

**Exhibit J**

State-Listed Bird Species Assessment



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Biodiversity Studies • Wetland Delineation & Assessment • Habitat Management • GIS Mapping • Permitting Forestry

## **State-listed Bird Species Assessment**

### **Proposed Amaral Solar Facility**

254 Putnam Road  
Pomfret Center, CT

*Submitted To:*

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and

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# 1. INTRODUCTION

A habitat-based assessment for State-listed bird species was conducted at 254 Putnam Road (Route 44) in the Town of Pomfret (“the Site”, hereinafter). While this work was primarily a habitat-based evaluation of suitability, our work also included baseline point-count surveys for grassland birds as described in Section 4.

Work was conducted by Eric Davison of Davison Environmental and Hunter Brawley of Brawley Consulting Group. Site visits were conducted in May and August. This work was conducted as part of an environmental impact review for the installation of a 1.97-megawatt ground-mounted solar array field (“the Project”, hereinafter) proposed within the southeast portions of the property as noted on the *Overview Map* and *Existing Site Habitat Map* included in Appendix A.

Consultation with the Connecticut Natural Diversity Database (NDDDB) was conducted and a Preliminary Assessment Letter (No.: 202103657) was issued on June 22, 2021. That letter indicated the potential presence of the following nine State-listed bird species within or adjacent to the Site:

- Short-eared owl (*Asio flammeus*)
- Long-eared owl (*Asio otus*)
- American bittern (*Botaurus lentiginosus*)
- Sedge wren (*Cistothorus platensis*)
- Bobolink (*Dolichonyx oryzivorus*)
- American kestrel (*Falco sparverius*)
- Savannah sparrow (*Passerculus sandwichensis*)
- Pied-billed grebe (*Podilymbus podiceps*)
- Purple martin (*Progne subis*)

Confirmation of the presence of two of these species within the project area, bobolink and Savannah sparrow, were made in May 2021 during grassland bird surveys. For the remaining seven species, potential bird habitats on the site were identified and mapped. For each habitat, abiotic and biotic habitat characteristics, including the soil type, hydrologic regime (of wetlands), cover type and dominant plant species were evaluated. These characteristics were compared to the known habitat preferences for these species in the region. This habitat-based evaluation was aided by local knowledge of the distribution of these species based on communications with Mr. Andy Rzeznikiewicz, the Manager of Connecticut Audubon’s 700-acre Bafflin Sanctuary in Pomfret. Mr. Rzeznikiewicz has managed the extensive grassland habitats at the Pomfret

Audubon Center for over 25 years and is on the Board of Directors of the Wyndham Land Trust (<https://www.wyndhamlandtrust.org/>). A list of bird species that have been recorded on or near the project site was compiled based on field visits, citizen science records (*ebird*) for Wyndham Land Trust's (WLT) Duck Marsh Preserve, and personal communications with Mr. Rzeznikiewicz who helps lead WLT's land conservation initiatives and regularly monitors bird populations on the Duck Marsh Preserve and active farm properties in the area.

## 2. SITE DESCRIPTION

The project site is a dairy farm located at 254 Putnam Road (Route 44) in the town of Pomfret. The 215-acre farm contains a residence and a dairy barn, pastures, and an 85± acre hayfield. The hayfield extends to the south from the barn over a prominent knoll and down to Wright's Crossing Road. On the south side of Wright's Crossing Road is Wyndham Land Trust's 146-acre Duck Marsh Preserve which contains a large emergent marsh complex and post-agricultural fields. Bark Meadow Brook flows to the south through the farm and into the Duck Marsh Preserve. The southern limits of the Project will fall within approximately 150 feet of the Preserve's northern property boundary. This matrix of open fields, wetlands and woodlands provides high quality habitat for a number of notable bird species including grassland birds which were included on the list of species provided by the NDDB.

## 3. HABITAT SUITABILITY

The farm property contains several distinct habitats/land cover types that are shown on the *Existing Site Habitat Map* in Appendix A. These habitats are illustrated in the photographs included in Appendix B. The following sections describe the characteristics of each of the habitats/land cover types present on the Site. The Project area is proposed on the southern edge of the Farm's expansive hayfield bordering Wright's Crossing Road. The Project area will total 14.2-acres of disturbance, and upon full construction the array field will cover a total of 11-acres. To the west of the hayfield and the brook is mesic to wet meadow habitat which is presently (as well as historically) used as a pasture for dairy cattle. A large contiguous wetland system borders Bark Meadow Brook, including areas of wetland which fall within the active pastureland.

### Hayfield

The dominant cover type on the site is hayfield dominated by non-native cool season grasses such as smooth brome grass, timothy, Kentucky bluegrass, tall fescue, and orchardgrass. This

site's 85± acre hayfield provides high quality habitat for the two grassland species that are confirmed breeders. However, the fields are cut for haylage several times during the growing season, including in 2021 in the end of May, which is well within the recognized breeding dates for bobolink and other grassland birds. The hayfield is large enough to support several other grassland bird species that occur in Northeast Connecticut which are area sensitive (e.g. only breed in larger fields) such as Eastern meadowlark and grasshopper sparrow, but to date these two state-listed species have not been recorded as nesting on the site.

### Pasture

Pasture areas occur along the entire western boundary of the farm and extend into the riparian corridor along the brook. The cattle have had unrestricted access to the stream and riparian corridor which has caused significant soil compaction, minor related erosion from hoof action, and vegetation over browse and trampling. The disturbed pastures/open fields provide foraging habitat for passerines and raptors and owls but are not suitable habitat for the State-listed grassland breeding bird species identified by the NDDB due to the lack of tall grass and forb cover.

### Emergent / Scrub-shrub wetland

Emergent/scrub-shrub wetlands occur along the riparian corridor. The more valuable habitat lies in the dendritic system on the north side of the site, on either side of the brook. At these locations, cattle activity is more limited or non-existing, and therefore the vegetation is relatively intact. Although well outside the Project area (approximately 2,000 feet away), these areas do provide suitable habitat for a variety of birds (and other wildlife). Sedge wren has historically been recorded breeding in the large wetland complex within Duck Marsh preserve but was not identified on this site during any of the field visits. Sedge Wrens nest in dense, tall growths of sedges and grasses in wet meadows, hayfields, retired croplands, upland margins of ponds and marshes, tallgrass prairie, coastal marshes, and sphagnum bogs—ideally all with some woody shrubs interspersed. It does not nest in tall reeds or deep-water marshes (generally habitat for Marsh Wren) and avoids sparsely vegetated wetlands that lack a shrub element. Migrants usually gravitate toward habitats that resemble nesting habitat, including agricultural fields, grasslands, saltmarshes, and overgrown weedy fields.”

The other wetland dependent bird listed by the NDDB is American Bittern, which also was recorded as nesting in the Duck Marsh Preserve. “American Bitterns usually build their nests among thick stands of cattails, bulrushes, and sedges that grow out of shallow water. Less commonly, they nest on dry ground, in grassland areas dense with tall herbaceous plants.” As with the sedge wren, the northern emergent/scrub-shrub wetland system represents suitable

habitat. However, this habitat is sub-optimal in comparison to Duck Marsh as the system is much smaller and less diverse (in species diversity and heterogeneity of vegetation), and is located relatively close to Putnam Road and the farm residence within the property off Wright's Crossing Road (and related human activities). Such conditions are generally less favorable to a highly secretive and disturbance sensitive species such as the American bittern.

Pied-billed grebe is an open water bird identified by the NDDB that was a confirmed nester in the Duck Marsh open water wetlands. According to the Cornell Lab of Ornithology, "Pied-billed Grebes live on bodies of flat or sluggish, fresh to slightly brackish water, at altitudes from sea level to about 8,000 feet. They forage in open water but construct their floating nests using materials and anchors of aquatic vegetation and/or dense stands of emergent vegetation—plants that root underwater with leaves and stems that extend into air. Habitat types include freshwater wetlands, wet fields, bays, sloughs, marshes, lakes, slow-moving rivers, and even sewage ponds. Pied-billed Grebes can nest in moderately to heavily populated areas. They occupy similar habitats during migration and winter." There is no suitable habitat for grebes within the subject property.

### Wetland Forest

Bordering to the hayfield to the east is a forested wetland which contains vegetation which is typical of red maple-dominated swamps throughout Connecticut. Red maple and American elm dominate the tree stratum over a dense mix of spicebush, winterberry and multiflora rose over jewelweed, ferns, tussock sedge and skunk cabbage. Imbedded within the forested wetland is a small vernal pool. This forested area does not provide habitat for any of the bird species identified by the NDDB.

### Bark Meadow Brook Riparian Corridor

This riparian habitat is also highly disturbed due to unlimited access by the cattle. The hedgerows along the stream do provide perches for cavity trees for woodpeckers and other passerines but is not suitable habitat for any of the State-listed birds.

### Developed

The area surrounding the farmhouse was mapped as developed, and includes the residence, barns and other outbuildings and equipment storage areas. The groundcover in these areas includes pavement, gravel and mowed lawn. There is also an agricultural pond. This area contains no habitat for any of the birds identified by the NDDB. However, there is a record for purple martin in the area, but in Connecticut this species nests exclusively in constructed bird houses. According to the CT Department of Energy & Environmental Protection (CT DEEP) "the entire eastern race of purple martins (east of the Rocky Mountains) is totally dependent on

humans for supplying them with nesting sites in the form of specially-designed houses or hollow gourds. If humans were to stop supplying martins with homes, they would likely disappear as a breeding bird in eastern North America.” We did not note any purple martin houses on the premises, although the habitat is suitable to support the species.

#### 4. GRASSLAND BIRDS

The Project area is sighted entirely (except for the existing access road) within the existing hayfield. Therefore, grassland dependent and grassland associated species utilizing the Site’s hayfield habitat are most at risk of impact from this Project. To document breeding season bird activity within the hayfield, a systematic grassland bird survey methodology was employed. This method consisted of documenting bird species using a transect line point-count survey method using 50m wide x 300m long transects that covered the entire Project area, including areas immediately adjacent (within approximately 300 feet) to the Project area within the contiguous hayfield. An initial site visit was conducted on May 12, 2021 to establish and field demarcate the transect locations using GPS and tall green garden stakes. The first transect survey was conducted on May 19<sup>th</sup>. Upon arrival for the second survey on May 24<sup>th</sup>, it was noted that the entire hayfield had been cut to a height of 6” (or less), interrupting the breeding activity of grassland nesting birds. Based on the May 19<sup>th</sup> Site visit, a maximum number of 10 individual bobolinks were recorded in a single transect, and bobolinks were recorded in similar numbers along all four transects. After the haying, between 12-15 male bobolinks were visible at one time within the Project area. The State-listed savannah sparrow (a single individual male) was observed during the initial site visit on May 12<sup>th</sup> but was not observed during the point count surveys on May 19<sup>th</sup>.

According to Mr. Rzeznikiewicz, both bobolink and Savannah sparrow nest annually in the Site’s hayfield as well as within suitable habitats nearby suggesting there is a regional metapopulation of bobolink. Other potential nesting species on the site are northern harrier and American kestrel, both species that utilize large hayfields, or their ecotones. Long-eared and short-eared owls have been observed during winter, seen roosting and foraging in the Site’s hayfield and on other open farm fields in the vicinity of the Site.

#### Population Sinks and Agricultural Land uses

Numerous factors may affect the density of nesting grassland birds on this Site, including current and historic farming practices and the size and location of the fields. Although forest edges provide important habitat for numerous wildlife species, studies have shown that breeding success for

ground-nesting birds can increase with distance from edge habitats (Renfrew et al. 2005). The subject hayfield has optimal vegetative consistency (homogenous grass cover, little tree and shrub cover) throughout, and has a large amount of interior habitat. The density of bobolinks within the survey area was highest away from the forest edge to the east and from Wright's Crossing Road to the south.

The principal issue with respect to the ability of this Site to effectively support grassland birds (e.g., bobolink) is the well-documented conflict between agricultural land use practices and the conservation of grassland birds. Haying is an intensive land use that typically occurs in the middle of the grassland-bird nesting season, which extends roughly from late May through July. Farmers typically try to get as many hay cuttings as possible during the summer months, resulting in the destruction of bird nest, adults, eggs and fledglings. The America Birding Association describes this conflict in New York State where bobolink are more abundant than in Connecticut: "Current agricultural practices allow farmers to grow more hay in one season through multiple harvests. While economically advantageous for farmers, the multiple harvests result in the destruction of bobolink nests during the breeding season. This is considered the main factor in the species' decline in New York." According to the *Best Management Practices for Grassland Birds* (Atwood et al. 2017), "Grassland birds have a high degree of nest-site fidelity, returning annually to the same site to attempt to breed...this loss caused by mowing affects more than just individual breeding pairs—it affects the entire population. Fields that are cut during June and July act as population sinks, in which mature birds waste their entire reproductive effort." While the premise haying cycle of this Site is not known, based on the site visits conducted, it appears that these fields are on a 2-3 cuttings/year management cycle. This represents a cutting cycle that is not conducive to successful grassland bird nesting. Therefore, at present, the Site likely serves as a population sink.

## 5. DUCK POND MARSH PRESERVE

On the south side of Wright's Crossing Road is Wyndham Land Trust's 146-acre Duck Marsh Preserve which contains a large emergent marsh complex and post-agricultural fields. A total of 148 species have been recorded at the Duck Pond Marsh Preserve according to the *Ebird* website (See Appendix C). The NDDB has records of nine State-listed bird species in the vicinity of the Site, six of which are typically associated with grassland habitats. The remaining three species occur in open water or wetland habitats. Although the NDDB does not have a record for northern harrier, this species was seen in the subject hayfield on one occasion and has been observed



foraging in the area for several years by Mr. Rzeznikiewicz. To date breeding by northern harrier has not been confirmed.

Table 1. State-listed bird species recorded on or near 254 Putnam Road.

Common Name	Scientific Name	NDDDB Status	Status	Preferred Habitat	Recorded Location(s)
Short-eared Owl	<i>Asio flammeus</i>	T	Winter roost/forage	Grassland	Duck Marsh, 254 Putnam Rd
Long-eared Owl	<i>Asio otus</i>	E	Winter roost/forage	Grassland	Duck Marsh, 254 Putnam Rd
American Bittern	<i>Botaurus lentiginosus</i>	E	Confirmed Breeding	Wetlands	Duck Marsh
Northern Harrier	<i>Circus hudsonius</i>	E	Possible Breeding	Grassland	Duck Marsh, 254 Putnam Rd
Sedge Wren	<i>Cistothorus platensis</i>	E	Confirmed Breeding	Wetlands	Duck Marsh
Bobolink	<i>Dolichonyx oryzivorus</i>	SC	Confirmed Breeding	Grassland	Duck Marsh, 254 Putnam Rd
American Kestrel	<i>Falco sparverius</i>	SC	Confirmed Breeding	Grassland	Duck Marsh
Savannah Sparrow	<i>Passerculus sandwichensis</i>	SC	Confirmed Breeding	Grassland	Duck Marsh, 254 Putnam Rd
Pied-billed Grebe	<i>Podilymbus podiceps</i>	E	Confirmed Breeding	Open water	Duck Marsh
Purple Martin	<i>Progne subis</i>	SC	Unknown	Nets Boxes	Unknown
<i>E = Endangered; T = Threatened; SC Special Concern. Breeding Status based on eBird records and personal communications.</i>					

## 6. PROJECT IMPACTS

According to Massachusetts Audubon Society’s publication *Best Management Practices for Grassland Birds* (Atwood et al. 2017), “grassland-nesting birds are among the most imperiled birds in the nation. Between 1966 and 2012, these species experienced steeper, more consistent, and more widespread population declines than any other group of birds in North America. These declines have been the direct result of three factors: the conversion of grassland habitat to other uses; the natural reversion of grassland to forest; and the intensification of agricultural practices on the grasslands that remain.” Many grassland bird species are “area dependent” and require larger unfragmented fields for successful breeding.

The direct impact of construction would be the loss of 12.5 acres of grassland bird habitat where two State-listed species have been documented: bobolink and savannah sparrow. The loss of the 12.5 acres within the 85± acre hayfield represents a 15% reduction in available habitat. Additionally, the remaining hayfield immediately east of the Project area, although it will not be directly affected by construction, will likely be rendered unsuitable for bobolink (and other

grassland birds) as the remaining habitat will become narrow in width (less than 300 feet wide) as it would be situated between the solar arrays to the west, and the forest to the east.

With respect to indirect impacts, at present there are little peer reviewed studies documenting the effects of solar arrays on birds in the northeastern U.S. Provided in the following sections is a discussion on the potential for short-term construction related impacts, and long-term impacts that could occur post-construction.

1. Construction related impacts: impacts during construction have the potential to affect birds utilizing the habitats adjacent to the construction zone. Indirect impacts, primarily noise from construction, could alter bird activity (causing habitat avoidance) to up to 500 feet from construction. To avoid construction-related impacts to breeding birds, avoid construction during the primary breeding bird season (approximately April 1<sup>st</sup> through August 30<sup>th</sup>). It should be noted that for short-eared and long-eared owls that utilize the subject Site during the winter for roosting and feeding, such activity would be disrupted by a fall-winter construction schedule. However, most species, including non-avian species, would benefit from a fall-winter construction schedule outside of the growing season.
2. Noise disturbance (post-construction): the level of post-construction human activity at a solar array field is very low, particularly in comparison to land uses such as residential development which include vehicle traffic, house cats, lawn mowing, residential windows (resulting in glass strikes) and the presence of trash which attracts subsidized predators of songbirds.
3. Direct Mortality (post-construction): there is significant anecdotal and empirical evidence of bird mortality caused by solar array fields. The causes of such impact were summarized by Walston et. al. (2016), referring to the phenomenon as collision-related mortality. This is mortality resulting from the direct contact of the bird with a solar project structure(s). This type of mortality has been documented at solar projects of all technology types. This can occur for a variety of reason, including disorientation during flight from solar glare, misinterpretation of the solar panel surface as sky or water, or unintended impact with panels during feeding (e.g., by aerial insectivores).

The authors surmised that the location of a solar energy project “relative to bird habitats, such as migration flyways, wetlands, and riparian vegetation could influence avian mortality risk”. surface disturbance and human activity. Projects with larger footprints may result in more

avian fatalities than projects with smaller footprints. In this case, the proposed Project is relatively small in scale (1.97 megawatts of production, covering 11.0 acres of land post-construction) in comparison to other solar array projects in the region. But the question of whether the Project's location relative to lands that support numerous rare species (i.e., Duck Marsh Preserve) could increase the likelihood or mortality, particularly to rare species of high conservation importance, is unknown. Unfortunately, the scientific community, and those at the regulatory level, currently lack the knowledge to evaluate this potential impact, as to date in Connecticut, we are unaware of any post-construction avian mortality monitoring of solar array fields that would inform our evaluation of risk at this Site. When the Connecticut Siting Council approved the construction of two commercial wind turbines in Colebrook in 2015, the concern over bird mortality led the Council to require post-construction bird-strike monitoring in order to evaluate the impact to birds. Similar monitoring in Connecticut for large-scale solar fields is desperately needed to better understand whether bird-strike mortality rates reach of level of concern, or how they can be mitigated.

## 7. CONSERVATION RECOMMENDATIONS

### SITE-WIDE CONSERVATION MEASURES

The areas within the property that support the highest density of grassland birds include hayfield areas that are located outside of the Project limits. To adequately protect nesting grassland birds, a site-wide comprehensive protection plan would be needed. Altering the future agricultural practices beyond the Project limits would be necessary in order to properly manage the Site for grassland birds. The following are ways to help conserve grassland birds excerpted from Massachusetts Audubon Society's publication *Best Management Practices for Grassland Bird* (Atwood et al. 2017):

1. **Mow outside of the breeding season.** Avoid haying during the breeding season between May 15 and August 15. ***This is the most important management practice.*** When possible, do not mow in the early spring. Mowing just prior to breeding season leaves very little cover in fields, making them much less attractive for nesting. If mowing is required to generate an early crop or to control woody vegetation or forbs, ensure that all operations are completed by May 15. Early season mowing should occur no more frequently than every other year.
2. **Discourage the growth of forbs and woody vegetation.** Mow fields before September 15 each year to prevent the proliferation of forbs. Later mowing allows goldenrods, asters,

and a wide variety of other wildflowers to mature and set seed, leading to a decline in grass cover and ultimately a decline in habitat quality. Collect cut material at least every three years.

3. **Avoid disturbances.** Grassland birds will be stressed by disturbance. Eliminating foot traffic, farm equipment travel, dog walking, and other disturbing activities through the grassland is important.
4. **Maximize field size.** Atwood et al. (2017) describe the minimum optimal field size for breeding bobolinks is 10+ acres (4± hectares) Many grassland bird species will nest only in large fields. Visual openness is an important aspect of how such birds assess habitat size. Enlarge fields by reclaiming field edges. Mow encroaching woody growth during the off-season, taking care to control invasive species. Remove hedgerows and tree lines between fields to increase the functional size of available grassland habitat. Although row crops when grown next to a grassland contribute to the overall openness of a landscape, they do not provide habitat for grassland birds.

#### PROJECT AREA CONSTRUCTION PERIOD PROTECTION MEASURES

Because the overall Site is a working dairy farm, and the presence of two State-listed grassland birds within the hayfield is simply incidental (from the farmers perspective) to this land use, it is unrealistic to believe that the site-wide conservation measures will be implemented beyond the Project limits, which is the only area under control by the Project proponent. Therefore, the following *Rare Grassland Birds Protective Measures During Construction* should be followed to prevent incidental take of bobolink (*Dolichonyx oryzivorus*) and savannah sparrow (*Passerculus sandwichensis*) during construction.

Davison Environmental will serve as the Environmental Monitor for this project to ensure that protection measures during construction work are implemented properly. Davison Environmental will provide an education session for the Contractor prior to the start of construction activities on rare grassland bird species that may be encountered due to the project's location within and adjacent to potentially sensitive habitat. The Contractor shall contact Eric Davison, at least 5 business days prior to the start of any construction activities. Mr. Davison can be reached by phone at (860) 803-0938 or via email at [eric@davisonenvironmental.com](mailto:eric@davisonenvironmental.com).

It is of the utmost importance that the Contractor comply with the requirement for implementation of these protective measures and the education of its employees and subcontractors performing construction and maintenance work at the Project site.

1. To avoid impact to these rare grassland bird species, it is recommended that construction be performed outside of the sensitive breeding season (April 1 through August 30). However, if this is not possible,
2. If construction activities are planned during the active peak breeding season for rare grassland bird species (May 20 to August 20), grassland birds should be deterred from nesting within the Project limits by implementing the following measures:
  - a. the Project area should be mowed continuously twice per week starting on May 1<sup>st</sup> and continuing until construction begins.
  - b. Vegetation should not be allowed to exceed three inches in height during this period.
  - c. The twice per week mowing schedule should be maintained regardless of vegetation height (i.e., even if vegetation height remains below three inches), to serve as an additional deterrent to nest establishment.
  - d. Field surveys by the lead biologists (Eric Davison and Hunter Brawley) should occur during this mowing period and through the month of May until construction begins, to ensure that the measures are effectively deterring nest establishment. If these measures prove unsuccessful, remedial measures will be recommended.

For maintenance of the Facility once construction has been completed, mowing activities should be restricted as outlined below in *Site Management Protection Measures (Mowing)*.

#### SITE MANAGEMENT PROTECTION MEASURES (MOWING)

- a. The following measures are intended for implementation within the fenced solar-powered generation facility. The likelihood of nesting occurring within the fenced compound, and amongst the arrays themselves, is low. However, these birds may breed in the contiguous grassland habitat adjacent to the facility and therefore would be subject to secondary impacts such as noise or visual disturbance that may affect nesting. Additionally, there is the potential for adults and fledglings to feed within the fenced compound.
- b. Breeding Period: Provided below are the typical breeding periods in the State.

CT Bird Atlas Safe Dates	
Common Name	Approximate breeding period*
Bobolink	6-1 to 8-1
Savannah Sparrow	5-10 to 8-1
*dates based on "safe dates" provided in the CT Bird Atlas. Due to seasonal variations based on weather and biogeographical region, a two-week buffer period should be considered at both the start and end of the breeding season to be conservative	

- c. Breeding begins in early May, eggs incubate in June and July, and fledglings develop from July through August. Any mowing conducted during those periods has the potential to impact nests or developing nestlings or disturb nesting birds adjacent to the facility.
- d. Timing of Mowing/Vegetation Maintenance: If possible, mowing should be avoided from May 15th through August 15th to minimize impacts to nesting birds. For the benefit of birds as well as terrestrial wildlife, mowing conducted once per season is optimal, after October 15th when most species have entered fall/winter dormancy.
- e. Mowing Type/Method:
  1. Mower Speed: Mowing at slow speeds will allow animals to react and move out of the field.
  2. Mowing style: Avoid flail mower heads with guide bars that ride along the ground. Sickle bar mowers will have the least impact if mowing every 1-5 years.
  3. Mowing height: If mowing during the breeding season, retention of mowing stubble at a minimum height of 7 inches will reduce mortality and will leave important cover for wildlife.
  4. Directionality: If mowing during the breeding season is necessary, start mowing closest to the arrays and move outward toward the edge of the array field.
- f. Pre-Mowing Nest Surveys: If mowing outside of the nesting season is not possible, a pre-mowing inspection by an ornithologist is recommended to confirm that no nests are present within the mowing limits. That survey should

occur no more than one week prior to the start of mowing. Any activity by target species should be field flagged and/or conveyed to the contractor. If a nest site is observed within the mowing limits, no mowing should occur within 100 feet of the nest site until it is inactive and the fledglings are fully mobile.

## 8. REFERENCES

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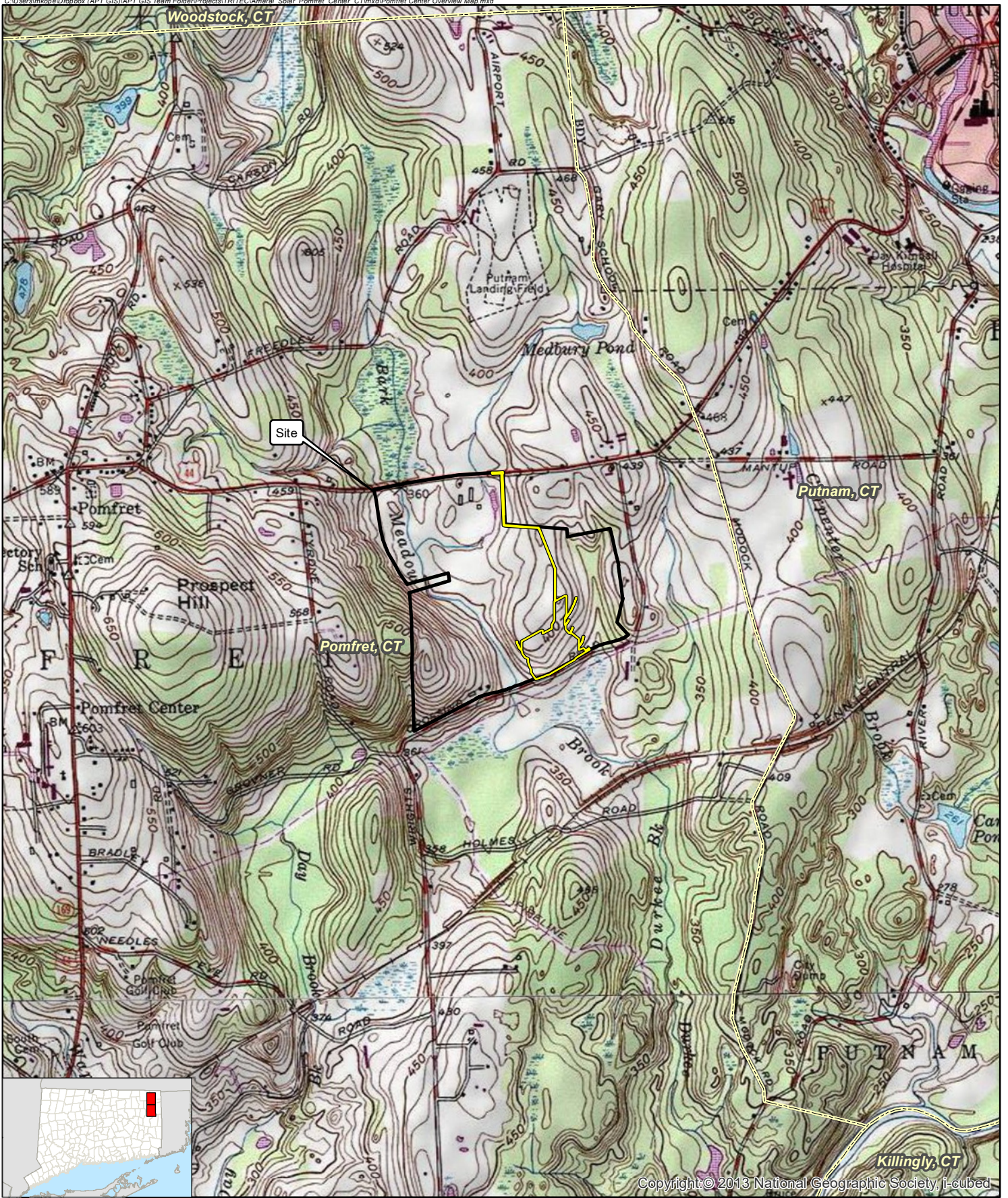
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## APPENDIX A: MAPPING

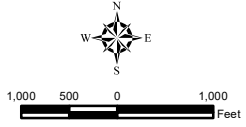




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- Legend**
- Project Area
  - Site
  - Municipal Boundary

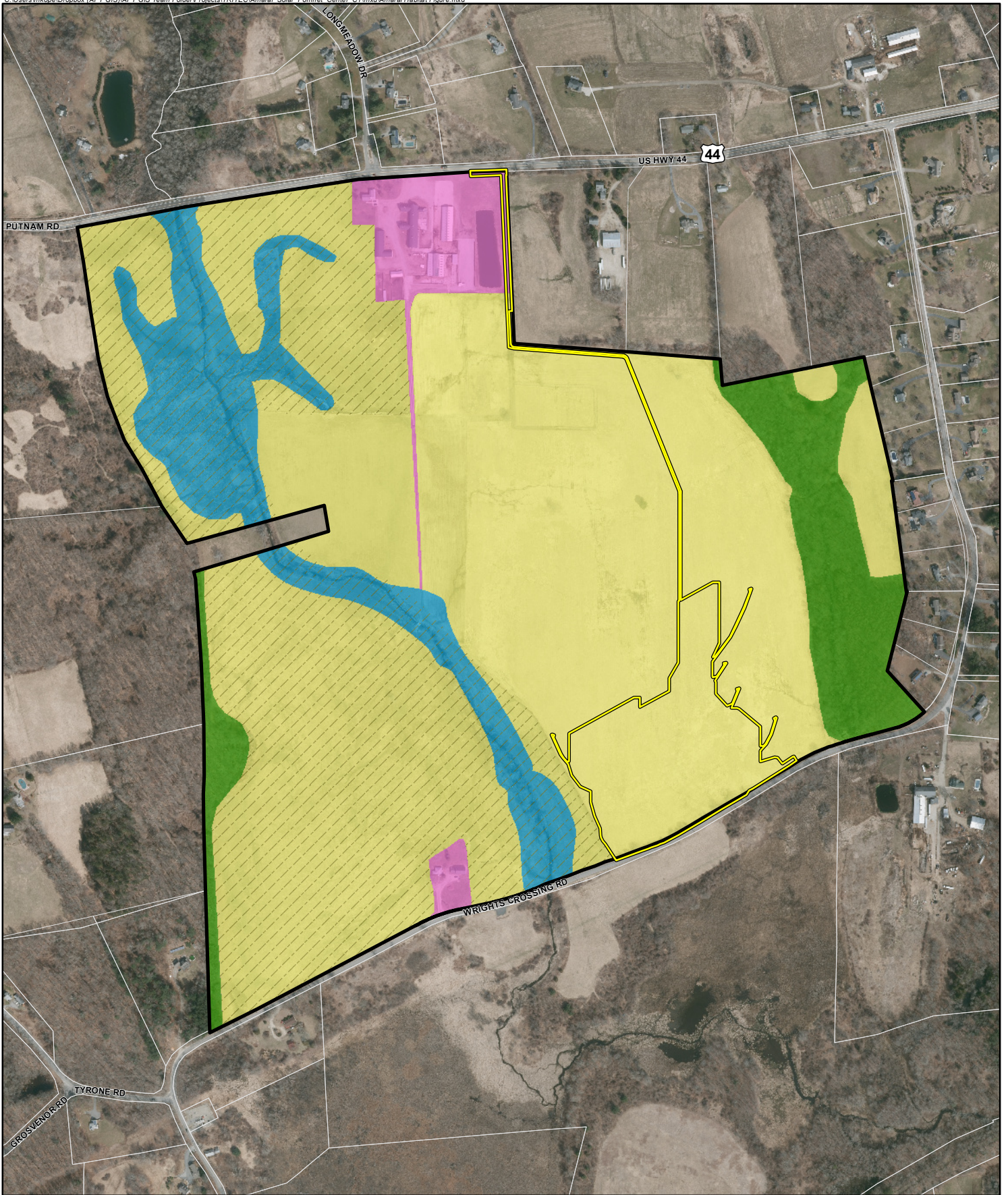
**Map Notes:**  
 Base Map Source: USGS 7.5 Minute Topographic  
 Quadrangle Maps, Danielson, CT (1970) and Putnam, CT (1970)  
 Map Scale: 1:24,000  
 Map Date: October 2021



### Overview Map

Proposed Solar Energy Facility  
 254 Putnam Road  
 Pomfret Center, Connecticut

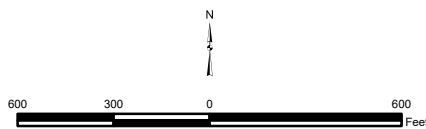




- Legend**
- Site
  - Project Area
  - Approximate Parcel Boundary

- Habitat Cover Type**
- Emergent/Scrub-Shrub Wetland
  - Wetland Forest
  - Hayfield
  - Pasture
  - Developed

Map Notes:  
 Base Map Source: 2019 Aerial Photograph (CTECO)  
 Map Scale: 1 inch = 600 feet  
 Map Date: August 2021



### Existing Site Habitat Map

Amaral Solar Facility  
 254 Putnam Road  
 Pomfret Center, Connecticut



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APPENDIX B: SITE PHOTOGRAPHS



Photo 1: Vista from the highest point on the property, looking north. Farmyard, main developed area, seen in the back right.



Photo 2: Vista from the highest point on the property, looking east across pastures and hayfields.



Photo 3: Northernmost portion of hayfield, recently mown. Photo taken from west side of Bark Meadow Brook, looking southeast.



Photo 4: Proposed Project Area. Photo taken from eastern edge looking west. Area a hayfield.



Photo 5: Proposed Project Area. Photo taken from western edge looking east. Note hayfield edge with higher species diversity, including goldenrods, queen anne's lace, and invasive reed canary grass.



Photo 6: Wetlands in pasture.



Photo 7: Wetland seepage in pasture near Bark Meadow Brook.



Photo 8: Shrub-herbaceous corridor of Bark Meadow Brook. Photo taken looking east.



Photo 9: Shrub-herbaceous corridor of Bark Meadow Brook. Photo taken looking north.



Photo 10: Wooded wetland area on western edge of property.





Photo 11: Herbaceous wetland area at edge of western woods.



Photo 12: Western wooded wetland with barberry dominated understory and red maple canopy. Photo taken looking south.



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APPENDIX C: SPECIES LIST, DUCK POND MARSH PRESERVE

## eBird Field Checklist

### Wyndham Land Trust--Duck Marsh Preserve

Windham, Connecticut, US

[ebird.org/hotspot/L6812273](https://ebird.org/hotspot/L6812273)

143 species (+12 other taxa) - Year-round, All years

Date: \_\_\_\_\_  
Start time: \_\_\_\_\_  
Duration: \_\_\_\_\_  
Distance: \_\_\_\_\_  
Party size: \_\_\_\_\_  
Notes:

This checklist is generated with data from eBird (ebird.org), a global database of bird sightings from birders like you. If you enjoy this checklist, please consider contributing your sightings to eBird. It is 100% free to take part, and your observations will help support birders, researchers, and conservationists worldwide.

Go to [ebird.org](https://ebird.org) to learn more!

#### Waterfowl

- Snow Goose
- Canada Goose
- Cackling/Canada Goose
- Wood Duck
- Mallard
- American Black Duck
- Northern Pintail
- Green-winged Teal
- Hooded Merganser
- Common Merganser
- duck sp.

#### Grouse, Quail, and Allies

- Wild Turkey
- Ring-necked Pheasant

#### Pigeons and Doves

- Rock Pigeon
- Mourning Dove

#### Cuckoos

- Black-billed Cuckoo

#### Swifts

- Chimney Swift

#### Hummingbirds

- Ruby-throated Hummingbird

#### Rails, Gallinules, and Allies

- Virginia Rail
- Sora

#### Shorebirds

- Semipalmated Plover
- Killdeer

- Dunlin
- Least Sandpiper
- American Woodcock
- Wilson's Snipe
- Spotted Sandpiper
- Solitary Sandpiper
- Greater Yellowlegs
- Lesser Yellowlegs

#### Gulls, Terns, and Skimmers

- Ring-billed Gull
- Herring Gull
- gull sp.

#### Cormorants and Anhingas

- Double-crested Cormorant

#### Hérons, Ibis, and Allies

- Great Blue Heron
- Green Heron
- Glossy Ibis

#### Vultures, Hawks, and Allies

- Black Vulture
- Turkey Vulture
- Osprey
- Northern Harrier
- Sharp-shinned Hawk
- Cooper's Hawk
- Bald Eagle
- Red-shouldered Hawk
- Broad-winged Hawk
- Red-tailed Hawk
- Rough-legged Hawk

**Owls**

- Great Horned Owl
- Barred Owl
- Long-eared Owl
- Short-eared Owl
- Long-eared/Short-eared Owl
- owl sp.

**Kingfishers**

- Belted Kingfisher

**Woodpeckers**

- Yellow-bellied Sapsucker
- Red-bellied Woodpecker
- Downy Woodpecker
- Hairy Woodpecker
- Pileated Woodpecker
- Northern Flicker
- woodpecker sp.

**Falcons and Caracaras**

- American Kestrel
- Peregrine Falcon

**Tyrant Flycatchers: Pewees, Kingbirds, and Allies**

- Eastern Wood-Pewee
- Alder Flycatcher
- Willow Flycatcher
- Least Flycatcher
- Empidonax sp.
- Eastern Phoebe
- Great Crested Flycatcher
- Eastern Kingbird

**Vireos**

- White-eyed Vireo
- Yellow-throated Vireo
- Warbling Vireo
- Red-eyed Vireo

**Shrikes**

- Northern Shrike

**Jays, Magpies, Crows, and Ravens**

- Blue Jay
- American Crow
- Common Raven

**Tits, Chickadees, and Titmice**

- Black-capped Chickadee
- Tufted Titmouse

**Larks**

- Horned Lark

**Martins and Swallows**

- Northern Rough-winged Swallow
- Tree Swallow
- Bank Swallow
- Barn Swallow
- swallow sp.

**Kinglets**

- Ruby-crowned Kinglet

**Nuthatches**

- White-breasted Nuthatch

**Gnatcatchers**

- Blue-gray Gnatcatcher

**Wrens**

- House Wren

- Winter Wren
- Sedge Wren
- Marsh Wren
- Carolina Wren

**Starlings and Mynas**

- European Starling

**Catbirds, Mockingbirds, and Thrashers**

- Gray Catbird
- Brown Thrasher
- Northern Mockingbird

**Thrushes**

- Eastern Bluebird
- Veery
- Hermit Thrush
- Wood Thrush
- American Robin

**Waxwings**

- Cedar Waxwing

**Old World Sparrows**

- House Sparrow

**Wagtails and Pipits**

- American Pipit

**Finches, Euphonias, and Allies**

- House Finch
- Purple Finch
- American Goldfinch

**Longspurs and Snow Buntings**

- Snow Bunting

**New World Sparrows**

- Grasshopper Sparrow

This field checklist was generated using eBird (ebird.org)

- Chipping Sparrow
- Field Sparrow
- American Tree Sparrow
- Dark-eyed Junco
- White-crowned Sparrow
- White-throated Sparrow
- Vesper Sparrow
- Savannah Sparrow
- Song Sparrow
- Lincoln's Sparrow
- Swamp Sparrow
- Eastern Towhee
- sparrow sp.

**Blackbirds**

- Bobolink
- Eastern Meadowlark
- Orchard Oriole
- Baltimore Oriole
- Red-winged Blackbird
- Brown-headed Cowbird
- Rusty Blackbird
- Common Grackle
- blackbird sp.

**Wood-Warblers**

- Ovenbird
- Louisiana Waterthrush
- Blue-winged Warbler
- Black-and-white Warbler
- Orange-crowned Warbler
- Common Yellowthroat

- American Redstart
- Yellow Warbler
- Chestnut-sided Warbler
- Blackpoll Warbler
- Palm Warbler
- Pine Warbler
- Yellow-rumped Warbler
- Prairie Warbler
- warbler sp. (Parulidae sp.)

**Cardinals, Grosbeaks, and Allies**

- Scarlet Tanager
- Northern Cardinal
- Rose-breasted Grosbeak
- Indigo Bunting

**Others**

- passerine sp.

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