

Appendix 22-1

Site Characterization Report

Bull Run Wind Energy Project,
Clinton County, New York



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1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) performed a site characterization study for the Invenergy Wind Development LLC (Invenergy) Bull Run Wind Energy Project (Project). The study was both a desktop review of available information as well as a compilation of information collected during site visits at the Project. This report presents the methodology, results and conclusions of Stantec's investigations.

1.1 PROJECT DESCRIPTION

The Project is located north and south of US Route 11 in the towns of Clinton and Ellenburg in Clinton County, New York. The Project Area studied for this survey covers approximately 42,263 acres¹.

1.2 PURPOSE AND OBJECTIVES

Invenergy contracted Stantec, an independent environmental consultant, to conduct a preliminary site evaluation and site characterization. Invenergy is using the tiered approach described in the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (WEG; USFWS 2012a) to assess the potential impacts to wildlife. Tier 1 (Preliminary Site Evaluation), as described in the WEG (USFWS 2012a), is a landscape-scale screening process using existing information to identify blocks of native habitat, ecological communities, and other areas of broad-scale wildlife value. The objective of Tier 1 is to answer the following questions at the landscape level (USFWS 2012a):

1. *Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?*
2. *Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally designated critical habitat; high-priority conservation areas for non-government organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations.*
3. *Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?*

¹ Invenergy updated the Project Area in spring 2016 to include areas further east, including areas in the towns of Mooers and Altona. The updated Project Area covers 54,444 acres.

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4. *Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?*

Tier 2 (Site Characterization) focuses on site-specific natural resource information and existing information specific to the Project Area to evaluate potential risks to sensitive or protected natural resource features.

The objective of Tier 2 is to answer the following questions at the site level (USFWS 2012a):

1. *Are known species of concern present at the proposed site, or is habitat (including designated critical habitat) present for these species?*
2. *Does the landscape contain areas where development is precluded by law or designated sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally designated critical habitat; high priority conservation areas for NGOs or other local, state, regional, federal, tribal, or international organizations.*
3. *Are there plant communities of concern present or likely to be present at the site?*
4. *Are there known critical areas of congregation of species of concern, including but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?*
5. *Using best scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?*
6. *Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?*
7. *Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?*

The objectives of Tier 1 and Tier 2 of the WEG are consistent with the objectives of the New York State Department of Environmental Conservation's (NYSDEC) Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects (NYSDEC Guidelines; NYSDEC 2009a). The NYSDEC Guidelines recommend investigating the occurrence of landscape features and resources of potential concern including habitat of state special concern, threatened, or endangered species; proximity (approximately 5 miles to the Atlantic coastline, the shoreline of the Great Lakes, or the corridor of large rivers; proximity (approximately 2 miles) to areas that concentrate raptors, waterfowl, or other species of concern; proximity to a major bat hibernaculum (approximately 40 miles); or the presence of a habitat or landscape feature that may function to funnel or concentrate birds during migration or for feeding, breeding, wintering, or roosting activities (e.g., National Wildlife Refuges, high elevation mountaintops, or ridgelines).

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The purpose of this report is to describe the results of the Tier 1 and Tier 2 and NYSDEC recommended investigations. Once the information in this site characterization has been reviewed by the USFWS and NYSDEC, Invenergy will determine if additional surveys are needed to assess potential project impacts to plant communities or wildlife.

2.0 METHODS

2.1 INTRODUCTION

For the site characterization, Stantec compiled publically available information including Global Information Systems (GIS) land cover data, New York Natural Heritage Program data, USFWS Information Planning and Conservation (IPaC) data, publicly available information from regional and onsite bird surveys, habitat observations based on interpretation of photos documented during site reconnaissance visits, and data from nearby wind projects in Clinton County. Stantec also considered information provided by USFWS and NYSDEC during agency meetings.

Stantec prepared land cover maps for the habitat and landscape features in the Project Area. The habitat maps and observations and photos documented during field surveys and site reconnaissance visits were reviewed to characterize the habitats and vegetation communities present in the Project Area. The uniqueness of the habitat present at the Project was considered in relation to the surrounding region. Onsite wildlife data as well as data from wind projects in Clinton County, and data from available wildlife databases were summarized in tables and reviewed to investigate the potential occurrence of any federally or state-listed species or state species of special concern within the Project Area. The results of the Natural Heritage and IPaC inquiries were summarized in tables and reviewed for the potential occurrence of any unique or rare natural communities or wildlife areas.

This site characterization focuses on the occurrence, and potential for occurrence, of species of special concern and natural resources of significance within and in the vicinity of the Project Area. Consistent with Tier 1 and 2 of the WEG and the NYSDEC Guidelines, this assessment prioritizes federally listed species (USFWS 2015a), state-listed species (NYSDEC 2015a), and New York Species of Greatest Conservation Need (SGCN; NYSDEC 2015b)². Stantec investigated if the geographic ranges or habitats of plant and wildlife species of concern overlapped with the Project Area, and if species of concern have been documented within the Project Area during regional or onsite surveys.

² New York State was required to develop a Comprehensive Wildlife Conservation Strategy (CWCS) that focuses on the Species of Greatest Conservation Need (SGCN). This list of SGCN includes species that are rare or declining. In the 2005 CWCS, 537 species were listed as SGCN.

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2.2 GIS LAND COVER DATA

The following GIS land cover data were reviewed to map and characterize the habitats and natural communities present in the Project Area:

- **Boundaries of the ecological regions of New York State** (NYSDEC 2008a)
- **Clinton County aerial imagery**(USDA 2013)
- **National Land Cover Data** (Homer et al. 2011)
- **National Wetland Inventory** (USFWS 2015b)
- **National Wild and Scenic Rivers** (USGS 2009)
- **Significant Natural Communities** (NYSDEC 2009b)
- **Public Land Boundary** (NYSDEC 2008b)
- **NYSDEC Roads and Trails** (NYSDEC 2006)
- **NYSDEC Special Interest Management Areas** (NYSDEC 2008b)
- **USFWS Critical Wildlife Habitats** (USFWS 2014a)
- **National Wilderness Areas** (USDA 2016)
- **National Audubon Important Bird Areas** (Audubon NY 2007)
- **NYSDEC Bird Conservation Areas** (NYSDEC 2005)

2.3 NEW YORK NATURAL HERITAGE PROGRAM DATABASE

The New York Natural Heritage Program database provides information to help developers assess the natural resources in a proposed project area. Stantec requested records of rare or listed wildlife and plant species, including records of breeding bald eagles (*Haliaeetus leucocephalus*), and significant natural communities within the Project Area. The managers of the database provide records of significant natural communities, plants, and wildlife in the Project Area. For rare bats and birds, the managers provide records of reported occurrences within 40 miles and 10 miles of the Project Area, respectively (the specific locations and the dates of the occurrences are not provided).

2.4 USFWS IPAC

The USFWS created the IPaC website to assist in the environmental review of projects. The website populates a resource list and an official species list³ for natural resources of conservation concern and federally endangered or threatened species that may occur in the Project Area.

³ The USFWS resource list is an unofficial list of species, including threatened and endangered species, designated or proposed critical habitat, migratory birds of conservation concern, and other natural resources of concern that may occur in the Project Area. The USFWS official list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of a proposed project and/or may be affected by the proposed project.

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Stantec submitted informal and official IPaC information requests for Clinton County on 1 December 2015.

2.5 PUBLICLY AVAILABLE WILDLIFE INFORMATION

Stantec reviewed the following publicly-available wildlife databases and public reports for the occurrence of state or federally listed species, as well as SGCN, in the vicinity of the Project Area.

- US Geological Survey Breeding Bird Survey (USGS BBS)⁴ routes overlapping with the Project Area,
- New York Breeding Bird Atlas survey⁵ blocks overlapping with the Project Area, and
- Recent wildlife survey reports for the Noble Altona, Clinton, and Ellenburg wind projects in Clinton County.⁶

2.6 ONSITE SURVEYS AND SITE RECONNAISSANCE VISITS

Stantec reviewed data from the following onsite field surveys conducted in fall 2015 for the occurrence of federally or state-listed species, or SGCN within the Project Area.

- Fall Migration Bird Stopover Survey (Stantec 2015), and
- Fall Raptor and Eagle Point Count Survey (Stantec 2015).

Stantec coordinated site reconnaissance visits with site visits for the eagle and raptor point count survey. Habitats were photographed at each of the point count locations, and a botanist interpreted the photos to characterize the vegetation communities.

2.7 AGENCY MEETINGS

Information obtained from USFWS and NYSDEC representatives during the following agency meetings were summarized for this site characterization:

- 26 May 2015, USFWS Cortland Field Office,
- 28 May 2015, NYSDEC Albany Office, and
- 22 July 2015, conference call with USFWS and NYSDEC.

⁴ The USGS survey is a volunteer-based survey of relative abundance and population changes of breeding birds in North America, developed in the 1960s. There are 3,700 active survey routes, most of which are surveyed annually. Surveys are conducted at the peak of the breeding season (usually June); each route is 25 miles long, with 50 stops located at 0.5 mile intervals along the route. A 3-minute point count is conducted at each stop, during which the observer records all birds heard or seen within 0.3 mile of the stop location.

⁵ The NY Breeding Bird Atlas is a state-wide survey that studies the distribution of breeding birds. There are 5,332 blocks, each 3 by 3 miles in the state. Volunteers survey habitats within the survey blocks and record observations of breeding birds.

⁶ For this survey, Stantec reviewed the most recent and publically available post-construction monitoring reports for the listed Clinton County wind projects. Per discussion with NYDEC, as of 8 June 2016, no reports for Marble River are publicly available. The Clinton wind project was previously called Churubusco.

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3.0 RESULTS

3.1 LAND COVER TYPES AND NATURAL COMMUNITIES

3.1.1 Land Cover Types

The Project Area occurs within the Lake Champlain ecological region and within the Champlain Transition subecological region (37,899 acres of the Project Area) and Western Adirondack Transition subecological region (4,364 acres of the Project Area) (NYSDEC 2008b; Appendix A Figure 1).

The Lake Champlain ecological region is characterized by lowland deciduous, mixed, and evergreen forests as well as higher-elevation boreal forests. Emergent marshes, bogs and fens, floodplain forests, and forested wetlands occur throughout the ecoregion.

The Champlain Transition subecological region is characterized by low elevations, relatively flat and uniform topography, and good soil quality, and land use is a mixture of commercial forests, active agriculture, idle farmland reverting to forests, and development. Where they occur, forests are primarily deciduous forest consisting of birches (*Betula*) and aspen (*Populus*), with incursions of mixed evergreen forests of eastern white pine (*Pinus strobus*), red spruce (*Picea rubens*), and balsam fir (*Abies balsamea*) (Andrle and Carroll 1988).

The Western Adirondack Transition subecological region is higher elevation, and has more varied topography and poorer soils associated with Precambrian bedrock (Andrle and Carroll 1988). Vegetation in the Western Adirondack transition is characterized by old fields, successional forests, and farmland. Tree species are similar to those that occur in the Champlain Transition region.

The current Project Area covers approximately 42,263 acres (Table 3-1). The primary land cover type is forest, with 29,721 acres of deciduous, evergreen, deciduous-evergreen mixed forests, and woody wetlands (Table 3-1; Appendix A Figures 2–4). Forested habitats represent approximately 70% of the land cover in the Project Area, with deciduous forests predominating (USGS 2011). The forested communities are predominately beech-maple mesic forest comprising American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), yellow birch (*Betula alleghaniensis*), aspen, paper birch (*Betula papyrifera*), gray birch (*Betula populifolia*), fire cherry (*Prunus pensylvanica*), and eastern hop-hornbeam (*Ostrya virginiana*) trees (Photo 1). Onsite observations indicated timber harvesting has occurred throughout the forested habitats resulting in stands of varying age classes, including early successional, second-growth, and maturing forests (Stantec 2015). Small inclusions of mixed or evergreen forests with balsam fir, white pine, and red spruce trees are scattered within the northern portions of the Project Area (Photo 2). Shrub/scrub habitat (Photo 3) represents 2,188 acres (5%) of the Project Area (Table 3-1).

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Table 3-1. Land Cover Types, Bull Run Wind Energy Project.

Land Cover Type¹	Acres	Percent
Barren Land (Rock/Sand/Clay)	30.5	0.1%
Cultivated Crops	889.8	2.1%
Deciduous Forest	15814.4	37.4%
Developed, High Intensity	13.6	0.0%
Developed, Medium Intensity	50.6	0.1%
Developed, Low Intensity	215.3	0.5%
Developed, Open Space	831.2	2.0%
Emergent Herbaceous Wetlands	759.8	1.8%
Evergreen Forest	2052.3	4.9%
Grassland/Herbaceous	875.6	2.1%
Mixed Forest	1358.1	3.2%
Open Water	722.6	1.7%
Pasture/Hay	5983.8	14.2%
Shrub/Scrub	2186.3	5.2%
Woody Wetlands	10478.9	24.8%
TOTAL	42262.6	100.0%

¹ Based on Homer et al. (2011).

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Photo 1. Example of beech-maple mesic forest in the Bull Run Wind Energy Project Area.



Photo 2. Example of mixed deciduous and evergreen forest habitat in the northern part of the Bull Run Wind Energy Project Area.

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Photo 3. Shrub/scrub cover type includes old fields that are reverting back to forest, an example of early succession in the Bull Run Wind Energy Project Area.

Active agricultural fields dominate the central and southern portions of the Project Area within the Crystal Creek, English River, and North Branch Great Chazy River watersheds. Concentrated residential and commercial development occurs in these areas. The agricultural fields are managed for row crops (e.g., corn) as well as livestock. Pasture and hayfield (Photo 4) combined with cultivated crop fields (Photo 5) occur on 6,878 acres (16%) of the Project Area, and developed areas represent 3% (1,111 acres) of the Project Area.

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Photo 4. Example of pasture/hay in the Bull Run Wind Energy Project Area.



Photo 5. Example of cultivated crops in the Bull Run Wind Energy Project Area.

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Woody wetlands are abundant (10,485 acres; 25%) and occur throughout the Project Area (Appendix A Figure 2). Non-forested wetlands, consisting of emergent herbaceous or open water wetlands, represent 4% (1,483 acres) of the land cover (Table 3-1; Appendix A Figure 5). Wetland communities occur throughout the Project Area with the highest concentration located in the northern and western portions of the site within the English River watershed. In the region, woody wetlands are dominated by tree species such as red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), northern white cedar (*Thuja occidentalis*), yellow birch, and balsam fir. Scrub-shrub and emergent wetlands are dominated by species such as speckled alder (*Alnus incana*), sweetgale (*Myrica gale*), dogwoods (*Cornus* spp.), viburnums (*Viburnum* spp.), and various graminoids (i.e., grass-like plants) such as tussock sedge (*Carex stricta*), wool-grass (*Scirpus cyperinus*), and Canada bluejoint (*Calamagrostis canadensis*).

Lake Roxanne (Photo 6), a small, man-made lake located near Ellenburg, is the largest body of water within the Project Area. The North Branch Great Chazy River runs parallel to US Route 11 through the southern portion of the Project Area. Brandy Brook occurs north of US Route 11. Crystal Creek and the English River intersect the northern portion of the Project Area. No designated National Wild or Scenic Rivers occur in the Project Area (USGS 2009, Rivers Council 2015), and no rivers listed on the Nationwide Rivers Inventory occur in the Project Area (NPS 2009).



Photo 6. Lake Roxanne occurs in the southern portion of the Bull Run Wind Energy Project Area.

There are 482 acres of State Forest Preserve land and 97 acres of State Reforestation Area in the Project Area (Appendix A Figure 6). The state Gulf Unique Area occurs in the northeastern

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portion of the Project Area, comprising 585 acres and containing a steep rocky gorge, formed by ice age flooding, and a 60-foot waterfall. The area consists of over 3 miles of marked hiking trails and is used for recreation activities such as hiking, ice climbing, hunting, cross-country skiing, and bird watching. There are no NYSDEC Special Interest Management Areas in the Project Area (NYSDEC 2008b).

3.1.2 Natural Communities

There are 89 acres of Significant Natural Communities within the Project Area (Appendix A Figure 6; **Error! Reference source not found.**), associated with the Gadway Road Flat Rock area (4 acres) and the Cannon Corners Flat Rock area (85 acres) and include perched bog (<1 acres), sandstone pavement barrens (51 acres), and black spruce-tamarack bog (38 acres). Two of these communities are designated as S1, extremely rare in the state (perched bog and sandstone pavement barrens). The sandstone pavement barrens are globally ranked as G2, imperiled.

No USFWS-Critical Wildlife Habitat, National Wilderness Areas, National Audubon Important Bird Areas, or NYSDEC Bird Conservation Areas occur within the Project Area (NYSDEC 2005, Audubon NY 2007, USFWS 2014a, USDA 2016).

3.2 NEW YORK NATURAL HERITAGE PROGRAM DATABASE RESULTS

The New York Natural Heritage Program database noted 4 significant natural communities associated with the Gadway Road Flat Rock area and the Cannon Corners Flat Rock area (Appendix A Figure 6; Appendix B Table 1) as described in Section 3.1. There are 4 acres of the Gadway Road Flat Rock area which overlap with the Project Area and 85 acres of the Cannon Corners Flat Rock area which overlap with the Project Area.

The database identified the occurrence of 1 rare plant species in the Gadway Road Flat Rock area, clustered sedge (*Carex cumulata*). This plant is listed as threatened in New York and is considered imperiled in New York by the Heritage Program. Also known to occur in the Gadway Road Flat Rock area are 9 species of moth that are considered of conservation concern by the Heritage Program (Appendix B Table 1); however, none of these species are listed in New York.

For bats, there are hibernaculum records of the federally and state-threatened northern long-eared bat (*Myotis septentrionalis*) and the state special concern eastern small-footed bat (*Myotis leibii*) within 40 miles of the Project. For birds, there are breeding records of the state-endangered peregrine falcon (*Falco peregrinus*), the state-threatened pied-billed grebe (*Podilymbus podiceps*) and northern harrier (*Circus cyaneus*), and the state special concern common loon (*Gavia immer*) within 10 miles of the Project Area. There were no Heritage Program records of breeding bald eagles within 10 miles of the Project Area.

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Table 3-2. Significant Natural Communities, Bull Run Wind Energy Project.

Community	System	Subsystem	Acres	Element Occurrence Rank ¹	Global Rank ²	State Rank ³	Description ⁴
Perched bog	Freshwater nontidal wetlands	Open peatlands	0.3	E	G3G4	S1S2	Gadway Road Flat Rock and Cannon Corner Flat Rock areas - mosaic of boggy wetlands, pavement barrens, and successional forests. Small areas of perched bog occur in low areas within the pavement barrens; the boggy patches are dominated by graminoids.
Sandstone pavement barrens	Uplands	Barrens and woodlands	46.8	BC	G2	S1	The site (Gadway Road Flat Rock area) is a mosaic of pavement barrens, boggy wetlands, and successional forests. Pavement barrens have open canopy, patches of shrubs, herbs, and mosses on flat rock outcrop.
Black spruce-tamarack bog	Freshwater nontidal wetlands	Forested peatlands	37.7	AB	G4G5	S3	The site (Cannon Corners Flat Rock area) is a mosaic of boggy wetlands, pavement barrens, and successional forests. Black spruce tamarack bog has a peat soil over 24 inches deep, scattered trees (many stunted), and patches of bog shrubs.
Sandstone pavement barrens	Uplands	Barrens and woodlands	3.6	A	G2	S1	This extensive flatrock outcrop of Potsdam sandstone (Cannon Corners Flat Rock area), is covered by thin soils and a patchy mosaic of jack pine woods, blueberry/lichen meadows, and small, shallow boggy wetlands. It is imbedded within a more than 4,500 acre landscape unbisected by paved roads. This landscape is comprised of more than 70% natural communities including managed forests in various stages of maturity, a wild gorge and associated river. The remainder of the landscape is in low density residential and agricultural land uses.

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Table 3-2 legend.

¹ Element occurrence rank: A - excellent, B- good, C - marginal, D - poor, E - verified extant (but not enough information to rank from A to D), F - failed to find (but not thoroughly searched for), X - extirpated, H - historical (no recent field information).

² Global rank:

G1 - critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles or stream, or especially vulnerable to extinction because of some factor of its biology.

G2 - Imperiled globally because of rarity (6-20 occurrences, or few remaining acres or miles of stream), or very vulnerable to extinction throughout its range because of other factors.

G3 - Either rare and local throughout its range (20 to 100 occurrences) or found locally (even abundantly at some of its locations) in a restricted range (e.g., a physiographic region), or vulnerable to extinction throughout its range due to other factors.

G4 - Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery.

G5 - Demonstrably secure globally, though it might be quite rare in parts of its range, especially at the periphery.

³ State rank

S1 - Extremely rare; typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York.

S2 - Very rare; typically 6 to 20 occurrences, few remaining individuals, acres or miles of stream, or factors demonstrably making it very vulnerable in New York.

S3 - Rare to uncommon; typically 21 to 100 occurrences, limited acreage, or miles of stream in New York. May have fewer occurrences, but with large numbers of individuals in some populations.

S4 - Common, apparently secure in New York; typically 100 or more estimated occurrences. May be fewer occurrences with many large populations.

S5 - Very common; demonstrably secure in New York.

⁴ Source: NYSDEC (2012). Environmental resource mapper, significant natural communities. < <http://www.dec.ny.gov/animals/38801.html>>.

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3.3 USFWS IPAC RESULTS

The USFWS resource and official species lists produced for Clinton county indicate that the federally and state-endangered Indiana bat (*Myotis sodalis*) and the federally and state-threatened northern long-eared bat may occur in the Project Area (Appendix C Table 1). Both species are also designated SGCN. Neither of these species has designated critical habitat in New York, and there is no designated USFWS Critical Habitat for any other species in the Project Area. There are no National Wildlife Refuges in the Project Area.

The USFWS provided the resource list of 19 migratory bird species that may occur in Clinton County. Among these bird species, there are no federally listed species. However, there are 3 state-endangered species: black tern (*Chlidonias niger*), peregrine falcon, and short-eared owl (*Asio flammeus*); 4 state-threatened species: bald eagle, common tern (*Sterna hirundo*), pied-billed grebe, and upland sandpiper (*Bartramia longicauda*); 4 species of special concern: American bittern (*Botaurus lentiginosus*), Bicknell's thrush (*Catharus bicknelli*), golden-winged warbler (*Vermivora chrysoptera*), and red-headed woodpecker (*Melanerpes erythrocephalus*). In addition, 17 of these species are SGCN (Appendix C Table 1; Table 4-1).

3.4 PUBLICLY AVAILABLE WILDLIFE INFORMATION

One USGS Breeding Bird Survey route (the Ellenburg route) intersects the Project Area, within the northern and western portions (Appendix A Figure 7). Species occurrence data are available for the period from 1966 to 2013. Along this route, observers documented 1 species of state special concern: American bittern, and 11 SGCN (Appendix D Table 1).

Twelve New York Breeding Bird Atlas blocks occur partially or entirely within the Project Area (Appendix A Figure 7). Survey data are available from 2000 to 2005. Within these survey blocks, observers documented 1 state-endangered species: peregrine falcon; 1 state-threatened species: northern harrier; 9 species of special concern; and 19 SGCN (Appendix D Table 2).

3.4.1 Altona, Ellenburg, and Clinton Bat and Bird Studies

The most recent passive bat acoustic studies available from existing wind projects in Clinton county include Altona (2010), Clinton (2008 and 2009), and Ellenburg (2008 and 2009) (Appendix A Figure 7; Appendix E Table 1). Species from the following guilds were detected among the three projects: *Myotis*, silver-haired/big brown bat, hoary, eastern red, tri-colored and unidentified (Reynolds 2009a, b; 2010a, b, c; Appendix E Table 1). Due to a high variation in calls of species within the genus *Myotis*, there are limitations to reliable species identification (Murray et al. 2001). However, the *Myotis* guild could include four species of *Myotis* that occur in the region: the federally and state-endangered Indiana bat, the federally and state-threatened northern long-eared bat, the state species of special concern eastern small-footed bat, and little brown bat (*Myotis lucifugus*).

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Carcass monitoring results are available from existing wind projects in Clinton county including Altona (2010 and 2011), Clinton (2008 and 2009), and Ellenburg (2008 and 2009) (Appendix F Table 1). Carcass monitoring at these projects documented seven bat species (not including unidentified bat and unidentified *Myotis*) (Appendix F Table 1). Of these species, six are SGCN and one is designated federally and state-threatened: northern long-eared bat (Appendix F Table 1). One northern long-eared bat carcass was detected at Ellenburg in 2008 (Jain et al. 2009b).

The most recent breeding bird surveys available from existing wind projects in Clinton county include Altona (2010), Clinton (2008 and 2009), and Ellenburg (2008 and 2009) (Appendix E Table 2). The species of conservation concern documented during these surveys are summarized in Appendix E Table 2. Listed species observed at these projects include: one species designated as state-threatened: northern harrier; two species of state special concern: northern goshawk (*Accipiter gentilis*) and vesper sparrow (*Pooecetes gramineus*); and 14 SGCN.

Carcass monitoring results from the Clinton county projects documented 45 species of birds (not including unidentified thrush, flycatcher, gull, kinglet, or bird) (Appendix F Table 2). Among these species, one species is designated special concern in New York: sharp-shinned hawk (*Accipiter striatus*); and four are SGCN (Appendix F Table 2).

3.4.2 New York Bat Hibernacula

There are 15 known Indiana bat hibernacula in New York, located in the following counties: Albany, Columbia, Essex, Jefferson, Onondaga, Orange, Schoharie, Ulster, and Warren (USFWS 2007). In New York, there are 90 known hibernacula (sites with one or more winter records of northern long-eared bats (USFWS 2015c, 2016). County locations for these northern long-eared bat hibernacula are not publicly available. There are no known bat hibernacula in Clinton County.

3.5 ONSITE FIELD SURVEY RESULTS

The species observed during fall migration stopover bird surveys and fall eagle and raptor point count survey at the Project are available in Appendix G Table 1. These surveys documented one state-endangered species: peregrine falcon; two state-threatened species: bald eagle and northern harrier; three state special concern species: Cooper's hawk (*Accipiter cooperii*), osprey (*Pandion haliaetus*), and sharp-shinned hawk; and 8 SGCN (Appendix G Table 1).

3.6 AGENCY MEETINGS

During the 2015 agency meetings the following additional wildlife information was provided by USFWS and NYSDEC representatives:

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- There is golden eagle (*Aquila chrysaetos*; state-endangered) migration activity in the region, golden eagles have been observed in the Lake George, New York area (T. Sullivan, USFWS, personal communication).
- The nearest known bald eagle nest is approximately 12 miles southwest of the Project on Chateaugay Lake (T. Sullivan, USFWS, personal communication).
- The Barton Hill Mine in Essex County is one of the largest hibernacula in the state for Indiana bats and eastern small-footed bats (R. Niver, USFWS, personal communication).

4.0 SUMMARY AND CONCLUSIONS

Based on the results of the biological resources evaluation, we conclude the following in regards to the WEG Tier 1 and 2 evaluations (USFWS 2012a) and the NYSDEC recommended investigations (NYSDEC 2009a).

- 1. Tier 1, NYSDEC Guidelines – Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species? Tier 2 – Are known species of concern present at the proposed site, or is habitat (including designated critical habitat) present for these species? NYSDEC Guidelines – Is there habitat of state-listed species?**

No USFWS-designated critical habitat exists in the Project Area (USFWS 2014a).

Bats

The Project Area provides potential summer habitat for two bat species listed at the federal and state levels, Indiana bat and northern long-eared bat (Table 4-1), and the Project Area is within both species' geographic ranges. Both species have been documented in Clinton County (USFWS 2012b, Jain et al. 2009b); however, surveys that would positively confirm the presence of these species within the Project Area have not been conducted. There is no known winter habitat (hibernacula) for these species within the Project Area or in Clinton County. Forest and woody wetlands within the Project Area may provide summer roosting opportunities. Suitable summer habitat for the Indiana bat consists of a variety of forested/wooded habitats where they roost, forage, and travel, as well as surrounding non-forested habitats (e.g., agricultural fields, emergent wetlands, old fields, pasture) (USFWS 2015d). This includes forests and woodlots containing potential roosts (i.e., trees and/or snags that have exfoliating bark/cracks/crevices/hollows), as well as linear features such as fence rows, riparian forests, and other wooded corridors (USFWS 2015d). Indiana bat maternity colonies generally have several separate roost areas located near one another that collectively provide the colony with the necessary roosting resources (including cover and correct temperature provided by exfoliating bark) needed during different environmental conditions. These colonies typically utilize one to a few primary roost trees that provide the proper roosting conditions most of the time, and these

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are normally large, dead trees with exfoliating bark that are exposed to abundant sunlight (USFWS 2015d).

Northern long-eared bats use a wide variety of forested habitats for roosting, foraging, and traveling and may also utilize some adjacent and interspersed non-forested habitat, such as emergent wetlands and edges of fields (USFWS 2015d). This species has also been found roosting in structures like barns and sheds particularly when suitable tree roosts are unavailable (USFWS 2015d). The bats will forage in upland and lowland woodlots and tree-lined corridors. Roosting habitat includes forested areas with a network of roost trees, and suitable roosts include live and dead trees typically ≥ 3 inches diameter at breast height (DBH) with exfoliating bark, cracks, crevices and/or other cavities (USFWS 2016).

Birds

There are no federally listed bird species whose habitats or known ranges overlap with the Project Area; however, there are several avian species listed at the state level that may occur in the Project Area (Table 4-1).

Raptors and Owls

The Project Area provides potential habitat for four raptor species and one owl species listed at the state level: bald eagle, golden eagle, northern harrier, peregrine falcon, and short-eared owl.

Bald eagles primarily fish along open, large water bodies; however, bald eagles will also seek carrion scavenging opportunities in fields and along roadsides (Wheeler 2003). There are no known bald eagle nests in the Project Area. The closest known bald eagle nest is over 10 miles from the project (T. Sullivan, USFWS, personal communication). Open water bodies including Lake Roxanne and the North Branch Great Chazy River, Brandy Brook, Crystal Creek, and the English River may provide fishing opportunities, and the grassland and cultivated crop fields of the Project Area may provide scavenging opportunities. Bald eagles were observed in the Project Area during the fall 2015 field surveys (Stantec 2015).

Golden eagles are not known to currently breed in New York. While golden eagles are known to occur in the region during migration and winter, no golden eagles were observed during the fall 2015 eagle and raptor point-count survey (Stantec 2015). During the winter, golden eagles may scavenge carrion and prey on rabbits, squirrels and waterfowl (Wheeler 2003). Winter foraging opportunities are available in the Project Area in harvested crop fields, grasslands, along roadsides, and along open waterbodies.

Breeding and wintering habitat for northern harrier exists in the Project Area. Northern harriers prefer abandoned or harvested crop or hayfields, grassland/herbaceous areas, and pastures adjacent to emergent herbaceous wetlands for both breeding and wintering habitat (Wheeler 2003). Northern harriers were observed in the Project Area during the fall 2015 field surveys (Stantec 2015).

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Peregrine falcons typically nest on cliffs or tall structures in urban areas (Wheeler 2003). Peregrine falcons primarily forage in open areas, taking prey on the wing (Wheeler 2003). Potential foraging habitats, including cultivated and abandoned fields as well as barns or abandoned man-made structures with nesting avian prey, occur in the Project Area. A peregrine falcon was observed within the Project Area during the fall 2015 field surveys (Stantec 2015), but there are no known peregrine falcon breeding sites within the Project Area.

New York is at the southern end of the breeding range of short-eared owls, and they are considered rare breeders in the state. Breeding and wintering habitats include grasslands adjacent to emergent herbaceous wetlands and abandoned or harvested crop fields (Wiggins et al. 2006). Both breeding and wintering habitats occur within the Project Area; however, short-eared owls have not been documented in the immediate area during the breeding season (NYSBBA 2007; Sauer et al. 2014). They are more common in New York in the winter.

Game Birds, Waterbirds, and Shorebirds

Spruce grouse, which are listed at the state level, prefer spruce-fir evergreen forests and woody wetlands. These habitats are available onsite; however, there have been no observations of spruce grouse in the Project Area (Stantec 2015; Sauer et al. 2014). Spruce grouse, if present, would be a year-round resident.

Breeding and migration habitat is available in the Project Area for two state-listed waterbirds, least bittern (*Ixobrychus exilis*) and pied-billed grebe, and a state-listed shorebird, upland sandpiper. Habitats include emergent herbaceous wetlands and grassland/herbaceous, and, in the case of pied-billed grebe, open water. However, these species have not been documented onsite (Stantec 2015; Sauer et al. 2014). The pied-billed grebe has been documented within 10 miles of the Project Area (NYSNHP 2015).

Passerines

The Project Area provides breeding and migration habitat for three passerines listed at the state-level: Henslow's sparrow (*Ammodramus henslowii*), loggerhead shrike (*Lanius ludovicianus*), and sedge wren (*Cistothorus platensis*) (Table 4-1). However, none of these species have been documented in the Project Area (Stantec 2015; Sauer et al. 2014). Henslow's sparrow and sedge wren may occur in grassland/herbaceous cover types while loggerhead shrike may occur within hedgerows at borders of cultivated crop fields, pasture/hay fields, and shrub/scrub cover types.

Amphibians and Reptiles

There are no federally or state-listed amphibians or reptiles whose habitats or known ranges overlap with the Project Area (4-1).

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Insects

There are no federally listed insects whose habitats or known ranges overlap with the Project Area. There is one state-listed insect whose habitat may occur in the Project Area (Table 4-1), pine pinon moth. This species may occur in evergreen forest and barren lands cover types (Table 4-1); however, surveys which would target the occurrence of this species have not been conducted.

Plants

There are no federally listed plant species whose habitats or known ranges overlap with the Project Area; there are 13 plant species listed at the state-level with the potential for occurrence in the Project Area (Table 4-1). The land cover types that may host these species include: deciduous forest, evergreen forest, mixed forest, woody wetlands, emergent herbaceous wetlands, grassland/herbaceous, barren lands, and scrub/shrub (Table 4-1); however, surveys that would target the occurrence of these species in the Project Area have not been conducted.

- 2. Tiers 1 and 2 – Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally designated critical habitat; high-priority conservation areas for non-government organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations.**

No USFWS-Critical Wildlife Habitat, National Wilderness Areas, National Audubon Important Bird Areas, or NYSDEC Bird Conservation Areas occur within the Project Area (USFWS 2014a, USDA 2016, Audubon NY 2007, NYSDEC 2005). There are 482 acres of State Forest Preserve land and 97 acres of State Reforestation Area within the Project Area. No other areas appear to be protected or designated as sensitive within the Project Area that would preclude development as a matter of law or according to scientifically credible information.

- 3. Tiers 1 and 2 - Are there known critical areas of wildlife or species of concern congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance? NYSDEC Guidelines - Is there the occurrence of landscape features and resources of potential concern including proximity (approximately 5 miles) to the Atlantic coastline, the shoreline of the Great Lakes, or the corridor of large rivers; proximity (approximately 2 miles) to areas that concentrate raptors, waterfowl, or other species of concern; proximity to a major bat hibernaculum (approximately 40 miles); or the presence of a habitat or landscape feature that may function to funnel or concentrate birds during migration or for feeding, breeding, wintering, or roosting activities (e.g., National Wildlife Refuges, high elevation mountaintops, or ridgelines).**

No USFWS-Critical Wildlife Habitat, National Wilderness Areas or Wildlife Refuges, National Audubon Important Bird Areas, or NYSDEC Bird Conservation Areas occur within the Project Area (USFWS 2014a, USDA 2016, Audubon NY 2007, NYSDEC 2005). The closest known bald eagle nest is approximately 12 miles southwest of the Project (T. Sullivan, USFWS, personal communication).

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The Project is not in the vicinity of the Great Lakes shoreline, the Atlantic coastline, or the corridor of any large rivers. There are no high elevation mountains within the Project Area.

There are hibernaculum records of the federally and state-threatened northern long-eared bat and the state special concern eastern small-footed bat within 40 miles of the Project. There are no known hibernacula within the Project Area or in Clinton County. There are no publicly available bat summer reproductive records (i.e., maternity colonies) known from the Project Area or County.

4. Tier 1 – Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat? Tier 2 – Using best scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?

As noted in the WEG, site clearing for access roads, transmission lines and turbines may “fragment continuous habitat areas into smaller, isolated tracts” (USFWS 2012a). Species vulnerable to habitat fragmentation are those that require large expanses of habitat for breeding and/or foraging. Isolation of local populations could result in “decreased reproductive success, reduced genetic diversity, and increased susceptibility to chance events (e.g., disease and natural disasters)” (USFWS 2012a). ‘Edge effects’ from fragmentation could result in “susceptibility to colonization by invasive species, increased risk of predation, and competing species” (USFWS 2012a). Both the USFWS and NYSDEC indicated the proposed wind project has the potential for causing fragmentation effects on forest-dwelling bird species due to the predominantly forested nature of the Project Area (T. Sullivan, USFWS, personal communication; B. Gary, personal communication). Forested habitats represent approximately 70% of the land cover in the Project Area, with deciduous forests predominating. Site observations indicate timber harvesting has occurred throughout the forested habitats resulting in stands of varying age classes, i.e., early-successional, second-growth, and maturing forests. Forest stands are currently fragmented in the Project Area by primary and secondary roads, forest roads and trails, residential areas, and agricultural areas. Due to the disturbed nature of the forested habitats onsite, there appear to be no significant areas of intact habitat.

5. Tier 2 – Are there plant communities of concern present or likely to be present at the site? NYSDEC Guidelines - Is the habitat present in the Project Area unique in relation to the surrounding region?

The predominant habitat within the Project Area is deciduous forest, a regionally abundant cover type (Andrle and Carroll 1988). There are no federally listed plant species whose habitats or known geographic ranges overlap with the Project Area. There are 13 plant species listed at the state-level with the potential for occurrence in the Project Area. There are state significant natural communities within the Project Area associated with the Gadway Road Flat Rock area (4 acres) and the Cannon Corners Flat Rock area (85 acres). These natural communities consist of perched bog (<1 acres), sandstone pavement barrens (51 acres), and black spruce-tamarack bog (38 acres). Two of these communities are designated as S1, extremely rare in the state

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(perched bog and sandstone pavement barrens). The sandstone pavement barrens are globally ranked as G2, imperiled.

6. Tier 2 – Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?

Many bird species are likely to utilize the Project Area at some point during the year. Bird species that occur during the breeding, wintering, and migratory periods would include forest, forest-edge, and grassland-dwelling species based on the habitats available onsite. Stantec documented 55 species of birds during the fall migratory stopover survey, and 12 species of raptor during the fall eagle and raptor point count survey (Stantec 2015). The spring 2016 breeding bird survey, which is currently underway, will provide information on those species present during the breeding period in the forested and grassland/agricultural habitats that occur in the Project area.

As the Project Area is approximately 70% forested, there are summer roosting opportunities for bat species. There is no known winter habitat for bats in the Project Area. Stantec documented both high- and low-frequency bat species calls during the fall acoustic survey (Stantec 2015). Nine species of bats occur in New York, based upon their normal geographical range (BCI 2015). It is possible that all of these species could occur within the Project Area either during the summer or migratory periods, including both of the federally listed species, Indiana bat and northern long-eared bat. The summer 2016 pilot mist-netting survey for bats will provide information on the potential occurrence of these species in the Project Area.

7. Tier 2 – Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?

The Tier 1 and 2 and NYSDEC-recommended site characterization confirms the presence or the potential occurrence of federally and state-listed wildlife and plant species within the Project Area. This is based on either direct sightings, detections of signs, the presence of suitable habitats in the Project Area, or the Project Area being within species' geographic ranges (Table 4-1). However, more information is needed to determine if some of these species actually occur within the Project Area and to what extent before it can be determined if significant adverse impacts to species of concern are expected. Given that the predominant habitat available onsite, deciduous forest, is regionally abundant, and due to the disturbed nature of the predominant habitats available, it is not expected that significant adverse impacts to habitats or species of concern would result from the Project. Wildlife field surveys at the Project were conducted beginning in fall 2015. Field surveys to be conducted in 2016 include a spring breeding bird survey, winter-through-summer eagle and raptor point count survey, spring-through-fall passive bat acoustic survey, and a summer bat pilot mist net survey. These surveys will possibly document the occurrence of other federally and state-listed bat and bird species in the Project Area. The need for and scope of further field investigations will be determined in consultation with the USFWS and NYSDEC.

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Table 4-1. Federally or state-listed species for which range and/or habitat occur within the Bull Run Wind Energy Project Area.

Common Name	Conservation Status¹	Onsite or Clinton County Record²	Habitat Type(s)	Land Cover Type(s)	Timing of Potential Occurrence³
<i>Mammals</i>					
Indiana bat	USFWS-E NYS-E	C	forest, forest edge	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
Northern long-eared bat	USFWS-T NYS-T	Within 40 miles of Project Area	forest, forest edge	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
Eastern small-footed bat	NYS-SC	Within 40 miles of Project Area	forest, rocky outcroppings, forest edge	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
<i>Birds</i>					
American bittern	NYS-SC	C	standing water, with emergent vegetation, grasslands or fields next to wetlands	grassland/herbaceous, emergent herbaceous wetlands	B, M
Bald eagle	NYS-T	OS	fields (foraging), undisturbed areas near large lakes and reservoirs, marshes, swamps, or rivers with open water and fish	cultivated crops, grassland/herbaceous, open water, woody wetlands	YR
Common loon	NYS-SC	Within 10 miles of Project Area	larger lakes of 25 acres or more, lakes with both shallow and deep waters	open water	B, M
Common nighthawk	NYS-SC	C	bare substrate (sand, dirt, gravel, or bare rock), forest clearings, and gravel roof tops	barren land, developed	B, M
Cooper's hawk	NYS-SC	OS, C	forest, forest edge	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
Golden eagle	NYS-E		grasslands, open water with waterfowl	grassland/herbaceous, open water	M, W

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Common Name	Conservation Status ¹	Onsite or Clinton County Record ²	Habitat Type(s)	Land Cover Type(s)	Timing of Potential Occurrence ³
Golden-winged warbler	NYS-SC		early successional fields with a combination of shrubby and open areas	grassland/herbaceous, shrub/scrub	B, M
Grasshopper sparrow	NYS-SC	C	dense grasses, upland meadows, pastures, hayfields, and croplands	grassland/herbaceous, pasture/hay, cultivated crops	B, M
Henslow's sparrow	NYS-T		fallow, weedy, often moist fields and meadows with tall, dense grass and herbaceous vegetation	grassland/herbaceous	B, M
Horned lark	NYS-SC		areas with short grasses and/or barren ground, often in agricultural fields	cultivated crops	B, M
Least bittern	NYS-T		freshwater and brackish marshes with tall, dense emergent vegetation with clumps of woody shrubs and open water	emergent herbaceous wetlands	B, M
Loggerhead shrike	NYS-E		agricultural areas with hedgerows, hayfields, pastures and scattered trees and shrubs	cultivated crops, pasture/hay, shrub/scrub	M
Northern goshawk	NYS-SC		mature forest	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
Northern harrier	NYS-T	OS, C; Heritage record within 10 miles Project Area	abandoned or harvested fields, meadows, and pastures adjacent to emergent herbaceous wetlands	emergent herbaceous wetlands, cultivated crops, grassland/herbaceous	B, M
Osprey	NYS-SC	OS, C	coastline, lakes, and rivers	open water	B, M
Peregrine falcon	NYS-E	OS, C; Heritage record within 10 miles of Project Area	fields, open forests, tall buildings	cultivated crops, grassland/herbaceous, developed	B, M

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Common Name	Conservation Status ¹	Onsite or Clinton County Record ²	Habitat Type(s)	Land Cover Type(s)	Timing of Potential Occurrence ³
Pied-billed grebe	NYS-T	Within 10 miles of Project Area	large wetlands with emergent vegetation and open water	emergent herbaceous wetlands, open water	YR
Red-headed woodpecker	NYS-SC		river bottoms, swamps, and open grasslands with scattered trees and snags	woody wetlands, grassland/herbaceous	B, M
Red-shouldered hawk	NYS-SC		deciduous forests, near rivers and swamps	deciduous forest, woody wetlands	B, M
Sedge wren	NYS-T		wet meadows or hayfields dominated by sedges and grasses	grassland/herbaceous	B, M
Sharp-shinned hawk	NYS-SC	OS, C	forest, forest edge	deciduous forest, evergreen forest, mixed forest, woody wetlands	B, M
Short-eared owl	NYS-E		marshes, grasslands	grassland/herbaceous, emergent herbaceous wetlands	W
Spruce grouse	NYS-E		spruce/fir conifer forest, wetlands	evergreen forest, woody wetlands	YR
Upland sandpiper	NYS-T		agricultural areas and grasslands with fence posts	grassland/herbaceous	B, M
Vesper sparrow	NYS-SC	C	patches of bare ground, severely disturbed habitats such as reclaimed mines, overgrazed pasture, and row crops	cultivated crops, pasture/hay	B, M
Whip-poor-will	NYS-SC		dry, deciduous or mixed forests with sparse underbrush near open areas (oak-hickory forests)	deciduous forest, mixed forest	B, M
<i>Amphibians</i>					
Blue-spotted salamander	NYS-SC		vernal pools and associated upland forests	deciduous forest, evergreen forest, mixed forest, woody wetlands	YR

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Common Name	Conservation Status¹	Onsite or Clinton County Record²	Habitat Type(s)	Land Cover Type(s)	Timing of Potential Occurrence³
Jefferson salamander	NYS-SC		vernal pools and associated upland forests	deciduous forest, evergreen forest, mixed forest, woody wetlands	YR
<i>Reptiles</i>					
Wood turtle	NYS-SC		high-order streams and rivers and associated riparian areas	open water, woody wetlands	YR
<i>Insects</i>					
Pine pinon moth	NYS-E		sandplain pine forests and woodlands	evergreen forest, barren land	YR
<i>Plants</i>					
Balsam willow	NYS-T		open marshes, fens, shorelines	emergent herbaceous wetlands	YR
Back's sedge	NYS-T		mesic, rocky deciduous forests; usually on a moderate to steep slope	deciduous forests	YR
Clustered sedge	NYS-T	C	open, sandy well-drained soils	barren land	YR
Hairy lettuce	NYS-E		forest edges, disturbed habitats, meadows, fields	shrub/scrub, grassland/herbaceous	YR
Fernald's sedge	NYS-T		forest edges, open sandy soils, meadows and fields	barren land, grassland/herbaceous	YR
Jack Pine	NYS-SC		nutrient-poor sandy soils	evergreen forest, barren land	YR
Handsome sedge	NYS-T		rich meadows and fields, vernal drainages	grassland/herbaceous	YR
Hooker's orchid	NYS-E		forests, forest edges	deciduous forest, evergreen forest, mixed forest, woody wetlands	YR
Lindley's aster	NYS-E		Forest edges, open fields, meadows, forests	deciduous forest, evergreen forest, mixed forest, woody wetlands, grassland/herbaceous	YR
Mock-pennyroyal	NYS-T		open meadows and fields	grassland/herbaceous	YR
Northern wild comfrey	NYS-E		early successional woods, forest edges, forests	deciduous forest, evergreen forest, mixed forest, woody wetlands	YR
Ram's-head lady's-slipper	NYS-T		rich, mesic forests, cedar swamps	deciduous forest, woody wetlands	YR

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Common Name	Conservation Status¹	Onsite or Clinton County Record²	Habitat Type(s)	Land Cover Type(s)	Timing of Potential Occurrence³
Spurred gentian	NYS-E		forests, forest edges, meadows, fields	deciduous forest, evergreen forest, mixed forest, woody wetlands, grassland/herbaceous	YR
Sweet coltsfoot	NYS-E		forested wetlands	woody wetlands	YR

¹ Status: E - endangered, T - threatened, SC - special concern, SGCN - species of greatest conservation need

² Record type: OS – onsite, C – Clinton County, blank – no record. Specified distance from Heritage record shown in bold.

Onsite surveys conducted in fall 2015 include a fall migration stopover bird survey and eagle and raptor point count survey. A passive bat acoustic survey was conducted in fall 2015; however, calls were analyzed as high frequency or low frequency.

Other wildlife surveys conducted in Clinton County included in this analysis are the USGS BBS and NY BBA and records from the NY Natural Heritage Program database.

³ Timing: B - breeding, YR - year round, W - Winter, M - Migration

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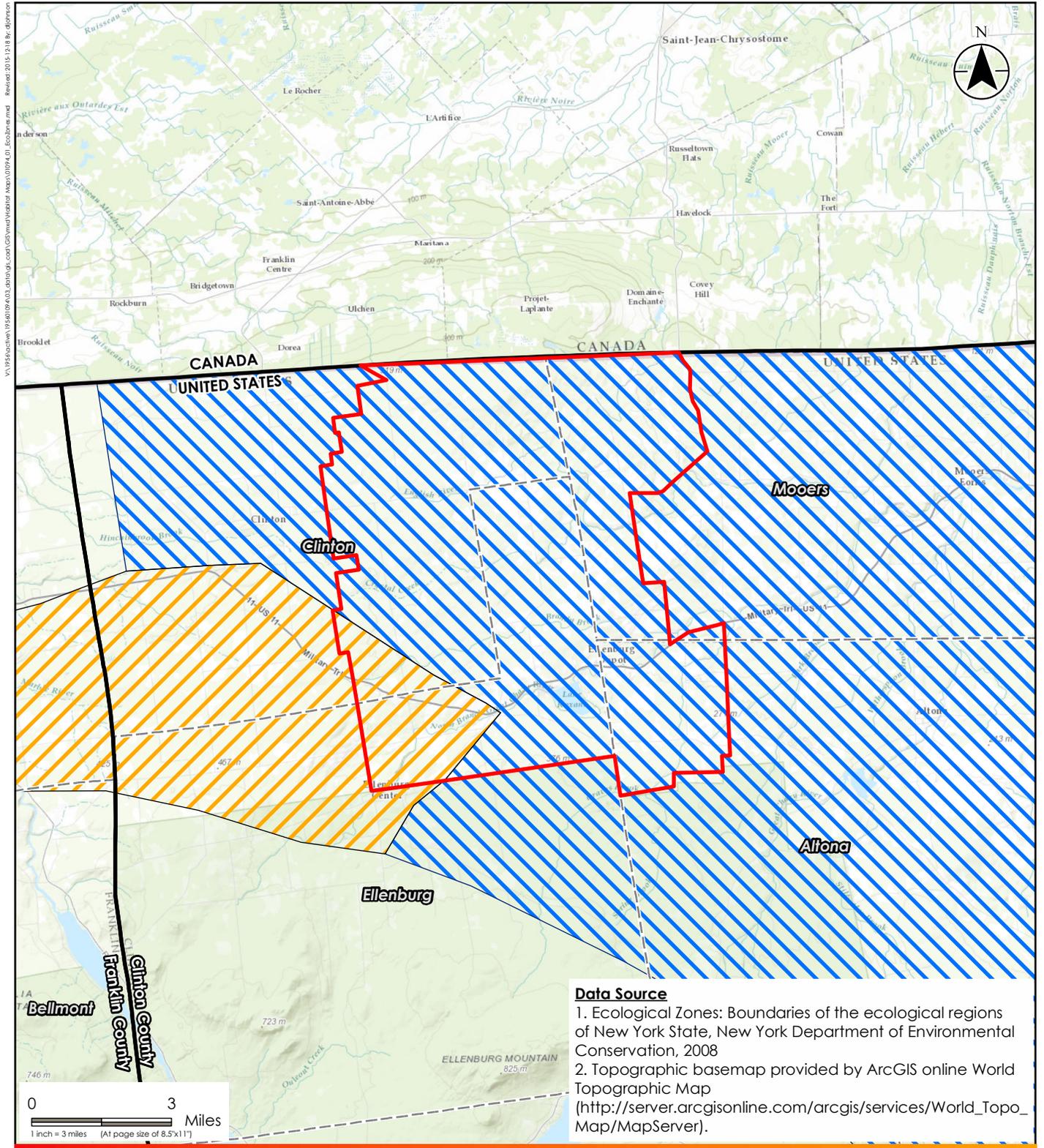
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Appendix A HABITAT MAPS



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195601094



30 Park Drive
Topsham, ME USA 04086
Phone (207) 729-1199

Prepared by DLJ on 2015-11-23
Quality Review by KWH on 2015-11-25
Independent Review by JLC on 2015-11-25

01094_01_EcoZones.mxd

Legend

- Approximate Project Boundary
- Ecological Zones
- Zone K: Western Adirondack Transition
- Zone L: Champlain Transition

Client/Project

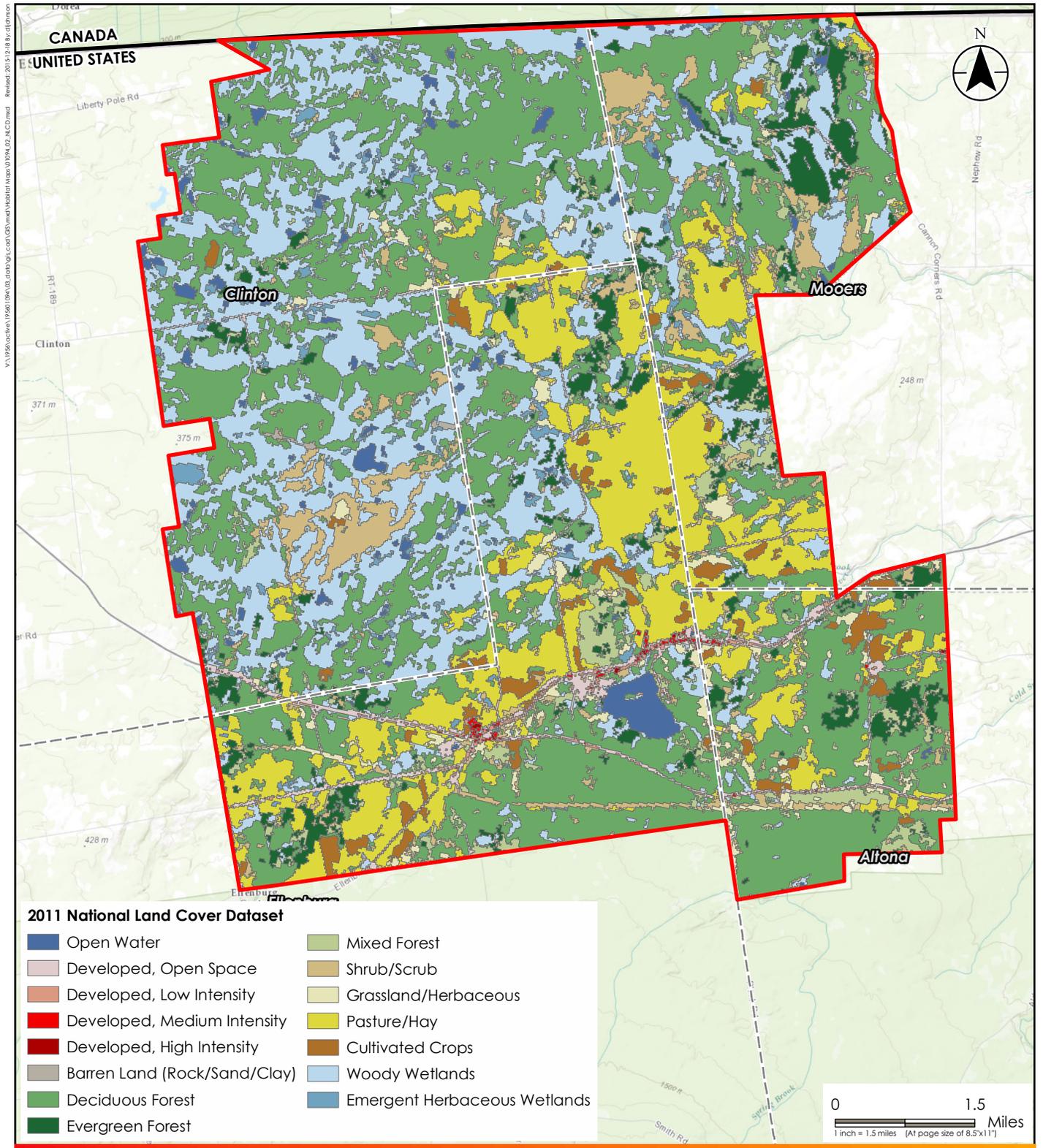
Invergy
Bull Run Wind Project
Clinton County, New York

Figure No.

1

Title

Ecological Zones
12/18/2015



30 Park Drive
Topsham, ME USA 04086
Phone (207) 729-1199

Prepared by DLJ on 2015-11-23
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Independent Review by JLC on 2015-11-25

01094_02_NLCD.mxd

Legend

- Approximate Project Boundary
- Town Boundary

Data Source

1. 2011 National Landcover Dataset: USGS 2011
2. Topographic basemap provided by ArcGIS online World Topographic Map (http://server.arcgisonline.com/arcgis/services/World_Topo_Map/MapServer).

Client/Project

Invenery
Bull Run Wind Project
Clinton County, New York

Figure No.

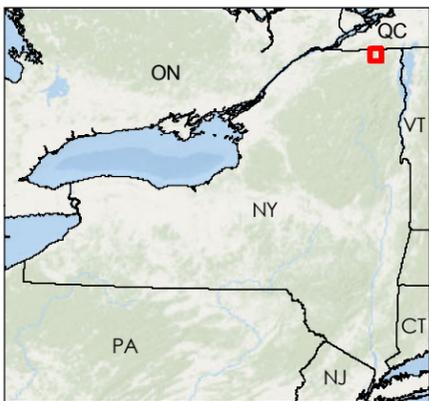
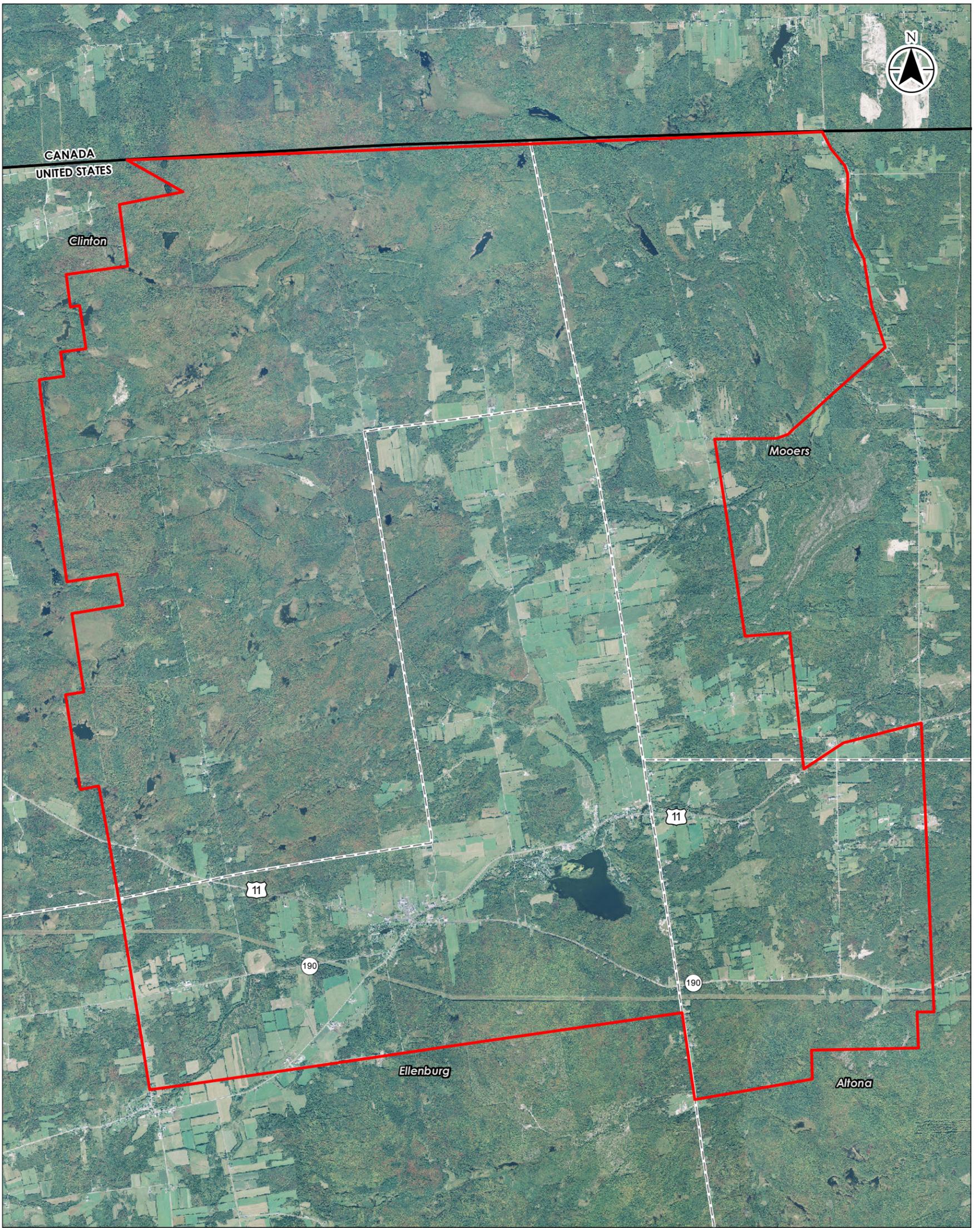
2

Title

2011 National Land
Cover Dataset
12/18/2015

195601094

V:\1956\active\195601094\03_data\gis\mxd\Map01094_03_Aerial_Imagery.mxd Revised: 2015-12-18 By: djohnson



- Legend**
- Approximate Project Boundary
 - Town Boundary



Project Location
Clinton County, New York

195601094
Prepared by DLJ on 2015-11-24
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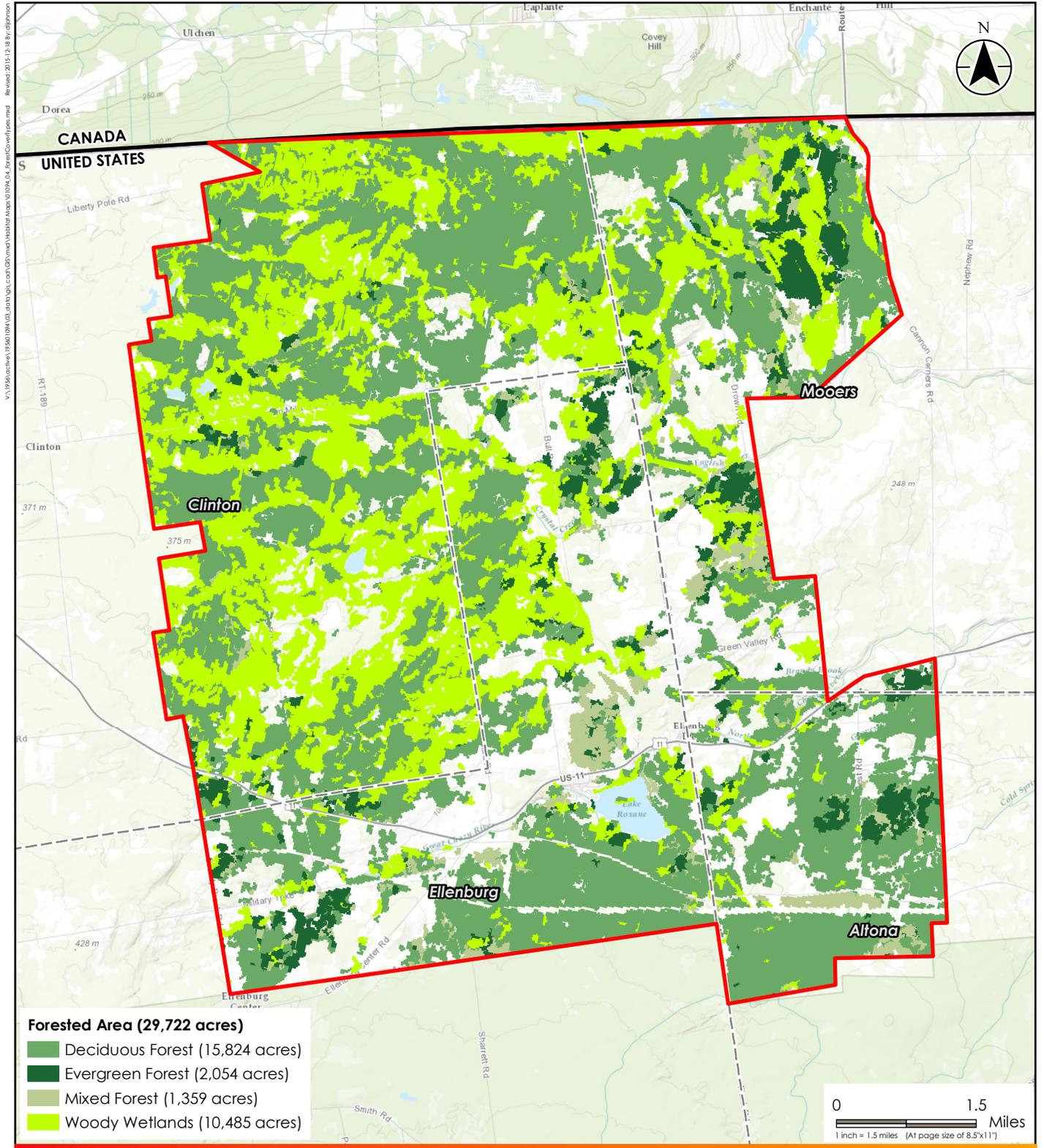
Client/Project
Invenergy
Bull Run Wind Project
Clinton County, New York

Figure No.
3

Title
2014 Aerial Imagery

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. 2013 National Agriculture Imagery Program (NAIP) aerial orthoimagery provided by USDA's Farm Service Agency.

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01094_04_ForestCoverTypes.mxd

Legend

- Approximate Project Boundary
- Town Boundary

Data Source

1. Forested Area: National Land Cover Database, 2011

Client/Project

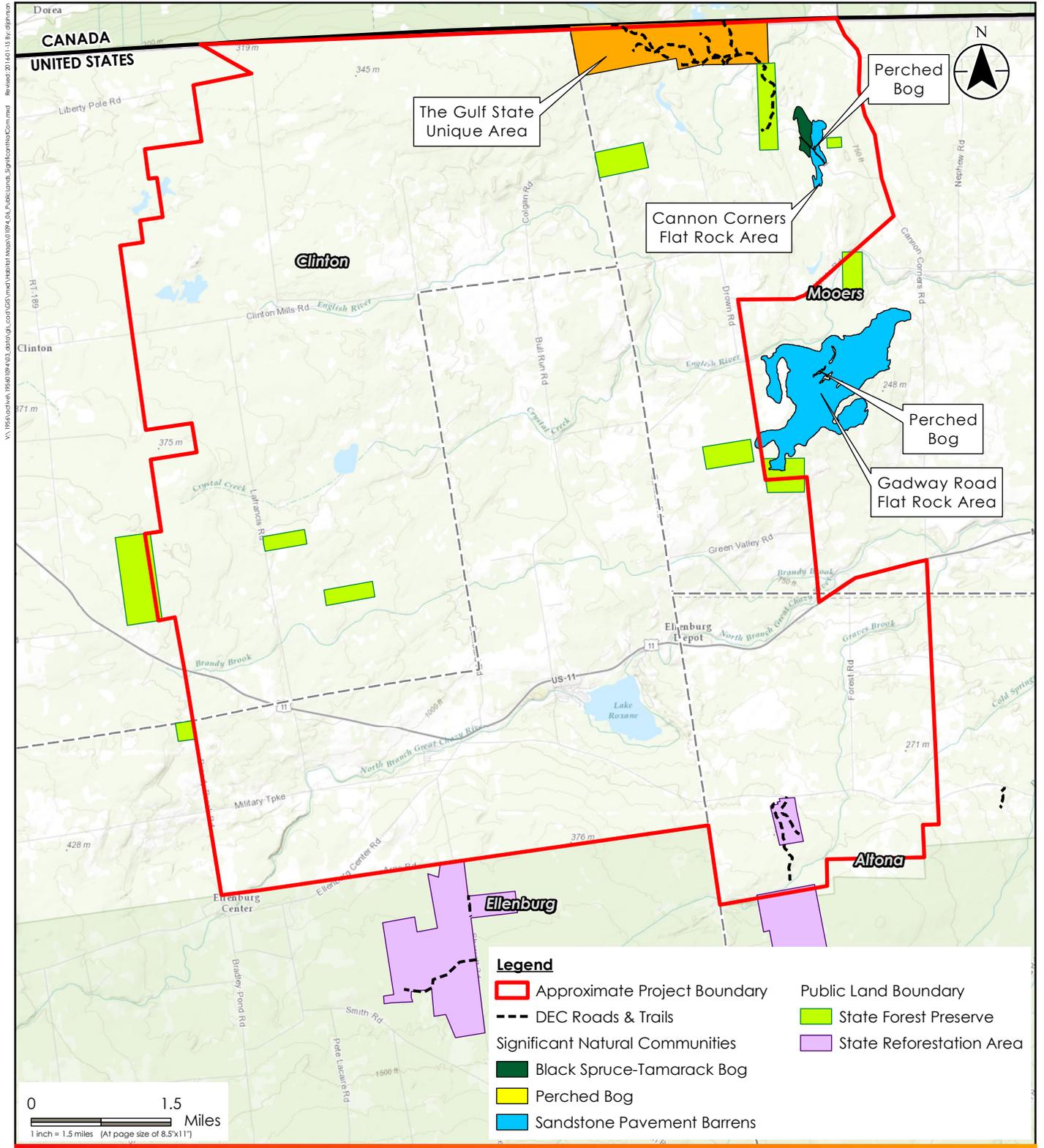
Inverny
Bull Run Wind Project
Clinton County, New York

Figure No.

4

Title

Forest Cover Type
12/18/2015



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Prepared by DLJ on 2015-11-24
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01094_06_PublicLands_SignificantNatCom.mxd

Data Source

1. Public Land Boundary, New York State Department of Conservation, 2015
2. Significant Natural Communities, New York State Department of Conservation, 2012
3. Roads and Trails, New York State Department of Conservation, 2012
4. Topographic basemap provided by ArcGIS online World Topographic Map (http://server.arcgisonline.com/arcgis/services/World_Topo_Map/MapServer).

Client/Project

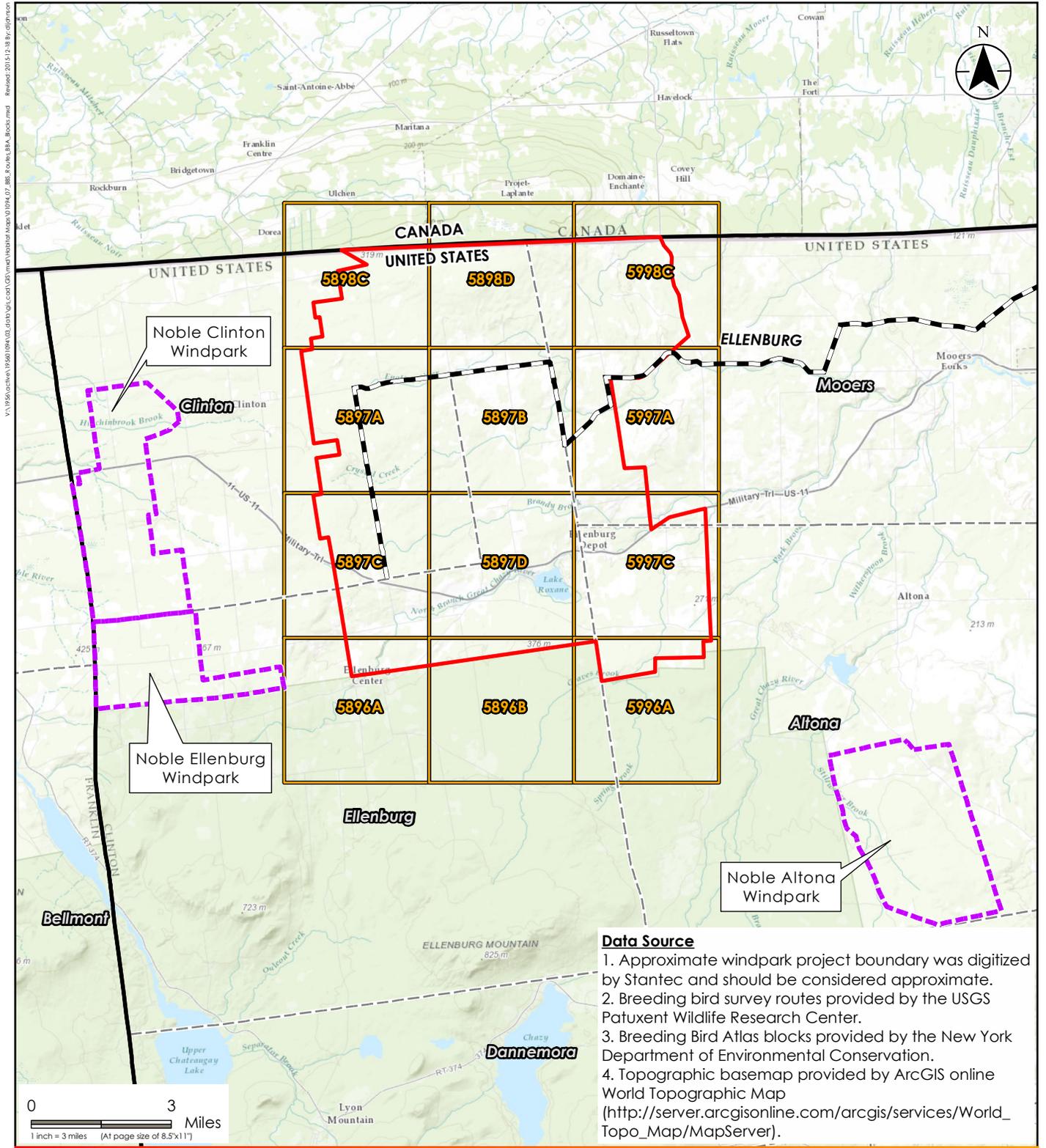
Inverny
 Bull Run Wind Project
 Clinton County, New York

Figure No.

6

Title

Significant Natural Communities and Public Lands
 1/15/2016



Data Source

1. Approximate windpark project boundary was digitized by Stantec and should be considered approximate.
2. Breeding bird survey routes provided by the USGS Patuxent Wildlife Research Center.
3. Breeding Bird Atlas blocks provided by the New York Department of Environmental Conservation.
4. Topographic basemap provided by ArcGIS online World Topographic Map (http://server.arcgisonline.com/arcgis/services/World_Topo_Map/MapServer).

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Prepared by DLJ on 2015-11-24
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 Independent Review by JLC on 2015-11-25

01094_07_BBS_Routes_BBA_Blocks.mxd

Legend

- Approximate Project Boundary
- Approximate Windpark Project Boundary
- USGS Breeding Bird Survey Route
- DEC Breeding Bird Atlas Blocks

Client/Project

Invergy
 Bull Run Wind Project
 Clinton County, New York

Figure No.

7

Title

Breeding Bird Survey Routes &
 Breeding Bird Atlas Blocks
 12/18/2015

Appendix B NY NATURAL HERITAGE DATABASE QUERY RESULTS

Appendix B Table 1. New York Natural Heritage Database Query Results.

Common Name	Scientific Name	Conservation Status¹	Location Recorded²
Significant natural communities			
Gadway Road Flat Rock area	<i>Sandstone Pavement Barrens</i>	High Quality Occurrence of Rare Community Type and Globally Rare	Gadway Road Flat Rock area, Mooers
Cannon Corners Flat Rock area	<i>Sandstone Pavement Barrens</i>	High Quality Occurrence of Rare Community Type and Globally Rare	Cannon Corners Flat Rock area, Mooers
Cannon Corners Flat Rock wetland	<i>Black Spruce-Tamarack Bog</i>	High Quality Occurrence of Uncommon Community Type	Cannon Corners Flat Rock area, Mooers
Cannon Corners Flat Rock wetland	<i>Perched Bog</i>	Rare Community Type	Cannon Corners Flat Rock area, Mooers
Plants			
Clustered sedge	<i>Carex cumulata</i>	NYS-T, Heritage imperiled in NYS	Gadway Road Flat Rock area, Mooers
Moths			
Jack pine looper	<i>Macaria marmorata</i>	NYS unlisted, Heritage critically imperiled in NYS	Gadway Road Flat Rock area, Mooers
Oblique dart	<i>Agrotis obliqua</i>	NYS unlisted, Heritage critically imperiled in NYS	Gadway Road Flat Rock area, Mooers
Pine barrens zanclognatha	<i>Zanclognatha martha</i>	NYS unlisted, Heritage critically imperiled in NYS	Gadway Road Flat Rock area, Mooers
Acadian swordgrass moth	<i>Xylena thoracica</i>	NYS unlisted, Heritage critically imperiled in NYS	Gadway Road Flat Rock area, Mooers
Bird dropping moth	<i>Cerma cora</i>	NYS unlisted, Heritage critically imperiled in NYS	Gadway Road Flat Rock area, Mooers
Toothed apharetra	<i>Sympistis dentata</i>	NYS unlisted, Heritage imperiled in NYS	Gadway Road Flat Rock area, Mooers
A Noctuid moth	<i>Chytonix sensilis</i>	NYS unlisted, Heritage imperiled in NYS	Gadway Road Flat Rock area, Mooers
Bridgham's brocade	<i>Oligia bridghamii</i>	NYS unlisted, Heritage status uncertain	Gadway Road Flat Rock area, Mooers

Common Name	Scientific Name	Conservation Status ¹	Location Recorded ²
Orange holomelina	<i>Virbia aurantiaca</i>	NYS unlisted, Heritage status uncertain	Gadway Road Flat Rock area, Mooers
Bats			
Northern long-eared bat (hibernaculum)	<i>Myotis septentrionalis</i>	USFWS-T, NYS-T, Heritage Rare or uncommon, Abundant and apparently secure	within 40 miles of Project area
Eastern small-footed bat (hibernaculum)	<i>Myotis leibii</i>	NYS-SC, Heritage Imperiled	within 40 miles of Project area
Birds			
Common loon (breeding)	<i>Gavia immer</i>	NYS-SC, Heritage Abundant and apparently secure	within 10 miles of Project area
Peregrine falcon (breeding)	<i>Falco peregrinus</i>	NYS-E, Heritage Breeding Rare or uncommon	within 10 miles of Project area
Pied-billed grebe (breeding)	<i>Podilymbus podiceps</i>	NYS-T, Heritage Breeding Rare or uncommon, Non-breeding Winter Critically imperiled	within 10 miles of Project area
Northern harrier (breeding)	<i>Circus cyaneus</i>	NYS-T, Heritage Breeding and Non-breeding Winter Rare or uncommon	within 10 miles of Project area
1 State status and Heritage Status. Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).			
2 New York Natural Heritage Program. 2015. Report on Rare Animals, Rare Plants, and Significant Natural Communities and Report on Rare Birds and Rare Bats in the General Vicinity of Wind Power Projects (Dated 16 December 2015).			

Appendix C USFWS IPAC RESULTS

Appendix C Table 1. USFWS IPaC Resource and Official List of Species, Clinton County.

Common Name	Scientific Name	Conservation Status ¹	Resource List ²	Official List ³
Bats				
Indiana bat	<i>Myotis sodalis</i>	USFWS-E, NYS-E, SGCN	X	X
Northern long-eared bat	<i>Myotis septentrionalis</i>	USFWS-T, NYS-T, SGCN	X	X
Birds				
American bittern	<i>Botaurus lentiginosus</i>	NYS-SC, SGCN	X	
Bald eagle	<i>Haliaeetus leucocephalus</i>	NYS-T, SGCN	X	
Bay-breasted warbler	<i>Setophaga castanea</i>	SGCN	X	
Bicknell's thrush	<i>Catharus bicknelli</i>	NYS-SC, SGCN	X	
Black tern	<i>Chlidonias niger</i>	NYS-E, SGCN	X	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN	X	
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	SGCN	X	
Canada warbler	<i>Cardellina canadensis</i>	SGCN	X	
Common tern	<i>Sterna hirundo</i>	NYS-T, SGCN	X	
Golden-winged warbler	<i>Vermivora chrysoptera</i>	NYS-SC, SGCN	X	
Olive-sided flycatcher	<i>Contopus cooperi</i>	SGCN	X	
Peregrine falcon	<i>Falco peregrinus</i>	NYS-E, SGCN	X	
Pied-billed grebe	<i>Podilymbus podiceps</i>	NYS-T, SGCN	X	
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	NYS-SC, SGCN	X	
Short-eared owl	<i>Asio flammeus</i>	NYS-E, SGCN	X	
Upland sandpiper	<i>Bartramia longicauda</i>	NYS-T, SGCN	X	
Willow flycatcher	<i>Empidonax traillii</i>		X	
Wood thrush	<i>Hylocichla mustelina</i>	SGCN	X	
Yellow rail	<i>Coturnicops noveboracensis</i>		X	
¹ Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).				
² The USFWS resource list is an unofficial list of species, including threatened and endangered species, designated or proposed critical habitat, migratory birds of conservation concern, or other natural resources of concern that may be affected by a project. Created for Clinton County. Available at https://ecos.fws.gov/ipac/ . Accessed 1 December 2015.				
³ The USFWS official list, a regulatory document, identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of a proposed project and/or may be affected by the proposed project. Created for Clinton County. Available at https://ecos.fws.gov/ipac/ . Accessed 1 December 2015.				

Appendix D USGS BBS AND NY BBA RESULTS

Appendix D Table 1. Species Observed Along USGS Breeding Bird Survey Ellenburg Route.

Common Name¹	Scientific Name	Conservation Status²
Alder & Willow flycatcher	<i>Empidonax spp.</i>	
Alder flycatcher	<i>Empidonax alnorum</i>	
American bittern	<i>Botaurus lentiginosus</i>	NYS-SC, SGCN
American crow	<i>Corvus brachyrhynchos</i>	
American goldfinch	<i>Spinus tristis</i>	
American kestrel	<i>Falco sparverius</i>	SGCN
American redstart	<i>Setophaga ruticilla</i>	
American robin	<i>Turdus migratorius</i>	
American woodcock	<i>Scolopax minor</i>	SGCN
Baltimore oriole	<i>Icterus galbula</i>	
Barn swallow	<i>Hirundo rustica</i>	
Black-and-white warbler	<i>Mniotilta varia</i>	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN
Black-capped chickadee	<i>Poecile atricapillus</i>	
Blue jay	<i>Cyanocitta cristata</i>	
Blue-headed vireo	<i>Vireo solitarius</i>	
Bobolink	<i>Dolichonyx oryzivorus</i>	SGCN
Broad-winged hawk	<i>Buteo platypterus</i>	
Brown thrasher	<i>Toxostoma rufum</i>	SGCN
Brown-headed cowbird	<i>Molothrus ater</i>	
Canada goose	<i>Branta canadensis</i>	
Canada warbler	<i>Cardellina canadensis</i>	SGCN
Cedar waxwing	<i>Bombycilla cedrorum</i>	
Chestnut-sided warbler	<i>Setophaga pennsylvanica</i>	
Chipping sparrow	<i>Spizella passerina</i>	
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	
Common grackle	<i>Quiscalus quiscula</i>	
Common raven	<i>Corvus corax</i>	
Common yellowthroat	<i>Geothlypis trichas</i>	
Dark-eyed junco	<i>Junco hyemalis</i>	
Downy woodpecker	<i>Picoides pubescens</i>	
Eastern bluebird	<i>Sialia sialis</i>	
Eastern kingbird	<i>Tyrannus tyrannus</i>	
Eastern meadowlark	<i>Sturnella magna</i>	SGCN
Eastern phoebe	<i>Sayornis phoebe</i>	
Eastern wood-Pewee	<i>Contopus virens</i>	
European starling	<i>Sturnus vulgaris</i>	
Field sparrow	<i>Spizella pusilla</i>	
Gray catbird	<i>Dumetella carolinensis</i>	
Great blue heron	<i>Ardea herodias</i>	
Great crested flycatcher	<i>Myiarchus crinitus</i>	
Hairy woodpecker	<i>Picoides villosus</i>	
Hermit thrush	<i>Catharus guttatus</i>	

Common Name ¹	Scientific Name	Conservation Status ²
House sparrow	<i>Passer domesticus</i>	
House wren	<i>Troglodytes aedon</i>	
Indigo bunting	<i>Passerina cyanea</i>	
Killdeer	<i>Charadrius vociferus</i>	
Least flycatcher	<i>Empidonax minimus</i>	
Mallard	<i>Anas platyrhynchos</i>	
Mourning dove	<i>Zenaida macroura</i>	
Mourning warbler	<i>Geothlypis philadelphia</i>	
Nashville warbler	<i>Oreothlypis ruficapilla</i>	
Northern cardinal	<i>Cardinalis cardinalis</i>	
Northern waterthrush	<i>Parkesia noveboracensis</i>	
Ovenbird	<i>Seiurus aurocapilla</i>	
Pileated woodpecker	<i>Dryocopus pileatus</i>	
Pine warbler	<i>Setophaga pinus</i>	
Purple finch	<i>Carpodacus purpureus</i>	
Purple martin	<i>Progne subis</i>	
Red-breasted nuthatch	<i>Sitta canadensis</i>	
Red-eyed vireo	<i>Vireo olivaceus</i>	
Red-winged blackbird	<i>Agelaius phoeniceus</i>	
Ring-billed gull	<i>Larus delawarensis</i>	
Rock pigeon	<i>Columba livia</i>	
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	
Ruby-throated hummingbird	<i>Archilochus colubris</i>	
Rusty blackbird	<i>Euphagus carolinus</i>	SGCN
Savannah sparrow	<i>Passerculus sandwichensis</i>	
Scarlet tanager	<i>Piranga olivacea</i>	SGCN
Song sparrow	<i>Melospiza melodia</i>	
Swamp sparrow	<i>Melospiza georgiana</i>	
Tree swallow	<i>Tachycineta bicolor</i>	
Turkey vulture	<i>Cathartes aura</i>	
Veery	<i>Catharus fuscescens</i>	
Warbling vireo	<i>Vireo gilvus</i>	
White-breasted nuthatch	<i>Sitta carolinensis</i>	
White-throated sparrow	<i>Zonotrichia albicollis</i>	
Wilson's snipe	<i>Gallinago delicata</i>	
Wood thrush	<i>Hylocichla mustelina</i>	SGCN
Yellow warbler	<i>Setophaga petechia</i>	
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	
Yellow-rumped warbler	<i>Setophaga coronata</i>	
Yellow-throated vireo	<i>Vireo flavifrons</i>	
¹ Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2014. The North American Breeding Bird Survey, Results and Analysis 1966 - 2013. Version 01.30.2015 USGS Patuxent Wildlife Research Center, Laurel, MD.		
² Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).		

Common Name ¹	Scientific Name	Conservation Status ²	5898C	5898D	5998C	5897A	5897B	5997A	5897C	5897D	5997C	5896A	5896B	5996A
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>										X			
Northern waterthrush	<i>Seiurus noveboracensis</i>			X	X	X	X	X		X	X		X	
Olive-sided flycatcher	<i>Contopus cooperi</i>	SGCN		X	X									
Osprey	<i>Pandion haliaetus</i>	NYS-SC		X						X				
Ovenbird	<i>Seiurus aurocapilla</i>		X	X	X	X	X	X	X	X	X	X	X	X
Palm warbler	<i>Dendroica palmarum</i>		X			X								
Peregrine falcon	<i>Falco peregrinus</i>	NYS-E, SGCN		X	X									
Pileated woodpecker	<i>Dryocopus pileatus</i>		X		X	X			X	X			X	
Pine warbler	<i>Dendroica pinus</i>				X									
Purple finch	<i>Carpodacus purpureus</i>		X	X	X	X	X	X	X	X	X	X	X	X
Purple martin	<i>Progne subis</i>						X	X						
Red-breasted nuthatch	<i>Sitta canadensis</i>			X	X		X			X	X		X	
Red-eyed vireo	<i>Vireo olivaceus</i>		X	X	X	X	X	X	X	X	X	X	X	
Red-tailed hawk	<i>Buteo jamaicensis</i>			X			X	X						
Red-winged blackbird	<i>Agelaius phoeniceus</i>		X	X	X	X	X	X	X	X	X	X	X	X
Rock pigeon	<i>Columba livia</i>		X	X	X		X	X	X	X	X	X		X
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>		X	X	X	X	X	X	X	X	X		X	
Ruby-crowned kinglet	<i>Regulus calendula</i>		X									X		X
Ruby-throated hummingbird	<i>Archilochus colubris</i>		X	X	X	X	X	X		X	X	X	X	X
Ruffed grouse	<i>Bonasa umbellus</i>	SGCN		X	X			X		X		X	X	X
Savannah sparrow	<i>Passerculus sandwichensis</i>		X		X		X	X	X	X	X	X		X
Scarlet tanager	<i>Piranga olivacea</i>	SGCN	X	X	X	X			X	X	X		X	
Sharp-shinned hawk	<i>Accipiter striatus</i>	NYS-SC			X	X								
Song sparrow	<i>Melospiza melodia</i>		X	X	X	X	X	X	X	X	X	X	X	X
Sora	<i>Porzana carolina</i>				X									X
Spotted sandpiper	<i>Actitis macularius</i>		X		X			X	X	X				X
Swamp sparrow	<i>Melospiza georgiana</i>		X	X	X	X	X	X	X	X	X			X
Tennessee warbler	<i>Vermivora peregrina</i>			X	X								X	
Tree swallow	<i>Tachycineta bicolor</i>		X	X	X	X	X	X	X	X	X	X		X
Tufted titmouse	<i>Baeolophus bicolor</i>											X		
Turkey vulture	<i>Cathartes aura</i>		X	X	X	X	X		X	X		X	X	
Veery	<i>Catharus fuscescens</i>		X	X	X	X	X	X	X	X	X		X	X
Vesper sparrow	<i>Poocetes gramineus</i>	NYS-SC					X		X	X	X			
Warbling vireo	<i>Vireo gilvus</i>		X	X	X		X	X	X	X	X	X	X	
Whip-poor-will	<i>Caprimulgus vociferus</i>	NYS-SC				X	X				X			
White-breasted nuthatch	<i>Sitta carolinensis</i>		X	X	X	X	X	X					X	X
White-throated sparrow	<i>Zonotrichia albicollis</i>		X	X	X	X	X	X	X	X	X	X	X	X
Wild turkey	<i>Meleagris gallopavo</i>				X	X	X	X			X	X		
Wilson's snipe	<i>Gallinago delicata</i>		X			X	X	X	X	X	X	X	X	X
Winter wren	<i>Troglodytes troglodytes</i>			X	X	X			X					X
Wood duck	<i>Aix sponsa</i>		X	X	X	X			X		X			

Common Name ¹	Scientific Name	Conservation Status ²	5898C	5898D	5998C	5897A	5897B	5997A	5897C	5897D	5997C	5896A	5896B	5996A
Wood thrush	<i>Hylocichla mustelina</i>	SGCN	X	X	X				X		X		X	
Yellow warbler	<i>Dendroica petechia</i>		X	X	X	X	X	X	X	X	X	X	X	
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>		X			X								
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>		X	X	X	X	X	X	X	X	X		X	X
Yellow-billed cuckoo	<i>Coccyzus americanus</i>				X									
Yellow-rumped warbler	<i>Dendroica coronata</i>		X	X	X			X	X	X	X	X	X	X
Yellow-throated vireo	<i>Vireo flavifrons</i>			X	X			X						

¹ New York State Breeding Bird Atlas 2000 [Internet]. 2000 - 2005. Release 1.0. Albany (New York): New York State Department of Environmental Conservation. [updated 2007 Jun 11; cited 2015 Nov 30]. Available from: <http://www.dec.ny.gov/animals/7312.html>

² Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).

**Appendix E CLINTON COUNTY WIND PROJECTS WILDLIFE
STUDY RESULTS**

Appendix E Table 1. Recent Clinton County Wind Project Passive Bat Acoustic Surveys, Composition of Predominant Species Groups.

Project	Year	Predominant Species Composition	Reference
Altona	2010	hoary bat 59.3%, silver-haired/big brown bat 28.4%, Myotis 0.9%	Reynolds, Scott. 2010a. Post-Construction Acoustic Monitoring Noble Altona Wind Park. Prepared for Noble Environmental Power, LLC.
Clinton	2008	silver-haired/big brown bat 53.2% Myotis 19.7%, hoary bat 20.0%	Reynolds, Scott. 2009a. Post-Construction Acoustic Monitoring Noble Clinton Wind Park. Prepared for Noble Environmental Power, LLC.
Clinton	2009	hoary bat 49.1%, silver-haired/big brown bat 26.7%, Myotis 14.7%	Reynolds, Scott. 2010b. Post-Construction Acoustic Monitoring 2009 Sampling Period Noble Clinton Wind Park. Prepared for Noble Environmental Power, LLC.
Ellensburg	2008	Myotis 82.9%, silver-haired/big brown bat 8.4%	Reynolds, Scott. 2009b. Post-Construction Acoustic Monitoring Noble Ellensburg Wind Park. Prepared for Noble Environmental Power, LLC.
Ellensburg	2009	silver-haired/big brown bat 55.7%, Myotis 34.5%, hoary bat 8.0%	Reynolds, Scott. 2010c. Post-Construction Acoustic Monitoring 2009 Sampling Period Noble Ellensburg Wind Park. Prepared for Noble Environmental Power, LLC.

Appendix E Table 2. Species Observed During Recent Clinton County Wind Project Breeding Bird Surveys.

Common Name	Scientific Name	Conservation Status ¹	Altona 2010 ²	Clinton 2008 ³	Clinton 2009 ⁴	Ellenburg 2008 ⁵	Ellenburg 2009 ⁶
Alder flycatcher	<i>Empidonax alnorum</i>		X	X	X	X	X
American crow	<i>Corvus brachyrhynchos</i>		X	X	X	X	X
American goldfinch	<i>Spinus tristis</i>		X		X	X	X
American kestrel	<i>Falco sparverius</i>	SGCN			X	X	
American redstart	<i>Setophaga ruticilla</i>		X		X		
American robin	<i>Turdus migratorius</i>		X	X	X	X	X
American woodcock	<i>Scolopax minor</i>	SGCN	X				
Baltimore oriole	<i>Icterus galbula</i>			X	X		
Black-and-white warbler	<i>Mniotilta varia</i>		X	X	X	X	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN			X		X
Blackburnian warbler	<i>Dendroica fusca</i>		X	X	X		X
Black-capped chickadee	<i>Poecile atricapillus</i>		X	X	X	X	X
Black-throated blue warbler	<i>Dendroica caerulescens</i>	SGCN	X	X	X	X	X
Black-throated green warbler	<i>Dendroica virens</i>		X		X	X	X
Blue jay	<i>Cyanocitta cristata</i>		X	X	X	X	X
Blue-headed vireo	<i>Vireo solitarius</i>		X	X	X		X
Bobolink	<i>Dolichonyx oryzivorus</i>	SGCN		X	X	X	X
Brown creeper	<i>Certhia americana</i>			X	X	X	
Brown thrasher	<i>Toxostoma rufum</i>	SGCN		X	X		X
Brown-headed cowbird	<i>Molothrus ater</i>		X	X	X	X	X
Canada warbler	<i>Wilsonia canadensis</i>	SGCN	X	X			
Cedar waxwing	<i>Bombycilla cedrorum</i>		X	X	X	X	X
Chesnut-sided warbler	<i>Dendroica pensylvanica</i>		X	X	X	X	X
Chipping sparrow	<i>Spizella passerina</i>		X	X	X	X	X
Common grackle	<i>Quiscalus quiscula</i>			X	X	X	X
Common raven	<i>Corvus corax</i>		X				X
Common yellowthroat	<i>Geothlypis trichas</i>		X	X	X	X	X
Dark-eyed junco	<i>Junco hyemalis</i>		X	X	X	X	X
Downy woodpecker	<i>Picoides pubescens</i>				X		X
Eastern kingbird	<i>Tyrannus tyrannus</i>			X	X	X	X
Eastern meadowlark	<i>Sturnella magna</i>	SGCN		X	X	X	
Eastern phoebe	<i>Sayornis phoebe</i>		X		X	X	X
Eastern towhee	<i>Pipilo erythrophthalmus</i>			X			
Eastern wood-pewee	<i>Contopus virens</i>		X	X	X	X	X
European starling	<i>Sturnus vulgaris</i>			X		X	
Field sparrow	<i>Spizella pusilla</i>		X				X
Golden-crowned kinglet	<i>Regulus satrapa</i>			X	X		
Gray catbird	<i>Dumetella carolinensis</i>		X	X	X		
Great crested flycatcher	<i>Myiarchus crinitus</i>		X	X		X	
Hairy woodpecker	<i>Picoides villosus</i>		X	X			X
Hermit thrush	<i>Catharus guttatus</i>		X	X	X		X
House wren	<i>Troglodytes aedon</i>			X	X	X	X
Indigo bunting	<i>Passerina cyanea</i>		X	X	X	X	X
Killdeer	<i>Charadrius vociferus</i>		X	X	X	X	X
Least flycatcher	<i>Empidonax minimus</i>		X	X	X	X	X

Common Name	Scientific Name	Conservation Status ¹	Altona 2010 ²	Clinton 2008 ³	Clinton 2009 ⁴	Ellenburg 2008 ⁵	Ellenburg 2009 ⁶
Lincoln's sparrow	<i>Melospiza lincolnii</i>				X		X
Magnolia warbler	<i>Dendroica magnolia</i>		X	X	X	X	X
Mourning dove	<i>Zenaida macroura</i>		X	X	X	X	
Mourning warbler	<i>Oporornis philadelphia</i>		X	X	X	X	X
Nashville warbler	<i>Vermivora ruficapilla</i>		X	X	X	X	X
Northern flicker	<i>Colaptes auratus</i>			X	X	X	X
Northern goshawk	<i>Accipiter gentilis</i>	NYS-SC, SGCN	X				
Northern harrier	<i>Circus cyaneus</i>	NYS-T, SGCN					X
Ovenbird	<i>Seiurus aurocapilla</i>		X	X	X	X	X
Pileated woodpecker	<i>Dryocopus pileatus</i>		X		X		
Purple finch	<i>Carpodacus purpureus</i>		X	X	X	X	X
Red-breasted nuthatch	<i>Sitta canadensis</i>		X	X	X		X
Red-eyed vireo	<i>Vireo olivaceus</i>		X	X	X	X	X
Red-winged blackbird	<i>Agelaius phoeniceus</i>			X	X	X	X
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>		X	X	X	X	X
Ruffed grouse	<i>Bonasa umbellus</i>	SGCN				X	
Savannah sparrow	<i>Passerculus sandwichensis</i>		X	X	X	X	X
Scarlet tanager	<i>Piranga olivacea</i>	SGCN	X	X	X	X	X
Song sparrow	<i>Melospiza melodia</i>		X	X	X	X	X
Swainson's thrush	<i>Catharus ustulatus</i>			X			
Swamp sparrow	<i>Melospiza georgiana</i>			X	X	X	X
Veery	<i>Catharus fuscescens</i>		X	X	X	X	X
Vesper sparrow	<i>Pooecetes gramineus</i>	NYS-SC, SGCN				X	X
Warbling vireo	<i>Vireo gilvus</i>			X	X		X
White-throated sparrow	<i>Zonotrichia albicollis</i>		X	X	X	X	X
Wild turkey	<i>Meleagris gallopavo</i>					X	X
Wilson's snipe	<i>Gallinago delicata</i>				X		X
Winter wren	<i>Troglodytes troglodytes</i>			X	X		
Wood thrush	<i>Hylocichla mustelina</i>	SGCN	X	X	X	X	X
Yellow warbler	<i>Dendroica petechia</i>			X	X	X	X
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>		X	X	X		X
Yellow-billed cuckoo	<i>Coccyzus americanus</i>			X			
Yellow-rumped warbler	<i>Dendroica coronata</i>		X	X	X		

¹ Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).

² Guarnaccia, John, James Dowdell, and Paul Kerlinger. 2010. Breeding Bird Survey 2010 Noble Altona Windpark Clinton County, New York. Prepared for Noble Environmental Power, LLC.

³ Kerlinger, Paul and James Dowdell. 2008a. Breeding Bird Survey for the Noble Clinton Wind Park Clinton County, New York. Prepared for Noble Environmental Power, LLC.

⁴ Kerlinger, Paul, John Guarnaccia, and James Dowdell. 2009a. Breeding Bird Survey 2009 Noble Clinton Wind Park Clinton County, New York. Prepared for Noble Environmental Power, LLC.

⁵ Kerlinger, Paul and James Dowdell. 2008b. Breeding Bird Survey for the Noble Ellenburg Wind Park Clinton County, New York. Prepared for Noble Environmental Power, LLC.

⁶ Kerlinger, Paul, John Guarnaccia, and James Dowdell. 2009b. Breeding Bird Survey 2009 Noble Ellenburg Wind Park Clinton County, New York. Prepared for Noble Environmental Power, LLC.

**Appendix F RESULTS OF CLINTON COUNTY WIND PROJECT
CARCASS SURVEYS**

Appendix F Table 1. Bat Carcasses Observed During Carcass Searches at Wind Projects in Clinton County.

Common Name	Scientific Name	Conservation Status ¹	Altona ^{2,3}	Clinton ^{4,5}	Ellenburg ^{6,7}
Big brown bat	<i>Eptesicus fuscus</i>		X	X	X
Eastern red bat	<i>Lasiurus borealis</i>	SGCN	X	X	X
Hoary bat	<i>Lasiurus cinereus</i>	SGCN	X	X	X
Little brown bat	<i>Myotis lucifugus</i>	SGCN	X	X	X
Northern long-eared bat	<i>Myotis septentrionalis</i>	USFWS-T, NYS-T, SGCN			X
Silver-haired bat	<i>Lasionycteris noctivagans</i>	SGCN	X	X	X
Tri-colored bat	<i>Perimyotis subflavus</i>	SGCN		X	X
Unidentified bat	<i>na</i>			X	
Unidentified myotis	<i>na</i>			X	
1 Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).					
2 Curry and Kerlinger, LLC. 2011. Annual Report for Noble Altona Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2010. Prepared for Noble Environmental Power, LLC.					
3 Kerlinger, P., S. Reynolds, J. Guarnaccia, L. Slobodnik, and R. Curry. 2011. An Examination of the Relationship between Bat Abundance and Fatalities at the Noble Altona Windpark. Prepared for Noble Environmental Power.					
4 A. Jain, P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009. Annual Report for the Noble Clinton Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC.					
5 A. Jain, P. Kerlinger, R. Curry, L. Slobodnik, and K. Russell. 2010. Annual Report for the Noble Clinton Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC.					
6 A. Jain, P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009. Annual Report for the Noble Ellenburg Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC.					
7 A. Jain, P. Kerlinger, R. Curry, L. Slobodnik, and K. Russell. 2010. Annual Report for the Noble Ellenburg Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC.					

Appendix F Table 2. Bird Carcasses Observed During Carcass Searches at Wind Projects in Clinton County.

Common Name	Scientific Name	Conservation Status ¹	Altona ^{2,3}	Clinton ^{4,5}	Ellenburg ^{6,7}
American crow	<i>Corvus brachyrhynchos</i>		X		
American robin	<i>Turdus migratorius</i>		X		X
American woodcock	<i>Scolopax minor</i>	SGCN	X		X
Belted kingfisher	<i>Megaceryle alcyon</i>		X		
Black-and-white warbler	<i>Mniotilta varia</i>				X
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN		X	
Blackburnian warbler	<i>Dendroica fusca</i>			X	
Blackpoll warbler	<i>Dendroica striata</i>				X
Black-throated green warbler	<i>Dendroica virens</i>				X
Blue jay	<i>Cyanocitta cristata</i>		X		X
Blue-headed vireo	<i>Vireo solitarius</i>			X	X
Bobolink	<i>Dolichonyx oryzivorus</i>	SGCN		X	
Broad-winged hawk	<i>Buteo platypterus</i>			X	X
Brown creeper	<i>Certhia americana</i>				X
Canada goose	<i>Branta canadensis</i>			X	X
Catharus sp. (thrush)	<i>Catharus sp.</i>		X		
Cedar waxwing	<i>Bombycilla cedrorum</i>			X	X
Chipping sparrow	<i>Spizella passerina</i>		X		
Common grackle	<i>Quiscalus quiscula</i>			X	
Common merganser	<i>Mergus merganser</i>			X	
Eastern kingbird	<i>Tyrannus tyrannus</i>				X
European starling	<i>Sturnus vulgaris</i>			X	X
Flycatcher sp.	<i>Empidonax sp.</i>			X	
Golden-crowned kinglet	<i>Regulus satrapa</i>		X		
Great blue heron	<i>Ardea herodias</i>			X	
Gull sp.	<i>Gull sp.</i>		X		
Hairy woodpecker	<i>Picoides villosus</i>		X		
Killdeer	<i>Charadrius vociferus</i>			X	
Kinglet sp.	<i>Regulus sp.</i>			X	X
Least flycatcher	<i>Empidonax minimus</i>			X	
Magnolia warbler	<i>Dendroica magnolia</i>				X

Common Name	Scientific Name	Conservation Status ¹	Altona ^{2,3}	Clinton ^{4,5}	Ellenburg ^{6,7}
Mallard	<i>Anas platyrhynchos</i>			X	X
Northern flicker	<i>Colaptes auratus</i>				X
Passerine sp.	<i>passerine sp.</i>				X
Red-breasted nuthatch	<i>Sitta canadensis</i>		X		
Red-eyed vireo	<i>Vireo olivaceus</i>		X	X	X
Red-tailed hawk	<i>Buteo jamaicensis</i>			X	X
Rock pigeon	<i>Columba livia</i>			X	X
Ruby-crowned kinglet	<i>Regulus calendula</i>				X
Ruffed grouse	<i>Bonasa umbellus</i>	SGCN	X	X	X
Sharp-shinned hawk	<i>Accipiter striatus</i>	NYS-SC		X	
Song sparrow	<i>Melospiza melodia</i>				X
Swainson's thrush	<i>Catharus ustulatus</i>		X		
Tree swallow	<i>Tachycineta bicolor</i>			X	X
Unidentified bird	<i>na</i>		X	X	X
White-crowned sparrow	<i>Zonotrichia leucophrys</i>				X
Wild turkey	<i>Meleagris gallopavo</i>		X		X
Yellow warbler	<i>Dendroica petechia</i>		X		
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>				X
Yellow-rumped warbler	<i>Dendroica coronata</i>			X	
¹ Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).					
² Curry and Kerlinger, LLC. 2011. Annual Report for Noble Altona Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2010. Prepared for Noble Environmental Power, LLC.					
³ Kerlinger, P., S. Reynolds, J. Guarnaccia, L. Slobodnik, and R. Curry. 2011. An Examination of the Relationship between Bat Abundance and Fatalities at the Noble Altona Windpark. Prepared for Noble Environmental Power.					
⁴ Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009a. Annual Report for the Noble Clinton Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC.					
⁵ Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, and K. Russell. 2010a. Annual Report for the Noble Clinton Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC.					
⁶ Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009b. Annual Report for the Noble Ellenburg Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC.					
⁷ Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, and K. Russell. 2010b. Annual Report for the Noble Ellenburg Windpark, LLC Post-Construction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC.					

Appendix G RESULTS OF BULL RUN FALL 2015 SURVEYS

Appendix G Table 1. Bird Species Observed During Fall 2015 Field Surveys at the Bull Run Wind Energy Project.

Common Name	Scientific Name	Conservation Status ¹	Fall Stopover Bird Survey ²	Eagle and Raptor Point Count Survey ²
American black duck	<i>Anas rubripes</i>	SGCN	X	
American crow	<i>Corvus brachyrhynchos</i>		X	X
American goldfinch	<i>Spinus tristis</i>		X	X
American kestrel	<i>Falco sparverius</i>	SGCN	X	X
American robin	<i>Turdus migratorius</i>		X	X
American woodcock	<i>Scolopax minor</i>	SGCN	X	X
American tree sparrow	<i>Spizella arborea</i>			X
Bald eagle	<i>Haliaeetus leucocephalus</i>	NYS-T, SGCN		X
Belted kingfisher	<i>Megaceryle alcyon</i>		X	
Black-and-white warbler	<i>Mniotilta varia</i>		X	
Black-capped chickadee	<i>Poecile atricapillus</i>		X	X
Blackpoll warbler	<i>Setophaga striata</i>		X	X
Blue jay	<i>Cyanocitta cristata</i>		X	X
Blue-headed vireo	<i>Vireo solitarius</i>		X	
Broad-winged hawk	<i>Buteo platypterus</i>			X
Brown creeper	<i>Certhia americana</i>		X	X
Canada goose	<i>Branta canadensis</i>		X	X
Cedar waxwing	<i>Bombycilla cedrorum</i>		X	X
Chipping sparrow	<i>Spizella passerina</i>		X	
Common raven	<i>Corvus corax</i>		X	X
Common yellowthroat	<i>Geothlypis trichas</i>		X	X
Cooper's hawk	<i>Accipiter cooperii</i>	NYS-SC	X	X
Dark-eyed junco	<i>Junco hyemalis</i>		X	X
Downy woodpecker	<i>Picoides pubescens</i>		X	X
Eastern bluebird	<i>Sialia sialis</i>		X	X
Eastern meadowlark	<i>Sturnella magna</i>	SGCN	X	X
Eastern phoebe	<i>Sayornis phoebe</i>		X	
Eastern towhee	<i>Pipilo erythrophthalmus</i>			X
Eastern wood-pewee	<i>Contopus virens</i>		X	X
European starling	<i>Sturnus vulgaris</i>		X	X
Field sparrow	<i>Spizella pusilla</i>			X
Golden-crowned kinglet	<i>Regulus satrapa</i>		X	X

Common Name	Scientific Name	Conservation Status ¹	Fall Stopover Bird Survey ²	Eagle and Raptor Point Count Survey ²
Gray catbird	<i>Dumetella carolinensis</i>		X	X
Great blue heron	<i>Ardea herodias</i>		X	X
Hairy woodpecker	<i>Picoides villosus</i>		X	X
Hermit thrush	<i>Catharus guttatus</i>		X	
House finch	<i>Haemorhous mexicanus</i>		X	
Killdeer	<i>Charadrius vociferus</i>		X	
Mallard	<i>Anas platyrhynchos</i>		X	
Merlin	<i>Falco columbarius</i>			X
Mourning dove	<i>Zenaida macroura</i>		X	X
Northern cardinal	<i>Cardinalis cardinalis</i>		X	
Northern flicker	<i>Colaptes auratus</i>		X	X
Northern harrier	<i>Circus cyaneus</i>	NYS-T, SGCN	X	X
Osprey	<i>Pandion haliaetus</i>	NYS-SC		X
Peregrine falcon	<i>Falco peregrinus</i>	NYS-E, SGCN		X
Pileated woodpecker	<i>Dryocopus pileatus</i>		X	X
Purple finch	<i>Carpodacus purpureus</i>			X
Red-breasted nuthatch	<i>Sitta canadensis</i>		X	X
Red-eyed vireo	<i>Vireo olivaceus</i>		X	X
Red-tailed hawk	<i>Buteo jamaicensis</i>			X
Red-winged blackbird	<i>Agelaius phoeniceus</i>		X	X
Ring-billed gull	<i>Larus delawarensis</i>		X	X
Rock pigeon	<i>Columba livia</i>		X	X
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>		X	
Rough-legged hawk	<i>Buteo lagopus</i>			X
Ruby-crowned kinglet	<i>Regulus calendula</i>			X
Ruby-throated hummingbird	<i>Archilochus colubris</i>			X
Ruffed grouse	<i>Bonasa umbellus</i>	SGCN	X	X
Savannah sparrow	<i>Passerculus sandwichensis</i>		X	X
Sharp-shinned hawk	<i>Accipiter striatus</i>	NYS-SC	X	X
Snow goose	<i>Chen caerulescens</i>			X
Song sparrow	<i>Melospiza melodia</i>		X	X

Common Name	Scientific Name	Conservation Status ¹	Fall Stopover Bird Survey ²	Eagle and Raptor Point Count Survey ²
Tree swallow	<i>Tachycineta bicolor</i>		X	X
Turkey vulture	<i>Cathartes aura</i>		X	X
Unidentified buteo	<i>n/a</i>			X
Unidentified duck	<i>Anatinae (gen, sp)</i>		X	
Unidentified eagle	<i>n/a</i>			X
Unidentified falcon	<i>n/a</i>			X
Unidentified flycatcher	<i>Empidonax (gen, sp)</i>			X
Unidentified gull	<i>n/a</i>			X
Unidentified passerine	<i>n/a</i>		X	
Unidentified sparrow	<i>Emberizidae (gen, sp)</i>		X	
Unidentified thrush	<i>Turdidae (gen, sp)</i>		X	
Unidentified vireo	<i>Vireonidae (gen, sp)</i>		X	
Unidentified warbler	<i>Parulidae (gen, sp)</i>		X	
Unidentified waterfowl	<i>n/a</i>		X	
Unidentified woodpecker	<i>Picadae (gen, sp)</i>		X	
White-breasted nuthatch	<i>Sitta carolinensis</i>		X	X
White-throated sparrow	<i>Zonotrichia albicollis</i>		X	X
Wild turkey	<i>Meleagris gallopavo</i>		X	X
Wood duck	<i>Aix sponsa</i>			X
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>		X	X
Yellow-rumped warbler	<i>Dendroica coronata</i>			X

¹ Species listed as Endangered (E), Threatened (T), Special Concern (SC), Species of Greatest Conservation Need (SGCN).

² Stantec Consulting. 2015. Bull Run Wind Energy Project Bird and Bat Survey Report, Fall 2015. Prepared for Invenergy LLC.