# High Bridge Wind Project

## Case No. 18-F-0262

# 1001.22 Exhibit 22 -REDACTED

# Terrestrial Ecology and Wetlands

**TABLE OF CONTENTS**

EXHIBIT 22 TERRESTRIAL ECOLOGY AND WETLANDS ..... 1
(a) Identification and Description of Plant Communities ..... 1
(1) Land Cover ..... 1
(2) Ecological Communities ..... 1
(3) Map of Ecological Communities ..... 3
(4) Plant Species List ..... 3
(b) Analysis of Impacts to Vegetation from Construction and Operation ..... 3
(1) Permanent and Temporary Impacts ..... 3
(2) Invasive Species Identification ..... 5
(3) Invasive Species Control Plan ..... 6
(c) Avoidance and Mitigation Measures Regarding Vegetation Impacts ..... 6
(d) Vegetation, Wildlife, and Wildlife Habitats ..... 7
(1) Vegetation ..... 7
(2) Mammals ..... 7
(3) Birds ..... 8
(4) Amphibians and Reptiles ..... 11
(5) Terrestrial Invertebrates ..... 12
(6) Wildlife Habitat ..... 13
(7) Special Status Species ..... 15
(e) Species List ..... 19
(f) Impacts to Vegetation, Wildlife, Wildlife Habitat, and Wildlife Travel Corridors ..... 19
(1) Summary ..... 19
(2) Construction-Related Impacts to Wildlife and Wildlife Habitats ..... 19
(3) Operation-Related Impacts to Wildlife and Wildlife Habitats ..... 21
(4) Impacts to Wildlife from Application of Biocides ..... 30
(5) Summary of Impacts to Wildlife Habitat ..... 31
(g) Measures to Avoid or Mitigate Impacts to Vegetation, Wildlife and Wildlife Habitat ..... 42
(h) Avian and Bat Impact Analysis and Monitoring Program: ..... 43
(1) Comparative Analysis of Avian and Bat Use at the Facility ..... 43
(2) Avian and Bat Post-Construction Monitoring ..... 50
(3) Avian and Bat Impact Avoidance and Mitigation Plan ..... 51
(i) Map Showing Delineated Wetland Boundaries ..... 51
(j) Description of Wetlands ..... 53
(k) Wetland Functional Assessment ..... 54
(l) Off-site Wetlands Analysis ..... 56

(m) Wetland Impacts ..... 56
(n) Measures to Avoid/Mitigate Wetland Impacts ..... 58
(o) State and Federal Endangered or Threatened Species ..... 59
(p) Invasive Species Prevention and Management Plan ..... 60
(q) Agricultural Impacts ..... 60
REFERENCES ..... 61

## LIST OF TABLES

Table 22-1. Land Cover Classes Found within the Facility Site ..... 1
Table 22-2. Ecological Community Impacts ..... 4
Table 22-3. New York State Special Status Species Occurring or Likely to Occur within the Facility Site ..... 16
Table 22-4. Impacts to Wildlife Habitat ..... 31
Table 22-5. Summary of Temporary and Permanent Impacts for New York State Special Status Species that Have the Potential to Occur Within the Facility Site ..... 39
Table 22-6. Wetland Impacts ..... 57

# EXHIBIT 22 TERRESTRIAL ECOLOGY AND WETLANDS

(a) Identification and Description of Plant Communities

(1) Land Cover

Plant communities and vegetation occurring within the Facility Site were determined using National Land Cover Data (NLCD) information, which is compiled by the United States Geological Survey (USGS) (Homer et al., 2015), and verified during field surveys conducted in 2018 and 2019. The Facility Site encompasses approximately 3,921 acres and is heavily forested; non-forested areas primarily consist of active and inactive agricultural land (see Table 22-1).

**Table 22-1. Land Cover Classes Found within the Facility Site**

| Cover | Acres | Percent Cover (%) |
|---|---|---|
| Beech-Maple Mesic Forest | 2,387 | 60.9 |
| Hayfield/Pasture | 719 | 18.3 |
| Hemlock-Northern Hardwood Forest | 460 | 11.7 |
| Successional Old Field | 235 | 6.0 |
| Row Crops | 79 | 2.0 |
| Disturbed/Developed | 27 | 0.7 |
| Open Water | 14 | 0.3 |
| **Total** | **3,921** | **100.0** |

Source: NLCD 2011

(2) Ecological Communities

All major plant communities found within parcels that will host Facility components are common to New York State. Beech-Maple Mesic Forest and Hemlock-Northern Hardwood Forest (i.e., mixed deciduous/coniferous forestland) are the dominant community types in the Facility Site, while successional old field, agricultural land, and disturbed/developed community types occur to a lesser extent. Descriptions of the ecological communities and dominant vegetation within the Facility Site are provided below for each of the land cover classes included in Table 22-1. Detailed descriptions of wetland community types encountered during on-site wetland delineations is provided in Exhibit 22(j).

Beech-Maple Mesic Forest/Hemlock-Northern Hardwood Forest

Tree species vary based on topography and hydrology across the Facility Site, but dominant or co-dominant species in most locations include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and American beech (*Fagus grandifolia*). Other tree species typically found in these community types include eastern hemlock (*Tsuga canadensis*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), birches (*Betula* spp.), eastern hophornbeam (*Ostrya virginiana*), white pine (*Pinus strobus*) and quaking aspen (*Populus tremuloides*). Understory trees and shrubs frequently observed in these communities include striped maple (*Acer pensylvanicum*), dogwoods (*Cornus* spp.), hawthorns (*Crataegus* spp.), witch hazel (*Hamamelis virginiana*), and numerous saplings. Characteristic herbaceous plants include woodland ferns such as marginal wood fern (*Dryopteris magrinalis*), New York fern (*Thelypteris noveboracensis*), and interrupted fern (*Osmunda claytonia*), and a variety of flowering plants including Canada mayflower (*Maianthemum canadense*) and Trillium species.

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, this community is located primarily along roadsides, in abandoned agricultural fields, or adjacent to active agricultural fields. Species found in these areas typically include grasses such as orchard grass (*Dactylis glomerata*) and timothy (*Phleum pretense*), flowering plants including goldenrods (*Solidago spp*.), clovers (*Trifolium spp*.) and milkweed (*Asclepias syriaca*), and weeds such as burdock (*Arctium spp*.). Shrubs such as bush honeysuckles (*Lonicera spp*.) and *rubus* species are also components of this community but represent less than 50% of total vegetative cover.

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, and are characterized by the presence of buildings, parking lots, paved and unpaved roads, lawns, quarries, and transmission line and pipeline rights-of-way. Vegetation in these areas is generally either lacking or highly managed (i.e., mowed lawns or routinely maintained rights-of-way). Volunteer vegetation that naturally re-stablishes in these areas is generally sparse, and typically comprised of old field, often non-native, herbaceous species such as pokeweed (*Phytolacca americana*), bull thistle (*Cirsium vulgare*), ragweed (*Ambrosia artemisiifolia*), curly dock (*Rumex crispus*), and various upland grasses. Disturbed lands in the Facility provide ideal conditions for invasive species to establish and outcompete native species.

Agricultural Land

As defined in the *Ecological Communities of New York State* (Edinger *et. al.,* 2014), agricultural land includes cropland/row crops, cropland/field crops, and pastureland. As defined by the United States Department of Agriculture (USDA, 2007), and for the purposes of this application, agricultural land includes harvested cropland, 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. Vegetation species found on cropland include either planted crops such as corn, soybeans, etc., or pasture crops, including timothy, rye, or other perennial grasses. Pastureland is similar in vegetation composition to successional old field but will vary depending on whether it is in use for grazing or silage purposes versus a fallow or abandoned agricultural field.

(3) Map of Ecological Communities

A map of identified plant communities in the Facility Site within adjacent parcels, as classified according to *Ecological Communities of New York State*, is provided in Figure 22-1 (Edinger et al, 2014).

(4) Plant Species List

Vascular plant species at the Facility Site were identified during various field studies (i.e., wetland delineations, invasive species surveys, etc.) and through incidental observations. A list of plant species identified is attached as Appendix 22-A; nomenclature follows the New York Flora Atlas (Weldy et al., 2019). A total of 241 unique native and non-native plant species were identified during these field surveys.

(b) Analysis of Impacts to Vegetation from Construction and Operation

(1) Permanent and Temporary Impacts

Construction and operation of the Facility will result in impacts to ecological communities. These impacts can be characterized as one of three types: temporary, permanent conversion, and permanent. Most impacts will be temporary, associated with collection line installation, access road and turbine construction workspaces, and construction staging. Permanent conversion will occur where communities are cleared and then maintained by the Applicant as successional communities for the life of the Facility (e.g., areas within collection line rights-of-way). Permanent impacts will be primarily associated with built facilities. Permanent built facilities include turbine foundations and pads, access roads, the O&M facility, meteorological tower foundations, the battery storage facility, and the collection and point of interconnection (POI) substations. Facility-related impacts to all ecological

communities identified in Exhibit 22(a)(2) are detailed in Table 22-2. These impacts were calculated using GIS software and the limits of disturbance identified in the Preliminary Design Drawings (Appendix 11-A).

**Table 22-2. Ecological Community Impacts[1]**

| Cover Type | Temporary Impact (acres)[1] | Permanent Conversion (acres)[2] | Permanent Impact (acres) | Total Impact |
|---|---|---|---|---|
| Beech-Maple Forest | 79.6 | 78.6 | 25.0 | 183.2 |
| Hemlock-Northern Hardwood Forest | 4.9 | 3.4 | 1.2 | 9.5 |
| Successional Old Field | 7.1 | 6.3 | 2.3 | 15.7 |
| Hayfield/Pasture[3] | 35.8 | n/a | 10.7 | 46.5 |
| Disturbed/ Developed[3] | 3.0 | n/a | 0.7 | 3.6 |
| Row Crops[3] | 10.0 | n/a | 3.6 | 13.6 |
| **Total** | **117.4** | **111.3** | **43.5** | **272.2** |

[1] Areas not maintained by the Applicant. Unless otherwise disturbed by the landowner, these areas would likely return to their pre-disturbance state with time.
[2] Areas where the Applicant would maintain a successional state to allow for Facility maintenance activities to be conducted. It is anticipated that all areas not converted to built facilities within 15 feet of collection lines, within 10 feet of access road edges, and within 100 feet of wind turbine pads would be maintained. All areas outside of these distances would not be maintained by the Applicant.
[3] Buried collection line rights-of-way, access road shoulders, and areas adjacent to wind turbine pads will not be maintained by the Applicant where they cross active agricultural or developed land, unless otherwise mandated in landowner lease agreements.

In forested areas that are temporarily impacted, 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. Following post-construction stabilization of soils, ecological succession will restore the forested condition of these areas with time.

For a detailed description of impacts to agricultural lands, please see Exhibit 22(q). 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. Temporary and permanent impacts to vegetation communities will not result in extirpation or significant reduction in any ecological community type.

[1] Impacts to public road rights-of-way are included in these calculations. Therefore, the total impact data presented in this table will not exactly match that presented in other impact tables (e.g., Table 4-9).

(2) Invasive Species Identification

An invasive plant survey was conducted by EDR within all proposed areas of disturbance in May-June 2019. The purpose of the invasive plant survey was to identify non-native invasive plant species listed as prohibited or regulated by the New York State Department of Environmental Conservation (NYSDEC, 2014). The results of the survey are provided in the Invasive Species Control Plan (Appendix 22-B) and summarized below. The Invasive Species Control Plan (ISCP) includes methods, including area and concentration thresholds that require mapping, for invasive species surveys that will be conducted in the growing season prior to the commencement of construction to identify the extent of invasive species. The Invasive Species Survey Report and ISCP will be updated, as needed, following this survey. A total of 10 invasive species were documented during the invasive species survey:

- Autumn Olive *(Elaeganus umbellata*)
- Canada Thistle (*Cirsium arvense*)
- Garlic Mustard (*Alliaria petiolate*)
- Japanese Barberry (*Berberis thungbergii*)
- Japanese stilt grass (*Microstegium vimineum*)
- Morrow's Honeysuckle (*Lonicera morrowii*)
- Mugwort (*Artemesia vulgaris*)
- Multiflora Rose (*Rosa multiflora*)
- Spotted Knapweed (*Centaurea strobe*)
- Swallow-wort (*Cynanchum*)

The most common invasive plant species encountered in the Facility Site were Morrow's honeysuckle and multiflora rose, both of which thrive on the edges of forests and streams adjacent to disturbed areas. Identified concentrations of non-native invasive plant species in areas of proposed disturbance are shown at a scale of 1:2,000 in Figure 22-1.

There were no invasive species of insects recorded during on-site surveys, and there were no observations of dead ash trees, which would indicate the presence of emerald ash-borer. However, this invasive insect is known to occur in Chenango County, and there is a possibility of infestation within the Facility Site. Therefore, measures to prevent the spread of emerald ash-borer from outside the Facility are included in the ISCP. Hemlock woolly adelgid has also been documented in Chenango County, and could possibly occur within the Facility. Therefore, measures to prevent the spread of hemlock woolly adelgid within the Facility are also included in the ISCP.

(3) Invasive Species Control Plan

An ISCP for the Facility is included with this Application in Appendix 22-B. This plan was developed based on species identified during the invasive plant survey conducted in 2019. Best Management Practices outlined in the ISCP that will be implemented to control invasive plant and insect species include; measures to educate workers; measures to control the spread of invasive species including construction materials inspection, target species treatment and removal, construction equipment sanitation; and restoration. The ISCP also outlines post-construction monitoring that will take place after the Facility is operational. The goal of the ISCP is to prevent an increase in invasive species coverage within the Facility. If post-construction monitoring determines that the goal has not been met, revisions will be made to the ISCP to ensure that control measures are sufficient to prevent further spread of invasive species.

(c) Avoidance and Mitigation Measures Regarding Vegetation Impacts

Avoidance, minimization and mitigation of impacts to vegetation have been and will be accomplished primarily through careful site planning. Large areas of undisturbed forest and wetland are being avoided to the extent practicable. Facility access roads have been sited on existing roads, farm lanes, and logging roads wherever possible, and areas of disturbance will be confined to the smallest feasible area.

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; preliminary measures associated with a stormwater pollution prevention plan (SWPPP) are included in Appendix 21-D. Other mitigation measures to avoid or minimize impacts to vegetation also include identifying 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, employing best management practices during construction, and maintaining a clean work area within the designated construction sites. An Environmental Monitor will conduct inspections of all areas requiring environmental compliance during construction activities, as outlined in the Preliminary Environmental Compliance and Monitoring Plan (ECMP) (Appendix 22-C).

In addition, as previously discussed in Exhibit 22(a), 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 all temporarily disturbed areas and areas permanently converted maintained by the Applicant in a successional state.[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 Exhibit 22(b).

(d) Vegetation, Wildlife, and Wildlife Habitats

(1) Vegetation

Exhibit 22(a) describes the dominant plant communities found within the Facility Site. In addition, a site-specific request for data on rare plant species was submitted to the New York Natural Heritage Program (NYNHP),[3] and a response was received on January 23, 2019, which identified that no significant natural communities or state-listed plants are known to occur within or immediately near the Facility Site.

(2) Mammals

Publicly available information regarding the occurrence of mammalian species in the Facility Site is generally not available. Therefore, the occurrence of mammals was determined through observations of species, habitat, and signs recorded during on-site field surveys for other studies such as wetland and stream delineations. Mammal species identified during on-site surveys include woodchuck (*Marmota momax*), North American porcupine (*Erithizon dorsatum*) and white-tailed deer (*Odocoileus virginianus*). A number of common mammal species would be expected to occur within the Facility Site, including black bear (*Ursus americanus*), eastern chipmunk *(Tamias striatus*), Virginia opossum (*Didephis virginiana),* striped skunk (*Mephitis mephitis*), eastern cottontail (*Sylvilagus floridanus*) and eastern coyote (*Canis latrans*). Multiple species of bats, weasels, foxes, squirrels, and a variety of small mammals (mice, voles, moles, and shrews) are also likely to occur. A complete list of mammal species that are likely to occur in the vicinity of the Facility are included in the Wildlife Species List, provided in Appendix 22-A.

NYSDEC did not require pre-construction surveys for bats, as pre- and post-construction studies for bats at other wind projects in the northeast provide a broad baseline of data on species distribution and temporal activity in the region. Although no site-specific surveys for bats were conducted, several common bat species are likely to be found in the Facility Site, including big brown bat (*Eptisicus fuscus*), hoary bat (*Lasiurus cinereus*), eastern red bat

[2] Areas adjacent to wind turbines and access roads, and within collection line rights-of-way. Vegetation will be maintained in these areas, e.g., herbaceous species will be mowed and/or woody species will be trimmed and/or removed.
[3] The New York Natural Heritage Program (NYNHP) is an agency that maintains data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities in the State.

(*Lasiurus borealis*) and silver-haired bat (*Lasionycteris noctivagans*). Other bat species that may use the Facility Site include little brown bat (*Myotis lucifugus*), small-footed bat (*Myotis leibii*), eastern pipistrelle (*Perimyotis subflavus*). According to the NYNHP review, there are no known maternity roosts, hibernacula, or critical habitat for the State-listed northern long-eared bat (*Myotis septentrionalis*). However, according to NYSDEC it is possible that northern long-eared bat may occur within the Facility Site during fall migration (July 1 – October 1). The Facility Site is outside of the range of the State- and federally listed Indiana bat (*Myotis sodalis*) northeastern recovery unit.

(3) Birds

The occurrence of birds in the Facility Site was determined using a variety of data collection methods and publicly available resources, including the results of on-site avian surveys conducted by Western Ecosystems Technology, Inc. (WEST; see Appendix 22-D). A review of methods and data provided by each source is provided below. All avian species identified are included in the Wildlife Species List, provided in Appendix 22-A.[4]

(i) Site-specific Surveys

In order to determine the type and number of bird species present within the Facility, work plans for pre-construction monitoring surveys for birds were developed by WEST in accordance with guidance provided by the U.S. Fish and Wildlife Service (USFWS) and NYSDEC. Surveys for breeding birds and raptor migration surveys were planned in accordance with NYSDEC *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (Guidelines; NYSDEC, 2016). Surveys for eagles were planned in accordance with the USFWS *Eagle Conservation Plan Guidance* (ECPG) (USFWS, 2013) and revisions to the ECPG published in December 2016 (USFWS, 2016b). All work plans were reviewed by NYSDEC and USFWS prior to the initiation of surveys and included the following surveys:

- Breeding Bird Surveys conducted during between May 21 – July 22, 2018
- Eagle Use Surveys conducted for one year between March 2, 2018 – February 10, 2019[5]
- Raptor Migration Surveys conducted during spring (March 3 – May 31, 2018) and fall (August 15 – December 10, 2018)
- Raptor Nest Aerial Surveys conducted during March and April 2019

[4] The Wildlife Species List also includes species identified in the course of other field surveys conducted by the Applicant within the Facility Site (e.g., the wetland and invasive species surveys).
[5] Note, these surveys are ongoing.

A summary of the methods and results of all surveys conducted by WEST for the Facility is provided in Exhibit 22(h), and copies of all reports providing detailed results of each survey and approved work plans are provided in Appendix 22-D.

(ii) Public Data Sources

In addition to on-site survey data, further information on birds that may occur at the Facility Site was obtained from a number of publicly available sources that include the New York State Breeding Bird Atlas, the North American Breeding Bird Survey, Audubon Christmas Bird Counts, eBird, Hawk Migration Association of North America (HMANA), The Nature Conservancy (TNC), and the Kingbird Publication.

*New York State Breeding Bird Atlas*

The New York State Breeding Bird Atlas (BBA) is a comprehensive, statewide survey that indicates the distribution of breeding birds in the State within 5-km by 5-km survey blocks across the state (NYSDEC, 2007b). Surveys were conducted by volunteers, and the most recent data was collected between 2000 and 2005. The Facility Site is located within six survey blocks, including 4569A, 4569B, 4669C, 4669A, 4670C, and 4570D. These blocks were queried for bird species occurrence data, and 109 species were listed as having been observed within these survey blocks. State-listed species recorded include two state threatened species (bald eagle and northern harrier) and four state species of special concern (Cooper's hawk, osprey, red-shouldered hawk, and sharp-shinned hawk).

*North American Breeding Bird Survey*

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 Oneonta BBS route begins near the City of Oneonta and runs westward towards the Otsego-Chenango County line, approximately 0.5 miles east of the Facility Site. Data for this route is available for 1968-2017, and a total of 120 species have been recorded. Several common species have been observed along the Oneonta route, including European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoeniceus*), American crow (*Corvus brachyrhynchos*), and American robin (*Turdus migratorius*). Two state-listed threatened species have been recorded: bald eagle (*Haliaeetus leucocephalus*) (recorded in 2013) and northern harrier (*Circus hudsonius*) (recorded in 1969). Five state-listed species of special concern have also been observed along this route; Cooper's hawk (*Accipiter*

*cooperii*), grasshopper sparrow (*Ammodramus savannarum*), osprey (*Pandion haliaetus*), sharp-shinned hawk (*Accipiter striatus*), and vesper sparrow (*Pooecetes gramineus*). No observations of bald eagle, northern harrier, Cooper's hawk, grasshopper sparrow, osprey, sharp-shinned hawk, or vesper sparrow have been recorded in the last 10 years (USGS, 2018).

*Audubon Christmas Bird Count*

The Christmas Bird Count (CBC), which was created by the National Audubon Society in 1900, is the longest-running citizen science project in the country. 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 within a 15-mile (24 km) diameter count circle, and all bird species and individuals observed are recorded by volunteers. Since the edge of the closest count circle to the Facility Site (the Sherburne circle) is approximately 8 miles northwest of the Facility, data from the CBC is not applicable to the Facility Site and is therefore not included in the Application.

*eBird*

The eBird database, managed by Cornell University's Lab of Ornithology, is an on-line database of bird observations collected by citizen scientists around the world, and vetted by regional experts. Ebird data is used to document bird distribution, abundance, habitat use, and trends within a simple, scientific framework to help inform bird research worldwide. The main limitation of eBird data is the concentration of data on publicly accessible lands such as state and national parks, national forest lands, and known birding hotspots. The nearest location with greater than 100 species recorded (Millbrook Town Park) is approximately 12 miles north of the Facility Site, data from this site is not applicable to the Facility Site and is therefore not included in the applications.

*Hawk Migration Association of North America*

The Hawk Migration Association of America (HMANA) is a nonprofit organization that collects hawk migration data from almost 200 affiliated raptor monitoring sites throughout the U.S., Canada, and Mexico, including the Franklin Mountain Hawkwatch, located approximately 18 miles east of the Facility in Oneonta. The Franklin Mountain Hawkwatch is operated by the Delaware-Otsego Audubon Society, and fall raptor migration data is collected from late August through December. The site has operated since 1989 and has recorded an average of 4,346 raptors each year. Broad-winged hawk and red-tailed hawk are the species most frequently observed, with over 1,000 observations of each species in most years. Bald eagle and golden eagle (*Aquila chrysaetos*) are both recorded annually at the Franklin Mountain Hawkwatch site. In 2016, the most recent year for which data summaries are available for Franklin Mountain, a total of 197 bald

eagles and 231 golden eagles were recorded. During the month of November, the peak month for golden eagle migration, an average of 0.91 golden eagles were recorded per hour. A total of 301 sharp-shinned hawks, and smaller numbers (<100) of Cooper's hawk, northern harrier (*Circus cyaneus*), red-shouldered hawk, American kestrel (*Falco sparverius*), merlin (*Falco columbaris*), northern goshawk, and peregrine falcon (*Falco peregrinus*) were recorded during the 2016 fall migration.

*The Nature Conservancy*

No TNC areas are located in the Facility Site. The closest TNC lands are the SEO Unadilla River Rockdale and SEO Butternut Creek Flat Iron Road areas east of the Facility Site and the M Chenango Highlands west of the Facility Site.

*The Kingbird Publication*

The Kingbird Publication is a resource cultivated by the New York State Ornithological Association (NYSOA). The Kingbird Publication maintains searchable archives for research and educational purposes back to 1950. A search through records maintained by the Kingbird Publication did not reveal records of birds not already discovered from on-site surveys, other data sources, or common birds that may be expected to occur in Chenango County during various times of year.

(4) Amphibians and Reptiles

Information on amphibians and reptiles for the Facility Site was compiled from the New York State Amphibian & Reptile Atlas (Herp Atlas), a 10-year survey conducted between 1990 and 1999 designed to document the geographic distribution of New York State's herpetofauna (NYSDEC, 2007a). Data from this survey was queried for the Sidney, Guilford, and Oxford USGS 7.5-minute quadrangles, which encapsulate the Facility. Information on amphibians and reptiles expected to occur within the Facility Site and an evaluation of suitable habitat for these species is provided in Exhibit 22(d). A total of 19 amphibian species and 11 reptile species were included in the Wildlife Species List (attached as Appendix 22-D).

Several amphibian species that may occur within the Facility Site rely on ephemeral water sources (vernal pools) for egg-laying and in early life stages. As such, a survey for vernal pools was conducted by the Applicant in the spring of 2019. Typical characteristics used to identify vernal pools are described in the Vernal Pool Report (Appendix 22-E). Indicator species, including adults, juveniles, and/or egg masses, observed in or near these pools included the spotted salamander (*Ambystoma maculatum*), Jefferson/blue-spotted complex (*Ambystoma*

*jeffersonianum x lat*), red-spotted newt (*Notophtalmus viridescens*), Eastern American toad (*Bufo americanus*), spring peeper (*Pseudacris crucifer*), green frog (*Lithobates clamitans*), and wood frog (*Lithobates sylvatica*).

As described in Exhibit 22(d)(7), three amphibian species of special concern, eastern hellbender, eastern longtail salamander, and the Jefferson/blue-spotted salamander complex, may occur in the Facility Site based on data from the NYS Herp Atlas (NYSDEC, 2007a). In addition, the Jefferson/blue-spotted salamander complex was observed on-site during vernal pool surveys. Jefferson/blue-spotted salamander complex egg masses were observed at five (5) vernal pools within the Wetland Study Area (VP-N, VP-V, VP-W, VP-X, and VP-Y).

As described in the Vernal Pool Report (Appendix 22-E), a total of 33 potential vernal pools were identified within the Wetland Study Area. Efforts have been made to avoid and minimize direct and indirect impacts at to vernal pools wherever practicable (see Exhibit 9, Table 9-1). Impacts to 29 of the 33 vernal pools will be completely avoided. Four potential vernal pools (VP-G, VP-C, VP-P) will be temporarily and permanently impacted. These impacts will primarily result from the construction of access roads. No potential vernal pools in which Jefferson/blue-spotted salamander complex egg masses were observed (VP-N, VP-V, VP-W, VP-X, and VP-Y), will be impacted.

Most of the potential vernal pools identified will be completely avoided, including those locations where Jefferson/blue-spotted salamander complex egg masses were observed. Where vernal pools will be impacted, much of the impact will be temporary. As a result, vernal pool habitat is expected to remain largely intact within the Facility Site.

(5) Terrestrial Invertebrates

Publicly available data on terrestrial invertebrate species are generally not available for upstate New York. As stated above, the NYNHP is an agency that maintains data on rare, threatened, and endangered plant and animal species, as well as significant ecological communities in the State. NYNHP does track several invertebrate groups, however, not all invertebrate groups are monitored. A site-specific request for data on rare wildlife species was submitted to NYNHP and a response was received on January 23, 2019, which did not identify any rare, threatened, and endangered terrestrial invertebrates within the Facility Site.

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, dragonflies and damselflies, ants, bees, beetles, mosquitoes, fleas, crickets, ladybirds, fireflies, cicadas, flies, grasshoppers, arachnids (e.g.,

spiders, ticks, and mites), earthworms, and nematodes. Invertebrates are important components of ecological communities within the Facility Site and serve a variety of ecosystems services and functions, including pollination, providing prey for birds, bats, and rodents, expediting nutrient cycling, and aerating the soil.

(6) Wildlife Habitat

A request for data on occurrence of state-listed species significant natural communities was submitted to NYNHP, and NYNHP provided a response on January 23, 2019 that did not identify any significant natural communities within the Facility Site. In addition, the USFWS's Information for Planning and Consultation (IPaC) database was accessed on January 31, 2019 for information relative to the proposed Facility. Results from both the NYNHP and IPAC database reviews specifically indicate "there are no critical habitats in/at this location." See Appendices A and B of the Net Conservation Benefit Plan (Appendix 22-F).

A discussion of habitat that is provided by each ecological community type identified in Exhibit 22(a) and 22(j) is provided below. Ecological communities with similar habitat requirements are grouped together for discussion purposes.

*Beech-Maple Mesic Forest/Hemlock-Northern Hardwood Forest*

Beech-maple mesic forest and hemlock-northern hardwood forest are the most widespread ecological communities within the Facility Site. Despite development and various land uses, many of the forests within the Facility remain intact and have areas of interior forest. The ecological benefits of interior forests include fewer predators, darker and more protected nesting/breeding sites, less disturbance, and the wide availability of trees for nesting. State special status species that have been documented in the Facility Site that use forested habitat include, golden eagle (state-endangered) and bald eagle (state threatened). Species of special concern that have been documented in the Facility Site and use forested habitat include Cooper's hawk, red-shouldered hawk, and sharp-shinned hawk. Species of greatest conservation need (SGCN) that have been recorded include black-billed cuckoo, cedar waxwing, ruffed grouse (*Bonsala umbellus*), wood thrush, scarlet tanager (*Piranga olivacea*), and Canada warbler. Mammals that may utilize forests on the Facility Site include black bear, porcupine, and white-tailed deer. Many species of bats may use forest habitats for roosting and foraging that include the state-threatened northern long-eared bat. One state species of special concern (eastern small-footed myotis) utilizes forested habitats and may occupy forests within the Facility Site. Three SGCN bat species (hoary bat, silver-haired bat, and eastern red bat), are likely to occur in forested habitats within the Facility Site. Common amphibians such as gray treefrog (*Hyla versicolor*), wood frog (*Rana sylvatica*), and a variety of salamanders likely utilize forested habitats within the Facility Site, which rely upon the vernal pools found within these habitats for reproduction.

Vernal pools are also important to amphibian species of concern such as the Jefferson/blues-spotted salamander complex and the eastern longtail salamander.

*Hayfield/Pasture/Row Crops*

Cropland communities consist of active agricultural areas of row crops, hayfields, and pasture. Active agriculture makes up over 18 percent of the Facility Site and provides marginal habitat for wildlife species, as these habitats are often too disturbed for nesting and breeding to be successful. Despite this fact, a number grassland bird species utilize cropland habitats, including species of concern such as eastern meadowlark, bobolink, and grasshopper sparrow. Flocks of Canada geese (*Branta canadensis*) and other waterfowl often use agricultural fields as stopover sites during migration. Additionally, several mammal species, including white-tailed deer and black bear, forage in agricultural fields.

*Successional Old Field*

Successional old field communities, which make up roughly 6 percent of the Facility Site, provide habitat for species that prefer open grasslands. Bird species that utilize successional old field habitats may include eastern meadowlark (*Sturnella magna*), savannah sparrow (*Passerculus sandwichensis*), red-winged blackbird, eastern kingbird (*Tyrannus tyrannus*), and eastern bluebird (*Sialia sialis*). One SGCN species, bobolink (*Dolichonyx oryzivorus*), is often abundant in successional old field habitats. Successional old fields also provide habitat for game species such as woodcock (*Scolopax minor*) and white-tailed deer. A variety of moles, mice, and shrews typically use successional old field communities, which provides foraging opportunities for species of concern such as American kestrel, red-shouldered hawk, and northern harrier. Successional old field habitats typically have a high diversity and abundance of flowering forbs, which attract bees, butterflies, and other insects, and may attract foraging bats.

*Forested Wetlands*

Forested wetlands found in the Facility Site resemble red maple-hardwood swamp and silver-maple ash swamp communities. Forested wetlands provide habitat for species that prefer moist conditions, including a wide range of amphibians. Forested wetlands are also preferred habitat for several avian species, including belted kingfisher (*Megaceryle alcyon*) and wood duck (*Aix sponsa*). Avian species of concern that may utilize forested wetland communities include the red-shouldered hawk.

*Non-forested Wetlands and Open Water*

Non-forested wetland habitats within the Facility Site include open water, shrub-scrub wetland, deep emergent marsh, and shallow emergent marsh communities. These wetland sites support diverse communities of vegetation

that provide habitat for numerous species, some of which may also use terrestrial habitat types in the Facility Site. Common waterbirds such as mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodia*), belted kingfisher (*Megaceryle* alcyon), and Canada goose would be expected to use emergent wetland habitat found within the Facility. American bittern (*Botaurus lentiginosus*) and pied-billed grebe (*Podilymbus podiceps*) are two species of concern that rely on emergent wetlands, neither of which have been documented within the vicinity of the Facility, likely due to the limited size of emergent wetlands within the Facility.

Open water areas in the Facility Site provide habitat for a variety of aquatic vertebrates and invertebrates. Several fish species are likely to be found in habitats with permanent open water. Streams provide habitat for aquatic insects that provide food for fish, such as mayflies, stoneflies, and caddisflies. Other aquatic invertebrates that could be found in these habitats include clams, mussels, and crayfish. Shallow open water bodies provide foraging habitat for bats, including species that are listed as either species of concern in New York State or species of greatest conservation need (SGCN). Frogs, toads, and salamanders may use isolated ponds within the Facility Site as egg-laying sites, many of which use terrestrial habitats as adults. Turtles likely use slow moving streams and other open waters within the Facility Site for foraging and basking. Some species of mammals use open water communities as well, including beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and mink (*Neovision vision*). See Exhibit 23 for further discussion regarding aquatic habitats and aquatic species.

(7) Special Status Species

Based on surveys conducted on-site, a review of publicly available sources, and a characterization of wildlife habitats within the Facility Site, a list of special status species and their potential to occur within the Facility Site is provided in Table 22-3.

**Table 22-3. New York State Special Status Species Occurring or Likely to Occur within the Facility Site**

| Species | NYS Status[1] | USFWS Status | SGCN Status[2] | Ecological Habitat Requirements[3] and On-site Observation Notes | Source[4] | Observed on-site? |
|---|---|---|---|---|---|---|
| Peregrine Falcon *Falco peregrinus* | E | N/A | SGCN | Nests in cliff and urban communities with tall structures such as bridges or buildings. Wintering and migrating birds utilize urban and open areas. Observed during raptor migration surveys. | W | Yes |
| Golden Eagle *Aquila chrysaetos* | E | N/A | SGCN | Found in cliff, woodland, and boreal heath communities. There are no records of the species nesting in New York State. Transient birds may utilize open habitat within the Facility Site. Observed during eagle use and raptor migration surveys | W | Yes |
| Northern Long-eared Bat *Myotis septentrionalis* | T | T | SGCN-HP | Found in multiple forest communities, including hemlock-northern hardwood and beech-maple mesic forests. 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. The species has not been documented at the site or in Chenango County. | FWS, NHP | No |
| Northern Harrier *Circus hudsonius* | T | N/A | SGCN | Found in a wide range of open habitats including grassland, cropland, emergent marsh, and successional old field communities. Suitable habitat for this species occurs in patches within the Facility Site. Observed during on-site eagle use and raptor migration surveys. | W | Yes |
| Bald Eagle *Haliaeetus leucocephalus* | T | N/A | SGCN | Found near open water in a wide range of forested habitats including hemlock-northern hardwood forest and beech-maple mesic forest communities. Preferentially roosts and nests in conifers or large, mature deciduous trees. Observed during eagle use and raptor migration surveys. No active nests have been identified within the Facility Site. | W, NHP, FWS, BBA | Yes |
| Common Loon *Gavia immer* | SC | N/A | SGCN | Found in lake and bog communities in the northern U.S. and Canada. Winter on lakes, rivers, and coastlines. No suitable habitat is present in the Facility Site; however, the species has been observed as flyovers during raptor migration surveys. | W | Yes |
| Grasshopper Sparrow *Ammodramus savannarum* | SC | N/A | SGCN-HP | Found in cropland and successional old field communities. In New York, the species is predominantly found in hayfields. Limited suitable habitat occurs within the Facility Site. The species was observed during on-site breeding bird surveys. | W, BBS | Yes |
| Wood Turtle *Glyptemys insculpta* | SC | N/A | SGCN-HP | Found in a wide range of habitats throughout the year, including hemlock-northern hardwood forest and floodplain communities. Frequently found in clean, fast-flowing streams with a rocky or sandy bottom. Suitable habitat occurs within the Facility Site. Not observed during on-site surveys, however, the species was recorded in the vicinity of the Facility Site during the NYS Amphibian and Reptile Atlas Project. | HA | No |
| Eastern Box Turtle *Terrapene carolina* | SC | N/A | N/A | Found in a wide range of forest habitats including hemlock-northern hardwood and beech-maple mesic forest communities Also found in grasslands in pastures. Suitable habitat occurs within the Facility Site. The species was not observed during on-site surveys. | HA | No |
| Red-shouldered Hawk *Buteo lineatus* | SC | N/A | SGCN | Found in moist forest habitats including floodplain, maple swamp, and shrub swamp communities. Suitable habitat for this species occurs within the Facility Site. The species was documented during eagle use and raptor migration surveys within the Facility Site. | W, BBS, BBA | Yes |
| Eastern Small-footed Myotis *Myotis leibii* | SC | N/A | SGCN | Found in a variety of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Also found in cliff and talus slope communities. Hibernates in caves, mines, and deep rock crevices. Suitable habitat for this species occurs within the Facility Site. There are no records of the species occurring at the site or in Chenango County. | NHP | No |

| Species | NYS Status[1] | USFWS Status | SGCN Status[2] | Ecological Habitat Requirements[3] and On-site Observation Notes | Source[4] | Observed on-site? |
|---|---|---|---|---|---|---|
| Eastern Longtail Salamander *Eurycea longicauda* | SC | N/A | SGCN | Found in stream, spring, and hemlock-northern-hardwood communities. 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* | SC | N/A | N/A | Found in open habitats above or adjacent to open water, including marsh and lake communities. Often builds nests above open water in submerged poles or trees. There is limited suitable habitat within the Facility Site, though the species may transiently utilize the Facility Site. Observed during eagle use and raptor migration surveys. | W, BBS, BBA | Yes |
| Cooper's Hawk *Accipiter cooperii* | SC | N/A | N/A | Found in a wide range of forested habitats, including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species occurs within the Facility Site. The species was observed during eagle use, raptor migration, and on-site breeding bird surveys. | W, BBS, BBA | Yes |
| Sharp-shinned Hawk *Accipiter striatus* | SC | N/A | N/A | Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat for this species is present within the Facility Site. The species was observed during eagle use, raptor migration, and on-site breeding bird surveys. | W, BBS, BBA | Yes |
| Common Nighthawk *Chordeiles minor* | SC | N/A | SGCN-HP | Found in a wide range of open habitats, including grassland, cliff, and urban communities. Observed during raptor migration surveys. | W | Yes |
| Jefferson/blue-spotted Salamander Complex *Ambystoma jeffersonianum x lat* | SC | N/A | SGCN-HP | Found in moist forest habitats including beech-maple mesic forest and maple swamp communities. Breeds in fishless ponds and vernal pools. Suitable habitat for this species occurs within the Facility Site. Not observed during on-site surveys. | HA, EDR | No |
| Hellbender *Cryptobranchus alleganiensis* | SC | N/A | SGCN-HP | Found in moist forests adjacent to swift-running, well-oxygenated, unpolluted streams and rivers with the presence of riffle areas and abundant large flat rocks or logs for cover and nesting sites. In New York the species is found solely in the Susquehanna and Allegheny River drainages. Not observed during on-site surveys. | HA | No |
| Bobolink *Dolichonyx oryzivorus* | N/A | N/A | SGCN-HP | Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed during on-site breeding bird surveys. | W, EDR | Yes |
| Eastern Meadowlark *Sturnella magna* | N/A | N/A | SGCN-HP | Found in grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. This species was observed during on-site breeding bird surveys. | W | Yes |
| Whimbrel *Numenius phaeopus* | N/A | N/A | SGCN-HP | Found in open habitats which vary from wet lowlands to dry uplands. . No suitable habitat is present in the Facility Site; however, the species has been observed as flyovers during raptor migration surveys. | W | Yes |
| American Kestrel *Falco sparverius* | N/A | N/A | SGCN | Found in open habitats including grassland, cropland, and successional old field communities. Suitable habitat is present within the Facility Site. The species was observed on-site during raptor migration and on-site breeding bird surveys. | W | Yes |
| Ruffed Grouse *Bonasa umbellus* | N/A | N/A | SGCN | Found in interior forest habitats with scattered clearings within hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was observed during on-site surveys for breeding birds. | W | Yes |
| Wood Thrush *Hylocichla mustelina* | N/A | N/A | SGCN | Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was observed during on-site surveys for breeding birds. | W | Yes |

| Species | NYS Status[1] | USFWS Status | SGCN Status[2] | Ecological Habitat Requirements[3] and On-site Observation Notes | Source[4] | Observed on-site? |
|---|---|---|---|---|---|---|
| Scarlet Tanager *Piranga olivacea* | N/A | N/A | SGCN | Found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest communities. Suitable habitat is present within the Facility Site. The species was observed during on-site surveys for breeding birds. | W, EDR | Yes |
| Silver-haired Bat *Lasionycteris noctivagans* | N/A | N/A | SGCN | A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Roosts in bark crevices and hollows. Suitable habitat is present within the Facility Site. Presence or absence of the species is undetermined, but the species is likely to occur at the Facility Site. | NHP | No |
| Eastern Red Bat *Lasiurus borealis* | N/A | N/A | SGCN | A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Suitable habitat is present within the Facility Site. Presence or absence of the species is undetermined, but the species is likely to occur at the Facility Site. | NHP | No |
| Hoary Bat *Lasiurus cinereus* | N/A | N/A | SGCN | A migratory bat that is found in a range of forested habitats including hemlock-northern hardwood and beech-maple mesic forest. Suitable habitat is present within the Facility Site. Presence or absence of the species is undetermined, but the species is likely to occur at the Facility Site. | NHP | No |

[1] E = endangered; T = threatened; SC = species of special concern.
[2] 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.
[3] Source: NYNHP Animal Guides. Available online at http://acris.nynhp.org/animals.php.
[4] Source: W = observed on-site by WEST 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, BBA = NYS Breeding Bird Atlas, HA = NYS Herp Atlas, BBS = USGS Breeding Bird Survey

(e) Species List

A Plant Species List and a Wildlife Species List was compiled based on on-site surveys, data/reports provided by the NYNHP, NYSDEC and USFWS, and publicly available data from the BBA, USGS, BBS, and eBird and is included in Appendix 22-A.

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

(1) Summary

With respect to impacts to vegetation, construction and operational impacts are addressed above in Exhibit 22(b) and shown in Figure 22-1. A total of up to approximately 228.7 acres (5.8% of the Facility Site) of vegetation will experience temporary disturbance as a result of Facility construction, and a total of up to 43.5 acres (approximately 1% of the Facility Site) of vegetation will be permanently lost through conversion to Facility components. No plant community will be extirpated or significantly reduced as a result of the Facility. Temporary and permanent disturbance to vegetation, including habitat fragmentation, will result in indirect impacts to wildlife species, and are discussed in detail below and in the Habitat Fragmentation Plan (Appendix 22-G). Direct impacts to wildlife are also expected to result from construction and operation of the Facility. The Applicant has taken measures to avoid, minimize, and mitigate for impacts to vegetation, wildlife, and wildlife habitats to the maximum extent practicable, which is discussed in detail in Exhibit 22(g). Impacts to wildlife are expected to be minimal and will not have significant effects on any of the species that occur within the Facility, as is discussed below.

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

Construction-related impacts to wildlife are anticipated to be limited to incidental injury or 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.

(i) Incidental Injury or Mortality

Direct impacts from construction equipment may inflict incidental injuries or mortalities to wildlife. Potential mortality is expected to be low as equipment used in wind energy facility construction is generally slow-moving or stationary for long periods (e.g., erection cranes). 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. 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.

The highest risk of direct mortality to birds from construction is the potential destruction of a nest during initial tree clearing. Adverse impacts to birds during construction of the Facility area are not expected, as the Applicant intends to conduct tree clearing outside the breeding season to the extent possible and will implement measures to avoid and mitigate potential impacts to birds that could result from tree clearing activities during the breeding season, to the maximum extent practicable. The highest risk to bat species is if tree clearing takes place outside of the winter season when bats are hibernating.

(ii) Habitat Disturbance and Loss Due to Clearing and Earth-moving Activities

As mentioned previously, Facility components have been sited to minimize impact to undisturbed habitat. For example, underground collection lines will parallel roads wherever possible, reducing the amount of temporary habitat loss. It is anticipated that 192.7 acres of forest, and 15.7 acres of successional old field will be directly impacted by construction-related disturbance. On a landscape scale, there is abundant availability of these habitats in the region. NLCD data indicates that there are approximately 355,037 acres of forested land in Chenango County.

Changes in vegetation could influence the behavior of wildlife species by changing the quality of habitat for foraging, nesting, or roosting. It is anticipated that the majority of wildlife present in the Facility Site would return to areas that were temporarily disturbed following the completion of construction activity. Adverse impacts on bat and bird populations are not expected during construction of the Facility. To the extent possible, tree clearing will be conducted between November 1 and March 31, when bats and other mammals are in hibernation and when bird species are not nesting. Bald eagles start nesting in approximately February and while no known bald eagle nests are in the Facility Site, the Applicant will implement measures outlined in the NYSDEC Conservation Plan for Bald Eagles in New York State if a new bald eagle nest is discovered in the Facility Site. In addition, if winter roosts of either eagle species are discovered, the Applicant will implement measures outlined in the NYSDEC Conservation Plan for Bald Eagles in New York State.

(iii) Displacement of Wildlife

Some wildlife displacement will also occur due to increased noise and human activity as an indirect impact of Facility construction. The level of 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 forest-interior and edge species of birds and mammals. Within New York State, peak breeding time for birds common to forested and agricultural habitats 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. These impacts are not expected to have population level affects as only 82 acres of forest will be removed and there is suitable habitat that will remain undisturbed adjacent to the Facility Site. Outside of localized displacement due to construction disturbance in the immediate vicinity of turbines, access roads, etc., no large-scale displacement impacts on wildlife species are anticipated during construction.

(3) 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.

(i) *Habitat Loss*

A total of 42.8 acres of wildlife habitat will be permanently lost from the Facility Site (i.e., converted to roads or built facilities) (see Table 22-4). This habitat loss represents only approximately 1% of the 3,921-acre Facility Site. Facility construction will result in a temporary loss of approximately 114.4 acres of habitat. An additional 111.3 acres, including 82.0 acres of forest, will be permanently converted to a successional community (old field, shrubland, or saplings) for the life of the Facility by necessary Facility maintenance activities. This will result in an increase in habitat for early-successional species, many of which are in decline (Swanson et al. 2010, Litvaitis 1993). Given the relatively small area of lost or converted natural communities, habitat loss/conversion resulting from Facility development is not considered significant.

*(ii) Forest Fragmentation*

Fragmentation may affect the movement, breeding, roosting, or nesting behavior of birds and bats across the landscape, which could degrade overall habitat suitability and result in reduced 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 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 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.

In order to assess forest fragmentation impacts to songbird and bat populations as a result of construction and operation of the Facility, WEST performed a fragmentation analysis that provided an overview of habitat fragmentation effects, quantified the acreage of forest anticipated to result in edge effects, and assessed potential impacts of fragmentation to state-listed species. The Habitat Fragmentation Analysis is attached as Appendix 22-G and summarized below.

Fragmentation Impacts to Birds

Sensitivity to habitat fragmentation varies by species, with forest interior species showing the highest degree of sensitivity (Bannerman 1998). Forest interior habitat located deep within woodlands has a relatively stable climatic environment with dense vegetation and woody debris that provides shelter and concealment from predators. As forests are cut, edges are created, which results in increased exposure to wind, sun, and predators. Some species of birds benefit from the creation of edge habitat, these species are typically habitat generalists that are adapted to use the variety of vegetation and food resources located within the forest edge.

Even though existing forests within the Facility are fragmented, several forest interior avian species were observed during breeding bird surveys, including red-eyed vireo, ovenbird, veery, scarlet tanager, wood thrush, and hooded warbler. These species have shown decreased reproductive success due to fragmentation in some studies (Donovan and Flather 2002, Robinson et al. 1995). Ground- or open-nesting species, such as hooded warbler, black-and-white warbler, ovenbird, veery and black-throated-blue warbler, are particularly vulnerable to the effects increased predation resulting from forest fragmentation. However, these species are common species in the landscape and population-level effects are unlikely to result from the construction of the Facility, as additional forest fragmentation is expected to be minimal.

While there is little information available on the effects of forest clearing for wind energy development to eastern forest birds, forest edge created by the development of roads and power lines has been shown to result in a decreased presence of forest interior bird species. However, narrow openings created within larger

forested areas, such as roads, appear to have a more limited effect with less reduction in use by forest dwelling species and no significant reduction in nest success (King and DeGraaf 2002, Ortega and Capen 1999, Askin 1994). The primary impact from construction of the Facility is likely an increase in predator activity along forest edges, which may result in increased nest predation and brown-headed cowbird (*Molothrus ater*) parasitism (Kroodsma 1982, Manolis et al. 2002). However, other species that use brushy habitats or edges may be positively affected by increased edge created as a result of Facility construction. Forest edges typically have a higher diversity of vegetation than interior forests, which can result in an increased diversity of wildlife species. Considering only 4.1% of forested habitat at the local level is expected to be cleared for construction and that the landscape consists of a patchwork of forested and non-forested habitat, it is unlikely that construction of the Facility will cause additional forest fragmentation impacts to bird communities.

Facility Site construction is also expected to result in a loss of 2.3% of herbaceous habitat at the local level. However, habitat fragmentation impacts to grassland birds are not expected to be substantial given the limited amount of herbaceous habitat present (1.1% of the area at the local level), which is generally scattered throughout the Facility Site and already subjected to fragmentation from development

Fragmentation Impacts to Bats

Forested fragmentation effects on bats are not well understood and effects may be different between species based upon each species' ecology (e.g., preferred prey, foraging areas, roosting needs, and flight morphology). Direct take of bat species during Facility construction is expected to be very unlikely as the Applicant will implement measures to minimize bat take. To the extent practicable, tree clearing for the Facility will take place during the winter when bats are hibernating or have migrated out of the Facility Site, and minimization measures to avoid direct take of bats will be implemented for all tree clearing that occurs outside of this time period. Suitable roosting areas for some species may be lost as a result of Facility construction; however, the creation of open areas and forest edge may benefit some species (such as little brown bat and big brown bat) by increasing foraging opportunities. Indirect impacts to bats may occur as a result of habitat loss, however, given the small percentage of forested habitat loss at the local scale, it is unlikely that habitat fragmentation will have an impact on any single bat species population.

(iii) Disturbance/Displacement of Wildlife

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, roosting, 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 Facility 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. An analysis of potential impacts to avian wildlife that may result from Facility construction was conducted by WEST and presented in the Avian Risk Assessment for the High Bridge Wind Project report, provided in Appendix 22-H. The following subheadings address potential disturbance/displacement impacts discussed in the report in relation to breeding birds, waterbirds, raptors, and game species.

Breeding Birds

While most of the Facility components will be located in forested habitats, the potential impacts of the Facility on forest-breeding birds should not affect any single species at a population-level. Disturbance and displacement are primarily caused by construction activities, and research has found that these effects are usually temporary and bird diversity rebounds over time. The fact that forest and forest edge birds are familiar with tall features (i.e., trees) in their habitat is thought to be a reason for the adaptability of many forest species to the presence of wind turbines (Kerlinger and Guarnaccia, 2009).

There is little information available on indirect effects from wind turbine facilities on eastern forest birds. For example, breeding bird surveys conducted prior to, during, and after construction of the Green Mountain Power Corporation's Wind Power Facility in Searsburg, Vermont, which is in a forested setting, the same diversity of species was detected during three survey periods following construction of the project. However, abundance and frequency of species occurrence at the study sites changed over the three periods (Kerlinger, 2002). The study found that abundance of forest interior species declined, while abundance of habitat generalists increased from that documented during preconstruction studies. Another example, at the Marble River Wind Farm, which is located in northeastern New York in an agricultural and forested setting, surveys to monitor breeding bird avoidance of turbines indicated there may have been some avoidance by bird species; however, the overall results were inconclusive as no consistent trends were detected across bird types or species between pre- and post-construction surveys (Bay et al., 2015).

Some degree of displacement to breeding birds in the direct vicinity of turbines is anticipated for certain species as habitat will be altered and human activity will increase. Bird species documented during the breeding bird surveys in the Facility Site such as red-eyed vireo, ovenbird (*Seiurus aurocapilla)*, black-throated green warbler, and Canada warbler have shown sensitivity to disturbance from wind energy development (Kerlinger, 2002). However, given the small amount of habitat in which displacement could occur compared to the total habitat available in the area surrounding the Facility, such displacement is not expected to adversely affect the viability of local populations. Additionally, if individuals of these species are displaced

from the Facility Site, it is unclear if displacement impacts would persist for the life of the Facility, given that some research shows that many species will habituate to the presence of turbines.

Although studies on the effects of bird displacement at wind energy facilities are limited, in particular for forested regions, most suggest indirect effects to be negligible or immeasurable (Howell and Noone 1992; Johnson et al. 2000a, 2002; Erickson et al. 2003; Madders and Whitfield 2006, Piorkowski 2006).

Waterbirds

Potential displacement impacts to waterfowl, waterbirds, and shorebirds from Facility operation are not expected to affect any single species at a population-level. Open water habitats preferred by these species are limited within the Facility Site (see Figures 3-1 and 22-2). Wind turbines have been sited in upland habitats away from these water bodies, and there will be no loss of open water wetlands as a result of Facility construction. 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.

Some species of waterbirds, primarily migrating geese, may forage in upland farm fields within the Facility Site. However, these birds are generally well-adapted to disturbed environments with heavy human influence such as along highways, in busy public parks, and on golf courses. Therefore, disturbance/displacement impacts to these species are not expected as a result of Facility operations.

During on site pre-construction surveys, overall use by waterfowl, waterbirds, and shorebirds was low and Canada goose comprised most observations in these groups. In addition, two years of post-construction surveys at a wind farm in Iowa that experienced high use by waterfowl due to its proximity to three wildlife management areas showed no displacement of waterfowl (Jain 2005). Based on these study results and the lack of preferred habitat present, the Facility is not anticipated to have displacement impacts to waterfowl, waterbirds, and shorebirds.

Raptors

A review of available research studies on raptor displacement at wind energy facilities conducted by WEST for the Avian Risk Assessment (Appendix 22-H) indicates that displacement effects have been shown to be negligible in most studies (Howell and Noone 1992; Johnson et al. 2000a, 2002; Madders and Whitfield 2006). Notable exceptions include a study in Scotland that described territorial golden eagles avoiding the entire wind energy Facility Site, except when intercepting non-territorial birds (Walker et al., 2005). Hen harriers (*Circus cyaneus:* a species related to northern harriers) and buzzards (*Buteo buteo*) showed reduced flight activity

around turbines at a wind energy facility in Europe (Pearce-Higgins et al., 2009). A study in Wisconsin found that raptor abundance was 47% less post-development compared to pre-construction levels; however, whether this possible displacement effect will remain constant over time, become more pronounced, or decrease through habituation was unknown (Garvin et al., 2011). Finally, a study at the Buffalo Ridge wind energy facility in Minnesota found evidence of northern harriers avoiding turbines in the year following construction, however, no large-scale displacement was detected two years after the facility was built, indicating that the species may have habituated to the facility (Johnson et al., 2003).

Avoidance of wind turbines by nesting raptors has only been reported in one study (Usgaard et al. 1997), while several studies have shown no avoidance behavior by nesting raptors (Erickson et al. 2004; Johnson et al. 2000, 2003). Avoidance behavior by nesting raptors was documented at the Buffalo Ridge facility in Minnesota, where raptor nest density was higher on land surrounding the wind energy facility than within the facility, even though habitat was similar (Usgaard et al. 1997). However, the analysis assumed that raptor nests are uniformly distributed across the landscape, which is not usually the case. Displacement of raptors that breed in forested habitats, such as red-tailed hawk, broad-winged hawk, and Cooper's hawk, may be displaced into nearby habitats if construction or operational activities occur near nesting sites, however, these impacts are unlikely to have a population-level effect on these common species. Further, multiple studies have documented raptors nesting and successfully fledging young within one mile of wind energy facilities (Erickson et al., 2004; Johnson et al, 2000, 2003).

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). Displacement of game species from a wind power site is not expected to be an issue; the Applicant's consultants have witnessed deer and turkey foraging in open fields directly adjacent to and beneath operating wind turbines at several New York wind projects.

(iv) Avian Collision Risk

Turbines pose a collision risk for birds and every wind energy facility in the U.S. likely results in some bird mortality. Avian fatality rates have been fairly consistent across the U.S. at most wind energy facilities that have been studied with appropriate methods. Evaluation of studies among wind energy facilities across North America showed that fatality rates for all bird species ranged from zero birds/MW/year to 77.0 birds/MW/year (Smallwood 2013). In the northeastern US (New York, Maine, New Hampshire, Maryland, and Pennsylvania)

and southern Ontario, Canada, regional avian fatality rates have ranged from zero birds/MW/year to 11.99 birds/MW/year, and at facilities in New York, bird fatality rates have ranged from 0.37 birds/MW/year to 6.20 birds/MW/year.

Breeding Birds

Collision risk varies between avian species based on abundance, use of habitat, and behavior. Passerines (songbirds) account for the highest percentage of wind-related fatalities in the U.S. and the northeast, with nocturnal migrants accounting for most fatalities. A review of post-mortality data from wind facilities in the northeast U.S. and southern Ontario found that passerines comprise 74.9% of all avian fatalities. Bird fatality rates have been observed to peak during the spring and fall migration seasons at most wind energy facilities, with lower numbers of fatalities occurring during the breeding season (Erickson et al., 2014).

Large-scale night migration-related mortality events are rare at wind energy facilities, and the few large-scale mortality events documented have been determined to be due to improper lighting. Minimization measures for facility lighting have since been developed to minimize such avian attractants, and provided the Facility implements these measures (see Appendix 18-A for preliminary lighting plan information), large-scale migration-related collision risk is expected to be low for migratory landbirds in the Facility.

Waterbirds

Although waterfowl, waterbird, and shorebird mortality at wind energy facilities has been highly variable, national research has demonstrated that these groups rarely collide with inland turbines. Waterbirds have been found to comprise approximately 3.5% of all fatalities in the northeastern U.S. and southern Ontario, based on a review of publicly available post-construction mortality data from wind facilities. The relatively low percentage of waterfowl fatalities has been consistent in fatality studies for wind energy facilities throughout the U.S. For example, at nine wind energy facilities in the Midwest and western US, waterfowl made up 2.5% of fatalities (Erickson et al., 2001). The NRC analyzed data from 14 studies (including four also used in Erickson et al., 2001) throughout the US and found that waterfowl composed about 2.0% of fatalities (NRC, 2007). Johnson and Stephens (2011) summarized results from 21 fatality monitoring studies in western North America and found that waterfowl, primarily mallards (*Anas platyrhynchos*), accounted for 1.9% of 1,247 avian fatalities. Finally, Johnson and Erickson (2011) reported a cumulative fatality rate of 2.1% for water-dependent species (waterfowl, waterbirds, and shorebirds combined) for 25 one-year studies at 23 wind energy facilities in the Columbia Plateau Ecoregion of Oregon and Washington.

During on-site surveys conducted at the Facility, waterbird, waterfowl, and shorebird use was mostly comprised of Canada goose observations, with all other species observed in relatively low numbers. While the Facility will expose low numbers of waterbirds, waterfowl, and shorebirds to risk from the turbines, the available data suggests that impacts will be low generally due to low collision impacts for these bird types and generally low use of the Facility.

Raptors

The fall raptor migration surveys completed by WEST showed the number of raptor observations per observer hour (excluding vultures) were lower than fall migration data collected at nearby HMANA raptor migration survey locations. Raptor observations per hour at nearby HMANA sites range from 11.20 raptors/hour (hr) at Franklin Mountain to 19.86 raptors/hr at Waggoner's Gap, while fall raptor migration rates recorded by WEST were 1.63 raptors/hr, respectively. Raptor migration rates recorded by WEST during migration surveys conducted in the spring (2.25 raptors/hr, respectively) were also lower than raptor migration rates recorded at spring HMANA sites (2.65 raptors/hr at Tussey Mountain and 2.73 raptors/hr at Hawk Mountain). In a review of publicly available post-construction mortality data from wind facilities in the northeastern U.S. and eastern Canada, raptors comprised only 3.7% of observed mortality. In New York State, publicly available post-construction monitoring data available from wind facilities revealed that raptor mortality rates averaged 0.17 raptors/MW/year and ranged from zero to 0.83 raptors/MW/year. Given the results of raptor use studies conducted at the Facility indicating relatively low use of the area by migrating raptors compared to nearby sites, the topographic and physiological features of the Facility, which are not conducive to concentrating migrant raptors, and the results of mortality monitoring studies at other New York wind facilities, raptor fatality rates at the Facility are expected to be similar to those at other northeastern wind facilities and are not expected to adversely impact any raptor species at a population level.

Based on eagle use data collected on-site and a review of publicly available information, there is some risk of turbine collisions for bald eagles. Bald eagles commonly soar at high altitudes while foraging, well above turbine blade heights, but they also hunt from perches and flap low over treetops near waterbodies and marshes within the turbine rotor swept height when foraging for prey (NYSDEC, 2016a). However, the absence of large water bodies in the Facility Site reduces the likelihood of collisions due to this behavior. A total of 56 bald eagle fatalities have been recorded at wind energy facilities (Pagel et al. 2013 [six bald eagle fatalities], C. Stihler, WVDNR, pers comm. [one bald eagle fatality], and USFWS 2018 [49 bald eagle fatalities]). Five of the bald eagle fatalities are known to have occurred in the Northeast; one in Maryland at a non-utility scale turbine, one each in New York and West Virginia at wind energy facilities, and two at a wind energy facility in Ontario, Canada. [redacted]

[redacted].

Based on eagle use data collected on-site and a review of publicly available information, there is a negligible risk of turbine collisions for golden eagles. No golden eagles are known to nest in New York, as the eastern population of golden eagles breeds in Canada and primarily winters in the central Appalachians from New York south and west through Pennsylvania, Maryland, Virginia, and West Virginia (Katzner et al. 2012). Therefore, the primary times that golden eagles may occur over the Facility Site are during spring and fall migration as demonstrated by data collected during on-site surveys for the Facility. In a review of publicly available post-construction monitoring reports from 28 facilities, 49 golden eagle fatalities were identified during standard monitoring surveys; however, none have been reported in the northeastern U.S. [redacted].

(v) Bat Collision Risk

Wind energy development has shown to result in higher direct impacts to bats than birds, with an estimated 500,000 bats killed annually by wind turbines across the U.S. and Canada. Fatality estimates across the U.S. range from zero bats/MW/year to 49.7 bats/MW/year (American Wind Wildlife Institute [AWWI] 2018a). In the northeastern US (New York, Maine, New Hampshire, Maryland, and Pennsylvania) and southern Ontario, Canada, overall bat fatality rates have ranged from zero bats/MW/year to 51.76 bats/MW/year. On a state level, bat mortality ranged from 1.78 to 16.3 bats/MW/year, or an average of 5.74 bats/MW/year. Collision risk is highest for migratory, tree-roosting species of bats (hoary, silver-haired, and eastern red bat), which account for an estimated 72% of all bat fatalities. [redacted].

(vi) 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. Smaller scale travel corridors that 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.

While no wildlife concentration areas have been identified within the Facility Site. Potential wildlife concentration areas are in proximity to the Facility, including to three Important Bird Areas (IBA) within 16.1 km (10 mi) of the Facility Site, which have been identified by the National Audubon Society as places that provide important habitat for birds. The three IBAs that fall within 16.1 km (10 mi) of the Facility Site are the Catskills Peaks, Long Pond State Forest, and Pharsalia Woods. The Catskills Peaks global IBA is approximately 8 km (5 mi) from the Facility Site and contains one of the largest contiguous forest tracts in New York, with forests covering approximately 97% of the IBA. Numerous species of birds are known to occur within the IBA including the state threatened bald eagle, and state species of special concern cerulean warbler (*Setophaga cerulea*), Cooper's hawk (*Accipiter cooperii*), northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), red-shouldered hawk (*Buteo lineatus*), and sharp-shinned hawk (*Accipiter striatus*), which have all been recorded during the breeding season. The Long Pond State Forest IBA is approximately 13 km (8 mi) from the Facility Site and is an important breeding area for grassland birds, including the grasshopper sparrow (*Ammodramus savannarum*; state species of special concern) and Henslow's sparrow (*A. henslowii*; state threatened; Audubon 2013b). Pharsalia Woods IBA is approximately 8 km (5 mi) from the Facility Site and composed of high elevation forests surrounded by open farmland and contains some of the largest unfragmented stands of hardwood and mixed forest in western New York (Audubon 2013c). The IBA supports a variety of breeding forest birds including the state threatened northern harrier, and four raptor species of special concern (sharp-shinned hawk, Cooper's hawk, northern goshawk, and red-shouldered hawk).

Four State Forests are located within 8 km (5 mi) the Facility Site: Lyon Brook, Basswood, Wiley Book, and South Hill. These properties are managed by the State for recreational opportunities and contributions to ecosystem health. No other possible wildlife concentration areas are located near the Facility Site.

The proposed Facility is not expected to have any impacts to wildlife travel corridors or concentration areas, as neither type of wildlife habitat has been identified within the Facility Site.

(4) Impacts to Wildlife from Application of Biocides

Per the terms of landowner lease agreements, the Applicant is not permitted to apply pesticides, herbicides, or biocides without the consent of the landowner. Therefore, it is anticipated that no biocides will be used within the Facility.

(5) Summary of Impacts to Wildlife Habitat

A summary table quantifying anticipated temporary and permanent impacts to wildlife habitats and vegetation cover types associated with the construction and operation of the Facility is provided in Table 22-4.

**Table 22-4. Impacts to Wildlife Habitat[6]**

| Cover Type | Temporary Impact (acres)[1] | Permanent Conversion (acres)[2] | Permanent Impact (acres) | Total Impact |
|---|---|---|---|---|
| Beech-Maple Forest | 79.6 | 78.6 | 25.0 | 183.2 |
| Hemlock-Northern Hardwood Forest | 4.9 | 3.4 | 1.2 | 9.5 |
| Successional Old Field | 7.1 | 6.3 | 2.3 | 15.7 |
| Hayfield/Pasture[3] | 35.8 | n/a | 10.7 | 46.5 |
| Row Crops[3] | 10.0 | n/a | 3.6 | 13.6 |
| **Total** | **114.4** | **111.3** | **42.8** | **268.6** |

[1] Areas not maintained by the Applicant. Unless otherwise disturbed by the landowner, these areas would likely return to their pre-disturbance state with time.
[2] Areas where the Applicant would maintain a successional state to allow for Facility maintenance activities to be conducted. It is anticipated that all areas not converted to built facilities within 15 feet of collection lines, within 10 feet of access road edges, and within 100 feet of wind turbine pads would be maintained. All areas outside of these distances would not be maintained by the Applicant.
[3] Buried collection line rights-of-way, access road shoulders, and areas adjacent to wind turbine pads will not be maintained by the Applicant where they cross active agricultural or developed land, unless otherwise mandated in landowner lease agreements.

(i) 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, NYNHP, NYSDEC state and regional offices, and direct observations made on-site. The Applicant requested site-specific data from the USFWS's IPaC database and the NYNHP database to determine the presence of threatened, endangered, candidate, or special concern species that may occur in the Facility Site (see Appendices A and B of the Net Conservation Benefit Plan (Appendix 22-F)). See Table 22-3 in Exhibit 22(d) for a list of all special status species identified, a brief description of the ecological requirements of each species, the source whereby each species is known to occur within the vicinity of the Facility Site, and whether the species was observed during on-site surveys.

[6] Only vegetative communities identified in Exhibit 22(a) that provide wildlife habitat are included in this table. Disturbed/developed community types were excluded. See Table 22-6 for impacts to wetland habitat types.

From the above sources, it was determined that one federally listed species could occur within vicinity of the Facility Site, the northern long-eared bat. This species is a federal-listed threatened mammal that is also state-listed as threatened and a High Priority SGCN. Northern long-eared bat is discussed in detail in the Net Conservation Benefit Plan.

State-listed bird species identified by the sources above or during on-site surveys included two state-listed endangered bird species (peregrine falcon and golden eagle) and two state-listed threatened species (northern harrier and bald eagle).

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, 2017a). A total of seven avian state-listed species of concern were identified through site-specific correspondence with the above sources, direct observation on-site, or review of other sources used to prepare the Wildlife Inventory as discussed in Section (e)(2). These species included common loon, common nighthawk, Cooper's hawk, grasshopper sparrow, osprey, red-shouldered hawk, and sharp-shinned hawk.

New York State maintains a Comprehensive State Wildlife Strategy that includes a list of Species of Greatest Conservation Concern (SGCN) (NYSDEC, 2017b). This list describes species that are rare or declining. Species listed as High Priority Species of Greatest Conservation Need (SGCN-HP) need timely management intervention to avoid reaching critical population levels in New York, specifically needing conservation actions within the next ten years. Species of Greatest Conservation Need (SGCN) are species that are experiencing some level of population decline and need conservation actions to maintain stable populations or sustain recovery. 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. There are six SGCN or SGCN-HP species that have been observed within or near the Facility Site that are not also listed as threatened, endangered, or of special concern.

A description of impacts to threatened, endangered, special concern, and SGCN species for which some level of impact is expected is provided in the following sections. A summary of impacts for these species is provided in Table 22-5. Note that some species listed in Table 22-3 are not expected to be impacted at all by Facility construction or operation, because they either do not occur at the Facility, or occur so rarely as to not be detected during on-site surveys and as a result were excluded from Table 22-5.

(ii) 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 or the NYNHP. 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.

(iii) Impacts to Special Status Birds

As noted in Exhibit 22(d), several special status species have been identified as occurring or having the potential to occur at the facility site. Potential impacts to these species resulting from Facility construction and operation are discussed below. For more details on the impacts to Special Status Birds, refer to the Avian Risk Assessment (Appendix 22-H).

*Golden Eagle*

As noted in previous sections, the golden eagle is a state-listed endangered species that likely will not be impacted by the Facility. During on-site surveys, golden eagles were only recorded during spring and fall migration, and only 12 observations (three during eagle use surveys [0.01 golden eagles/hour] and nine during raptor migration surveys [0.02 golden eagles/hour]) were recorded. Facility construction is anticipated to have negligible impacts on golden eagle populations, as the species is largely absent from the Facility Site outside of the migration period. Potential indirect impacts due to Facility operations could include displacement, as some research indicates that individuals may adjust migration routes due to the presence of turbines. [redacted].

*Peregrine Falcon*

The state endangered peregrine falcon was not identified as potentially occurring within the Facility Site during agency correspondence; however, two observations were recorded during raptor migration surveys. Peregrine falcons occur mostly in open country, including open forests, and nest high on rocky outcrops and buildings (White et al., 2002). Based on a review of publicly available post-construction monitoring studies from wind energy facilities in New York did not indicate any records of peregrine falcon mortality, direct impacts to the species from Facility operation are unlikely. Based on the limited number of observations of peregrine falcons during pre-construction surveys, indirect impacts to the species are not expected to result from Facility construction and operation; therefore, the Applicant will not seek Incidental Take Authorization.

*Bald Eagle*

The NYNHP review identified the state-threatened bald eagle as nesting within 16.1 km (10 mi) of the Facility. During on-site surveys, bald eagles were recorded during eagle use surveys (26 observations [0.07 bald eagles/hour]) and raptor migration surveys (68 observations [0.12 bald eagles/hour]). Some displacement of bald eagles may occur due to construction and operation as some studies have shown that bald eagles tend to avoid development. However, the bald eagle population continues to increase rapidly in New York and the species has been observed using and showing compatibility in areas with higher human presence. Optimal foraging habitat (i.e., large lakes and rivers) is limited within the Facility, and more optimal foraging habitat (large lakes and rivers) is found outside of the Facility Site. Indirect impacts to potential bald eagle optimal foraging areas are expected to be minimal as Facility components will be sited in upland areas and there will be no loss of open water wetlands. Any bald eagles present in winter may forage in the Facility Site; however, the surrounding landscape is similar in composition and the Facility Site likely doesn't serve as an attractant to foraging bald eagles in winter. Indirect impacts to nesting bald eagles are also expected to be minimal as the nearest occupied and active bald eagle nest site is approximately [redacted] from the Facility. Bald eagles are more likely to nest outside of the Facility along the Unadilla River and Chenango River as these areas provide more suitable nesting locations and foraging opportunities than habitats within the Facility. [redacted].

*Northern Harrier*

The state threatened northern harrier was not identified as potentially occurring within the Facility Site during agency correspondence; however, 17 observations were recorded during pre-construction avian surveys at the Facility by WEST. Northern harriers primarily occupy large, open wetlands and grasslands, and will nest in a variety of habitats including fields, grasslands, meadows, marshlands, and other open habitats with little or no woody vegetation. Northern harriers are known to breed in Chenango County and have been recorded within a block of the New York State Breeding Bird Atlas that overlaps the Facility Site. One northern harrier observation was recorded during breeding bird surveys and observations were recorded during eagle use surveys and raptor migration surveys within the breeding season (April 15-August 31: PGC 2012), suggesting the species may breed within or near the Facility Site. As discussed in Section (f), studies have shown some indirect displacement impacts to northern harriers from wind energy development; however, large-scale displacement has not been observed.

A review of publicly available data indicates that northern harriers appear to be at low risk of collision with wind turbines, as they are rarely found as fatalities at wind energy facilities where the species is often

observed. The hunting habits of northern harriers typically involve low, coursing flights over grassland habitats, which likely decreases the potential for this species to collide with a wind turbine. Northern harriers may fly higher when conducting aerial courtship displays or during migration, however, data collected during the raptor migration surveys in the Facility Site indicate that this is a relatively uncommon event in the Facility (66.7% of flights recorded were below the rotor swept zone). Additionally, only three of the known 23 northern harrier fatalities occurred in the northeastern U.S. and southern Ontario, Canada. Northern harriers are not expected to be especially vulnerable to turbine collisions and impacts from Facility construction and operation are not expected to result in population declines for this species; therefore, the Applicant will not seek Incidental Take Authorization.

*State Species of Concern*

Seven state species of special concern were documented during surveys within the Facility Site (Cooper's hawk, sharp-shinned hawk, red-shouldered hawk, common loon, osprey, common nighthawk, and grasshopper sparrow). Twenty-four observations of common loons were recorded during raptor migration surveys and eagle use surveys. No common loon nesting habitat is present within the Facility Site and impacts to this species are not expected based on the limited number of observations during all Facility Site surveys. Only one observation each was reported for common nighthawk and grasshopper sparrow during all surveys, suggesting limited use of the Facility Site and a low risk of impacts from construction and operation of the Facility Site.

The remaining species of special concern are raptors which have shown negligible displacement impacts and lower fatality rates at wind energy facilities across the northeastern US and southern Ontario, Canada. All the raptor species observed likely pass through the Facility Site during migration and may be at risk of turbine collision; however, impacts from the construction and operation of the Facility Site are not expected to cause local population declines.

One observation of Cooper's hawk and one of sharp-shinned hawk were recorded during breeding bird surveys. Forest clearing for infrastructure construction represents the most immediate impact to breeding raptors. However, forest clearing is anticipated to be conducted between November 1 and March 31, which is outside the nesting period for many forest dwelling bird species and minimizes or avoids impacts to these species. If tree clearing is needed during the nesting season for forest dwelling birds (May 15 – July 15) or eagles (February 1 – June 30), the Applicant will implement minimization measures to reduce indirect impacts to breeding raptors that could result from tree clearing.

There were four state species of concern identified by NYNHP in initial correspondence for Chenango County as potentially occurring in the vicinity of the Facility Site that were not documented during on-site surveys: Henslow's sparrow, pied-billed grebe, least bittern, sedge wren. Further, no observational records were identified in any of the reviewed public sources. 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.

(iv) Impacts to State-listed Bat Species

Special status bat species that may occur in the Facility Site based on their known range include the state- and federal-threatened northern long-eared bat. This species hibernates 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 and foraging habitat for northern long-eared bat. Potential impacts to northern long-eared bat could include loss of foraging/roosting habitat associated with tree removal, direct mortality due to tree clearing, and turbine-related mortality during Facility operation.

Seven northern long-eared bat fatalities have been reported at wind energy facilities in New York and the surrounding region (Pennsylvania and Wolfe Island, Ontario). The USFWS has 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 northern long-eared bats have been recorded in Chenango County. The closest known county with summer maternity records is approximately 42 mi away from the Facility and the closest known hibernaculum is approximately 46 mi away from the Facility. However, NYSDEC considers the range of the northern long-eared bat to include all of New York State during fall migration (July 1 – October 1; NYSDEC, 2016b). Therefore, the Applicant has developed a Net Conservation Benefit Plan (NCBP) to ensure there are no long-term impacts to state-wide or range-wide northern long-eared bat populations from the Facility (Appendix 22-F).

*(v)* Impacts to Special Status Amphibians and Reptiles

No special status amphibian or reptile species were identified by NYNHP as occurring within the Facility Site.

Based on the New York State Amphibian and Reptile Atlas Project (NYS Herp Atlas) database, one reptile species of special concern, wood turtle, could potentially occur in the Facility Site. This species was not observed during on-site surveys. This species prefers slow-moving water with vegetated banks and soft bottoms. 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. If present, direct mortality through Facility construction will be limited for these species. The Facility design has been modified to minimize impacts to wetland and open water habitats wherever possible and tree clearing within riparian areas will be limited. Please see Exhibit 23(b)(5) and (e)(2) for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms, respectively.

Three amphibian species of special concern, eastern hellbender, eastern longtail salamander, and the Jefferson/blue-spotted salamander complex, may occur in the Facility Site based on data from the NYS Herp Atlas (NYSDEC, 2007a). In addition, the Jefferson/blue-spotted salamander complex was observed on-site during vernal pool surveys. The eastern hellbender is found in swift running, well oxygenated rivers. The longtail salamander and the Jefferson/blue-spotted salamander complex is usually found along the borders of streams and wetlands. Impacts to these salamander species could occur in areas that might be disturbed during construction. However, no potential vernal pools in which Jefferson/blue-spotted salamander complex egg masses were observed will be impacted (See Exhibit 22(d)(4)). In addition, impacts to populations of these salamander species have been minimized through changes to Facility design, including rerouting of access roads that have been made to avoid impacts to wetlands and vernal pools within the Facility Site. Avoidance and minimization measures, including the use of horizontal directional drilling (HDD), will be implemented to minimize impacts to these habitat types within the Facility. See Exhibit 22(m) for further discussion of wetland and vernal pool impacts, and Exhibit 22(n) and Table 9-1 for additional detail on avoidance and minimization measures.

(vi) Impacts to Special Status Invertebrates

No special status invertebrates were identified by NYNHP as occurring within the Facility Site. Two state-threatened species of mussels, green floater (*Lasmigona subviridis*) and brook floater (*Alasmidonta varicose*), have been documented in within or adjacent to the Facility Site. Neither of these species were identified within the Facility Site during on site surveys, and aquatic habitats in the Facility are largely unsuitable to host these species. Further, no suitable habitat for these species will be impacted by construction of the Facility. Therefore, no impacts to special status invertebrate species are anticipated as a result of Facility construction or operation. See Exhibit 23 for additional detail on avoidance and minimization measures for impacts to surface waters and aquatic organisms.

(vii) Impacts to Species of Greatest Conservation Need

Fourteen avian species (American kestrel, black-billed cuckoo, black-throated blue warbler, blue-winged warbler, cedar waxwing, Louisiana waterthrush, prairie warbler, ruffed grouse, scarlet tanager, wood thrush, bobolink, brown thrasher, Canada warbler, and eastern meadowlark) with SGCN-HP or SGCN status (but not state-listed) were observed during on-site surveys. 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. Impacts to wood thrush and scarlet tanager are unlikely to occur during construction, as these are forest species and tree clearing will primarily be conducted when these species have migrated south. Impacts to ruffed grouse, a species that occupies forests year-round, are expected to be minimal due to the amount of forested habitat available on a regional scale. None of these 14 species are listed as threatened, endangered, or of special concern, and all 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 influence regional, statewide or range-wide populations of these species.

Silver-haired bat, eastern red bat, and hoary bat are three species of mammals with SGCN status that may occur within the vicinity of the Facility Site. Direct mortality due to Facility construction is expected to be unlikely due to the timing of tree clearing. Tree clearing is anticipated will take place between November 1 and March 31 to the extent possible, which is outside of the breeding and activity periods for these species. As outlined in the NCBP, the Applicant will implement measures to avoid and minimize impacts to the northern long-eared bat for tree clearing outside of these dates, which will also minimize impacts to other bat species. Facility operation could potentially result in direct impacts to these species due to turbine collisions; however, Section (h) includes discussion of a curtailment plan to minimize impacts to the northern long-eared bat that will also reduce operational impacts to all bat species. These other bat 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 influence statewide or range-wide populations.

**Table 22-5. Summary of Temporary and Permanent Impacts for New York State Special Status Species that Have the Potential to Occur Within the Facility Site**

| Species | Temporary Impacts Anticipated Due to Construction | | | Permanent Impacts Anticipated Due to Operation and Maintenance | | | |
|---|---|---|---|---|---|---|---|
| | Indirect Impacts | | Direct Impacts | Indirect Impacts | | | Direct Impacts |
| | Displacement | Habitat Disturbance | Injury or Mortality | Habitat Loss | Habitat Fragmentation | Displacement | Injury or Mortality[2] |
| **State Endangered Species** | | | | | | | |
| Peregrine Falcon[1] *Falco peregrinus* | none | none | none | none | none | none | unlikely |
| Golden Eagle *Aquila chrysaetos* | unlikely | unlikely | unlikely | unlikely | unlikely | unlikely | unlikely |
| **State Threatened Species** | | | | | | | |
| Northern Long-Eared Bat *Myotis septentrionalis* | unlikely | unlikely | unlikely | unlikely | unlikely | unlikely | unlikely |
| Northern Harrier *Circus hudsonius* | none | none | none | none | none | unlikely | unlikely |
| Bald Eagle *Haliaeetus leucocephalus* | unlikely/temporary | unlikely/temporary | unlikely | unlikely | unlikely | unlikely | likely |
| **State Species of Special Concern** | | | | | | | |
| Common Loon[1] *Gavia immer* | none | none | none | none | none | none | unlikely |
| Grasshopper Sparrow[1] *Ammodramus savannarum* | none | none | none | none | none | none | unlikely |
| Wood Turtle *Glyptemys insculpta* | unlikely | unlikely | unlikely | none | none | none | none |
| Eastern Box Turtle *Terrapene carolina* | unlikely | unlikely | unlikely | none | none | none | none |
| Red-shouldered Hawk *Buteo lineatus* | none | none | none | unlikely | unlikely | unlikely | unlikely |
| Eastern Small-footed Myotis *Myotis leibii* | none | none | none | none | none | unlikely | unlikely |
| Eastern Longtail Salamander *Eurycea longicauda* | unlikely | unlikely | unlikely | unlikely | unlikely | none | none |

| Species | Temporary Impacts Anticipated Due to Construction | | | Permanent Impacts Anticipated Due to Operation and Maintenance | | | |
|---|---|---|---|---|---|---|---|
| | Indirect Impacts | | Direct Impacts | Indirect Impacts | | | Direct Impacts |
| | Displacement | Habitat Disturbance | Injury or Mortality | Habitat Loss | Habitat Fragmentation | Displacement | Injury or Mortality[2] |
| Osprey[1] *Pandion haliaetus* | none | none | none | none | none | none | unlikely |
| Cooper's Hawk *Accipiter cooperii* | unlikely | unlikely | none | unlikely | unlikely | unlikely | unlikely |
| Sharp-shinned Hawk *Accipiter striatus* | unlikely | unlikely | none | unlikely | unlikely | unlikely | unlikely |
| Common Nighthawk[1] *Chordeiles minor* | none | none | none | none | none | none | unlikely |
| Jefferson/blue-spotted Salamander complex *Ambystoma jeffersonianum x lat* | unlikely | unlikely | unlikely | unlikely | unlikely | none | none |
| Eastern Hellbender Cryptobranchus alleganiensis | none | none | none | none | none | none | none |
| **High Priority Species of Greatest Conservation Need** | | | | | | | |
| Bobolink *Dolichonyx oryzivorus* | potential | potential | none | unlikely | unlikely | potential | potential |
| Eastern Meadowlark *Sturnella magna* | potential | potential | none | unlikely | unlikely | potential | potential |
| Whimbrel *Numenius phaeopus* | None | none | none | none | none | none | unlikely |
| **Species of Greatest Conservation Need** | | | | | | | |
| American Kestrel *Falco sparverius* | unlikely | unlikely | none | unlikely | unlikely | unlikely | unlikely |
| Ruffed Grouse *Bonasa umbellus* | potential | potential | none | unlikely | unlikely | potential | unlikely |
| Wood Thrush *Hylocichla mustelina* | unlikely | unlikely | none | unlikely | unlikely | potential | potential |
| Scarlet Tanager *Piranga olivacea* | unlikely | unlikely | none | unlikely | unlikely | potential | potential |
| Silver-haired Bat *Lasionycteris noctivagans* | unlikely | unlikely | none | unlikely | unlikely | potential | potential |

| Species | Temporary Impacts Anticipated Due to Construction | | | Permanent Impacts Anticipated Due to Operation and Maintenance | | | |
|---|---|---|---|---|---|---|---|
| | Indirect Impacts | | Direct Impacts | Indirect Impacts | | | Direct Impacts |
| | Displacement | Habitat Disturbance | Injury or Mortality | Habitat Loss | Habitat Fragmentation | Displacement | Injury or Mortality[2] |
| Eastern Red bat *Lasiurus borealis* | unlikely | unlikely | none | unlikely | unlikely | potential | potential |
| Hoary bat *Lasiurus cinereus* | unlikely | unlikely | none | unlikely | unlikely | potential | potential |

[1]Based on the result of on-site surveys and publicly available data, the species either rarely occurs or does not occur at the site, however, based on the species' range and migration behavior, there is a low risk of the species colliding with turbines during migration.
[2] Species that could potentially be directly impacted by Facility operation are species that have been documented as fatalities at other New York wind facilities that are likely to occur at the Facility.

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

(1) Plant Communities

With respect to measures to avoid or mitigate impacts to plant communities (including vegetation), please see Exhibit 22(c).

(2) Wildlife and Wildlife Habitat

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. Minimization 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. Please see the NCBP provided in Appendix 22-F for further information regarding additional measures that the Facility will take to avoid, minimize, and mitigate for impacts to birds and bats.

Minimization of 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 logging roads, the edges of agricultural fields, and other previously disturbed areas to minimize impacts to, and fragmentation of, wildlife habitat. Cleared forest land along Facility access roads and at the periphery of turbine sites will be allowed to regenerate in areas that are not required for Facility maintenance, which will provide habitat for early successional species over the short term and will eventually support forest species in the long term.

The Facility has been designed to minimize bird and bat collision mortality (see NCBP, Appendix 22-F). To reduce avian and bat impacts, electrical collection lines between the turbines will 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 while maintaining safety and site security in line with the proposed measures outlined in Exhibit 18 and Appendices 18-A, 18-B, and 18-C. The use of guy wires will be minimized to the extent practicable and all guy wires will be marked to reduce collisions. In addition to Facility design features, an adaptive management plan to reduce

northern long-eared bat fatalities is included in the NCBP, which will also reduce risk to all bat species including migratory bats.

(3) Special Status Species

Construction and operation of the Facility may result in some level of impact to northern long-eared bat. An estimate of take was calculated as part of a NCBP for the Facility, based on a 25-turbine layout and the incorporation of avoidance and minimization measures to reduce impacts to listed species. Although take of the species has been conservatively calculated and included in the NCBP for the Facility actual take of the species is unlikely.

Post-construction data collected from more than 30 post-construction studies from within 100 miles of the Facility was used to develop a take estimate for northern long-eared bat. Data was filtered to exclude studies that occurred prior to the onset of WNS in each of the studied populations. Collision risk at the Facility for northern long-eared bat would be limited to the fall migration period as defined by the NYSDEC (July 1 – October 1) because no summer maternity records exist for northern long-eared bat in Chenango County, New York and there are no known spring northern long-eared bat fatalities. [redacted]. Although this is a conservative estimate, and the last known northern long-eared bat fatality at a wind facility in New York occurred in 2011, compensatory mitigation will be implemented to offset potential take of northern long-eared bats in order to ensure a net conservation benefit for the species.

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

(1) Comparative Analysis of Avian and Bat Use at the Facility

Numerous avian pre-construction surveys were conducted to support the Article 10 Application. In combination with data provided by local experts and obtained from publicly available sources, the results of these surveys have been used to assess potential impacts the Facility could have on birds. Per consultations with NYSDEC, impacts to bats from Facility construction and operation are expected to be similar to impacts observed at similar wind facilities in New York; therefore, the analysis of cumulative impacts to bats is based on pre- and post-construction studies conducted at other wind facilities in the region.

(i) Pre-construction Surveys

Avian pre-construction surveys were conducted by WEST between 2018 and 2019. As mentioned above in Section (d), multiple reports providing the results of avian surveys were submitted to the USFWS and NYSDEC and are included with this Application in Appendix 22-D. The methods and results of these surveys, as provided in these reports, are summarized in this section.

*Breeding Bird Surveys*

WEST conducted breeding bird surveys between May and July in 2018 to establish baseline data for avian species occurring and breeding within the various habitats in the Facility Area, to investigate breeding bird use and the potential presence of sensitive or state-listed birds, and provide a baseline of bird use data to be used for a future before-after-control-impact (BACI) analysis. Breeding bird survey protocols were developed in accordance with the NYSDEC Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects (NYSDEC, 2016a) and were approved by the NYSDEC in May 2018.

WEST conducted surveys along fourteen 300-meter-long transects that were systematically placed within major habitat types in the preliminary Facility Area at areas where turbines are proposed and at control areas away from turbines. Each transect consisted of six, 50-meter-radius survey plots placed 50 meters apart, and each plot was surveyed between a half-hour before sunrise and four hours after sunrise for five minutes. Surveys were conducted weekly between May 21 and July 22, 2018. All avian species seen or heard within the survey plot were recorded. Nine transects were centered on proposed turbine locations and five were in control areas outside turbine areas where no impact was expected to occur. Of the nine Turbine transects, two were located in non-forested vegetation and seven were located in forested vegetation, which is generally representative of the proportion of turbines in each vegetation type (76% of turbines are proposed in forested vegetation and 4% are proposed in non-forested vegetation based on aerial imagery). Of the five Control transects, two were in non-forested vegetation and three were located in forested vegetation

WEST recorded 2,786 bird observations within 2,434 separate groups. A total of 94 species were detected, excluding unidentified birds that could be identified to genus only. The most common species observed included five species accounting for 36.1% of all observations: red-eyed vireo (261 observations; *Vireo olivaceus*), ovenbird (212; *Seiurus aurocapilla),* song sparrow (153; *Melospiza melodia*), common yellowthroat (144; *Geothlypis trichas*), gray catbird (123; *Dumetella carolinensis*), and black-capped chickadee (114; *Poecile atricapillus*) Species diversity ranged from 8.00 species/transect/survey at transect T4 to 18.44 species/transect/survey at transect C1. For both control and turbine transects, use varied across the Facility

Area, with no consistent differences in use between transects dominated by either non-forested or forested vegetation types.

No federally threatened or endangered birds were observed during breeding bird surveys. One state-threatened species, northern harrier was observed during surveys. Three NYSDEC species of special concern were also observed during surveys (Cooper's hawk, sharp-shinned hawk, and grasshopper sparrow). Additionally, 14 SGCN-HP or SGCN status species were observed during surveys (American kestrel, black-billed cuckoo, black-throated blue warbler, blue-winged warbler, cedar waxwing, Louisiana waterthrush, prairie warbler, ruffed grouse, scarlet tanager, wood thrush, bobolink, brown thrasher, Canada warbler, and eastern meadowlark). Additional detail regarding the breeding bird surveys is provided in the Pre-Construction Bird Surveys for the Bluestone Wind Project report included in Appendix 22-D.

*Eagle Use Surveys*

The first year of surveys to document eagle use of the Facility Site were conducted by WEST between March 2018 and February 2019 consistent with the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS, 2013). A second year of surveys is ongoing and field work will be completed in March 2020. Initially, 10 survey plots were established and surveyed from March 1 to May 31, 2018 in accordance with the USFWS' ECPG recommendations for 30% coverage of a proposed wind project. An additional four plots were added and surveyed June 1, 2018 to February 10, 2019, in response to recommendation from the USFWS for adding more plots to increase coverage of the Survey Area and account for possible turbine array shifts. Surveys were conducted monthly from March 2018 – February 2019. In response to recommendations made by the USFWS regarding migrating golden eagles in the region where the Survey Area is located, survey intensity increased to weekly surveys at all plots during the spring (March 1 – March 31) and fall (October 15 – December 8). Additional detail regarding eagle use survey protocols is provided in the Eagle Observation Survey Protocol for the High Bridge Wind Project reports submitted to the USFWS and NYSDEC in March 2019 and included in Appendix 22-D.

Between March 1, 2018 and February 10, 2019, a total of 400 hours of eagle observation surveys were conducted. Each survey was conducted from a central point within an 800 meter-radius survey plot for one hour. Surveys were conducted in all weather conditions except when visibility was reduced to <800 meters, and were stratified across a range of daylight hours between 0800 and 1700 hours.

During the first year of eagle use surveys, all large birds were recorded, including all species of raptors, waterfowl, and corvids. A total of 643 birds were observed within 493 separate groups during surveys. Of

these, turkey vulture and red-tailed hawk comprised 67.7% of all observations. Eleven species of raptors were recorded, with red-tailed hawk and broad-winged hawk being the most common species observed. There were a total of 27 bald eagle observations during year one. Bald eagles were observed during all seasons except winter. Bald eagle use was highest during the summer (0.13 bird/800-m plot/60-minute survey), followed by fall (0.07), and spring (0.04). Three golden eagle observations were made during surveys and all observations were in the spring and fall. Golden eagles use during the fall was 0.02 bird/800-m plot/60-minute survey; the spring golden eagle observation was outside of the 800-m plot and not included in the analysis. No bald or golden eagles were observed in the winter. Six other species of concern were also recorded, including the state-threatened northern harrier and five state species of special concern (Cooper's hawk, sharp-shinned hawk, red-shouldered hawk, common loon, and osprey). Further details regarding the results of eagle surveys can be found in the Eagle Use Studies for the High Bridge Wind Project report, provided in Appendix 22-D.

*Raptor Migration Surveys*

In order to assess the spatial and temporal use of the Facility Area by migrating raptors, WEST conducted raptor migration surveys within the peak periods of migration in the fall (August 15 – December 10) and spring (March 3 – May 31) of 2018 following recommendations in the New York State Department of Environmental Conservation *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects* (NYSDEC, 2016). Surveys were conducted in the Facility Area at two locations in the fall (using methods outlined by the Hawk Migration Association of North America (HMANA). Survey plots were centered on a single plot and were selected based upon terrain and vegetation to provide the best possible 360$^{o}$ viewshed. Surveys were conducted at each location once per week between 0800 hours and two hours prior to sunset.

A total of 546 hours of surveys were conducted, and a total of 1,040 individual raptors of 15 species were recorded. Broad-winged hawk and red-tailed hawk were the species with the highest number of observations, both of which are common New York raptor species. Two state-endangered species, golden eagle and peregrine falcon, and two state-threatened species, bald eagle and northern harrier, were recorded. Six state species of special concern were also recorded; Cooper's hawk, sharp-shinned hawk, red-shouldered hawk, osprey, common loon, and common nighthawk. Flight height varies by species, but on average, 63.9% of migrating raptors observed were recorded within the rotor-swept height of turbines. Overall raptor use was higher in the spring at 2.23 birds/survey hour than in the fall (1.41 birds/survey hour). Results of the 2018 raptor migration surveys are presented in the Raptor Migration Surveys for the Bluestone Wind Project report, included in Appendix 22-D.

*Raptor Nest Aerial Survey*

As part of an assessment of the potential risk the Facility could pose to eagles, WEST conducted aerial surveys in spring 2019 to search for eagle nests within 10 miles of the Facility Site. Non-eagle raptor nests within the Facility Site were also documented. The survey focused on species that build large nest structures, such as bald eagle and red-tailed hawk. Twelve bald eagle nests were documented, eight occupied and active [i.e., documented adult with eggs or nestlings], one occupied and inactive [i.e., documented adult nearby, no eggs or nestlings observed], and three unoccupied [not in-use. None of these nests are located within the Facility Site. [redacted]. Results of aerial surveys are presented in a technical memorandum provided by WEST on June 14, 2019, included in Appendix 22-D.

(ii) Cumulative Avian Impacts

Based on the results of the pre-construction avian surveys detailed above, direct impacts to avian species resulting from turbine collisions at the Facility are expected to be similar to the number of collisions reported at other wind energy projects in New York State. In the northeastern US (New York, Maine, New Hampshire, Maryland, and Pennsylvania) and southern Ontario, Canada, avian fatality rates have ranged from zero birds/MW/year to 11.99 birds/MW/year. At facilities in New York, bird fatality rates averaged 1.82 birds/MW/year and ranged from 0.37 birds/MW/year to 6.20 birds/MW/year. Based on this average approximately 184 bird fatalities per year could be expected at the Facility. However, the curtailment regime planned for the Facility from July 1 to October 1 to reduce the estimated take of northern long-eared bat may reduce the estimated avian impacts, further reducing the total percentage of direct impacts from the Facility.

Currently there is an estimated 1.75 gigawatts (GW) of installed wind capacity in New York State. From 2020 to 2050, the projected 30-year life of the Facility, on-shore wind development in New York is estimated to increase to 5.61 GW (USDOE, 2019). Based upon the average direct avian impacts per MW from New York wind energy projects (1.82 birds/MW/year), and projections of future wind capacity to be installed in New York by 2050, an estimated 10,211 birds per year will be directly impacted by wind in New York by 2050, and the Facility, with 184 bird fatalities per year, will account for approximately 1.8% of direct bird impacts by wind facilities in New York.

Nationally, wind turbines are estimated to be responsible for a nominal proportion of all avian fatalities resulting from anthropogenic causes; thus, wind energy is considered a minor contributor to bird mortality compared to other anthropogenic activities. A recent analysis of fatality data from 116 studies at wind facilities across the US and Canada found that an estimated that 368,000 bird fatalities may occur per year nationally (Erickson et al,

2014). These impacts are spread across many species and the effect on any given population is very small and likely negligible with respect to influencing population viability or stability.

As discussed in Section (d), there is some risk of turbine collisions for bald and negligible risk to golden eagles. To date, there has only been one reported bald eagle fatality at a wind energy facility in New York State and no reported golden eagle fatalities at wind energy facilities in New York. Therefore, cumulative impacts from the Facility and other wind projects in New York are not anticipated to affect bald or golden eagle populations.

(iii) Cumulative Bat Impacts

Across the US and Canada, it's estimated that 500,000 bats are killed annually by wind turbines with adjusted fatality rates in the U.S. ranging from zero bat fatalities/MW/year to 49.7 bat fatalities/MW/year . Three migratory bat species (hoary bat, eastern red bat, and silver-haired bat) comprise approximately 72% of all bat carcasses found at wind energy projects. The other estimated 28% of bat fatalities are comprised of cave-dwelling species of bats, including big brown bat, eastern pipistrelle, and several *Myotis* species, including northern long-eared bat. Although collisions with turbines results in direct impacts to these species, these impacts are considered minimal in contrast to the declines these species have endured due to white-nose syndrome (WNS), a disease caused by an infectious fungus that was first discovered in New York State in 2006. WNS has caused a 98% decline in northern long-eared bat populations in New York State since the fungus was first discovered and is the primary reason the USFWS recently listed the species as threatened under the ESA (USFWS, 2015). It is estimated that between 5.7 and 6.7 million bats have died as a result of WNS, which has been identified in 31 states (USFWS, 2012). The NYSDEC has identified WNS as the primary threat to bat species in New York (Carl Herzog, NYSDEC, pers. comm.).

In the northeastern US (New York, Maine, New Hampshire, Maryland, and Pennsylvania) and southern Ontario, Canada, overall bat fatality rates have ranged from zero bats/MW/year to 51.76 bats/MW/year. In New York, bat fatality rates averaged 5.74 bats/MW/year and ranged from 1.78 bats/MW/year to 16.30 bats/MW/year. If impacts to bat species at the Facility would be similar to those reported at other wind energy projects in New York, approximately 579 bat fatalities per year could be expected at the Facility. [redacted].

Wind energy projects in New York have recorded similar species composition as wind energy projects in other parts of the US, with the three migratory tree bats comprising more than half of all recorded carcasses. If 72% of those bats directly impacted by the Facility are migratory tree bats, this would result in the direct impact to approximately 417 individuals of hoary bat, eastern red bat, and silver-haired bat combined. However, proposed curtailment could result in reductions of migratory tree bat fatalities during the fall migration, reducing estimated migratory tree bat fatalities from approximately 417 to 260 bats per year.

Based upon the average direct per-MW bat impacts from New York wind energy projects (5.74 bats/MW/year) and projections of future wind capacity to be installed in New York by 2050, an estimated 32,201 bats per year will be directly impacted by wind in New York in 2050. However, if a similar curtailment regime being employed at the Facility is utilized by most or all wind projects in New York by 2050, the estimated number of bats directly impacted by wind projects could drop from 32,201 bats per year to 12,880 bats per year. If species composition of bats found at wind energy projects remains consistent, estimated direct impacts to migratory tree bats in 2050 could drop from 23,185 bats per year to 9,274 bats per year. Based upon the estimated annual take of bats at the Facility under curtailment (231 bats per year) and assuming all other wind energy facilities implement curtailment in 2050 (total estimated fatality rate for all facilities of 12,880 bats per year), the Facility may account for approximately 1.8% of bat fatalities from wind energy facilities in New York.

[redacted]

[redacted]

[redacted].

(iv) Habitat Fragmentation

A Habitat Fragmentation Analysis was conducted for the Facility at a local and regional scale. Calculations in the Habitat Fragmentation Analysis provide a more conservative estimate of impacts than those provided in (f), as calculations were based on impact assumptions that anticipated a total of 56 acres of permanent habitat loss due to clearing for facility infrastructure, which is higher than the 53.6 acres of habitat loss that is anticipated based on design drawings. Indirect impacts to habitat may result from the functional loss or degradation of habitat due to construction and operations; these fragmentation effects are anticipated to extend up to 300 feet beyond the limits of disturbance. Therefore, habitat fragmentation effects were calculated based on a conservatively estimated total of 1,396 acres of wildlife habitat that could be indirectly impacted by the Facility. At the local scale (within a 2.5-mile buffer of the Facility), this results in an approximate 3.5% decrease in forested and grassland (herbaceous and hay/pasture) habitat. On a landscape scale, habitat fragmentation is anticipated to result in a 0.3% loss of forested and grassland habitats within Chenango County. Fragmentation of forested habitat is conservatively estimated to result in a 14.9% decrease in patch size and a 2.8 increase in forest edge within the Facility Area and a 2.5-mile buffer. Further information regarding habitat fragmentation is included in the Habitat Fragmentation Analysis for the Bluestone Wind Project, provided in Appendix 22-G.

(2) Avian and Bat Post-Construction Monitoring

The Applicant has developed a Post-Construction Monitoring Program (Monitoring Program) to assess the direct and indirect impacts of the Facility on bird and bat species. The Monitoring Program was developed in consultation with the NYSDEC and USFWS in accordance with NYSDEC's June 2016 *Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects*, and Tier 4 of the *Wind Energy Guidelines* for standard post-construction studies. Monitoring will be conducted for 2 years post-construction following commencement of operation and will be conducted year-round. During the spring, summer and fall (April 15 – November 15), surveys will be completed for all birds and bats. During spring, summer, and fall all turbines will be included in searches. Of the 25 turbines, 13 (~52%) will be searched daily and 12 (~48%) will be searched weekly. The Monitoring Program will include standard carcass searches of selected turbines; searcher efficiency trials to determine

percentage of carcasses found by searchers; and 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 will be used to estimate bird and bat mortality within the Facility Site. Further details regarding the Monitoring Program is provided in the NCBP, in Appendix 22-F.

(3) Avian and Bat Impact Avoidance and Mitigation Plan

Based on the data collected during pre-construction surveys, the Applicant has extensively evaluated the potential impacts of Facility construction and operation to avian and bat species through the development of an Avian Risk Assessment and Cumulative Impacts Analysis, provided in Appendix 22-H and Appendix 22-I, respectively. Based on these analyses, the Applicant has committed to several measures to avoid, minimize, and mitigate impacts to avian and bat species, which are outlined in the NCBP that was developed for northern long-eared bat (see Appendix 22-F). [redacted]. Estimated take of northern long-eared bat, although unlikely, will be offset through compensatory mitigation measures outlined in the NCBP in order to achieve a net conservation benefit for this species.

(i) Map Showing Delineated Wetland Boundaries

(i) Wetland Boundaries and Mapping

Wetland delineations were conducted through on-site field investigations of all areas in the Facility Site within 500 feet of areas to be disturbed by construction (the "Wetland Study Area"). Delineations were conducted per the three-parameter methodology described in the U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual, and the appropriate Regional Supplement to the Corps of Engineers Wetland Delineation Manual. Additionally, freshwater wetlands regulated under Article 24 of the New York Environmental Conservation Law (ECL) were determined according to methods described in the NYSDEC Freshwater Wetlands Delineation Manual (1995).

All wetland boundaries were defined in the field by sequentially numbered pink surveyor's flagging marked and locations were recorded using GPS technology with reported sub-meter accuracy. Wetlands identified within the Facility Site, as described in this section, will be referred to as "delineated wetlands." In addition, predicted presence and extent of wetlands outside the Facility Site but within 500 feet of areas to be disturbed (e.g.,

wetlands within adjacent properties without accessibility) were approximated based on remote-sensing data, interpretation of published wetland and soil mapping, and aerial photography. Wetlands identified by these methods are referred to as "approximate wetlands." All delineated and approximated wetlands and streams are shown on Figure 22-2. Additionally, these wetland and stream resources are shown on the Preliminary Design Drawings included with Exhibit 11.

EDR delineated 121 wetlands totaling 103.3 acres within the Wetland Study Area. In addition, EDR delineated 83 streams totaling approximately 36,874 linear feet (7.0 miles) within the Wetland Study Area. As described below and in the Wetland Delineation Report, wetlands and streams were categorized as one or more of the following community types: palustrine emergent wetland (PEM), palustrine scrub-shrub wetland (PSS), palustrine forested wetland (PFO), palustrine open water wetland (POW), riverine upper perennial (R3), riverine intermittent (R4), riverine unknown perennial (R5), and riverine ephemeral (R6). Many wetlands identified contained more than one community type.

No NYSDEC-mapped wetlands were identified within the Facility Site, per a review the NYSDEC online resource mapper, and no wetlands within the Facility Site are greater than 12.4 acres in size. However, in many cases delineated wetlands and streams extend beyond the boundaries of the Wetland Study Area and may be larger than the acreage delineated.

(ii) Jurisdictional Determination

In parallel with the filing of this Application, the Applicant will provide a draft copy of the Wetland Delineation Report and delineated wetland boundaries to the NYSDEC regional biologist and the U.S. Army Corps of Engineers in order to schedule a Jurisdiction Determination (JD) site visit. The Applicant anticipates the JD visit will occur in late summer and any follow-up information resulting from this visit will be provided to the Siting Board.

(iii) NYSDEC-Regulated Wetlands and Streams

Review of NYSDEC Freshwater Wetlands mapping indicates that there are no State-protected wetlands within the Facility Site. Wetland GL-2 is the nearest wetland to the Facility, which is approximately 3,700 feet northeast of Turbine T106 (see Figure 23-2). As stated previously, no wetlands within the Wetland Study Area are greater than 12.4 acres in size.

NYSDEC stream mapping indicates that there is one State-protected stream, Kent Brook, a Class C(T) stream, that flows through the Wetland Study Area. There are also five NYSDEC-mapped unprotected (Class C) streams and tributaries within the Wetland Study Area. See Exhibit 23 and Figure 23-2 for additional information.

(j) Description of Wetlands

During on-site delineations of wetlands, data were collected and recorded as needed to fulfill USACE requirements. This information was recorded on USACE Routine Wetland Determination forms, which are included in the Wetland Delineation Report (Appendix 22-J). Data collected for wetlands included dominant vegetation, hydrology indicators, and soil characteristics. Data collected for streams included information on channel width (mean high water mark), water depth, substrate material, bank condition and gradient. Additional details regarding wetland delineation and data collection methods, wetland and stream types, and other pertinent information are provided in the Wetland Delineation Report. A brief summary of wetland community types within the Wetland Study Area is provided below.

*Emergent wetlands (PEM)* – Seventy-eight wetlands contain emergent wetland communities. These wetland areas are dominated by herbaceous vegetation including common rush (Juncus effusus), spotted jewelweed (Impatiens capensis), woolgrass (Scirpus cyperinus), and multiple sedge species (Carex spp.). Evidence of wetland soils included low chroma matrix with red colors (e.g., 5YR 4/2) and high chroma mottles (e.g., 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, inundation, and the presence of reduced iron.

*Forested wetland (PFO)* – Sixty wetlands contain 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. Forested wetlands in the Study Area are dominated by red maple (Acer rubrum) and green ash (Fraxinus pennsylvanica) in the upper canopy. Shrub vegetation includes saplings of the above-mentioned species, highbush blueberry (Vaccinium corymbosum), and honeysuckle (Lonicera spp.). Herbaceous species in the forested wetlands included various sedges (Carex spp.), false hellebore (Veratrum viride), sensitive fern (Onoclea sensibilis), and spotted jewelweed (Impatiens capensis). Evidence of wetland hydrology observed in these wetlands at the time of delineation typically included soil saturation, microtopographic relief, iron deposits, drainage patterns, and water stained leaves. Typical hydric soil indicators for forested wetlands included depleted matrix (F3), redox dark surface (F6), and depleted below dark surface (A11).

*Scrub-shrub wetlands (PSS)* – Twenty-one wetlands contain scrub-shrub vegetation. Scrub-shrub wetlands are characterized by dense stands of shrub species and small trees less than 20 feet tall. Shrub-scrub vegetation typically included various willow species (*Salix* spp.), highbush blueberry (*Vaccinium corymbosum*) and gray dogwood (*Cornus racemosa*). Herbaceous vegetation in these areas included reed canary grass *(Phalaris arundinacea)*, sensitive fern, false hellebore (*Veratrum viride*), and spotted jewelweed (*Impatiens capensis*). Evidence of wetland hydrology observed in scrub-shrub wetlands at the time of delineation consisted of indicators such as drainage patterns, surface water, saturation, high water table, and microtopographic relief. Hydric soil indicators included depleted soils with low chroma (2 or less) and prominent redox concentrations.

*Palustrine Open Water (POW)* – Eleven wetlands contain open water communities. These open water features are bordered by upland forest and/or developed areas (e.g., roads or lawn). These open water communities have well-defined banks and fringes of emergent wetland vegetation. Although not verified, water depths of such ponds were typically estimated to be greater than four feet deep.

*Streams* – Streams are located primarily within forests and hedgerows and generally have a gentle to moderate gradients (0-5%). Half of the delineated streams were identified as intermittent channels. Most of the streams were less than 10 feet wide with variable substrates and vegetative cover characteristics. Delineated stream channels are generally characterized by rock and cobble substrate and well-defined, abrupt, and steep banks, and primarily flow during the wet season (winter to spring).

(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. Flood flow Alteration (Storage and Desynchronization)
3. Fish and Shellfish Habitat
4. Sediment/Toxicant/Pathogen 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, a spreadsheet that includes several basic considerations that help identify the primary functions and values provided by wetlands was developed. 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. Wetlands likely to be disturbed by Facility construction and operation were entered into the spreadsheet and wetland characteristics were identified for each. Data regarding these wetland characteristics and associated

functions and values were collected during the wetland delineations surveys conducted in Fall of 2018 and Spring/Summer of 2019. The results of the qualitative assessment are included in the Wetland Delineation Report (Appendix 22-J).

The functions and values assessment indicates that most of the delineated wetlands within the Wetland Study Area provide some level of groundwater recharge, wildlife habitat, and water quality improvement functions. In many cases these functions are limited by the small size of many of the wetlands. See Appendix 22-J for additional details.

(l) Off-site Wetlands Analysis

EDR analysis suggests that most of the delineated wetlands and all delineated streams are likely to be hydrologically connected to Waters of the US (WOUS) and considered to be jurisdictional by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

(m) Wetland Impacts

During construction, temporary and permanent direct or indirect impacts to wetlands and surface waters may occur as a result of the installation of access roads, the installation of collection lines, the installation of wind turbines, and the development and use of temporary workspaces around the turbine sites. The construction of access roads is anticipated to result in permanent impacts (loss of wetland/surface water acreage through filling), permanent forested wetland conversion (clearing or other disturbance to forested wetlands that does not involve filling), and temporary impacts. The installation collection lines and the development and use of temporary workspaces around wind turbines is anticipated to temporarily disturb streams and wetlands during construction as a result of clearing (brushhogging, or similar clearing method requiring no removal of rooted woody plants). In addition, soil disturbance and permanent forest conversion from the installation of the electrical collection lines and the temporary workspaces may occur. 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 occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated, including areas adjacent to proposed access road upgrade/construction, electrical collection and transmission routes, turbine sites, staging area(s), wind measurement towers, or the substations.

Based on the limits of disturbance as determined through preparation of the preliminary design drawings, construction of the Facility is anticipated to result in an impact to a total of 2.5 acres of wetlands—less than

3% of the total wetland acreage documented within the Wetland Study Area. Of the impacted area, 1.24 acres will be temporary impact, 0.78 acres will be permanent forested wetland conversion, and 0.51 will be permanent impact. All impacts are depicted on the Wetland and Stream Impact Drawings (Appendix 22-K). Impacts to each wetland are presented below in Table 22-6.

**Table 22-6. Wetland Impacts**

| Wetland ID[1] | Wetland Type[2] | Temp. Impact (acres) | Perm. Forested Wetland Conversion (acres) | Perm. Impact (acres) | Facility Impacting Resource[3] | Preliminary Design Drawing (Appendix 11-A) Sheet # |
|---|---|---|---|---|---|---|
| 1A | PFO | -- | -- | 0.12 | AR, CL, WT | C-205 |
| 1H | PFO | -- | 0.22 | 0.09 | AR, CL | C-204 |
| 1K | POW | 0.01 | -- | -- | AR, CL | C-202 |
| 1L | PEM | <0.01 | -- | -- | AR, CL | C-202 |
| 1M | PEM | 0.07 | -- | -- | AR, CL | C-202 |
| 1V | PEM | Impacts avoided through trenchless | | | CL | |
| 1Z | PEM | 0.02 | -- | 0.05 | AR, CL | C-206 |
| 2C | PEM | -- | -- | 0.01 | AR | C-208 |
| 2D | PFO | -- | 0.15 | -- | CL | C-301B |
| 2E | PFO | -- | 0.03 | -- | CL | C-301B |
| 2Y | PFO | -- | 0.10 | -- | CL | C-303A |
| 2Y | PSS | 0.10 | -- | -- | CL | C-303A |
| 2Y | PEM | 0.02 | -- | -- | CL | C-303A |
| 3A | PFO | -- | 0.10 | -- | CL | C-30B |
| 3B | PFO | -- | 0.06 | -- | CL | C-303B |
| 3B | PEM | 0.03 | -- | -- | CL | C-303B |
| 3F | PSS | 0.21 | -- | -- | CL | C-304B |
| 3G | PFO | -- | 0.03 | -- | CL | C-304B |
| 3G | PSS | <0.01 | -- | -- | CL | C-304B |
| 3H | PSS | 0.07 | -- | 0.02 | AR | C-212 |
| 3I | PFO | -- | <0.01 | -- | AR, CL | C-214 |
| 3I | PEM | <0.01 | -- | <0.01 | AR, CL | C-214 |
| 3I | PSS | 0.02 | -- | 0.01 | AR | C-214 |
| 3L | PEM | 0.04 | -- | 0.04 | AR, CL | C-214 |
| 3N | PFO | -- | <0.01 | -- | AR, CL | C-212 |
| 3O | PEM | 0.01 | -- | -- | AR, CL | C-212 |
| 3P | POW | 0.06 | -- | -- | CL | C-213 |
| 3Q | PFO | -- | 0.03 | -- | CL | C-305A |
| 3S | PSS | <0.01 | -- | -- | CL | C-305A |
| 3T | PSS | 0.18 | -- | -- | CL | C-305A |
| 3T | PEM | 0.31 | -- | -- | CL | C-305A |
| 4C | PEM | 0.04 | -- | 0.05 | AR, CL | C-215 |
| 4H | PEM | <0.01 | -- | -- | WT | C-218 |
| 4I | PEM | <0.01 | -- | -- | AR, CL | C-218 |
| 4S | PEM | -- | -- | 0.02 | AR | C-231 |
| 5F | PFO | | 0.02 | <0.01 | AR, CL | C-225 |
| 5J | PFO | -- | 0.01 | -- | AR, CL | C-227 |
| 5N | PEM | <0.01 | -- | -- | AR, CL | C-227 |
| 6A | PFO | -- | 0.03 | 0.01 | WT | C-229, C-230 |
| 6E | PEM | 0.02 | -- | 0.03 | AR, CL | C-230 |

| Wetland ID[1] | Wetland Type[2] | Temp. Impact (acres) | Perm. Forested Wetland Conversion (acres) | Perm. Impact (acres) | Facility Impacting Resource[3] | Preliminary Design Drawing (Appendix 11-A) Sheet # |
|---|---|---|---|---|---|---|
| 6E | PSS | 0.01 | -- | 0.06 | AR, CL | C-230 |
| 6F | PFO | -- | <0.01 | -- | AR, CL | C-227 |
| **Totals** | | **1.24** | **0.78** | **0.51** | | |

[1]Delineation ID assigned by EDR.

[1]PEM = palustrine emergent marsh, PSS = palustrine scrub shrub, PFO = palustrine forested, WM = wet meadow, OW = open water.

[3]AR = Access Road, CL = Collection Line, WT = Wind Turbine.

(n) Measures to Avoid/Mitigate Wetland Impacts

*Avoidance and Minimization*

The Applicant utilized an iterative Facility design process to avoid wetland impacts to the greatest extent practicable. Wetland data were progressively used to inform Facility design, locating turbines, access roads, and collection outside of wetlands and utilizing existing crossings to the maximum extent practicable. As a result, temporary and permanent wetland impacts were reduced to 1.24 acres and 0.51 acres, respectively (see Exhibit 23(b)(4) for a discussion of impacts to surface waters). Where avoidance was not practicable due to practical constraints (topography or land ownership) or conflicts with other sensitive resources (such as stone landscapes), narrow portions of the wetlands were chosen for crossing locations. As indicated in Table 22-6, wetland impacts have been avoided and minimized substantially. See Table 9-1 in Exhibit 9 for a full tally of the Applicants wetland avoidance and minimization efforts.

Indirect impacts to wetland that could result from the construction of the Facility include siltation and degradation of downstream water quality. These impacts are not anticipated as the Applicant will take appropriate measures to prevent these impacts, as detailed below and in the Preliminary Stormwater Pollution Prevention Plan:[7]

- *No Equipment Access Areas:* Except where crossed by permitted access roads or through non-jurisdictional use of temporary matting, wetlands 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 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 wetland (or as required per manufacturer's instructions);

[7] See also the Preliminary Environmental Compliance and Monitoring Plan (Appendix 22-C).

- No equipment washing or refueling within the area;
- No storage of any petroleum or chemical material; and
- No disposal of excess concrete or concrete washwater.

- *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's Preliminary 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.

*Mitigation*

A total of 0.51 acres of wetlands and 0.08 acres of streams will be lost as a result of Facility construction and operation. Compensatory mitigation to offset impacts to federally regulated wetlands will be required as part of the federal wetland permitting process under Section 404 of the Clean Water Act. To accomplish this mitigation, the Applicant is proposing to purchase wetland mitigation credits under an In-Lieu Fee Program (ILFP) approved by the U.S. Army Corps of Engineers. The Wetland Trust (TWT) is a 501(c)3 non-profit corporation that has established an ILFP in 15 service areas in the Susquehanna River headwaters and adjacent basins. The Applicant has been in contact with the TWT throughout the public involvement process and will continue to coordinate with this group as part of future permitting efforts. The U.S. Army Corps of Engineers will determine the number of credits that will be required to offset wetland impacts to jurisdictional wetlands, and once the transaction is completed, the Applicant will have fulfilled all wetland mitigation requirements. The TWT will be responsible for the creation of high-quality wetlands within the Susquehanna River watershed and the long-term success of the wetlands that the credits purchased by the Applicant represent.

(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 Exhibit 22(f). Discussion of mitigation for wildlife and wildlife habitat is provided in Exhibit 22(g). These measures will also mitigate impacts to threatened and endangered species, even though it is not specific to such species. Measures to mitigate impacts specifically to New York State threatened and endangered species that are found within the Facility Site are discussed in Exhibit 22(h)(3); and further detailed in the NCBP (Appendix 22-F). All federal and State-listed

threatened and endangered species, and State-regulated species are identified in the Wildlife and Plant Species List (see Appendix 22-A).

(p) Invasive Species Prevention and Management Plan

Please see Exhibit 22(b) for a discussion of invasive species prevention and management. Additionally, an Invasive Species Control Plan (ISCP) is provided in Appendix 22-B.

(q) Agricultural Impacts

Based on NCLD cover types and a review of aerial imagery, there are a total of 799 acres of agricultural land within the Facility Site. Construction of the Facility is anticipated to result in 102.2 acres of temporary impacts and 36.3 acres of permanent impacts to agricultural land (see Exhibit 4). Several minimization and mitigation measures will be implemented to offset these impacts. See Exhibit 4(i) for a complete list of measures that will be implemented to minimize and mitigate impacts to agricultural land. The Applicant will consult with NYSDAM during construction if deviation from the *Guidelines* is necessary. 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 need mitigation and to implement the follow-up restoration.

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