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Final Environmental Impact Statement for the Ball Hill Wind Project Chautauqua County, New York Volume 2

November 2016

Prepared for:

Ball Hill Wind Energy, LLC
11101 W. 120th Ave., Suite 400
Broomfield, CO 80021

Prepared by:

ecology and environment, inc.
Global Environmental Specialists

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ECOLOGY AND ENVIRONMENT, INC.
368 Pleasant View Drive
Lancaster, New York 14086

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Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bird Fatalities/ Turbine/Period	Number of Bird Fatalities/ MW/Period	
Maple Ridge, Lewis County, New York – Mixed (agriculture and forest)					
Daily surveys	6/17 – 11/15	2006	9.29	5.63	Jain et al. 2007
3-day surveys	6/29 – 11/15	2006	4.47	2.71	Jain et al. 2007
Weekly surveys	7/11 – 11/13	2006	3.13	1.90	Jain et al. 2007
Weekly surveys	4/30 – 11/14	2007	3.87	2.34	Jain et al. 2009a
Weekly surveys	4/15 – 11/9	2008	3.42	2.07	Jain et al. 2009b
Weekly Surveys	7/12 – 10/15	2012			
Noble Bliss, Wyoming County, New York – Mixed (agriculture and forest)					
Daily surveys	4/21 – 11/14	2008	4.30	2.86	Jain et al. 2009e
3-day surveys	5/9 – 11/14	2008	0.66	0.44	Jain et al. 2009e
Weekly surveys	5/9 – 11/14	2008	0.74	0.50	Jain et al. 2009e
Daily surveys	4/15 – 11/15	2009	4.45	2.97	Jain et al. 2009c
Weekly surveys	4/15 – 11/15	2009	2.87	1.91	Jain et al. 2009c
Noble Clinton, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/13	2008	1.43	0.96	Jain et al. 2009d
3-day surveys	4/26 – 10/13	2008	3.26	2.17	Jain et al. 2009d
Weekly surveys	5/8 – 10/13	2008	2.48	1.65	Jain et al. 2009d
Daily surveys	4/15 – 11/15	2009	1.50	1.00	Jain et al. 2010b
Weekly surveys	4/15 – 11/15	2009	1.76	1.17	Jain et al. 2010b
Noble Ellenburg, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/29 – 10/13	2008	2.09	1.40	Jain et al. 2009c
3-day surveys	4/28 – 10/13	2008	1.37	0.91	Jain et al. 2009c
Weekly surveys	4/28 – 10/13	2008	1.18	0.78	Jain et al. 2009c
Daily surveys	4/15 – 11/15	2009	5.69	3.79	Jain et al. 2010a
Weekly surveys	4/15 – 11/15	2009	2.29	1.53	Jain et al. 2010a
Cohocton and Dutch Hill, Steuben County, New York – Mixed (agriculture and forest)					
Daily surveys	7/15 – 9/17	2010	2.06	1.37	Stantec Consulting 2011
Weekly surveys	7/15 – 9/17	2010	1.16	0.77	Stantec Consulting 2011
Munnsville, Madison and Oneida Counties, New York – Mixed (agriculture and forest)					
Dog searches (recurrence unknown)	4/15 – 11/15	2008	1.71	1.14	Stantec Consulting 2009
Weekly surveys	4/15 – 11/15	2008	2.22	1.48	Stantec Consulting 2009
Noble Wethersfield, Wyoming County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	2.55	1.70	Jain et al. 2011a

Table H-1 Bird Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bird Fatalities/ Turbine/Period	Number of Bird Fatalities/ MW/Period	
Noble Altona, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/15	2010	2.76	1.84	Jain et al. 2011b
Weekly surveys	4/26 – 10/15	2010	1.55	1.04	Jain et al. 2011b
Daily Surveys		2011			
Noble Chateaugay, Franklin County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	2.48	1.65	Jain et al. 2011c
High Sheldon, Wyoming County, New York – Mixed (agriculture and forest)					
Daily and weekly surveys	4/15 – 11/15	2010	2.64	1.76	Tidhar et al. 2011a
Daily and weekly surveys	5/15 – 11/15	2011	2.36	1.57	Tidhar et al. 2011b
Daily Surveys	4/15-10/7	2012	6.86	3.43	Ritzert et al. 2012
Howard, Steuben County, New York					
Daily and Weekly surveys	4/13-11/16	2012	2.50	1.29	
Steel Winds I and II, Erie County, New York – Lakeshore (former industrial use)					
Weekly and bi-weekly	3/10 – 5/31, 7/15 – 9/30	2012	7.15 - 8.46[1]	2.89-3.38	Stantec 2012
Weekly and bi-weekly	3/21 – 5/30, 7/15 – 9/30	2013	6.92 - 15.50[2]	2.77-6.2	Stantec 2014
Marble River, New York					
		2014		1.67	Bay et al. 2015

Source:
Stantec. 2012. *Steel Winds I and II Post-construction Monitoring Report, 2012.* Prepared for First Wind Management, LLC.
Stantec. 2014. Steel Winds I and II Year 2 Post-construction Wildlife Monitoring Report, 2013. Prepared for First Wind Management, LLC.

Notes:
[1] Stantec applied two different estimators for comparison; both are included here
[2] When gulls are removed from the analysis the estimated rate is 6.29

Table H-2 Bat Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bat Fatalities/ Turbine	Number of Bat Fatalities/ MW/Period	
Maple Ridge, Lewis County, New York – Mixed (agriculture and forest)					
Daily surveys	6/17 – 11/15	2006	24.53	14.87	Jain et al. 2007
3-day surveys	6/29 – 11/15	2006	22.34	13.54	Jain et al. 2007
Weekly surveys	7/11 – 11/13	2006	15.2	9.21	Jain et al. 2007
Weekly surveys	4/30 – 11/14	2007	15.24	9.42	Jain et al. 2009a
Weekly surveys	4/15 – 11/9	2008	8.18	4.96	Jain et al. 2009b
Weekly Surveys	7/12 – 10/15	2012	12.05	7.30	Jain et al. 2013
Noble Bliss, Wyoming County, New York – Mixed (agriculture and forest)					
Daily surveys	4/21 – 11/14	2008	7.58	5.05	Jain et al. 2009e
3-day surveys	5/9 – 11/14	2008	14.66	9.78	Jain et al. 2009e
Weekly surveys	5/9 – 11/14	2008	13.01	8.67	Jain et al. 2009e
Daily surveys	4/15 – 11/15	2009	8.24	5.5	Jain et al. 2009c
Weekly surveys	4/15 – 11/15	2009	4.46	2.97	Jain et al. 2009c
Noble Clinton, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/13	2008	5.45	3.63	Jain et al. 2009d
3-day surveys	4/26 – 10/13	2008	4.81	3.21	Jain et al. 2009d
Weekly surveys	5/8 – 10/13	2008	3.76	2.5	Jain et al. 2009d
Daily surveys	4/15 – 11/15	2009	9.72	6.48	Jain et al. 2010b
Weekly surveys	4/15 – 11/15	2009	5.16	3.44	Jain et al. 2010b
Noble Ellenburg, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/29 – 10/13	2008	8.17	5.45	Jain et al. 2009c
3-day surveys	4/28 – 10/13	2008	6.94	4.63	Jain et al. 2009c
Weekly surveys	4/28 – 10/13	2008	4.19	2.79	Jain et al. 2009c
Daily surveys	4/15 – 11/15	2009	8.01	5.34	Jain et al. 2010a
Weekly surveys	4/15 – 11/15	2009	3.7	2.47	Jain et al. 2010a
Cohocton and Dutch Hill, Steuben County, New York – Mixed (agriculture and forest)					
Daily surveys	4/15 – 11/15	2009	40	16	Stantec Consulting 2011
Weekly surveys	4/15 – 11/15	2009	13.8	5.53	Stantec Consulting 2011
Munnsville, Madison and Oneida Counties, New York – Mixed (agriculture and forest)					
Dog searches (recurrence unknown)	4/15 – 11/15	2008	2.9	1.93	Stantec Consulting 2009
Weekly surveys	4/15 – 11/15	2008	0.7	0.46	Stantec Consulting 2009
Noble Wethersfield, Wyoming County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	24.45	16.3	Jain et al. 2011a
Noble Altona, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/15	2010	6.51	4.34	Jain et al. 2011b
Weekly surveys	4/26 – 10/15	2010	3.87	2.58	Jain et al. 2011b
Noble Chateaugay, Franklin County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	3.66	2.44	Jain et al. 2011c

Table H-2 Bat Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bat Fatalities/ Turbine	Number of Bat Fatalities/ MW/Period	
High Sheldon, Wyoming County, New York – Mixed (agriculture and forest)					
Daily and weekly surveys	4/15 – 11/15	2010	3.50	2.33	Tidhar et al. 2011a
Daily and weekly surveys	5/15 – 11/15	2011	2.67	1.78	Tidhar et al. 2011b
Steel Winds I and II, Erie County, New York – Lakeshore (former industrial use)					
Weekly and bi-weekly	3/10 – 5/31, 7/15 – 9/30	2012	6.88-13.01	2.75-2.54	Stantec 2012
Weekly and bi-weekly	3/21 – 5/30, 7/15 – 9/30	2013	15.30	Not Reported	Stantec 2014
Howard, Steuben County, NY					
Daily and Weekly surveys	4/13-11/6	2012	20.09	10.00	
Hardscrabble, Herkimer County, NY					
Daily Surveys	4/15 – 10/15	2012	21.34	10.67	Ritzert et al. 2012
Marble River, New York					
		2014		0.71	Bay et al. 2015

Table H-3 Approximate Regional Number of Bird Fatalities

Project	Number of Turbines	Number of Megawatts (MW)	Approximate Minimum Bird Fatalities/ Turbine/[1]	Approximate Minimum Bird Fatalities/ MW[2]	Approximate Maximum Bird Fatalities/ Turbine[3]	Approximate Maximum Bird Fatalities/ MW[4]
Ball Hill Wind	29	100	19	44	269	563
Arkwright Summit	36	79	24	35	334	445
Cassadaga Wind	58	126	38	55	539	709
Total	**123**	**305**	**81**	**134**	**1,142**	**1,717**

Notes:

1 0.66 birds/turbine/survey period (Jain et al. 2009e). Survey Period Based on 2008 Noble Bliss three-day Survey Rate.

2. 0.44 birds/MW/survey period (Jain et al. 2009e). Survey Period Based on 2008 Noble Bliss three-day Survey Rate.

3 9.29 birds/turbine/survey period (Jain et al. 2007). Survey Period Based on 2006 Maple Ridge Daily Survey Rate.

4 5.63 birds/MW/survey period (Jain et al. 2007). Survey Period based on 2006 Maple Ridge Daily Survey Rate.

Table H-4 Approximate Regional Number of Bat Fatalities

Project	Number of Turbines	Number of Megawatts	Approximate Minimum Bat Fatalities/ Turbine/[1]	Approximate Minimum Bat Fatalities/ MW/[2]	Approximate Maximum Bat Fatalities/ Turbine/[3]	Approximate Maximum Bat Fatalities/ MW/[4]
Ball Hill Wind	29	100	20	46	1,160	1,630
Arkwright Summit	36	79	25	36	1,440	1,288
Cassadaga Wind	58	126	41	58	2,320	2,054
Total	**123**	**305**	**86**	**140**	**4,920**	**4,972**

Notes:

1 0.7 bats/turbine/survey period (Stantec Consulting 2009). Survey Period Based on 2008 Munnsville Weekly Survey Rate.

2 0.46 bats/MW/survey period (Stantec Consulting 2009). Survey Period Based on 2008 Munnsville Weekly Survey Rate.

3 40 bats/turbine/survey period (Stantec Consulting 2011). Survey Period Based on 2009 Cohocton and Dutch Hill Daily Survey Rate. Note that this Project did not implement operational minimizations to reduce bat mortality that Ball Hill would employ.

4 16.3 bats/MW/survey period (Jain et al. 2011a). Survey Period based on 2010 Noble Wethersfield Weekly Survey Rate. Note that this Project did not implement operational minimizations to reduce bat mortality that Ball Hill would employ.

H-2 2012 Bat Acoustic Data Analysis

2012 Bat Acoustic Data Analysis

Introduction

Ball Hill Wind Energy, LLC, a company owned by Renewable Energy Systems Americas, Inc., is continuing the development of the Ball Hill Wind Project (Project), which it proposes to construct and operate in the towns of Villenova and Hanover, Chautauqua County, located in western New York. The Project would include up to 29 wind turbines with a maximum capacity of approximately 100 megawatts. The Project is anticipated to include minor forest clearing activities during construction and other potential operational impacts to resident and migratory bat species. Consequently, pre-construction acoustic bat surveys were warranted.

In April 2012, two AnaBat SD1 bat detectors were deployed on a meteorological (met) tower within the Project Area at approximately 5 and 40 meters above ground level (hereafter referred to as the "low" and "high" detectors, respectively). The detectors recorded bat activity from 30 minutes before sunset to 30 minutes after sunrise from April 12 to October 25, 2012.

Call Analysis Methodology

All recorded bat passes were analyzed using two automated species identification software packages currently approved by the USFWS for presence/probable absence surveys for the federally-listed endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*). These software programs, or automated classifiers, included Bat Call Identification Version 2.7c (henceforth "BCID"; Bat Call Identification, Inc., Kansas City, Missouri) and Kaleidoscope Pro Version 3.1.8 (henceforth "Kaleidoscope"; Wildlife Acoustics, Inc., Maynard, Massachusetts). The Bats of North America (Version 3.1.0) extension was used as the classifier for Kaleidoscope, and a sensitivity setting of -1 "More Sensitive (Liberal)" was used, as required by the USFWS (USFWS 2016). Default filter settings were used for both programs, with the exception of altering the number of minimum pulses for BCID identification from five pulses to two pulses. The species selected for possible identification were specified as big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), eastern small-footed bat (*Myotis leibii*), little brown bat (*Myotis lucifugus*), northern long-eared bat (*Myotis septentrionalis;* NLEB), and tri-colored bat (*Perimyotis subflavus*).

To assess the likelihood of presence of NLEBs within the Project area, a multi-level analysis approach was used that incorporated results from the automated classifiers, maximum likelihood estimations, and independent reviews from three E & E bat specialists with expertise in acoustic identification. This multi-level approach was used in order to reduce potential false-positive identifications. The visual review included a comparison of the bat call in question to a library of known NLEB calls. If either of the automated classifiers identified call files as NLEBs, the panel of three E & E biologists independently reviewed these files. The total number of bat passes identified by BCID and Kaleidoscope, the p-values from the maximum likelihood estimation for presence calculated from each of the automated classifiers, and the consensus of visual confirmation from the E & E qualified bat biologists was then summarized to determine the potential presence of NLEBs within the Project (Table 1).

For each night in which a NLEB was identified by the automated classifiers BCID or Kaleidoscope, presence was determined as "not likely," "possible," or "probable" based on a combination of factors, as outlined below:

- ***Not likely*** – no NLEB bat passes identified by either automated classifier; or NLEB bat passes identified by automated classifier programs were visually confirmed as another species by E & E biologists.
- ***Possible*** – at least one automated classifier program identified the call as a NLEB and was visually confirmed by E & E biologists.
- ***Probable*** – NLEB bat passes identified by both automated classifiers and confirmed visually by E & E biologists.

Results

The automated classifiers suggested that NLEBs were present on 29 detector nights between April 12 and October 25, 2012. In total, 23 call files on 21 distinct nights were preliminarily identified as NLEB by BCID. Kaleidoscope identified 15 call files on 15 distinct nights as NLEBs (Table 1). Both software programs similarly identified seven calls as NLEBs on seven distinct nights. In total, 31 call files originating from low detectors were preliminarily identified as NLEBs by BCID and Kaleidoscope. Only two call files originated from high detectors were identified as NLEBs, both by BCID.

The panel of E & E biologists independently reviewed all files identified as NLEBs by either classifier program. A consensus on visual confirmation for NLEB was achieved on April 17, April 19, and September 2, 2012 (Table 1) and presence is "probable" for those three nights. Based on the previously defined presence determinations, presence of NLEB was also "possible" on three additional nights (June 11, August 7, and August 9, 2012; Table 1). In total, 24 call files identified as NLEBs by BCID or Kaleidoscope were determined by E & E biologists to be either vocalizations of another species (i.e., little brown bat call or eastern red bat feeding buzz) or of poor quality (i.e., too few pulses or fragmented) and incapable of being identified to a specific species.

Discussion

The acoustic bat survey suggests that the NLEB is potentially present within the Project area during the spring, summer, and fall months. Multiple call files were identified as NLEB by the automated classifiers and visually confirmed by E & E biologists; therefore, the presence of this species cannot be ruled out.

Both automated classifiers used in this analysis, BCID and Kaleidoscope, were approved for use by the USFWS (USFWS 2016). These programs are not 100% accurate and there are inherent differences between the algorithms used to identify species by each automated classifier. Consequently, bat passes may be identified incorrectly by these programs and may differ among programs. Visual confirmation by an experienced bat biologist is the only means by which to confidently determine species presence.

Table 1 Identification Matrix and Presence Determination for the Northern Long-Eared Bat

Date	BCID		Kaleidoscope		Visual Confirmation	Presence
	Files Identified	p-value for MLE*	Files Identified	p-value for MLE*		
4/17/2012	1	<0.001	1	0.267	Yes	Probable
4/19/2012	1	<0.001	1	0.267	Yes	Probable
5/15/2012	1	<0.001	0	-	No	Not Likely
5/22/2012	0	-	1	0.267	No	Not Likely
5/24/2012	0	-	1	0.267	No	Not Likely
6/10/2012	0	-	1	0.267	No	Not Likely
6/11/2012	2	<0.001	0	-	Yes	Possible
6/12/2012	1	<0.001	0	-	No	Not Likely
6/15/2012	1	<0.001	0	-	No	Not Likely
6/21/2012	1	<0.001	1	0.267	No	Not Likely
6/28/2012	1	<0.001	0	-	No	Not Likely
7/14/2012	1	<0.001	0	-	No	Not Likely
7/19/2012	1	<0.001	0	-	No	Not Likely
7/24/2012	0	-	1	0.267	No	Not Likely
7/27/2012	0	-	1	0.267	No	Not Likely
7/28/2012	1	<0.001	0	-	No	Not Likely
8/3/2012	1	<0.001	1	0.267	No	Not Likely
8/4/2012	1	<0.001	0	-	No	Not Likely
8/7/2012	0	-	1	0.267	Yes	Possible
8/9/2012	1	<0.001	1	0.267	Yes	Possible
8/12/2012	1	<0.001	1	0.267	No	Not Likely
8/25/2012	0	-	1	0.267	No	Not Likely
8/30/2012	1	<0.001	0	-	No	Not Likely
9/2/2012	1	<0.001	1	0.267	Yes	Probable
9/5/2012	0	-	1	0.267	No	Not Likely
9/6/2012	2	<0.001	0	-	No	Not Likely
9/9/2012	1	<0.001	0	-	No	Not Likely
9/14/2012	1	<0.001	0	-	No	Not Likely
9/25/2012	1	<0.001	0	-	No	Not Likely
Total	**23**	**-**	**15**	**-**	**-**	**-**

* Maximum Likelihood Estimate (MLE) based on Britzke et al. (2002). A p-value less than 0.05 indicates statistical significance support for presence.

H-3 2016 Breeding Bird Survey

Results of 2016 Breeding Bird Surveys at the Ball Hill Wind Energy Project Area Towns of Villenova and Hanover, Chautauqua County, New York

October 2016

Prepared for:

Ball Hill Wind Energy, LLC
11101 W. 120th Avenue, Suite 400
Broomfield, Colorado 80021

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
368 Pleasant View Drive
Lancaster, New York 14086

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List of Abbreviations and Acronyms

Ball Hill	Ball Hill Wind Energy, LLC.
DEIS	Draft Environmental Impact Statement
E & E	Ecology and Environment, Inc.
MW	megawatt
Noble	Noble Environmental Power
NYSDEC	New York State Department of Environmental Conservation
Project	Ball Hill Wind Energy Project
SDEIS	Supplemental Draft Environmental Impact Statement
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

1 Project Background

Ball Hill Wind Energy, LLC (Ball Hill) is developing the Ball Hill Wind Energy Project (project) in the towns of Villenova and Hanover, Chautauqua County, New York. The project area encompasses 9,715 acres and comprises forest stands, pastures, hayfields, and agricultural fields. Construction of the Project would be expected to begin in 2017 and end in 2018.

In 2007, Noble Environmental Power (Noble) performed pre-construction development surveys for the Noble Ball Hill Wind Farm and submitted a Draft Environmental Impact Statement (DEIS) to the town of Villenova and a Joint Application for Permits to the New York State Department of Environmental Conservation (NYSDEC) and the United States Army Corps of Engineers (USACE). However, Noble suspended development of the project without finalizing these permitting tasks. In late 2010, DEGS Wind I, LLC (DEGS) purchased the project from Noble and submitted an amended application and a Supplemental DEIS (SDEIS) in 2012. In 2015, Ball Hill continued the permitting of the project that was initiated by DEGS and submitted another version of an SDEIS in January 2016, reflecting a revised project area. Ball Hill is currently proposing to construct the project with 29 3.45 megawatt (MW) turbines in a slightly revised formation than previously proposed by Noble and DEGS.

Ecology and Environment, Inc. (E & E) previously conducted breeding bird surveys for DEGS during June 2011 at the proposed project area as part of the pre-construction avian studies. E & E conducted another round of breeding bird surveys for Ball Hill in June 2016. This report summarizes the results of the 2016 breeding bird surveys and supplements the data and analyses provided by previous surveys in the project area (E & E September 2008; E & E August 2011).

2 Methodology

Because June is the primary breeding season for bird species in Western New York and it is the best time to detect local resident populations, supplemental breeding bird surveys were conducted by an E & E avian specialist in two sets of surveys, encompassing four days each, between June 6 and June 24, 2016. The two sets of four morning surveys were approximately two weeks apart, following methods in the NYSDEC Guidelines (NYSDEC 2016).

The breeding bird surveys were conducted on 19 transects within the proposed project area (see Figure 2-1). The objectives of the surveys were to document the occurrence and distribution of bird species in the project area as well as to identify critical habitat of listed species and areas of greater/lesser bird activity.

Nineteen survey transects were distributed throughout the range of habitats available within the project area. Survey transects were established at potential turbine or transmission line locations throughout the project area where Ball Hill has land access on leased parcels. Sixteen of the transects (70%) were placed with one end near potential turbine locations; these transects were also in the vicinity of planned access roads and collection lines. Two transects (10%) were placed along the proposed transmission line. The remaining four transects (20%) were considered "control" transects and were not associated with preliminary turbine locations (Figure 2-1). Each transect was 300 meters long and included six 50-meter survey blocks, based on recommendations outlined in NYSDEC's *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (Guidelines) (June 2016), which created a 300-meter by 100-meter rectangular survey plot that encompasses 30,000 square meters bisected by the transect line.

Land-use (cover type) was categorized as forest stands (beech/maple mesic, hemlock – northern hardwoods, mixed deciduous/coniferous forest), pasture/hayfield, and cultivated agriculture habitats. Beech/maple mesic habitat was the dominant habitat type for proposed wind turbines and represented 42% of the survey effort (8 transects); the remaining 58% (11 transects) were pasture/hayfield habitats (6 transects), cultivated agriculture (2 transects), hemlock–northern hardwoods (2 transects), and mixed forest (1 transect) habitats. See Appendix A, Table A-1, for a list of all survey transects and associated habitat.

All birds seen or heard were identified, recorded, and parsed into two groups:

- those within 50 meters on either side of the transect; and
- those identified outside of 50 meters on either side of the transect.

The surveyor stopped every 50 meters (i.e., at the beginning and end of each block), for a total of seven stops per transect. At each stop, the surveyor stopped for a period of one to three minutes, based on the surveyor's discretion, to allow birds to acclimate to the surveyor's presence. The surveyor remained at the stop for five more minutes, recording species heard or seen and then continued to slowly walk along the transect. Birds detected between the 50-meter stops were also recorded. Surveys were conducted between a half-hour prior to sunrise (approximately 5:30 a.m.) to approximately 10:30 a.m. during favorable weather conditions. An exception occurred on June 9, 2016, in which thick vegetation along transect WO-1 delayed the survey end time to 10:51 a.m.; however, conditions were still conducive for surveys as birds were still active. To compensate for generally higher levels of bird activity in the early morning compared with late morning, surveys were conducted along transects at the different times in the morning as travel logistics permitted.

For each bird detection, the surveyor recorded species, number of birds per sighting, approximate distance from the observer, how the bird was detected (visual or auditory), whether the bird was within 50 meters from the observer, and any additional notes, including behavior. Care was taken to avoid double counting individuals, particularly when auditory identifications were made in forested habitats, which could potentially represent double counting of some individuals due to local movements. Bird behaviors, such as nesting behaviors, singing, foraging, or flying, were recorded. Standard weather data (e.g., temperature, cloud cover, wind speed and direction) were also recorded at the start and end of each 300-meter transect survey.

Although all birds were recorded regardless of distance from the transect, only birds located within approximately 50 meters of the transect were used to assess species diversity and habitat use. Additional bird data collected beyond 50 meters of the transects are presented in Appendix B, Table B-1.

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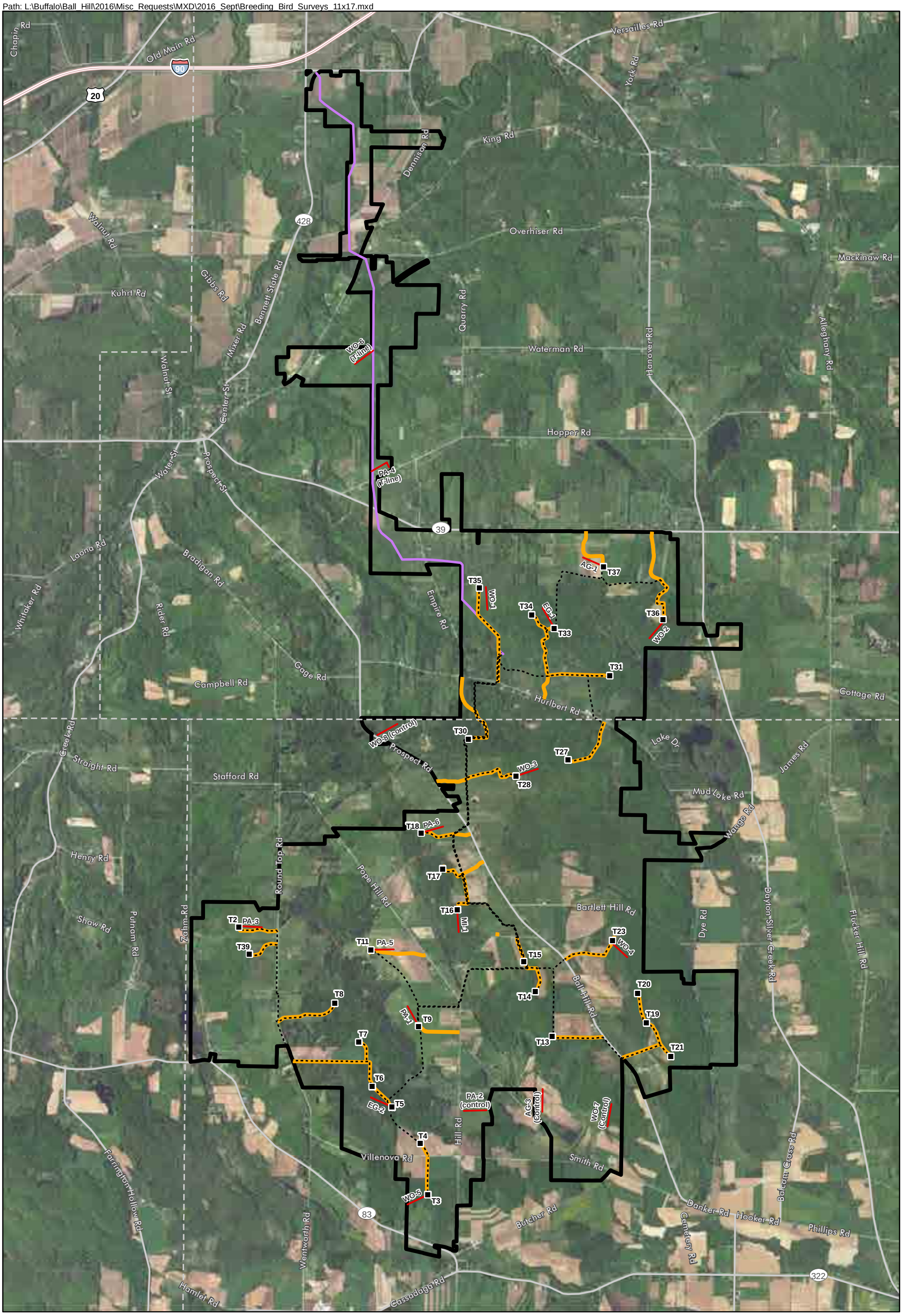

Legend

- Turbine
- Breeding Bird Survey Transect Lines
- Collection Line
- Access Road
- Transmission Line
- Local Street
- Project Area

Figure 2-1
Breeding Bird Survey Transects
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.5 1 Miles

N

Source: ESRI 2012, 2016.

3 Results

The first set of breeding bird surveys was conducted on June 6, 7, 9, and 13, 2016. The second set was conducted on June 21, 22, 23, and 24, 2016. A total of 1,954 birds comprising 80 species were identified (see Appendix B, Table B-1). Of these, 67 species (962 individuals [49%]) were within 50 meters of the transects. Among those individuals within 50 meters of the transect, 151 (16%) were detections of birds flying over the transect rather than using the habitat. The total number of individuals located within 50 meters of each transect ranged from 22 to 99 (22 to 90 for non-flyover detections), with an average for all transects of 50.7 individuals per transect (average of 42.7 for non-flyover detections). Total species per transect within 50 meters (including fly-over detections) ranged from 8 to 26, with an average for all transects of 15.9 species per transect.

The most common species detected within 50 meters of the transects were bobolink (*Dolichonyx oryzivorus*) (113 birds), red-winged blackbird (*Agelaius phoeniceus*) (94), cedar waxwing (*Bombycilla cedrorum*) (51), red-eyed vireo (*Vireo olivaceus*) (51), and song sparrow (*Melospiza melodia*) (50). The most common flyover species included ring-billed gull (*Larus delawarensis*) (38), cedar waxwing (35 [69% of 51 detections]), American goldfinch (*Spinus tristis*) (18), and common grackle (*Quiscalus quiscula*) (17).

Bird diversity and abundance along survey transects was influenced partly by habitat type (Table 3-1). Based on the birds identified within 50 meters of the transect data, the greatest species diversity was observed in beech-maple mesic forest (44 species), followed by hemlock-northern hardwood forest (29 species) and pasture/hayfield habitat (29 species). The lowest species diversity was observed along the one mixed forest transect (15 species). A similar observation was made for the average number of species detected per transect by habitat type, where the greatest species diversity was observed within beech-maple mesic forest and hemlock-northern hardwood forest habitats (18 and 19.5 species per transect, respectively); however, pasture/hayfield habitat had lower average diversity (12.5 species per transect).

Table 3-1 June 2016 Survey Results by Habitat for Bird Detections within 50 Meters of the Transect

	Beech-Maple Mesic	Hemlock-N. Hardwoods	Mixed Forest	Pasture/ Hayfield	Agriculture
Number of Transects	8	2	1	6	2
Total Species	44	29	15	29	21
Average Number of Species per Transect	18	19.5	-*	12.5	14
Average Number of Birds per Transect	42	46.5	-*	69	38
Total Number of Birds	**337**	**93**	**40**	**416**	**76**

Note:

* Because there was only one mixed forest habitat among the transects, the "average number of species" and "average number of birds" per transect could not be computed.

The total number of birds identified by habitat type ranged from 40 to 416 individuals. The average number of birds per transect within each habitat type was highest for pasture/hayfield (69 birds per transect) compared with the other habitat types. Agricultural habitat had the lowest average number of birds (38 birds per transect). All bird species and numbers identified during surveys were typical of the habitats examined.

The wooded survey transects EG-2, WO-1, WO-8, and WO-7 yielded the greatest number of species (26, 23, 22, and 22, respectively), while the greatest numbers of birds were detected at pasture/hayfield transects PA-1, PA-2, and PA-6 (99, 74, and 73, respectively). Transect PA-1 had the highest number of birds within 50 meters yet had the lowest species diversity (8 species). (Transect PA-1 had a large number of bobolinks present compared with other transects. However, the transect was set farther from trees and woods than the other transects, which may in part explain the low diversity observed.) Survey transect WO-6 had the lowest number of birds (22) and the second-lowest number of species (9 species).

During the surveys, some birds were observed in small family groups and were also observed on occasion carrying food or nest material, all signs of breeding behavior. Early to mid-June is peak breeding time for many bird species and, based on the observed behavior and time of year, it is highly likely that the vast majority of birds identified in the project area were local breeders.

No threatened or endangered species were observed during the surveys or time spent traveling throughout the project area (during non-survey time). One grasshopper sparrow (*Ammodramus savannarum*) and one sharp-shinned hawk (*Accipiter striatus*) were identified, both of which are species of special concern in New York State. The grasshopper sparrow was heard singing several times near the mid-point of transect PA-3 on June 6, 2016. The sharp-shinned hawk was de-

tected as a flyover at transect PA-4 on June 24, 2016. Based on the time of year detected, the habitat, and their known breeding range, it is likely that these two birds were breeding individuals.

The time it took to complete each 50-meter survey block for each transect varied based on the level of bird activity at the time and the terrain traversed. The average completion time was 45.7 minutes per transect. Nearly all surveys were conducted under weather conditions that were not likely to impact detection rates of birds, e.g., precipitation or strong winds. Weather conditions on the mornings varied from clear to overcast, and temperatures ranged from 44ºF to 73ºF, with typically calm or light winds that at times increased to 6 to 9 miles per hour. The first two days of surveys were notably windier than the other six days. On June 6, wind gusts were as high as 16 miles per hour late in the morning, while winds infrequently reached 12 miles per hour on June 7, 2016. Strong winds have the potential to interfere with an observer's ability to detect birds singing and calling. In response to increasing winds on June 6, only four surveys were conducted instead of the usual five. Only one of these four surveys was completed in wooded habitat, where auditory detections are more frequent than visual detections.

4 Discussion

The results of the 2016 breeding bird surveys were consistent with bird species diversity and abundance expected for the baseline habitat types found in Western New York. The total number of species and numbers of individual birds detected during the survey was consistent with historic resident breeding bird data for this time of year.

Overall, transects in pasture/hayfield habitats had the highest number of birds, dominated by bobolinks and red-winged blackbirds and, to a lesser extent, savannah sparrows (*Passerculus sandwichensis*) and song sparrows. Several of the wooded habitats also had multiple individuals of several species such as red-eyed vireo, hooded warbler (*Setophaga citrina*), and other forest species occurring along a single transect. Forested habitats in general also had relatively high species diversity, reflecting habitat variations within certain transects, which likely provide different ecological niches for the bird community. Survey transect EG-2 is a notable example of heterogeneous habitat: this transect was characterized by hemlock groves interspersed with open areas, which are dominated by herbaceous or shrub plant species, providing a wider array of habitats within that transect. Transect EG-2 also had the greatest number of bird species detected, including a number of species that prefer shrub habitat and species associated with canopied forest, such as the northern cardinal (*Cardinalis cardinalis*), red-eyed vireo, and mourning warbler (*Geothlypis philadelphia*).

The two agricultural transects had the lowest bird species diversity and numbers of individuals. Both agricultural transects included a hedgerow, where most of the recorded birds were congregated. Although small in area, the hedgerow provided habitat suitable for a greater variety of birds than the cornfield habitat alone.

Breeding bird surveys at the site in 2007, 2008, and 2011 (E & E August 2011) used survey points placed at proposed wind turbine locations; these surveys were conducted using the recommended protocol as discussed with NYSDEC. The methods were modified from United States Geological Survey (USGS) Breeding Bird Survey methods (USGS 2007) and the NYSDEC guidelines for wind energy projects used at the time (NYSDEC 2009). The survey points used in 2007 were visited on two occasions and surveys were three minutes in length. The survey points used in 2008 and 2011 were visited on one occasion for five minutes. The results of the three surveys were consistent across years (see Table 4-1 for comparison of results).

Table 4-1 Breeding Bird Survey Results for 2007, 2008, and 2011 at Stationary Survey Points

	2007			
	6/11	6/26	2008	2011
Number of Survey Points	13	13	26	25
Number of Species Identified	56	60	72	66
Number of Birds	250	359	653	502
Average Species per Point	11.2	15.2	14.1	11
Average Birds per Point	19.2	27.6	25.1	20.8

Source: E & E August 2011

In the time between surveys conducted in 2011 and 2016, NYSDEC revised the guidance on survey methods for wind energy projects, including a change to transect-based breeding bird surveys. E & E coordinated with NYSDEC and complied with the new protocol for the 2016 breeding bird surveys. Consequently, the results of the 2016 breeding bird surveys are not directly comparable to the results from previous years due to the differences in survey methodologies. The total number of species detected was somewhat higher in 2016 (80 species) than previous years but is comparable when including only birds within 50 meters of the transect (67 species). The two most common species detected during the 2016 breeding bird surveys were bobolink and red-winged blackbird, which were the most abundant species detected in the 2011 surveys. The number of birds detected in 2016 surveys in total (1,954) and birds within 50 meters (962) were higher than previous years. This observation is most likely a result of longer total survey time in 2016 compared with previous years.

No federally or state-listed threatened or endangered species were identified during the 2007, 2008, 2011, and 2016 breeding bird surveys; however, one grasshopper sparrow (New York State species of special concern) was detected during the 2008 surveys and again in 2011 at an agricultural location (the closest 2016 transect is AG-1) dominated by wheat and other tall grasses. One grasshopper sparrow was also detected in 2016 along transect PA-3, which is dominated by tall grasses and scattered shrubs.

Based on the 2016 breeding bird survey results, there are no deviations from the findings in the DEIS, Appendix J, Bird and Bat Risk Assessment (E & E September 2008) with respect to breeding birds and potential impacts on them from construction and operation of the project.

This is the fourth year of pre-construction breeding bird surveys. Collectively, the data from 2016 and previous years will provide baseline data from the pre-construction to post-construction phases of development of the proposed project.

5 References

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A Breeding Bird Survey Transect Information

Table A-1 Ball Hill Breeding Bird Survey Transects (2016), with Nearest Road and Primary Habitat Description

Transect Name	Near Turbine or Control	Nearest Road	Primary Habitat Description
AG-1	Turbine	Route 39	Agriculture: Cornfield
AG-3	Control	Smith	Agriculture: Cornfield
EG-1	Turbine	Hulbert	Hemlock-Northern Hardwoods
EG-2	Turbine	Villenova	Hemlock-Northern Hardwoods
MI-1	Turbine	North Hill	Mixed Deciduous/Conifer Forest
PA-1	Turbine	North Hill	Hayfield
PA-2	Control	North Hill	Natural Pasture
PA-3	Turbine	Round Top	Natural Pasture
PA-4	T-line	Hopper	Natural Pasture
PA-5	Turbine	Pope Hill	Hayfield
PA-6	Turbine	Prospect	Hayfield
WO-1	Turbine	Empire	North Half Cottonwood and Shrubs; South Half Beech-Maple Mesic
WO-2	Turbine	Hanover	Beech-Maple Mesic
WO-3	Turbine	Prospect	Beech-Maple Mesic
WO-4	Turbine	Prospect	Beech-Maple Mesic, Selectively Harvested
WO-5	Turbine	Route 83	Beech-Maple Mesic
WO-6	T-line	Dennison	Beech-Maple Mesic
WO-7	Control	Smith	Beech-Maple Mesic
WO-8	Control	Prospect	Beech-Maple Mesic

B Breeding Bird Survey Data

Table B-1 Birds Identified During the 2016 Breeding Bird Survey

Common Name	Total Birds Identified	Birds Identified at Less than or Equal to 50 Meters	Birds Identified at More than 50 Meters
Canada Goose	2	0	2
Mallard	2	0	2
Wild Turkey	1	0	1
Great Blue Heron	3	0	3
Turkey Vulture	15	4	11
Sharp-shinned Hawk	1	1	0
Red-tailed Hawk	6	1	5
American Kestrel	1	0	1
Killdeer	21	15	6
Ring-billed Gull	57	38	19
Mourning Dove	22	1	21
Yellow-billed Cuckoo	8	2	6
Ruby-throated Hummingbird	1	1	0
Red-bellied Woodpecker	4	0	4
Yellow-bellied Sapsucker	21	15	6
Downy Woodpecker	8	7	1
Hairy Woodpecker	6	1	5
Northern Flicker	12	1	11
Pileated Woodpecker	3	0	3
Eastern Wood-Pewee	25	7	18
Acadian Flycatcher	19	7	12
Alder Flycatcher	3	1	2
Willow Flycatcher	14	2	12
Eastern Phoebe	1	0	1
Great Crested Flycatcher	16	5	11
Eastern Kingbird	7	4	3
Warbling Vireo	4	2	2
Red-eyed Vireo	79	51	28
Blue Jay	40	10	30
American Crow	118	4	114
Tree Swallow	6	4	2
Barn Swallow	31	23	8
Black-capped Chickadee	36	27	9
Tufted Titmouse	1	0	1
Red-breasted Nuthatch	3	3	0
White-breasted Nuthatch	6	3	3
House Wren	16	4	12
Winter Wren	4	1	3
Golden-crowned Kinglet	4	0	4
Eastern Bluebird	1	0	1
Veery	31	19	12
Hermit Thrush	5	2	3

Table B-1 Birds Identified During the 2016 Breeding Bird Survey

Common Name	Total Birds Identified	Birds Identified at Less than or Equal to 50 Meters	Birds Identified at More than 50 Meters
Wood Thrush	57	20	37
American Robin	62	44	18
Gray Catbird	27	15	12
Brown Thrasher	3	2	1
Northern Mockingbird	1	0	1
Cedar Waxwing	61	51	10
Ovenbird	22	6	16
Louisiana Waterthrush	2	0	2
Mourning Warbler	7	7	0
Common Yellowthroat	54	23	31
Hooded Warbler	53	38	15
American Redstart	14	10	4
Blackburnian Warbler	7	6	1
Yellow Warbler	32	17	15
Chestnut-sided Warbler	8	3	5
Black-throated Blue Warbler	6	3	3
Black-throated Green Warbler	28	14	14
Canada Warbler	2	2	0
Eastern Towhee	16	10	6
Chipping Sparrow	6	1	5
Field Sparrow	21	1	20
Savannah Sparrow	47	40	7
Grasshopper Sparrow	1	1	0
Song Sparrow	86	50	36
Dark-eyed Junco	22	14	8
Scarlet Tanager	23	15	8
Northern Cardinal	17	2	15
Rose-breasted Grosbeak	16	7	9
Indigo Bunting	18	4	14
Bobolink	137	113	24
Red-winged Blackbird	127	94	33
Eastern Meadowlark	7	1	6
Common Grackle	199	18	181
Brown-headed Cowbird	45	23	22
Orchard Oriole	1	1	0
Baltimore Oriole	5	1	4
Purple Finch	2	1	1
American Goldfinch	48	38	10
Total Birds	**1,954**	**962**	**992**

H-4 2016 Eagle Survey

2016 Eagle Surveys at the Proposed Ball Hill Wind Energy Project Chautauqua County, New York

October 2016

Prepared for:

Ball Hill Wind Energy, LLC
11101 W. 120th Avenue, Suite 400
Broomfield, Colorado 80021

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
368 Pleasant View Drive
Lancaster, New York 14086

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List of Abbreviations and Acronyms

agl	above ground level
Ball Hill	Ball Hill Windpark, LLC
BGEPA	Bald and Golden Eagle Protection Act
DECPG	Draft Eagle Conservation Plan Guidance
DEIS	Draft Environmental Impact Statement
FEIS	Final Environmental Impact Statement
E & E	Ecology and Environment, Inc.
ECL	Environmental Conservation Law
MW	megawatt
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
project	Ball Hill Windpark
RSZ	rotor-swept zone
SEQRA	(New York) State Environmental Quality Review Act
USFWS	United States Fish and Wildlife Service

1 Background and Study Area

1.1 Wind Project Description

Ball Hill Wind Energy, LLC (Ball Hill) is proposing to construct and operate a wind energy project in the Chautauqua County towns of Villenova and Hanover, located in western New York State. The proposed project area encompasses 9,715 acres and comprises forest stands, pastures, hayfields, and agricultural fields. The project would include installing and operating 29 wind turbines (23 in the town of Villenova and 6 in the town of Hanover), with a total capacity of 100 megawatts (MW). Ball Hill proposes to install Vestas Model V126-3.45MW turbines. Each turbine is a 3-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of approximately 413 feet (126 meters). The turbine rotor and the nacelle are mounted atop a tubular tower giving a rotor hub height of 285 feet (87 meters). The maximum height for the turbine is 492 feet when a rotor blade is at the top of its rotation (150 meters). The project would also include the construction and use of access roads, an underground electrical collection system, a collection substation and interconnection substation in the town of Hanover, an overhead 115-kilovolt transmission line in the town of Hanover, and an operations and maintenance (O&M) facility within the project area. Construction of the project is expected to begin in 2017 and finish in 2018.

Ecology and Environment, Inc. (E & E) conducted eagle use point-count surveys from March 2012 through February 2013 at the proposed project area as part of the pre-construction avian studies, and initiated another year of eagle use point-count surveys for Ball Hill in March 2016. This report summarizes the results of the 2016 eagle surveys conducted to date (September 2016). Eagle surveys will continue through February 2017, at which point this report will be updated.

1.2 Project Permitting

The project is subject to the New York State Environmental Quality Review Act (SEQRA) (Environmental Conservation Law [ECL] Article 8) and its implementing regulations (6 New York Codes, Rules and Regulations [NYCRR] Part 617). Following the lead agency's (town of Villenova) acceptance of a Supplemental Draft Environmental Impact Statement (DEIS), Ball Hill is preparing a Final Environmental Impact Statement (FEIS). This report is being submitted in support of the FEIS and as part of continued coordination with the United States Fish and Wildlife Service (USFWS) and the New York State Department of Environmental Conservation (NYSDEC) regarding Bald Eagle issues. E & E is working with Ball Hill on the permitting for this project.

1.3 Eagle Surveys Overview

The pre-construction surveys are based on the USFWS's *Eagle Conservation Plan Guidance, Module 1 – Land Based Wind Energy, version 2* (USFWS 2013), referred to as ECPG in this report. This study was designed to document the movements of eagles in accordance with the recommended methods and metrics outlined in the ECPG. The 2016-2017 data will supplement data collected from numerous avian studies that have been conducted in the project area since 2006.

Ball Hill and E & E met with the USFWS in Cortland, New York, on May 10 and with NYSDEC on August 10, 2016, to review the survey results to date.

2 Methodology

2.1 Eagle Surveys

E & E is conducting eagle use point-count surveys for a 12-month period. During each round of surveys, 13 points are visited for 1 hour once per month, requiring a total of 2 field days per month (see Figure 2-1). Point locations were concentrated in the areas of proposed turbines (points 1 through 10), and three points were surveyed along the proposed transmission line (points 11 through 13). The completed survey effort will include approximately 156 total survey hours and will supplement the 312 survey hours previously completed at the site in 2012 and 2013.

Surveys generally begin at 8:00 a.m. and end at approximately 5:00 p.m., with alternating start and end points. Surveys are conducted during all weather conditions, with the exception of conditions that limit visibility to below 200 meters vertically and 800 meters horizontally. In order to provide an efficient and standardized account of eagle exposure, eagles are recorded in flight within one-minute intervals. One exposure minute is recorded for any eagle observed perching throughout the survey window. The time, direction, behavior, age, number of individuals, and approximate flight height for eagle flights are documented on field survey forms, as recommended in the ECPG. The observer also records weather data, including wind direction and speed, temperature, precipitation, and cloud cover.

2.2 Characterization of the Local Nesting Population

E & E obtained status information from NYSDEC's 2015 and 2016 monitoring of the local Bald Eagle nests. In addition to the eagle use point-count surveys, the E & E avian surveyor visited the two Bald Eagle nests that are closest to the project area during each survey day from March 2016 through September 2016 and documented eagle observations and nest status to the extent possible from nearby roadside locations. E & E provided information to NYSDEC regarding Bald Eagle activity and nesting from these two nests.

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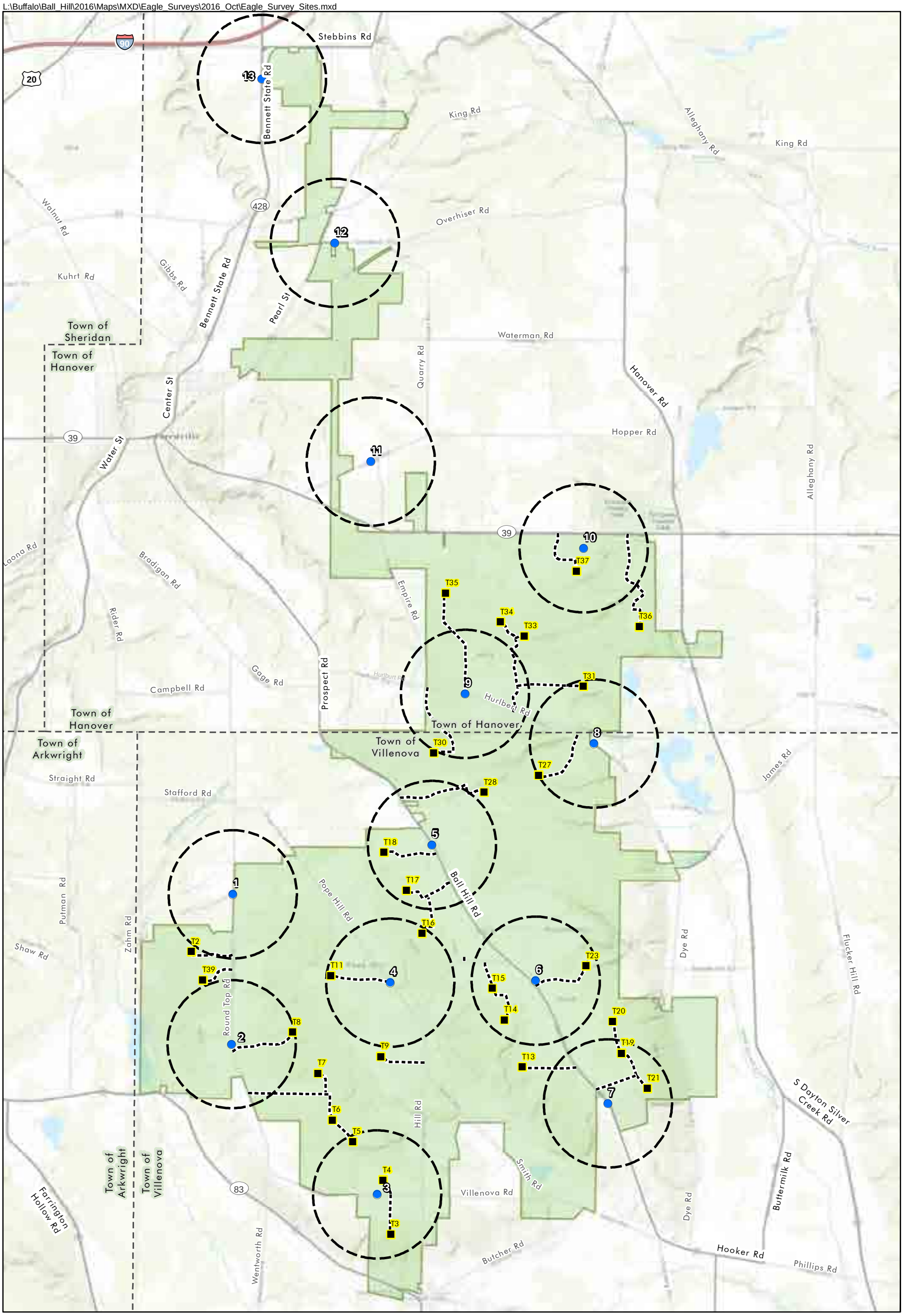

Figure 2-1
Eagle Survey Sites
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

3 Results

3.1 2016 Eagle Survey Results

A total of 36 Bald Eagle (*Haliaeetus leucocephalus*) sightings and no Golden Eagle (*Aquila chrysaetos*) sightings were recorded within the 800-meter-radius survey plots during the point-count surveys conducted from March 2016 through September 2016 (see Tables 3-1 and 3-2 and Appendix A, Table A-1). The eagle survey effort to date amounted to a total of 91 hours (5,460 minutes) of survey time. Bald Eagles were identified in the project area during all seven monthly survey rounds conducted to date. No Golden Eagles were identified during the seven survey rounds. Figure 3-1 depicts all of the eagle flight paths within each survey point to date. The mean sighting rates in the project area (not including incidental sightings) were 0.40 Bald Eagles per hour (see Table 3-1) and 0.00 Golden Eagles per hour.

The greatest number of eagle observations (14) were made at point 12, followed by points 11 and 13 (5 observations each), points 4 and 7 (3 observations each), point 9 (2 observations), and points 1, 3, 8, and 10 (1 observation each) (see Table 3-1). Sighting rates by point ranged from 0.00 to 2.00 eagles per hour (see Figures 3-2 and 3-3). Two incidental Bald Eagle sightings were made. One incidental Bald Eagle was observed to the east within the survey radius, following the completion of the survey at point 2 on April 25, 2016, circling in the rotor-sweep zone (RSZ). A second incidental Bald Eagle was observed to the east, outside of the survey radius of point 13, on September 1, 2016, gliding north within the RSZ.

Table 3-1 Eagle Sightings at Survey Points within the Project Area, March 2016 through September 2016

Survey Point	3/14 and 3/22	4/6 and 4/25	5/7 and 5/25	6/8 and 6/27	7/3 and 7/15	8/14 and 8/23	9/1 and 9/23	Sightings per Point
Bald Eagles								
1	0	1	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	0	1
4	1	0	1	0	0	0	1	3
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	3	0	0	0	0	0	3
8	0	0	1	0	0	0	0	1
9	0	1	0	0	1	0	0	2
10	0	0	0	0	0	0	1	1
11	0	0	3	0	0	1	1	5
12	0	0	0	1	2	0	11	14
13	0	1	0	0	0	0	4	5
Total Bald Eagles	**1**	**6**	**5**	**1**	**3**	**2**	**18**	**36**
Golden Eagles								
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
Total Golden Eagles	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Survey Time (mins.)	780	780	780	780	780	780	780	5,460
Total Survey Time (hrs.)	13	13	13	13	13	13	13	91
Bald Eagle Sightings/ Survey Period (in hrs.)	**0.08**	**0.46**	**0.38**	**0.08**	**0.23**	**0.15**	**1.38**	**0.40**
Golden Eagle Sightings/ Survey Period (in hrs.)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table 3-2 Eagles Sighted Below 200 Meters AGL

Species	Number of Eagle Sightings	Number of Eagle Sightings below 200 meters agl	Percentage
Bald Eagle	36	23	64%
Golden Eagle	0	0	0%

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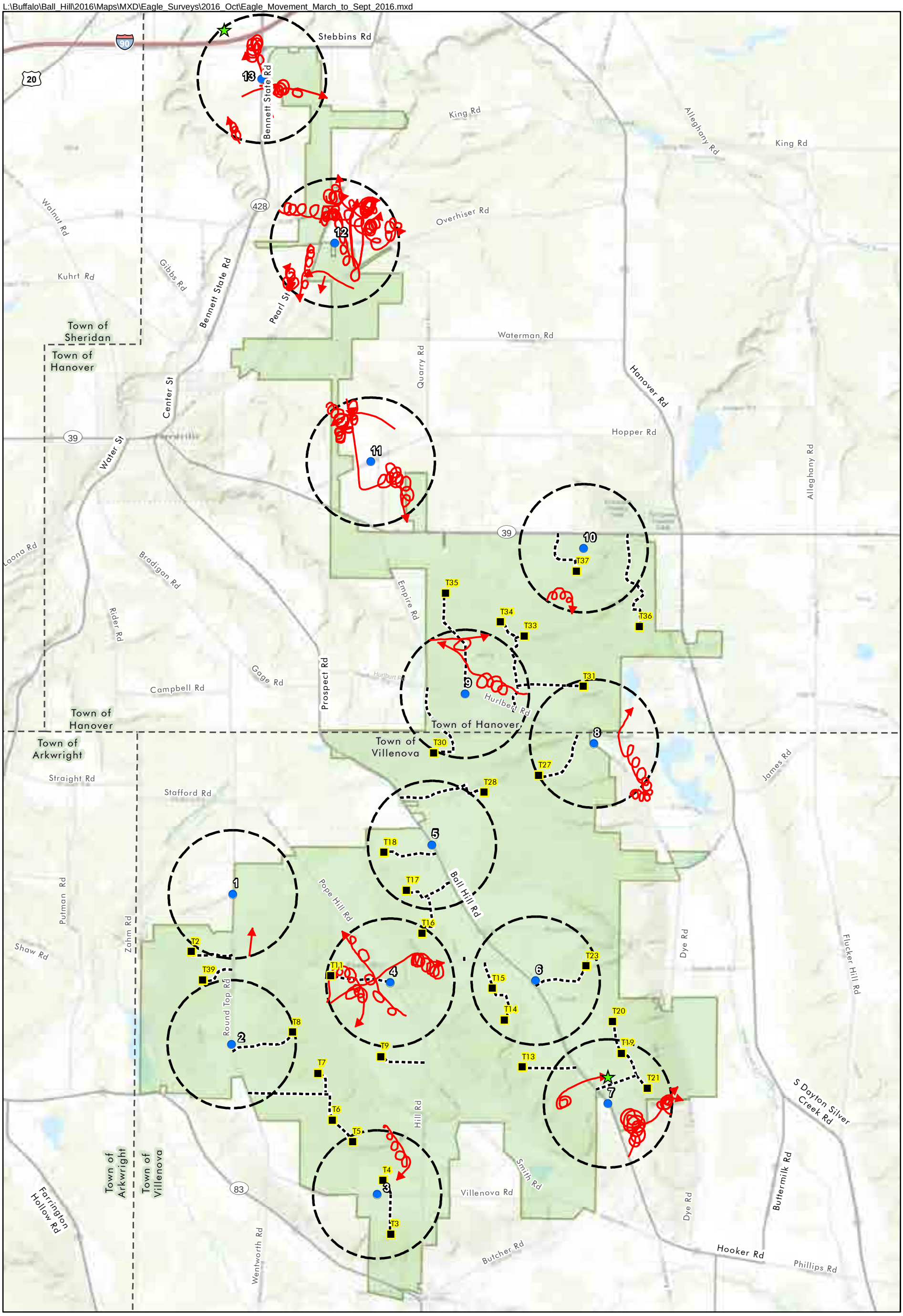

Figure 3-1
Eagle Movements, March – September 2016
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

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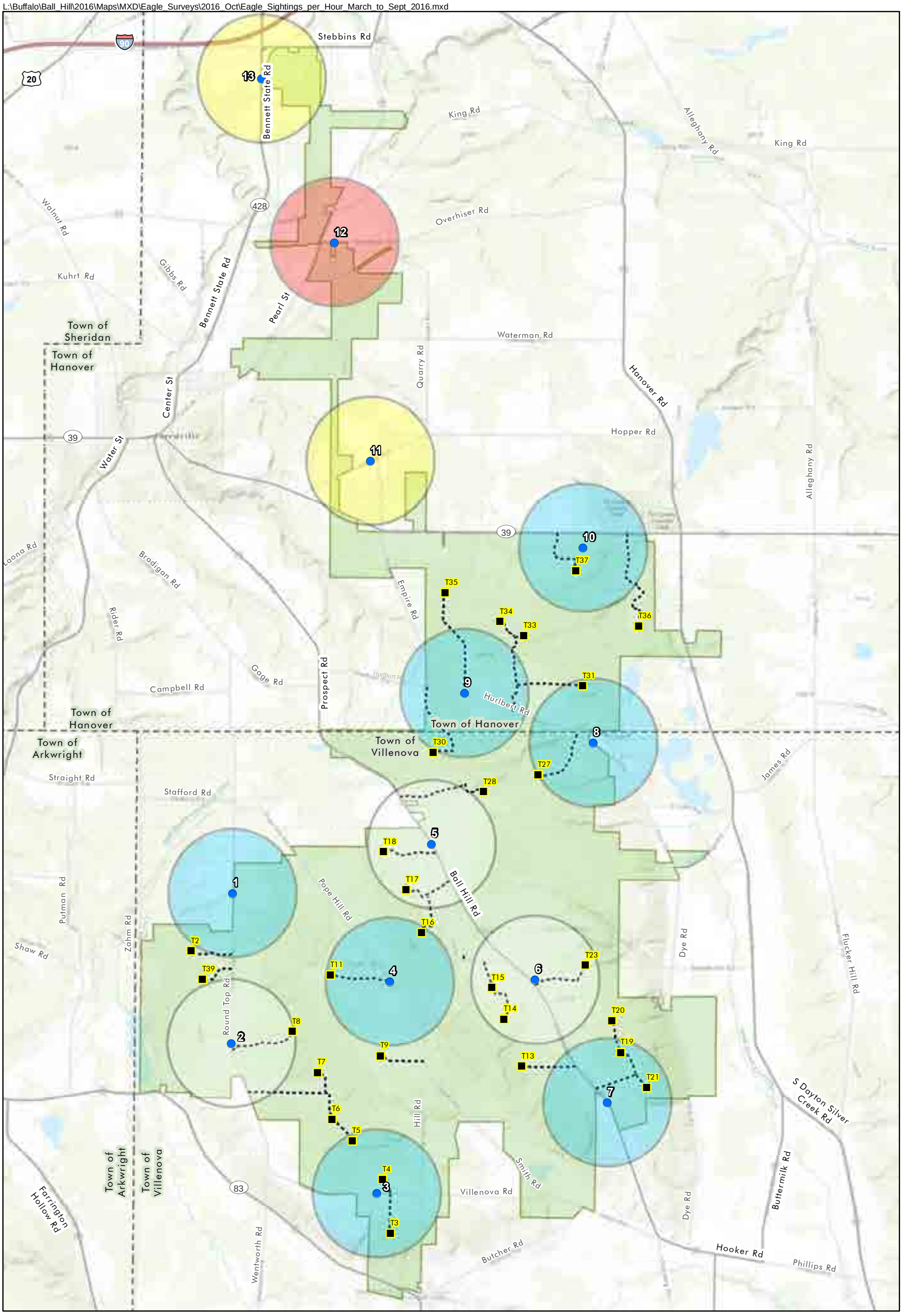

Figure 3-2
Bald Eagle Sightings per Hour
March – September 2016
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

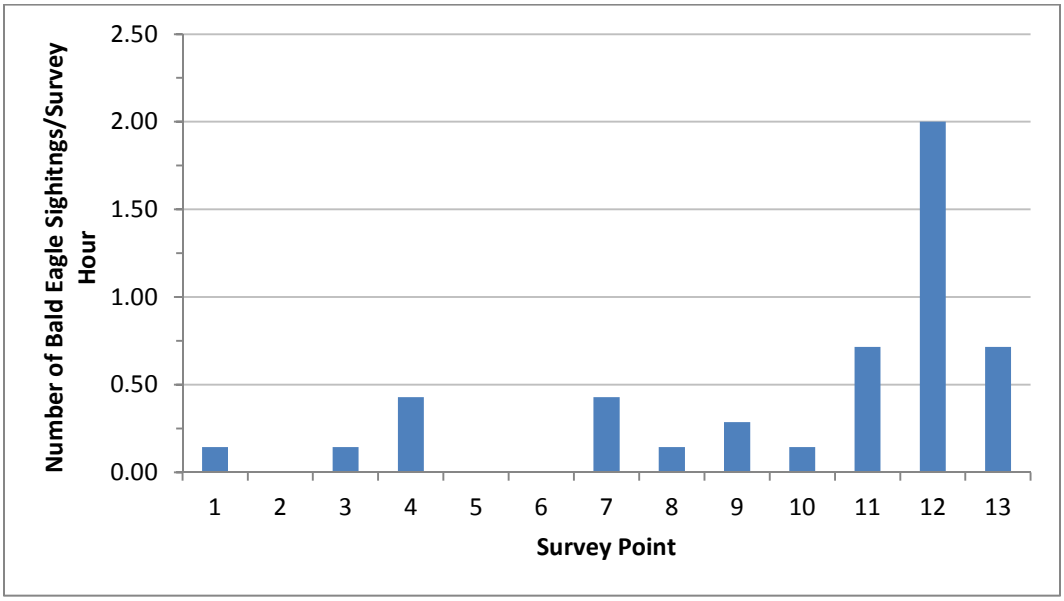

Figure 3-3 Eagle Mean Use (Number of Bald Eagle Sightings/Survey Hour) by Survey Point (March through September 2016)

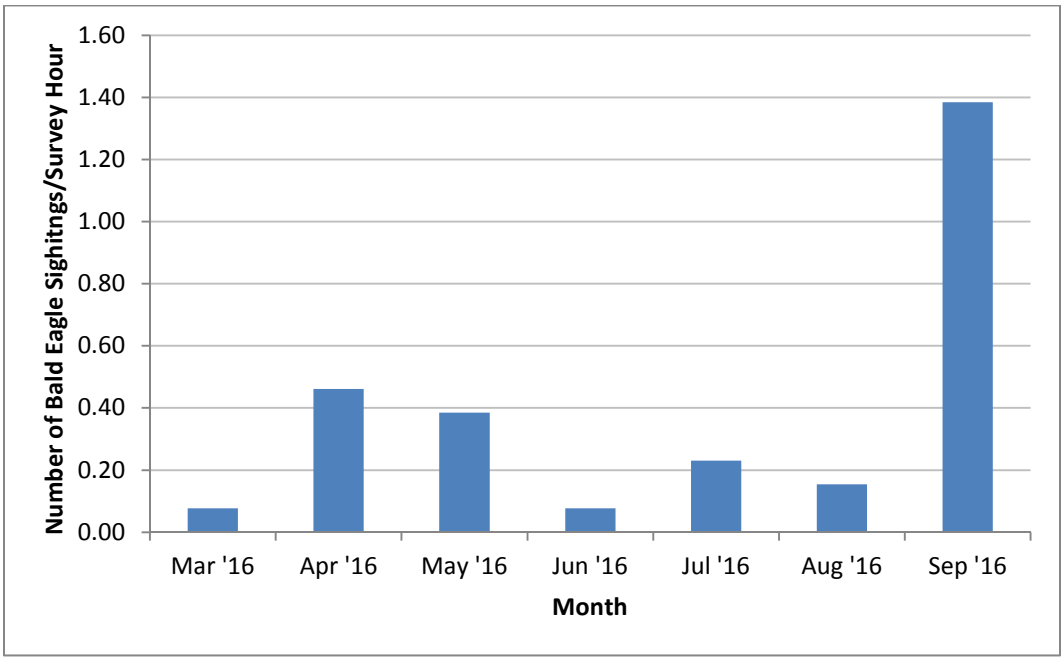

Figure 3-4 Eagle Mean Use (Number of Bald Eagle Sightings/Survey Hour) by Month (March through September 2016)

Bald Eagle sightings within the project area ranged from 1 to 18 sightings per survey round (see Table 3-1). Table 3-1 and Figure 3-4 present eagle detection rates based on survey effort per month. Detection rates of Bald Eagles were highest during September, with 1.38 eagles per survey hour; April and May had the next highest detection rates, ranging from 0.38 to 0.46 eagles/hour during this period. Lower Bald Eagle detection rates were documented in the other months (0.08 to 0.23 eagles/hour). Golden Eagles were not recorded during the survey period (0.00 eagles/hour).

Of the 36 eagle sightings observed during the point-count surveys to date, 64% (23 sightings) were observed flying below 200 meters above ground level (agl) for at least a portion of the viewing time. Approximately 58% (21 sightings) of the eagles observed were recorded flying in the RSZ.

Of the 36 Bald Eagle sightings recorded during the surveys, 17 were adult eagles and 19 were immature. In general, adult Bald Eagles were observed throughout the survey period except for August. Immature Bald Eagles were observed during the April, May, August, and September surveys. Most of the sightings of immature Bald Eagles were likely transient eagles.

Weather conditions were conducive to Bald Eagle sightings during all survey dates (see Appendix B, Table B-1). Precipitation was limited to approximately 15 minutes of light rain on August 14, 2016 (see Appendix B). On most survey dates, temperature rose slowly throughout the day; the coolest temperatures were recorded during the March surveys, while the warmest were recorded during the July surveys. The lowest maximum recorded temperature was 46°F on April 6, 2016, and the highest maximum recorded temperature was 82°F on June 27, 2016. Winds and cloud cover were variable during most survey periods and across all survey dates (see Appendix B).

3.2 Bald Eagle Nests

In 2016, there were two known Bald Eagle nests in the close vicinity of the project area, plus several other Bald Eagle nests within 10 miles of the project area. Bald Eagle nest locations are considered sensitive information; therefore, no figures in this report identify these nest locations. The descriptions below of the nests in the vicinity (i.e., within approximately 10 miles) of the project area include the “Thruway nest” and the “Hanover nest”, which were monitored during the 2016 field season.

- The “Thruway nest”, located in the vicinity of the NYS Thruway, is approximately 4,000 feet northwest of the proposed transmission line and approximately 5 miles north of the nearest proposed turbine. This nest site has been active for several years, and E & E confirmed it was active again in 2016 (see Appendix C, Table C-1). E & E observed this nest from a distance for a total of 111 minutes during 11 visits between March 2016 and August 2016. An incubating adult Bald Eagle was observed on March 14, 2016, and adults were observed incubating or in the vicinity of the nest in March, April, and May.

By late May leaves had obscured the nest from view. This nest probably fledged two young, as two juvenile Bald Eagles were seen in the vicinity of the nest tree on July 15, 2016.

- The "Hanover nest" was discovered by E & E in early April 2012. The nest is located in the vicinity of the Silver Creek Reservoir, approximately 0.7 miles northeast of the nearest project component (an access road). The closest turbine is located just over 1 mile (6,000 feet) to the southwest of the nest. E & E confirmed the nest was active in 2016 (see Appendix C, Table C-1). E & E observed this nest from three varying distances for a total of 420 minutes during 13 visits between March and September, 2016. An incubating adult Bald Eagle was observed on March 14, 2016, and adults were observed perched on or near the nest in subsequent visits in March, April, and May. The nest apparently failed by May 25, 2016, as indicated by a flycatcher perched on the nest edge. No Bald Eagle activity was recorded at or near the nest during observations between June and September 2016.
- There are an unspecified number of active nests along Cattaraugus Creek in the vicinity of the Cattaraugus Indian Reservation. The distance from the closest turbine to the area with nests along Cattaraugus Creek is approximately 6.3 miles.
- The "Dayton nest" is located approximately 5.5 miles southeast of the project area and has been active in recent years according to NYSDEC.
- The "Pomfret nest" is located approximately 7.0 miles west of the project area, in the vicinity of the Fredonia reservoir. NYSDEC discovered nesting activity in this location in 2012 and it has been active since that time.
- The "Dunkirk nest" is located approximately 9.5 miles west of the project area. This is a more recent nest location according to NYSDEC.
- The "Sheridan nest" is located approximately 3.0 miles northwest of the project area. This is a more recent nest location according to NYSDEC.

4 Discussion

4.1 2016 Eagle Surveys to Date

Bald Eagles were periodically observed in the project area during surveys between March 2016 and September 2016, with most sightings occurring in September. Golden Eagles were not observed in the project area during the 2016 surveys. The 17 Bald Eagle sightings on September 1 likely involved multiple sightings of the same individuals. The Bald Eagles were likely a mix of migrants, locals, and transients and included adult and immature birds. The relatively high sightings per hour at the three most northern survey points is influenced by the large number of sightings on September 1, which involved surveying only the northern half of the site. Aside from the number of sightings on September 1, the results of the 2016 surveys to date are generally consistent with the results reported in previous studies conducted by E & E in the project area, suggesting Bald Eagle activity within the project area during spring and fall migration seasons and more occasional activity during summer months.

The project area is situated east and south of the Portage Escarpment and Lake Erie plain, where Bald Eagles and other raptor migrants are concentrated during spring migration. It is likely that some of the eagles observed in April, May, and possibly September were migrants. Surveys on September 1, 2016, yielded the highest number of Bald Eagle sightings for any single day thus far (17 sightings). The winds on this day were moderate and from the north, providing good conditions for raptor migration; however, the time period was too early in the fall for migration activity and there is minimal fall raptor migration along the southern shores of the Great Lakes. Therefore, these sightings were likely of local birds and included multiple sightings of the same individuals. The local flights in the project area may have been between possible foraging areas (i.e., East Mud Lake, West Mud Lake, Lake Erie, Silver Creek Reservoir, Fredonia Reservoir, and Dayton gravel ponds). Five Bald Eagle sightings were made at survey point 13, which is the survey point closest to the "Thruway nest." One of these was a perched adult that was likely associated with this nest. The other four Bald Eagle sightings were two adults and two immatures seen during the fall migration season. With the proximity of the "Thruway nest" to Lake Erie (approximately 2.5 miles), it is likely that most foraging flights go toward the lake. One immature Bald Eagle was sighted at survey point 10, which is the survey point closest to the "Hanover nest." There were no sightings of the adult Bald Eagles from the "Hanover nest" at the nearest survey point.

4.2 Golden Eagles

Golden Eagles are uncommon migrants over western New York. No Golden Eagles have been observed during the 2016 surveys to date. Migrant Golden Eagles would be expected to fly over the project area during the usual periods of migration, specifically spring migration. Because the period of time when Golden Eagles would be expected to fly over the project area is brief, and because the occurrence of the Golden Eagle is generally uncommon, it is expected that the Golden Eagle is unlikely to be adversely affected by the Project.

4.3 Bald Eagle Nests

Bald Eagles continue to increase their presence and expand their distribution in Chautauqua County as well as in Western New York State, adjacent states, and the Great Lakes region. Two Bald Eagle nest locations in the vicinity of the project area were monitored in 2016 and both were confirmed to be occupied by incubating Bald Eagles. The "Hanover nest" apparently failed later in the season while the "Thruway nest" possibly fledged two young (see Section 3.2 above).

Nesting typically takes place in forested areas relatively close (usually less than 1.2 miles) to suitable foraging areas, typically large bodies of water (Buehler 2000). Undisturbed forested habitats near lakes, rivers, or wetlands are preferred (Nye 2008). Large nests of sticks and finer materials are typically built in the tops of the largest trees in the area and are reused for many years. Bald Eagles may build one or more alternate nest(s) within their territory and may switch to an alternate nest in successive years, particularly after a nesting failure (Buehler 2000). As Bald Eagle populations continue to increase, greater nest densities may occur in preferred habitats, and eagles may also begin to nest in less ideal habitats further from foraging areas.

4.4 Next Steps

Surveys will continue through February 2017, at which point this report will be updated. Ball Hill will continue to coordinate with NYSDEC and the USFWS regarding eagle activity.

5 References

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A Eagle Surveys Sightings Data

Table A-1 Eagle Survey Sightings (March through September, 2016), Ball Hill Wind Energy Project Area.

Species	Date	Time	Number	Survey Point	Flight Height	Flight Direction	Resight	Behavior	Age Class	Notes
Bald Eagle	3/14	1242	1	4	L	NW	No	S	A	Soaring NW through plot
Bald Eagle	4/6	925	1	13			No	P	A	Perched in riparian strip to NW. Likely one of breeding pair of I-90 nest
Bald Eagle	4/6	1251	1	9	RSZ	E	No	FG	Im	Flew east through plot
Bald Eagle	4/25	1001	1	7	L/RSZ/H	NE	No	S/G	Im	Initially soaring NE with Broad-winged Hawks then with second immature Bald Eagle
Bald Eagle	4/25	1008	1	7	L/RSZ	W/E	No	S/FG	Im	Soaring with first immature Bald Eagle
Bald Eagle	4/25	1021	1	7	L	NE	No	FG/P	A	Soaring low then perched in tree to north
Bald Eagle	4/25	1535	1	1	RSZ	N	No	G	A	Gliding north; kettle of Broad-winged Hawks flying above
Bald Eagle	5/7	1111	1	8	RSZ/H	NNW	No	S/G	A	Soaring east then NW, net movement NNW
Bald Eagle	5/7	1323	1	11	H	SE	No	S	A	Soaring with two immature Bald Eagles; net movement SE
Bald Eagle	5/7	1325	1	11	H	S	No	S	Im	One of two immatures soaring higher than adult Bald Eagle; soaring south
Bald Eagle	5/7	1325	1	11	H	SE/NE	No	S	Im	One of two immatures soaring higher than adult Bald Eagle; soaring SE then NE, net movement east
Bald Eagle	5/25	1243	1	4	RSZ/H	ENE	No	FG/S	A	Flap-gliding NE through plot then soaring SE
Bald Eagle	6/8	1053	1	12	RSZ/H	ESE	No	S	A	Soaring ESE through plot
Bald Eagle	7/3	1129	1	9	H	NW	No	G/S	A	Gliding and soaring NW through plot
Bald Eagle	7/3	1429	1	12	H	W	No	FG	A	Adult flap-gliding west over woods to south
Bald Eagle	7/3	1435	1	12	H	E	Yes	S	A	Resight of adult soaring off to SW
Bald Eagle	8/14	1125	1	11	RSZ/H	S	No	S/FG	Im	Soaring/gliding south, then east, then south
Bald Eagle	8/23	1402	1	3	H	SE	No	S	Im	Soaring SE and joins a flock of Turkey Vultures
Bald Eagle	9/1	1032	1	10	RSZ	NE/S	No	S	Im	Soaring off to SSW
Bald Eagle	9/1	1249	1	11	H	W	No	G	A	Gliding west; flies past a soaring Osprey
Bald Eagle	9/1	1306	2	12	RSZ/H	S	No	S	Im	Two immatures soaring and talon grabbing (Im, 1 & 2)
Bald Eagle	9/1	1309	2	12	RSZ	N	Yes	S	Im	Likely immature Bald Eagles from 1306 (Im, 1 and 2)
Bald Eagle	9/1	1319	1	12	RSZ/H	S/NE	Yes	S/G	Im	Im. 1 gliding south then soaring NE
Bald Eagle	9/1	1319	1	12	RSZ/H	S/NE	Yes	S/G	Im	Im. 2 gliding south then soaring NE, separates from Im. 1 flight path
Bald Eagle	9/1	1335	1	12	RSZ	S	Unknown	S	Im	Soaring off to south; could be a resight or new

Table A-1 Eagle Survey Sightings (March through September, 2016), Ball Hill Wind Energy Project Area.

Species	Date	Time	Number	Survey Point	Flight Height	Flight Direction	Resight	Behavior	Age Class	Notes
Bald Eagle	9/1	1324	1	12	H	N	No	G/S	A	Adult gliding north overhead with immature (Im. 3) as Im. 1 and 2 glide south
Bald Eagle	9/1	1324	1	12	RSZ/H	NNE	No	G/S	Im	Im. 3 gliding north overhead with adult Bald Eagle, then soaring with Im. 1, then soaring NW
Bald Eagle	9/1	1332	1	12	H	NE	No	G/S	Im	Im. 4 soaring with adult; five Bald Eagles visible
Bald Eagle	9/1	1332	1	12	H	NE	Yes	G/S	A	Resighted adult soaring with Im. 4
Bald Eagle	9/1	1448	1	13	RSZ/H	N	No	G/S	Im	Immature soaring NNW then south until too high to see; net movement north
Bald Eagle	9/1	1504	1	13	RSZ/H	E	No	G/S	A	Adult soaring then gliding east with second adult Bald Eagle
Bald Eagle	9/1	1505	1	13	RSZ/H	E	No	G/S	A	Adult soaring then gliding east with first adult Bald Eagle
Bald Eagle	9/1	1524	1	13	H	N	No	S/G	Im	Second immature soaring north; joined by another immature Bald Eagle after end of survey
Bald Eagle	9/23	1116	1	4	L/RSZ	NE/S	No	S/G	A	Soaring NE then gliding south; net movement SE
Total			**36**							

Key:

RSZ = rotor-swept zone

Height:
L = < 50 m agl
RSZ = 50 – 200 m agl
H = > 200 m agl

Behavior:
S = Soaring
G = Gliding
FG = Flapping - Gliding
P = Perching

Age:
A = Adult
Im = Immature

B Weather Data

Table B-1 Weather Conditions by Survey Date for Eagle Surveys - March 2016 through September 2016

Date	Survey Mean Temperature (ºF)	Survey Max Temperature (ºF)	Survey Min Temperature (ºF)	Survey Wind Direction	Survey Avg. Wind Speed (mph)	Survey Max. Wind Speed (mph)	Average Cloud Cover	Comments
2016 Surveys								
3/14/2016	49	56	44	S	17	23	Overcast	
3/22/2016	45	55	34	S	9	15	Overcast	
4/6/2016	41	46	36	S	15	26	Overcast	
4/25/2016	60	65	52	SE	6	8	Partly Cloudy	
5/7/2016	63	70	54	S	7	13	Partly Cloudy	
5/25/2016	77	82	70	W	13	18	Sunny	
6/8/2016	53	57	48	WNW	18	22	Overcast	
6/27/2016	78	82	70	W	10	15	Partly Sunny	
7/3/2016	73	77	64	WNW	7	11	Partly Cloudy	
7/15/2016	77	79	72	WSW	16	25	Partly Sunny	
8/14/2016	74	77	72	W	5	8	Overcast	Light rain (0.25 hour)
8/23/2016	73	79	64	SSW	6	9	Sunny	
9/1/2016	72	77	64	N	8	12	Partly Sunny	
9/23/2016	74	77	66	NW	8	10	Partly Cloudy	

Key:

Cloud Cover:
Sunny = 0%-20%
Partly Sunny = 21%-50%
Partly Cloudy = 51%-80%
Overcast = 81%-100%

C Bald Eagle Nest Observation Data

Table C-1 E & E Bald Eagle Nest Observations - March 2016 through September 2016

Date	Hanover Nest		Thruway Nest	
	Bald Eagle Activity at or Near the Nest	Observation Time (min.)	Bald Eagle Activity at or Near the Nest	Observation Time (min.)
3/14/2016	1 adult BAEA incubating nest.	20	1 adult BAEA incubating nest.	10
3/22/2016	1 adult BAEA perched 5 m from nest and 2nd adult perched nearby.	6	1 adult BAEA incubating nest.	12
4/6/2016	1 adult BAEA flew south in the vicinity of the nest tree.	40	None	5
4/25/2016	1 adult BAEA perched below the nest for 4 minutes.	65	1 adult BAEA perched on nest edge and 2nd adult perched nearby.	5
5/7/2016	1 adult BAEA perched on nest edge for 4 minutes and perched below the nest for 47 minutes.	65	1 adult BAEA perched on nest edge.	5
5/25/2016	1 adult BAEA perched 210 m north of nest. A flycatcher perched on the edge of the eagle nest.	68	None; nest not visible.	10
6/7/201	No activity	10	N/A	0
6/8/2016	No activity	65	No activity; nest not visible.	8
6/13/201	No activity	25	N/A	0
6/22/201	N/A	0	No activity; nest not visible.	10
6/24/201	No activity	30	No activity; nest not visible.	5
7/3/2016	No activity	9	1 adult BAEA perched south of nest tree.	6
7/15/2016	No activity	10	2 juvenile BAEA flying in vicinity of nest tree.	30
8/14/2016	No activity	5	N/A	0
8/23/2016	N/A	0	No activity; nest not visible.	5
9/1/2016	No activity	2	N/A	0
9/23/2016	N/A	0	N/A	0
2016 Status	**Apparently failed**	**420**	**Possibly fledged 2 young**	**111**