



## Preliminary Habitat Assessment

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To: LSE Phoenix LLC  
40 Tower Lane - Suite 201  
Avon, CT 06001  
Attn: Carrie Ortolano

Date: May 27, 2020

Re: NDDDB Preliminary Assessment No.: 201913244  
100 Sand Road  
North Canaan, Connecticut

Dear Ms. Ortolano:

This letter summarizes the results of our initial habitat assessment completed at the referenced property (or "Site") in response to the Connecticut Department of Energy and Environmental Protection ("DEEP") Natural Diversity Data Base ("NDDDB") Program review letter dated February 26, 2020 ("determination letter"; NDDDB Preliminary Assessment No.: 201913244, attached to this report). In its letter, the DEEP provided a list of state-listed species known to occur within or close to the boundaries of this property. This species list included 21 vascular plants, three (3) invertebrates, five (5) vertebrates, and four (4) critical habitat communities that support state-listed plant species (including one terrestrial and three [3] freshwater communities). To prevent impacts to these resources, the DEEP recommended field surveys of the Site be performed by qualified biologists.

The field assessments were conducted by Eric Davison, James Cowen and Dennis Quinn. Work conducted consisted of a multiple-day site evaluation to search for suitable habitat to support the relevant species noted in the DEEP determination letter, and where possible the species themselves.

### **Preliminary Assessment for State-Listed Plant Communities and Species**

Botanist James Cowen conducted a preliminary botanical survey on May 12, 2020. None of the four (4) plant communities identified in the NDDDB determination letter are present on the Site; these include: (1) Circumneutral Maple/Ash Basin Swamp; (2) Circumneutral Northern White Cedar Basin Swamp; and (3) Floodplain Forest; and (4) Rich Fen.<sup>1</sup> However, the single wetland on the Site consists of a hillside groundwater slope wetland with some early-successional cover and calcareous soils. Therefore, there is potential for rare plant species associated with another fen type, the circumneutral spring fen.

The 21 state-listed plant species identified in the determination letter are comprised largely of herbaceous species, including a number of grasses and sedges, along with two tree species (Red Pine and Northern White Cedar, neither of which were observed on the Site). Suitable habitat

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<sup>1</sup> According to the CT ECO Critical Habitat Resource Guide, Rich Fen habitat is defined as "Natural peatlands occupying topographically defined basins; influenced by base-rich waters; on deep, poorly decomposed peats; restricted to the western marble valleys. Subtypes include sedge, shrub thicket, dwarf shrub, woodland, phragmites, and other/unique."

was found on the Site for several of the noted state-listed species. The eastern slope consists of rich woods with rock outcrops which represents suitable habitat for the mountain spleenwort, wallrue spleenwort and goldie's fern. Species of both of these genus' (*Asplenium* and *Dryopteris*) were present in these areas, but it was too early in the season to key them out to species. Additional surveys within this rich wood's habitat are required to key these observed plants down to the species level.

Six (6) of the noted state-listed species are in the genus *Carex*. During the Site survey, we noted six (6) or more *Carex* species present across the Site, including both wetland and upland species that could represent the noted state-listed species. Again, it was too early in the season to key them out to the species level. Additional surveys are recommended within both the woodland and wetlands and the drainage areas on the northern low slope.

Several of the species identified by DEEP include woodland grasses. Two (2) or more early season woodland grasses were noted on the Site. Additional surveys later during the mid-summer season are necessary to confirm species.

Sweet coltsfoot (*Petasites frigidus*) has a similar flower to the common invasive coltsfoot (*Tussilago farfara*) which is found extensively throughout the Site. Sweet coltsfoot is distinguished by its leaf which emerges later in the season, after flowering has completed. Additional surveys of these plant areas are needed to determine if sweet coltsfoot is present.

### **Preliminary Assessment for State-Listed Vertebrate Animals**

On April 28<sup>th</sup> 2020, Dennis Quinn performed a habitat assessment for the state-listed special concern blue-spotted salamander complex (*Ambystoma laterale x jeffersonianum*), northern leopard frog (*Rana pipiens*), smooth green snake (*Opheodrys vernalis*) and state-listed endangered timber rattlesnake (*Crotalus horridus*). A summary of these species is provided below.

#### **Blue-spotted Salamander complex (*Ambystoma laterale x jeffersonianum*)**

There are only three (3) known locations for the blue-spotted salamander complex, all in extreme western Connecticut (Ridgefield, Danbury/New Fairfield, and Salisbury) and in large swamp systems atop glacial till.

Blue-spotted complex salamanders occur in riparian wetland systems, where they can be found in a wide variety of wetland habitats including emergent and scrub-shrub, but favor primarily forested wetlands (i.e., red maple swamps). Their wetland hydrology varies from seasonally-flooded vernal pools to semi-permanently flooded riparian wetlands.

Where they occur in the same area (i.e., sympatrically) as Jefferson salamanders, the blue-spotted complex salamander is found in the lower-lying forested wetlands, with the Jefferson salamanders inhabiting the adjacent higher elevation forests. Unlike the Jefferson salamander, the blue-spotted salamander exhibits a greater tolerance for disturbed habitats because its life cycle is largely confined to riparian wetlands, including seasonally inundated forests, that often receive greater regulatory protection than upland forests.

All Connecticut populations of blue-spotted salamanders (except the pure-diploid populations in other locations in CT) exhibit some genetic contribution from the closely-allied Jefferson salamander. The blue-spotted salamander complex is listed as special concern species and

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designated as very important in Connecticut's Wildlife Action Plan for Species of Greatest Conservation Need.

Northern Leopard Frog (*Rana pipiens*)

The northern leopard frog is found in low elevation, open, grassy wetlands and floodplain forests primarily adjacent to riparian systems within the Connecticut and Housatonic river drainage basins. Populations also occur within extensive wetland habitats associated with large, naturally occurring lakes in the highlands of Litchfield County.

Northern leopard frogs typically breed in seasonally-flooded early-successional wetlands including marshes and shrub swamps. These agile frogs are well-known for moving across the landscape, and during the summer months they are frequently observed in fields, lawns and other grassland habitats as well as floodplain forests adjacent to breeding wetlands. The northern leopard frog is listed as special concern and designated as very important in Connecticut's Wildlife Action Plan for Species of Greatest Conservation Need.

Smooth Green Snake (*Opheodrys vernalis*)

The smooth green snake is found statewide in widely scattered populations, although records from western Connecticut are scarce. Smooth green snakes are inhabitants of early-successional habitats ranging from old fields and grasslands to mountaintop glades, and they are often found along the edges of early-successional wetlands. Due to their cryptic coloration and secretive nature, smooth green snakes may be more widely distributed than records indicate.

Along with other "grassland dependent" species, as reforestation and development have replaced agricultural land in Connecticut and throughout the northeast, smooth green snake populations are likely under-going a regional decline. As insectivores, smooth green snakes are also highly susceptible to pesticide applications which may have historically impacted their populations. The smooth green snake is listed as special concern and designated as important in Connecticut's Wildlife Action Plan for Species of Greatest Conservation Need.

Timber Rattlesnake (*Crotalus horridus*)

The current distribution and strong-hold of the timber rattlesnake in the state is restricted to a small number of populations located in northwestern Connecticut and the uplands east of the Connecticut River in central Connecticut. A small number of geographically isolated sites, often represented by records for only one or two individuals, are widely scattered throughout the state. Timber rattlesnakes favor remote mountainous terrain characterized by steep ledges and associated rock slides. Deciduous and mixed deciduous forest dominate rattlesnake habitat. While gravid, females congregate in sparsely vegetated open canopy ledges strewn with large rock slabs. Over-wintering occurs at communal den sites, typically located in steep forested ledges.

As a long-lived reptile with delayed sexual maturity and low fecundity, the timber rattlesnake is highly vulnerable to long-term population declines resulting from adult mortality, both from collection at the den sites, and through road mortality, as males of this species move several miles from the den sites. The timber rattlesnake is listed as endangered and designated as most important in Connecticut's Wildlife Action Plan for Species of Greatest Conservation Need.

## Results of Preliminary Assessment for State-Listed Vertebrate Animals

Although DEEP records indicate proximity to known blue-spotted salamander, northern leopard frog and timber rattlesnake populations, no suitable habitat for these species occurs on the Site.

With respect to the blue-spotted salamander and the northern leopard frog, both species require seasonally flooded wetlands for breeding, and no such wetlands occur on the Site. With respect to the timber rattlesnake, while the species is known to occur in the region, there is no direct connectivity to the forest block in which known denning sites occur. Known denning sites occur some distance away, with numerous fragmentary landscape features (roads, waterways) lying between, making use of the Site highly unlikely.

Therefore, no impacts to these species or their known extant populations are anticipated. No further surveys or species protection measures are recommended for these 3 species.

The Site does contain suitable habitat for the **smooth green snake** within the early-successional habitats and associated transition zones, as well as the onsite wetland. The extensive stone walls, downed trees and brush piles present represent areas of suitable cover for this species.

Due to the cryptic nature and difficulties in encountering this species during targeting surveys, it is recommended that this species is assumed present and appropriate protection measures be developed to reduce impacts to individual snakes and their habitat.

We believe that a suitable species protection and habitat mitigation plan can be developed that would be acceptable to the NDDB. This plan would be implemented prior to and during construction to minimize impacts to green snakes and their habitat. The following measures outline the basis of that protection program and habitat mitigation plan:

### General Recommendations to Guide the Development of Detailed Protection Measures

1. Construction is recommended during the green snake active season (approximately May through November) to avoid mortality of hibernating snakes.
2. Snake Capture and Removal Protocols Prior to Construction
  - a. Prior to construction, enclose the construction limits of disturbance ("LOD") with exclusion fencing, such as geotextile silt fencing (3-ft minimum height).
  - b. Exclusion fencing to remain in place during construction.
  - c. Install cover boards (1/2 sheet of plywood, or comparable) along the interior of the silt fencing, as well as in select locations within the LOD near key habitat features (e.g., debris piles, stone walls) for monitoring and removal of snakes prior to any earthwork or construction activities. Allow 2 to 3 weeks for cover board installation and monitoring.
  - d. Have a herpetologist onsite to monitor the removal/grading of certain anthropogenic cover features, in order to search for snakes.
3. Creation of anthropogenic cover features post-construction within the solar installation.
4. Development of a planting plan within the areas required for tree clearing to provide suitable habitat for smooth greensnakes around the perimeter of the solar installation, consisting of early-succesional meadow and shrubland habitat.

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5. Development of a long-term habitat maintenance plan including seasonal mowing restrictions. This should include measures to control/manage invasive plant species.

### **Habitat Assessment for the Alder Flycatcher (*Empidonax alnorum*)**

Eric Davison assessed the habitat for alder flycatcher on May 14, 2020. No alder flycatcher were observed; however the timing of the survey was conducted prior to the primary breeding season which occurs from early June to early August. All bird species observed during the field visit were recorded. The species observed were largely migratory species utilizing the Site as stopover habitat en route to breeding grounds.

The alder flycatcher is a bird of wet thickets. The species inhabits shrubby wetlands near forested areas. Most commonly it nests within early-successional habitats with 3 to 8 years growth after clearing. Studies conducted in Michigan showed that the species is found in brush and shrubby wetlands, at the edges of woods, and in damp thickets of alder-buckthorn; as well as within hardwood (sugar [*Acer saccharum*] and red [*A. rubrum*] maple, paper (*Betula papyrifera*) and yellow (*B. allegheniensis*) birch forests, when shrub stem density and shrub foliage cover peak. Studies in Ontario showed that the species prefers damp fields and meadows, usually fairly open but sometimes overgrown with willow (*Salix* spp.) and alder, dogwood (*Cornus* spp.), cedar (*Juniperus* spp.), tamarack (*Larix laricina*), spruce (*Picea* spp.), poplar (*Populus* spp.), birch (*Betula* spp.), hawthorn (*Crataegus* spp.), elm (*Ulmus* spp.), hazelnut (*Corylus* spp.), and maple (*Acer* spp.).<sup>2</sup>

Nesting habitat as described in the Atlas of Breeding Birds of Connecticut (1994) consists of low shrub and tree vegetation in the vicinity of streams and other open water. The nest is placed less than three (3) feet off the ground in thickets of hawthorn, spirea, buttonbush or alder. The primary breeding area is the northwest corner of the state.

Because this species is associated with wetlands, the focus of the assessment was the single wetland located on the Site. This wetland is predominately forested but does include a small area of early-successional wet meadow and scrub-shrub cover. The hydrology does not fit the characteristics of a wetland suitable for this species (i.e., comprised of a low-lying basin with standing or flowing water). The Site wetland consists of a hillside groundwater slope wetland that, due to the steep slopes, has merely a saturated hydrology with no standing or flowing water (other than groundwater seepage). These conditions clearly represent sub-optimal breeding habitat for the Alder Flycatcher.

Although the habitat is considered sub-optimal, the presence of this species cannot be definitively rule out without detailed surveys. Moreover, the presence of early-successional habitat, including open-canopy wetland areas, promotes the appearance of suitable habitat. Therefore, we cannot be certain that DEEP review of Site conditions would not prompt questions regarding the possibility of the species' presence, however marginal the habitat characteristics.

Because additional surveys are necessary in order to rule-out several of the noted state-listed plants, it would be prudent to conduct breeding season bird surveys in concert with plant surveys

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<sup>2</sup> Lowther, P. E. (2020). Alder Flycatcher (*Empidonax alnorum*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.aldfly.01>

from late May through early July. Otherwise, we run the risk that a critical review by DEEP might question the lack of such a survey during the same time period in which plant surveys were being conducted by our Project biologists.

## **Conclusions and Recommendations**

An inspection of the Site was completed in response to NDDB Preliminary Assessment No.: 201913244. Although the field results indicate that some of the listed species identified by DEEP are not present, several species could not be accurately surveyed due to the time of year. In addition, a few species and a habitat require additional field surveys to definitively confirm/deny presence. Finally, one species is assumed to use the Site (green snake).

The following recommendations are provided.

### Additional Plant Surveys

In summary, habitat and specimens representing a number of the state-listed species noted were observed on the Site, including those of the genus' *Carex*, *Asplenium*, *Dryopteris*, and *Petasites*. In order to confirm/deny the presence of these noted species, additional surveys on the Site are required between late May and early September.

### State Listed Vertebrate Animals

No further surveys or species protection measures are recommended for three (3) of the listed species. The Site was found to contain suitable habitat for the smooth green snake. Although no specimens were identified, we recommend green snake be assumed present and appropriate protection measures be developed to reduce impacts to individual snakes and their habitat.

### Alder Flycatcher Surveys

Because additional surveys are necessary in order to rule-out several of the noted state-listed plants, it would be prudent to conduct breeding season bird surveys in concert with plant surveys from late May through early July to determine the presence/absence of alder flycatcher at the Site.

Thank you for the opportunity to provide these services. Please let us know if you have any questions.

Yours Truly,  
ALL-POINTS TECHNOLOGY CORP., P.C.



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Michael Libertine  
Director of Siting and Permitting

Attachment

# **ATTACHMENT**



Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

February 26, 2020

Mr. Dean Gustafson  
All-Points Technology Corporation, P.C.  
3 Saddlebrook Drive  
Killingworth, CT 06419  
[dgustafson@allpointstech.com](mailto:dgustafson@allpointstech.com)

Project: Preliminary Assessment for Lodestar Energy, LLC North Canaan Solar Facility Located at 100 Sand Road in North Canaan, Connecticut  
NDDDB Preliminary Assessment No.: 201913244

Dear Dean Gustafson,

I have reviewed Natural Diversity Database maps and files regarding the area delineated on the map provided for Lodestar Energy, LLC North Canaan Solar Facility Located at 100 Sand Road in North Canaan, Connecticut.

According to our records there are known extant populations of State Listed Species that occur within or close to the boundaries of this property. I have attached a list of species known from this area. Please be advised that this is a preliminary review and not a final determination. A more detailed review will be necessary to move forward with any environmental permit applications submitted to DEEP for the proposed project. **This preliminary assessment letter cannot be used or submitted with permit applications at DEEP.** This letter is valid for one year.

To prevent impacts to State-listed species, field surveys of the site should be performed by a qualified biologist with the appropriate scientific collecting permits at a time when these target species are identifiable. A report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs.
3. List of component vascular plant and animal species within the survey area (including scientific binomials).
4. Data regarding population numbers and/or area occupied by State-listed species. Include special plant and/or animal forms found at:  
[https://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&deepNav\\_GID=1628](https://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&deepNav_GID=1628)
5. Detailed maps of the area surveyed including the survey route and locations of State listed species.
6. Conservation strategies or protection plans that indicate how impacts may be avoided for all state listed species present on the site.
7. Statement/résumé indicating the biologist's qualifications. Please be sure when you hire a consulting qualified biologist to help conduct this site survey that they have the proper experience with target taxon and have a CT scientific collectors permit to work with state listed species for this specific project.

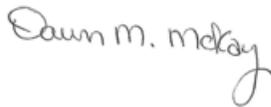
The site surveys report should be sent to our CT DEEP-NDDDB Program ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) for further review by our program biologists **along with an updated request** for another NDDDB review. Incomplete reports may not be accepted.

If you do not intend to do site surveys to determine the presence or absence of state-listed species, then you should presume species are present and let us know how you will protect the state-listed species from being impacted by this project. You may submit these best management practices or protection plans with your new request for an NDDDB review. After reviewing your new NDDDB request form and the documents describing how you will protect this species from project impacts we will make a final determination and provide you with a letter from our program to use with DEEP-Permits.

Natural Diversity Database information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey, cooperating units of DEEP, landowners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDDB should not be substitutes for onsite surveys necessary for a thorough environmental impact assessment. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits.

Please contact me if you have further questions at (860) 424-3592, or [deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)  
Thank you for consulting the Natural Diversity Data Base.

Sincerely,

A handwritten signature in cursive script that reads "Dawn M. McKay".

Dawn M. McKay  
Environmental Analyst 3

# Species List for NDDB Request

Scientific Name	Common Name	State Status
<b>Freshwater Community - Other Classification</b>		
Circumneutral maple/ash basin swamp		
Circumneutral northern white cedar basin swamp		
Rich fen		
<b>Invertebrate Animal</b>		
Bombus terricola	Yellow-banded bumble bee	T
Hemaris gracilis	Slender clearwing	T
Sympistis dentata	Toothed apharetra moth	T
<b>Terrestrial Community - Other Classification</b>		
Floodplain forest		
<b>Vascular Plant</b>		
Alopecurus aequalis	Short-awned meadow foxtail	T
Asplenium montanum	Mountain spleenwort	SC
Asplenium ruta-muraria	Wallrue spleenwort	T
Cardamine douglassii	Purple cress	SC
Carex alopecoidea	Foxtail sedge	T
Carex aquatilis ssp. altior	Water sedge	SC
Carex backii	Back's sedge	E
Carex castanea	Chestnut-colored sedge	E
Carex cumulata	Clustered sedge	T
Carex oligocarpa	Eastern few-fruit sedge	SC
Coeloglossum viride	Long-bracted green orchid	E
Desmodium cuspidatum	Large-bracted tick-trefoil	E
Dryopteris goldiana	Goldie's fern	SC
Maianthemum trifolium	Three-leaved false Solomon's-seal	T

E = Endangered, T = Threatened, SC = Special Concern, \* Extirpated

<b>Scientific Name</b>	<b>Common Name</b>	<b>State Status</b>
<i>Petasites frigidus</i> var. <i>palmaris</i>	Sweet coltsfoot	T
<i>Pinus resinosa</i>	Red pine	E
<i>Schizachne purpurascens</i>	Purple oat	SC
<i>Sibbaldiopsis tridentata</i>	Three-toothed cinquefoil	T
<i>Thuja occidentalis</i>	Northern white cedar	T
<i>Trisetum spicatum</i>	Narrow false oats	E
<i>Uvularia grandiflora</i>	Large-flowered bellwort	E

#### Vertebrate Animal

<i>Ambystoma laterale</i>	Blue-spotted salamander	E/SC
<i>Crotalus horridus</i>	Timber rattlesnake	E
<i>Empidonax alnorum</i>	Alder flycatcher	SC
<i>Opheodrys vernalis</i>	Smooth green snake	SC
<i>Rana pipiens</i>	Northern leopard frog	SC