Appendix 22-4:

Grassland Breeding Birds Cumulative Impacts Assessment

Grassland Breeding Birds Cumulative Impacts Assessment

July 2020

Excelsior Energy Center

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1.0 Introduction

1.1 Project Description

Excelsior Energy Center, LLC, (Excelsior Energy Center or the Applicant) a wholly-owned indirect subsidiary of NextEra Energy Resources, LLC (NEER), is submitting an application to construct a major electric generating facility, the Excelsior Energy Center (the Project), under Article 10 of the Public Service Law (PSL).

The Excelsior Energy Center Project will have a generating capacity of 280 MW of power with a 20 MW 4-hour Energy Storage System that will be developed on land leased from owners of private property located in the Town of Byron, Genesee County, New York (Figure 1). Project facilities will include commercial-scale solar arrays, an energy storage system, access roads, inverters, fencing, buried electric collection lines, and electrical interconnection facilities.

The proposed facility will consist of ground-mounted solar arrays and associated infrastructure with an anticipated footprint of approximately 1,671 acres within the 3,409-acre Project Area.

1.2 Purpose and Objectives

This cumulative impact analysis was requested by the New York State Department of Environmental Conservation (NYSDEC). Its purpose and objective is to evaluate the expected construction, operation, and maintenance impacts of the Project on federally- and state-listed threatened or endangered grassland bird species, in combination with the actual and expected impact of proposed and operating solar energy projects with a generating capacity greater than or equal to 5 MW, occupying grassland habitat within 100 miles of the Project Area (Study Projects). This analysis uses data provided to the Applicant by the NYSDEC and publicly-available information including the Department of Public Service (DPS) Document and Matter Management (DMM) system to identify Study Projects located within 100-miles of the Project in New York State (Grassland Study Area). The Applicant was not required to make Freedom of Information requests, nor perform any field studies at the Study Projects. This analysis included, at a minimum:

- Examination of publicly-available open and grassland habitat data on the Study Projects within the Grassland Study Area using the NYSDEC data, and the publicly-available information the Applicant obtained;
- estimated take of state-listed T&E bird species and their habitats at the Project, if any, and a description of methods used, and sources consulted to estimate take;
- estimates of available open and grassland habitat within the Grassland Study Area;
- estimates of acres of grassland breeding bird habitat lost directly through installation of panels and other project components at the Study Projects, using best available information or typical industry solar land use metrics;
- estimates of acres of grassland habitat indirectly affected by the Study Projects due to functional loss/degradation of habitat; and
- estimates of cumulative potential impacts to state-listed grassland bird species within the Project Area.

2.0 Literature Review

2.1 Solar Energy Facility Impacts to Grassland Breeding Birds

2.1.1 Direct Impacts

There are few studies quantifying the effects of utility-scale solar projects on biodiversity, including birds. Available peer-reviewed publications on renewable energy, including solar, are insufficient to thoroughly assess the impact of utility-scale solar projects on wildlife populations (Lovich and Ennen, 2011). What literature exists indicates two types of direct impacts to birds from utility-scale solar projects. These occur in the form of burning and collisions (Walston Jr. et al., 2016). Burning impacts may result from the use of solar thermal technology, which is not applicable to the Excelsior Energy Center, as that facility shall instead use photovoltaic (PV) solar module technology. Estimates of annual avian mortality from direct impacts attributable to utility scale solar energy developments, including both thermal and PV solar, in the US range from 37,800 to 138,600 (Walston Jr. et al. 2016), which taken in context accounts for an insignificant portion of annual avian mortality from anthropogenic sources (Loss et al. 2015). For example, cats (feral and owned) cause over 2.4 billion bird deaths annually, and building collisions kill over 599,000,000 birds each year (Loss et al. 2015).

Walston Jr. and the Department of Energy's Argonne National Laboratory (2015) reviewed and synthesized data from seven utility-scale solar facilities in California and Nevada, including data from some of the studies noted above, to evaluate avian mortality. Data was collected through both systematic and incidental monitoring from 2011-2014. Over 1,300 mortality events were documented. Unfortunately, cause of death could not be determined for 50 percent of the observations. The authors conclude that data were too sparse to make definitive statements regarding the rate of avian mortality caused by solar facilities (Walston Jr. et al. 2015). Mortality is expected to vary seasonally, influenced by influx of migrants and departure of residents, as well as local avian abundance, and non-facility related causes of mortality. Numerous design factors may influence mortality, however given the complexity of determining facility-related mortality events, the current understanding of these factors is exceedingly limited. Factors influencing detectability of mortality events also exist and include predation and scavenging.

2.1.2 Indirect Impacts

To date, there has been very few peer-reviewed studies of the indirect effects of ground-mounted solar systems and birds (DeVault et al., 2014). Although the topic is understudied, what research has been conducted suggests that indirect effects are site- and species-specific (Hernandez et al., 2014, DeVault et al., 2014, Smith & Dwyer 2016). The DeVault represents the only peer-reviewed study to date to evaluate indirect impacts from utility-scale solar facilities to birds. The study compared bird use at ground-mounted solar facilities and managed grasslands at airfields, concluding that although bird diversity was lower than adjacent grasslands, bird density was greater at solar facilities. The same study found several grassland birds using solar systems including eastern meadowlark, grasshopper sparrow and savannah sparrow (DeVault et al., 2014). Careful siting of solar facilities with respect to land use, overall footprint and site hydrology is likely to reduce the effect if indirect impacts (Smith & Dwyer 2016, Hernandez et al., 2014). Further, solar systems provide an opportunity for co-location of energy generation and grassland habitat conservation which may ultimately benefit grassland breeding birds and pollinators (Hernandez et al., 2014, Walston Jr., et al., 2018).

Grassland birds are declining in New York State due largely to the loss of grassland habitat, resulting from afforestation and conversion to agriculture (Brennan & Kuvlesky Jr., 2012). Unfortunately, compared to natural grasslands, agricultural operations provide reduced foraging opportunities, lower vertical structure and horizontal cover, are often monotypic in floristic diversity, and generally experience increased physical and biological disturbance associated with human activity. Most utility-scale solar facilities in the United States are sited in agricultural areas, and construction of facilities often results in conversion of land use out of row crop production. While species-specific requirements for grassland birds vary, the habitat provided by today's farmland, and in particular row crop cover is generally considered marginal (Morgan and Burger, 2008).

Following construction, solar energy facilities typically use a grass seed mix to establish a stabilized vegetative ground cover. These grass seed mixes are comprised of grasses that are native and/or indigenous to the area and are considered favorable for wildlife habitat and sustainable growth. For this reason, solar farms have been observed to improve plant and insect diversity which likely provides benefit to grassland birds (Parker and McQueen 2013, Walston Jr. et al., 2018).

Additionally, the effects of climate change have been identified as a preeminent threat to continental bird populations (National Audubon Society, 2014). As noted by Audubon in their endorsement of solar energy, increasing the capacity to generate energy from renewable sources will indirectly benefit birds through climate change mitigation.

2.2 Summary of Previous Site-Specific Studies

2.2.1 Grassland Breeding Bird Study

TRC conducted a preconstruction monitoring survey of grassland breeding birds during the 2019 breeding season (TRC, 2020a). The survey methodology followed the *NYSDEC Draft Survey Protocol for State-listed Breeding Grassland Bird Species* (NYSDEC, 2015a) and incorporated comments provided by NYSDEC on the site-specific protocol. The objective of the grassland breeding bird survey was to determine the presence and site use of federally and state-listed threatened, endangered, and special concern grassland bird species within the proposed Project Area including:

- northern harrier (*Circus hudsonius*)
- upland sandpiper (*Bartramia longicauda*)
- short-eared owl (*Asio flammeus*)
- Henslow's sparrow (*Ammodramus henslowii*)
- sedge wren (*Cistothorus platensis*)
- grasshopper sparrow (*Ammodramus savannarum*)
- vesper sparrow (*Pooecetes gramineus*), first observed on May 21, 2019
- horned lark (*Eremophila alpestris*), first observed on May 21, 2019

Additional target grassland bird species included:

- American kestrel (*Falco sparverius*), first observed on July 1, 2019
- bobolink (*Dolichonyx oryzivorus*), first observed on May 22, 2019
- eastern meadowlark (*Sturnella magna*)
- golden-winged warbler (*Vermivora chrysoptera*)
- savannah sparrow (*Passerculus sandwichensis*), first observed on May 21, 2019

Biologists recorded 1,224 observations representing 61 species. This included grassland birds observed from the survey points, both inside and outside of these 100-meter radius circular plots, as well as birds observed during the meander surveys. Target grassland breeding bird species observed included bobolink, horned lark, savannah sparrow, America kestrel, and vesper sparrow. No state-listed threatened or endangered species were observed. Savannah sparrow (n = 186) were the most commonly observed target grassland bird species and comprised 17.1 percent of all birds observed. Horned lark (n = 74) were the second most numerous target grassland species observed. Both species can be expected where there is suitable grassland habitat. Sixteen raptors from three species, including American kestrel, red-tailed hawk (*Buteo jamaicensis*) and turkey vulture (*Cathartes aura*), were observed at the Project Area.

The vesper sparrow, a state-listed species of special concern, was observed at the Project Area at a single location on two occasions. Horned lark, another species of special concern, were observed on every survey date during the study, and appear to be common throughout the Project Area. For any target species, regardless of listed status, no behavior consistent with breeding or nesting was documented. For a detailed description of the 2018 Grassland Breeding Bird Survey, including figures showing locations, methods, and results, refer to Appendix 22-3.

2.2.2 Winter Grassland Raptor Surveys

TRC conducted a preconstruction monitoring survey of wintering grassland raptors (TRC, 2020b). The objective of the wintering grassland raptor survey was to determine the presence and site use of state-listed threatened/endangered grassland raptors within the proposed Project Area. Target species were short-eared owl and northern harrier. The survey methodology followed the NYSDEC Draft Survey Protocol for State-listed Wintering Raptor Species (NYSDEC, 2015b), and incorporated comments provided by NYSDEC on the site-specific protocol.

Stationary and driving surveys were conducted between November 18, 2019, and March 31, 2020. Driving surveys and stationary surveys were conducted weekly, with each survey point or driving stop visited once every two weeks. Stationary surveys were conducted for a total of 141.4 hours, and Driving surveys were conducted for a total of 25.13 hours.

Thirty-five observations of four species were recorded during stationary surveys, for a total of 291 use minutes. Overall mean use of the Project Area by raptors was 0.034. No short-eared owls were observed during winter raptor surveys at the Project Area. Red-tailed hawk (*Buteo*

jamaicensis), were the most commonly observed raptor species, accounting for 80.0 and 64.8 percent of stationary and driving route survey observations respectively.

Two state-listed species, including the northern harrier (*Circus cyaneus*) and bald eagle (*Haliaeetus leucocephalus*), were documented during the study. Northern harrier were observed on six occasions. Observations primarily indicated hunting or migratory behavior. No roosts or roosting behavior were documented for this species. One state-listed species of special concern, the Cooper's hawk (*Accipiter cooperii*), was observed on two occasions within the Project Area. The single observation of a bald eagle was recorded outside of the Project Area. For a more detailed description of the wintering grassland raptor survey, including a list of incidental bird observations, refer to Appendix 22-4.

3.0 Methods

3.1 Desktop Review

3.1.1 Grassland Species Use

TRC conducted a review of publicly-available information to determine grassland bird species with potential to occur within the Project Area and those which may be impacted by solar energy development within the 100-mile Grassland Study Area. This review focused on state- and federally-listed Threatened (T) and Endangered (E) species and grassland species of Special Concern (SC), as designated in the NYSDEC grassland breeding bird survey protocol (NYSDEC 2015a). This review included:

- Route-level data from the United States Geological Survey (USGS) North American Breeding Bird Survey for survey routes within the Project Area
- Block-level data from the 2nd New York State Breeding Bird Atlas (2000-2005) for survey blocks within the Project Area
- Christmas Bird Count data from counts located closest to the Project Area
- County-level eBird data for Genesee County and other counties with Study Projects in the Grassland Study Area
- County-level data from the New York Natural Heritage Program (NYNHP) for Genesee County and counties with Study Projects in the Grassland Study Area

While additional species in New York may use grassland habitat during some portion of the annual life-cycle, and have potential to occur within the Project Area, analyses were restricted to those species considered “Grassland Breeding Birds” in the NYSDEC protocol (NYSDEC 2015a) and the North American Breeding Bird Survey (USGS 2019). Species with potential to occur in the Project Area based on habitat requirements and species’ range are described in Table 1.

3.1.2 Study Project Identification

TRC analyzed the data provided by the NYSDEC for Study Projects with a proposed generating capacity of 5 MW or greater within the 100-mile Grassland Study Area contained within the New York State boundaries. Projects were cross-referenced with the New York Interconnection System Operator (NYISO) Interconnection Queue to obtain additional project-specific information.

Few projects reported MW capacity; therefore, a conservative approach was used to identify Study Projects which met the criteria to be included in further analysis. Any projects with a size of less than 25 acres reported in the database were eliminated from the Study, based on the minimum capacity-weighted average land use for PV solar technologies of ~5 acres/MWac[1].

A literature search was conducted for each Study Project in order to obtain any additional publicly and electronically available pertinent information, including Project location, generating capacity, area of impact, and avian studies completed to date.

3.2 Spatial Analysis

TRC used the USGS National Land Cover Database (NLCD) for the conterminous United States, updated 2016, to determine the presence and extent of grassland habitat within the Grassland Study area, and the Study Project boundaries, and to characterize habitat available within the proposed Project Area.

The NLCD categorizes each 30x30-meter pixel into one of 20 cover classes. As a conservative approach, for the purposes of this analysis, grassland habitat was defined as including both the "Grassland/Herbaceous" category and pixels classified as "Pasture/Hay," which are consistent with the definition of grassland communities of New York described in Edinger et al. 2014[2].

NLCD provides the following definition for each of these categories:

- Grassland/Herbaceous - areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling but can be used for grazing.
- Pasture/Hay - areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.

[1] Ong, S., Campbell, C., Denholm, P., Margolis, R., & Heath, G. 2013. Land-use requirements for solar power plants in the United States (No. NREL/TP-6A20-56290). National Renewable Energy Lab. (NREL), Golden, CO (United States).

[2] From Edinger et al. 2014: Grasslands include communities that are dominated by grasses and sedges; they may include scattered shrubs (never more than 50% cover of shrubs), and scattered trees (usually less than one tree per acre, or 3 trees per hectare).

Grassland habitat was extracted from the NLCD dataset using a Geographic Information System (GIS) to determine percent area in grassland cover. Acreages and percent cover values were compared between the Project Area, Study Projects (collectively), and the Grassland Study Area. This approach was used to highlight the overall indirect impact posed to grassland breeding birds resulting from habitat conversion/loss associated with Project construction. This methodology conservatively assumes that although the total footprint of the Project is limited to approximately 1,671 acres, indirect impacts to grassland birds have the potential to occur on all grassland habitat acres within the Project Area.

4.0 Results

4.1 Grassland Species Use

4.1.1 Project Area

Several target grassland species were identified on site during the grassland breeding bird and winter raptor surveys. Species observed include bobolink, horned lark, savannah sparrow, vesper sparrow, American kestrel, and northern harrier. Savannah sparrow (n = 186) were the most commonly observed target grassland bird species and comprised 17.1 percent of all grassland birds observed.

Six northern harrier (ST) observations occurred within the Project Area during the winter grassland raptor survey, as well as two Cooper's hawk (SC) observations. Horned lark (SC) was also observed during winter raptor surveys conducted within the Project Area.

4.1.2 Study Project Counties

TRC reviewed the NYNHP and eBird databases to determine the most recent occurrence of grassland birds within each of the 24 counties where Study Projects were identified (Tables 2 and 3). Numerous species were widely distributed and had recent records among the counties, and all have been recently observed (within last 10 years) in Genesee County except for barn owl, Henslow's sparrow, and prairie warbler. Few species were less recently recorded or limited in distribution, including:

- Barn Owl; observed in 10 counties; no observations in Genesee County
- Henslow's Sparrow; observed in 24 counties, however records are >10 years old in 20 counties; last observed in Genesee County in 2001

Recent records for the remaining species indicate widespread distribution within the Grassland Study Area. Although only the most recent record is reported, many of these species (with the exception of those listed above) were also documented in each of these counties during the most recent Breeding Bird Atlas, conducted from 2000-2005, indicating a persisting population over the previous 15-20 years (NYS BBA, 2008).

4.2 Summary of Study Projects Evaluated

An initial review of the NYSDEC-provided data yielded multiple projects identified as duplicate records, with duplicates containing slightly modified project areas. Polygons were merged to retain the full extent of the project area, resulting in 183 unique projects within the Grassland Study Area.

Many of the records contained missing data. Of 183 records, only 44 included the proposed or actual MW capacity. Records missing MW capacity data were filtered based on acreage to retain only those projects greater than 25 acres in size, resulting in the identification of 107 Study Projects considered in the evaluation of impacts. The full list of Study Projects evaluated is provided as Table 4.

Study Projects were identified in 22 of the 24 counties within the Grassland Study Area. Monroe County contained the highest concentration of Study Projects, with 19 projects identified, followed by Ontario County (10), and Onondaga County (10). The remaining counties had 7 or fewer Study Projects. No Study Projects were identified in the portions of Cortland or Jefferson Counties within the Grassland Study Area (Table 4; Figure 2). Study project locations are depicted in Figure 2. In addition to the Project, four Study Projects were identified in Genesee County.

Study Projects, including the Project, encompass a total of 106,585.7 acres within the Grassland Study Area. Of the 107 Study Projects, 13 have already been constructed and account for 594.1 acres of development. None of the proposed Study Projects in the database provided information regarding the total impact acreage resulting from construction within their respective project area boundaries. Therefore, the total area reported is likely overestimated, as additional land area could be included within each project's boundary beyond what is needed to achieve the project's proposed generating capacity.

Study Projects within Wayne County comprised the largest amount of acreage among Study Projects, with total area of 24,499.8 acres across five projects. Study Projects in Niagara county have a total area of 20,949.6 acres across seven projects, and Erie County with six projects, has a total proposed area of 20,793.3 acres. Genesee County, where the Project is located, has a proposed development area of 3,745.3 acres (the Project, plus 4 Study Projects), accounting for 3.5 percent of the total area of development within the Grassland Study Area.

The results of pre-construction studies of grassland bird use are not publicly available for the majority of Study Projects. Only five Study Projects have progressed in the process of filing for an Article 10 certificate, so as to make the results of such studies publicly available. This information is summarized below and considered in the evaluation of cumulative impacts. Project narratives were obtained from publicly-filed Article 10 application exhibits or other publicly-available documents.

Cypress Creek Renewables – Bear Ridge Solar, Niagara County

Bear Ridge Solar is a proposed 100-MW solar energy generating facility to be sited on approximately 750 acres in Niagara County. Consultation with the NYSDEC presented in the Public Scoping Statement for the project indicated that two bird species, the state-endangered short-eared owl (Asio flammeus) and the state-threatened northern harrier (Circus cyaneus) have been documented at various locations at or near the facility area.

Cypress Creek Renewables – Sky High Solar, Onondaga County

The Sky High Solar Project consists of approximately 121.5 acres and is sited within two tax parcels totaling approximately 555.3 acres in the town of Tully, Onondaga County. TRC was contracted to conduct breeding bird surveys during 2019. A total of four point count surveys at each of five survey locations were conducted over the course of the survey period.

A total of 249 observations of grassland birds from 19 species were observed within the Project Area during the entire survey period. A total of 99 individuals were observed during regular surveys. Bobolink (28.28% of total individuals observed), red-winged blackbird (13.13% of total individuals observed), common yellowthroat (10.10% of total individuals observed), song sparrow (9.09% of all total individuals observed), and field sparrow (8.08% of total individuals observed) were the most common grassland bird species observed during the study. No federally or state-listed species were observed during the survey period, either during surveys or incidentally outside of the prescribed survey window.

TRC was contracted by the project developer to perform winter grassland raptor surveys for the proposed Sky High Solar Project in the winter of 2019-2020.

Stationary surveys were conducted at two survey locations within the Project Area between November 26, 2019 and March 30, 2020. A total of ten stationary surveys per site (twenty stationary surveys) were conducted over the course of the study period, for a total of 34.2 survey hours. No state-listed species were observed on the Sky High Solar Project Area during or incidentally to surveys.

EDF Renewables - Morris Ridge Solar Energy Center, Livingston County

Morris Ridge is a proposed 177-MW solar energy generating facility located on approximately 1,350 acres of leased private lands in Livingston County. In the Preliminary Scoping Statement (PSS) for the project, consultation with NYNHP indicated occurrences of breeding upland sandpiper and Henslow's sparrow, as well as records of wintering northern harrier within the project area.

EDF Renewables – Genesee Road Solar Energy Center, Erie County

The Genesee Road solar facility is proposed to have a maximum generating capacity of 350 MW, with facilities and infrastructure located on a portion of the 2,500-acre project area. EDF Renewables conducted wintering grassland surveys within the Facility Area during the winter of 2019-2020. The results of that survey are not available; however, the PSS notes that consultation with the NYNHP did not indicate known occurrences of any listed species in the vicinity of the project. eBird records did not indicate observations of northern harrier or short-eared owl within the project area in the last ten years.

NYSDEC provided a comment response to the PSS filing indicating records of occupied habitat for State-listed species within three miles of the project, including breeding black tern, short-eared owl, and Henslow's sparrow. Records from Breeding Bird Atlas blocks overlapping with and adjacent to the project indicate two additional State-listed species, upland sandpiper and pied-billed grebe, may also nest in the vicinity. Observations of several species of grassland birds, including northern harrier, upland sandpiper, Henslow's sparrow, and grasshopper sparrow have been made within and near the project and reported on eBird.

Invenergy – Horseshoe Solar, Livingston and Monroe Counties

The Horseshoe Solar project facility will have a maximum generating capacity of 180 MW to be sited within a 3,800-acre project area in the towns of Rus and Caledonia in Livingston and Monroe counties. The PSS filed in March of 2019 provides little information regarding the project area, however comments provided from the DEC on this filing indicate no known occurrences of listed grassland bird species within the vicinity of the project.

Trelina Solar Energy Center, LLC – Trelina Energy Center, Seneca County

The Trelina solar energy-generating facility will have an 80 MW capacity and consist of ground-mounted solar arrays and associated infrastructure, with an anticipated footprint of 450 acres within the 1,072-acre facility. The facility is located in the Town of Waterloo in Seneca County.

Grassland breeding bird surveys were conducted during the 2019 breeding season. Biologists recorded a total of 608 observations of 55 species, including 4 grassland bird species (i.e., bobolink, horned lark, savannah sparrow, and vesper sparrow) at the Project Area. This included grassland birds observed at the survey points, outside of the 100-meter radius circular plot, and birds observed during the meander surveys. Bald eagles (state-listed threatened) were observed incidentally to surveys. There is a known active eagle nest within the Project Area, and it is believed that this individual is associated with the nest. The vesper sparrow is a state-listed species of special concern a single vesper sparrow was observed at the Project Area. No breeding or nesting activity was observed. Horned lark, also a species of special concern, were observed on several occasions.

Winter Raptor Surveys were performed in winter of 2019–2020 to determine presence and site use of the Project by state-listed northern harrier and short-eared owl. Surveys were conducted between November 18, 2019, and April 1, 2020. Stationary surveys were conducted for a total of 94.7 hours, and 22.7 total hours were spent conducting daytime driving surveys.

No short-eared owls were observed during winter raptor surveys at the Project Area. Two observations of northern harrier and several observations of bald eagles (*Haliaeetus leucocephalus*) were made during stationary surveys.

Watkins Glen Solar Energy Center, LLC – Watkins Glen Solar Energy Center, Schuyler County

The Watkins Glen facility will consist of ground-mounted solar arrays and associated infrastructure within the 774-acre project area, with a proposed 50 MW generating capacity.

A preconstruction monitoring survey of grassland bird species during the 2018 breeding season required by the NYSDEC was conducted by Tetra Tech, an engineering services company. Biologists recorded a total of 297 observations, including individuals representing three grassland bird species (bobolink, savannah sparrow, and grasshopper sparrow) at the project area. The grasshopper sparrow is a state-listed species of special concern and a total of three grasshopper sparrow observations were made at the project area. No other state- or federally-listed threatened or endangered species were documented.

Bobolinks (n = 189) were the most commonly observed grassland bird species and comprised 63.6 percent of all grassland birds observed. Mean use was highest for bobolinks (3.42 birds/100-meter radius plot/5 minutes), followed by savannah sparrows (1.21 birds/100-meter radius plot/5 minutes), and grasshopper sparrows (0.09 birds/100-meter radius plot/5 minutes).

TRC conducted a preconstruction monitoring survey of wintering grassland raptors during the winter of 2018-2019. A total of 16 stationary surveys and 13 driving route surveys were conducted during the study, totaling 23.9 and 9.87 survey hours, respectively.

No short-eared owls or northern harriers were observed during winter raptor surveys at the project area. A total of 24 observations of four species were observed during the course of the surveys. No state-listed threatened or endangered species were observed. Five individuals were observed during stationary counts, including three red-tailed hawk, two Cooper's Hawk and one rough-legged hawk. Nineteen individual observations were made during daytime driving surveys, including 18 red-tailed hawk and one turkey vulture.

4.3 Facility Impacts to Grassland Habitat

Land cover within the Excelsior Energy Center Project Area is predominantly characterized as cultivated crops (2,936.84 acres), comprising 86 percent of land cover within the Project Area (Table 5; Figure 3). Grassland habitat collectively comprises 122.72 acres (3.6%) of the Project Area (Figure 4). This consists of hay/pasture (121.39 acres), with grassland herbaceous cover

accounting for only 1.34 acres. When compared with the Grassland Study area, which, according to the NLCD, contains approximately 1.52 million acres of grassland habitat (Figure 5), impacts from the Project will affect less than 0.001% of available habitat within 100-miles in the state of New York.

4.4 Cumulative Impacts of Grassland Habitat Use

The Grassland Study Area encompasses 9,168,375.4 acres. Together, the 107 Study Projects comprise 106,585.7 acres of proposed development within the Grassland Study Area (0.2% of total acreage within the Grassland Study Area; Table 5). Grassland habitat covers 1,521,214.2 acres and accounts for 16.6% of land within the Grassland Study Area. Grassland habitat within the boundaries of the 107 Study Projects totals 16,484.8 acres, which covers 15.5% of the proposed area of development among the projects and accounts for approximately 1.1% of grassland habitat within the Grassland Study Area (Table 6).

The proposed Project is anticipated to impact (directly and indirectly) approximately 122.7 acres of grassland habitat in the Project Area. The actual limits of disturbance to grassland habitat within each of the Study Projects is unknown and impact studies from the Study Projects are not available. Therefore, to estimate cumulative impacts, a conservative approach was employed and assumed that all grassland habitat within the 107 Study Projects (16,484.8 acres) would be developed. Even with this conservative assumption, approximately 0.2% of available grassland habitat within the Grassland Study Area would be impacted.

5.0 Discussion

Mortality studies are inherently lacking for utility-scale ground-mounted solar. As such, providing an accurate or reliable estimate of take of listed species for this or other Projects is infeasible and was therefore not accomplished. To date, few studies within North America have been published on the subject, both from projects located in the Western United States. From these limited studies, estimates of annual avian mortality events attributable to solar facilities are insignificant relative to other anthropogenic sources of mortality, ranging from 37,800 to 138,600 individuals for all utility-scale solar sites operational in the US (Walston Jr. et al. 2016, Loss et al., 2015). These estimates indicate that at the scale of development proposed within the Grassland Study Area, direct impacts to listed species are unlikely to have measurable impact at the population level.

The total limits of disturbance were unavailable for most of the Study Projects. As a result, the extent of permanent impacts to grassland habitat within the Grassland Study Area could not be quantified, therefore these results likely reflect an overestimation. Moreover, the estimates are speculative in nature based on the uncertainty that all proposed projects included in this analysis will ultimately be developed.

Using conservative assumptions, this analysis estimates that approximately 1.1% of grassland habitat within the more than 9-million-acre Grassland Study Area would be impacted in the unlikely event that all 107 Study Projects and the proposed Project are ultimately developed. Considering that the amount of grassland habitat that would be impacted within each Study Project accounts for only a portion of the proposed project boundaries, this is a highly conservative estimate and the actual impact will be substantially lower.

The suite of species identified, and those with the potential to occur, are primarily widely distributed throughout the Grassland Study Area, with recent and multiple records in counties where grassland habitat exists. A review of the literature surrounding these species indicates that while populations of many grassland-associated species are declining state-wide (NYS BBA 2008, Brennan & Kuvlesky Jr., 2005), these species are also adapting to changing habitat at the landscape scale (Walston Jr., et al., 2018). Many grassland bird species in fact may benefit from the conversion of agriculture to more structurally diverse vegetation, as is typically seeded beneath and between solar panels. While the conversion of grassland habitat types to solar

development has the potential to impact individuals among grassland species, adverse population-level impacts are not likely from this Project, or cumulatively from the 107 Study Projects identified.

6.0 References

A. 8083, 2017-2018 General Assembly. (New York 2018)

Brennan, L. A., & W. P. Kuvlesky Jr.. 2005. North American grassland birds: an unfolding conservation crisis? The Journal of Wildlife Management, 69(1), 1-13.

Cypress Creek Renewables. 2019. Preliminary Scoping Statement Bear Ridge Solar Project, LLC Case 18-F-0338. 155pp.

DeVault, T. L. et al. 2014. Bird use of solar photovoltaic installations at US airports. Implication for aviation safety. Landscape and Urban Planning 122: 122-128.

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

Environmental Design & Research. 2020. Preliminary Scoping Statement Case 19-F-0602: Genesee Road Solar Energy Center. 271pp.

Environmental Design & Research. 2019. Preliminary Scoping Statement Case 18-F-0440: Morris Ridge Solar Energy Center. 174pp.

Hernandez, R. R., S. B. Easter, M. L. Murphy-Mariscal, F. T. Maestre, M. Tavassoli, E.B. Allen, ... & M. F. Allen. 2014. Environmental impacts of utility-scale solar energy. Renewable and sustainable energy reviews, 29, 766-779.

Invenergy. 2019. Preliminary Scoping Statement Horseshoe Solar, Livingston and Monroe Counties, Case 18-F-0633. 16pp.

Loss, S. R., T. Will, and P. P. Marra. 2015. Direct Mortality of Birds from Anthropogenic Causes. Annual Review of Ecology, Evolution, and Systematics, 46: 99-120.

Lovich, J.E. and Ennen, J.R. 2011. Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States. Bioscience, 61: 982-992.

McCrary, Michael D., R. L. McKernan, R. W. Schreiber, W. D. Wagner, and T. C. Sciarrotta. 1986. Avian Mortality at a Solar Energy Power Plant. Journal of Field Ornithology, 57(2): 135-141.

Morgan, M. and Burger, M. 2008. A Plan for Conserving Grassland Birds in New York: Final Report to the New York State Department of Environmental Conservation under contract #C005137. New York Audubon.

National Audubon Society. 2014. Audubon's Birds and Climate Change Report: A Primer for Practitioners. National Audubon Society, New York. 35 pp.

New York State Breeding Bird Atlas (NYS BBA). 2008. New York State Department of Environmental Conservation. Available at https://www.dec.ny.gov/animals/7312.html.

NYSDEC. 2015a. NYSDEC Draft Survey Protocol for State-listed Breeding Grassland Bird Species.

NYSDEC. 2015b. NYSDEC Draft Survey Protocol for State-listed Wintering Raptor Species.

Parker, G. E., & C. McQueen. 2013. Can solar farms deliver significant benefits for biodiversity. Winchwood Biodiversity/Rowsell & McQueen.

Smith, J. A., & J. F. Dwyer. 2016. Avian interactions with renewable energy infrastructure: An update. The Condor: Ornithological Applications, 118(2), 411-423.

TRC. 2020a. Excelsior Energy Center Project Grassland Breeding Bird Survey Report. (unpublished)

TRC. 2020b. State-listed Wintering Grassland Raptor Survey Report for the Excelsior Solar Energy Center. (unpublished)

United States Geological Survey [USGS]. 2019. Breeding Species List for New York, United States. North American Breeding Bird Survey. USGS Patuxent Wildlife Research Center, Laurel, MD. Available at: https://www.pwrc.usgs.gov/BBS/PublicDataInterface/index.cfm.

Walston Jr., L. J., K. E. Rollins, K. P. Smith, K. E. LaGory, K. Sinclair, C. Turchi, ... & H. Souder. 2015. A review of avian monitoring and mitigation information at existing utility-scale solar facilities (No. ANL/EVS-15/2). Argonne National Lab. (ANL), Argonne, IL (United States).

Walston Jr., L. J., K. E. Rollins, K. E. LaGory, K. P. Smith, and S. A. Meyers. 2016. A Preliminary Assessment of Avian Mortality at Utility-Scale Solar Energy Facilities in The United States. Renewable Energy (92): 405-414.

Walston Jr., L. J., S.i K. Mishra, H. M. Hartmann, I. Hlohowskyj, J. McCall, and J. Macknick. 2018. Examining the Potential for Agricultural Benefits from Pollinator Habitat at Solar Facilities in the United States. Environmental Science & Technology, 52(13): 7566-7576.

Tables

Table 1. Summary of Grassland Species with Potential to Occur Within the Project Area.

Species Name	Federal Status[1]	NYS Status[2]	SGCN Listing[3]	Habitat Preference[4]	Source of Potential Presence[5]	Observed On site
American Kestrel (Falco sparverius)	-	-	SGCN	This species prefers open areas, such as successional old fields, forest edges, scrublands, pastures and hay fields. Habitat for this species occurs within the Project Area.	C, D, E, F	Yes
Bald Eagle (*Haliaeetus leucocephalus*)	-	THR	SGCN	This species prefers undisturbed areas near large lakes, reservoirs, marshes, swamps, or stretches along rivers where they can breed and forage for fish. Habitat may exist at the site, though waterbodies are not large enough to support prey fish populations.	C, E, F	Yes
Bobolink (*Dolichonyx oryzivorus*)	-	-	SGCN-HP	This species prefers grasslands, including pastures, successional old fields, and meadows. Habitat for this species occurs within the Project Area.	C, D, F	Yes
Common Barn Owl (*Tyto alba*)	-	-	-	This species prefers open habitats which include grasslands, marshes, brushy fields, and agriculture. They typically nest in tree cavities, caves, but often in human structures. Habitat for this species occurs within the Project Area.	-	No
Eastern Meadowlark (*Sturnella magna*)	-	-	SGCN-HP	This species prefers farm fields, pastures, grasslands, and wet fields. Habitat for this species occurs within the Project Area.	C, D, F	No
Golden-winged Warbler (*Vermivora chrysoptera*)	-	SSC	SGCN-HP	This species prefers open woodlands, wet thickets, and successional shrublands. A mosaic of shrubby, open areas and mature forests are important for this species. Habitat for this species occurs within the Project Area.	-	No
Grasshopper Sparrow (*Ammodramus savannarum*)	-	SSC	SGCN-HP	This species prefers open fields and prairie including active hay fields, successional old field, and minimally in successional shrublands. Habitat for this species occurs within the Project Area.	C, D	No

Species Name	Federal Status[1]	NYS Status[2]	SGCN Listing[3]	Habitat Preference[4]	Source of Potential Presence[5]	Observed On site
Henslow's Sparrow (*Ammodramus henslowii*)	-	THR	SGCN-HP	This species prefers moist fallow fields and meadows. Breeding occurs in a variety of habitats with tall, dense grass and herbaceous vegetation. Habitat for this species occurs within the Project Area.	D	No
Horned Lark (*Eremophila alpestris*)	-	SSC	SGCN-HP	This species prefers open habitats with sparse vegetation such as prairies and heavily grazed pastures. Habitat for this species occurs within the Project Area.	C, D, E, F	Yes
Northern Harrier (*Circus cyaneus*)	-	THR	SGCN	This species prefers freshwater marshes, wet grasslands, lightly grazed pastures, successional old field, and croplands. Habitat for this species occurs within the Project Area.	C, D, E, F	Yes
Prairie Warbler (*Setophaga discolor*)	-	-	SGCN	This species prefers successional shrubland, successional old-field, brush piles, and pastures. Breeds in dry old field and clearing, edges of forest, and sandy pine barrens. Habitat for this species occurs within the Project Area.	-	No
Ring-necked Pheasant (*Phasianus colchicus*)	-	-	-	This species prefers agricultural land and old fields, especially fields that are interspersed with grass ditches, hedges, marshes, woodland borders, and brushy groves. Pheasant may also be found in pasture/hay, particularly alfalfa. Habitat for this species occurs within the Project Area.	C, D, E, F	No
Savannah Sparrow (*Passerculus sandwichensis*)	-	-	-	The species prefers patches of bare ground or short vegetation interspersed among taller dense grasses, pastures, hayfields, native prairies, the grassy edges of marshes, and reclaimed strip mines. Habitat for this species occurs within the Project Area.	C, D	Yes
Sedge Wren (*Cistothorus platensis*)	-	THR	SGCN	This species prefers shallow marshes, wet meadows, grasslands, and hayfields. Habitat for this species occurs within the Project Area.	-	No
Short-eared Owl (*Asio flammeus*)	-	THR	SGCN-HP	This species prefers open areas grasslands, prairies, marshes, and meadows. Habitat for this species occurs within the Project Area.	-	No

Species Name	Federal Status[1]	NYS Status[2]	SGCN Listing[3]	Habitat Preference[4]	Source of Potential Presence[5]	Observed On site
Upland Sandpiper (*Bartramia longicauda*)	-	THR	SGCN-HP	This species prefers prairies, grasslands, and successional old field. Habitat for this species occurs within the Project Area.	-	No
Vesper Sparrow (*Pooecetes gramineus*)	-	SSC	SGCN	This species responds quickly to changes in habitat and often occupies abandoned old farm fields and successional shrub lands as they return to forest. Habitat for this species occurs within the Project Area.	C, D	Yes

1- 'Federal Status' refers to the species listing as federally endangered (END) OR threatened (THR).

2 - 'NYS Status' refers to the species listing as a state-listed endangered (END), threatened (THR), or species of special concern (SSC).

3- 'SGCN Listing' refers to is the species state listed as a Species of Greatest Conservation Need – High Priority (SGCN-HP), Species of Greatest Conservation Need (SGCN), or a Species of Potential Conservation Need (SPCN).

4- References for habitat preference were Audubon.org, Allaboutbirds.org, and NYSDEC SWAP

5- "Source of Potential Presence" refers to the source of information indication the potential presence of the species at the Project Area:

A: Species identified by NYNHP as occurring within 10 miles of the Project Area

B: Species identified by USFWS online database (IPaC)

C: Species identified in the USGS Breeding Bird Survey

D: Species identified in the NYS BBA

E: Species identified in the Audubon CBC

F: Species identified in eBird

Table 2. Grassland Bird Species Occurrence Records for Study Project Counties (A-N)

Species	Last Year Observed in County[4]											
	Allegany	Cattaraugus	Cayuga	Chautauqua	Chemung	Cortland	Erie	Genesee	Jefferson	Livingston	Monroe	Niagara
American Kestrel[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Bald Eagle[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Bobolink[1]	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Common Barn Owl[2]		1992			No Date		No Date				No Date	1995
Eastern Meadowlark[1]	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Golden-winged Warbler[1]	2019	2017	2015	2015	2015	2019	2019	2016	2019	2018	2019	2018
Grasshopper Sparrow[1]	2019	2018	2019	2019	2018	2015	2019	2019	2019	2019	2019	2019
Henslow's Sparrow[2]	2003	2000	2001	2013	2001	Recent	2006	2001	2019	2018	2018	2000-2005
Horned Lark[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Northern Harrier[1]	2020	2020	2020	2020	2020	2019	2020	2020	2020	2020	2020	2020
Prairie Warbler[1]	2019	2019	2019	2019	2019	2019	2019		2019	2019	2019	2014
Ring-necked Pheasant[1]	2020	2020	2020	2019	2020	2019	2019	2020	2020	2020	2020	2020
Savannah Sparrow[1]	2019	2019	2019	2019	2019	2019	2019	2019	2019	2020	2020	2019
Sedge Wren[2]		2019	2019	2019			2016	2018	2019	2000-2005	2019	2018
Short-eared Owl[1]	2019	2020	2020	2020	2019	2014	2019	2020	2020	2020	2020	2018
Upland Sandpiper[2]	2002	2000	2018	2015	2015	2014	2019	2017	2019	2019	2019	2017
Vesper Sparrow[1]	2018	2019	2019	2019	2018	2019	2019	2019	2019	2019	2019	2018

1 Most recent record from eBird database

2 Most recent record taken from either NYNHP or eBird

3 Most recent record from NYNHP

4 A date range of 2000-2005 indicates data retrieved from NY BBA

Table 3. Grassland Bird Species Occurrence Records for Study Project Counties (O-Z)

Species	Last Year Observed in County[4]											
	Onondaga	Ontario	Orleans	Oswego	Schuyler	Seneca	Steuben	Tioga	Tompkins	Wayne	Wyoming	Yates
American Kestrel[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Bald Eagle[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Bobolink[1]	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Common Barn Owl[2]	1971		2019	2012			2018		2013			
Eastern Meadowlark[1]	2020	2020	2020	2020	2020	2020	2020	2019	2020	2020	2019	2019
Golden-winged Warbler[2]	2019	2010	2017	2019		2019		2018	2019	2018	2017	
Grasshopper Sparrow[1]	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Henslow's Sparrow[2]	2017	Recent	2009	2000	2000-2005	2002	2015	Recent	2016	2000-2005	2002	2002
Horned Lark[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Northern Harrier[1]	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Prairie Warbler[1]	2018	2019	2019	2019	2019	2019	2019	2019	2019	2019	2018	2018
Ring-necked Pheasant[1]	2020	2020	2020	2020	2020	2020	2019	2020	2020	2020	2020	2020
Savannah Sparrow[1]	2019	2019	2019	2019	2019	2020	2019	2019	2020	2019	2019	2019
Sedge Wren[2]	2019	2019	2018	2019		2019	2014		2011	2019	Historic	1998
Short-eared Owl[1]	2018	2020	2020	2019	2020	2020	2019	2020	2019	2020	2017	2018
Upland Sandpiper[2]	2014	2005	2016	2019	2016	2019	2018		2019	2010	2016	
Vesper Sparrow[1]	2019	2019	2019	2019	2019	2019	2016	2019	2019	2019	2019	2017

1 Most recent record from eBird database

2 Most recent record taken from either NYNHP or eBird

3 Most recent record from NYNHP

4 A date range of 2000-2005 indicates data retrieved from NY BBA

Table 4. Summary of Study Projects Evaluated

NHP Project Number	Project Name	Project Applicant	City	County	DEC Region	MW	Acres	Status
20161227	Allegany County Solar Project	SolarCity	Amity	Allegany	9		28.8	Proposed
2013687	Houghton College Solar Array Project	Houghton College	Caneadea	Allegany	9		47.2	Constructed
2018647	Swift Hill Solar Facility	Solar Provider Group	Rushford	Allegany	9		35.0	Proposed
2018630	Moraine Solar Energy Center	Environmental Design & Research	Burns, Dansville, Ossian	Allegany, Steuben, Livingston	89	75	9804.8	Proposed
2018963	1414 Rowe Ave	Borrego Solar Systems Inc.	Portville	Cattaraugus	9	7	68.5	Proposed
2018390	4959.15 Yorkshire-Fisher PV	Nexamp Solar, LLC	Yorkshire	Cattaraugus	9		38.3	Proposed
20171266	ASP CNY WL1 – Ledyard PV Plant	Abundant Solar Power, Inc.	Ledyard	Cayuga	7		39.3	Proposed
20171267	ASP CNY WL2 – Aurora PV Plant	Abundant Solar Power, Inc.	Ledyard	Cayuga	7		50.8	Proposed
20181439	Scipio Solar Facility at 2909 Center Road	Duke Energy Renewables	Scipio	Cayuga	7		162.5	Proposed
	Dog Corners Solar Project	Suneast Development LLC	Ledyard	Cayuga	7		230.2	Proposed
	Garnet Energy Center	Garnet Energy Center, LLC	Conquest	Cayuga	7	200	1595.7	Proposed
2018862	Silver Creek Unit 1	Source Renewables	Sheridan	Chautauqua	9		140.6	Proposed
2017599	Cold Water Solar Project, EDR Project No. 17050	Environmental Design & Research	Sheridan	Chautauqua	9		378.3	Proposed
20151255	Dunkirk Solar Project	AECOM	Pomfret	Chautauqua	9		92.1	Proposed
	South Ripley Solar and Storage	ConnectGen Chautauqua County LLC	Ripley	Chautauqua	9	270	2070.7	Proposed
2016832	Turner Solar Array	Delaware River Solar	Baldwin	Chemung	8		27.2	Constructed
20161266	Solar farm installation, 68 Callahan Road, Beaver Dams	Renovus Solar	Catlin	Chemung	8	5.25	37.9	Constructed
20161015	Delaware Snell Road	The Chazen Companies	Chemung	Chemung	8		41.5	Proposed
20161265	Solar farm installation, Breesport Road	Renovus Solar	Erin	Chemung	8		30.6	Proposed
	Erin Solar Array	Abundant Solar Power	Erin	Chemung	8	5	100.4	Proposed
2016303	Southtown Solar Project	OneEnergy Renewables	Brant	Erie	9		104.9	Proposed
20181210	Proposed solar array, 2555 Staley Road	Borrego Solar Systems, Inc.	Grand Island	Erie	9		44.0	Proposed
2017994	Grand Island CSD Solar Array		Grand Island	Erie	9		48.6	Proposed
	Wales Landfill	TM Montante Solar Developments LLC	Tonawanda	Erie	9		35.5	Proposed
	Solar Park 2	Whitehaven Solar A LLC	Grand Island	Erie	9		39.9	Proposed

NHP Project Number	Project Name	Project Applicant	City	County	DEC Region	MW	Acres	Status
	Genesee Road Solar Energy Center	EDF Renewables	East Concord, Sardinia	Erie	9	350	20520.4	Proposed
20181215	Solar array at 3235 West Main Street Road	Borrego Solar Systems, Inc.	Batavia	Genesee	8		51.5	Proposed
20181216	Solar array at 3232 West Main Street Road	Borrego Solar Systems, Inc.	Batavia	Genesee	8		94.0	Proposed
20181217	Batavia Solar Array	Borrego Solar Systems, Inc.	Batavia	Genesee	8		55.5	Proposed
20161509	Seven Springs Solar, LLC	Tetra Tech, Inc.	Stafford	Genesee	8		128.3	Proposed
	Excelsior Energy Center	Excelsior Energy Center LLC	Byron	Genesee	8	280	3416.1	Proposed
20181230	York solar project	Geronimo Energy	York	Livingston	8		133.2	Proposed
2018633	Morris Ridge Solar	Environmental Design & Research	Mount Morris	Livingston	8	175	1408.5	Proposed
	White Creek Solar	Community Solar	Byron	Livingston	8	135	2598.7	Proposed
2018724	Horseshoe Solar	Invenergy	Caledonia, Rush	Livingston, Monroe	8	180	2818.8	Proposed
20181193	Proposed solar arrays at 2668 Redman Road	Borrego Solar Systems, Inc.	Clarkson	Monroe	8		83.6	Proposed
2018226	Solar array at 3254 Roosevelt Highway	Borrego Solar Systems, Inc.	Hamlin	Monroe	8		59.1	Proposed
20161321	Flotilla 3 Solar project	OneEnergy Renewables	Hamlin	Monroe	8		97.3	Proposed
20161322	Flotilla 4 Solar project	OneEnergy Renewables	Hamlin	Monroe	8		75.1	Proposed
20171590	Solar arrays at 2645 Union Street	Borrego Solar Systems, Inc.	Ogden	Monroe	8		70.5	Proposed
20171591	Solar arrays at at 2648 Union Street	Borrego Solar Systems, Inc.	Ogden	Monroe	8		87.2	Proposed
20171592	Solar arrays at 2675 Union Street	Borrego Solar Systems, Inc.	Ogden	Monroe	8		63.9	Proposed
201685	Genesee Solar	Cypress Creek Renewables, LLC	Parma	Monroe	8		37.7	Proposed
20161192	Parma Delaware Solar	Delaware Solar	Parma	Monroe	8		43.1	Proposed
2018594	2290 Scottsville Mumford Road, Mumford Project	Borrego Solar Systems, Inc.	Wheatland	Monroe	8		75.0	Proposed
20161152	Oatka Solar	OneEnergy Renewables	Wheatland	Monroe	8		55.2	Proposed
2018132	Brokenstraw Solar, LLC	Cypress Creek Renewables	Rush	Monroe	8		59.8	Proposed
2016777	Proposed Solar Project – Swillburg 2 Solar	OneEnergy Renewables	Rush	Monroe	8		100.9	Proposed
2016544	Caspian 2 Solar Project	OneEnergy Renewables	Riga	Monroe	8		46.9	Proposed
2016304	Caprock Solar Project	OneEnergy Renewables	Sweden	Monroe	8		114.5	Proposed
	Monroe County Solar Project	Brydges Environmental Engineering & Energy	Greece	Monroe	8		274.8	Proposed

NHP Project Number	Project Name	Project Applicant	City	County	DEC Region	MW	Acres	Status
	Parma Community Solar	Suncommon NY Commercial Solar Assets LLC	Parma	Monroe	8		38.7	Proposed
	Monroe County Solar Project	Brydges Environmental Engineering and Energy	Penfield	Monroe	8		89.5	Constructed
	Delaware River Solar LLC Solar Energy Facility	Town of Ogden	Ogden	Monroe	8	8	85.7	Proposed
2018596	Lewiston Borrego Solar Project	Borrego Solar Systems Inc	Lewiston	Niagara	9		40.8	Proposed
20181337	Solar array at 4352 Williams Road	Borrego Solar Systems, Inc.	Lewiston	Niagara	9		97.7	Proposed
2018961	Bear Ridge Road Borrego Solar Site	Borrego Solar Systems Inc	Pendleton	Niagara	9		71.6	Proposed
2018225	Sanborn Solar Site	Borrego Solar Systems Inc	Wheatfield	Niagara	9		83.2	Proposed
2018500	Bear Ridge Solar	Cypress Creek Renewables	Cambria, Pendleton	Niagara	9	100	5129.7	Proposed
	OYA Solar Farm	OYA Solar NY, LP	Lewiston	Niagara	9		73.1	Proposed
	Ridge View Solar Energy Center	EDF Renewables Development Inc	Hartland	Niagara	9	350	15453.5	Proposed
20171271	ASP CNY OC2 – Baldwinsville PV Plant	Abundant Solar Power, Inc.	Lysander	Onondaga	7		45.6	Constructed
20161151	Archimedes West Solar	OneEnergy Renewables	Lysander	Onondaga	7		98.7	Proposed
20161150	Archimedes East Solar	OneEnergy Renewables	Lysander	Onondaga	7		56.2	Proposed
20161149	Sundew Solar	OneEnergy Renewables	Lysander	Onondaga	7		49.2	Proposed
2014787	5 MW solar array	NextEra Energy Resources	Otisco	Onondaga	7		53.9	Proposed
20181045	Sky High Solar, LLC	Cypress Creek Renewables, LLC	Tully	Onondaga	7		247.2	Proposed
2016643	Potter Solar Project	SolarCity	Tully	Onondaga	7		54.1	Proposed
20171269	ASP CNY W4 – Van Buren PV Plant	Abundant Solar Power, Inc.	Van Buren	Onondaga	7		60.0	Proposed
20171270	ASP CNY OC1 – Brewerton PV Plant	Abundant Solar Power, Inc.	Cicero	Onondaga	7		32.1	Proposed
			Clay	Onondaga	7		76.7	Constructed
2018192	North Road Community Solar Garden, 4575 North Road	YSG Solar	Canandaigua	Ontario	8		36.1	Proposed
2015635	Wallace Farms Solar Project	US Department of Agriculture - Rural Development	Geneva	Ontario	8		33.6	Constructed
2018161	Proposed Ground Mount Solar System at 2493 State Route 21	YSG Solar	Hopewell	Ontario	8		125.8	Proposed
2016518	Driscoll Solar Project	TRC	Phelps	Ontario	8		43.8	Proposed
2014834	Proposed utility-scale solar farm at 4380 State Route 14A	OneEnergy Renewables	Seneca	Ontario	8		47.6	Constructed
2018595	5297 County Road 37, Hemlock Solar Arrays	Borrego Solar Systems, Inc.	Richmond	Ontario	8		46.5	Proposed

NHP Project Number	Project Name	Project Applicant	City	County	DEC Region	MW	Acres	Status
			Canadaigua	Ontario	8		26.3	Constructed
			Canadaigua	Ontario	8		29.5	Constructed
	Large Scale Solar Array Bennet Farms Inc		st Bloomfield	Ontario	8		194.8	Proposed
		Delaware River Solar LLC	Farmington	Ontario	8	7	135.4	Proposed
2018850	Solar arrays at 3962 Allis Road, Medina	Borrego Solar Systems, Inc.	Ridgeway	Orleans	8	6.8	42.0	Proposed
	Orleans Solar	Community Energy Solar LLC	Barre, Shelby	Orleans	8	200	2154.1	Proposed
201846	Route 57 Solar - Schroeppel, NY	CITE Development, Engineering & Landscape Architecture, PLLC	Schroeppel	Oswego	7		90.2	Proposed
20161633	Crofoot Solar, LLC Site	Cypress Creek Renewables	Volney	Oswego	7		70.9	Proposed
			Oswego	Oswego	7		44.7	Constructed
	Watkins Glen Solar Energy Center	Watkins Glen Solar Energy Center, LLC	Dix	Schuyler	8	50	774.7	Proposed
2018632	Suffragette Solar Energy Center	EDF Renewables	Seneca Falls	Seneca	8	20	219.3	Proposed
	Trelina Solar Energy Center	Trelina Solar Energy Center, LLC	Waterloo	Seneca	8	80	898.6	Proposed
20141222	Proposed Slingshot Solar solar photovoltaic project	OneEnergy Renewables	Wayne	Steuben	8		46.0	Proposed
2017176	sun8 Gillis Property Solar Array Project, NYS Route 96	sun8	Spencer	Tioga	7		220.1	Proposed
2017186	sun8 2150 Dryden Road Solar Array Project	sun8	Dryden	Tompkins	7		140.2	Proposed
2017185	sun8 Ellis Tract Solar Array Project	sun8	Dryden	Tompkins	7		143.2	Proposed
20161566	Podunk Road Solar Site	xzerta energy group	Enfield	Tompkins	7		25.3	Proposed
2016829	Newfield Solar Array	Delaware River Solar	Newfield	Tompkins	7		94.8	Proposed
20161503	Ground-mounted photovoltaic solar array at intersection of Millard Hill Road and Burdge Hill Road	The Chazen Companies	Newfield	Tompkins	7		30.7	Proposed
20161533	Solar array near intersection of Trumbull Corners Road and Blovsky Hill Road	The Chazen Companies	Newfield	Tompkins	7		40.0	Proposed
	Science Center Project		Ulysses	Tompkins	7		62.7	Constructed
20161510	Laidlaw Solar, LLC - solar energy facility, 4031 W. Walworth Road	Tetra Tech, Inc.	Walworth	Wayne	8		44.7	Proposed
20161511	Brickchurch Solar Project	Sodus Town Planning Board	Sodus	Wayne	8		27.2	Proposed

NHP Project Number	Project Name	Project Applicant	City	County	DEC Region	MW	Acres	Status
	Town of Williamson Ground Mounted Solar Panels	Town of Williamson	Williamson	Wayne	8		25.6	Constructed
	Wang Community Solar Project	US Dept of Interior	Sodus	Wayne	8		139.5	Proposed
	Rosalen Solar Energy Center	EDF Renewables Development Inc	Rose, Glaen	Wayne	8	350	24262.8	Proposed
20181395	Niagara Solar Project	Duke Energy Renewables	Bennington	Wyoming	9	20	158.8	Proposed
20181420	Silver Lake Solar Project	Tetra Tech	Castile	Wyoming	9		452.1	Proposed
	Big Tree Solar Project		Bennington, Sheldon	Wyoming	9	175	5830.5	Proposed
2017448	Middlesex Solar Array	sun8 PDC LLC	Middlesex	Yates	8		28.0	Proposed

Table 5. NLCD Land Cover Data for Project Area and relative to Grassland Study Area

NLCD Land Cover Class	PROJECT AREA IMPACT ACRES	100-MILE IMPACT ACRES	PCT OF PROJECT AREA TO 100 MILE
Barren Land (Rock/Sand/Clay)	6.36	22,375.10	0.03
Cultivated Crops	2,936.84	1,769,399.45	0.17
Deciduous Forest	102.76	2,814,810.53	0.00
Developed, High Intensity	0.21	44,240.01	0.00
Developed, Low Intensity	26.16	256,749.47	0.01
Developed, Medium Intensity	3.12	103,553.70	0.00
Developed, Open Space	43.57	546,865.24	0.01
Emergent Herbaceous Wetlands	7.18	69,503.36	0.01
Evergreen Forest	-	219,757.75	0.00
Grassland/Herbaceous	1.34	30,142.05	0.00
Hay/Pasture	121.39	1,491,072.14	0.01
Mixed Forest	3.32	890,177.99	0.00
Open Water	0.45	223,448.91	0.00
Shrub/Scrub	-	58,577.02	-
Woody Wetlands	156.46	627,702.71	0.02
Grand Total	**3,409.2**	**9,168,375.44**	**0.04**

Table 6. Percent of Grassland Habitat Among Study Projects Relative to Proposed Project and Available Habitat Within Grassland Study Area

	Acres of Grassland Habitat	Total Acres	Percent of Grassland Habitat Relative to Project Area(s)	Percent of Grassland Habitat Relative to Grassland Habitat in Study Area	Percent of Grassland Habitat Relative to Total Acreage in Study Area
Project Area	122.7	3,409.2	3.6%	0.0%	0.0%
Study Projects	16,484.8	106,585.7	15.5%	1.1%	0.2%
Grassland Study Area	1,521,214.2	9,168,375.4	N/A	N/A	16.6%

Figures