0.1	<0.1	*	0.06	0.0	0.0	*	NA
Thrushes		*0.2*	*0.3*	*-0.1*	*0.19*	*<0.1*	*<0.1*	*	*0.70*
American robin	*Turdus migratorius*	<0.1	<0.1	*	0.99	<0.1	<0.1	*	0.26
veery	*Catharus fuscescens*	**<0.1**	**0.2**	**-0.1**	**0.00**	<0.1	0.0	*	0.48
wood thrush	*Hylocichla mustelina*	<0.1	<0.1	*	1.00	<0.1	0.0	*	0.22
Titmice/Chickadees		*<0.1*	*<0.1*	*	*0.63*	*<0.1*	*<0.1*	*	*1.00*
black-capped chickadee	*Poecile atricapilla*	<0.1	<0.1	*	0.63	<0.1	<0.1	*	1.00
Vireos		*0.3*	*0.3*	*	*0.69*	*<0.1*	*<0.1*	*	*0.65*
red-eyed vireo	*Vireo olivaceus*	0.3	0.3	*	0.48	<0.1	<0.1	*	0.39
Warblers									
black-throated green warbler	*Setophaga virens*	**<0.1**	**<0.1**	*****	**0.00**	0.0	0.0	*	NA
common yellowthroat	*Geothlypis trichas*	<0.1	0.2	*	0.06	<0.1	<0.1	*	0.38
northern waterthrush	*Parkesia noveboracensis*	<0.1	<0.1	*	0.09	0.0	0.0	*	NA
ovenbird	*Seiurus aurocapilla*	0.4	0.4	*	0.74	<0.1	0.0	*	0.06
Wrens		*<0.1*	*<0.1*	*	*0.88*	*<0.1*	*<0.1*	*	*0.11*
house wren	*Troglodytes aedon*	<0.1	<0.1	*	0.66	**<0.1**	**<0.1**	*****	**0.01**

[1] *=The absolute difference is less than 0.1; [2]NA = no p-value was generated because no test occurred. [3]Sums of values may not add to total value shown, due to rounding

Use by passerine subtypes and species was analyzed at the point count survey plot location scale and is presented in Appendices G and H. These data will be further analyzed and may be important for determining effects of turbines on use by passerine subtypes and species using the BACI design once the Project is constructed.

4.3 Sensitive Species

No federally listed birds were observed. Three state-listed threatened species and three state species of special concern were recorded during point count survey plot surveys, including the state-threatened northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*), and upland sandpiper (*Bartramia longicauda*); and state species of special concern the horned lark (*Eremophila alpestris*), grasshopper sparrow (*Ammodramus savannarum*), and Cooper's hawk (*Accipiter cooperii*; Figure 3; Appendix C1). Details of the sensitive species observations are presented in Appendix I.

4.4 Incidental Observations

Incidental observations of 62 bird species were recorded during the breeding bird surveys, totaling 596 observations within 522 separate groups. Northern harrier (state-listed as threatened) and horned lark (state species of special concern) were recorded as incidental observations (Appendix C2). The hooded warbler (*Setophaga citrina*), Nashville warbler (*Oreothlypis ruficapilla*), northern cardinal (*Cardinalis cardinalis*), and ruffed grouse (*Bonasa umbellus*) were only observed incidentally.

5 DISCUSSION

The objectives of this study were to investigate pre-construction breeding bird use and the potential presence of sensitive or state-listed birds, and to provide baseline data that can be used in a BACI study when coupled with data collected post-construction using the same methods.

No federally listed birds were observed. The six state-list species were all observed in relatively low numbers compared to other passerine species observed.

Based on these baseline study results, no consistent differences in bird use between turbine and control transects were detected. While some significant differences were identified for certain bird subtypes and species between control and turbine transects, these results are likely a reflection of natural variation in use across the Project area because no turbines were present in the Project area during the breeding bird surveys. To the extent possible, all aspects of study design, including transect locations, should be replicated during future post-construction studies to allow for a meaningful assessment of the effects of turbines on avian use.

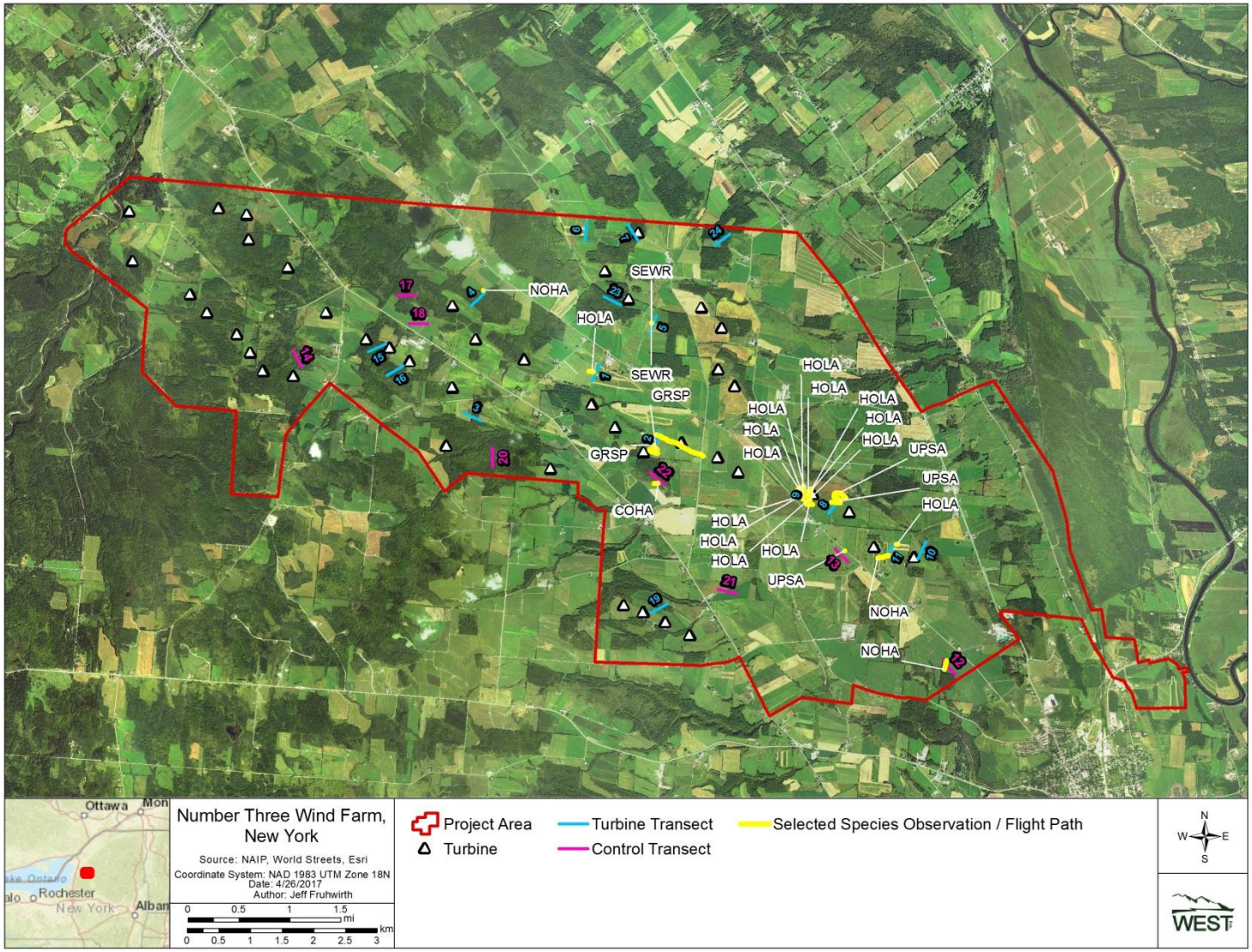


Figure 3. Locations of sensitive species observed during the breeding bird surveys at the Number Three Wind Project in Lewis County, New York.

6 REFERENCES

Bay, K., M. Trana, and G, Johnson. 2016. Site Characterization Study Number Three Wind Energy Project, Lewis County, New York. Final Report. Prepared for Number Three Wind Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. 40 pages + appendices.

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. http://www.mrlc.gov/nlcd2011.php

New York Natural Heritage Program (NYNHP). 2016. Online Conservation Guide: Endangered, Threatened and Species of Special Concern in Lewis County. Accessed July and September, 2016. Information: http://www.acris.nynhp.org/search.php

New York State Department of Environmental Conservation (NYSDEC). 2016a. Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects. Prepared by NYSDEC Division of Fish and Wildlife. June 2016. http://www.dec.ny.gov/docs/wildlife_pdf/winguide16.pdf

New York State Department of Environmental Conservation (NYSDEC). 2016b. List of Endangered, Threatened and Special Concern Fish and Wildlife Species of New York State. NYSDEC, Albany, New York. Accessed February 2016. http://www.dec.ny.gov/animals/ 7494.html#Authority

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

U.S. Department of Agriculture (USDA). 2016. Imagery Programs - National Agriculture Imagery Program (NAIP). USDA - Farm Service Agency (FSA). Aerial Photography Field Office (APFO), Salt Lake City, Utah. http://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/index

U.S. Environmental Protection Agency (USEPA). 2016. Level III and Level IV Ecoregions of the Continental United States. https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states

U.S. Fish and Wildlife Service (USFWS). 2016. Information, Planning and Conservation System. IPaC, Environmental Conservation Online System (ECOS), USFWS. http://ecos.fws.gov/ipac/

U.S. Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online at: http://www.fws.gov/cno/pdf/Energy/2012_Wind_Energy_Guidelines_final.pdf

U.S. Geological Survey (USGS). 2016. The National Map/US Topo. http://nationalmap.gov/ustopo/index.html

U.S. Geological Survey (USGS) National Land Cover Database (USGS NLCD). 2011. National Land Cover Database 2011. Multi-Resolution Land Characteristics Consortium, National Land Cover Database. USGS Earth Resources Observation and Science Center, Sioux Falls, South Dakota. http://www.mrlc.gov/nlcd2011.php; Legend: http://www.mrlc.gov/nlcd11_leg.php

Appendix A: List of All Bird Observations Recorded During Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Appendix B: Weather Conditions Recorded During and Immediately Prior to the Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Appendix B. Weather conditions recorded during and immediately prior to the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Round	Date	Temperature (°F)		Prevailing Wind Direction	Wind Speed (MPH)		Precipitation
		Hi	Low T		Max	Min	
Day before Round 1	6/3/2016	77	59	WSW	21	7	none
Round 1	6/4/2016	62	48	NNW	4	0	none
	6/5/2016	62	60	S	7	4	light rain
	6/6/2016	52	58	WSW	12	2	light rain
	6/7/2016	54	62	WSW	0	3	light rain
	6/8/2016	52	57	WNW	4	0	light rain
	6/9/2016	47	54	WNW	9	2	none
	6/10/2016	56	56	W	7	15	none
Day before Round 2	6/13/2016	61	50	WNW	22	8	none
Round 2	6/14/2016	45	56	W	0	7	none
	6/15/2016	43	60	WSW	0	7	none
	6/16/2016	55	64	E	0	0	none
	6/17/2016	52	63	SSE	0	0	none
	6/18/2016	51	63	S	0	0	none
	6/19/2016	55	63	SSW	0	6	none
Day before Round 3	6/22/2016	70	55	SW	22	7	light rain
Round 3	6/23/2016	47	61	SSW	0	2	none
	6/24/2016	48	63	ESE	0	4	none
	6/25/2016	50	62	S	0	0	none
	6/26/2016	54	67	S	2	7	none
	6/27/2016	64	69	SSW	4	10	light rain
	6/28/2016	62	66	SW	0	3	none
Day before Round 4	7/6/2016	84	66	WSW	17	7	none
Round 4	7/7/2016	66	77	S	0	3	none
	7/8/2016	65	70	ESE	0	3	none
	7/9/2016	67	74	SW	0	5	none
	7/10/2016	61	62	NNW	3	6	light rain
	7/11/2016	55	62	S	0	0	none
	7/12/2016	55	65	S	1	4	none

Day before rounds = summary of conditions for entire day; day of surveys = actual conditions while surveying.

Appendix C: Birds Observed During Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016

Appendix C1. Total number of groups and observations for each bird type, passerine subtype, and species seen or heard within 50 meters (164 feet) of the observer recorded at point count survey plots during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species[1]	Scientific Name	Visit 1		Visit 2		Visit 3		Visit 4		Overall	
		#grps[2]	#obs[2]	#grps	#obs	#grps	#obs	#grps	#obs	#grps	#obs
Waterfowl		**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**
Canada goose	*Branta canadensis*	1	1	0	0	0	0	0	0	1	1
mallard	*Anas platyrhynchos*	1	1	0	0	0	0	0	0	1	1
Shorebirds		**4**	**4**	**2**	**2**	**2**	**2**	**0**	**0**	**8**	**8**
killdeer	*Charadrius vociferus*	1	1	2	2	2	2	0	0	5	5
upland sandpiper	*Bartramia longicauda*	3	3	0	0	0	0	0	0	3	3
Gulls/Terns		**1**	**1**	**7**	**12**	**1**	**1**	**4**	**6**	**13**	**20**
ring-billed gull	*Larus delawarensis*	1	1	7	12	1	1	4	6	13	20
Diurnal Raptors		**3**	**3**	**5**	**5**	**0**	**0**	**3**	**3**	**11**	**11**
American kestrel	*Falco sparverius*	1	1	0	0	0	0	0	0	1	1
broad-winged hawk	*Buteo platypterus*	0	0	2	2	0	0	0	0	2	2
Cooper's hawk	*Accipiter cooperii*	0	0	1	1	0	0	0	0	1	1
northern harrier	*Circus cyaneus*	2	2	1	1	0	0	0	0	3	3
red-tailed hawk	*Buteo jamaicensis*	0	0	1	1	0	0	3	3	4	4
Owls		**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
barred owl	*Strix varia*	0	0	0	0	0	0	1	1	1	1
Vultures		**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**1**	**2**
turkey vulture	*Cathartes aura*	0	0	0	0	0	0	1	2	1	2
Doves/Pigeons		**1**	**1**	**2**	**4**	**3**	**4**	**2**	**2**	**8**	**11**
mourning dove	*Zenaida macroura*	0	0	1	2	2	2	2	2	5	6
rock pigeon	*Columba livia*	1	1	1	2	1	2	0	0	3	5
Passerines		**366**	**377**	**498**	**551**	**492**	**618**	**410**	**551**	**1,766**	**2,097**
Blackbirds/Orioles		*38*	*42*	*61*	*97*	*51*	*136*	*33*	*156*	*183*	*431*
Baltimore oriole	*Icterus galbula*	1	1	1	1	0	0	1	1	3	3
bobolink	*Dolichonyx oryzivorus*	10	11	20	23	22	31	7	11	59	76
brown-headed cowbird	*Molothrus ater*	4	4	4	4	3	9	1	1	12	18
common grackle	*Quiscalus quiscula*	3	4	7	19	6	40	6	53	22	116
eastern meadowlark	*Sturnella magna*	1	1	2	2	0	0	0	0	3	3
European starling	*Sturnus vulgaris*	1	1	4	23	2	36	3	59	10	119
red-winged blackbird	*Agelaius phoeniceus*	18	20	23	25	18	20	15	31	74	96
Creepers/Nuthatches		*7*	*7*	*8*	*8*	*15*	*16*	*11*	*11*	*41*	*42*
brown creeper	*Certhia americana*	3	3	1	1	3	3	2	2	9	9
red-breasted nuthatch	*Sitta canadensis*	1	1	2	2	3	3	0	0	6	6
white-breasted nuthatch	*Sitta carolinensis*	3	3	5	5	9	10	9	9	26	27

Appendix C1 (*continued*). Total number of groups and observations for each bird type, passerine subtype, and species seen or heard within 50 meters (164 feet) of the observer recorded at point count survey plots during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species[1]	Scientific Name	Visit 1		Visit 2		Visit 3		Visit 4		Overall	
		#grps[2]	#obs[2]	#grps	#obs	#grps	#obs	#grps	#obs	#grps	#obs
Finches/Crossbills		*10*	*12*	*16*	*18*	*15*	*20*	*15*	*18*	*56*	*68*
American goldfinch	*Spinus tristis*	10	12	16	18	15	20	15	18	56	68
Flycatchers		*32*	*32*	*37*	*37*	*31*	*31*	*25*	*25*	*125*	*125*
alder flycatcher	*Empidonax alnorum*	1	1	1	1	0	0	0	0	2	2
eastern kingbird	*Tyrannus tyrannus*	0	0	1	1	0	0	2	2	3	3
eastern wood-pewee	*Contopus virens*	16	16	26	26	22	22	20	20	84	84
great crested flycatcher	*Myiarchus crinitus*	9	9	7	7	8	8	3	3	27	27
least flycatcher	*Empidonax minimus*	3	3	1	1	0	0	0	0	4	4
unidentified flycatcher		0	0	0	0	1	1	0	0	1	1
willow flycatcher	*Empidonax traillii*	3	3	1	1	0	0	0	0	4	4
Gnatcatchers/Kinglet		*1*	*1*	*2*	*2*	*3*	*3*	*0*	*0*	*6*	*6*
blue-gray gnatcatcher	*Polioptila caerulea*	1	1	2	2	3	3	0	0	6	6
Grassland Birds/Sparrows		*63*	*65*	*86*	*88*	*104*	*111*	*96*	*102*	*349*	*366*
eastern towhee	*Pipilo erythrophthalmus*	1	1	0	0	0	0	1	1	2	2
field sparrow	*Spizella pusilla*	0	0	1	1	1	1	0	0	2	2
grasshopper sparrow	*Ammodramus savannarum*	2	2	0	0	0	0	0	0	2	2
horned lark	*Eremophila alpestris*	2	2	4	4	3	4	2	3	11	13
Savannah sparrow	*Passerculus sandwichensis*	20	22	42	44	56	60	50	54	168	180
song sparrow	*Melospiza melodia*	34	34	36	36	41	43	40	41	151	154
swamp sparrow	*Melospiza georgiana*	2	2	2	2	2	2	2	2	8	8
unidentified sparrow		0	0	1	1	0	0	1	1	2	2
white-throated sparrow	*Zonotrichia albicollis*	2	2	0	0	1	1	0	0	3	3
Mimids		*4*	*4*	*7*	*7*	*8*	*8*	*7*	*7*	*26*	*26*
gray catbird	*Dumetella carolinensis*	4	4	7	7	8	8	7	7	26	26
Swallows		*2*	*4*	*12*	*21*	*4*	*6*	*5*	*5*	*23*	*36*
barn swallow	*Hirundo rustica*	2	4	12	21	3	5	1	1	18	31
tree swallow	*Tachycineta bicolor*	0	0	0	0	1	1	4	4	5	5
Tanagers		*14*	*14*	*12*	*12*	*14*	*14*	*10*	*10*	*50*	*50*
indigo bunting	*Passerina cyanea*	3	3	4	4	6	6	4	4	17	17
scarlet tanager	*Piranga olivacea*	11	11	8	8	8	8	6	6	33	33
Grosbeaks		*4*	*4*	*6*	*6*	*6*	*6*	*0*	*0*	*16*	*16*
rose-breasted grosbeak	*Pheucticus ludovicianus*	4	4	6	6	6	6	0	0	16	16

Appendix C1 (*continued*). Total number of groups and observations for each bird type, passerine subtype, and species seen or heard within 50 meters (164 feet) of the observer recorded at point count survey plots during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species[1]	Scientific Name	Visit 1		Visit 2		Visit 3		Visit 4		Overall	
		#grps[2]	#obs[2]	#grps	#obs	#grps	#obs	#grps	#obs	#grps	#obs
Thrushes		*21*	*21*	*38*	*39*	*44*	*45*	*42*	*42*	*145*	*147*
American robin	*Turdus migratorius*	4	4	12	12	15	16	20	20	51	52
hermit thrush	*Catharus guttatus*	1	1	0	0	2	2	1	1	4	4
veery	*Catharus fuscescens*	10	10	16	17	19	19	13	13	58	59
wood thrush	*Hylocichla mustelina*	6	6	10	10	8	8	8	8	32	32
Titmice/Chickadees		*3*	*3*	*5*	*5*	*5*	*25*	*12*	*15*	*25*	*48*
black-capped chickadee	*Poecile atricapilla*	3	3	5	5	5	25	12	15	25	48
Vireos		*43*	*43*	*56*	*56*	*44*	*45*	*42*	*42*	*185*	*186*
blue-headed vireo	*Vireo solitarius*	1	1	3	3	2	2	2	2	8	8
red-eyed vireo	*Vireo olivaceus*	40	40	51	51	41	42	40	40	172	173
warbling vireo	*Vireo gilvus*	2	2	2	2	1	1	0	0	5	5
Warblers		*112*	*112*	*130*	*131*	*130*	*130*	*81*	*81*	*453*	*454*
American redstart	*Setophaga ruticilla*	6	6	5	5	6	6	1	1	18	18
black-and-white warbler	*Mniotilta varia*	1	1	4	4	1	1	1	1	7	7
black-throated green warbler	*Setophaga virens*	10	10	8	8	10	10	7	7	35	35
Blackburnian warbler	*Setophaga fusca*	1	1	1	1	0	0	0	0	2	2
chestnut-sided warbler	*Setophaga pensylvanica*	5	5	11	11	6	6	4	4	26	26
common yellowthroat	*Geothlypis trichas*	20	20	23	23	24	24	17	17	84	84
northern waterthrush	*Parkesia noveboracensis*	8	8	12	12	14	14	0	0	34	34
ovenbird	*Seiurus aurocapilla*	56	56	62	63	64	64	49	49	231	232
yellow-rumped warbler	*Setophaga coronata*	1	1	0	0	0	0	0	0	1	1
yellow warbler	*Setophaga petechia*	4	4	4	4	5	5	2	2	15	15
Waxwings		*0*	*0*	*0*	*0*	*3*	*5*	*8*	*12*	*11*	*17*
cedar waxwing	*Bombycilla cedrorum*	0	0	0	0	3	5	8	12	11	17
Wrens		*7*	*7*	*12*	*12*	*6*	*6*	*15*	*15*	*40*	*40*
house wren	*Troglodytes aedon*	7	7	12	12	6	6	11	11	36	36
sedge wren	*Cistothorus platensis*	0	0	0	0	0	0	3	3	3	3
winter wren	*Troglodytes hiemalis*	0	0	0	0	0	0	1	1	1	1
Corvids		*5*	*6*	*10*	*12*	*9*	*11*	*8*	*10*	*32*	*39*
American crow	*Corvus brachyrhynchos*	1	1	6	7	4	6	3	5	14	19
blue jay	*Cyanocitta cristata*	4	5	4	5	5	5	2	2	15	17
common raven	*Corvus corax*	0	0	0	0	0	0	3	3	3	3

Appendix C1 (*continued*). Total number of groups and observations for each bird type, passerine subtype, and species seen or heard within 50 meters (164 feet) of the observer recorded at point count survey plots during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species[1]	Scientific Name	Visit 1		Visit 2		Visit 3		Visit 4		Overall	
		#grps[2]	#obs[2]	#grps	#obs	#grps	#obs	#grps	#obs	#grps	#obs
Cuckoos		**0**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**2**	**2**
black-billed cuckoo	*Coccyzus erythropthalmus*	0	0	1	1	1	1	0	0	2	2
Swifts/Hummingbirds		**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
ruby-throated hummingbird	*Archilochus colubris*	0	0	0	0	0	0	1	1	1	1
Woodpeckers		**7**	**8**	**25**	**31**	**15**	**17**	**7**	**7**	**54**	**63**
downy woodpecker	*Picoides pubescens*	2	3	8	8	3	4	2	2	15	17
hairy woodpecker	*Picoides villosus*	0	0	6	12	2	2	1	1	9	15
northern flicker	*Colaptes auratus*	0	0	3	3	2	2	1	1	6	6
pileated woodpecker	*Dryocopus pileatus*	1	1	0	0	0	0	0	0	1	1
red-bellied woodpecker	*Melanerpes carolinus*	1	1	1	1	0	0	0	0	2	2
unidentified woodpecker		0	0	1	1	0	0	0	0	1	1
yellow-bellied sapsucker	*Sphyrapicus varius*	3	3	6	6	8	9	3	3	20	21
Kingfishers		**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**
belted kingfisher	*Megaceryle alcyon*	0	0	1	1	0	0	0	0	1	1
Overall		**384**	**396**	**541**	**607**	**514**	**643**	**429**	**573**	**1,868**	**2,219**

[1] Passerine species and their respective subtypes with 30 or more observations were included in the displacement analysis
[2] #grps = number of groups, #obs = number of observations

Appendix C2. Total number of incidental groups and observations for each bird type, passerine subtype, and species recorded while in-transit between breeding bird point count survey plots at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Scientific Name	# grps[1]	# obs[1]
Gulls/Terns		**6**	**20**
ring-billed gull	*Larus delawarensis*	6	20
Diurnal Raptors		**7**	**7**
broad-winged hawk	*Buteo platypterus*	1	1
northern harrier	*Circus cyaneus*	2	2
red-tailed hawk	*Buteo jamaicensis*	4	4
Owls		**2**	**2**
barred owl	*Strix varia*	2	2
Upland Game Birds		**4**	**4**
ruffed grouse	*Bonasa umbellus*	4	4
Doves/Pigeons		**2**	**2**
mourning dove	*Zenaida macroura*	2	2
Passerines		**486**	**545**
Blackbirds/Orioles		*66*	*101*
Baltimore oriole	*Icterus galbula*	2	2
bobolink	*Dolichonyx oryzivorus*	26	46
brown-headed cowbird	*Molothrus ater*	1	1
common grackle	*Quiscalus quiscula*	2	2
European starling	*Sturnus vulgaris*	1	5
red-winged blackbird	*Agelaius phoeniceus*	34	45
Creepers/Nuthatches		*4*	*4*
brown creeper	*Certhia americana*	1	1
white-breasted nuthatch	*Sitta carolinensis*	3	3
Finches/Crossbills		*17*	*21*
American goldfinch	*Spinus tristis*	17	21
Flycatchers		*23*	*24*
alder flycatcher	*Empidonax alnorum*	2	2
eastern kingbird	*Tyrannus tyrannus*	2	3
eastern wood-pewee	*Contopus virens*	13	13
great crested flycatcher	*Myiarchus crinitus*	5	5
willow flycatcher	*Empidonax traillii*	1	1
Gnatcatchers/Kinglet		*2*	*2*
blue-gray gnatcatcher	*Polioptila caerulea*	2	2
Grassland/Sparrows		*96*	*101*
eastern towhee	*Pipilo erythrophthalmus*	1	1
field sparrow	*Spizella pusilla*	3	3
horned lark	*Eremophila alpestris*	2	2
Savannah sparrow	*Passerculus sandwichensis*	62	64
song sparrow	*Melospiza melodia*	28	31
Mimids		*7*	*7*
gray catbird	*Dumetella carolinensis*	7	7
Swallows		*7*	*13*
barn swallow	*Hirundo rustica*	2	3
tree swallow	*Tachycineta bicolor*	5	10
Tanagers		*14*	*14*
indigo bunting	*Passerina cyanea*	1	1
scarlet tanager	*Piranga olivacea*	13	13
Grosbeaks		*6*	*6*
rose-breasted grosbeak	*Pheucticus ludovicianus*	6	6

Appendix C2 (*continued*). Total number of incidental groups and observations for each bird type, passerine subtype, and species recorded while in-transit between breeding bird point count survey plots at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Scientific Name	# grps[1]	# obs[1]
Cardinals		*2*	*2*
northern cardinal	*Cardinalis cardinalis*	2	2
Thrushes		*39*	*39*
American robin	*Turdus migratorius*	14	14
veery	*Catharus fuscescens*	14	14
wood thrush	*Hylocichla mustelina*	11	11
Titmice/Chickadees		*9*	*12*
black-capped chickadee	*Poecile atricapilla*	9	12
Vireos		*43*	*43*
blue-headed vireo	*Vireo solitarius*	1	1
red-eyed vireo	*Vireo olivaceus*	41	41
warbling vireo	*Vireo gilvus*	1	1
Warblers		120	122
American redstart	*Setophaga ruticilla*	8	8
black-and-white warbler	*Mniotilta varia*	4	4
black-throated green warbler	*Setophaga virens*	2	2
Blackburnian warbler	*Setophaga fusca*	2	2
chestnut-sided warbler	*Setophaga pensylvanica*	7	7
common yellowthroat	*Geothlypis trichas*	25	25
hooded warbler	*Setophaga citrina*	1	1
Nashville warbler	*Oreothlypis ruficapilla*	1	1
northern waterthrush	*Parkesia noveboracensis*	7	8
ovenbird	*Seiurus aurocapilla*	56	57
yellow warbler	*Setophaga petechia*	7	7
Waxwings		*2*	*2*
cedar waxwing	*Bombycilla cedrorum*	2	2
Wrens		*17*	*17*
house wren	*Troglodytes aedon*	17	17
Corvids		*12*	*15*
American crow	*Corvus brachyrhynchos*	4	6
blue jay	*Cyanocitta cristata*	5	6
common raven	*Corvus corax*	3	3
Woodpeckers		**15**	**16**
downy woodpecker	*Picoides pubescens*	2	2
hairy woodpecker	*Picoides villosus*	3	4
northern flicker	*Colaptes auratus*	1	1
red-bellied woodpecker	*Melanerpes carolinus*	1	1
yellow-bellied sapsucker	*Sphyrapicus varius*	8	8
Overall		**522**	**596**

[1] #grps = number of groups, #obs = number of observations

Appendix D: Summary of Species Observed, Species Diversity (Average Number of Species Observed Across All Sampling Events), Total Observations (Sum of All Observed Birds), and Frequency (Percent of Sampling Events with Observations) Recorded by Transect and Point Count Survey Plots during the Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016

Appendix D1. Summary of species observed, species diversity (average number of species observed across all sampling events), total observations (sum of all observed birds), and frequency (percent of sampling events with observations) recorded by transect during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Transect #	# of Species Observed	Species Diversity	Total Observations	% Frequency
T1	14	6.75	60	100
T2	9	3.75	47	100
T3	17	10	81	100
T4	26	14.25	130	100
T5	8	4.25	80	100
T6	6	4	37	100
T7	29	13.75	120	100
T8	8	2.75	46	100
T9	5	2.5	31	100
T10	21	11.75	116	100
T11	13	6.75	62	100
C12	15	7.5	226	100
C13	16	8.5	90	100
C14	19	10.25	84	100
T15	19	9.25	95	100
T16	26	12.5	116	100
C17	24	12.25	105	100
C18	4	2	38	100
T19	23	11.5	87	100
C20	27	12	136	100
C21	14	6.25	55	100
C22	21	13.25	109	100
T23	22	12.75	165	100
T24	22	10.5	103	100

[1]T = Turbine transect; C = Control transect

Appendix D2. Number of species observed, species diversity (average number of species observed across all sampling events), total observations (sum of all observed birds), and frequency (percent of sampling events with observations) recorded by transect and point count survey plot during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Transect #	Point #	# of Species Observed	Species Diversity	Total Observations	% Frequency
T1	1	3	1.33	6	75
T1	2	0	0	0	0
T1	3	3	1	11	100
T1	4	4	2	8	50
T1	5	3	1.75	8	100
T1	6	9	3.75	27	100
T2	1	3	1.33	6	75
T2	2	4	1.75	10	100
T2	3	3	1.5	10	100
T2	4	5	2.25	10	100
T2	5	1	1	7	75
T2	6	1	1	4	75
T3	1	1	1	1	25
T3	2	3	1.33	5	75
T3	3	8	4	16	100
T3	4	7	3.5	16	100
T3	5	8	4.5	23	100
T3	6	9	4.5	20	100
T4	1	11	3.75	17	100
T4	2	10	5	23	100
T4	3	10	5.5	24	100
T4	4	10	4.5	18	100
T4	5	10	4.5	22	100
T4	6	16	6	26	100
T5	1	3	1.75	13	100
T5	2	5	2.25	9	100
T5	3	5	2.25	17	100
T5	4	3	1.5	8	100
T5	5	5	2.25	18	100
T5	6	3	2.33	15	75
T6	1	1	1	1	25
T6	2	4	2	10	100
T6	3	3	1.75	7	100
T6	4	4	1.5	9	100
T6	5	4	1.67	6	75
T6	6	3	1	4	75
T7	1	15	4.25	20	100
T7	2	11	4.75	19	100
T7	3	14	5.5	24	100
T7	4	11	4.75	24	100
T7	5	11	4	19	100
T7	6	11	3.5	14	100
T8	1	5	1.75	9	100
T8	2	2	1	2	50
T8	3	3	1.25	9	100
T8	4	1	1	4	75
T8	5	3	1.25	11	100
T8	6	3	1.5	11	100

Appendix D2 *(continued).* Number of species observed, species diversity (average number of species observed across all sampling events), total observations (sum of all observed birds), and frequency (percent of sampling events with observations) recorded by transect and point count survey plot during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Transect #	Point #	# of Species Observed	Species Diversity	Total Observations	% Frequency
T9	1	3	1	5	75
T9	2	3	3	6	25
T9	3	3	1.33	7	75
T9	4	2	1.5	4	50
T9	5	2	1	5	50
T9	6	2	1	4	75
T10	1	2	1	2	50
T10	2	4	2	12	100
T10	3	7	3.25	20	100
T10	4	11	6	28	100
T10	5	12	4.25	31	100
T10	6	7	4.5	23	100
T11	1	5	1.5	9	100
T11	2	5	1.75	20	100
T11	3	5	2	8	100
T11	4	5	1.5	7	100
T11	5	4	1.25	7	100
T11	6	10	2.75	11	100
C12	1	4	0.07	5	75
C12	2	2	2	20	25
C12	3	2	1.67	24	75
C12	4	6	2.5	86	100
C12	5	8	3.33	45	75
C12	6	9	3.75	46	100
C13	1	4	1.75	16	100
C13	2	9	3.75	18	100
C13	3	9	3.75	21	100
C13	4	8	2.75	14	100
C13	5	6	2	13	100
C13	6	4	1.67	8	75
C14	1	14	4.5	19	100
C14	2	7	2.75	12	100
C14	3	7	2.75	11	100
C14	4	5	2.67	11	75
C14	5	7	3.25	17	100
C14	6	8	2.75	14	100
T15	1	6	2.5	13	100
T15	2	8	4	13	75
T15	3	8	3.5	16	100
T15	4	9	5	18	75
T15	5	7	3.25	14	100
T15	6	11	4.5	21	100
T16	1	7	2.5	10	100
T16	2	6	2.5	14	100
T16	3	10	4	16	100
T16	4	14	4.5	19	100
T16	5	12	4.25	23	100
T16	6	16	6.5	34	100
C17	1	12	4.5	20	100
C17	2	10	3.25	15	100

Appendix D2 *(continued).* Number of species observed, species diversity (average number of species observed across all sampling events), total observations (sum of all observed birds), and frequency (percent of sampling events with observations) recorded by transect and point count survey plot during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Transect #	Point #	# of Species Observed	Species Diversity	Total Observations	% Frequency
C17	3	7	3.25	19	100
C17	4	12	4.75	25	100
C17	5	10	3.75	16	100
C17	6	5	2	10	100
C18	1	3	1.5	6	50
C18	2	2	1	4	75
C18	3	2	1.5	5	50
C18	4	3	1.5	5	50
C18	5	2	1.33	7	75
C18	6	3	1.25	11	100
T19	1	1	1	4	75
T19	2	6	2.25	9	100
T19	3	6	2.5	10	100
T19	4	12	4.5	23	100
T19	5	10	3.75	20	100
T19	6	12	4.75	21	100
C20	1	13	4.5	18	100
C20	2	10	4.25	18	100
C20	3	12	4.75	34	100
C20	4	12	4.75	23	100
C20	5	7	3.5	21	100
C20	6	11	4.25	22	100
C21	1	4	1.75	8	100
C21	2	6	2.25	13	100
C21	3	10	3.5	18	100
C21	4	1	1	3	75
C21	5	3	1.67	6	75
C21	6	4	2.5	7	50
C22	1	9	3	13	100
C22	2	9	3.5	16	100
C22	3	10	4.25	18	100
C22	4	12	5.25	21	100
C22	5	10	3.75	17	100
C22	6	12	5.5	24	100
T23	1	10	4.5	23	100
T23	2	11	5.25	27	100
T23	3	12	5.25	44	100
T23	4	12	5.5	27	100
T23	5	12	4.5	21	100
T23	6	13	5.25	23	100
T24	1	3	1	4	100
T24	2	9	3	13	100
T24	3	13	4.75	24	100
T24	4	9	5	26	100
T24	5	6	3.5	20	100
T24	6	8	3.25	16	100

[1]T = Turbine transect; C = Control transect

Appendix E: Mean Use, Percent of Use, and Percent Frequency by Bird Type, Passerine Subtype and Species Observed during the Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016

Appendix E. Mean bird use (number of birds/transect/survey event), percent of use, and percent frequency for all bird types, passerine subtypes, and species observed during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Scientific Name	Mean Use[1]	% of Use	% Frequency
Waterfowl		**<0.1**	**<0.1**	**2.1**
Canada goose	*Branta canadensis*	<0.1	<0.1	1.0
mallard	*Anas platyrhynchos*	<0.1	<0.1	1.0
Shorebirds		**<0.1**	**0.4**	**7.3**
killdeer	*Charadrius vociferus*	<0.1	0.2	5.2
upland sandpiper	*Bartramia longicauda*	<0.1	0.1	2.1
Gulls/Terns		**0.2**	**0.9**	**7.3**
ring-billed gull	*Larus delawarensis*	0.2	0.9	7.3
Diurnal Raptors		**0.1**	**0.5**	**8.3**
American kestrel	*Falco sparverius*	<0.1	<0.1	1.0
broad-winged hawk	*Buteo platypterus*	<0.1	<0.1	1.0
Cooper's hawk	*Accipiter cooperii*	<0.1	<0.1	1.0
northern harrier	*Circus cyaneus*	<0.1	0.1	3.1
red-tailed hawk	*Buteo jamaicensis*	<0.1	0.2	2.1
Owls		**<0.1**	**<0.1**	**1.0**
barred owl	*Strix varia*	<0.1	<0.1	1.0
Vultures		**<0.1**	**<0.1**	**1.0**
turkey vulture	*Cathartes aura*	<0.1	<0.1	1.0
Doves/Pigeons		**0.1**	**0.5**	**8.3**
mourning dove	*Zenaida macroura*	<0.1	0.3	5.2
rock pigeon	*Columba livia*	<0.1	0.2	3.1
Passerines		**21.8**	**94.5**	**100.0**
Blackbirds/Orioles		*4.5*	*19.4*	*56.2*
Baltimore oriole	*Icterus galbula*	<0.1	0.1	3.1
bobolink	*Dolichonyx oryzivorus*	0.8	3.4	16.7
brown-headed cowbird	*Molothrus ater*	0.2	0.8	12.5
common grackle	*Quiscalus quiscula*	1.2	5.2	14.6
eastern meadowlark	*Sturnella magna*	<0.1	0.1	3.1
European starling	*Sturnus vulgaris*	1.2	5.4	8.3
red-winged blackbird	*Agelaius phoeniceus*	1.0	4.3	35.4
Creepers/Nuthatches		*0.4*	*1.9*	*25.0*
brown creeper	*Certhia americana*	<0.1	0.4	8.3
red-breasted nuthatch	*Sitta canadensis*	<0.1	0.3	5.2
white-breasted nuthatch	*Sitta carolinensis*	0.3	1.2	15.6
Finches/Crossbills		*0.7*	*3.1*	*43.8*
American goldfinch	*Spinus tristis*	0.7	3.1	43.8
Flycatchers		*1.3*	*5.6*	*50.0*
alder flycatcher	*Empidonax alnorum*	<0.1	<0.1	2.1
eastern kingbird	*Tyrannus tyrannus*	<0.1	0.1	3.1
eastern wood-pewee	*Contopus virens*	0.9	3.8	37.5
great crested flycatcher	*Myiarchus crinitus*	0.3	1.2	16.7
least flycatcher	*Empidonax minimus*	<0.1	0.2	3.1
unidentified flycatcher	*NA*	<0.1	<0.1	1.0
willow flycatcher	*Empidonax traillii*	<0.1	0.2	3.1
Gnatcatchers/Kinglet		*<0.1*	*0.3*	*5.2*
blue-gray gnatcatcher	*Polioptila caerulea*	<0.1	0.3	5.2
Grassland Birds/Sparrows		*3.8*	*16.5*	*79.2*
eastern towhee	*Pipilo erythrophthalmus*	<0.1	<0.1	2.1
field sparrow	*Spizella pusilla*	<0.1	<0.1	2.1
grasshopper sparrow	*Ammodramus savannarum*	<0.1	<0.1	1.0
horned lark	*Eremophila alpestris*	0.1	0.6	6.3

Appendix E *(continued).* Mean bird use (number of birds/transect/survey event), percent of use, and percent frequency for all bird types, passerine subtypes, and species observed during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Scientific Name	Mean Use[1]	% of Use	% Frequency
Savannah sparrow	*Passerculus sandwichensis*	1.9	8.1	46.9
song sparrow	*Melospiza melodia*	1.6	6.9	49.0
swamp sparrow	*Melospiza georgiana*	<0.1	0.4	5.2
unidentified sparrow	*NA*	<0.1	<0.1	2.1
white-throated sparrow	*Zonotrichia albicollis*	<0.1	0.1	3.1
Mimids		*0.3*	*1.2*	*13.5*
gray catbird	*Dumetella carolinensis*	0.3	1.2	13.5
Swallows		*0.4*	*1.6*	*10.4*
barn swallow	*Hirundo rustica*	0.3	1.4	8.3
tree swallow	*Tachycineta bicolor*	<0.1	0.2	3.1
Tanagers		*0.5*	*2.3*	*27.1*
indigo bunting	*Passerina cyanea*	0.2	0.8	11.5
scarlet tanager	*Piranga olivacea*	0.3	1.5	15.6
Grosbeaks		*0.2*	*0.7*	*12.5*
rose-breasted grosbeak	*Pheucticus ludovicianus*	0.2	0.7	12.5
Thrushes		*1.5*	*6.6*	*53.1*
American robin	*Turdus migratorius*	0.5	2.3	36.5
hermit thrush	*Catharus guttatus*	<0.1	0.2	3.1
veery	*Catharus fuscescens*	0.6	2.7	22.9
wood thrush	*Hylocichla mustelina*	0.3	1.4	19.8
Titmice/Chickadees		0.5	2.2	17.7
black-capped chickadee	*Poecile atricapilla*	0.5	2.2	17.7
Vireos		*1.9*	*8.4*	*45.8*
blue-headed vireo	*Vireo solitarius*	<0.1	0.4	7.3
red-eyed vireo	*Vireo olivaceus*	1.8	7.8	42.7
warbling vireo	*Vireo gilvus*	<0.1	0.2	5.2
Warblers		*4.7*	*20.5*	*59.4*
American redstart	*Setophaga ruticilla*	0.2	0.8	9.4
black-and-white warbler	*Mniotilta varia*	<0.1	0.3	7.3
black-throated green warbler	*Setophaga virens*	0.4	1.6	15.6
Blackburnian warbler	*Setophaga fusca*	<0.1	<0.1	2.1
chestnut-sided warbler	*Setophaga pensylvanica*	0.3	1.2	11.5
common yellowthroat	*Geothlypis trichas*	0.9	3.8	38.5
northern waterthrush	*Parkesia noveboracensis*	0.4	1.5	12.5
1bird	*Seiurus aurocapilla*	2.4	10.5	44.8
yellow-rumped warbler	*Setophaga coronata*	<0.1	<0.1	1.0
yellow warbler	*Setophaga petechia*	0.2	0.7	11.5
Waxwings		*0.2*	*0.8*	*9.4*
cedar waxwing	*Bombycilla cedrorum*	0.2	0.8	9.4
Wrens		*0.4*	*1.8*	*24.0*
house wren	*Troglodytes aedon*	0.4	1.6	21.9
sedge wren	*Cistothorus platensis*	<0.1	0.1	1.0
winter wren	*Troglodytes hiemalis*	<0.1	<0.1	1.0
Corvids		*0.4*	*1.8*	*17.7*
American crow	*Corvus brachyrhynchos*	0.2	0.9	11.5
blue jay	*Cyanocitta cristata*	0.2	0.8	10.4
common raven	*Corvus corax*	<0.1	0.1	1.0
Cuckoos		**<0.1**	**<0.1**	**2.1**
black-billed cuckoo	*Coccyzus erythropthalmus*	<0.1	<0.1	2.1

Appendix E *(continued).* Mean bird use (number of birds/transect/survey event), percent of use, and percent frequency for all bird types, passerine subtypes, and species observed during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type / Species	Scientific Name	Mean Use[1]	% of Use	% Frequency
Swifts/Hummingbirds		**<0.1**	**<0.1**	**1.0**
ruby-throated hummingbird	*Archilochus colubris*	<0.1	<0.1	1.0
Woodpeckers		**0.7**	**2.8**	**32.3**
downy woodpecker	*Picoides pubescens*	0.2	0.8	12.5
hairy woodpecker	*Picoides villosus*	0.2	0.7	5.2
northern flicker	*Colaptes auratus*	<0.1	0.3	6.2
pileated woodpecker	*Dryocopus pileatus*	<0.1	<0.1	1.0
red-bellied woodpecker	*Melanerpes carolinus*	<0.1	<0.1	2.1
unidentified woodpecker		<0.1	<0.1	1.0
yellow-bellied sapsucker	*Sphyrapicus varius*	0.2	0.9	16.7
Kingfishers		**<0.1**	**<0.1**	**1.0**
belted kingfisher	*Megaceryle alcyon*	<0.1	<0.1	1.0
Overall[2]		**23.1**	**100.0**	

[1]Data are restricted to those species seen within 50 meters (164 feet) of the observer
[2]Sums of values may not add to total value shown, due to rounding

Appendix F: Mean Use by Bird Type and Passerine Subtypes Observed during Breeding Bird Surveys at Turbine Transects and Control Transects at the Number Three Wind Energy Project from June 4 – July 12, 2016

Appendix F1. Mean use for major bird types and passerine subtypes observed at each turbine transect during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type	Survey Transect[1]							
	T1	T2	T3	T4	T5	T6	T7	T8
Vegetation[2]	**HP**	**HP**	**FO**	**FO**	**HP**	**HP**	**FO**	**HP**
Waterfowl	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Shorebirds	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Gulls/Terns	1.2	0.2	0.0	0.0	0.5	0.0	0.0	0.0
Diurnal Raptors	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0
Owls	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vultures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Doves/Pigeons	1.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0
Passerines	12.2	11.2	18.2	32.0	19.2	8.8	28.8	11.0
Blackbirds/Orioles	*4.0*	*1.2*	*0.0*	*0.2*	*12.0*	*2.5*	*1.2*	*1.8*
Creepers/Nuthatches	*0.0*	*0.0*	*0.0*	*1.5*	*0.0*	*0.0*	*0.5*	*0.0*
Finches/Crossbills	*1.8*	*0.8*	*0.5*	*0.5*	*0.2*	*0.5*	*0.8*	*0.5*
Flycatchers	*0.0*	*0.0*	*1.0*	*3.8*	*0.0*	*0.0*	*3.5*	*0.0*
Gnatcatchers/Kinglet	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*
Grassland Birds/Sparrows	*5.5*	*9.0*	*4.8*	*0.8*	*6.0*	*5.8*	*1.0*	*7.0*
Mimids	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*1.0*	*0.0*
Swallows	*0.8*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.8*
Tanagers	*0.0*	*0.0*	*2.0*	*0.5*	*0.0*	*0.0*	*1.8*	*0.0*
Grosbeaks	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.8*	*0.0*
Thrushes	*0.0*	*0.0*	*1.5*	*5.2*	*0.2*	*0.0*	*3.0*	*0.0*
Titmice/Chickadees	*0.0*	*0.0*	*1.5*	*0.2*	*0.0*	*0.0*	*0.8*	*0.0*
Vireos	*0.0*	*0.0*	*0.0*	*2.2*	*0.0*	*0.0*	*4.8*	*0.0*
Warblers	*0.2*	*0.0*	*5.8*	*14.0*	*0.0*	*0.0*	*7.8*	*0.0*
Waxwings	*0.0*	*0.0*	*0.0*	*0.8*	*0.0*	*0.0*	*0.0*	*0.0*
Wrens	*0.0*	*0.0*	*0.5*	*1.8*	*0.8*	*0.0*	*1.5*	*0.0*
Corvids	*0.0*	*0.0*	*0.8*	*0.0*	*0.0*	*0.0*	*0.5*	*0.0*
Cuckoos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Swifts/Hummingbirds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Woodpeckers	0.0	0.0	2.0	0.2	0.0	0.0	0.8	0.0
Kingfishers	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Birds[3]	**15.0**	**11.8**	**20.2**	**32.5**	**20.0**	**9.2**	**30.0**	**11.5**

[1]Data are restricted to those species seen within 50 meters (164 feet) of the observer
[2]Vegetation Codes - FO=Forested, HP=Hay/Pasture
[3]Sums of values may not add to total value shown, due to rounding

Appendix F1 (*continued)*. Mean use for major bird types and passerine subtypes observed at each turbine transect during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Bird Type	Survey Transect[1]							
	T9	T10	T11	T15	T16	T19	T23	T24
Vegetation[2]	**HP**	**HP**	**HP**	**FO**	**FO**	**FO**	**FO**	**FO**
Waterfowl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shorebirds	0.0	0.2	0.8	0.0	0.0	0.0	0.0	0.0
Gulls/Terns	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diurnal Raptors	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Owls	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Vultures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Doves/Pigeons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passerines	5.0	28.5	14.5	22.5	28.0	18.8	39.8	24.0
Blackbirds/Orioles	*0.0*	*6.0*	*7.0*	*0.2*	*1.8*	*1.8*	*0.2*	*0.2*
Creepers/Nuthatches	*0.0*	*0.0*	*0.0*	*0.0*	*1.5*	*1.5*	*2.0*	*1.5*
Finches/Crossbills	*0.5*	*1.5*	*0.8*	*0.2*	*0.0*	*0.5*	*0.2*	*0.8*
Flycatchers	*0.0*	*1.0*	*0.0*	*1.2*	*4.2*	*1.2*	*4.0*	*6.0*
Gnatcatchers/Kinglet	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.2*
Grassland Birds/Sparrows	*3.2*	*8.5*	*4.2*	*0.0*	*1.2*	*4.8*	*0.0*	*0.2*
Mimids	*0.0*	*2.2*	*0.0*	*0.0*	*0.0*	*0.8*	*0.0*	*0.0*
Swallows	*1.2*	*0.0*	*1.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Tanagers	*0.0*	*0.5*	*0.0*	*0.0*	*0.5*	*1.5*	*1.5*	*0.0*
Grosbeaks	*0.0*	*0.0*	*0.0*	*0.0*	*0.5*	*0.5*	*1.5*	*0.2*
Thrushes	*0.0*	*0.0*	*0.8*	*3.5*	*1.8*	*1.8*	*2.5*	*1.0*
Titmice/Chickadees	*0.0*	*0.0*	*0.0*	*0.2*	*1.2*	*0.2*	*5.2*	*0.5*
Vireos	*0.0*	*0.5*	*0.0*	*6.0*	*4.0*	*0.2*	*6.0*	*7.0*
Warblers	*0.0*	*6.8*	*0.0*	*10.0*	*9.8*	*4.0*	*15.0*	*5.0*
Waxwings	*0.0*	*1.5*	*0.0*	*0.5*	*0.0*	*0.0*	*0.2*	*0.2*
Wrens	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*1.2*	*0.5*
Corvids	*0.0*	*0.0*	*0.0*	*0.2*	*1.5*	*0.0*	*0.0*	*0.5*
Cuckoos	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Swifts/Hummingbirds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Woodpeckers	0.0	0.2	0.2	0.8	0.8	2.8	1.5	1.8
Kingfishers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Birds[3]	**7.8**	**29.0**	**15.5**	**23.8**	**29.0**	**21.8**	**41.2**	**25.8**

[1]Data are restricted to those species seen within 50 meters (164 feet) of the observer
[2]Vegetation Codes - FO=Forested, HP=Hay/pasture
[3]Sums of values may not add to total value shown, due to rounding

Appendix F2. Mean use for major bird types and passerine subtypes observed at each control transect during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

	Survey Transect[1]							
Bird Type	**R12**	**R13**	**R14**	**R17**	**R18**	**R20**	**R21**	**R22**
Vegetation[2]	**HP**	**HP**	**FO**	**FO**	**HP**	**FO**	**HP**	**FO**
Waterfowl	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Shorebirds	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Gulls/Terns	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diurnal Raptors	0.2	0.0	0.0	0.0	0.0	0.0	1.2	0.2
Owls	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vultures	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Doves/Pigeons	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Passerines	55.8	21.8	21.0	25.0	9.5	31.5	11.2	26.0
Blackbirds/Orioles	*47.5*	*12.5*	*0.5*	*0.0*	*3.8*	*2.2*	*0.8*	*0.2*
Creepers/Nuthatches	*0.0*	*0.0*	*0.0*	*0.8*	*0.0*	*0.8*	*0.0*	*0.5*
Finches/Crossbills	*0.8*	*0.8*	*0.5*	*2.2*	*0.2*	*1.0*	*0.8*	*0.8*
Flycatchers	*0.0*	*0.0*	*0.8*	*1.5*	*0.0*	*1.8*	*0.5*	*0.8*
Gnatcatchers/Kinglet	*0.0*	*0.0*	*0.0*	*0.5*	*0.0*	*0.2*	*0.0*	*0.0*
Grassland Birds/Sparrows	*5.0*	*2.8*	*1.0*	*1.8*	*5.5*	*0.2*	*7.8*	*5.5*
Mimids	*0.0*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*2.0*
Swallows	*0.0*	*3.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Tanagers	*0.0*	*0.0*	*1.8*	*0.2*	*0.0*	*2.2*	*0.0*	*0.0*
Grosbeaks	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*	*0.2*	*0.0*	*0.0*
Thrushes	*0.2*	*0.5*	*1.2*	*5.5*	*0.0*	*5.5*	*0.5*	*2.0*
Titmice/Chickadees	*0.2*	*0.0*	*0.2*	*0.2*	*0.0*	*0.2*	*0.0*	*1.0*
Vireos	*0.2*	*0.8*	*3.5*	*2.0*	*0.0*	*6.2*	*0.0*	*3.0*
Warblers	*0.0*	*0.8*	*8.2*	*6.8*	*0.0*	*10.2*	*0.5*	*8.8*
Waxwings	*0.0*	*0.0*	*0.0*	*0.5*	*0.0*	*0.0*	*0.5*	*0.0*
Wrens	*1.2*	*0.5*	*0.0*	*1.8*	*0.0*	*0.2*	*0.0*	*0.0*
Corvids	*0.5*	*0.0*	*3.0*	*1.0*	*0.0*	*0.2*	*0.0*	*1.5*
Cuckoos	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Swifts/Hummingbirds	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Woodpeckers	0.0	0.0	0.0	1.2	0.0	1.8	0.8	1.0
Kingfishers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Birds[3]	**56.5**	**22.5**	**21.0**	**26.2**	**9.5**	**34.0**	**13.8**	**27.2**

[1]Data are restricted to those species seen within 50 meters (164 feet) of the observer
[2]Vegetation Codes - FO=Forested, HP=Hay/pasture
[3]Sums of values may not add to total value shown, due to rounding

Appendix G: The Difference between Mean Use Recorded at Turbine and Control Transects Separated by Forested and Hay/Pasture Land Cover for Passerine Subtypes and Passerine Species Observed during Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016

Appendix G1. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine subtypes observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Passerine Subtype[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
Creepers/Nuthatches	Forested	1	<0.1	0.1	*	0.08
		2	<0.1	0.0	*	0.15
		3	<0.1	0.0	*	0.08
		4	0.1	<0.1	0.1	0.10
		5	<0.1	<0.1	*	0.78
		6	<0.1	<0.1	*	0.52
	Hay/pasture	1	<0.1	0.0	*	0.49
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
Finches/Crossbills	Forested	**1**	**<0.1**	**0.2**	**-0.1**	**0.02**
		2	**0.0**	**<0.1**	*****	**0.05**
		3	<0.1	<0.1	*	0.22
		4	**0.0**	**<0.1**	*****	**0.01**
		5	<0.1	<0.1	*	0.99
		6	<0.1	<0.1	*	0.47
	Hay/pasture	1	0.1	<0.1	0.1	0.19
		2	<0.1	0.0	*	0.08
		3	<0.1	<0.1	*	0.63
		4	<0.1	<0.1	*	0.73
		5	<0.1	<0.1	*	0.54
		6	<0.1	0.1	*	0.38
Flycatchers	Forested	1	0.1	<0.1	*	0.82
		2	0.2	0.2	*	0.70
		3	0.2	<0.1	0.1	0.14
		4	**0.3**	**<0.1**	**0.2**	**0.01**
		5	0.3	0.1	0.2	0.23
		6	**0.4**	**<0.1**	**0.3**	**0.02**
	Hay/pasture	1	0.0	0.0	*	NA
		2	<0.1	<0.1	*	0.73
		3	<0.1	<0.1	*	0.63
		4	0.0	0.0	*	NA
		5	<0.1	0.0	*	0.32
		6	<0.1	0.0	*	0.32
Swallows	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
	Hay/pasture	1	<0.1	0.2	-0.1	0.21
		2	<0.1	<0.1	*	0.64
		3	<0.1	<0.1	*	0.75
		4	<0.1	<0.1	*	0.54
		5	<0.1	<0.1	*	1.00
		6	<0.1	0.0	*	0.32

Appendix G1 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine subtypes observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Passerine Subtype[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
Tanagers	Forested	**1**	**0.0**	**0.1**	**-0.1**	**0.00**
		2	<0.1	0.0	*	0.32
		3	<0.1	<0.1	*	0.52
		4	0.1	0.1	*	1.00
		5	0.1	0.1	*	0.84
		6	<0.1	0.1	*	0.46
	Hay/pasture	1	0.0	0.0	*	NA
		2	<0.1	0.0	*	0.49
		3	<0.1	0.0	*	0.32
		4	<0.1	0.0	*	0.49
		5	<0.1	0.0	*	0.49
		6	0.0	0.0	*	NA
Thrushes	Forested	1	0.1	0.2	-0.1	0.14
		2	0.1	0.4	-0.2	0.10
		3	0.2	0.5	-0.3	0.29
		4	0.3	0.3	*	0.87
		5	0.2	0.2	*	0.98
		6	0.2	0.2	*	0.51
	Hay/pasture	1	<0.1	0.0	*	0.22
		2	<0.1	<0.1	*	0.63
		3	<0.1	<0.1	*	0.72
		4	0.0	<0.1	*	0.16
		5	0.0	0.0	*	NA
		6	<0.1	<0.1	*	0.22
Titmice/Chickadees	Forested	1	<0.1	<0.1	*	1.00
		2	<0.1	<0.1	*	0.63
		3	0.3	<0.1	0.3	1.00
		4	<0.1	<0.1	*	1.00
		5	0.1	0.0	0.1	0.15
		6	<0.1	<0.1	*	1.00
	Hay/pasture	1	<0.1	0.0	*	0.49
		2	<0.1	0.0	*	0.49
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	<0.1	*	0.16
		6	0.0	0.0	*	NA
Vireos	Forested	1	0.2	0.2	*	0.57
		2	0.3	0.3	*	1.00
		3	0.4	0.3	*	0.75
		4	0.3	0.3	*	0.49
		5	0.4	0.4	*	0.81
		6	0.3	0.2	*	0.87
	Hay/pasture	1	<0.1	<0.1	*	0.63
		2	<0.1	0.0	*	0.22
		3	**0.0**	**<0.1**	*****	**0.01**
		4	<0.1	0.0	*	0.49
		5	<0.1	0.0	*	0.49
		6	0.0	0.0	*	NA

Appendix G1 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine subtypes observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Passerine Subtype[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
Wrens	Forested	1	0.0	0.0	*	NA
		2	<0.1	<0.1	*	1.00
		3	<0.1	<0.1	*	0.20
		4	<0.1	<0.1	*	0.20
		5	<0.1	0.0	*	0.15
		6	0.1	<0.1	*	0.20
	Hay/pasture	1	<0.1	0.0	*	0.32
		2	<0.1	<0.1	*	1.00
		3	<0.1	0.0	*	0.49
		4	0.0	<0.1	*	0.16
		5	<0.1	<0.1	*	0.22
		6	**0.0**	**<0.1**	*****	**0.01**

[1]Data are restricted to those subtypes where at least 30 observations were recorded; statistically significant difference (p-values less than or equal to 0.05) are bolded

[2] The absolute difference Is less than 0.1

Appendix G2. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
American goldfinch	Forested	**1**	**<0.1**	**0.2**	**-0.1**	**0.02**
		2	**0.0**	**<0.1**	*****	**0.05**
		3	<0.1	<0.1	*	0.22
		4	**0.0**	**<0.1**	*****	**0.01**
		5	<0.1	<0.1	*	0.99
		6	<0.1	<0.1	*	0.47
	Hay/ pasture	1	0.1	<0.1	0.1	0.19
		2	<0.1	0.0	*	0.08
		3	<0.1	<0.1	*	0.63
		4	<0.1	<0.1	*	0.73
		5	<0.1	<0.1	*	0.54
		6	<0.1	0.1	*	0.38
American robin	Forested	1	<0.1	<0.1	*	0.52
		2	<0.1	<0.1	*	0.75
		3	<0.1	0.1	*	0.77
		4	<0.1	<0.1	*	0.99
		5	<0.1	<0.1	*	0.38
		6	0.1	<0.1	*	0.46
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	<0.1	<0.1	*	0.63
		3	<0.1	<0.1	*	1.00
		4	0.0	<0.1	*	0.16
		5	0.0	0.0	*	NA
		6	<0.1	<0.1	*	0.22
barn swallow	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
	Hay/ pasture	**1**	**0.0**	**0.2**	**-0.2**	**0.05**
		2	<0.1	<0.1	*	0.64
		3	<0.1	<0.1	*	0.99
		4	<0.1	<0.1	*	0.74
		5	<0.1	<0.1	*	0.64
		6	<0.1	0.0	*	0.32
black-capped chickadee	Forested	1	<0.1	<0.1	*	1.00
		2	<0.1	<0.1	*	0.63
		3	0.3	<0.1	0.3	1.00
		4	<0.1	<0.1	*	1.00
		5	0.1	0.0	0.1	0.15
		6	<0.1	<0.1	*	1.00
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	<0.1	0.0	*	0.49
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	<0.1	*	0.16
		6	0.0	0.0	*	NA

Appendix G2 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
bobolink	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	<0.1	0.0	*	0.49
	Hay/ pasture	1	<0.1	0.2	-0.2	0.19
		2	<0.1	0.1	*	0.17
		3	0.1	0.1	*	0.59
		4	<0.1	<0.1	*	0.82
		5	0.2	0.2	*	0.62
		6	0.2	<0.1	0.1	0.76
black-throated green warbler	Forested	1	<0.1	<0.1	*	0.21
		2	<0.1	0.0	*	0.15
		3	<0.1	0.0	*	0.08
		4	<0.1	0.0	*	0.08
		5	<0.1	0.0	*	0.11
		6	**0.1**	**0.0**	**0.1**	**0.05**
	Hay/ pasture	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
common grackle	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.3	-0.3	0.16
		4	0.0	0.0	*	NA
		5	<0.1	0.0	*	0.49
		6	0.0	0.0	*	NA
	Hay/ pasture	1	<0.1	<0.1	*	0.22
		2	<0.1	0.6	-0.5	0.62
		3	0.1	0.7	-0.5	0.22
		4	**0.0**	**1.0**	**-1.0**	**0.01**
		5	**0.0**	**<0.1**	*****	**0.05**
		6	<0.1	0.4	-0.4	0.36
common yellowthroat	Forested	1	<0.1	0.2	-0.1	0.06
		2	**<0.1**	**0.2**	**-0.2**	**0.01**
		3	<0.1	0.2	-0.1	0.12
		4	0.1	0.1	*	1.00
		5	<0.1	<0.1	*	0.64
		6	0.2	<0.1	*	0.39
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	<0.1	<0.1	*	0.73
		3	<0.1	<0.1	*	0.2
		4	<0.1	0.0	*	0.22
		5	<0.1	0.0	*	0.32
		6	<0.1	0.0	*	0.32

Appendix G2 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
eastern wood-pewee	Forested	1	0.1	<0.1	*	0.46
		2	0.2	<0.1	*	0.39
		3	**0.2**	**<0.1**	**0.1**	**0.05**
		4	**0.2**	**<0.1**	**0.2**	**0.05**
		5	0.2	<0.1	0.1	0.22
		6	**0.2**	**<0.1**	**0.2**	**0.04**
	Hay/ pasture	1	0.0	0.0	*	NA
		2	<0.1	0.0	*	0.49
		3	<0.1	0.0	*	0.49
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
European starling	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	0.2	0.0	0.2	0.49
		3	<0.1	0.0	*	0.49
		4	0.0	1.0	-1.0	0.16
		5	0.2	1.1	-0.9	0.99
		6	<0.1	0.6	-0.5	0.99
house wren	Forested	1	0.0	0.0	*	NA
		2	<0.1	<0.1	*	1.00
		3	<0.1	<0.1	*	0.20
		4	<0.1	<0.1	*	0.20
		5	<0.1	0.0	*	0.15
		6	**0.1**	**0.0**	**0.1**	**0.05**
	Hay/ pasture	1	<0.1	0.0	*	0.32
		2	<0.1	<0.1	*	0.63
		3	0.0	0.0	*	NA
		4	0.0	<0.1	*	0.16
		5	**0.0**	**<0.1**	*****	**0.05**
		6	**0.0**	**<0.1**	*****	**0.01**
northern waterthrush	Forested	1	<0.1	<0.1	*	0.48
		2	<0.1	<0.1	*	0.75
		3	0.1	<0.1	*	0.59
		4	<0.1	0.0	*	0.08
		5	<0.1	0.0	*	0.22
		6	<0.1	0.0	*	0.11
	Hay/ pasture	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA

Appendix G2 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
ovenbird	Forested	1	0.2	0.2	*	0.68
		2	0.4	0.2	0.1	0.61
		3	0.4	0.4	*	0.99
		4	0.5	0.5	*	0.86
		5	0.4	0.6	-0.1	0.67
		6	0.3	0.5	-0.2	0.40
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	<0.1	0.0	*	0.32
		3	<0.1	0.0	*	0.15
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
red-eyed vireo	Forested	1	0.2	0.2	*	0.85
		2	0.3	0.3	*	0.85
		3	0.4	0.3	*	0.86
		4	0.3	0.3	*	0.39
		5	0.3	0.4	*	0.59
		6	0.2	0.2	*	0.98
	Hay/ pasture	1	<0.1	<0.1	*	0.63
		2	<0.1	0.0	*	0.22
		3	0.0	0.0	*	NA
		4	<0.1	0.0	*	0.49
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
red-winged blackbird	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	<0.1	<0.1	*	0.64
	Hay/ pasture	1	0.1	0.2	-0.1	0.32
		2	0.1	0.2	-0.1	0.46
		3	0.1	0.2	*	0.64
		4	**<0.1**	**0.7**	**-0.6**	**0.02**
		5	<0.1	<0.1	*	0.77
		6	0.2	0.1	*	0.33
Savannah sparrow	Forested	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
	Hay/ pasture	**1**	**0.4**	**<0.1**	**0.4**	**0.01**
		2	0.3	0.2	*	0.36
		3	0.5	0.3	0.2	0.36
		4	0.3	0.2	0.1	0.36
		5	0.3	0.2	0.1	0.85
		6	0.3	0.4	-0.2	0.78

Appendix G2 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
scarlet tanager	Forested	**1**	**0.0**	**<0.1**	*****	**0.01**
		2	<0.1	0.0	*	0.32
		3	<0.1	<0.1	*	0.52
		4	<0.1	0.1	*	0.64
		5	<0.1	0.1	*	0.17
		6	<0.1	0.1	*	0.08
	Hay/ pasture	1	0.0	0.0	*	NA
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA
song sparrow	Forested	1	<0.1	<0.1	*	0.20
		2	0.0	<0.1	*	0.16
		3	<0.1	<0.1	*	0.75
		4	0.1	<0.1	*	0.84
		5	0.1	0.2	*	0.23
		6	0.3	0.3	*	0.78
	Hay/ pasture	1	**<0.1**	**0.2**	**-0.2**	**0.03**
		2	0.2	0.2	*	0.81
		3	0.2	0.3	*	0.52
		4	<0.1	0.1	*	0.30
		5	0.1	<0.1	*	0.63
		6	0.2	0.2	*	0.69
veery	Forested	1	**<0.1**	**0.1**	**-0.1**	**0.02**
		2	**<0.1**	**0.2**	**-0.2**	**0.01**
		3	**<0.1**	**0.3**	**-0.2**	**0.04**
		4	0.1	0.2	*	0.63
		5	<0.1	<0.1	*	0.99
		6	<0.1	<0.1	*	0.59
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	0.0	0.0	*	NA
		3	0.0	0.0	*	NA
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA

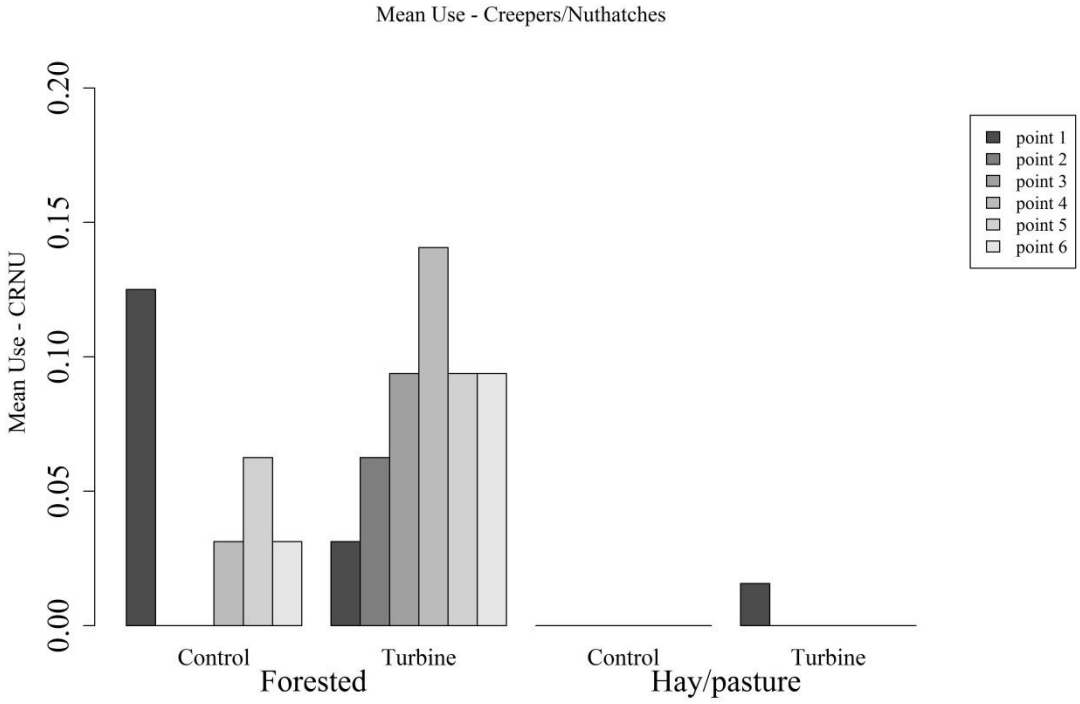
Appendix G2 *(continued)*. The difference between mean use recorded at turbine and control transects, separated by forested and hay/pasture land cover, for passerine species observed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

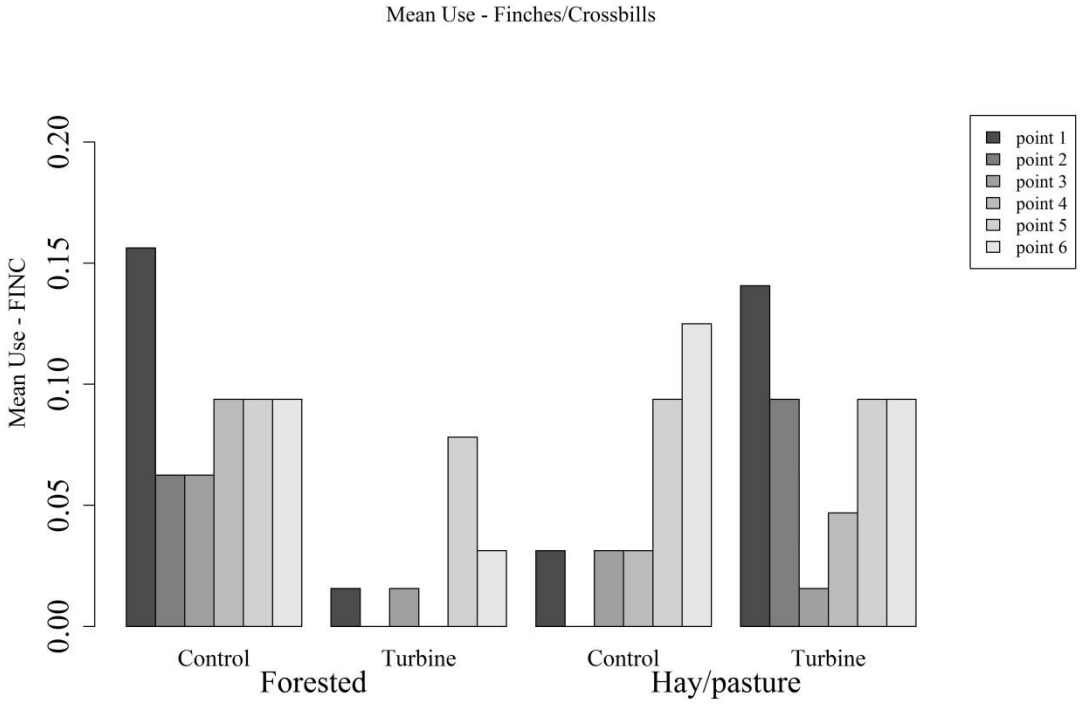
Species[1]	Vegetation Type	Point	Turbine Mean	Control Mean	Difference of Means[2]	p-value
wood thrush	Forested	1	<0.1	<0.1	*	0.48
		2	<0.1	<0.1	*	0.59
		3	<0.1	<0.1	*	0.75
		4	<0.1	<0.1	*	0.38
		5	<0.1	0.0	*	0.32
		6	<0.1	<0.1	*	1.00
	Hay/ pasture	1	<0.1	0.0	*	0.49
		2	0.0	0.0	*	NA
		3	<0.1	0.0	*	0.32
		4	0.0	0.0	*	NA
		5	0.0	0.0	*	NA
		6	0.0	0.0	*	NA

[1]Data are restricted to those subtypes where at least 30 observations were recorded; statistically significant difference (p-values less than or equal to 0.05) are bolded

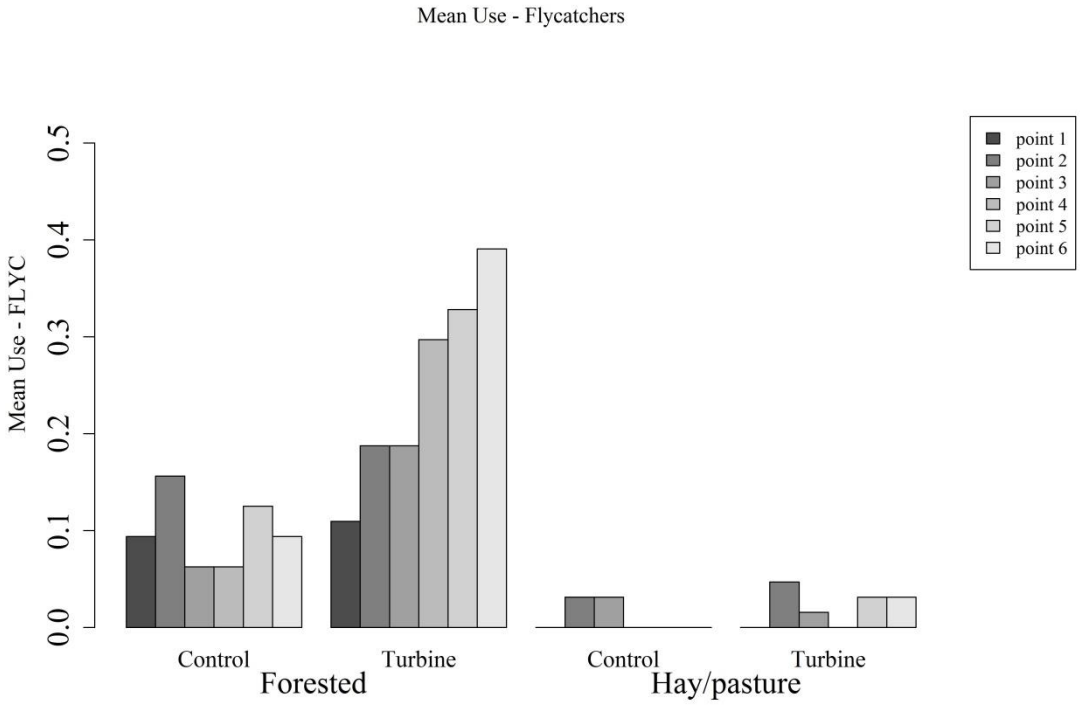
[2] The absolute difference is less than 0.1

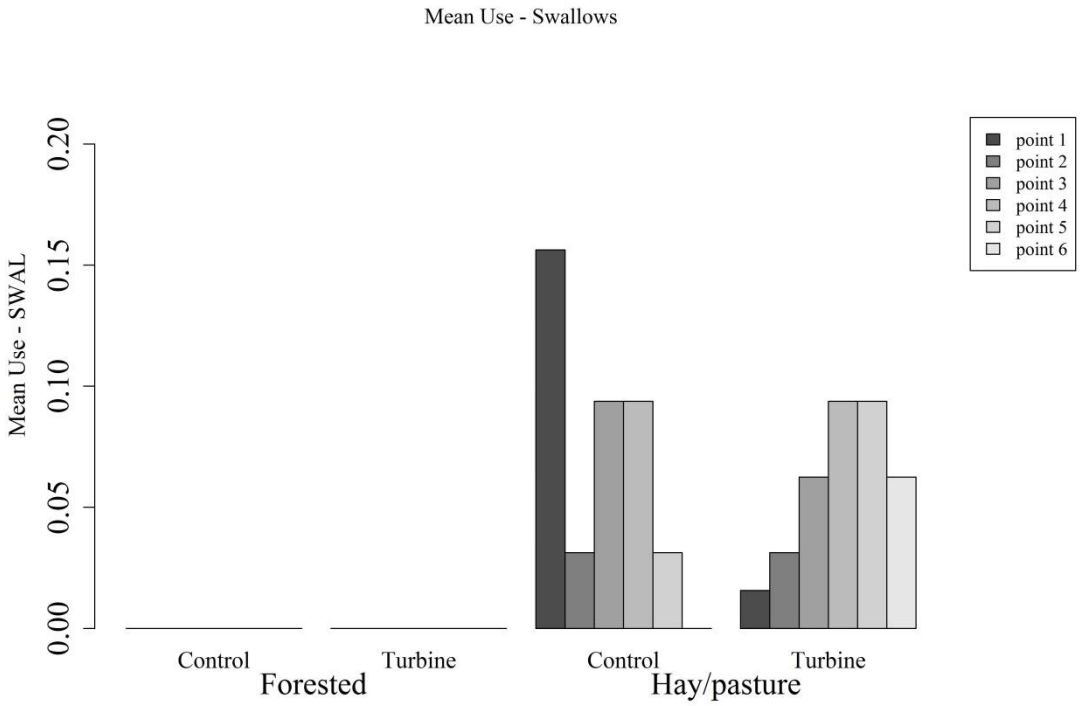
Appendix H: Mean Use by Selected Passerine Subtypes and Species, Separated by Forested and Hay/pasture Land Cover, at each Point Count Location of the Control and Turbine Transects Surveyed during Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016



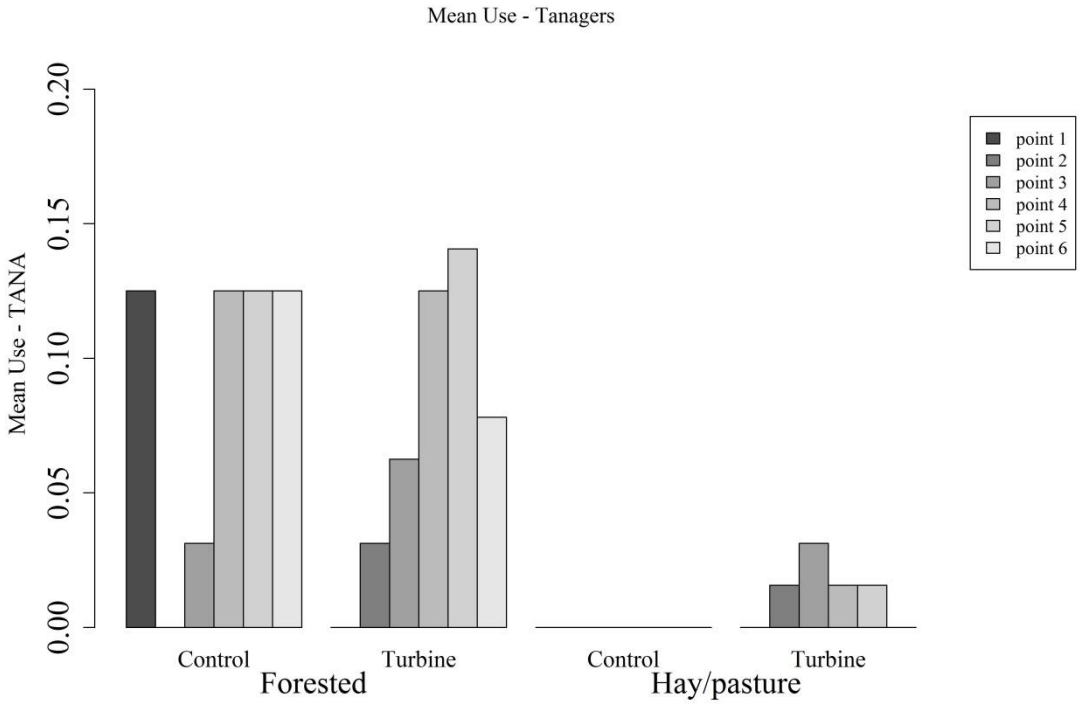


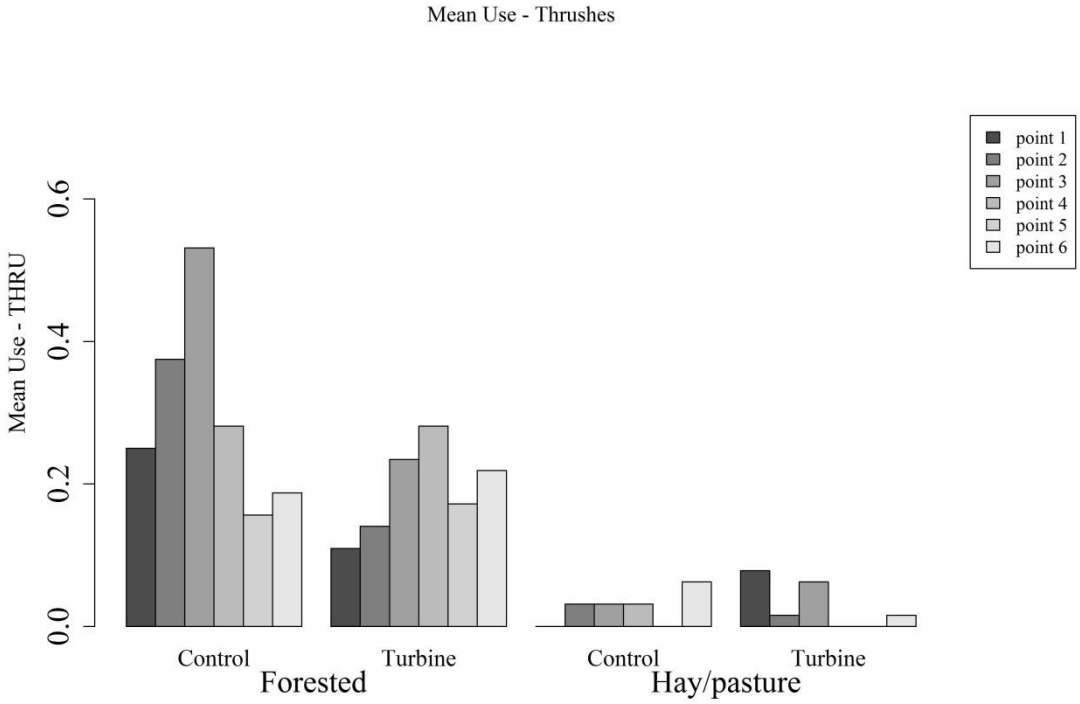
Appendix H1. Mean use by selected passerine subtypes (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



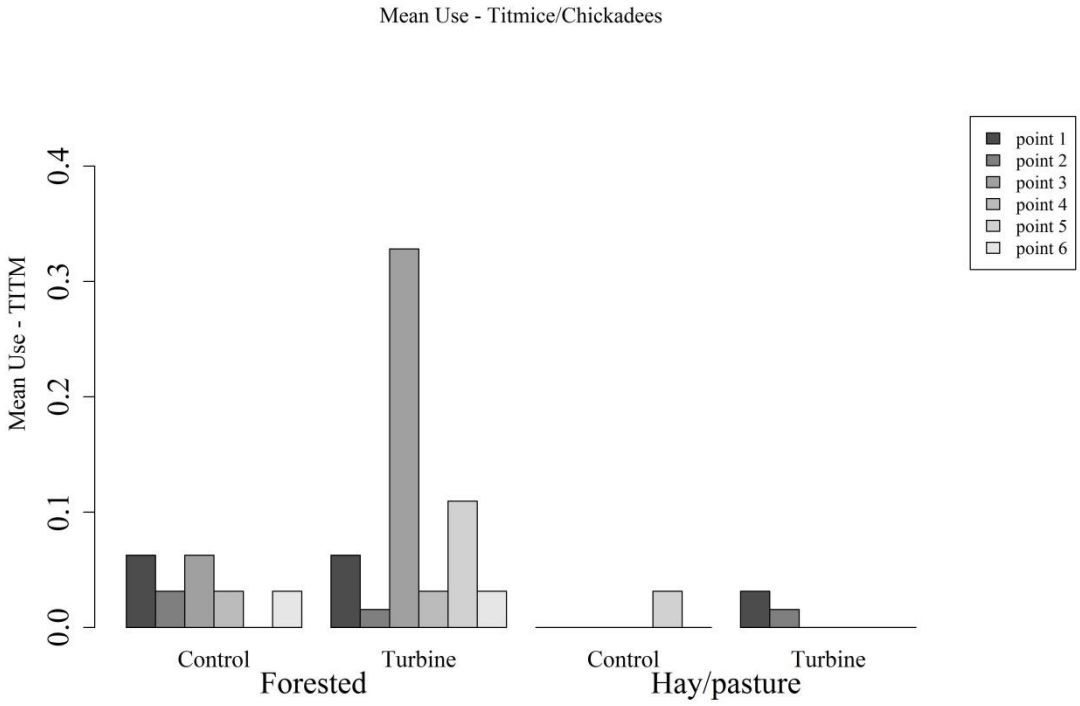


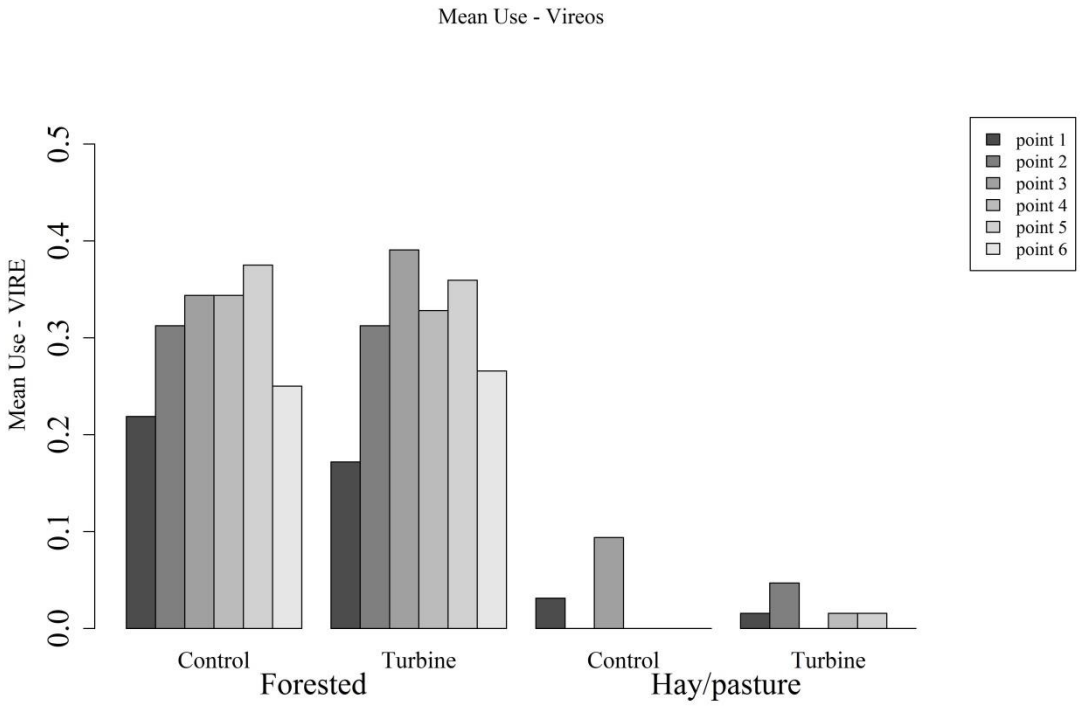
Appendix H1 (continued). Mean use by selected passerine subtypes (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



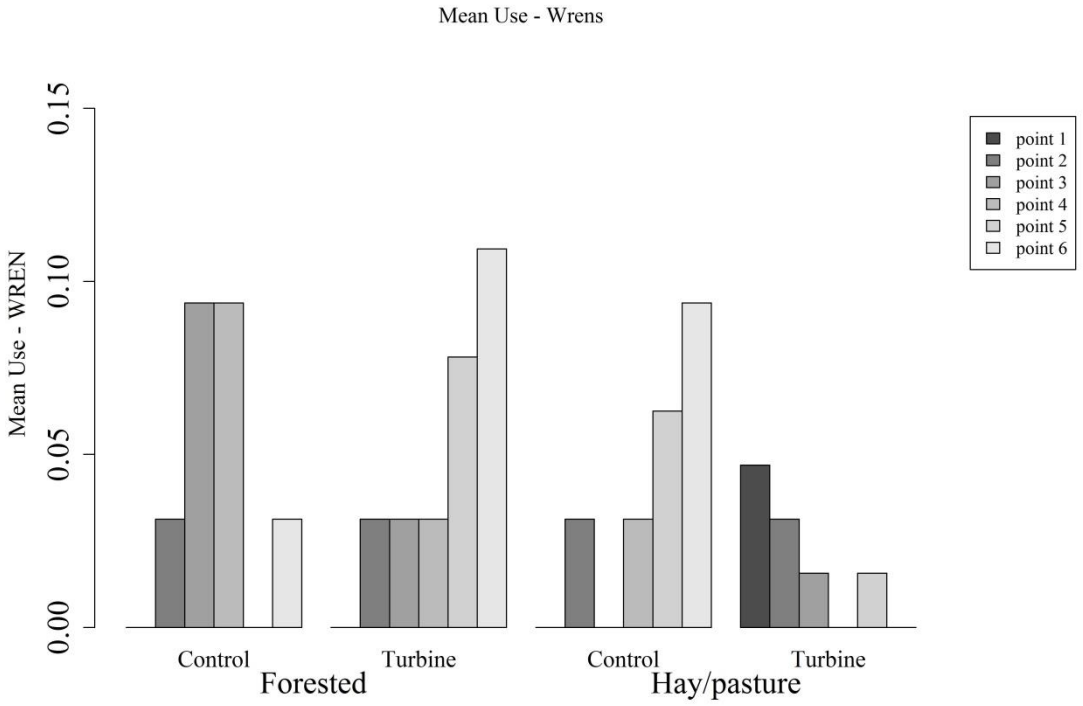


Appendix H1 (continued). Mean use by selected passerine subtypes (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

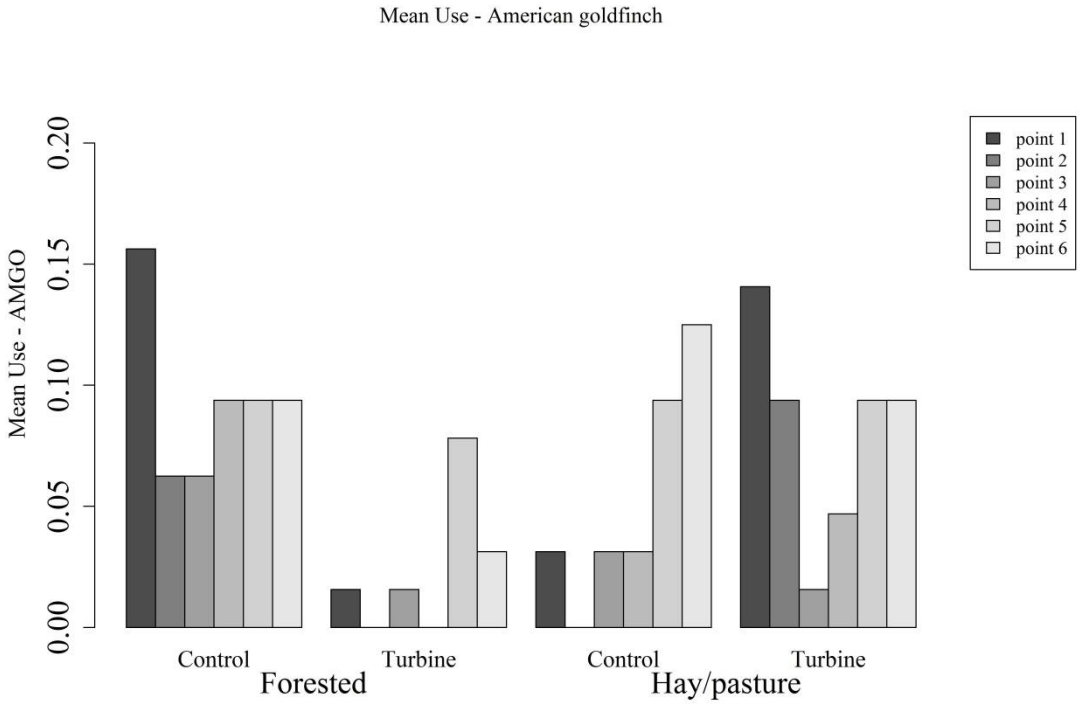


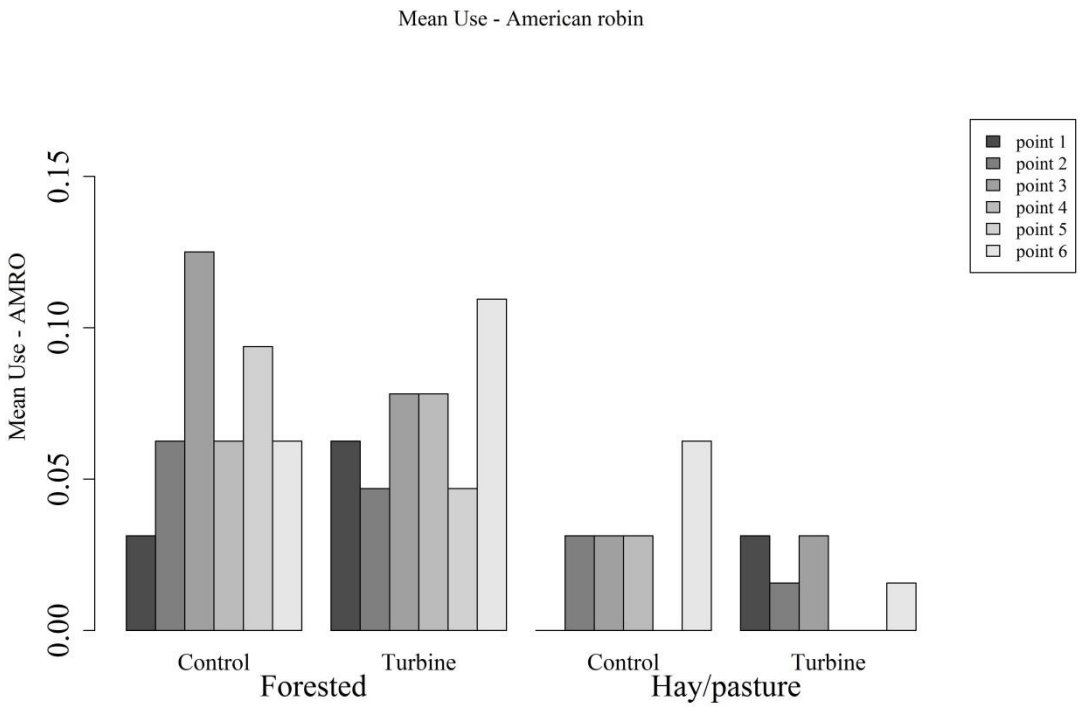


Appendix H1 (continued). Mean use by selected passerine subtypes (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

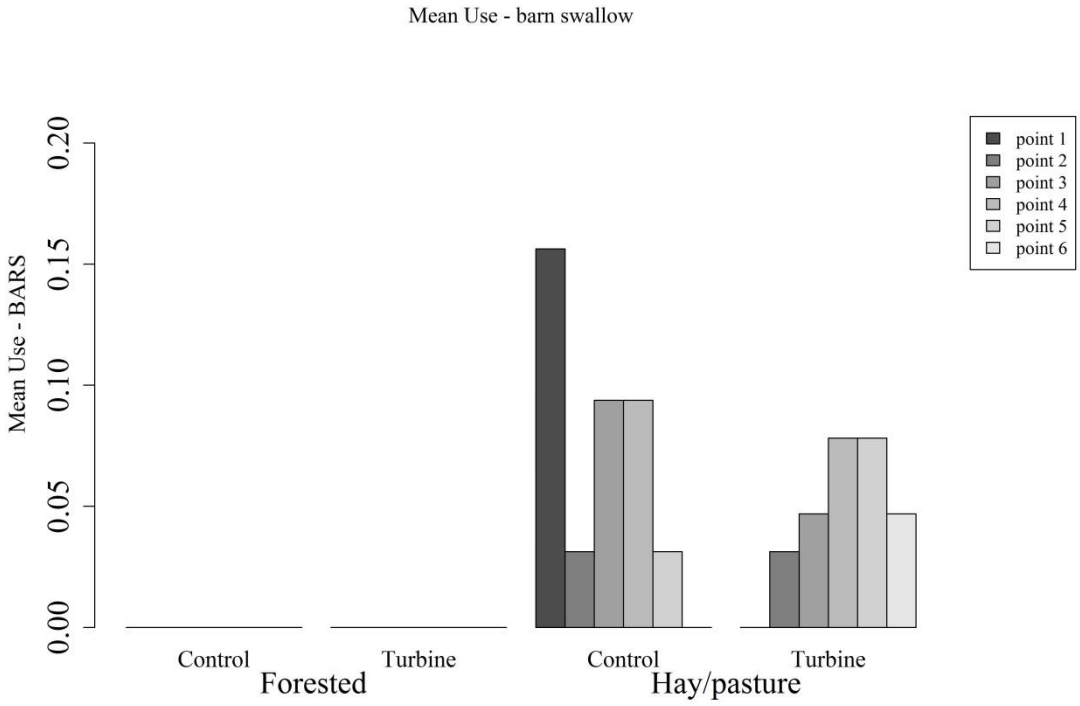


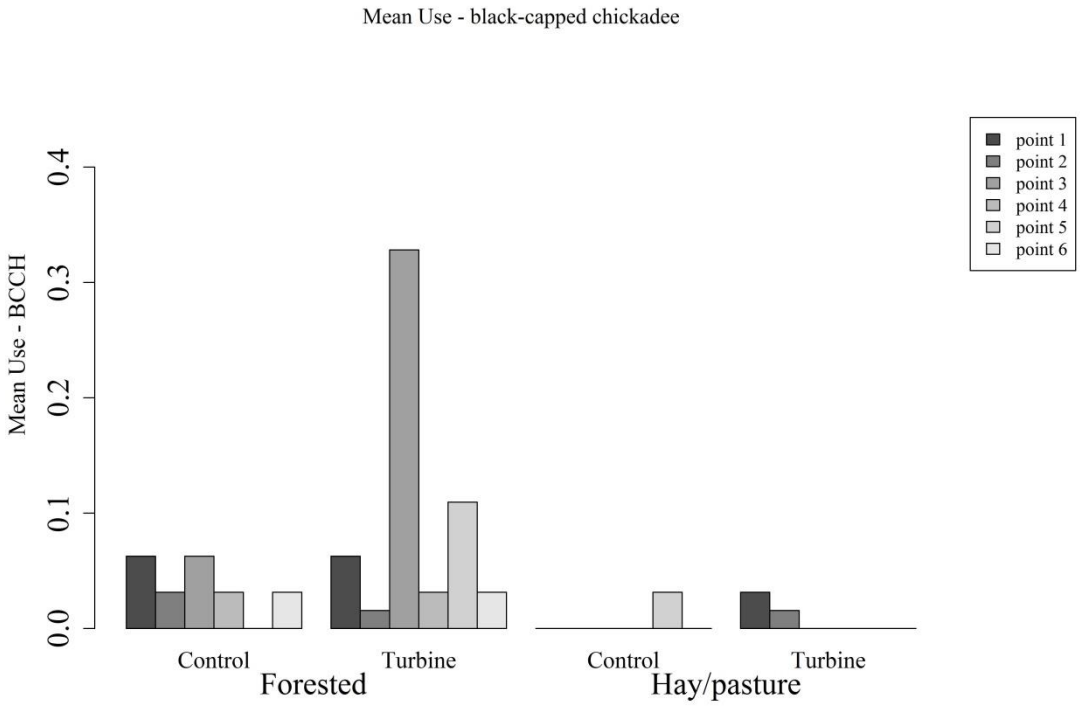
Appendix H1 (continued). Mean use by selected passerine subtypes (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



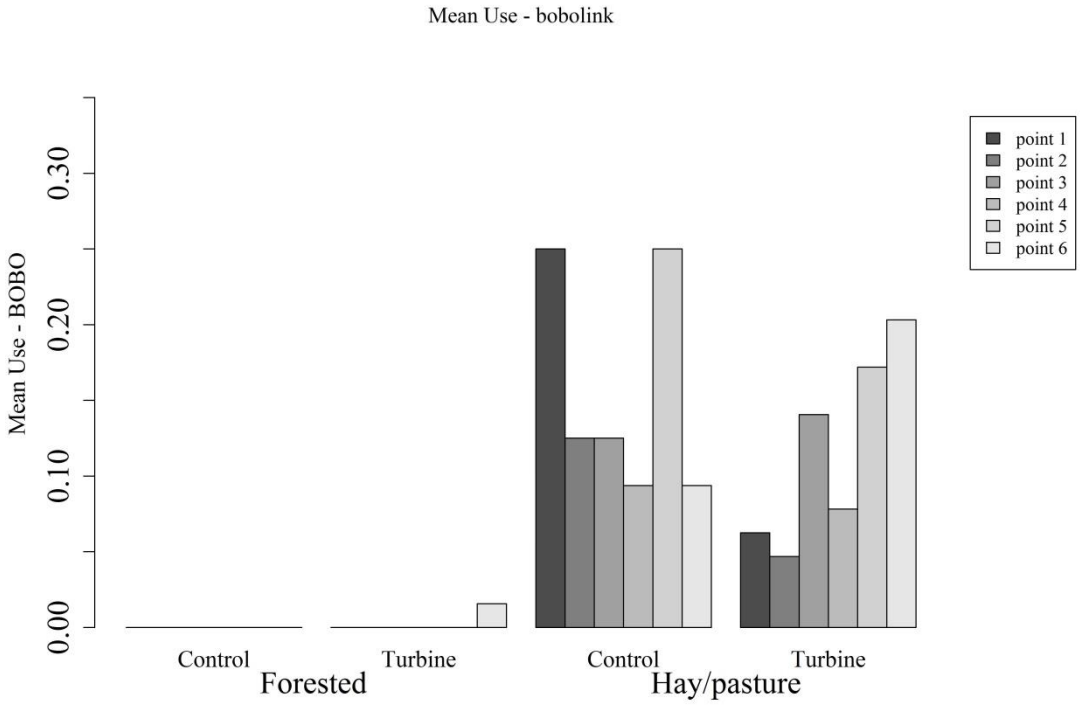


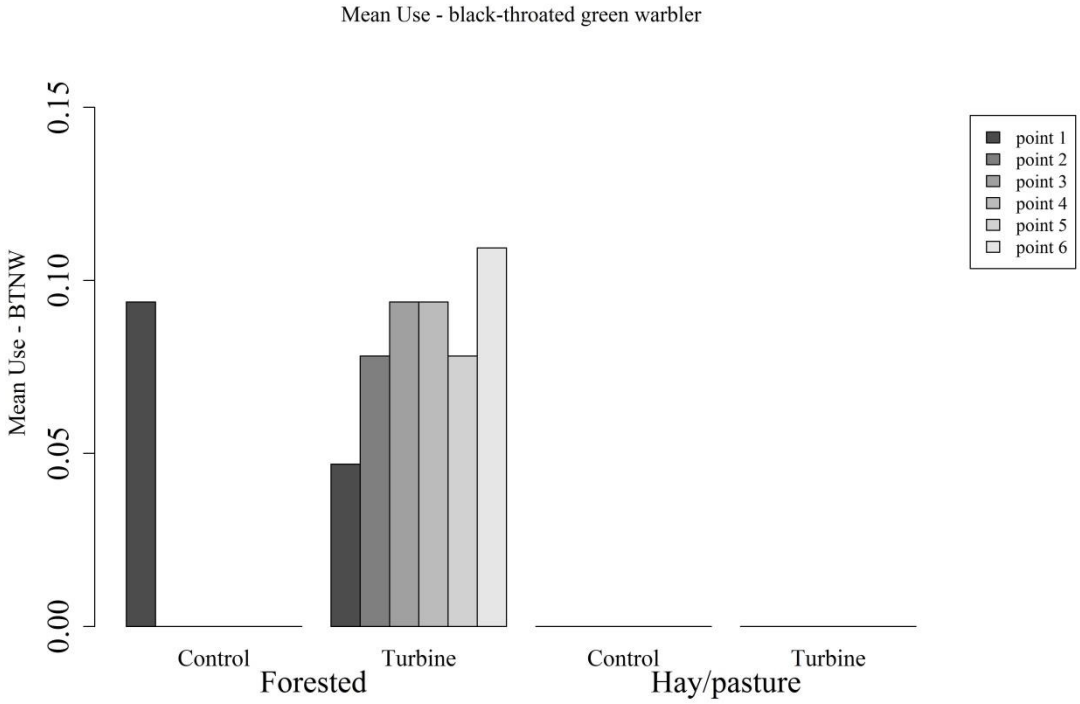
Appendix H2. Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



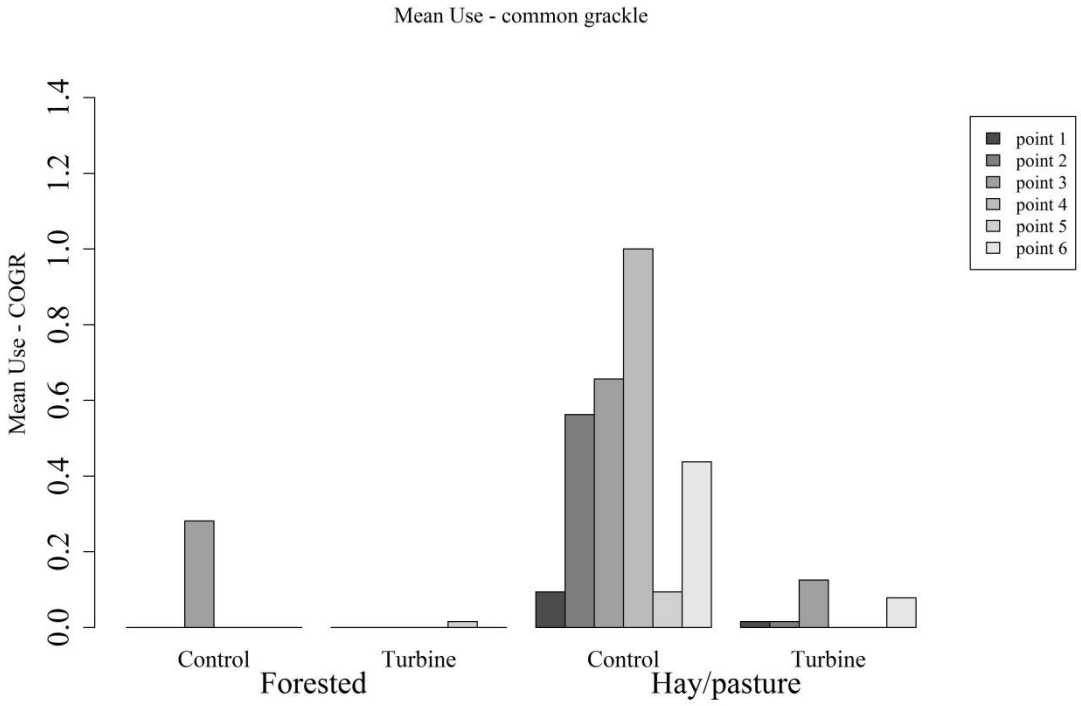


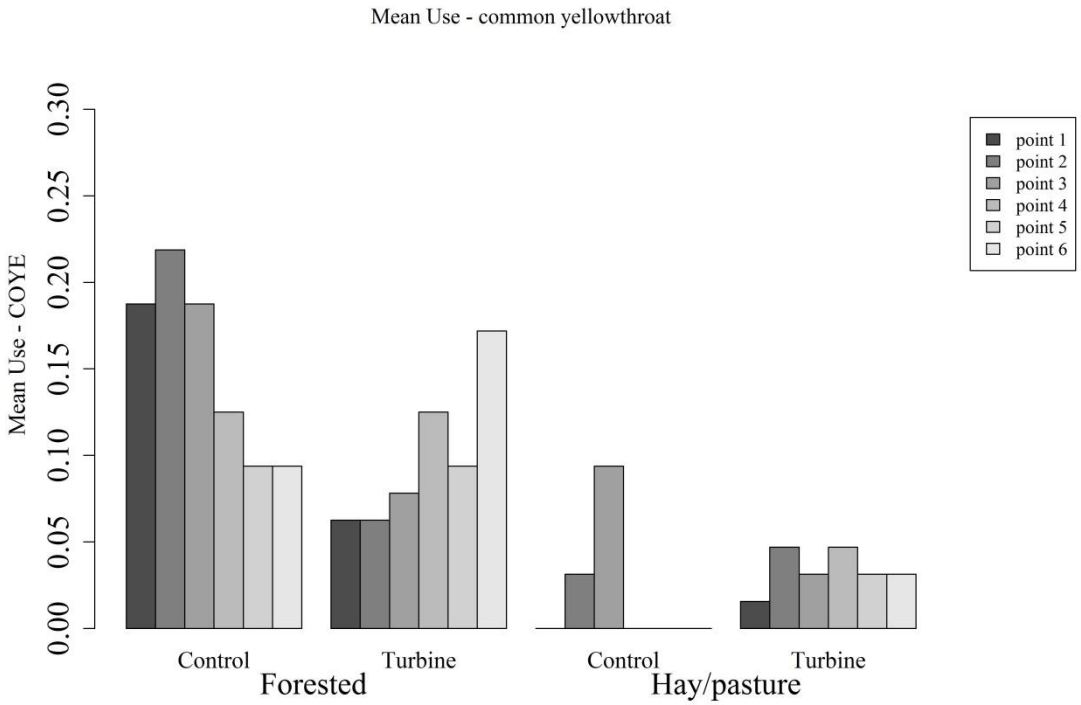
Appendix H2 (continued). Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



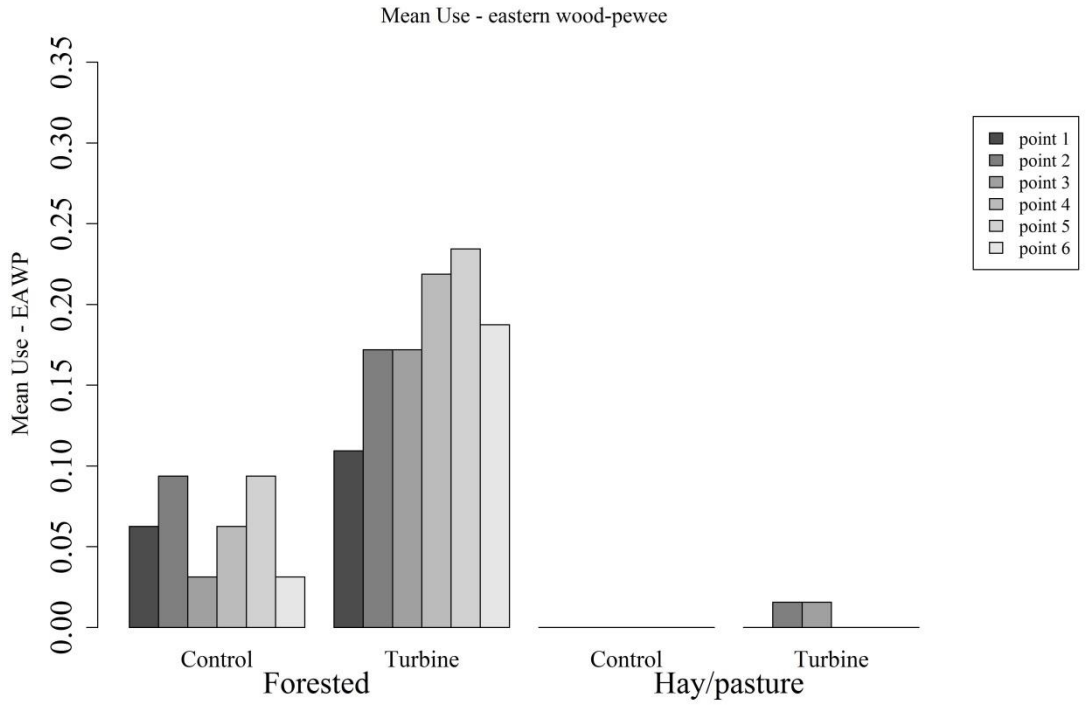


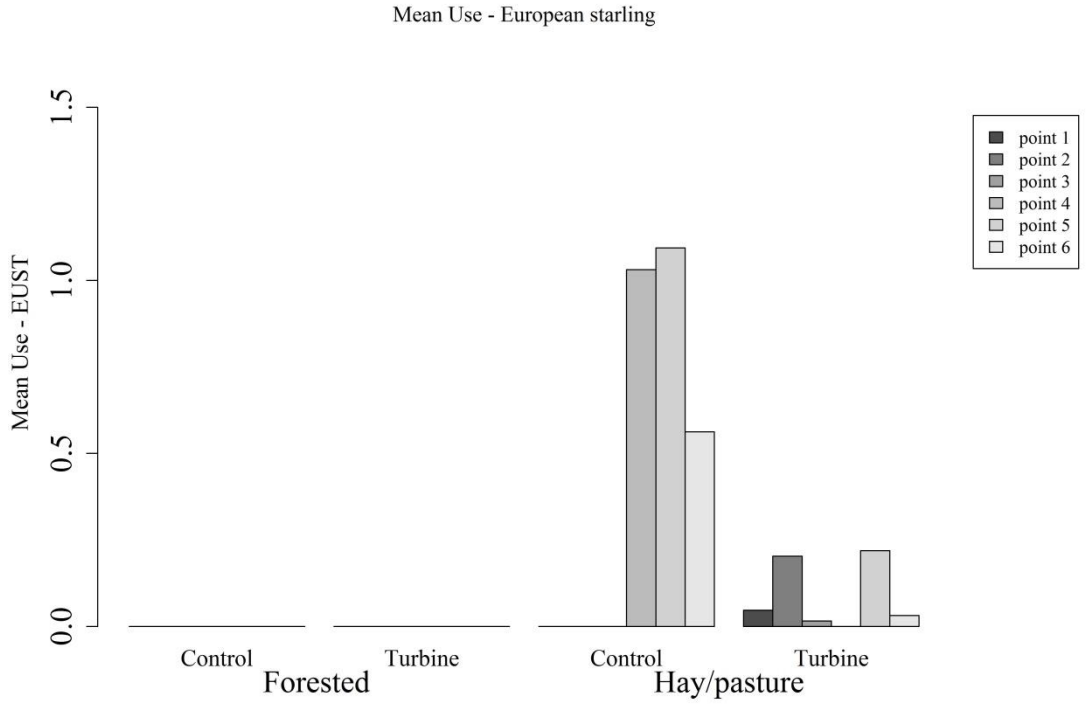
Appendix H2 (continued). Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



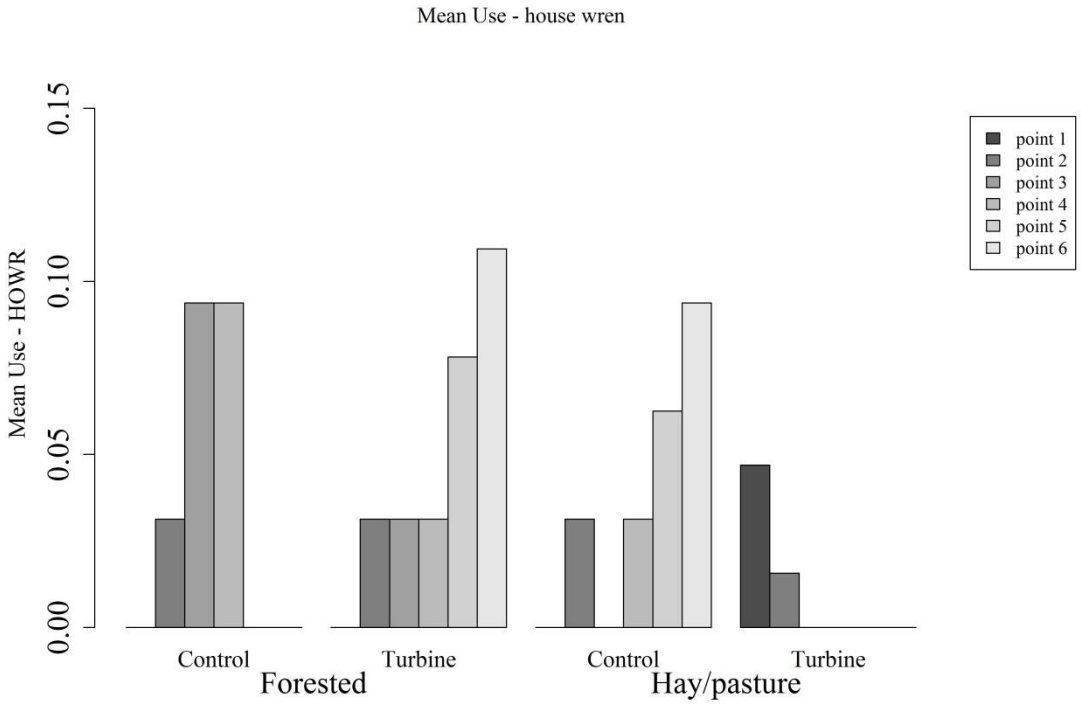


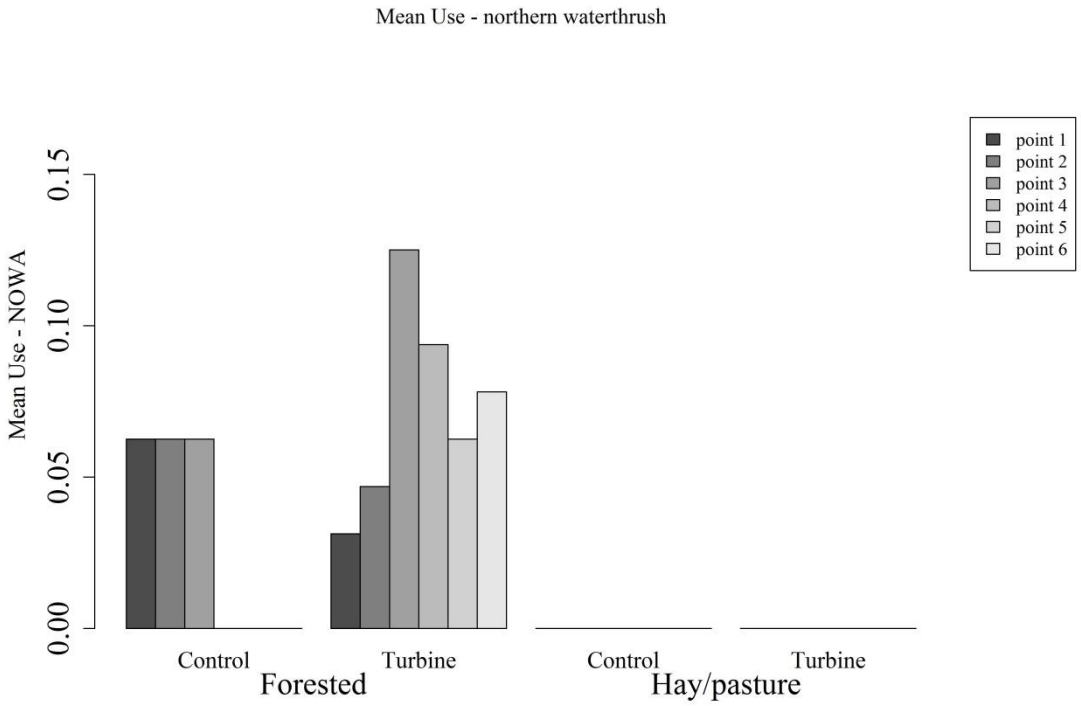
Appendix H2 (continued). Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.



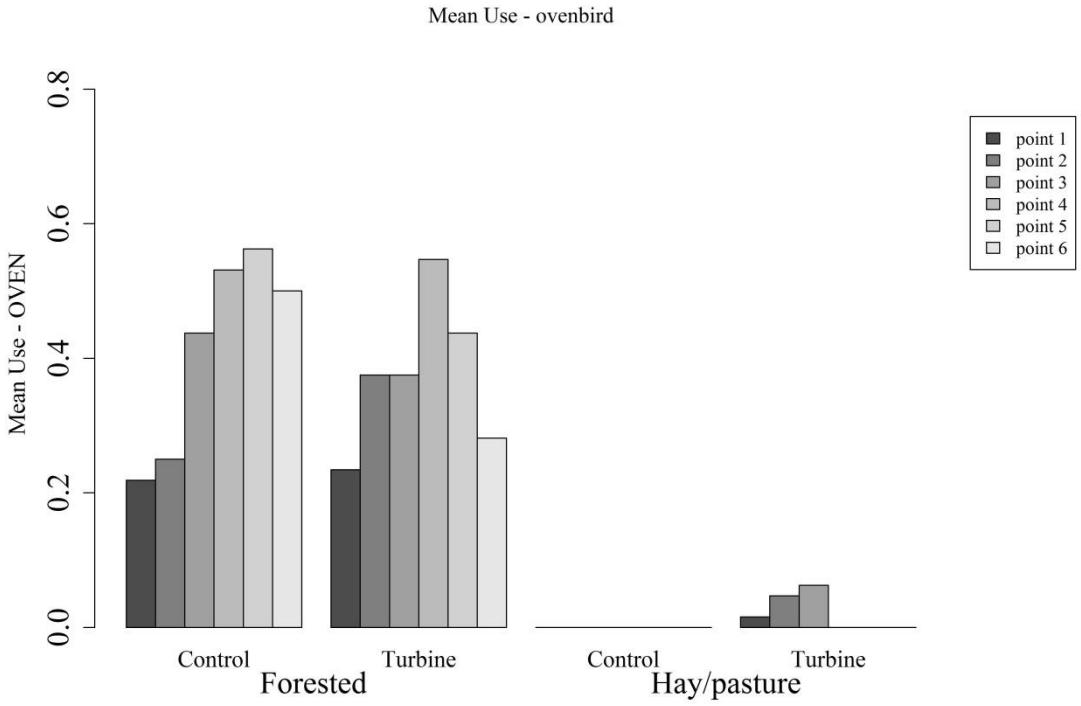


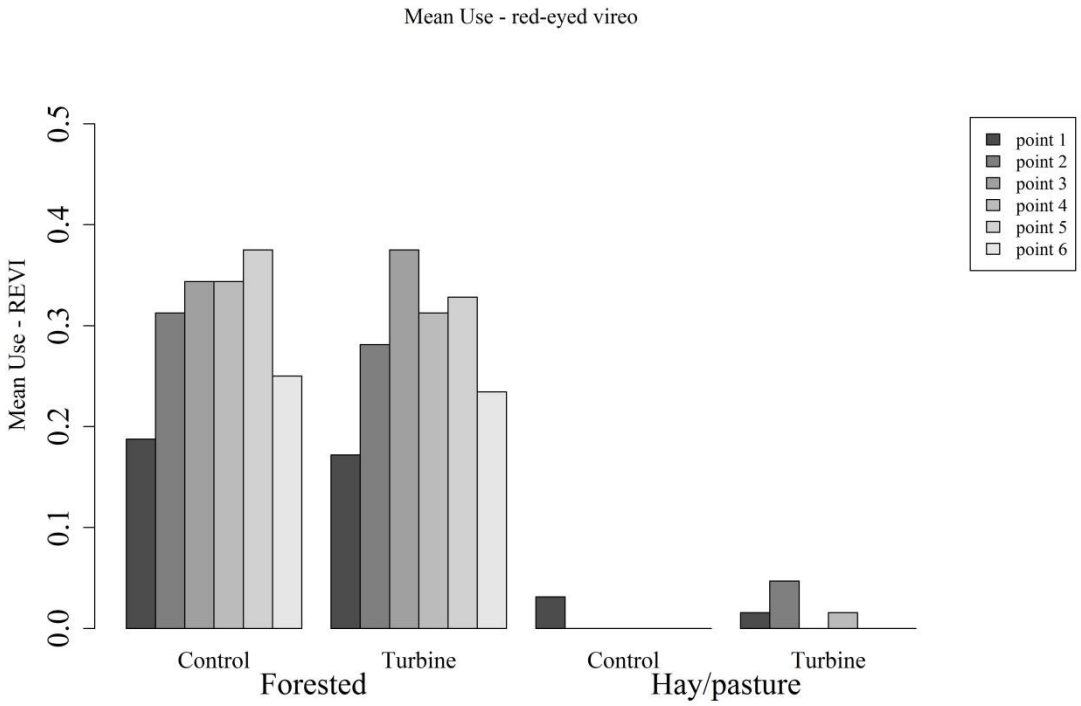
Appendix H2 (continued). Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.





Appendix H2 (continued). Mean use by selected passerine species (birds/transect/survey), separated by forested and hay/pasture land cover, at each point count location of the control and turbine transects surveyed during breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.





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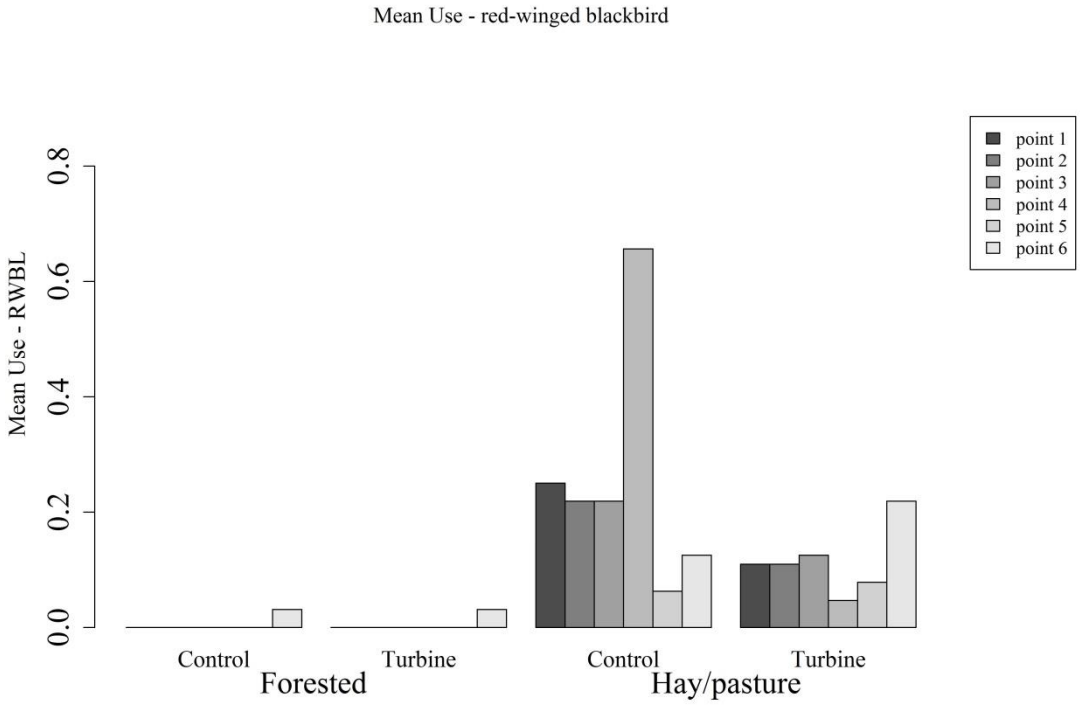

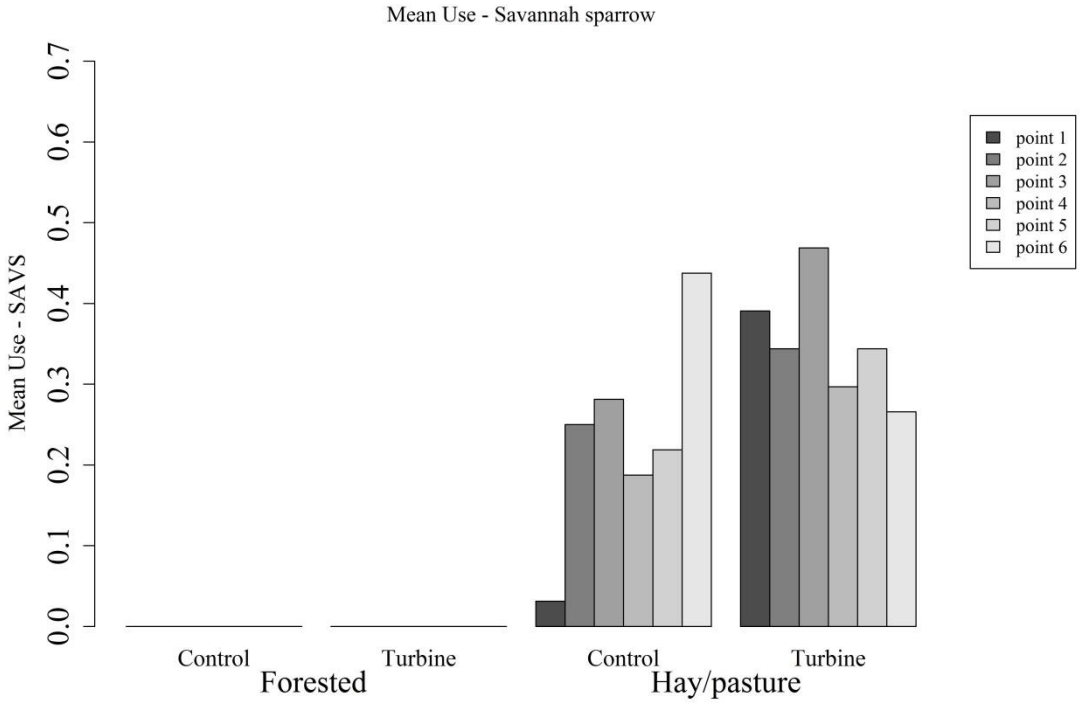

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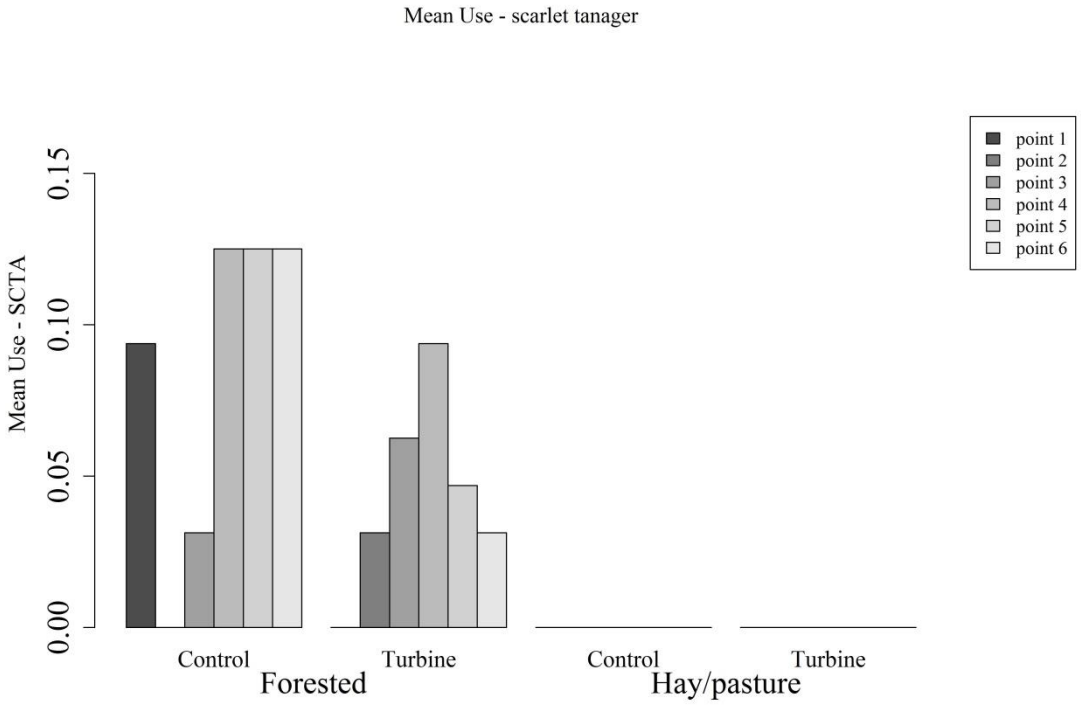

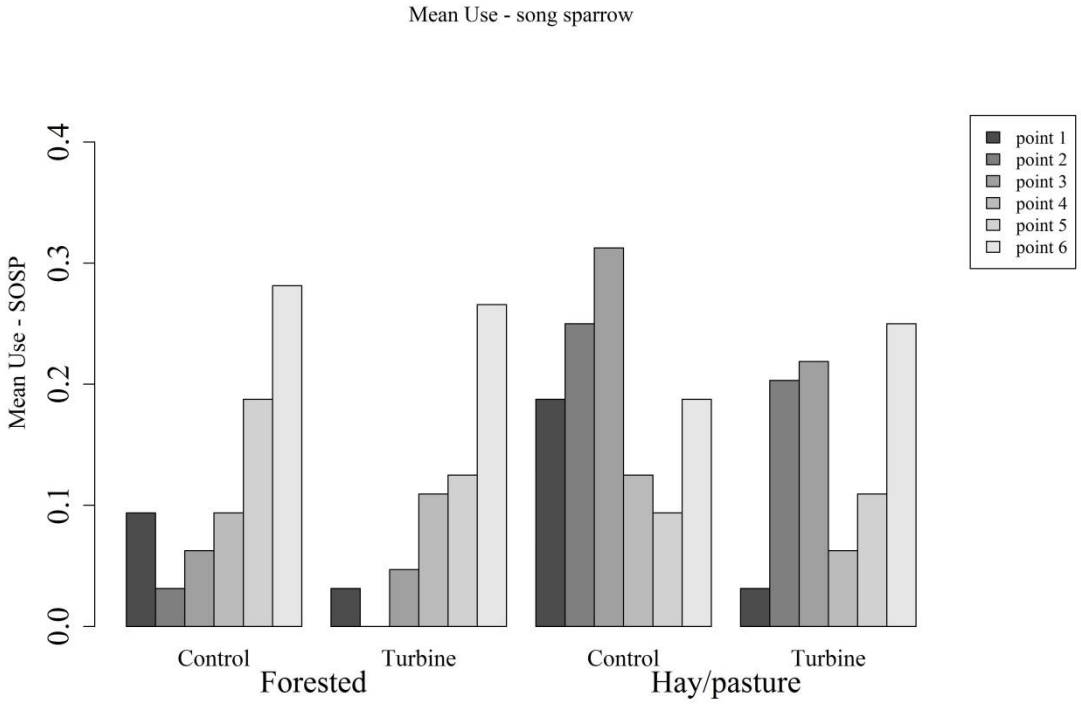

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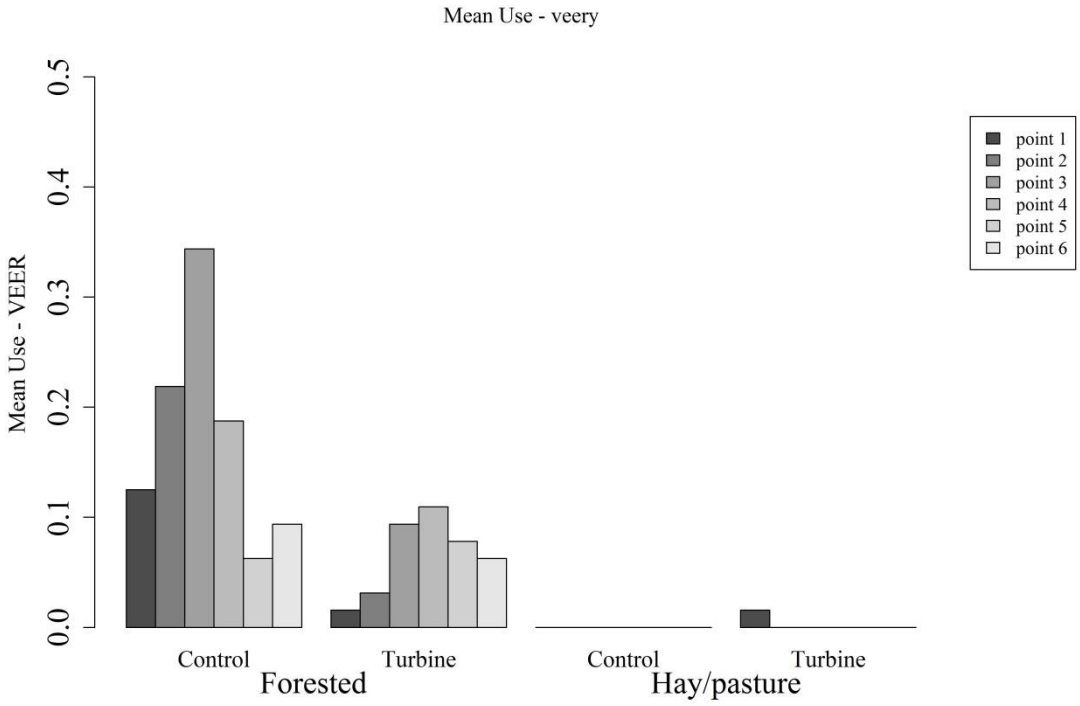

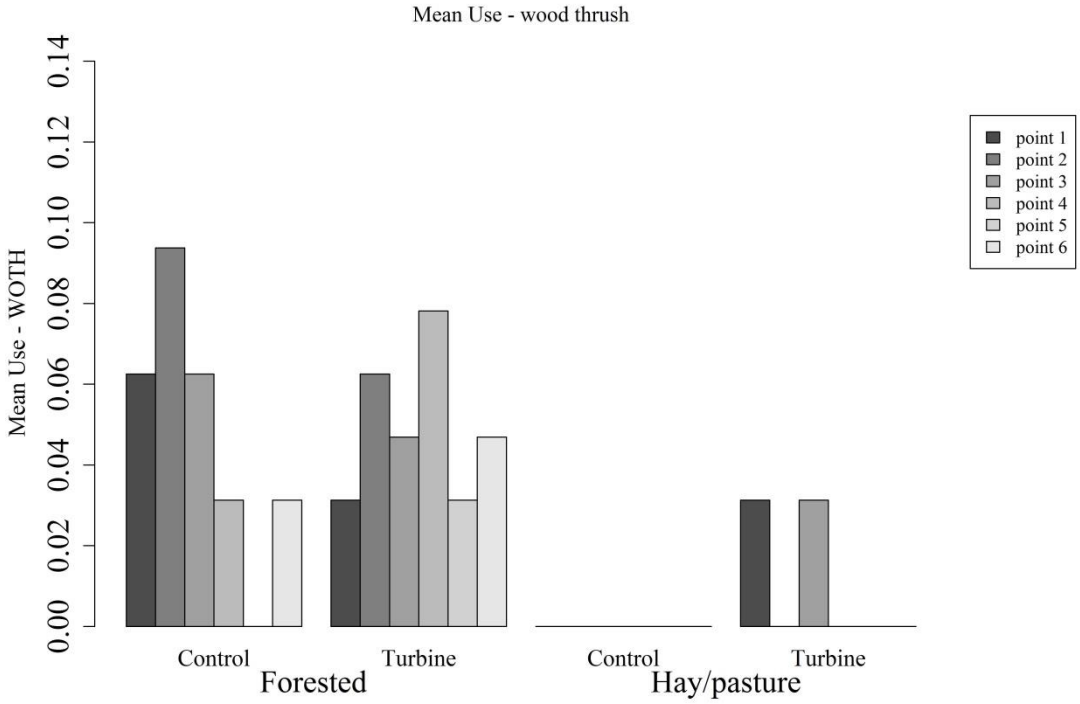

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Appendix I: Details of Sensitive Species Observations Recorded during the Breeding Bird Surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Appendix I. Summary of state-listed species observations recorded during the breeding bird surveys at the Number Three Wind Energy Project from June 4 – July 12, 2016.

Date	Common Name	Status[2]	# grps	# obs	Transect #	Point #	Method of Detection	Behavior	Distance from Observer
6/4/2016	northern harrier	ST	1	1	C12	4	visual	flapping/gliding	50
6/4/2016	upland sandpiper	ST	1	1	C13	4	visual	perched	50
6/4/2016	horned lark	SSC	1	1	T9	4	vocalization	singing	50
6/4/2016	horned lark	SSC	1	1	T9	4	visual	singing	40
6/4/2016	horned lark	SSC	1	1	T9	3	vocalization	singing	45
6/5/2016	upland sandpiper	ST	1	1	T8	1	visual	flapping/gliding	50
6/5/2016	upland sandpiper	ST	1	1	T8	3	visual	flapping/gliding	50
6/7/2016	northern harrier	ST	1	1	T4	5	vocalization	signing	40
6/9/2016	northern harrier	ST	1	1	T2	1	visual	flapping/gliding	280
6/9/2016	grasshopper sparrow	SSC	1	1	T2	2	vocalization	singing	35
6/9/2016	grasshopper sparrow	SSC	1	1	T2	1	vocalization	singing	30
6/14/2016	horned lark	SSC	1	1	T9	4	vocalization	singing	50
6/14/2016	horned lark	SSC	1	1	T9	2	vocalization	singing	50
6/14/2016	horned lark	SSC	1	1	T9	2	vocalization	singing	45
6/14/2016	horned lark	SSC	1	1	T9	2	vocalization	singing	40
6/15/2016	horned lark	SSC	1	1	T1	3	vocalization	singing	45
6/18/2016	Cooper's hawk	SSC	1	1	22	4	vocalization	other call	30
6/18/2016	northern harrier	SSC	1	1	T2	4	visual	flapping/gliding	40
6/23/2016	northern harrier	SSC	1	1	T11	2	visual	flapping/gliding	200
6/23/2016	horned lark	SSC	1	1	T9	3	visual	flapping/gliding	45
6/23/2016	horned lark	SSC	1	2	T9	3	visual	flapping/gliding	40
6/23/2016	horned lark	SSC	1	1	T11	6	vocalization	singing	40
7/7/2016	horned lark	SSC	1	1	T9	3	visual	flapping/gliding	45
7/7/2016	horned lark	SSC	1	2	T9	1	visual	flapping/gliding	35
7/8/2016	sedge wren	ST	1	1	T5	2	vocalization	singing	50
7/8/2016	sedge wren	ST	1	1	T5	3	visual	perched	35
7/8/2016	sedge wren	ST	1	1	T5	5	vocalization	singing	50

[1] #grps = number of groups, #obs = number of observations

[2] ST = state threatened; SSC = state species of special concern