Baron Winds Project

Case No. 15-F-0122

1001.22 Exhibit 22

Terrestrial Ecology and Wetlands

TABLE OF CONTENTS

EXHIBIT 22 TERRESTRIAL ECOLOGY AND WETLANDS

(a) Plant Communities

Plant communities and vegetation occurring within the Facility Site were identified and characterized during on-site field surveys during the 2016 and 2017 growing seasons. Documentation of vascular plant species included those vascular plant species that were identifiable while on the Facility Site. A total of 193 unique native and non-native plant species were identified during these field surveys. The plant list is attached as Appendix LL; nomenclature follows the New York Flora Atlas (Weldy et al., 2017).

Plant communities were mapped within the Facility Site using Geographic Information System (GIS) software (see Figure 22-1). Vegetation cover was determined using National Land Cover Data (NLCD), field investigations, roadside observations, and aerial photo interpretation. All ecological communities within the Facility Site were identified as those described in the 2014 *Ecological Communities of New York State, Second Edition: A Revised and Expanded Edition of Carol Reschke's Ecological Communities of New York State.* In the *Ecological Communities of New York State*, the New York Natural Heritage Program described each community, including the ecoregions in which they occur, and the dominant plant species typically found therein (Edinger et al., 2014). Identification of each specific community type was based on data collected during field surveys, aerial photo interpretation, and roadside observations. All of the major plant communities found within the Facility Site are common to New York State. Forestlands and agricultural land are the dominant community type in the Facility Site, while successional old field and developed/disturbed communities occur to a lesser extent. Descriptions of the dominant vegetation within the Facility Site are provided below for each of these ecological communities. Detailed descriptions of wetland community types encountered during on-site wetland delineations is provided below in 1001.22 (j).

(1) Forests

Aside from agricultural land, forestland constitutes the largest cover type within the Facility Site, occupying approximately 3,537 acres (41% of the Facility Site). Forestland within the Facility Site resemble the beech-maple mesic forest and the hemlock-northern hardwood forest communities described in the *Ecological Communities of New York State* (Edinger et. al., 2014). These forests occur throughout the Facility Site, on ridgetops, steep hillsides, and interspersed between agricultural areas. Tree species vary based on the orientation of the slope, but dominant or co-dominant species in most locations include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*), black cherry (*Prunus serotina*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), and yellow birch (*Betula alleghaniensis*).

Specific forest types within the Facility Site are described below. All of the species mentioned were observed on-site; see Appendix LL for a full listing of plant species.

Beech-maple Mesic Forest

The majority of forests within the Facility Site are beech-maple mesic, dominated by American beech and sugar maple. Other canopy species in these forests include red maple, white ash (*Fraxinus americana*), black cherry, white pine (*Pinus strobus*), hop hornbeam (*Ostrya virginiana*), eastern hemlock, American hornbeam (*Carpinus caroliniana*), and witch hazel (*Hamamelis virginiana*). The understory of these forests typically contains a diverse array of ferns and forbs, including Christmas fern (*Polystichum acrostichoides*), woodferns (*Drypoteris* spp.), hay-scented fern (*Dennstaedtia punctilobula*), mayapple (*Podophyllum peltatum*), yellow trout lily (*Erythronium americanum*), jack-in-the-pulpit (*Arisaema triphyllum*), Canada mayflower (*Maianthemum candadense*), and wild leek (*Allium tricoccum*).

Hemlock-Northern Hardwood Forest

Hemlock-northern hardwood forests in the Facility Site are dominated by eastern hemlock, with American beech occasionally co-dominant. Other tree species occasionally present include yellow birch, sugar maple, and red maple. Where hemlock is dominant, very little light reaches the forest flora and understory tends to be very sparse. Woodferns, starflower (*Lysimachia borealis*), purple trillium (*Trillium erectum*), and Canada mayflower are some of the understory species found in these habitats.

(2) Successional Shrubland

As defined by the *Ecological Communities of New York State* (Edinger et al., 2014), successional shrublands are sites that develop after they have been cleared, and have at least 50% cover by shrub species. Successional shrublands occupy approximately 461 acres (5% of the Facility Site). This community type represents a successional step between old field habitats and successional forest, and often contains a similar suite of species. Shrubs common in successional forests of the Facility Site include gray dogwood (*Cornus racemosa*), multiflora rose (*Rosa multiflora*), common buckthorn (*Rhamnus cathartica*), Morrow's honeysuckle (*Lonicera morrowii*), choke cherry (*Prunus virginiana*), and nannyberry (*Viburnum lentago*). Herbaceous species include a wide variety of asters (*Symphyotrichum* spp.) and goldenrods (*Solidago* spp.), as well as orchard grass (*Dactylis glomerata*), Queen Anne's lace (*Daucus carota*), common burdock (*Arctium minus*), and ox-eye daisy (*Leucanthemum vulgare*). Vines, such as riverbank grape (*Vitis riparia*), may be present as well.

(3) Successional Old Field

As defined by the *Ecological Communities of New York State* (Edinger et. al., 2014), a successional old field is a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed (for farming or development), and then abandoned. Within the Facility Site successional old field occupies approximately 176 acres (2% of the Facility Site). This community is located primarily along roadsides, or adjacent to active agricultural fields. Species found in these areas include orchard grass, timothy (*Phleum pratense*), smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), goldenrods, clovers (*Trifolium* spp.), common milkweed (*Asclepias syriaca*), asters, Queen Anne's lace, wild madder (*Galium album*), old field cinquefoil (*Potentialla simplex*), and common burdock. Shrubs such as honeysuckle (*Lonicera* spp.) and arrowwood (*Virburnum* spp.) are also components of this community, but represent less than 50% of total vegetative cover.

(4) Disturbed/Developed

Disturbed/developed land consists of a combination of several "cultural communities" as defined in the *Ecological Communities of New York State* (Edinger *et. al.,* 2014). Disturbed/developed lands occur throughout the Facility Site, although due to the rural nature of the landscape, disturbed and developed areas only occupy approximately 89 acres (less than 1% of the Facility Site). Disturbed/developed land are characterized by the presence of buildings, parking lots, paved and unpaved roads, lawns, gravel mines, and gas/oil infrastructure. Vegetation in these areas is generally either lacking or highly managed (i.e., mowed lawns or plants seeded along roadsides for erosion control). Volunteer vegetation in these areas is generally sparse, and comprised of old-field, often non-native, herbaceous species such as bull thistle (*Cirsium vulgare*), curly dock (*Rumex crispus*), chicory (*Cichorium intybus*), spotted knapweed (*Centaurea stoebe*), mugwort (*Artemisia vulgaris*), pineapple-weed (*Matricaria discoidea*), butter-and-eggs (*Linaria vulgaris*), and various upland grasses including orchard grass, smooth brome, and sweet vernal grass (*Anthoxanthum odoratum*).

(5) Agricultural Land

As defined by the United States Department of Agriculture (USDA, 2009), and for the purposes of this application, agricultural land or crop land consists of cropland harvested, crop failure, cultivated summer fallow, cropland used only for pasture, and idle cropland. Each of these categories consists of variation in vegetation type, intensity of agricultural operations (tillage, seeding, harvesting etc.) and overall land use. Active agricultural land is the most common ecological community within the Facility Site, collectively occupying approximately 4,245 acres (50% of the Facility Site). Within the Facility Site, row and field crops are dominant (4,013 acres) and consist of row crops

that are planted on tilled soil and then harvested, and cover crops used to stabilize exposed soils/replenish soil nutrients and provide feedstock for livestock. In cropland with row crops, vegetation includes corn, wheat, soybeans, barley, oats, etc. Cover crops and hayfields include timothy, rye and other perennial grasses. Pasture land is less prevalent within the Facility Site, occupying 232 acres. Vegetation composition in pastures is similar to successional old fields, with some differences in species abundance due to grazing preferences (i.e., species not favored by livestock may be more common).

(b) Impact to Plant Communities

Construction and operation of the Facility will result in impacts to plant communities. These impacts include vegetation clearing and disturbance from construction, as well as permanent loss of vegetated habitats by conversion to built facilities. Facility-related impacts to all plant communities identified in the mapping of ecological communities described above in support of 1001.22(a) were calculated in ArcGIS based on information derived from the Preliminary Design drawings. Specifically, relevant aspects of the proposed Facility (e.g., proposed grading, location of overhead collection poles, and associated guy wires) were factored into the preliminary design, and associated limits of disturbance were generated in AutoCAD software. The limits of disturbance were then converted to shapefile for use in ArcGIS software, which allowed for quantification of impacts to plant communities.

Please note that temporary, permanent, and total impacts to soils are provided in Exhibit 21 and impacts to vegetation are presented below.

A total of up to 573.9 acres of vegetation will be disturbed by Facility construction (i.e., less than 7% of the Facility Site). Of this area, 447.0 acres (77.9% of disturbance) will be disturbed only temporarily, including areas where collection line is buried underground, construction staging areas, and the margins of access roads and turbine construction workspaces. Approximately 126.9 acres of vegetation will be permanently converted to built facilities, which represents 1.5% of the Facility Site. Permanent built facilities include turbine foundations and pads, access roads, an O&M building, meteorological tower foundations, overhead collection line poles, the collection substation, and the POI substation.

Forest clearing impacts can be characterized as one of three types. The first is permanent loss, where forests would be replaced with built facilities (access roads, turbines, etc.). There is expected to be approximately 30.1 acres of forest impacted in this manner. The second is forested conversion, where forests would be cleared and maintained as successional communities for the life of the Facility (e.g., areas under the turbines, beneath overhead collection lines, and along buried collection lines). This type of disturbance is anticipated to result in up to 115.7 acres of impact to

forests. Finally, temporary impacts are those where forest would be allowed to regrow following construction (e.g. along the periphery of access roads and turbine sites). Approximately 16.6 acres of forest will be disturbed in this manner, and allowed to regrow following construction. In these areas, the Applicant will only remove stumps where necessary to install underground components, will not use herbicides to prevent sprouting, and will not remove trees as part of routine vegetation management during Facility operation. Ecological succession will restore the forested condition of these areas over time.

Construction of the Facility will result in temporary disturbance of up to approximately 272.9 acres of row and field crop vegetation, and up to approximately 6.6 acres of pasture. Approximately 84.6 acres of row and field crops will be permanently lost to built facilities, along with 3.6 acres of pasture. For a detailed description of impacts to agricultural lands, please see 1001.22(q). Construction of the Facility will result in temporary disturbance of 11.4 acres of successional old field, 16.7 acres of successional shrublands, and 6.9 acres of disturbed/developed communities. The Facility will ultimately result in loss of 4.3 acres of successional old field, 3.2 acres of successional shrublands, and 1.1 acres of disturbed/developed communities. Approximately 0.2 acre of temporary disturbance and no permanent loss of open water vegetation communities, as defined by the ecological communities mapping procedure described in 1001.22(a), are anticipated. See 1001.23(b)(4) for a discussion of impacts to surface waters, as defined by on-site wetland and stream delineations, anticipated as a result of Facility construction and operation. Temporary and permanent impacts to vegetation communities will not result in extirpation or significant reduction in any ecological community type. Temporary and permanent impacts to all ecological community types is provided below in Table 22-1.

Table 22-1. Vegetation Impacts

Cover Type	Temporary Impact (acres)	Permanent Loss (acres)	Regenerating Forest (acres)	Forest Conversion to Successional Communities (acres)	Total Impact (acres)
Forest	-	30.1	16.6	115.7	162.4
Successional Shrubland	16.7	3.2	-	-	19.9
Successional Old Field	11.4	4.3	-	-	15.7
Row & Field Crops	272.9	84.6	-	-	357.5
Pasture	6.6	3.6	-	-	10.2
Open Water	0.2	0.0	-	-	0.2
Disturbed/Developed	6.9	1.1	-	-	8.0
Total	447.0	126.9	16.6	115.7	573.9

As stated above in 1001.22(a), vegetation in the Facility Site was identified and characterized during on-site field surveys during the 2016 and 2017 growing seasons, which documented 193 native and non-native plant species (see Appendix LL). A subset of these field investigations, conducted in May and June of 2017, consisted of targeted baseline surveys for invasive plant species to document the occurrence and extent of prohibited invasive plant species[1] within a Survey Area comprised of the anticipated limits of vegetation disturbance. Survey methodology consisted of walking the Survey Area and visually estimating cover of NYSDEC-listed prohibited invasive plant species. Invasive plant occurrences were documented with field notes and global positioning system (GPS) point data, and assigned a density code for absolute cover. Density codes were created based on established invasive plant survey protocols, and species data were recorded using a four-letter code corresponding to the first two letters of the scientific name of the genus and the first two letters of the scientific name of the species (e.g., since the scientific name of multiflora rose is *Rosa multiflora*, multiflora rose populations were labeled "ROMU"). Field notes and GPS data were then digitized in ArcGIS to produce a map of invasive plant coverage throughout the Survey Area. Photos were taken to document pre-construction conditions throughout the Survey Area, and example photos were taken of each species detected. Polygon data was taken in the field for species with discrete populations, primarily Japanese knotweed. Please see Appendix MM for a complete copy of the Invasive Species Survey Baseline Report.

A total of 11 different invasive plant species were observed during the survey:

- garlic mustard (*Alliaria petiolata*)
- mugwort (*Artemisia vulgaris*)
- Japanese barberry (*Berberis thunbergii*)
- spotted knapweed (*Centaurea stoebe*)
- Canada thistle (*Cirsium arvense*)
- autumn olive (*Elaeagnus umbellata*)
- Morrow's honeysuckle (*Lonicera morrowii*)
- Japanese knotweed (*Reynoutria japonica*)
- Common buckthorn (*Rhamnus cathartica*)
- multiflora rose (*Rosa multiflora*)
- wineberry (*Rubus phoenicolasius*)

[1] As per the terms of the Stipulations, incidental observations of invasive insect species were recorded during the baseline invasive plant surveys. Although no invasive insect species were directly observed, many dead ash (*Fraxiunus* sp.) trees were observed within the Survey Area, suggesting the likely presence of an invasive beetle, the emerald ash borer (*Agrilus planipennis*). This conclusion is consistent with NYSDEC mapping of known emerald ash borer locations throughout New York State (NYSDEC, 2017a).

An Invasive Species Control Plan (ISCP) is included with the Invasive Species Survey Baseline Report, which is provided in Appendix MM. A central theme of the ISCP will be educating construction workers about invasive species and how to prevent their spread. This education will be accomplished through the various contractor-training sessions provided by an Environmental Monitor, who will be engaged as part of the Facility's Environmental Compliance and Monitoring Program. The ISCP consists of the following control measures: 1) construction materials inspection; 2) target species treatment and removal; 3) construction equipment sanitation; and 4) restoration. Each of these measures is described in detail in the ISCP.

Although the seed mix that will be used in site restoration is not available at this time, typical upland and wetland seed mixes that could be used are summarized below (please visit https://www.ernstseed.com/products/seed-mixes/ for additional detail).

- Wetland Areas – ERNST FACW Meadow Mix 122 or similar:
    - Fox sedge (31%)
    - Virginia wildrye (20%0
    - Lurid sedge (14%)
    - Green bulrush (5%)
    - Blue vervain (4%)
    - Wood reedgrass (3.5%)
    - Soft rush (3%)
    - Blunt broom sedge (3%)
    - Hop sedge (3%)
    - Other forbs and graminoids (each 2% or less)

- Upland Areas/Erosion Control Areas – ERNST Eastern Ecotype Native Grass Mix 177 or similar:
    - Indiangrass (30%)
    - Big Bluestem (30%)
    - Switchgrass (20%)
    - Virginia wildrye (16%)
    - Autumn bentgrass (4%)

- Lawn Areas – ERNST Conservation Mix 5311 or similar:
    - Creeping red fescue (30%)
    - Kentucky bluegrass (50%)
    - Annual ryegrass (10%)

- Perennial ryegrass (10%)

(c) Measures To Avoid or Mitigate Plant Community Impacts

Mitigation of impacts to vegetation will be (and has been) accomplished primarily through careful site planning. Large areas of forest and wetland are being avoided to the extent practicable. Therefore, these ecologically valuable communities within the Facility Site will be largely protected from disturbance. Facility access roads will be sited on existing farm lanes and logging roads wherever possible, and areas of disturbance will be confined to the smallest area possible. As mentioned above in 1001.22(a)(1), forestland occupies approximately 3,537 acres within the Facility Site (41%). Without avoidance measures, it would be expected that impacts to forestland would make up a similar percentage of total vegetation impacts (approximately 41% of total impacts to vegetation). However, impacts to forestland total 162.4 acres, just 28% of the total impacts to vegetation (see Table 22-1). This comparison illustrates the success of the Facility design in minimizing impacts to forest communities.

To protect adjacent undisturbed vegetation and other ecological resources, a comprehensive sediment and erosion control plan will be developed and implemented prior to Facility construction (please see the Preliminary SWPPP summarized in Exhibit 21 for additional detail). Other mitigation measures to avoid or minimize impacts to vegetation will also include delineating sensitive areas (such as wetlands) where no disturbance or vehicular activities are allowed, educating the construction workforce on respecting and adhering to the physical boundaries of off-limit areas, complying with guidance provided by Environmental Monitors, employing best management practices during construction, and maintaining a clean work area within the designated construction sites.

In addition, as previously discussed in 1001.22(a) above, all plant communities identified within the Facility Site are common to New York State. Therefore, no impacts to unique or rare natural communities will result from Facility construction. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to reestablish vegetative cover in these areas. Other than in active agricultural fields, native species will be allowed to revegetate these areas.

There are no native or natural grassland communities within the Facility Site; successional old fields, pasture land, hayfields, and idle cropland represent the closest analogs. These communities are fairly limited in the immediate area, with successional old fields and pastures collectively accounting for just 5% of the Facility Site. Land use in many of these areas has included ongoing and/or recent disturbances, often associated with agricultural operations, which are not dissimilar to the temporary impacts associated with Facility construction. Furthermore, Facility infrastructure will largely avoid these communities and turbines to be located in or near these communities are located at the edges

(Stantec, 2017b). As such, no special protections to avoid impacts to successional old fields or pasture land were incorporated in Facility design. Potential fragmentation impacts to grassland birds are discussed in detail in 1001.22(f)(2).

Measures to be implemented to control the spread of invasive species coverage throughout the area disturbed by Facility construction is provided in the ISCP, as described above in 1001.22 (b), and attached to the Invasive Species Baseline Report, which is included as Appendix MM.

(d) Vegetation, Wildlife, and Wildlife Habitats

(1) Plant Communities and Species

See Plant Communities discussion above in association with 1001.22(a). The Plant Species Inventory is attached as Appendix LL.

(2) Avian and Bat Surveys

Preconstruction monitoring surveys for birds and bats were designed by Stantec Consulting (Stantec) in consultation with U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC), and in accordance with work plans reviewed and approved by NYSDEC and USFWS. A draft Work Plan for Pre-Construction Bird and Bat Studies was submitted to the USFWS and NYSDEC in June 2013. After a series of meetings with NYSDEC and USFWS, the revised work plan was finalized in September 2013 (see Appendix NN for a copy of the Final Work Plan). Various bird and bat studies were conducted in 2013, 2014, 2015 and 2017, and multiple reports have been provided to the USFWS and NYSDEC. Results of the bird and bat studies are summarized below in this section.

Avian Surveys

A description of the planning process, guideline compliance, and agency consultations for avian surveys conducted by Stantec is the same as the process for bat surveys described below in 1001.22(d)(2), with the exception of the eagle use point count survey. This eagle survey was planned in accordance with USFWS *Eagle Conservation Plan Guidance* (USFWS, 2013). Stantec conducted fall bird migration surveys (2013), spring breeding bird surveys (2015) and eagle use point count surveys (2013-2014). Additional targeted eagle use surveys were conducted by Stantec in 2017. A brief description of these surveys and their results are summarized below.

Fall Bird Migration Surveys

Stantec conducted fall migratory point count surveys at 34 survey locations once each week in September 2013 to provide baseline data of songbird species occurring in the vicinity of the Facility during fall migration, to assess the likelihood that rare bird species occur in the vicinity of the Facility during fall migration, and to evaluate the degree to which the migratory bird community in the Facility area is typical of the region. A Stantec biologist conducted surveys from sunrise until no later than approximately 10:00 A.M. in weather conditions conducive to hearing birdsong and swing birds move about in vegetation and in flight. All birds identified by sight or sound, including soaring raptors, waterfowl, large flocks, and fly-overs, were recorded during a 5-minute session during each survey. The biologist also recorded weather information and general habitat conditions at each survey point. The species and number of individuals documented were used to calculate species richness, relative abundance, frequency of occurrence and community diversity for all species for all habitats combined, and for each habitat classification (crop field, fallow field, forest edge, hardwood forest, and mixed forest).

Mixed forest habitat had the most individuals observed (n=556) and the greatest species richness (SR=31). Crop field habitat (points visited three times) had the greatest relative abundance (RA=29.00) and crop field habitat (points visited four times) had the highest diversity index (SDI=2.53). In crop field habitat and fallow field habitats at points visited three times, Canada goose (*Branta canadensis*) had the greatest relative abundance (RA=18.67 and 6.22, respectively). In forest edge habitat at points visited three times, black-capped chickadee (*Poecile atricapillus*) had the greatest relative abundance (RA=1.83). Turkey vulture (*Cathartes aura*) had the greatest relative abundance in hardwood forest habitat (RA=1.75) and European starling (*Sturnus vulgaris*) had the greatest relative abundance in mixed forest habitat (RA=11.88). No state- or federally-listed endangered species or federally-listed threatened species were observed. One state-listed threatened bald eagle (*Haliaeetus leucocephalus*) was observed, and four species of special concern were observed: two Cooper's hawks (*Accipiter cooperii*), one osprey (*Pandion haliaetus*), four sharp-shinned hawks (*Accipiter striatus*), and one yellow-breasted chat (*Icteria virens*). Additional detail regarding the fall bird migration surveys is provided in the Bird and Bat Survey Report in Appendix OO.

Spring Breeding Bird Surveys

Stantec conducted breeding bird surveys in May and June 2015 to provide a baseline data of songbird species occurring and breeding within the various habitats in the Facility Area, to assess the likelihood that rare bird species occur in the Facility Area, and to evaluate the degree to which the breeding bird community in the Facility Area is typical of the region. The survey also aimed to compare the breeding bird community at points in close proximity

to proposed turbine locations with the breeding bird community at control points in areas where no impact is expected to occur.

Stantec conducted surveys along 18 transects that each had five to six points spaced approximately 125 meters apart. Twelve of the transects were centered on proposed turbine locates and six were in control areas outside turbine areas where no impact was expected to occur. Survey points were grouped into 5 habitat categories based on dominant vegetation cover and general habitat characteristics: agricultural, forest edge, hardwood forest, missed (hardwood and conifer) forest, and over-grown field. A Stantec biologist conducted 5-minute surveys at each point count location from sunrise until 10:00 A.M.

Stantec detected 2,170 individual birds from at all survey points combined. Seventy-six species were detected, excluding unidentified birds that could be identified to genus only. Turbine points and control points had similar relative abundances (RA = 7.20 and 10.69) and diversity indexes (SDI = 2.73 and 3.14). Agricultural habitat had the most individuals observed and the highest species richness for both the turbine points (n = 507, SR = 43) and control points (n = 353, SR = 39). Over-grown field habitat had the highest relative abundance among turbine points (RA = 13.25), and mixed forest habitat had the highest relative abundance among control points (RA = 15.50). Hardwood forest habitat had the highest diversity index among control points (SDI = 3.11).

Among turbine points in agricultural habitat, American crow (*Corvus brachyrhynchos*) had the greatest relative abundance (RA = 1.19). Ovenbird (*Seiurus aurocapilla*) had the greatest relative abundance in turbine points in forest-edge (RA = 1.69), hardwood (RA = 0.64), and mixed forest (RA = 1.33). Red-winged blackbird (*Agelaius phoeniceus*) had the greatest relative abundance in turbine points in over-grown field (RA = 4.08). Among control points, European starling had the greatest relative abundance (RA = 3.42) in agricultural habitat, American robin (*Turdus migratorius*) had the greatest relative abundance (RA = 5.50) in missed forest. Stantec did not detect any federally-listed endangered or threatened species, or state-listed endangered species. Two state-threatened species, the bald eagle and northern harrier (*Circus cyaneus*), and one state species of special concern, sharp-shinned hawk were detected. Additional detail regarding the spring breeding bird surveys is provided in the Bird and Bat Survey Report in Appendix OO.

Eagle Use Surveys

As part of assessing potential risk to eagles, Stantec requested from New York State Department of Environmental Conservation (NYSDEC) information regarding the nearest known bald eagle nests to the Facility. As of 2012, there were no nests known to be present in the Facility Area. There was one nest, the Wayland New NY 132, 4 miles from the nearest turbine. The next closest nest was 11 miles from the nearest turbine.

Stantec conducted point count surveys for eagles for one full year (2013-2014) consistent with Eagle Conservation Plan Guidance (USFWS, 2013). Point count surveys consisted of 1-hour visual surveys at 34 locations within the Facility Area and two points outside the Facility Area. Stantec surveyed all 36 points for one hour 18 times between September 9, 2013 and September 8, 2014. Surveys occurred in all weather conditions except when visibility was poor, and occurred in a range of daylight hours. Stantec documented 20 bald eagle observations during surveys. Eagles were observed inside the turbine area for a total of 16 minutes. Stantec observed eagles in every season except summer. No courtship displays or territorial displays were observed. A single foraging behavior was observed. Overall, eagle use of the Facility area was relatively low, and the majority of behaviors observed were not behaviors that are thought to be associated with greater collision risk at wind projects (courtship, territorial displays, or foraging). Results of the 2013-2014 eagle use surveys were presented in the *Baron Winds Project Bird and Bat Survey Report, 2013-2015* (Stantec, 2016a).

In June 2016, Stantec received from NYSDEC additional eagle territory data proximate to the Facility Area, which included the locations of one additional historic bald eagle nest and one suspected bald eagle nest within 10 miles of the Facility Area. Stantec provided an addendum describing that despite these additional eagle territories, eagle use of the Facility Area was still found to be low and risk to eagles was still expected to be low (Stantec, 2016b). In February 2017, Stantec submitted an additional work plan at the recommendation of USFWS describing methods for a targeted eagle point count survey during the breeding season (February to July). Stantec conducted six additional targeted eagle use point count surveys in 2017. In 1,080 survey minutes, observed eagle exposure minutes totaled 5 minutes and no courtship, territorial displays, or foraging behaviors were observed proximal to the Facility Area in 2017. Based on these additional surveys, the risk to eagles was still expected to be low (Stantec, 2017a).

Habitat Assessments

Stantec conducted a habitat assessment at the 36 eagle point count locations in September 2013. Stantec described and photographed the cover types and estimated percent canopy cover of forests within an approximately 800-meter radius around each eagle survey point and used aerial imagery and public GIS data to characterize additional cover types present. The Facility area was determined to contain a mixture of agricultural land and mixed (hardwood and softwood) forest, including agricultural land, fallow filed, maintained field, mixed forest, hardwood forest, softwood forest, pine plantation, and urban development. Stantec did not identify habitat within the Facility Area with potential to support federally listed avian species, State-listed species bald eagle, and protected bird great blue heron. Habitat that could potentially support pied-billed grebe (*Podilumbus podicpes*),

northern harrier, and Henslow's sparrow (*Ammodramus henslowii*) was identified within the Facility Area (Stantec, 2014).

Stantec also assessed potential habitat fragmentation impacts to birds and bats by mapping land cover within the Facility area, observing where development and/or clearing would occur within forest and grassland areas, and determining the total habitat acreage that would be affected by Facility development. Stantec concluded that habitat fragmentation impacts to forest-interior bird communities would be low given the small area of forested habitat to be affected, the low levels of vehicle use on access roads, and the existing patchwork of forested and non-forested habitats currently present in the proposed Facility area. Habitat fragmentation impacts to grassland bird communities were also found to be low, particularly in areas where buried lines are proposed. For bats, Facility development was not expected to negatively impact the suitability of foraging or roosting habitat, given that both forest interior and forest edge habitats will remain (Stantec, 2017b). Please see 1001.22(f)(2) for further discussion of fragmentation impacts to birds and bats.

Bat Surveys

Stantec conducted acoustic bat surveys in the northern portion of the Facility Site to characterize activity, timing of activity, and when possible, species composition of bats. As agreed upon in the work plan, because bat activity levels during spring and fall migration periods have already been studied at the proximal Cohocton and Dutch Hill Wind Project and the Howard Wind Project, surveys were not repeated for the full period when bats are known to be active (spring, summer, and fall). Bat fatalities have peaked at other operational wind projects in the east during the summer residency and fall swarming periods. Consequently, Stantec conducted passive acoustic echolocation monitoring surveys at the Facility Site from 1 June to 30 September 2015, to obtain site-specific data on species composition and activity levels of bats during these periods.

Stantec deployed two Anabat model SDI detectors (Titley Electronics Pty Ltd.) in the single on-site meteorological tower at approximately 45 meters (148 feet) above ground level and 3 meters (10 feet) above ground level. Combined, detectors recorded 835 call sequences and had an overall detection rate of 3.4 bat call sequences per detector-night (calls/detector-night). Of the total calls, 334 (2.7 calls/detector-night) were recorded at the high detector, while 501 (4.1 calls/detector-night) were recorded at the low detector. Call data were downloaded from the detectors and analyzed using CFRead© software. Calls recorded on the Anabat devices were identified to bat species wherever possible. However, some bat calls are difficult or impossible to distinguish due to the similarities of calls from different species (i.e., different species produce calls that contain overlapping frequency ranges). Therefore, some calls were narrowed down only to a "guild" level, representing a group of possible species.

Additional detail regarding methodology for the data collection and analysis of the acoustic surveys in provided in the Bird and Bat Survey Report in Appendix OO.

Monthly activity was greatest at the high detector during August (n = 115 call sequences, 3.7 calls/detector-night), and at the low detector during July (n = 236 call sequences, 7.6 calls/detector-night). Species composition was similar between the two detectors. The greatest percentage of call sequences (n = 383, 46%) recorded by both detectors combined consisted of calls from the big brown bat (*Eptesicus fuscus*) silver-haired bat (*Lasionycteris noctivagans*) guild (BBSH), followed by unknown call sequences (UNKN) that could not be identified to genus or species (n = 333, 40%). Within the BBSH guild, 14% of calls sequences were identified as big brown bats (n = 55), and 13% of call sequences were identified as silver-haired bats (n = 49); the remaining call sequences within the BBSH guild (n = 279, 73%) lacked sufficient detail to be identified to species level. Call sequences classified as UNKN either had fewer than five call pulses or were of poor quality. The majority of calls at the high detector belonged to the UNKN guild (n = 185, 55%), while the majority of calls at low detector belonged to the BBSH guild (n = 298, 59%). Eighty-eight percent of UNKN call sequences at the high detector (n = 162) contained calls pulses with a minimum frequency below 30–35 kHz, and were classified as low frequency unknown (LFUN). In this region, LFUN calls likely represents bat in the BBSH guild or hoary bats.

Detectors recorded only three calls sequences (< 1% of total call sequences recorded) produced by *Myotis* bats, the genus which includes Indiana bat (*M. sodalis*), eastern small-footed bat (*M. leibii*), little brown bat (*M. lucifugus*), and northern long-eared bat (*M. septentrionalis*). *Myotis* calls were not able to be further identified to the species level. All three *Myotis* call sequences were recorded by the low detector.

For both detectors combined, 90% of call sequences (n = 751) were recorded when mean nightly wind speeds were 6 meters per second (m/s) or less, and 60% of call sequences (n = 498) were recorded when mean nightly temperatures were 18 degrees Celsius (°C; 64 degrees Fahrenheit [°F]) or higher.

The numbers of bat calls recorded cannot be correlated with the number of bats in an area because acoustic detectors cannot differentiate between individuals. In other words, it is possible that a single bat or a few bats of each species made multiple passes by the detectors while foraging. Therefore, the results of the acoustic surveys cannot be used to determine the total number of bats inhabiting an area. However, the survey results do confirm that silver-haired bat, big brown bat, eastern red bat, hoary bat, and at least one species within the genus *Myotis* do occur within the Facility Site. The presence of Indiana bat, a state- and federally-listed endangered species, and northern long-eared bat, a state- and federally-listed threatened species, was not determined, although calls confirmed as *Myotis* sp. were extremely infrequent (n = 3; <1% of all recorded calls). Additional discussion

regarding the potential occurrence of listed bat species at the Facility Site and potential impacts to these species is provided below in 1001.22(f).

(3) Shapefiles

Shapefiles suitable for use in GIS software (e.g., ArcGIS) have been provided to NYSDEC and NYSDPS under separate cover, and include the following:

- Facility layout components (e.g., turbines, access roads, collection lines)
- Analyses (e.g., viewshed, visually sensitive sites, shadow flicker isolines)
- Cultural resources
- Ecological features (e.g., bird survey locations, wetlands)
- Existing built facilities (e.g., communication towers, emergency services locations, existing turbines)
- Other site features and designations (e.g., 2-foot topographic contours, agricultural districts, zoning)

(4) Amphibians and Reptiles

The New York State Amphibians & Reptile Atlas Project (Herp Atlas) was a survey conducted over ten years (1990-1999), that was designed to document the geographic distribution of New York State's herpetofauna (NYSDEC, 2007a). The USGS 7.5-minute topographic quadrangle is the unit of measurement for data collection for the Herp Atlas. Data from this survey was queried for the Avoca, Canisteo, Haskinville, and Wayland USGS 7.5-minute quadrangles, which encapsulate the Facility Area. Based on a preliminary review of the atlas data, it is estimated that 30 species could occur within the Facility Site (see Wildlife Inventory attached as Appendix LL). These include common species such as painted turtle (*Chrysemys picta*), common snapping turtle (*Chelydra serpentina*), common garter snake (*Thamnophis sirtalis*), smooth green snake (*Liochlorophis vernalis*), northern dusky salamander (*Desmognathus fuscus*), northern red-backed salamander (*Plethodon cinereus*), red-spotted newt (*Notophthalmus viridescens*), American toad (*Bufo americanus*), spring peeper (*Pseudacris crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), and wood frog (*Rana sylvatica*).

Amphibians within the Facility Site typically use both wetlands with adjacent uplands. Many of the wetlands within the Facility Site provide good habitat for these species, particularly those that are less disturbed. Forested wetlands in the Facility Site tend to have adjacent uplands that are less disturbed than those that are not forested, because areas that are not forested tend to be active agricultural fields, or areas that are mowed annually. One potential vernal pool (Wetland 3H) was observed within the Facility Site during on-site delineations conducted in May 2017; a buried collection line will cross a narrow portion of this wetland. However, this vernal pool is a

component of a forested wetland, and the buried collection line will be installed through horizontal directional drill (HDD) technology to avoid impacts. Of the amphibian species known from the Facility Site, Jefferson salamander (*Ambystoma jeffersonianum*), spotted salamander (*A. laterale*), and wood frog are most suited to vernal pools, and may use the potential vernal pool(s) that occur within the Facility Site (NYNHP, 2017).

Turtles that could occur in the Facility Site prefer slow-moving water with vegetated banks and soft bottoms, such as ponds, beaver ponds, and marshes. Turtles bask on fallen logs or rocks in the water where they can absorb solar thermal energy. Many of the wetlands in the Facility Site are not ideal turtle habitat, either because they are too disturbed, too shaded, or lack areas with open water. However, some suitable habitat is present primarily in the wetlands with an open water component. Snakes of the Facility Site may also use upland areas adjacent to wetlands; however, they are more likely to be found farther from water than the other reptiles and amphibians. Snakes use a variety of habitats including upland and wetland grasslands, meadows, marshes, open woods, and lawns.

(5) Terrestrial Invertebrates

Publicly available data on terrestrial invertebrate species are generally not available for upstate New York. The New York Natural Heritage Program (NYNHP) maintains data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities in the State. NYNHP tracks several invertebrate groups, notably: butterflies and moths, dragonflies and damselflies, beetles, and mollusks. However, according to NYSDEC (2017b), "insufficient data are available to make general statements about the status of native invertebrate species." Site-specific requests for data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities, were submitted to NYNHP on April 20, 2016 and June 22, 2017. The NYNHP provided responses on May 31, 2016 and July 19, 2017. Neither response letter identified any rare, threatened, or endangered invertebrate species within the Facility Site (see Appendix VV).

Based on the size of the Facility Site and on-site observation of habitat types available, a wide range of terrestrial invertebrates are likely to occur. These include a variety of insects such as butterflies, moths, ants, bees, wasps, beetles, weevils, flies, mosquitoes, cicadas, dragonflies, damselflies, mayflies, stinkbugs, earwigs, fleas, fireflies, cockroaches, mantids, crickets, katydids, and grasshoppers, as well as other related arthropods, such as pillbugs, millipedes, centipedes, and arachnids. Common arachnids at the Facility Site include spiders, daddy-long-legs, ticks, and mites. Worms, including earthworms and nematodes, are common invertebrates that live in the soil. Common terrestrial molluscs within the Facility Site include gastropods such as slugs and snails.

(6) Descriptions of Wildlife Habitat

As stated above, a request for data on occurrence of significant natural communities was submitted to NYNHP on April 20, 2016 and June 22, 2017. The NYNHP provided written responses on May 31, 2016 and July 19, 2017, respectively, and neither response identified any significant natural communities within the Study Area. In addition, the USFWS's Information for Planning and Consultation (IPaC) database was accessed on April 11, 2016 and November 15, 2017 for information relative to the proposed Facility. Results from both IPAC database reviews specifically indicate "there are no critical habitats in/at this location" (see Appendix VV for information from the NYNHP and USFWS databases).

The various plant communities that occur within the Facility Site (see 1001.22(a)) each provide habitat for different wildlife species. A discussion of habitat that is provided by each of the types of ecological communities is provided under the headings below.

Forest

Forests within the Facility Site provide habitat for species that prefer forest conditions, the characteristics of which may include fewer predators, darker and more protected nesting sites, less disturbance, more even moisture, and available nesting sites in tall trees. Forest-interior species identified within the Facility Site by Stantec during the spring breeding bird surveys include black-and-white warbler (*Mniotilta varia*), blackburnian warbler (*Setophaga fusca*), black-throated green warbler (*Setophaga virens*), brown creeper (*Certhia americana*), hooded warbler (*Setophaga citrina*), ovenbird, red-eyed vireo, scarlet tanager (*Piranga olivacea*), veery (*Catharus fuscescens*), and wood thrush (*Hylocichla mustelina*). Mammals that may utilize forests on the Facility Site include black bear (*Ursus americanus*), porcupine (*Erethizon dorsatum*), red squirrel (*Sciurus vulgaris*), and whitetail deer (*Odocoileus virginianus*). Amphibians such as gray treefrog (*Hyla versicolor*), wood frog, and a variety of salamanders likely use forested habitats within the Facility Site as well.

Successional Old Field

Successional old field communities in the Facility Site provide habitat for species that prefer open grasslands. Bird species that utilize successional old field habitats include bobolink, eastern meadowlark (*Sturnella magna*), savannah sparrow (*Passerculus sandwichensis*), red-winged blackbird, eastern kingbird (*Tyrannus tyrannus*), and eastern bluebird (*Sialia sialis*). Raptors such as red-tailed hawk (*Buteo* jamaicensis) and American kestrel (*Falco sparverius*) use successional old field habitats for hunting prey. Mammals such as coyote (*Canis latrans*), whitetail deer, eastern cottontail, and a variety of moles, mice, and shrews typically use successional old field communities

for hunting, grazing, and foraging. Successional old field habitats typically have a high diversity and abundance of flowering forbs, which provide food for bees and butterflies.

Active Agriculture

Active agriculture provides some marginal habitat for wildlife species in the Facility Site. Although pasture lands and hayfields may be too disturbed for nesting and breeding, some birds including eastern meadowlark, tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), killdeer (*Charadrius vociferous*), and brown-headed cowbird (*Molothrus ater*) use these areas for foraging. Flocks of Canada geese often use agricultural fields as stopover sites during migration. Additionally, whitetail deer and black bears may eat corn off the stalks growing in cornfields.

Open Water

Open water sites support diverse communities of wildlife species, and provide habitat for a suite of species different from that supported by terrestrial habitat types in the Facility Site. Waterbirds such as wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), green heron (*Butorides* virescens), great blue heron, belted kingfisher (*Megaceryle* alcyon), and Canada goose utilize habitat provided by open water sites. Raptors such as bald eagles may occasionally use open water communities in the Facility Site for hunting fish; however, this type of use is not common because the water bodies within the Facility Site are generally not large enough for this purpose. Open water areas in the Facility Site provide habitat for a variety of aquatic vertebrates and invertebrates. Fish species within the Facility Site are found in these open water habitats, see 1001.22(e)(2) for more information on fish species. These streams also provide habitat for aquatic insects that provide prey for fish species, such as mayflies, stoneflies, and caddisflies. Other aquatic invertebrates found in these habitats include clams, mussels, and crayfish. Frogs, toads, and salamanders may use ponds within the Facility Site as egg-laying sites, and turtles likely use slow moving streams and other open waters for foraging and basking. Many mammals use open water communities as well, including beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and mink (*Neovision vision*).

Please note that in the context of state-protected streams, recent correspondence with NYSDEC personnel indicated that none of the protected streams crossed by the Facility were identified as containing threatened or endangered mussel species; however, some rare mussel species have been identified in the Cohocton River (S. Miller, pers. comm.).

In addition, as previously discussed Stantec conducted habitat assessments to identify areas with potential to support avian listed species and to determine potential fragmentation impacts to song birds and bats. These

assessments are described above in Section (d)(2). Please also see Exhibit 22(f)(2) for additional information on habitat disturbance. Lastly, as previously indicated both the NYNHP and USFWS databases were consulted, and neither of these databases identified the presence of any designated unusual habitats or significant natural communities that could support state- or federally-listed species (see Appendix VV for information from the NYNHP and USFWS databases).

(e) Species List

(1) Plant Inventory

The plant species inventory is described in 1001.22(a), and the species list is attached as Appendix LL.

(2) Wildlife Inventory

A comprehensive wildlife inventory was performed that included on-site observations of species, a review of existing data sources, and consideration of species likely to occur based on the availability of suitable habitat. The inventory covered the vicinity of the Facility Site and included wildlife species that could occur in the Facility Site at some time during the year. Based on this review, a total of up to approximately 232 wildlife species could use the Facility Site at some time during the year. The complete species list is attached as Appendix LL.

The headings below discuss the methods and data sources that were used to create the wildlife inventory list for several main taxonomic groups.

Mammals

Publicly available information regarding the occurrence of mammalian species in the Facility Site is generally not available. Therefore, mammal occurrence was documented through species observations made during on-site field surveys that were conducted concurrently with other studies such as wetland and stream delineations. Field observations included direct observations of individuals as well as observations of signs of occurrence such as tracks or scat, and evaluation of available habitat. In addition, an inquiry for any site-specific mammal occurrence data was submitted to the NYSDEC (Region 8). NYSDEC staff indicated that site-specific records for mammal occurrences are not available. Species known to occur in the Facility Site based on field observation of individuals and sign include opossum, raccoon, red fox, eastern gray squirrel, eastern chipmunk, red squirrel, and white-tailed deer. Additional mammals expected to use the Facility Site based on available habitat and wide occurrence throughout New York State include porcupine, striped skunk, weasels, mink, coyote, black bear, bobcat, beaver,

and eastern cottontail. In addition, a variety of mice, voles, shrews, and moles are expected to use the Facility Site. The list of species observed on-site and expected to occur on-site is included in the Wildlife Inventory, attached as Appendix LL. A total of 36 mammal species are included in the Wildlife Inventory.

To characterize and document bat activity within the Facility Site, Stantec conducted on-site acoustic bat surveys in 2015. The methods and findings of the bat studies completed in support of the Facility are described in 1001.22(d). Bat species confirmed on-site are identified in the Wildlife Inventory attached as Appendix LL. These bat species included big brown bat, silver-haired bat, eastern red bat, and hoary bat. Though not detected at the Facility Site, the northern long-eared bat was also included on the list because it could potentially occur in the area at some time during the year.

Birds

To determine the type and number of bird species present within the Facility Site, existing data sources and on-site observations were compiled to generate a complete list of bird species that use the Facility Site. A total of 140 bird species were included in the Wildlife Inventory (attached as Appendix LL). Sources of information are listed below, and further discussion of the databases that were queried is included in the subsections following this list:

- USGS Breeding Bird Survey (BBS)
- NYS Breeding Bird Atlas (BBA)
- Audubon Christmas Bird Count (CBC)
- USFWS Information for Planning and Consultation (IPaC)
- On-site Ecological Surveys Conducted by EDR
- Bird Migration Surveys Conducted by Stantec during the Fall of 2013
- Habitat Assessment Conducted by Stantec during the Fall of 2013
- New York Natural Heritage Program Rare Birds List Provided to Stantec on May 29, 2013
- Raptor Migration Surveys Conducted by Stantec during the Spring of 2014
- Breeding Bird Surveys Conducted by Stantec during the Spring of 2015
- Henslow's Sparrow Surveys Conducted by Stantec during the Spring of 2015
- Eagle Point Count Surveys conducted by Stantec in 2013 and 2014
- Targeted Eagle Use Surveys Conducted by Stantec in 2017
- eBird
- Hawk Migration Association of North America

USGS Breeding Bird Survey (BBS)

The North American Breeding Bird Survey (BBS), overseen by the Patuxent Wildlife Research Center of the USGS, is a long-term, large-scale, international avian monitoring program that tracks the status and trends of North American bird populations. Each survey route is 24.5 miles long, with 3-minute point counts conducted at 0.5-mile intervals. During the point counts, every bird seen or heard within a 0.25-mile radius is recorded. The closest BBS route (the Swain route) is approximately 10 miles west of the Facility Area. Due to the distance between the Facility Site and the nearest survey route, the BBS is not applicable to the Facility.

New York State Breed Bird Atlas

The NYS Breeding Bird Atlas (BBA) is a comprehensive, statewide survey that indicates the distribution of breeding birds in New York State. Point counts are conducted by volunteers within 5-km by 5-km survey blocks across the state (McGowan and Corwin, 2008). The Facility Site is located within or immediately adjacent to 12 New York State BBA blocks (2770B, 2770D, 2869A, 2869B, 2869C, 2869D, 2870A, 2870B, 2870C, and 2870D). These blocks were queried for bird species occurrence data. A total of 116 species were observed within the survey blocks (see Appendix LL), of which 37 species were unique to the BBA data (NYSDEC, 2007b).

Christmas Bird Count

Most avian species present in the summer breeding season migrate south for the winter (e.g., warblers, flycatchers, and thrushes), leaving only year-round species that are not seasonally displaced and species that travel south from more northern climates to winter in New York. Data from the Audubon's Christmas Bird Count (CBC) provides an overview of the birds that inhabit the region during early winter. The primary objective of the CBC is to monitor the status and distribution of wintering bird populations across the Western Hemisphere. Counts take place on a single day during a three-week period around Christmas, when volunteers comb a 15-mile (24 km) diameter circle in order to tally up all bird species and individuals observed. Since the edge of the closest count circle to the Facility Site (the Conesus-Hemlock-Honeoye Lakes circle) is approximately 14 miles north of the Facility Area, data from the CBC is not applicable to the Facility Site and will not be included in the Article 10 Application (National Audubon Society, 2017).

Fish

Data were retrieved from Version 45 of the NYSDEC Statewide Fisheries Database via a site-specific request from the Region 8 office of the NYSDEC. The following streams within or proximate to the Facility Site were queried for lists of fish species documented to live in those streams: Neils Creek, Reynolds Creek, Carrington Creek, Big Creek, Mill Creek, and Page Brook. Much of the Facility Site is high in the watershed, and the streams within the

Facility Site are generally smaller than the streams where fish species were documented as occurring. However, all of the fish species documented in these streams by the NYSDEC Statewide Fisheries Database are included in the Wildlife Inventory (attached as Appendix LL) in order to conservatively report all species that could possibly occur. A total of 22 unique fish species were identified. These include larger fish valued by anglers such as brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and largemouth bass (*Micropterus salmoides*). Smaller fish that are preyed upon by these larger fish are supported by these streams as well, including a variety of darters (*Etheostoma* spp.) and dace (*Rhinichthys* spp.).

Amphibians and Reptiles

Information on amphibians and reptiles for the Facility Site was compiled from the New York State Amphibians & Reptile Atlas (Herp Atlas), a 10-year survey conducted over ten years (1990-1999) designed to document the geographic distribution of New York State's herpetofauna (NYSDEC, 2007a). Information on amphibians and reptiles expected to occur within the Facility Site and an evaluation of suitable habitat for these species is provided in 1001.22(d) above. A total of 20 amphibian species and 10 reptile species were included in the Wildlife Inventory (attached as Appendix LL).

Terrestrial Invertebrates

Based on the size of the Facility Site and on-site observation of habitat types available, a wide range of terrestrial invertebrates are likely to occur. These include a variety of insects such as butterflies, ants, bees, beetles, mosquitoes, fleas, crickets, ladybirds, fireflies, cicadas, flies, and grasshoppers. Arachnids including spiders, ticks, and mites are common throughout the Facility Site. Worms including earthworms and nematodes are common invertebrates that live in the soil. Invertebrates are important components of ecological communities within the Facility Site because they serve a variety of ecosystems services and functions, including pollination, providing prey for birds, bats, and rodents, expediting nutrient cycling, and aerating the soil. Four terrestrial invertebrate species were observed on-site during other surveys and were included in the Wildlife Inventory, attached as Appendix LL.

(f) Impacts to Vegetation, Wildlife, Wildlife Habitats, and Wildlife Travel Corridors

With respect to impacts to vegetation, construction and operational impacts are addressed above in Section (b) and shown in Figure 22-1. A total of up to approximately 447.0 acres (5.2% of the Facility Site) of vegetation will experience temporary disturbance as a result of Facility construction, and a total of up to 126.9 acres (1.5% of the Facility Site) of vegetation will be permanently lost through conversion to facility components. No plant community will be extirpated of

significantly reduced as a result of the Facility. The Applicant has taken measures to avoid, minimize, and mitigate for vegetation impacts to the extent practicable.

(1) Construction-Related Impacts to Wildlife and Wildlife Habitats

Construction-related impacts to wildlife are anticipated to be limited to incidental injury and mortality due to construction activity and vehicular movement, construction-related sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth-moving activities, and displacement of wildlife due to increased noise and human activities. Each of these potential impacts is described below.

Incidental Injury or Mortality

Incidental injury and mortality should be limited to sedentary/slow-moving species such as small mammals, reptiles, amphibians, and invertebrates that are unable to move out of the area being disturbed by construction. Tree clearing will take place between November 1 and April 1, which is outside of the breeding period for birds and bats, in order to avoid impacts to the eggs and/or young offspring of nesting birds, as well as immature mammalian species that are not yet fully mobile. More mobile species and mature individuals should be able to vacate areas that are being disturbed by construction. Vehicle-related mortality may increase temporarily due to the increased traffic during construction; however, as traffic decreases upon the completion of construction, so will wildlife-vehicle collisions.

Silt and Sedimentation

Earth-moving activities (including foundation excavation and back-fill, widening of existing roads and construction of new access roads) may result in sedimentation and siltation impacts to aquatic habitat. These impacts could occur down slope of areas subject to significant earth-moving activity (e.g., turbine sites). Siltation and sedimentation of water bodies can adversely impact water quality and aquatic habitat. It can also interfere with the respiration of aquatic organisms and the survival of fish and amphibian eggs and larvae. Although these impacts are possible, they are expected to be minor due to the substantial mitigation efforts that the Applicant will take to avoid impacts to aquatic habitats. Please see the discussion of measures to avoid and mitigate surface waters in Exhibit 23(b)(5).

Habitat Disturbance/Loss

As mentioned previously, Facility components have been sited so as to minimize impact to undisturbed habitat. Many of the proposed wind turbines would be located in or adjacent to agricultural land, which in general provides habitat for only a limited number of wildlife species. In addition, these areas are already subject to periodic

disturbance in the form of mowing, plowing, harvesting, etc. However, approximately 440.1 acres of wildlife habitat will be temporarily disturbed during construction, while permanent loss through conversion of natural habitat to built facilities will total 125.8 acres (calculations include wildlife habitat, excluding areas with vegetation that is disturbed/developed). Ground-disturbing construction activities could also reduce the availability of stopover habitat for migratory birds within the landscape, directly through the loss of habitat and indirectly by inducing avoidance of stopover habitat in response to visual and/or noise disturbance (Strickland et al., 2011). Changes in vegetation could also influence the behavior of bats by changing microclimate conditions and the quality of habitat for foraging or roosting bats (National Research Council, 2007). Bats may also become attracted to openings made in forested areas from tree clearing activities for turbines and access roads, as they may find foraging opportunities in the openings. It is anticipated that any bats that are present in the Facility Site would return to areas that were temporarily disturbed following the completion of construction activity. Significant adverse impacts on bat and bird populations are not expected during construction of the Facility. Tree clearing will be conducted between October 1 and May 1, outside of the nesting season for birds and the activity period for bats.

On a landscape scale, there is abundant availability of habitats similar to those of the Facility within the nearby landscape. It is anticipated that 357.5 acres of agricultural row and field crops will be disturbed during construction. Natural communities will also experience construction-related disturbance, including approximately 162.4 acres of forest, 19.9 acres of successional shrubland, 15.7 acres of successional old field, and 10.2 acres of pasture will be directly impacted by Facility construction.

Approximately 0.2 acre of open water habitat within the Facility Site will be disturbed, however, please see Exhibit 23(b)(4) for a discussion of impacts to surface waters, as defined by on-site wetland and stream delineations, anticipated as a result of Facility construction and operation.

Displacement

Some wildlife displacement will also occur due to increased noise and human activity as a result of Facility construction. The significance of this impact will vary by species and the seasonal timing of construction activities. However, the species most likely to be disturbed/displaced by Facility construction include grassland bird species such as bobolink, eastern meadowlark, red-winged blackbird, and savannah sparrow, and forest species such as forest-dwelling warblers, ovenbird, and veery. Within New York State, peak breeding time for birds common to agricultural, grassland, and forest habitat occurs in late spring and early summer. If construction begins before the initiation of breeding activities, then most breeding birds would likely avoid nesting in active construction areas. If construction begins during the breeding season, the breeding birds that are accustomed to similar disturbances such as farming and logging, are expected to remain in the area while others will likely relocate to adjacent suitable

habitat, if available. These impacts are not expected to be significant because of a sizeable amount of suitable habitat will remain undisturbed within and adjacent to the Facility Site. Outside of localized construction disturbance and some temporary displacement in the immediate vicinity of turbines, access roads, etc., no significant displacement impacts on breeding birds are anticipated during construction.

None of the construction-related impacts described above will be significant enough to affect local populations of any resident or migratory wildlife species.

(2) Operation-Related Impacts to Wildlife and Wildlife Habitats

Operation-related impacts to wildlife include direct habitat loss, habitat degradation through forest fragmentation, disturbance/displacement due to presence of wind turbines, and avian and bat mortality as a result of collisions with operating turbines.

Habitat Loss

A total of 125.8 acres of wildlife habitat will be permanently lost from the Facility Site (i.e., converted to as built facilities). This habitat loss represents only approximately 1.5% of the 8,533-acre Facility Site. Approximately 67% of this loss (approximately 84.6 acres) will occur in row and field crops, which have limited wildlife habitat value. In addition, approximately 115.7 acres of forest are expected to be converted to a successional community (old field, shrubland, or saplings) for the life of the Facility. Given the relatively small area of lost or converted natural communities, habitat loss/conversion resulting from Facility development is not considered significant.

Forest/Grassland Fragmentation

In order to assess forest fragmentation impacts to songbird and bat populations as a result of construction and operation of the Facility, Stantec performed a fragmentation analysis that provided an overview of habitat fragmentation effects, quantified the acreage of forest anticipated to result in edge effects, assessed potential impacts of fragmentation on birds based on results of on-site spring breeding bird surveys conducted in 2015, and assessed potential impacts to bats based on a review of literature regarding bat habitat requirements and behavior. The fragmentation analysis is attached as Appendix UU, and summarized below.

Forest habitat fragmentation occurs when large blocks of contiguous forest are divided or broken into smaller patches as a result of clearing or canopy removal. Similarly, grassland habitat fragmentation typically occurs when a larger, contiguous patch of grassland is divided by development or land-use changes into smaller patches. In either case, fragmentation may affect the movement, breeding, roosting, or nesting behavior of birds and bats

across the landscape, which could degrade overall habitat suitability and reduce reproductive success. Fragmentation can occur at a variety of scales and patterns, and may affect species differently depending on their habitat requirements. The potential effects of habitat fragmentation depend in part on previous land use, the original extent of intact forested or grassland habitat, how much habitat will be impacted during and after construction, and the behavioral sensitivity of potentially affected species or species group. The relative impacts of forest or grassland habitat removal or conversion also depend on the configuration of impacted areas, the current level of habitat degradation or disturbance, and types and levels of activity (e.g., traffic volume, noise levels, visual disturbances) to occur in the affected areas.

Fragmentation Impacts to Forest-Interior Birds

The categorization of bird species as "forest-interior specialists," "interior-edge generalists," "edge species," or "field-edge species." As outlined by Whitcomb et al. (1981) and modified by Freemark and Collins (1992) can be useful in the conceptual understanding of potential impacts of habitat fragmentation (Villard, 1998). Forrest-interior habitat located deep within woodlands is sheltered from influence of forest edges and open habitats. Bird species that utilize forest interior habitat ('forest-interior species') prefer these sheltered conditions due to availability of certain types of food, less ness disruption, and fewer predators. Conversely, forest edge habitat is typically sunnier, warmer, drier, windier, and prone to more disturbance and supports a higher density of predators than interior habitat. Bird species that utilize forest edge ('edge species') are often generalists in terms of habitat needs, are well-adapted to these conditions, and can successfully occupy such transitional habitats (LandOwner Resource Centre, 2000). While such categorizations are useful in evaluating theoretical impacts of habitat fragmentation, bird species do not always conform to distinct categorizations as "edge" or "interior" specialists. Also, continued presence of a species in an area affected by habitat removal or conversion does not necessarily indicate that the reproductive success of that species has been unaffected by fragmentation. Also, presence in a particular habitat does not necessarily indicate that the reproductive success of a species has been unaffected by fragmentation.

Pre-construction breeding bird survey results and point counts conducted during fall migration provide baseline data and an opportunity to assess species use of habitats and the potential habitat fragmentation impacts to resident and migrant bird species from development and operation of the Facility. Stantec documented forest-interior, edge, and grassland species during spring breeding and fall migration surveys at the Facility (see Section (d) for additional detail on these studies). From the standpoint of potential fragmentation effects, the assessment is focused on forest-interior and obligate grassland bird species. During spring breeding bird surveys, forest-interior species were observed in forested habitats, but most individuals of these species were observed in non-forested habitat (agricultural, forest edge, and overgrown field; n=89,

64%; Table 22-2). Similarly, non-interior species were also observed in forested habitats, indicating variation in utilization among different habitats in the Facility area during spring breeding season. Breeding bird point count surveys were not designed to quantify reproductive success rates. Observations of forest-interior species during fall were infrequent, partly due to the few forest points (n=4) relative to non-forest points (n=16), and since songbirds are more difficult to identify during fall due to drab plumage and minimal singing. Observations during fall migration surveys included one red-eyed vireo in hardwood forest habitat, one veery and one northern cardinal (*Cadinalis cardinalis*) in forest edge habitats, and one winter wren (*Trogolodytes hiemalis*) in a crop field (Table 22-3; Stantec, 2016a).

Table 22-2. Locations of Forest-Interior Species Observed During Breeding Bird Surveys, Spring 2015

Forest-interior Species	Non-forest Total (52 points)	Forest Total (9 points)	All Points Total (61 points)	% Observed in Forested Habitat
Acadian flycatcher	3	0	3	0
Black-and-white warbler	1	0	1	0
Black-throated green warbler	10	7	17	41
Blue-headed vireo	0	2	2	100
Chestnut-sided warbler	1	5	6	83
Dark-eyed junco	0	7	7	100
Eastern towhee	7	1	8	13
Eastern wood-pewee	2	3	5	60
Hermit thrush	3	1	4	25
Indigo bunting	6	0	6	0
Northern cardinal	0	1	1	100
Ovenbird	45	17	62	27
red-eyed vireo	8	2	10	20
Scarlet tanager	3	1	4	25
Veery	0	2	2	100
Woodthrush	0	1	1	100
Total	89	50	139	36

Table 22-3. Locations of Forest-interior Species Observed During Fall Migration Bird Surveys, September 2013

Forest-interior Species	Crop Land (5 points)	Old Field (2 points)	Forest Edge (5 points)	Interior Forest (4 points)	All Points Total (16 points)	% Observed in Interior Forest
Dark-eyed junco	0	0	2	1	3	33
Eastern towhee	1	0	0	1	2	50
Northern cardinal	0	0	1	0	1	0
Red-eyed vireo	0	0	0	1	1	100
Veery	0	0	1	0	1	0
Winter wren	1	0	0	0	1	0
Yellow-rumped warbler	0	0	1	1	2	50
Total	2	0	5	4	11	36

Despite being partially fragmented, the Facility Site supports a variety of fragmentation-sensitive interior species. Forest-interior species such as Acadian flycatcher (*Empidonax virescens*), indigo bunting (*Passerina cyanea*), ovenbird, red-eyed vireo, scarlet tanager, and wood thrush (all observed during breeding bird surveys) are known to be sensitive to fragmentation and may experience reproductive dysfunction associated with fragmentation (Donovan and Flather, 2002). Ground or open-nesting species are most sensitive to fragmentation, and may experience low nesting success due to nest predation and nest parasitism (Lampila et al., 2005). Species in this category include black-and-white warbler (*Mniotilta varia*), ovenbird, and veery (Cornell University, 2015). Ovenbirds were frequently observed in the Facility area, with individuals utilizing interior forest, forest-edge, and agricultural habitats. Somewhat surprisingly, agricultural habitat had the greatest number of bird observations, the greatest species richness, and the greatest Shannon diversity Index during breeding bird surveys (Stantec, 2016a). The forest interior species observed in the Facility area are regionally common and none are federally or state-listed (NYSDEC, 2017c). Scarlet tanager and wood thrush are New York Species of Greatest Conservation Need (SGCN) considered to be experiencing some level of population decline (NYSDEC, 2017c).

Construction and use of access roads generally present lower levels of threat to bird communities than highways and other major roads, due to smaller sizes (thus less clear-cutting), lower levels of traffic, and lower vehicle speeds (Jacobson, 2005). The primary potential habitat-related impacts to forest-interior songbirds that could be anticipated as a result of construction and operation of the Facility may be increased predator activity and brood parasitism along edges of new clearings, which could either reduce reproductive success or remove viable habitat for certain vulnerable species (e.g. ground nesting songbirds) (Herkert et al., 2003). Certain species that are least tolerant of edges, or more susceptible to nest predation, may suffer reduced reproductive success over the long-term, based on cumulative landscape conversion in the Facility Site and region.

Empirical studies of the effects of constructing wind projects on breeding bird populations with similar forested landscapes elsewhere in New York have not documented substantial shifts in species presence or distribution before and after construction. A breeding bird study was conducted after construction of the Howard Wind Project in Steuben County, New York, to assess the potential bird avoidance and/or habituation to turbines in a fragmented landscape. Surveys did not document systematic shifts in species composition or abundance based on proximity to turbines, nor did they document behavioral avoidance of turbines. Only the passerine subtype creepers and nuthatches exhibited statistically significant patterns of avoidance across the 2-year study (West, Inc., 2014).

Given that conservatively, only 9% of forested habitat at the Facility is expected to be affected, that access roads will have low levels of vehicle use, and that the Facility Site already consists of a patchwork of forested and non-forested habitats, it is unlikely that this Facility poses a significant risk of habitat fragmentation impacts to forest-interior bird communities. The forest-interior species observed in the Facility Site will likely continue to persist after clearing associated with the Facility. Habitat-related impacts associated with wind projects are expected to be less than those associated with activities requiring greater percentages of deforestation, larger-scale construction activities, and greater human presence, such as large-scale agriculture, logging, transportation, and urban/residential development. Species sensitive to fragmentation are currently present in partially-fragmented areas of the Facility Site, and utilize forested and non-forested habitats. Given the persistence of these species, and the fact that minimal amounts of additional habitat fragmentation is unlikely to drastically alter the landscape, it is likely that these species will continue to persist after small amounts of additional fragmentation.

Fragmentation Impacts to Grassland Birds

Native grassland ecosystems are rare in North America due to human-induced influences, primarily agriculture and development. The surrogate grasslands that exist today, particularly in the northeast, are typically associated with agriculture, and largely composed of hayfields, pastures, old fields, and idle croplands. Obligate grassland birds generally are considered to be species that are adapted to and dependent upon open, grassy habitats (ideally uncultivated) for successful nesting and food resources. Habitat requirements vary greatly among species. “Area-sensitive” obligate grassland species are habitat specialists that require certain amounts of contiguous patches or unbroken blocks of grassland to attract the birds and support nesting. For the purpose of this report, the assessment of potential effects of grassland fragmentation is focused only on the obligate grassland bird species, and not the wide range of generalist bird species that utilize edge habitats (including grassland).

During spring breeding bird surveys, grassland obligate bird species were observed in both non-forest and forested habitats, though most (95%, n=323) were observed in non-forested habitat (agricultural, forest edge, and successional old field) (Table 22-4). These data suggest that grassland obligate birds appear to have greater affinity to their preferred habitat during spring than do the forest-interior species. By contrast, the fall migration survey showed that only 40% of grassland birds were observed in their preferred habitat, though the sample size (n=15) was relatively small for that survey period (Table 22-5).

Table 22-4. Locations of Grassland Species Observed During Breeding Bird Surveys, Spring 2015

Area-Sensitive Grassland Bird Species	Crop Land (50 points)	Old Field (6 points)	Forest Edge (25 points)	Forest (11 points)	All Points Total (92 points)	% Observed in Open Habitat
Bobolink	86	30	2	0	118	98
Eastern bluebird	0	1	0	0	1	100
Eastern meadowlark	4	0	0	0	4	100
Grasshopper sparrow	1	0	0	0	1	100
Red-winged blackbird	70	49	6	5	130	92
Savannah sparrow	72	10	4	0	86	95
Total	233	90	12	5	340	95

Table 22-5. Locations of Grassland Species Observed During Fall Migration Bird Surveys, September 2013

Area-Sensitive Grassland Bird Species	Crop Land (50 points)	Old Field (6 points)	Forest Edge (25 points)	Forest (11 points)	All Points Total (92 points)	% Observed in Open Habitat
Northern harrier	4	0	1	1	6	67
Red-winged blackbird	1	0	0	0	1	100
Savannah sparrow	0	1	6	1	8	13
Total	5	1	7	2	15	40

Sources of grassland habitat fragmentation from a wind energy project would primarily include construction of permanent access roads, turbine pads, and other infrastructure within the interior portions of grassland patches. Displacement of some grassland species as a result of construction and operation of wind energy projects has been documented (Pearce-Higgins et al., 2009, 2012). New roads into grasslands may create new edges that encourage increased nest predation or interior forests, the installation of electrical collector lines in grasslands would not be expected to cause habitat fragmentation due to the small amount of permanent ground disturbance as it relates to use by grassland birds for feeding and nesting (assuming the grassland habitat is allowed to persist in electrical transmission rights of way). While overhead lines may potentially provide perching habitat for raptors, maximizing the use of buried lines to the extent practicable would eliminate this risk of depredation or disturbance to songbirds. Conversion of grassland, fallow land/old field, or hayfield to cropland would be considered a fragmentation effect, and indeed is one of the primary sources of grassland fragmentation in North America (Herkert 1994; Herkert et al., 2003; Johnson, 2001).

An example of an operating wind energy facility with extensive, high quality grassland habitat with a high abundance and diversity of grassland breeding birds (Ontario Partners in Flight, 2006 as cited in Stantec, 2011) is the 86-turbine Wolfe Island Wind Facility in the Province of Ontario, on the northeast corner of Lake

Ontario. In three years, 2009, 2010, and 2011, biologists conducted disturbance effects monitoring for multiple bird groups including grassland birds at Wolfe Island. Monitoring involved area searches, pre/post construction point counts, and paired point counts, which allowed for mapping bird occurrences in 100-meter bands from the base of turbines. Results did not suggest avoidance of the most common grassland breeding birds around the wind turbines (Stantec, 2011). Bobolink, savanna sparrow, and a song sparrow showed little or no change in recorded breeding densities between pre-construction and post-construction point count surveys. Horned lark, eastern meadowlark, and red-winged blackbird were recorded at lower densities in post-construction years than during pre-construction surveys. However, these abundance changes were not reflected in the area search results, which surveyed the same tracts of habitat pre- and post-construction.

Facility infrastructure will largely avoid the potential grassland habitats identified on aerial imagery. The seven turbines to be located in or near grasslands are located at the edges of the grassland habitat, and are thus not likely to cause fragmentation effects to grassland birds using those habitats. Narrow access roads and buried or overhead collector lines crossing grasslands are not expected to result in significant or measurable habitat fragmentation effects. Buried lines would have minimal, short-term, temporary impacts to habitat and are not likely to result in fragmentation effects. Overhead lines would likely have little to no fragmentation effects to habitat for common grassland obligate species with the possible exception of some area-sensitive species. The presence of overhead lines could increase the potential for depredation or disturbance by raptors. Maximizing the use of buried lines and minimizing the use of overhead collector lines will likely reduce potential impacts to grassland birds and their habitat. Proximate suitable habitat exists for birds that may be displaced during Facility construction.

Fragmentation Impacts to Bats

Potential effects of forest habitat fragmentation on bats are not well understood. Potential mechanisms of impact may vary among species but could include increased parasitism and/or predation, narrowed niche breadth, or shifts in home ranges (Segers and Broders, 2014). Forest structure plays an important role in determining the suitability of foraging habitat, with different species selecting foraging habitat according to their prey preferences and flight morphology. Large bats such as migratory hoary bats, eastern red bats, and silver-haired bats tend to be less maneuverable and prey on larger insects (Aldridge and Rautenbach, 1987; Fenton, 1990). As a result, these species tend to forage in open habitats or above the forest canopy. Small, highly maneuverable bats such as northern long-eared bats and eastern small-footed bats typically forage closer to the ground, often beneath the forest canopy. Many bat species forage along forest edges, riparian corridors, and other gaps in the forest. Accordingly, a matrix of forest types and structural elements including

gaps, edges, and corridors likely increase the overall diversity of bats in an area, provided a sufficient amount of roost opportunities and access to water (Krusic et al., 1996).

The clearing of linear corridors (e.g., access roads) and patches (e.g., turbine clearings) in an otherwise forested landscape will increase the amount of edge habitat present and reduce the amount of forest interior habitat. Accordingly, bat species that forage along forest edges and within open areas are likely to benefit from these activities whereas available habitat will be reduced for species preferring to forage within forest interior. Indeed, bat species appear to respond differently to forest thinning or clearing, probably due to a combination of prey availability, foraging behavior, or influence of forest structure on factors such as wind speed (Patriquin and Barclay, 2003; Segers and Broders, 2014). Forest interior specialists, such as northern long-eared bats, have shown a positive association with forest patch size, although effects differed among males and females (Henderson et al., 2008). However, forest fragmentation typically does not negatively impact bat diversity or abundance in a forested landscape unless remnant forest patches are very small or widely isolated (e.g., Lesinski et al., 2007; Medelin et al., 2010). Further, impacts to wetland resources, which provide foraging habitat for many bat species in the region, will be avoided.

As described above, a small percent of forested habitats within the Facility Site will be potentially affected, and remaining forest habitat should provide ample roosting opportunity for bats. While loss of individual roost trees could also occur as a result of forest clearing, though most bat species that reproduce in New York are not thought to be limited by day roost availability. Specifically, roost habitat is not considered a limiting factor for the federally threatened northern long-eared bat, which could occur in the Facility Site (USFWS, 2016). Accordingly, construction of the Facility is not expected to negatively impact the suitability of foraging or roosting habitat for bats. The distribution of species across the Facility Site may shift somewhat as a result of creating additional edge habitat and cleared corridors, although sufficient intact forest patches will remain for species that forage within the forest interior habitats as well as those that prefer open habitats and edges.

Disturbance/Displacement

Habitat alteration and disturbance resulting from the operation of turbines and other wind farm infrastructure can make a site unsuitable or less suitable for nesting, foraging, resting, or other wildlife use. The footprint of turbine pads, roads, and other Facility infrastructure represents a very small percentage of the site following construction. Therefore, overall land use is relatively unchanged by wind power development. However, the true amount of wildlife habitat altered by a wind power facility can extend beyond the functional footprint, due to the presence of tall structures and increased human activity. The following subheadings address potential disturbance/displacement impacts to breeding birds, waterbirds, raptors, and game species.

Breeding Birds

While wildlife may become habituated to the presence of wind turbines within a few years, the rate (and degree) of habituation is currently unknown because few long-term studies have been conducted. Evidence indicates that some grassland species do not respond favorably to the presence of tall structures in their habitats. Studies conducted at wind power projects in southwest Minnesota and in Wyoming revealed that grassland nesting birds are found in reduced numbers as the proximity to wind turbines increases (Johnson et al., 2000; Leddy et al., 1999). Post-construction surveys at the Noble Wethersfield Windpark in Wyoming County, New York concluded that one avian species, the bobolink, showed an effect of turbine displacement following construction, with significantly fewer bobolinks within 246 feet (75 meters) of turbines situated in hayfields. However, another species, the savannah sparrow, did not show a significant decrease in abundance with distance from turbines (Kerlinger and Guarnaccia, 2010).

Most breeding grassland bird species are anticipated to habituate to the turbines over the long-term, though some permanent displacement may result. However, displacement is likely to be limited to the immediate area of each turbine, and is also likely to be influenced by other factors, such as size of field and agricultural practices. Any potential impacts to grassland-nesting species are anticipated to be much less than the impacts from existing hay mowing and pesticide use in the same area. Many of the proposed turbines are sited in active agriculture fields that are already subject to periodic disturbance and have limited habitat value, or forested land that does not provide grassland habitat. Therefore, there is a low risk of substantial displacement of breeding grassland birds.

Forest and forest edge birds are not likely to be significantly disturbed because these species are familiar with tall features (i.e., trees) in their habitat (Kerlinger and Guarnaccia, 2007). A post-construction study of 11 turbines located on a ridgeline in Searsburg, Vermont showed that some forest-nesting birds (such as blackpoll warbler, yellow-rumped warbler, white-throated sparrow, and dark-eyed junco) appeared to habituate to the turbines within a year of construction. The study did not document how close to the turbines these species nested, but it clearly demonstrated that forest-nesting birds foraged and sang within forest habitat about 100 feet (30 meters) from the turbine bases. Other species found in pre-construction surveys, such as Swainson's thrush, were absent in the initial post-construction surveys and appeared to have been displaced by the turbines (Kerlinger, 2002). However, a subsequent visit to the Searsburg site six years later revealed that Swainson's thrushes were singing (and likely nesting) within the forest adjacent to turbines (Kerlinger and Guarnaccia, 2007). Minimal displacement in wooded areas was also documented following construction of the Noble Bliss Wind Farm in Wyoming County, New York. This study found that bird diversity

rebounded following construction of the wind project, but abundance did not. These results suggest that different species may habituate to the presence of wind turbines at different rates (Kerlinger and Guarnaccia, 2009).

Waterbirds

The potential impacts of the Facility on migrating or foraging waterfowl should not be significant. Wind turbines are sited in uplands, for the most part away from the open water habitats that waterbirds prefer. There are no lakes within the Facility Site. However, lakes proximate to the Facility Site (e.g., Loon Lake, Mud Lake) are addressed in the Habitat Assessment memorandum prepared by Stantec (see Appendix TT). Sometimes waterbirds, such as migrating geese, do forage in upland farm fields in substantial numbers. Disturbance/displacement impacts to waterbirds that use farm fields are not expected as a result of operating wind turbines, because these birds are generally well-adapted to disturbed environments with heavy human influence (e.g., along highways, in busy public parks, often near tall buildings, etc.).

The conclusion that Facility operation is unlikely to cause significant disturbance or displacement impacts to waterbirds is supported by the results of a study conducted by the Iowa Cooperative Fish and Wildlife Research Unit at the Top of Iowa Wind Farm located in Worth County, Iowa. Due to its proximity to three state-owned wildlife management areas, the Top of Iowa Wind Farm experiences very high use by waterfowl (over 1.5 million duck and goose use-days per year). Observations at that site revealed that wind turbines did not affect the use of the fields by Canada geese or other species of waterfowl. In addition, over the two-year course of the study, no turbine-related waterfowl or shorebird mortality was documented (Koford et al., 2005). Based on these study results, the proposed Facility is not anticipated to have a significant, long-term displacement or mortality effect on resident or migrating waterfowl.

Raptors

Raptors may experience some displacement due to the loss and fragmentation of habitat from the construction of the Facility. A study conducted at a 129 MW wind farm in Wisconsin measured use by raptors at the site both pre- and post-construction. Species observed during the study (either pre-construction, post-construction, or both) included American kestrel, bald eagle, broad-winged hawk, great horned owl, northern harrier, osprey, peregrine falcon, red-shouldered hawk, red-tailed hawk, turkey vulture, as well as a few unidentified accipiter and buteo hawk species. This is a similar suite of species to those identified at the Facility Site (see Appendix OO for more detail). The study found that abundance of raptors in all species groups was lower in the first year of post-construction monitoring than it was pre-construction; this reduction was attributed to disturbance from construction and ongoing presence of wind turbines. American kestrel, red-winged hawk,

and turkey vultures experienced the greatest declines. (Garvin et al., 2011). The results of this study suggest that some displacement of raptors into similar nearby habitats is likely at the Facility.

Game Species

While habituation to the presence of the turbines may not be immediate, game species such as deer and wild turkey generally adapt quickly to the presence of man-made features in their habitat (as evidenced by the abundance of these species in suburban settings). Significant displacement of game species from a wind power site is not expected to be an issue; the Applicant's consultant has witnessed substantial numbers of deer and turkey foraging in open fields directly adjacent to and beneath operating wind turbines at several New York wind power sites.

Bird and Bat Collision Risk

To assess potential collision risk as a result of Facility operation, Stantec conducted a literature review of existing post-construction bird and bat fatality data for wind farms in New York State. Based on 22 post-construction studies conducted at 12 wind facilities in New York, the statewide bird mortality rate is 4.36 birds/turbine/year (see also Table A-1 in Stantec's Cumulative Effects Analysis, included as Appendix AAA). Applying this rate to the 76 turbines proposed for the Facility yields a total bird mortality estimate of approximately 332 bird fatalities per year. As outlined in the Cumulative Effects Analysis, this estimate is based on averages of documented mortality rates at similar projects in New York and is not expected to have population level effects to affected bird species, including those species of conservation concern. As further indicated in the Cumulative Effects Analysis, the proposed Facility is not expected to cause naturally occurring populations of common or rare birds to be reduced to numbers below levels for maintaining viability at local or regional levels (see Section 3.3 of the Cumulative Effects Analysis in Appendix AAA).

The statewide bat mortality rate, based on 19 studies conducted at 12 wind facilities, is 12.36 bat fatalities/turbine/year (see also Table A-2 in Stantec's Cumulative Effects Analysis, included as Appendix AAA). Few if any of the New York studies for which bat mortality estimates were available were implementing curtailment or any other measures to reduce or minimize bat mortality. The minimization plan proposed for the Facility is expected to reduce bat mortality rates by 50%, such that the Facility-specific mortality estimate is 6.18 bats/turbine/year based on the available data from wind farms in New York. Applying this rate to the 76 Facility turbines yields a total mortality estimate of approximately 470 bats per year. As indicated in the Cumulative Effects Analysis, the proposed Facility's rate of bat mortality will be at least 50% lower than other projects that are operating with no turbine adjustments during the fall migration season (see Section 4.3 of the Cumulative Effects Analysis in Appendix AAA).

Predicted rates of bird and bat fatality will be confirmed through post-construction bird and bat carcass monitoring once the Facility becomes operational, following methods developed in coordination with the DEC.

(3) Impacts Due to Biocides

Beyond the occasional use of weed control (e.g., "roundup") during operation and maintenance activities, the Applicant does not anticipate the frequent or consistent use of biocides. Therefore, impacts associated with the use of biocides are not anticipated.

(4) Impacts to Wildlife Travel Corridors and Wildlife Habitat, and Information Regarding Threatened, Endangered, and Special Concern Species

Impacts to Wildlife Travel Corridors and Wildlife Habitat

The Applicant conducted research to determine the presence of documented wildlife travel corridors within or adjacent to the proposed Facility, and none were identified. Therefore, the Facility is not anticipated to have adverse impacts to continental-scale migration corridors. Smaller scale travel corridors that are not used for migration but are used for local movement between resource patches likely exist within the Facility Site. These include deer trails, areas between wetlands and uplands that reptiles and amphibians cross in order to access breeding grounds, and patches of forest that mammals may travel through while foraging. Impacts to wildlife habitat has been quantified and is presented below in Table 22-6.

Table 22-6. Impacts to Wildlife Habitat

Cover Type	Temporary Impact (acres)	Permanent Loss (acres)	Regenerating Forest (acres)	Forest Conversion to Successional Communities (acres)	Total Impact (acres)
Vegetative Communities[1]					
Forest	-	30.1	16.6	115.7	162.4
Successional Shrubland	16.7	3.2	-	-	19.9
Successional Old Field	11.4	4.3	-	-	15.7
Row & Field Crops	272.9	84.6	-	-	357.5
Pasture	6.6	3.6	-	-	10.2
Open Water[2]	0.2	0.0	-	-	0.2
Total	440.1	125.8	16.6	115.7	565.9
Potential Grassland Habitat[3]					

Cover Type	Temporary Impact (acres)	Permanent Loss (acres)	Regenerating Forest (acres)	Forest Conversion to Successional Communities (acres)	Total Impact (acres)
Vegetative Communities[1]					
Emergent Marsh	0.2	0.0	-	-	0.2
Hayfield	6.7	1.8	-	-	8.5
Pasture	1.1	0.8	-	-	1.9
Successional Old Field	11.5	3.8	-	-	15.3
Total	19.5	6.4	-	-	25.9
Forest Interior	2.4	2.1	-	-	4.5

[1] Only includes vegetative communities identified in 1001.22(a) that provide wildlife habitat (excludes disturbed/developed community).
[2] See 1001.23(b)(4) for a discussion of impacts to surface waters, as defined by on-site wetland and stream delineations, anticipated as a result of Facility construction and operation.
[3] Areas of potential grassland habitat identified by Stantec during the Habitat Fragmentation Analysis (Stantec, 2017). However, impact calculation methods are as described in 1001.22(b).

In addition, a preliminary GIS analysis was conducted to determine the extent of potential "interior forest" with the Facility Site. The methodology of this analysis is based on similar methodology utilized by EDR for the Jericho Rise Wind Farm (Franklin County) and Cassadaga Wind Project (Chautauqua County). This methodology was developed based on information from the NYSDEC. Specifically, the NYSDEC submitted a comment letter on the Jericho Rise Wind Farm Supplemental Environmental Impact Statement on January 11, 2016, which states the following with respect to forest fragmentation impacts:

> "Indirect impacts to interior forests are difficult to quantify, though many studies have shown that measurable impacts are found at least 300 feet, and up to 2000 feet, into the forest from the boundary of a disturbance."

In relation to Baron Winds Project, a geospatial analysis was conducted to identify areas within the Facility Site (i.e., parcels hosing the various Facility components) that may provide the interior forest habitat conditions that could be subject to fragmentation impacts. These areas were identified using GIS software. Forest edges were defined as places where successional areas, public roads, agricultural fields, or other disturbed/developed areas were located adjacent to forests as identified through aerial photograph interpretation (desktop analysis). The larger forest tracts in the northern portion of the Facility Site have been fragmented by roads. In cases where these roads resulted in an obvious break in the canopy, clearly noticeable in the aerial photography, they were included as edges in this analysis. As indicated above, a distance range of 300 to 2,000 feet was identified by NSYDEC, indicating the distance at which some edge effects may penetrate into a forest. Therefore, for the purposes of this analysis a distance of 1,000 feet from the forest boundary was used as the threshold beyond which the forest is considered interior, which would appear to represent a reasonable middle ground within the

distance range identified by the NYSDEC. As such, sizable forested areas contiguous with the Facility Site were identified up to 1,000 feet beyond the Facility boundary and an interior buffer of 1,000 feet was then excluded from these areas. The remaining areas, considered to be interior forest, were then narrowed down to only areas occurring within the Facility Site.

This analysis identified nine patches of forest located greater than 1,000 feet from a forest edge within the Facility Site, totaling approximately 59 acres. Based on vegetation communities identified and presented in 1001.22(a), the Facility Site contains approximately 3,536.6 acres of forest, therefore only approximately 1.7% of the forestland within the Facility Site would be considered interior forest, as determined per the methodology described above (i.e., the 1,000-foot assumption). These areas of interior forest range in size from 0.1 acre to 27.1 acres and are located throughout the Facility Site. The results of this analysis also indicate that one turbine (turbine 64) is located within interior forest.

It should be noted that additional areas of disturbance/fragmentation that are small in size and/or are not clearly visible on aerial photography do occur on-site as well, although they were not included in this analysis. In that respect, fragmentation or existing disturbance is likely somewhat more extensive than this analysis indicates, resulting in overestimation of interior forest in some areas. Therefore, based on this analysis the Facility will not result in significant adverse impacts to interior forest conditions.

Please also note that Steuben County contains a significant amount of forest. GIS analysis of NLCD data shows that there is approximately 514,722 acres of forest in Steuben County (including deciduous forest, evergreen forest, mixed forest, and woody wetlands). Using the methods described above, the NLCD data was used to approximate the amount of interior forest in Steuben County. The NLCD data indicates approximately 804 square miles of forest in Steuben County, and applying a 1,000 foot buffer to this dataset in GIS results in approximately 82 square miles (52,256 acres) of interior forest in the county. Using these numbers, the interior forest within the Facility Site (59 acres) represents less than 1% of the interior forest in Steuben County, and provides further evidence that the Facility would not result in significant adverse impacts to interior forest.

Information Regarding Threatened, Endangered, and Special Concern Species

The Applicant compiled a list of federally and state-listed species that could occur in the Facility Site based on site-specific correspondence and database queries from USFWS, the New York Natural Heritage Program (NYNHP), NYSDEC state and regional offices, and direct observations made on-site. The USFWS maintains an online database called IPaC (Information for Planning and Consultation) where users can request site-specific information for known occurrences of federally-listed threatened, endangered, and candidate species listed under

the Endangered Species Act. NYNHP tracks threatened, endangered, and special concern plant and animal species that occur throughout the state, as well as ecological communities that are unique or of special ecological significance. The Applicant requested site-specific data from these sources to determine the presence of threatened, endangered, candidate, or special concern species that may occur in the Facility Site (see Appendix VV). The Applicant also requested site-specific data from the NYSDEC Region 8 office regarding fish species known to occur in streams whose tributaries are located within the Facility Site (see 1001.22(e)(2) for additional information about this request). Results of this request were compared to state and federal species lists to determine if any of these fishes were listed as threatened, endangered, or special concern species. Finally, the Applicant identified those species listed federally or at the state level that were observed on-site during surveys conducted by Stantec and EDR. Table 22-7 provides the list of all special status species identified through these methods, as well as a brief description of the ecological requirements of each species, on-site observation notes, the source whereby each species is known to occur within the vicinity of the Facility Site, and whether the species was actually observed during on-site surveys.

From the above sources, it was determined that one federally-listed species could occur within vicinity of the Facility Site. This species is the northern long-eared bat (*Myotis septentrionalis*), a federally-listed threatened mammal that is also state-listed as threatened and a High Priority Species of Greatest Conservation Need (SGCN-HP). Other state-listed species identified by the sources above or during on-site surveys included two state-listed endangered bird species (peregrine falcon and golden eagle), four state-listed threatened species (pied-billed grebe, northern harrier, bald eagle, and Henslow's sparrow), and one state-listed protected species (great blue heron). NYSDEC provided records to Stantec indicating that one bald eagle nest has been observed approximately four miles north of the project and another bald eagle nest has been observed approximately four miles east of the project.

The NYSDEC also keeps records on species of special concern (SSC). These species are not listed, but their conservation needs do "warrant attention and consideration" (NYSDEC, 2017c). Twelve species of special concern were identified through site-specific correspondence with the above source, direct observation on-site, or review of other sources (NYS Breeding Bird Atlas, NYS Herp Atlas) used to prepare the Wildlife Inventory for section 1001.22(e)(2). These species included osprey, Cooper's hawk, northern goshawk, sharp-shinned hawk, red-shouldered hawk, red-headed woodpecker, yellow-breasted chat, golden-winged warbler, grasshopper sparrow, wood turtle, Jefferson salamander, and eastern longtail salamander). Because NYNHP also indicated that both a hibernaculum and maternity colony of eastern small-footed myotis bat (*Myotis leibii*, a SSC) have been documented within 40 miles (but not within 10 miles) of the Facility Site, this species of special concern has also been included in Table 22-7.

New York State maintains a Comprehensive State Wildlife Strategy that includes a list of Species of Greatest Conservation Concern (SGCN) (NYSDEC, 2017f). This list describes species that are rare or declining. For species listed as High Priority Species of Greatest Conservation Need (SGCN-HP), the status of these species is known and conservation is needed within the next ten years. For Species of Greatest Conservation Need (SGCN), the status of these species is known and conservation action is needed. However, the need for conservation action is not as imperative as for those in the High Priority category. Many of the species listed as threatened, endangered, or of special concern are also identified as SGCN or SGCN-HP. Nine species observed on-site within the Facility Site that are not listed as threatened, endangered, or of special concern are listed as SGCN or SGCN-HP and have been included in Table 22-7.

Table 22-7. New York State Special Status Species Occurring or Likely to Occur within the Facility Site

Species	NYS Status	SGCN Status[1]	Ecological Requirements and On-site Observation Notes	Source[2]	Observed on-site?
Peregrine Falcon *Falco peregrinus*	Endangered	SGCN	Breeds in open landscapes with cliffs and ledges, but may transiently utilize open, lake edge, or mountain habitat within the Facility Site in migration and in winter. One incidental observation during eagle use point count surveys.	ST	Yes
Golden Eagle *Aquila chrysaetos*	Endangered	SGCN	Found in open and semi-open country; avoids large stretches of forests. May transiently utilize habitat within the Facility Site. One observation during eagle use point count surveys.	ST	Yes
Northern Long-Eared Bat *Myotis septentrionalis*	Threatened[3]	SGCN-HP	Overwinters in caves where temperature and moisture remain even. Summer roost habitat consists of trees with cracked or exfoliating bark, and summer foraging habitat consists of forest understories. Suitable habitat is present within the Facility Site. Presence of this species was not determined during on-site surveys.	FWS NHP	No[4]
Henslow's Sparrow *Ammodramus henslowii*	Threatened	SGCN-HP	Often found in patchy, weedy old fields. Suitable habitat occurs within the Facility Site in the form of abandoned fields. Not observed during on-site surveys.	NHP	No
Pied-billed Grebe *Podilymbus podiceps*	Threatened	SGCN	Found foraging on open water in wetlands, lakes, ponds, and slow-moving rivers. Nests in aquatic/emergent vegetation and may be present in the Facility Site during summer breeding season. Not observed during on-site surveys.	NHP	No
Northern Harrier *Circus cyaneus*	Threatened	SGCN	Found in meadows, grasslands, marshes, and cultivated fields. Nests on the ground, often in shrubby habitat. Suitable habitat for this species occurs within the Facility Site. Observed during fall migration surveys (six observations), spring breeding bird surveys (one observation), and eagle use point count surveys (37 observations).	ST NHP	Yes
Bald Eagle *Haliaeetus leucocephalus*	Threatened	SGCN	Usually breeds in riparian and lacustrine habitats. Preferentially roosts in conifers. May transiently utilize habitat within the Facility Site. One observation during spring breeding bird surveys and 20 observations during eagle use point count surveys.	ST NHP	Yes
Great Blue Heron *Ardea herodias*	Protected	N/A	Found in wetland habitats including marshes, riverbanks, lakes, and ponds; they occasionally forage in grasslands and agricultural fields. Two observations during spring breeding bird surveys and five incidental observations during eagle use point count surveys. Also observed on-site by EDR.	ST EDR NHP	Yes
Red-headed Woodpecker *Melanerpes erythrocephalus*	Special Concern	SGCN-HP	Prefers river bottomlands, wooded swamps, and open grasslands with trees. Breeding habitat contains dead trees for nest sites, snags for roosting, and open ground for foraging. Not observed during on-site surveys.	FWS	No
Yellow-breasted Chat *Icteria virens*	Special Concern	SGCN-HP	Breeds in areas of dense shrubbery, including abandoned farm fields, powerline corridors, fencerows, forest edges, and stream/pond edges. Suitable habitat occurs within the Facility Site. One observation during fall migration survey.	ST	Yes
Golden-winged Warbler *Vermivora chrysoptera*	Special Concern	SGCN-HP	Breeds in tangled, shrubby habitats and needs both mature forests and shrubby, open areas. Suitable habitat occurs within the Facility Site. Not observed during on-site surveys.	BBA	No
Grasshopper Sparrow *Ammodramus savannarum*	Special Concern	SGCN-HP	Found in open grasslands and prairies with patches of bare ground. Forages and nests on the ground. Suitable habitat occurs within the Facility Site. One observation during spring breeding bird surveys.	ST	Yes
Wood Turtle *Glyptemys insculpta*	Special Concern	SGCN-HP	Usually found in or along clean, fast-flowing trout streams. In summer, forages in woodlands bordering streams. Suitable habitat occurs within the Facility Site. Not observed during on-site surveys.	HA	No
Red-shouldered Hawk *Buteo lineatus*	Special Concern	SGCN	Forest-dwelling raptor that prefers wet areas such as swamps and forested wetlands. Suitable habitat for this species occurs within the Facility Site. Five incidental observations during eagle point count surveys.	ST	Yes

Species	NYS Status	SGCN Status[1]	Ecological Requirements and On-site Observation Notes	Source[2]	Observed on-site?
Eastern Small-footed Myotis *Myotis leibii*	Special Concern	SGCN	Overwinters in caves, mines, and deep rock crevices. Found in deciduous forests in the summer months. Feeds over ponds and streams, and along roads. Suitable habitat for this species occurs within the Facility Site. Presence of this species was not confirmed or refuted during on-site surveys.	NHP	No[4]
Eastern Longtail Salamander *Eurycea longicauda*	Special Concern	SGCN	Usually found along the borders of streams, swamps, seeps, and marshes. Occurrences have been reported in Steuben County (NYS Herp Atlas). Suitable habitat for this species occurs within the Facility Site. Not observed during on-site surveys.	HA	No
Osprey *Pandion haliaetus*	Special Concern	N/A	Prefers open water habitat, including saltmarshes, rivers, ponds, reservoirs, estuaries, and lakes. Often build large stick nests above open water. May transiently utilize habitat within the Facility Site. Six incidental observations during eagle use point count surveys.	ST	Yes
Cooper's Hawk *Accipiter cooperii*	Special Concern	N/A	Forest-dwelling raptor that breeds in deciduous, mixed, and coniferous forests. Suitable habitat for this species occurs within the Facility Site. Fourteen incidental observations during eagle use point count surveys.	ST	Yes
Northern Goshawk *Accipiter gentilis*	Special Concern	N/A	Nests in mixed-hardwood forests and hunts in forests, along riparian corridors, and in more open habitat. Suitable habitat for this species occurs within the Facility Site. One incidental observation during eagle use point count surveys.	ST	Yes
Sharp-shinned Hawk *Accipiter striatus*	Special Concern	N/A	Forest-dwelling raptor found in deciduous or mixed woodlands. Suitable habitat for this species is within the Facility Site. One flyover observation during spring breeding bird surveys and 19 incidental observations during eagle point count surveys.	ST	Yes
Jefferson Salamander *Ambystoma jeffersonianum*	Special Concern	N/A	Found in moist or damp areas of deciduous forests. Breeds in fishless ponds and vernal pools. Suitable habitat for this species occurs within the Facility Site. Not observed during on-site surveys.	HA	No
Bobolink *Dolichonyx oryzivorus*	N/A	SGCN-HP	Prefers tall grasslands, including pastures, old fields, and meadows. Suitable habitat is present within the Facility Site. During spring breeding bird surveys, this species was observed 140 times. One observation during spring Henslow's sparrow habitat surveys.	ST EDR	Yes
Eastern Meadowlark *Sturnella magna*	N/A	SGCN-HP	Habitat consists of grasslands, including farm fields, old fields, meadows. Suitable habitat is present within the Facility Site. Ten observations during spring breeding bird surveys.	ST	Yes
American Kestrel *Falco sparverius*	N/A	SGCN	Generally occupy open areas with few trees, such as grasslands and agricultural fields. Suitable habitat is present within the Facility Site. Two observations during spring Henslow's sparrow habitat surveys and 35 incidental observations during eagle use point county surveys.	ST	Yes
Ruffed Grouse *Bonasa umbellus*	N/A	SGCN	Prefers forest interior with scattered clearings, but may also be found in areas growing back after disturbance. Suitable habitat is present within the Facility Site. One observation during spring breeding bird surveys.	ST	Yes
Wood Thrush *Hylocichla mustelina*	N/A	SGCN	Found in shady, deciduous and mixed forests. Suitable habitat is present within the Facility Site. Two observations during spring breeding bird surveys.	ST	Yes
Scarlet Tanager *Piranga olivacea*	N/A	SGCN	Found in deciduous and mixed forests. Suitable habitat is present within the Facility Site. Eight observations during spring breeding bird surveys.	ST	Yes

Species	NYS Status	SGCN Status[1]	Ecological Requirements and On-site Observation Notes	Source[2]	Observed on-site?
Silver-Haired Bat *Lasionycteris noctivagans*	N/A	SGCN	A migratory bat that resides in deciduous and mixed forests, often near water. Roosts in bark crevices and hollows. Suitable habitat present within the Facility Site. At least 38 calls identified during on-site acoustic bat surveys.	ST	Yes
Eastern Red bat Lasiurus borealis	N/A	SGCN	A migratory bat that often resides in forested areas; does not overwinter in caves. Suitable habitat present within the Facility Site. At least 13 calls identified during on-site acoustic bat surveys.	ST	Yes
Hoary bat *Lasiurus cinereus*	N/A	SGCN	Prefers forested habitats and roosts on trees, hidden by foliage. Suitable habitat is present within the Facility Site. At least 48 calls identified during on-site acoustic bat surveys.	ST	Yes

[1] SGCN Status refers to the species' status under the Comprehensive State Wildlife Strategy. SGCN = Species of Greatest Conservation Need, SGCN-HP = High Priority Species of Greatest Conservation.

[2] Source: ST = observed on-site by Stantec biologists, EDR = observed by EDR biologists, NHP = New York Natural Heritage Program site-specific request for data, FWS = US Fish & Wildlife Service IPaC resource list for federally-listed species, DEC = identified by DEC Region 8 office following a request for fisheries data, BBA = NYS Breeding Bird Atlas, HA = NYS Herp Atlas

[3] Also federally-listed as threatened.

[4] At least one species within the genus *Myotis* was identified by Stantec during acoustic surveys in 2015, although the calls confirmed as *Myotis* sp. were extremely infrequent (n = 3; <1% of all recorded calls).

Impacts to Special Status Plants and Significant Ecological Communities

No threatened, endangered, candidate, or rare plant species and no significant ecological communities were identified by either the USFWS IPaC results or the NYNHP response letter. In addition, no special status plants or significant ecological communities were observed on-site during ecological surveys. Therefore, Facility construction and operation are not expected to result in adverse impacts to protected plants or to significant ecological communities.

Impacts to Special Status Birds

Impacts Based on Results of On-Site Avian Surveys

No federally threatened or endangered bird species were documented in the Facility Site. Pre-construction surveys documented eleven special status bird species in the Facility Site during the migratory period, the breeding period, and/or incidentally during eagle use point count surveys. These special status species included peregrine falcon (endangered), golden eagle (endangered), northern harrier (threatened), bald eagle (threatened), yellow-breasted chat (special concern), grasshopper sparrow (special concern), red-shouldered hawk (special concern), osprey (special concern), Cooper's hawk (special concern), northern goshawk (special concern), and sharp-shinned hawk (special concern).

For peregrine falcon, golden eagle, yellow-breasted chat, grasshopper sparrow, northern goshawk, only a single observation was recorded for each species throughout all on-site surveys conducted, suggesting that these species are very rarely found in or near the Facility Site. Thus, because of their rare occurrence within the Facility Site, impacts are expected to be extremely low for these five species. For the six other special status raptor species observed more than a single time, impacts are also expected to be low, given that most documented bird collision mortalities (approximately 70%) at other wind facilities in New York have been for common passerine species such as red-eyed vireo and golden-crowned kinglet rather than raptors (see 1001.22(h)(1) for detail on cumulative impact analysis and bird mortality).

While the risk to raptors is low, most of the raptor species observed on-site could be expected to pass through the Facility Site during seasonal migration, during which they could be at risk of collision with turbines during Facility operation. Nonetheless, raptor fatality rates at other wind projects in the northeast, including those within known raptor migration routes, have been low, suggesting low risk of collision and a high degree of behavioral avoidance of turbines by raptors. There are no known eagle nests within the Facility Site, and the closest documented eagle nests are approximately four miles away. Most observations of state-listed raptor species during eagle use point county surveys, which took place from September-December 2013 as well as from January-May and in September 2014, occurred outside the summer nesting period, suggesting low risk to eagles and state-listed raptor species

during the breeding period. The only state-listed raptor observations that occurred during the breeding season included one northern harrier observation, one bald eagle observation, and one sharp-shipped hawk observation recorded by Stantec during breeding bird surveys in May and June 2015.

Eagle activity in the vicinity of the Facility Site as assessed during eagle use point count surveys (2013-2014) and during other on-site surveys including fall migration surveys was low (20 eagle observations in the Project area in 612 observation hours). The behaviors of individual eagles observed were not behaviors that are thought to be associated with greater collision risk at wind projects (courtship, territorial displays, or foraging). There are no features within the Project area that are likely to concentrate eagles or eagle activity. To date, based on publicly available information, no bald eagle fatalities have occurred at operational commercial-scale wind projects in New York or the northeast in general. Even if the number of eagle nests within 10 miles of the Facility increased between 2013 and 2017 (see discussion of eagle nest sites above in 22(d)(3)), collision risk to eagles at the Facility is still expected to be low. Indeed, supplemental eagle use surveys conducted after a new eagle nest was established approximately 5 miles from the Facility confirmed continued low eagle use of the area, suggesting low potential risk. Therefore, based on the low eagle use observed during eagle use point count and fall migration surveys, the eagle behavior observed, the lack of any features within the Facility area that would concentrate eagles or eagle activity, the lack of known bald eagle fatalities in New York, and the additional eagle use surveys in 2017 that continued to show low eagle use, the potential risk to eagles due to Facility operation is expected to be low.

There were four special status bird species that were identified by NYNHP, USFWS, or the NYS Breeding Bird Atlas as potentially occurring in the vicinity of the Facility Site, but that were not documented during on-site surveys: Henslow's sparrow (threatened), pied-billed grebe (threatened), red-headed woodpecker (special concern), and golden-winged warbler (special concern). Impacts to these species are generally not anticipated, because they either do not use the Facility Site at all, or they use the Facility Site so infrequently as to not be detected during on-site surveys approved by NYSDEC and USFWS. However, because high-quality habitat for Henslow's sparrow exists within the Facility Site, further consideration is given to impacts to this species below, under the heading Impacts Based on Results of Habitat Assessment.

Facility construction impacts would occur primarily during forest clearing required for access roads and turbine pads. Forest clearing is to be conducted between November 1 and April 1, which will avoid or minimize potential direct impacts to threatened and endangered bird species. Further, the lack of documented breeding populations of these species within the Facility Site indicates a low potential for impacts. Potential habitat-related impacts such as fragmentation effects are discussed in 1001.22(f)(3).

Impacts Based on Results of Habitat Assessment

To determine whether habitat with potential to support listed species is present within the Facility Site, Stantec conducted a habitat assessment at each of 36 eagle point count locations in the Facility Site in September 2013 (see 1001.22(d)(3) for details on the eagle use study). The assessment was specific to habitat requirements for a list of rare birds documented within 10 miles of the Facility Site provided by NYNHP on May 29, 2013. The list included state-threatened Henslow's sparrow, bald eagle, northern harrier, and pied-billed grebe, as well as one protected bird, the great blue heron. Within an 800-meter radius around each of the point count locations (covering approximately 500 acres), cover types were recorded and percent canopy cover of forests was estimated. In addition, those areas with potential suitable habitat were noted and recorded while traveling between survey points.

No habitat within the Facility Site with potential to support federally listed avian species, state-listed species bald eagle, or the protected bird great blue heron was identified in the habitat assessment. In addition, NYSDEC is not aware of any bald eagle nests on Loon Lake, a 162-acre pond adjacent to the northeastern Facility Site boundary (Stantec, 2014). In addition, no wooded freshwater swamps or water bodies with islands where great blue heron typically establish rookeries were identified (NYSDEC, 2017d). These species are not expected to occur more than just occasionally in the Facility Site, due to lack of suitable habitat. The lack of documented breeding populations of these species within the Facility Site indicates a low potential for impacts.

Breeding habitat for northern harrier includes extensive open wetlands, freshwater marshes, wet lightly grazed pastures, fallow grasslands, meadows, and cultivated fields (Smith et al., 2011). Stantec identified Mud Lake and its associated wetland (located west of the Facility Site) as potentially suitable breeding habitat for northern harrier. Mud Lake and its associated wetland are outside of the Facility Site and this habitat will not be disturbed by construction or operation of the Facility. Therefore, the Facility should not result in impacts to northern harrier breeding grounds (see the Habitat Assessment Memo in Appendix TT). The Facility Site does contain potential foraging habitat for northern harrier, as demonstrated by Stantec's 18 observations of northern harrier soaring, gliding, or foraging over fallow and cultivated fields at point count locations. Although Facility construction and operation could have an adverse impact on some northern harrier foraging habitat, suitable habitat is abundant within and immediately around the Facility Site, and will be available during and after construction. It is likely that foraging habitat impacted directly by construction and operation activities would represent only a small portion of total available foraging habitat for northern harriers present in or near the Facility Site.

Seven areas within the Facility Site were identified by Stantec as having potential habitat for Henslow's sparrow. Suitable habitat for this species includes moist fallow fields and meadows, weedy hayfields, pastures lacking shrubs, wet meadows, and hillsides with sedges (NYSDEC, 2017e), and the species typically breeds in relatively

large fields, greater than approximately 30 hectares (Zimmerman, 1988; Mazur 1996 as cited in Herkert, 2003). Of the seven areas identified, three were further designated as having the greatest potential to support Henslow's sparrow. Stantec surveyed these greatest potential areas in spring 2015 during breeding bird surveys and did not detect Henslow's sparrow. Therefore direct impacts to breeding Henslow's sparrow during construction are not anticipated. During Facility operation, direct impacts in the form of turbine-related collision fatality could potentially occur; although to date no Henslow's sparrow fatalities have been reported by operational wind projects with publicly available fatality monitoring results.

Impacts to Species of Greatest Conservation Need

Six avian species (bobolink, eastern meadowlark, American kestrel, ruffed grouse, wood thrush, and scarlet tanager) with SGCN-HP or SGCN status (but not state-listed) were observed during on-site surveys. Of these, ruffed grouse was observed once, and wood thrush was observed twice during spring breeding bird surveys. These species occur in such low numbers that Facility construction and operation are unlikely to adversely impact population numbers. The other four species (bobolink, eastern meadowlark, American kestrel, and scarlet tanager) were observed in greater numbers within the Facility site. Although Facility construction and operation could have an adverse impact on individuals of these species, suitable habitat is abundant within the Facility Site, and will be available during and after construction. Furthermore, these species are not listed as threatened, endangered, or of special concern, and have population numbers statewide that are more stable than species listed under one of these protection statuses. Therefore, it is not anticipated that Facility construction or operation will have a significant effect on regional, statewide or range-wide populations.

Impacts to Special Status Mammals

Special status bat species that may occur in the Facility Site based on their known range and NYNHP documented bat sites within 40 miles include the state- and federally-threatened northern long-eared bat (*Myotis septentrionalis*), and state species of special concern eastern small-footed myotis (*Myotis leibii*). Both of these species hibernate during winter and can be found in forested areas throughout the northeast during spring, summer, and fall. Forested habitats within the Facility Site could provide roosting habitat for northern long-eared bats and foraging habitat for both species, whereas presence of eastern small-footed bats in the Facility Site is unlikely due to absence of preferred roosting habitat for the species (rocky outcrops or talus slopes). *Myotis* species were detected at low levels acoustically in the Facility Site during pre-construction surveys, but could not be identified to species. Potential impacts to these bat species could include loss of foraging/roosting habitat associated with tree removal, direct mortality due to tree clearing, and turbine-related mortality during Facility operation.

Potential direct mortality of listed bats during construction will be avoided through conducting forest clearing between November 1 and April 1, outside of the spring and summer reproductive period. Several studies have documented that northern long-eared bats roost in a wide variety of tree species (e.g. Sasse and Pekins, 1996; Broders and Forbes, 2004), are not habitat limited during the summer in forested areas (USFWS, 2016), and persist in areas despite removal of preferred roost trees (Silvis et al. 2015). As such, forest clearing associated with the Facility is not expected to result in significant habitat-related impacts to either the northern long-eared bat or the eastern small-footed bat. Potential effects of habitat fragmentation on bats are addressed in 1001.22(f)(1).

Turbine-related mortality of northern long-eared bats has been documented at low levels at wind projects in the northeast, with 43 mortalities (less than 1% of bat mortality) documented at 19 facilities. The USFWS concluded that, despite some monitoring limitations, northern long-eared bats were rarely detected as mortalities, even when they were known to be common on the landscape around wind energy facilities (USFWS, 2016).

No eastern small-footed bat mortalities have been documented at any wind projects in New York, and only 1 has been documented in Pennsylvania, based on publicly available data. Also, Stantec understands that no northern long-eared bat mortality has occurred at projects implementing feathering below normal manufacturer cut-in speed. The USFWS has concluded that the level of observed northern long-eared bat mortality at wind farms does not constitute a significant risk to the species, particularly in light of voluntary industry BMPs establishing the voluntary operating protocol of feathering turbines below normal cut-in speed (USFWS, 2016), which will be implemented at the Facility during the fall migration period.

Silver-haired bat, eastern red bat, and hoary bat are species with SGCN status whose calls were positively identified during on-site acoustic surveys. Direct mortality through Facility construction will be limited, because tree clearing will take place between November 1 and April 1, outside of the breeding and activity periods for these species (see 1001.22(f)(1) for a discussion of construction-related impacts to bats). Additionally, Facility operation could result in some collision mortality to these species (see 1001.22(f)(2) for a discussion of operation-related impacts to bats). However, the Applicant has developed avoidance, minimization, and mitigation measures (see 1001.22(h)(5) for a discussion of the Bird and Bat Conservation Strategy (BBCS)). These species are not listed as threatened, endangered, or of special concern, and have population numbers statewide that are more stable than species listed under one of these protection statuses. Therefore, it is not anticipated that Facility construction or operation will have a significant effect on statewide or range-wide populations.

Impacts to Special Status Fish

No special status fish fishes were identified by NYSDEC Region 8 offices as occurring within streams that cross (or whose tributaries cross) the Facility Site. Therefore, no impacts to special status fish species are anticipated as a result of Facility construction or operation. Please see 1001.23(b)(5) and 1001.23(e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms, respectively.

Impacts to Special Status Amphibians and Reptiles

No special status amphibian or reptile species were identified by NYNHP as occurring within the Facility Site. However, based on the New York State Amphibian and Reptile Atlas Project (NYS Herp Atlas) database, one special concern reptile species and two special concern amphibian species and one could potentially occur in the Facility Site. None of these species were observed during on-site surveys. The wood turtle is a SGCN-HP species of special concern found along fast-flowing streams bordered by woodlands and could occur in the Facility Site. If present, direct mortality through Facility construction will be limited for this species, because tree clearing will take place between November 1 and April 1 when the species is dormant for the winter and will seldom occur along riparian areas. Please see 1001.23(b)(5) and 1001.23(e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms, respectively. Two salamander species of special concern (eastern longtail salamander and Jefferson salamander) may occur in the Facility Site based on data from the NYS Herp Atlas (NYSDEC, 2007a). The eastern longtail salamander is usually found along the borders of streams and wetlands. The Jefferson salamander is found in damp forested areas and breeds in fishless ponds and vernal pools. Impacts to these salamander species could occur in areas that might be disturbed during construction. However, impacts to populations of these salamander species will be minimized by avoiding vernal pools and areas of forest adjacent to wetlands to the extent practicable. Wetland impacts in the Facility Site are expected to be extremely minimal and are described further in 1001.22(m). Please see 1001.22(d)(5) for additional detail on vernal pools, 1001.22(n) for additional detail on avoidance and minimization measures for impacts to wetlands, and 1001.23(b)(5) for additional detail on avoidance and minimization measures for impacts to surface waters.

Impacts to Special Status Invertebrates

No special status invertebrates were identified by NYNHP as occurring within the Facility Site. In addition, NYSDEC Region 8 offices did not identify any special status invertebrates as occurring within streams that cross (or whose tributaries cross) the Facility Site. Therefore, no impacts to special status invertebrate species are anticipated as a result of Facility construction or operation. Please see 1001.23(b)(5) and 1001.23(e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms, respectively.

(5) Take Estimate, Net Conservation Benefit, and Adaptive Management

Take Estimate

As previously mentioned, a pre-construction bat acoustic monitoring survey from June 1 to September 30, 2015 was conducted to document bat activity patterns at the Facility Site. Members of the *Myotis* genus, although not identified to species, made up <1% (3) of the total recorded bat passes (835) over 244 detector nights during pre-construction acoustic monitoring. Positioned on the meteorological tower at 3 meters above ground level, the Low Tower detector recorded the 3 *Myotis* calls on July 23, 30, and 31. No *Myotis* were recorded at the acoustic detector positioned 45 meters above ground level.

The NYSDEC provides records of northern long-eared bat (NLEB) occurrences at the town-level, but does not provide dates for the records. The nearest known winter occurrence of NLEBs is within 30 miles of the Facility in the Town of Portage in southwestern Livingston County. Confirmed summer occurrences include three townships in southeastern Steuben County, the Towns of Tuscarora, Lindley, and Caton, which are within 30 miles of the Facility. The NYSDEC asserts that the entire state is occupied NLEB habitat during the fall migration period (July 1 to October 1). Based on pre-construction surveys and known occurrences of NLEB, while it is possible that NLEB could pass through the area during fall migration, they are expected to occur in the rotor zone infrequently based on their tendency to fly close to ground and within the forest canopy. [redacted]. This practice is expected to further reduce the already low risk to NLEB to the point that a mortality would be extremely unlikely. The Applicant notes that no NLEB fatalities have been documented at any wind project in New York or the northeast that was implementing curtailment below manufacturer's cut-in speed or an increased cut-in speed. While the Applicant strongly disagrees with the NYSDEC's assertion that the entire state is occupied NLEB habitat during fall migration, the Applicant requested that Stantec estimate the number of NLEB that could be incidentally taken at the Facility during its operation assuming there is presence of NLEB during the fall migration period, and taking into account the proposed curtailment plan. The Applicant believes that based on 1) the extremely low numbers of myotis detected during pre-construction bat surveys including no myotis detected at acoustic monitor heights above 3 meters, 2) one reported incident of NLEB fatality in or about 2010 documented at a nearby wind project based on post-construction monitoring (and no NLEB fatalities at projects implementing curtailment), 3) the anticipated effectiveness of the proposed curtailment plan, and 4) the proposed adaptive management plan, that impacts to NLEB have been fully minimized, if not completely avoided, to the maximum extent practical and additional curtailment is unwarranted.

The methodology, assumptions, and results of take estimate conducted for the Facility is included in the Northern Long-Eared Bat Take Estimate memorandum, which is included as Appendix XX.

Net Conservation Benefit Plan

Due to the possibility that NLEB could pass through the area during fall migration, even though the risk of take is considered extremely low, the Applicant has agreed that NYSDEC's Endangered and Threatened Species Regulations (6 New York Codes, Rules and Regulations [NYCRR] 182; ECL §11-0535) apply to the Facility, and that but for Article 10 the Applicant would apply for an incidental take permit from NYSDEC. Therefore, the Applicant has prepared a net conservation benefit plan in accordance with NYSDEC incidental take permit standards to mitigate for potential incidental NLEB take that could occur as a result of operation of the Facility.

Pursuant to NYSDEC's Endangered and Threatened Species Regulations (6 NYCRR 182; ECL §11-0535), before an incidental take permit is issued the Applicant must submit an endangered and threatened species mitigation plan which will result in a net conservation benefit to the species in question. Part 182 defines a net conservation benefit to mean a successful enhancement of the species' subject population, successful enhancement of the species' overall population or a contribution to the recovery of the species within New York. To be classified as a net conservation benefit, the enhancement or contribution must benefit the affected species listed as endangered or threatened or its habitat to a greater degree than if the Applicant's proposed activity were not undertaken. In summary, a proposed mitigation measure either reduces the impact of an existing threat to the species or proactively increases the productivity or abundance of the species, often through the protection or enhancement of suitable and known occupied habitat.

The mitigation will be finalized in collaboration with the NYSDEC, and is expected to include one or more of the following:

- gating of known hibernacula,
- protection of known roosts by conservation easement,
- providing funds for white-nose syndrome treatment if developed, and/or
- protecting summer habitat. The timing of mitigation will be determined collaboratively with NYSDEC.

The Applicant's proposed net conservation benefit plan is included as Appendix YY.

Adaptive Management

The Applicant has developed a plan to adaptively manage potential impacts to NLEB and provide a structured framework to make decisions regarding minimization measures implemented for NLEB. The plan establishes management triggers based on results of post-construction monitoring, outlines a process by which minimization measures can be adjusted, and describes additional monitoring effort necessary to determine the effectiveness of management actions.

The Applicant's proposed adaptive management plan is included as Appendix ZZ.

(g) Measures to Avoid or Mitigate Impacts to Vegetation, Wildlife and Wildlife Habitat

With respect to measures to avoid or mitigate impacts to plant communities (including vegetation), please see 1001.22(c) above. With respect to measures to minimize and mitigation impacts to NLEB, please see 1001.22(f)(5) above.

With respect to wildlife and wildlife habitat, construction-related impacts to fish and wildlife should be limited to incidental injury and mortality due to construction activity and vehicular movement, construction-related silt and sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth moving activities, and displacement due to increased noise and human activities. Mitigation of impacts related to construction activity will be accomplished through careful site design (e.g., utilizing existing roads, avoiding sensitive habitat, and minimizing disturbance to the extent practicable), adherence to designated construction limits, and avoidance of off-limit sensitive areas. In order to reduce impacts to birds and bats, the Applicant plans to conduct tree clearing between November 1 and April 1, when these wildlife species are not nesting or roosting in tree canopies. Please see the Bird and Bat Conservation Strategy (BBCS) outline in Appendix WW, which includes this and other measures that the Facility will take to avoid, minimize, and mitigate for impacts to birds and bats.

To avoid and minimize impacts to aquatic resources resulting from construction-related siltation and sedimentation, an approved sediment and erosion control plan and SWPPP will be implemented. The sediment and erosion control plan and Preliminary SWPPP are described in 1001.23(c)(1), and the Preliminary SWPPP is attached as Appendix II. Proper implementation of these plans will assure compliance with NYSDEC SPDES regulations and New York State Water Quality Standards. In addition, a Preliminary Spill Prevention, Containment and Counter Measures (SPCC) Plan has been developed and will be implemented to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Facility construction and operation, which is included as Appendix FFF (see Exhibit 23 for additional information).

Mitigation for impacts related to permanent habitat loss and forest fragmentation will be accomplished through careful site design. Facility access roads and collection lines have been sited along the edges of agricultural fields and forests, in order to minimize impacts to, and fragmentation of, both of these habitat types. Cleared forest land along Facility access roads and at the periphery of turbine sites will be allowed to grow back and reestablish forest habitat in areas where it was cleared, which over the long term will provide shrubland or forested habitat for species that require these types.

The Facility has been designed to minimize bird and bat collision mortality (see BBCS in Appendix WW). In an effort to reduce avian and bat impacts, electrical collection lines between the turbines will generally be buried to the maximum extent practicable. Lighting of the turbines (and other infrastructure) will be minimized to the extent allowed by the Federal Aviation Administration (FAA), and will follow specific design guidelines to reduce collision risk (e.g., using blinking lights with the longest permissible off cycle). The use of guy wires will be minimized, which have been shown to increase collision mortality, will not be used (Longcore et. al, 2008). In addition to Facility design features, the bat curtailment plan described above will reduce risk to all bat species including migratory bats, and the adaptive management plan will provide a framework to address any unforeseen impacts to birds and bats once the Facility becomes operational.

(h) Avian and Bat Impact Analysis and Monitoring Program:

(1) Avian and Bat Impacts

As previously mentioned numerous pre-construction avian and bat studies have been conducted, which were based on the July 2013 *Work Plan for Pre-Construction Avian and Bat Surveys.* Copies of all reports prepared in accordance with this work plan were provided to NYSDEC personnel in April 2015, and these reports are appended to this Article 10 Application. Full detail on methodology and results of these studies is provided in 1001.22(d). A comprehensive analysis of construction and operation-related impacts to birds and bats, as well as their habitats, as a result of the Facility is provided in 1001.22(f).

Cumulative Impacts

Stantec conducted a stand-alone cumulative effects analysis, which focuses on cumulative effects associated with collision mortality of birds and bats from the proposed Facility in light of current and projected wind energy development within Steuben County and New York State. For the temporal scope, Stantec assumed a 30-year operational life of the Facility, with operation beginning at the end of year 2020. Further, Stantec assumed the Applicant will implement turbine operations strategy during these periods:

- [redacted]
- [redacted]

Outside of these specific timeframes, turbines will operate at the manufacturer's rated cut-in speed with no feathering. To inform predictions, the analysis used mortality estimates from post-construction studies conducted in New York that are publicly available.

For decades, researchers have studied and estimated bird mortality from several sources, such as collision with man-made structures, legal hunting, and domestic cat depredation. In addition, turbines spinning or stationary in the air can pose a collision risk for birds. For bats, the emergence of wind energy development over the past decade has introduced a new source of mortality, particularly for the migratory tree-roosting bats. Post construction monitoring data, the primary source of knowledge about bat mortality, and the rapid expansion of wind development has raised concerns for the potential for substantial cumulative impacts to bats from turbine mortality. Carcasses of cave-dwelling bats are not detected as frequently as migratory tree-roosting bats. However, this mortality is adding cumulative impacts on cave-dwelling species in the wake of white-nose syndrome (WNS). In addition to mortality at wind energy facilities, Stantec's cumulative effects analysis also considers impacts associated with other mortality sources for birds and WNS for bats.

Bird mortality at wind energy facilities contributes to overall mortality. Compared to other anthropogenic sources of avian mortality, the effect at wind energy facilities is minor (see Table 1 of the Cumulative Effects Analysis included as Appendix AAA).

The proposed Facility is not expected to cause naturally occurring populations of common or rare birds to be reduced to numbers below levels for maintaining viability at local or regional levels. Resulting bird mortality will contribute cumulatively to other causes of mortality, specifically other wind energy facilities and other anthropogenic sources. Less than 1% of all anthropogenic bird mortality is attributed to wind energy facilities. Mortality at wind energy facilities in Steuben County or New York State is not likely to result in population-level impacts to any species of bird.

The Applicant acknowledges that bat mortality at wind energy facilities contributes to overall bat mortality, and the Facility's resulting bat mortality will contribute cumulatively to other wind facility mortality. Compared to the effects of WNS, cave-dwelling bat mortality from wind energy facilities is minor. However, unlike cave-dwelling bats where

mortality from wind energy facilities is low as compared with other sources, wind energy facilities kill more migratory tree-roosting bats than any other known documented source.

By 2050, wind facilities in Steuben County and New York State are predicted to result in >91,000 and >630,000 bat fatalities, respectively, most of these being migratory tree-roosting bats (~78%). However, it is difficult to characterize cumulative impacts to bats because estimates of current population sizes are unknown for bat species most susceptible to turbine collision. The cumulative impact assessment concludes that the Facility will represent a small percentage of overall bat mortality in New York State from wind project development. In addition, the Facility has been sited in a location that is not known for a high or unusual incidence of bat activity. Thus, overall, it is not expected that this Facility will result in a significant contribution to cumulative bat impacts in New York. Moreover, because the Applicant has proposed a curtailment plan to minimize impacts as well as an adaptive management strategy, impacts have been avoided or minimized to the maximum extent practicable. The Applicant's proposed plans will result in at least 50% lower than mortality compared with those wind facilities that are operating with no turbine adjustments during the fall migration season.

Please see Appendix AAA for the complete cumulative effects analysis.

(2) Avian and Bat Post-Construction Monitoring

A Post-Construction Monitoring program that will assess the direct and indirect impacts of the Facility on bird and bat species will be developed. Post-construction monitoring will include: standard carcass searches of selected turbines; searcher efficiency trials to determine percentage of carcasses found by searchers; carcass removal trials to estimate the length of time that a carcass remained in the field for possible detection; adjusted fatality estimates for birds and bats based on the results of searcher efficiency trials and carcass removal trials to estimate bird and bat mortality within the Facility Site; acoustic bat surveys to determine the relationship between bat activity data and bat fatalities; and breeding bird avoidance and habituation surveys to assess the species composition and relative of abundance of birds along a gradient from turbines, and between Facility areas and reference areas. The post-construction monitoring program, including specifics on study duration, search frequency, search areas, number and location of turbines to be searched, concurrent data collection and analysis, and carcass collection, will be developed in consultation with the NYSDEC and USFWS. The details of the monitoring program will follow NYSDEC's June 2016 *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects*, for standard post-construction studies. The post-construction monitoring will be conducted for at least 2 years but no more than 3 years.

Specific to NLEB monitoring and adaptive management, please see 1001.22(f)(5) above.

(3) Avian and Bat Impact Avoidance and Mitigation Plan

The Applicant is developing a BBCS which will outline measures to avoid, minimize, and mitigate impacts to avian and bat species (an outline is included in Appendix WW). Specifically, the BBCS will outline the pre-construction monitoring surveys that have already been completed, in accordance with Tiers 1-3 of the USFWS *Land-Based Wind Energy Guidelines* (USFWS, 2012). The BBCS will also include a discussion of impact avoidance and minimization measures that will be taken to reduce impacts to birds and bats. In order to reduce bird and bat mortality during nesting and roosting, the Applicant plans to conduct tree clearing between October 1 and May 1. The BBCS will further describe post construction monitoring, which will be in accordance with Tier 4 of the *Wind Energy Guidelines* and NYSDEC *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (NYSDEC, 2009). The BBCS will also describe how impact avoidance/minimization measures may be adjusted if determined to be necessary based on the results of future studies, and what mitigation will be considered should unexpected impacts to birds and bats occur. Finally, the BBCS will include a section devoted to eagle conservation, which will include information on pre-construction eagle surveys, eagle-specific avoidance and minimization measures, post-construction monitoring for eagles, ongoing eagle risk assessment, and adaptive management measures that could be taken should unexpected impacts to eagles arise.

Specific to NLEB avoidance and mitigation, please see 1001.22(f)(5) above.

(i) Map Showing Delineated Wetland Boundaries

Wetland delineations within the Facility Site were conducted within a 200-foot wide corridor centered on linear Facility components (e.g., access roads, buried electrical interconnect, overhead transmission line), and within a 200-foot radius of turbines and other components such as permanent meteorological towers, operations and maintenance (O&M) building, and substation. This area in which delineations took place is referred to as the Delineation Study Area throughout this Exhibit. Wetland delineations were conducted by EDR personnel during the fall of 2016 and spring/summer of 2017, in accordance with the three-parameter methodology described in the U.S. Army Corps of Engineers (Corps) *Wetland Delineation Manual* (Environmental Laboratory, 1987), and further described by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North Central and Northeastern Region* (USACE, 2012). Wetland boundaries were defined in the field by sequentially numbered pink surveyor's flagging marked "wetland delineation", the locations of which were documented using Global Positioning System (GPS)

technology with sub-meter accuracy. Wetlands identified by these methods are referred to as delineated wetlands throughout this Exhibit.

In order to define boundaries out to 500 feet from Facility components, EDR personnel used interpretation of aerial imagery signatures, on-site observations, analysis of topography, and existing data bases of wetland mapping maintained by National Wetland Inventory (NWI) and NYSDEC. Wetlands identified in this way are referred to as approximate wetlands throughout this Exhibit. All delineated and approximate wetlands described here are depicted in Figure 22-2.

(j) Description of Wetlands

Forested wetland (PFO) – Of the delineated wetlands within the Delineation Study Area, 13 contained forested wetland communities. These communities are dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbaceous species. Forest wetlands in the Study Area are dominated by red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*) in the overstory, along with American hornbeam (*Carpinus caroliniana*), and occasional yellow birch (*Betula alleghaniensis*). Understory vegetation includes saplings of the above-mentioned species and occasionally shrub species such as spice bush (*Lindera benzoin*) and Morrow's honeysuckle (*Lonicera morrowii*). Herbaceous species in the forested wetlands include sedges (*Carex* spp.), sensitive fern (*Onoclea sensibilis*), horsetail species (*Equisetum spp*.), and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in these wetlands at the time of delineation included soil saturation, oxidized rhizospheres on living roots, geomorphic position, drainage patterns, and sparsely vegetated concave surfaces.

Scrub-shrub wetlands (PSS) – 11 wetland features delineated within the Delineation Study Area contained scrub-shrub vegetation. Scrub-shrub wetlands are characterized by dense stands of shrub species and small trees less than 20 feet tall. Plant species typically encountered in the scrub-shrub wetlands delineated within the Study Area include willows (*Salix spp*.), speckled alder (*Alnus incana*), meadowsweet (*Spiraea alba*) silky dogwood (*Cornus amomum*), red osier dogwood (*Cornus sericea*), and gray dogwood (*Cornus racemosa*). Herbaceous vegetation in these areas includes sensitive fern, common boneset (*Eupatorium perfoliatum*), sedges, and New England aster (*Symphyotrichum novae-angliae*). Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as hydrogen sulfide odors, water-stained leaves, and sparsely vegetated concave surfaces. Hydric soil indicators included depleted soils with low chroma (2 or less) and prominent redox concentrations.

Emergent wetlands (PEM) – This community type characterizes the majority of the wetlands found within the Delineation Study Area. A total of 28 delineated areas contained emergent wetland communities. These wetland

areas are dominated by herbaceous vegetation including common rush (*Juncus effusus*), spotted jewelweed, rice cutgrass (*Leersia oryzoides*), fringed willow herb (*Epilobium ciliatum*), and numerous sedge species. Evidence of wetland soils included low chroma matrix with dark brown to black colors (10YR 2/2) and high chroma mottles (7.5YR 4/6) throughout the matrices with prominent redox concentrations. Wetland hydrology indicators found within these areas at the time of delineation included standing surface water, high water table, soil saturation, drainage patterns, oxidized rhizospheres on living roots and the presence of reduced iron.

Open Water (OW) – four open water areas were delineated in the Delineation Study Area. Most of these open water features were either small farm ponds or man-made impoundments typically found in farm settings, adjacent to housed and barns or within wetlands. These ponds occurred in a variety of settings, including open fields, scrub-shrub, and forested environments, and typically have well-defined banks and a fringe of emergent wetland vegetation. Although not verified, water depths of such ponds are typically in excess of 3 feet deep.

Streams – A total of 33 streams were delineated within the Delineation Study Area. These streams are mostly located within forests and hedgerows, and generally have a gentle to moderate gradient (0-5%). The majority of the delineated streams appeared to be intermittent channels. Most of the streams are less than 10 feet wide with variable substrates and vegetative cover characteristics. The delineated stream channels are generally characterized by rocky substrate and well-defined, abrupt steep banks, and flow during the wet season (winter to spring). With the exception of Neils Creek, water depths within channels with stream flow averaged 2-12 inches.

(k) Wetland Functional Assessment

A functions and values assessment was conducted following the general methodology described in the *Wetlands Functions and Values: Descriptive Approach* described in the September 1999 supplement to *The Highway Methodology Workbook* (Supplement) by the New England Division of the USACE (USACE, 1995).

Wetland functions are ecosystem properties that result from the biologic, geologic, hydrologic, chemical and/or physical processes that take place within a wetland. These functions include:

1. Groundwater Recharge/Discharge
2. Floodflow Alteration
3. Fish and Shellfish Habitat
4. Sediment/Pollutant Retention
5. Nutrient Removal/Retention/Transformation

6. Production (Nutrient) Export
7. Sediment/Shoreline Stabilization
8. Wildlife Habitat

Wetland values are the perceived benefits for society that can be derived from the ecosystem functions and/or other characteristics of a wetland. Values attributed to wetlands in the Supplement include the following:

1. Recreation
2. Education/Scientific Value
3. Uniqueness/Heritage
4. Visual Quality/Aesthetics
5. Threatened or Endangered Species Habitat

Wetlands functions and values recognized under Article 24 of the Environmental Conservation Law and Regulations are similar to those described in the Supplement, and include:

1. Flood and storm control by the hydrologic absorption and storage capacity of wetlands;
2. Breeding, nesting and feeding habitat for many forms of wildlife, including migratory wildfowl and rare species such as the bald eagle and osprey;
3. Protection of subsurface water resources and recharge of ground water supplies;
4. Recreation by providing areas for hunting, fishing, boating, hiking, bird watching, photography, camping and other uses;
5. Pollution treatment by serving as biological and chemical oxidation basins;
6. Erosion control by serving as filtering basins, absorbing silt and organic matter and protecting channels and harbors;
7. Education and scientific research by providing outdoor bio-physical laboratories, living classrooms and training/education resources;
8. Open space and aesthetic appreciation by providing often the only remaining open areas along crowded river fronts and coastal regions;
9. Sources of nutrients in freshwater food cycles and nursery grounds and sanctuaries for fish.

Based on the "Considerations/Qualifiers" outlined in the Supplement, EDR developed a spreadsheet that includes several basic considerations that help identify the primary functions and values provided by wetlands. These considerations include observed vegetation conditions, hydrologic conditions, size, adjacent area conditions, and the availability of public access. Specific conditions within each of these consideration areas were also defined to allow each wetland's functions and values to be evaluated based on data collected during field delineation. A total of 46 wetlands delineated within the Study Area were entered into the spreadsheet and wetland characteristics identified for

each. Data regarding these wetland characteristics and associated functions and values were collected during the fall of 2016 and spring/summer of 2017.

The spreadsheet containing results of the qualitative assessment is included as Appendix D of the Wetland Delineation Report (Appendix BBB to this Application).

(l) Offsite Wetlands Analysis

As described in 1001.22(i), wetland boundaries within 500 feet of all Facility components were mapped using interpretation of aerial/infrared imagery signatures, on-site observations, analysis of topography, USDA soil survey data, and existing data bases of wetland mapping maintained by NWI and NYSDEC. This mapping was used to inform an analysis of hydrological connections to offsite wetlands, including those that are state mapped wetlands protected by NYSDEC. A total of 87 wetlands and 112 streams within 500 feet of proposed Facility components were identified. The results of the wetland delineation suggest that all delineated wetlands fall under federal jurisdiction, due to visual hydrologic connectivity observed in the field and review of available spatial data. Many of the 87 wetlands identified within 500 feet of Facility components are hydrologically connected to the wetlands identified within the Delineation Study Area, and would be likely be considered federally jurisdictional by USACE. Jurisdiction over federally regulated wetlands will ultimately be determined by the USACE.

(m) Wetland Impacts

During construction, potential direct or indirect impacts to wetlands and surface waters are anticipated to occur as a result of the installation of access roads, the installation of above-ground and buried electrical interconnects, and the development and use of temporary workspaces around the turbine sites. Direct impacts, including clearing of vegetation, earthwork (excavating and grading activities), and the direct placement of fill in wetlands and surface waters, are typically associated with the development of access roads and workspaces around turbines. Specific to the proposed Facility, the construction of access roads is anticipated to result in both permanent (loss of wetland/surface water acreage) and temporary impacts to wetlands. However, the development and use of temporary turbine workspaces will not result in any impacts to wetlands (see Exhibit 23 for a detailed discussion of impacts to streams). The installation of overhead and buried collection lines will temporarily disturb wetlands during construction as a result of clearing (brushhogging, or similar clearing method requiring no removal of rooted woody plants), and soil disturbance from burial of the electrical collection lines or from pole installation along the overhead collection line. Indirect impacts to wetlands and surface waters may result from sedimentation and erosion caused by adjacent construction activities (e.g., removal of vegetation and soil disturbance). This indirect impact may also occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated.

Based on the limits of disturbance as determined through preparation of the preliminary design drawings, construction of the Facility is anticipated to result in a total of 0.42 acre of wetland impact. Of this impact, 0.32 acre will be impacted only temporarily, while 0.10 acre will be permanently impacts. All impacts are depicted on the Wetland and Stream Impact Drawings (Appendix CCC). Temporary and permanent impacts to each wetland are also presented below in Table 22-8.

Table 22-8. Wetland Impacts

Wetland Delineation ID	Wetland Type (1)	Temporary Wetland Impact (square feet)	Permanent Wetland Impact (square feet)	Temporary Regulated Adjacent Area Impact (square feet) (2)	Facilities Crossing Resource (3)	Crossing/Avoidance Methodology	Permanent Wetland Forest Conversion (square feet)	Permanent Regulated Adjacent Area Forest Conversion (square feet)
V	PEM/PSS	851	2,295	--	BI, AR			
4N	PEM	215	--	--	BI	Trench		
S	PFO	1,264	221	--	BI, AR		1,760	
3C	OW	1,436	--	--	BI	Trench		
3H	PFO	--	--	--	BI	HDD		
3J	PEM	400	--	--	BI	Trench		
4S	PSS/PFO	--	--	--	BI	HDD		
3D	PEM	66	851	--	BI, AR			
ZZ	PEM	223	--	--	BI	Trench		
XX	PFO/PEM	--	--	--	BI	HDD		
3X	PFO	--	--	--	AR		16	
4P	PEM	1,910	1,152					
II	PEM	6	--	--	BI, AR			
HH	PEM	79	--	--	BI, AR			
E	PEM	--	--	--	OI	Mat and span, span and drive around, or avoid		
C	PEM/PSS	--	--	--	OI	Mat and span, span and drive around, or avoid		
B	PEM	--	--	--	OI	Mat and span, span and drive around, or avoid		

Wetland Delineation ID	Wetland Type (1)	Temporary Wetland Impact (square feet)	Permanent Wetland Impact (square feet)	Temporary Regulated Adjacent Area Impact (square feet) (2)	Facilities Crossing Resource (3)	Crossing/Avoidance Methodology	Permanent Wetland Forest Conversion (square feet)	Permanent Regulated Adjacent Area Forest Conversion (square feet)
NYSDEC Wetland HK-3 (3Z)	PEM/PSS	741	--	2,143	OI			37,393
4E	PSS/PFO	--	--	--	OI	Mat and span, span and drive around, or avoid		
Y	PEM	6,293	--	--	BI	Trench		
4L	PFO/PEM	--	--	--	BI	HDD		
4R	PEM/PSS/PFO	446	--	--	BI	HDD		
Totals		13,930 sf (0.32 acre)	4,519 sf (0.10 acre)	2,143 sf (0.05 acre)			1,776 sf (0.04 acre)	37,393 sf (0.86 acre)

(1) PEM = palustrine emergent marsh, PSS = palustrine scrub shrub, PFO = palustrine forested, WM = wet meadow, OW = open water, R3 = riverine perennial, R4 = riverine intermittent, RE = riverine ephemeral

(2) Permanent impacts to NYSDEC regulated wetlands and adjacent areas are associated with OI structures only, and are anticipated to total less than 10 square feet and 20 square feet, respectively.

(3) BI = buried interconnect, OI = overhead interconnect, AR = access road, WT = wind turbine

With respect to impacts to NYSDEC-regulated wetlands, as previously indicated the NYSDEC issued a Freshwater Wetland Determination, which describes the jurisdictional status of delineated wetlands and streams. This determination indicates that only two wetlands (NYSDEC wetlands HK-3 and HK-8) are crossed by Facility components, specifically collection lines. However, subsequent to the NYSDEC jurisdictional site review, one of the collection line routes was relocated; therefore, wetland HK-3 (delineated wetland 3Z) is the only Facility-related wetland that is regulated by the NYSDEC.

It is currently anticipated that wetland HK-3 will be crossed by overhead electrical collection, and the details of this crossing are depicted on Sheet 6.3 of the Wetland and Stream Impact Drawings (see Appendix CCC). This wetland contains emergent (PEM) and scrub shrub (PSS) cover types, and therefore no impacts associated with forest conversion will occur. In addition, the wetland is proposed to be spanned with poles primarily placed outside of the wetland. However, due to a turning point in the overhead line, it is anticipated that this structure and associated guy anchors will be placed immediately outside the wetland, within the 100-foot regulated adjacent area, with the potential for a guy anchor and a portion of the structure to be located just inside the wetland boundary (preliminary engineering indicates that this turning structure will include three poles and three guy anchors, with one of the poles and one of the guy anchors inside the wetland boundary). The construction of this structure is anticipated to result in approximately 741 square feet (0.02 acre) of temporary disturbance to wetland HK-3 and less than 10 square feet (0.0002 acre) of permanent fill due to a portion of the structure/guy anchor, and approximately 2,143 square feet (0.05 acre) of temporary disturbance and less than 20 square feet (0.0005 acre) of permanent fill to the regulated adjacent area due to a portion of the structure/guy anchors. In addition, vegetation clearing within the ROW of the overhead collection line is anticipated to result in approximately 37,393 square feet (0.86 acre) of forest conversion within the regulated adjacent area of wetland HK-3.

Please see the Wetland and Stream Impact Drawings (Appendix CCC) for additional information. Specifically, impacts associated with wetland HK-3 are depicted on Sheet 6.3, and a table quantifying all impacts is included on Sheet G-001.

(n) Measures to Avoid/Mitigate Wetland Impacts

Impact Avoidance and Minimization

Wetland impacts have been minimized substantially due changes in the Facility design. A 120-turbine layout, proposed early in Facility siting, was evaluated at a reconnaissance level for wetland and stream resources. In order to approximate the impacts associated with this early 120-turbine layout, the location of wetlands were estimated based on field noted taken during the reconnaissance level site review, and standard impact assumptions were applied to the

various project components (i.e., 40-foot wide temporary impact for buried collection lines, 75-foot wide temporary impact and 20-foot wide permanent impact for access roads, 200-foot radius temporary impact and 0.2-acre permanent impact for turbines). This analysis resulted in approximately 68 acres of temporary wetland impact and 11.5 acres of permanent wetland impact associated with the initial 120-turbine layout. As a result of the reconnaissance level review, recommendations for removal of certain components, to initially avoid and minimize impacts, were taken into consideration as the Facility layout continued to evolve.

Regarding impact minimization and avoidance specific to the Facility layout set forth herein, the layout was designed, in part, through an iterative process of identifying wetland locations and siting Facility components to avoid and minimize impacts to surface waters and wetlands wherever practicable. The Facility layout presented in this Application achieves this by locating turbines outside of wetlands and by routing access roads and collection lines around wetlands and streams where practicable. Where such avoidance was not practicable (typically where linear wetlands and streams were encountered), narrow and/or previously disturbed portions of the wetlands were chosen for crossing locations. In addition, the Applicant has committed to installing buried interconnect through horizontal direction drill (HDD) technology to further avoid/minimize impacts. Specifically, HDD installation will be used where buried interconnect crosses forested wetlands and NYSDEC-protected streams, and buried interconnect is the only component crossing such features. As indicated in the Wetland and Stream Impact Drawings (Appendix CCC), it is currently anticipated that HDD installation will be used in 11 unique crossing locations, which results in the avoidance of forest clearing/conversion impacts to five different wetlands (delineated wetlands 3H, 4S, XX, 4L, and 4R). Please see Exhibit 23 for additional information on stream impact avoidance.

Indirect impacts to wetlands resulting from construction could include siltation and degradation of downstream water quality. These impacts are not anticipated as a result of this Facility, because the Applicant will take appropriate measures to prevent these impacts. Specific mitigation measures for indirect impacts to wetlands include:

- *No Equipment Access Areas:* Except where crossed by permitted access roads or through non-jurisdictional use of temporary matting, streams will be designated "No Equipment Access," thus prohibiting the use of motorized equipment in these areas.
- *Restricted Activities Area:* A buffer zone of 100 feet, referred to as "Restricted Activities Area", will be established where Facility construction traverses streams, wetlands and other bodies of water. Restrictions will include:
    - No deposition of slash within or adjacent to a waterbody;
    - No accumulation of construction debris within the area;

- Herbicide restrictions within 100 feet of a stream or wetland (or as required per manufacturer's instructions);
- No degradation of stream banks;
- No equipment washing or refueling within the area;
- No storage of any petroleum or chemical material; and
- No disposal of excess concrete or concrete wash water.

- *Sediment and Siltation Control*: A soil erosion and sedimentation control plan will be developed and implemented as part of the SPDES General Permit for the Facility. Silt fences, hay bales, and temporary siltation basins will be installed and maintained throughout Facility construction. Exposed soil will be seeded and/or mulched to assure that erosion and siltation is kept to a minimum along wetland boundaries. Specific control measures are identified in the Facility Preliminary Stormwater Pollution Prevention Plan (SWPPP), and the location of these features will be indicated on construction drawings and reviewed by the contractor and other appropriate parties prior to construction. These features will be inspected on a regular basis to assure that they function properly throughout the period of construction, and until completion of all restoration work.
- *Work Period Restriction for Stream Crossings*: Construction in streams protected under Article 15 will comply with work period restrictions that are established to protect fish spawning and migration. The NYSDEC indicated that all protected streams associated with the Facility are C(T) and as such work period restrictions from October 1 to May 15 would likely apply. However, site-specific consultation with NYSDEC stream biologists may result in less restrictive no-work periods. For example, the Final Environmental Impact Statement (FEIS) for the Arkwright Summit Wind Farm noted that NYSDEC personnel indicated that in-stream work could take place outside of the seasonal work restriction window, as determined on a case-by-case basis (EDR, 2016). Seasonal work period restrictions on in-stream work during Facility Construction will be established in consultation with NYSDEC. All protected streams are associated with electrical collection components of the Facility, and are anticipated to be crossed either by spanning overhead or HDD, so as to reduce impacts to streams and avoid in-stream work.

Please note, a discussion of mitigation measures for impacts to surface waters (including streams) and ground water is provided in Exhibit 23.

Mitigation

Despite avoiding and minimizing wetland impacts where possible, some wetland impacts are unavoidable. Specific to NYSDEC-regulated wetlands, as indicated above it is currently anticipated that there will be less than 10 square feet

(0.0002 acre) of permanent impacts, and only 741 square feet (0.02 acre) of temporary impact to NYSDEC-regulated wetlands (wetland HK-3). Specific to regulated adjacent area impacts, it is anticipated that less than 20 square feet (0.0005 acre) of permanent fill and approximately 2,143 square feet (0.05 acre) of temporary disturbance will occur, while vegetation clearing is anticipated to result in approximately 37,393 square feet (0.86 acre) of forest conversion within NYSDEC-regulated adjacent area (all associated with wetland HK-3). To mitigate for these impacts the Applicant proposes the following:

1. Construction activities associated with installation of the overhead collection structure and guy anchors with the wetland and adjacent area will be conducted on timber mats, and any removal of woody vegetation will not include grubbing of stumps.
2. Any seeding necessary due to bare soils that result from construction activities within the wetland or adjacent area will be accomplished through use of a native seed mix, such as an Ernst Wetland Mix (OBL-FACW Perennial Wetland Mix, OBL Wetland Mix, Specialized Wetland Mix for Shaded OBL-FACW, or similar).
3. The Applicant will install wood duck boxes north of the proposed location of impacts to wetland HK-3 and the adjacent area, likely on the same parcel that the impacts would occur.
4. The Applicant will consult with the NYSDEC to determine the need for any additional habitat improvement within the wetland HK-3 system.

Permanent wetland impacts associated with construction of the Facility will primarily occur in wetlands regulated by the USACE, and total only 4,519 square feet (0.1 acre). The Applicant will work with the USACE to implement appropriate mitigation, as necessary, which is currently anticipated to be accomplished through use of the in-lieu-fee (ILF) program established by The Wetland Trust (TWT). This program, which uses a scientifically based watershed approach, covers 15 services areas in New York (including all of Steuben County) (see http://www.thewetlandtrust.org/ilfp.html for additional information).

Although impacts to all wetlands, and state-regulated wetland adjacent areas, are extremely minimal for a Facility of this size, the Applicant has proposed mitigation measures that allow for construction and operation of the Facility without any adverse impacts to wetlands or state-regulated wetlands adjacent areas.

Environmental Compliance and Monitoring Program

The Applicant is committed to developing and operating the Facility in a safe and environmentally responsible manner. In addition to the mitigation measures described above, an environmental compliance and monitoring program is summarized below The Applicant will provide funding for an independent, third party environmental monitor to oversee

compliance with environmental commitments and permit requirements. The environmental compliance and monitoring program will include the following components:

1. Planning – Prior to the start of construction, the environmental monitor will review all environmental permits and, based upon the conditions/requirements of the permits, prepare an environmental management document (Environmental Compliance Manual) that will be utilized for the duration of the construction and operation of the Facility. This document will distill and clearly present all environmental requirements for construction and restoration included in all Facility permits and approvals, and will be designed to aid in the management of environmental issues and concerns that may arise during construction of the Facility. The Environmental Compliance Manual will include 1) copies of all issued environmental permits and approvals, 2) a compliance matrix that summarizes all relevant permit requirements and identifies the responsible party and time frame (if applicable), and 3) a Facility contact list and organizational chart.

2. Training – The environmental monitor will hold environmental training sessions that will be mandatory for all contractors and subcontractors before they begin working on the site. The purpose of the training sessions will be to distribute the Environmental Compliance Manual, explain the environmental compliance program in detail, prior to the start of construction, and to assure that all personnel on site are aware of the permitting requirements for construction of the Facility.

3. Preconstruction Coordination – Prior to construction, the contractor(s) and the environmental monitor will conduct a walkover of areas to be affected by construction activities. The limits of work areas, especially in and adjacent to sensitive resource areas such as wetlands, will be defined by flagging, staking or fencing prior to construction, as needed. This walkover will identify landowner concerns, sensitive resources, limits of clearing, proposed stream or wetland crossings, and placement of sediment and erosion control features. Specific construction procedures will be discussed amongst the group, and updated to become part of the Facility layout and construction sequence, as needed. The pre-construction site review will serve as a critical means of identifying any required changes in the construction of the Facility early enough in the process to avoid potential delays once construction has begun. Proposed changes to the construction plan will be identified as soon as possible, as changes may require an agency notification period and take time for approval to be received.

4. Construction and Restoration Inspection – The monitoring program will include daily inspection of construction work sites by the environmental monitor. The environmental monitor is the primary individual responsible for overseeing and documenting compliance with environmental permit conditions on the Facility. The

environmental monitor will conduct inspections of all areas requiring environmental compliance during construction activities, with an emphasis on those activities that are occurring within jurisdictional/sensitive areas, including cultural resource areas, wetland and stream crossings, and active agricultural lands. When on-site, the environmental monitor's schedule will include participation in a daily Plan of Day (POD) meeting with the contractors to obtain schedule updates, identify in-field monitoring priorities, and address any observed or anticipated compliance issues. During the course of each visit, multiple operations are likely to be occurring throughout the Facility Site, and will need to be monitored by the environmental monitor. Activities with the potential to impact jurisdictional/sensitive resources, or with greater potential for environmental impact, will receive priority attention from the environmental monitor. For instance, installation of an access road across a protected stream would likely receive greater attention than installation of buried electrical collection lines across a successional old field. However, some level of field inspection by the environmental monitor will occur at all earth-disturbing work sites during each site visit. The monitor will keep a log of daily construction activities, and will issue periodic/regular (typically weekly) reporting and compliance audits. Additionally, when construction is nearing completion in certain portions of the Facility area, the monitor will work with the contractors to create a punch list of areas in need of restoration in accordance with all issued permits.

Specific to agricultural land impacted by the Facility, the Applicant will provide a monitoring and remediation period of no less than two years immediately following the completion of initial restoration. The two-year period will allow for the effects of climatic cycles such as frost action, precipitation, and growing seasons to occur, from which various monitoring determinations can be made. The monitoring and remediation phase will be used to identify any remaining agricultural impacts associated with construction that are in need of mitigation and to implement the follow-up restoration. Impacts will be identified by the environmental monitor through on-site monitoring of all agricultural areas impacted by construction and through contact with respective farmland operators and New York State Department of Agriculture and Markets (NYSDAM). If the NYSDAM agrees that the environmental monitor is qualified on agricultural issues, one monitor will act as both the environmental and agricultural monitor. Please see 1001.22(q) below for information on agricultural impacts.

(o) State and Federal Endangered or Threatened Species

Please see the discussion of state and federal threatened and endangered species documented within or adjacent to the Facility Site, along with potential impacts and mitigation for such species, in 1001.22(f). Discussion of mitigation for wildlife and wildlife habitat is provided in 1001.22(g). These measures will mitigate impacts to threatened and endangered species, even though it is not specific to such species. Discussion of the BBCS for the Facility is provided

in 1001.22(h)(3); measures described in this plan will mitigate impacts to threatened and endangered avian and bat species within the Facility Site. Specific to NLEB avoidance and mitigation, please see 1001.22(f)(5).

(p) Invasive Species Prevention and Management Plan

Please see (b) above for a description of the Invasive Species Control Plan (ISCP) to be prepared.

(q) Agricultural Impacts

Agricultural land was documented within the Facility Site in the same manner that other vegetation community types were identified. Please see 1001.22(a) for a discussion of vegetative community mapping methodology. Agricultural lands in the Facility site consist of field crops (e.g., hayfields and greenchop), row crops (planted mostly in corn), and pastureland (mostly grazing for dairy cattle).

The Facility layout has been designed to avoid impacts to active agricultural lands to the extent practicable. Access roads have been sited along the edges of fields and forests in order to minimize impacts to both. Proposed access roads have been sited along existing access roads to the extent practicable. However, some impacts to agricultural lands are unavoidable. Construction of the Facility will result in disturbance of up to approximately 221.5 acres of agricultural vegetation, of which approximately 133.3 acres will be restored following construction. Up to approximately 88.2 acres will be permanently lost to built facilities for the operational life of the Facility.

Mitigation measures to protect and restore any agricultural soils within the Facility Site will be undertaken during and after construction, and will include restoration of temporarily disturbed agricultural land according to the *New York Department of Agriculture and Markets Guidelines for Agricultural Mitigation for Windpower Projects* (see Appendix E). For example, topsoil will not be stripped during saturated conditions when such actions would damage agricultural soils. Existing farm roads will be used for temporary access to farmland to the extent practicable. However, if temporary roads in new locations are necessary, topsoil in the work area will be stripped and stockpiled alongside the area of disturbance, (topsoil will be kept separate from subsoil), on the property from which it was removed. All vehicular movements and construction activity will be restricted to areas where topsoil has been removed. All temporarily disturbed agricultural soils will be restored following construction. This process will generally involve the following sequence of activities:

1. Removal of gravel or other temporary fill.
2. Decompaction of compacted subsoils to a depth of 18 inches using a deep ripper or heavy duty chisel plow.
3. Disking and removal of stones (four inches and larger in size) from decompacted subsoil.

4. Spreading of stockpiled topsoil over the decompacted subsoil, and reestablishing pre-construction contours to the extent practicable.
5. Disking and removal of stones (four inches and larger in size) following the spreading of topsoil.
6. Seeding and mulching topsoil. Seed selection in agricultural fields will be based on guidance provided by the landowner and NYSDAM personnel.

Please also note that based on recent consultation with NYSDAM personnel, complete adherence to the *Guidelines for Agricultural Mitigation for Windpower Projects* is not necessarily required in all locations. As discussed with NYSDAM personnel, the Applicant and/or Environmental Monitor will consult with NYSDAM during construction when deviation from the *Guidelines* is necessary.

Soil impacts occurring during the construction of the Facility will also be minimized by providing the contractor and all subcontractors copies of the final construction documentation and erosion and sediment control plans, which will contain all applicable soil protection, erosion control, and soil restoration measures. During construction, the Environmental Monitor will assure compliance with the construction plans/documentation and soil protection measures described above.

REFERENCES

Aldridge, H.D.J.N, and I.L. Rautenbach. 1987. *Morphology, Echolocation and Resource Partitioning in Insectivorous Bats*. The Journal of Animal Ecology 56(3): 763–778.

Broders, H.G., and G.J. Forbes. 2004. *Interspecific and Intersexual Variation in Roost-Site Selection of Northern Long-Eared and Little Brown Bats in the Greater Fundy National Park Ecosystem*. Journal of Wildlife Management 68: 602-610.

Cornell University. 2015. *Cornell Lab of Ornithology: All About Birds*. Available at: https://www.allaboutbirds.org. (Accessed January 2016).

Donovan, T M., and C.H. Flather. 2002. *Relationships among North American Songbird Trends, Habitat Fragmentation, and Landscape Occupancy*. Ecological Applications 12:364-374.

Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State*. Second Edition: A Revised and Expanded Edition of Carol Reschke's *Ecological Communities of New York State* (1990). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual.* Technical Report Y-87-1. U.S. Army Corps of Engineers: Waterways Experiment Station; Vicksburg, MS.

Fenton, M.B. 1990. *The Foraging Behavior and Ecology of Animal-Eating Bats*. Canadian Journal of Zoology 68: 411–422.

Freemark, K.E., and B. Collins. 1992. Landscape Ecology of Birds Breeding in Temperate Forest Fragments. Pages 443 – 454 in Ecology and conservation of Neotropical migrant landbirds. J.M. Hagan III and D.W. Johnston, Eds. Smithsonian Institution Press, Washington, D.C.

Garvin, J.C., C.S. Jennelle, D. Drake, and S.M. Grodsky. 2011. *Response of Raptors to a Windfarm*. Journal of Applied Ecology 48:199-209.

Henderson, L.E., L.J. Farrow, and H.G. Broders. 2008. *Intra-Specific Effects of Forest Loss on the Distribution of the Forest-Dependent Northern Long-Eared Bat (*Myotis septentrionalis*)*. Biological Conservation 141: 1819–1828.

Herkert, D.L. 1994. *The Effects of Habitat Fragmentation on Mid-western Grassland Bird Communities*. Ecological Applications. 4(3):461-471.

Herkert, D.L., D.L. Reinking, D.A. Weidenfeld, M. Winter, J.L. Zimmerman, W.E. Jensen, E.J. Finck, R.R. Koford, D.H. Wolfe, S.K. Sherrod, M.A. Jenkins, J. Faaborg, and S.K. Robinson. 2003. *Effect of Prairie Fragmentation of the Nest Success of Breeding Birds in the Midcontinental United States.* Conservation Biology. 17(2): 587-594.

Herkert, J.R. 2003. *Effects of management practices on grassland birds: Henslow's Sparrow.* Northern Prairie Wildlife Research Center, Jamestown, ND. Northern Prairie Wildlife Research Center Online. Available at: http://www.npwrc.usgs.gov/resource/literatr/grasbird/hesp/hesp.htm. (Version 12DEC2003). Accessed November 2013.

Jacobson, S.L. 2005. *Mitigation Measures for Highway-caused Impacts to Birds.* USDA Forest Service Gen. Tech. Rep. http://www.fs.fed.us/psw/publications/documents/psw_gtr191/psw_gtr191_1043-1050_jacobson.pdf.

Johnson, G. D., W. P. Erickson, M. D. Strickland, M. F. Shepherd, and D. A. Shepherd. 2000. *Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year Study.* Technical report prepared for Norther States Power Co., Minneapolis, Minnesota.

Johnson, D.H. 2001. *Habitat Fragmentation Effects on Birds in Grasslands and Wetlands: a Critique of our Knowledge.* Great Plains Research. 11:211-231.

Kerlinger, P. 2002. *An Assessment of the Impacts of Green Mountain Power Corporation's Wind Power Facility on Breeding and Migrating Birds in Searsburg, Vermont*. Report to National Renewable Energy Laboratory, U.S. Department of Energy. Golden, CO.

Kerlinger, P., and J. Guarnaccia. 2007. *Phase I Avian Risk Assessment Roaring Brook Wind Power Project, Lewis County, NY.* Prepared for PPM Energy. July 2007.

Kerlinger, P., and J. Guarnaccia. 2009. *Breeding Bird Survey – 2009 Noble Bliss Windpark, Wyoming County, New York*. Prepared for Noble Environmental Power, LLC. Prepared by Curry & Kerlinger, LLC, Cape May Point, NJ.

Kerlinger, P., and J. Guarnaccia. 2010. *Grassland Nesting Bird Displacement Study – 2010, Noble Wethersfield Windpark, Wyoming County, New York*. Prepared for Noble Environmental Power, LLC. Prepared by Curry & Kerlinger, LLC, Cape May Point, NJ.

Koford, R., A. Jain, G. Zenner, and A. Hancock. 2005. *Avian Mortality Associated With the Top of Iowa Wind Farm*. Iowa Cooperative Fish & Wildlife Research Unit, Iowa State University. Ames, IA.

Krusic, R.A., M. Yamasaki, C.D. Neefus, and P.J. Pekins. 1996. *Bat habitat use in the White Mountain National Forest*. Journal of Wildlife Management 60(3): 625–631.

Lampila, P., M. Monkkonen, and A. Desrochers. 2005. Demographic Responses by Birds to Forest Fragmentation. Conservation Biology 19:1537–1546.

LandOwner Resource Centre with Support from Ontario Ministry of Natural Resources. 2000. *Conserving the Forest Interior: A Threatened Wildlife Habitat*. http://www.lrconline.com/Extension_Notes_English/pdf/forInterior.pdf.

Leddy, K., K. Higgins, and D. Naugle. 1999. *Effects of Wind Turbines on Upland Nesting Birds in Conservation Reserve Program Grasslands*. Wilson Bulletin 111:100-104.

Lesiński, G., M. Kowalski, B. Wojtowicz, J. Gulatowska, and A. Lisowska. 2007. *Bats on Forest Islands of Different Size in an Agricultural Landscape*. Folia Zoologica 56(2): 153–161.

Longcore T., C. Rich, and S.A. Gauthreaux Jr. 2008. *Height, Guy Wires, and Steady-Burning Lights Increase Hazard of Communication Towers to Nocturnal Migrants: A Review and Meta-Analysis*. Auk 125 (2):485-492.

Medelin, R.E., M.B. Connior, K.F. Gaines, and T.S. Risch. 2010. *Responses of Bats to Forest Fragmentation in the Mississippi River Alluvial Valley, Arkansas, USA*. Diversity 2: 1146–1157.

McGowan, K.J., and K.J. Corwin. 2008. *The Second Atlas of Breeding Birds in New York State*. Cornell University Press, Ithaca, NY.

Miller, S. 2017. [Personal Communication]. Biologist (Ecology), Bureau of Habitat, Region 8, New York State Department of Environmental Conservation. Electronic mail correspondence with B. Brazell of EDR on October 11, 2017.

National Audubon Society. 2016. *The Christmas Bird Count Historical Results [Online].* Available at http://www.christmasbirdcount.org. (Accessed February 2016).

National Research Council. 2007. *Environmental Impacts of Wind-Energy Projects*. Prepared by the Committee on Environmental Impacts of Wind Energy Projects.

New York Natural Heritage Program (NYNHP). 2017. *Online Conservation Guide for Vernal Pool*. Available at: http://www.acris.nynhp.org/guide.php?id=9902 (Accessed August 2017).

New York State Department of Environmental Conservation (NYSDEC). 2007a. *New York State Amphibian and Reptile Atlas Data*. Bureau of Wildlife, Albany NY. November 20, 2007.

NYSDEC. 2007b. *New York State Breeding Bird Atlas 2000 [Internet]. 2000 - 2005*. Release 1.0. Albany, New York. Updated June 11, 2007. Available at: http://www.dec.ny.gov/animals/7312.html. (Accessed February 2016).

NYSDEC. 2009. *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects*. Division of Fish, Wildlife, and Marine Resources. August 2009.

NYSDEC. 2014. *6 NYCRR Part 575 Prohibited and Regulated Invasive Species*. Division of Lands and Forests. September 10, 2014. Available at: http://www.dec.ny.gov/docs/lands_forests_pdf/islist.pdf (Accessed August 2017).

NYSDEC. 2017a. *Emerald Ash Borer (EAB) Restricted Zone.* Bureau of Invasive Species and Ecosystem Health. May 2017. Available at: http://www.dec.ny.gov/docs/lands_forests_pdf/eabquarmaps.pdf (Accessed August 2017).

NYSDEC. 2017b. *New York Natural Heritage Program*. Division of Fish, Wildlife, and Marine Resources. Available at: http://www.dec.ny.gov/animals/29338.html (Accessed August 2017).

NYSDEC. 2017c. *List of Endangered, Threatened, and Special Concern Fish and Wildlife Species of New York State.* Available at: http://www.dec.ny.gov/animals/7494.html. Accessed July 2017.

NYSDEC. 2017d. *Great Blue Heron.* Available at: http://www.dec.ny.gov/animals/61491.html. Accessed November 2017.

NYSDEC. 2017e. *Henslow's Sparrow Fact Sheet.* Available at: http://www.dec.ny.gov/animals/59554.html. Accessed November 2017.

NYSDEC. 2017f. *New York State Species of Greatest Conservation Need.* Available at: http://www.dec.ny.fovgov/animals/9406.html. Accessed July 2017.

Patriquin, K.J., and R.M.R. Barclay. 2003. *Foraging by Bats in Cleared, Thinned and Unharvested Boreal Forest*. Journal of Applied Ecology 40: 646–657.

Pearce-Higgins, J.W., L. Stephen, A. Douse, and H. W. Langston. 2012. *Greater Impacts of Wind Farms on Bird Populations During Construction than Subsequent Operation: results of a Multi-Site and Multi-Species Analysis.* Journal of Appled Ecology (49): 386-394.

Pearce-Higgins, J.W., L. Stephen, R. H. W. Langston, I.P. Brainbridge, and R. Bullman. 2009. *The Distribution of Breeding Birds Around Upland Wind Farms.* Journal of Applied Ecology.

United States Department of Agriculture (USDA). 2009. *2007 Census of Agriculture: United States Summary and State Data, Volume 1*. National Agricultural Statistics Service. AC-07-A-51. Issued February 2009; updated December 2009.

Sasse, D.B., and P. Pekins. 1996. *Summer Roosting Ecology of Northern Long-Eared Bats (*Myotis septentrionalis*) in the White Mountain National Forest.* British Columbia Ministry of Forests Working Paper 23:91-101.

Segers, J.L., and H.G. Broders. 2014. *Interspecific effects of forest fragmentation on bats*. Canadian Journal of Zoology 92: 665–673.

Silvis, A., W.M. Ford, and E.R. Britzke. 2015. *Effects of hierarchical roost removal on northern long-eared bat (*Myotis septentrionalis*) maternity colonies*. PLoS One 10(1): e0116356. doi:10.1371/journal.pone.0116356.

Smith, K.G., S.R. Wittenberg, R.B. Macwhirter, and K.L. Bildstein. 2011. *Northern Harrier (Circus cyaneus), The Birds of North America Online*. A. Poole, Ed. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America at: http://bna.birds.cornell.edu/bna/species/210/articles/habitat. (Accessed November 2013).

Stantec Consulting Services, Inc. (Stantec). 2011. *Wolfe Island Wind Plant. Post-construction Follow-up Plan.* Bird and Bat Resources. Monitoring Report No. 3. January – June 2010. Prepared for TransAlta wholly owned subsidiary Canadian Renewable Energy Corporation. January 2011.

Stantec. 2014. *Baron Winds Project – Habitat Assessment.* Prepared for EverPower Wind Holdings, Inc. February 2014.

Stantec. 2016a. *Baron Winds Project Bird and Bat Survey Report, 2013-2015.* Prepared for EverPower Wind Holdings, Inc. October 2015 REV June 2016.

Stantec. 2016b. *Addendum to Baron Winds Project Bird and Bat Survey Report, 2013-2015, October 2015 REV June 2016.* Prepared for EverPower Wind Holdings, Inc. July 2016.

Stantec. 2017a. *Second Addendum to Baron Winds Project Bird and Bat Survey Report, 2013-2015, October 2015 REV June 2016.* Prepared for EverPower Wind Holdings, Inc. August 2017.

Stantec. 2017b. *Analysis of Potential Habitat Fragmentation Impacts to Songbirds and Bats Associated with the Baron Winds Project, New York.* October 11, 2017.

Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Shaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for the National Wind Coordinating Collaborative, Washington, DC.

U.S. Army Corps of Engineers (USACE). 1995. *The Highway Methodology Workbook Supplement. Wetland Functions and Values: A Descriptive Approach*. U.S. Army Corps of Engineers, New England Division. NENEP-360-1-30a. 32 pp.

USACE. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North central and Northeastern Region*.

U.S. Fish and Wildlife Service (USFWS). 2012. *Land-Based Wind Energy Guidelines*. March 23, 2012. Available at: http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf (Accessed August 2017).

USFWS. 2013. *Eagle Conservation Plan Guidance Module 1 – Land-based Wind Energy, Version 2*. April 2013. Available at: https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf (Accessed August 2017).

USFWS. 2016. *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*. Federal Register Vol. 81 (6):1900-1922. January 14, 2016.

United States Geological Survey (USGS). 2017. North American Breeding Bird Survey. Annual Species Totals for Swain 2 (61146). 2011-2016. Available at: https://www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm. Accessed October 2017.

Villard, M. 1998. *On Forest-Interior Species, Edge Avoidance, Area Sensitivity, and Dogmas in Avian Conservation*. Auk 115(3): 801–805.

Weldy, T., D. Werier, and A. Nelson. 2017. *New York Flora Atlas*. [S.M. Landry and K.N. Campbell (original application development), USF Water Institute. University of South Florida]. Albany, New York.

Western EcoSystems Technology, Inc. (West, Inc.). 2014. *2012 and 2013 Breeding Bird Avoidance and Habituation Studies for the Howard Wind Project, Steuben County, New York.*

Whitcomb, R.F., J.F. Lynch, P.A. Opler, and C.S. Robbins. 1981. *Effects of Forest Fragmentation on Avifauna of the Eastern Deciduous Forest*. Pages 125 – 205 *in* Forest island dynamics in man-dominated landscapes. R.L. Burgess and D.M. Sharpe, Eds. Springer-Verlag, New York.

Zimmerman, J. L. 1988. *Breeding season habitat selection by the Henslow's sparrow (*Ammodramus henslowii*) in Kansas.* Wilson Bulletin 100(1): 17–24.